COUNTY OF MONTEREY

PUBLIC WORKS, FACILITIES & PARKS

VOLUME TWO OF TWO

PROJECT MANUAL

65650 BRADLEY ROAD – NEW BRADLEY LIBRARY & RESILIENCY CENTER
PROJECT NO. 8821
BID NO. 10966

DIRECTORY

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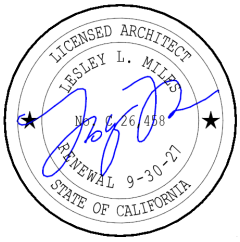








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Division 01:
General Requirements

SECTION 011000 - SUMMARY OF WORK

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. This Section includes summary of work including:

1. Work covered by Contract Documents including but not limited to:

a. New Bradley Branch Library and Resiliency Center Building including, but not limited to:

1. Concrete slab foundation.

2. Pre-fab metal building and exterior canopy including all associated structural steel framing, and storefront windows and doors.

3. Interior work to include, but limited to, interior partitions, glazing, wood and doors, suspended acoustical and gypsum board ceilings; interior finishes including luxury vinyl tile, resilient flooring, painting, residential kitchen equipment, mechanical, plumbing and electrical systems, lighting, connection to existing utilities.

4. Resiliency features including solar & batteries and generator backup to both the building and the existing school well pump.

b. Site Work:

1. Grading

2. New parking lot to include, but limited to, pervious and asphalt paving, parking striping and signage, site lighting.

3. New utility yard including concrete paving, fencing, underground utilities.

4. New irrigation backflow with irrigation and landscape planting.

5. Limited construction of street pavement and pavement markings.

c. Design-Build Requirements:

1. *Base Bid:* Metal Building Design & Installation. See spec section 133419 – Metal Building Systems and Construction Drawings for scope requirements. The design and procurement process for the pre-fab building will have an impact on overall construction schedule. Fabrication & /procurement should align with the anticipated installation schedule.

2. Base Bid: Fire Alarm. See electrical drawings for scope requirements.

3. Alternate Bid #1: Includes cost for a well water filtration system design and installation for the School and County Library, as described in the drawings.

4. Alternate Bid #2: Includes cost for solar panel design and installation, as described in the drawings.

5. Alternate Bid #3: Includes cost for a net zero battery backup including integration with solar panel system design and installation, as described in the drawings

6. Alternate Bid #4: Includes cost to remove petromat/water proofing membrane if found under existing asphalt that is to be removed, as described in drawings.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. Unless provided otherwise in the Contract Documents, all risk of loss to Work covered by Contract Documents shall rest with Contractor until Final Completion and Acceptance of the Work.

1.4 BID ITEMS

A. Any bid item may be deleted in total or in part prior to or after award of Contract without compensation in any form or adjustment of other bid items or prices therefore.

1. Contractor must coordinate related work and modify surrounding work as required to complete Work, including changes under each Alternate designated in the contract documents.

B. Alternate Bid #1: Includes cost for a well water filtration system design and installation for the School and County Library, as described in the drawings.

C. Alternate Bid #2: Includes cost for solar panel design and installation, as described in the drawings.

D. Alternate Bid #3: Includes cost for a net zero battery backup including integration with solar panel system design and installation, as described in the drawings

E. Alternate Bid #4: Includes cost to remove petromat/water proofing membrane if found under existing asphalt that is to be removed, as described in drawings.

1.5 WORK SEQUENCE

A. Construct work in stages and at times to accommodate school operation requirements during the construction period.

1. All work on school property to occur when students are not present as part of contractor responsibility.

2. Prior to commencing any construction activities on school property, Contractor shall coordinate with County and School Staff. Coordination shall include notification of work limits, anticipated duration of closure, and the methods used to secure the area.

B. Work Summary

1. Set up contractor staging area

2. Construction shall begin with all site work, including grading and paving and construction of the pre-fab metal building.

3. Construction of the remaining interior improvement shall conform with the schedule. It is the responsibility of the Contractor to ensure that all work is completed within the given timeline.

4. Contractor shall implement appropriate safety measure for any active work areas located on the School's property. Safety precautions shall include, but not limited to, temporary secure construction fencing, trench plates, barricades, delineators, protection or safe-offs around excavation and hazards, warning signage, and other measures necessary to protect, students, staff, and the public.

   All protective measures shall comply with applicable safety regulations and shall remain in place until the area is restored to a safe condition or work is complete. The Contractor shall ensure that all work areas are secured and made safe during non-working hours and whenever the site is accessible to school occupants or the public.

C. Total Project Duration: 271-days

1.6 COOPERATION OF CONTRACTOR AND COORDINATION WITH OTHER WORK

A. Should construction work, or work of any other nature, be under way by other forces or by other contractors within or adjacent to the limits of the Work, the Contractor shall cooperate with all such other contractors or forces to the end that any delay or hindrance to their work will be avoided. The cost of such cooperation will be considered as included in the bid amount and no direct or additional payment will be made therefore.

B. The County of Monterey reserves the right to perform other or additional work, within or adjacent to the limits of the work specified, at any time by the use of other forces. The Contractor shall coordinate with the County of Monterey and any forces, or other forces, engaged by the County of Monterey, as required by the Contract General Conditions. In the event that the performance of such other or additional work materially increases or decreases the Contractor's costs, the work and the amount to be paid therefore will be appropriately adjusted as determined by the Architect.

C. Limit use of premises for Work and for construction operations to allow for:

1. Operation.

2. Work by other contractors and tenants.

D. Coordinate use of premises and access to site with other contractors, utilities, tenants, and forces, as required by the Contract General Conditions. Architect has final authority over coordination, use of premises, and access to site.

E. Cooperate with contractors for other area work, not included in Contract, but which may take place during construction period.

F. Cooperate with students, teachers, administrators, maintenance, bus yard staff and others who may occupy the school site prior to completion of Work of this Contract.

1.7 MAINTENANCE

A. Cost of maintenance of systems and equipment prior to Final Acceptance will be considered as included in prices bid and no direct or additional payment will be made therefore.

1.8 OCCUPANCY REQUIREMENTS

A. Whenever, in the opinion of Architect, Work or any part thereof is in a condition suitable for use, and the best interest of requires such use, may take beneficial occupancy of and connect to, open for public use, or use the Work or such part thereof. In such case, will request Architect to inspect the Work or part thereof, and issue a Certificate of Substantial Completion for that part of Work.

B. Prior to date of Final Acceptance of the Work by all necessary repairs or renewals in Work or part thereof so used, not due to ordinary wear and tear, but due to defective materials or workmanship or to operations of Contractor, shall be made at expense of Contractor.

C. Use of Work or part thereof as contemplated by this Section shall in no case be construed as constituting acceptance of Work or any part thereof. Such use shall neither relieve Contractor of any responsibilities under Contract, nor act as waiver by of any of the conditions thereof.

2.0 PRODUCTS

2.1 REFERENCE STANDARDS

A. For products specified by association or trade standards, comply with requirements of standard, except where more rigid requirements are specified or are required by applicable codes.

3.0 EXECUTION

A. Not applicable to this Section.

END OF SECTION

SECTION 012100 – PROJECT CONTROL SYSTEM

1.0 GENERAL

1.1 WEB DATABASE

A. The County of Monterey will use and maintain a web-based database as the primary means of communication related to the Project's correspondence, submittals, requests for information (RFIs), advisory notices, and non-compliance issues. Correspondence from the Contractor shall be sent to the Construction Manager via the PROCORE System.

B. The Construction Manager and Contractor shall utilize PROCORE's system for electronic submittal of all data and documents (unless specified otherwise by the Construction Manager) throughout the duration of the Contract. PROCORE is a web-based electronic media site that is hosted by PROCORE LLC utilizing their PROCORE web solution. PROCORE will be made available to the Contractor's project personnel. The joint use of this system is to facilitate electronic exchange of information, automation of key processes, and overall management of the Contract. PROCORE shall be the primary means of project information submission and management. When required by the Construction Manager, paper documents will also be required. In the event of discrepancy between the electronic version and paper documents, the paper documents will govern. PROCORE is a registered trademark of PROCORE LLC.

1.2 USER ACCESS LIMITATIONS

A. The Construction Manager will control the Contractor's access to PROCORE by allowing access and assigning user profiles to accepted Contractor personnel. User profiles will define levels of access into the system, determine assigned function-based authorizations (determines what can be seen) and user privileges (determines what they can do).

1.3 AUTOMATED SYSTEM NOTIFICATION AND AUDIT LOG TRACKING

A. Review comments made (or lack thereof) by the Construction Manager and Design Consultant on Contractor submitted documentation shall not relieve the Contractor from compliance with requirements of the Contract Documents. The Contractor is responsible for managing, tracking, and documenting the Work to comply with the requirements of the Contract Documents. Neither automated system notifications nor audit logs constitute validation of the Contractor's submitted information.

1.4 CONTRACTOR RESPONSIBILITY

A. The Contractor shall be responsible for the validity of their information placed in PROCORE and for the abilities of their personnel. Accepted users shall be knowledgeable in the use of computers, including Internet Browsers, email programs,

CAD drawing applications, and Adobe Portable Document Format (PDF) document distribution program. Adobe PDF documents shall be created through electronic conversion rather than optically scanned whenever possible. The Contractor is responsible for the training of their personnel in the use of PROCORE (outside what is provided by the Construction Manager) and the other programs indicated above as needed.

B. User Access Administration:

1. Provide a list of Contractor's key PROCORE personnel for the Construction Manager's acceptance. The Construction Manager is responsible for adding and removing users from the system. The Construction Manager reserves the right to perform a security check on all potential users.

1.5 CONNECTIVITY PROBLEMS

A. PROCORE is a web-based environment and therefore subject to the inherent speed and connectivity problems of the Internet. The Contractor is responsible for its own connectivity to the Internet. PROCORE response time is dependent on the Contractor's equipment, including processor speed, Internet access speed, etc. and current traffic on the Internet. The County of Monterey and Construction Manager will not be liable for any delays associated from the usage of PROCORE including, but not limited to: slow response time, down time periods, connectivity problems, or loss of information. The Contractor will ensure that connectivity to the PROCORE system (whether at the home office or job site) is accomplished through some form of high-speed communications with 1 Mbps as the minimum bandwidth requirements for using the system. It is recommended a faster connection be used when uploading pictures and files into the system. Under no circumstances shall the usage of PROCORE be grounds for a time extension or cost adjustment to the Contract. If there are problems that persist with the PROCORE site for more than 24 consecutive hours that prevent the electronic submission of data by the Contractor, the Contractor may submit documents in paper form to the Construction Manager until such time that the Construction Manager notifies the Contractor that the PROCORE site is operable and available for use.

1.6 TRAINING

A. The County of Monterey has arranged for the following training to be provided to the Contractor. The Construction Manager will provide a one hour training class to the Contractor within ten (10) days of NTP at a time mutually agreeable to Contractor and Construction Manager. Thereafter the Construction Manager will provide up to one hour of additional training via telephone during the project per month of the project life.

2.0 EQUIPMENT

A. In order to process correspondence, submittals, and RFIs, the Contractor must provide and have in place for its own use the required basic components outlined below:

2.1 HARDWARE

A. A computer with internet access and sufficient capabilities to perform all duties stated in Section 012100; a scanner at least large enough to scan 11” x 17” sheets with sufficient resolution to maintain clarity and legibility of the document at its native size; and a color printer of sufficient size and capacity to accept incoming correspondence as described in this section.

2.2 SOFTWARE

A. Adobe Acrobat 9 Standard; Microsoft Office 2010 or higher, including but not limited to Microsoft Word and Microsoft Excel.

B. PROCORE currently supports Mozilla's Firefox v15.0.1 and newer, Google Chrome v22.01229.79 m and newer, Apple's Safari v6 and newer, and Microsoft's Internet Explorer v8 and v9 and newer web browsers for accessing the application. Certain functions may not be available when using any program other than the newest version of the respective web browser.

2.3 FACILITIES

A. The Contractor shall make its own arrangements to provide high-speed (minimum speed: download 1Mbps/upload 1Mbps) internet connection for its own use as soon as practicable.

3.0 EXECUTION

A. Items to be uploaded to PROCORE by the Construction Manager include but are not limited to: RFI responses, Submittal comments, Clarification letters, Design Clarifications, Field Orders, Potential Change Orders, and System Outage Requests et al. These items will be attached in PDF file format. These attachments may include files that need to be viewed and/or printed in color. Formal letters, stop notices, Field Orders, Progress Payment Requests, and Contract Change Orders shall always include a wet-signed hard copy.

3.1 PROCORE UTILIZATION

A. All project related correspondence (RFIs, submittals, etc.) originated by the Contractor or Subcontractor, Supplier, et al. shall be directed to the Architect and the Construction Manager, unless otherwise indicated in the Specifications.

B. Submittals

1. The use of the electronic communication does not waive the requirement for the provision of hard copies of all formal correspondence and, submittals. The hard copies of all documents must match the electronic copies of all correspondence and submittals.

2. Submittals shall be in accordance with Section 013300. The provisions of Section 013300 shall apply both to electronic copies and hard copies of submittals, unless otherwise stated in writing by the Construction Manager.

3. In addition to above, PROCORE shall be utilized in connection with submittal preparation and information management required by but not limited to Sections:

    a. 00700 General Conditions

    b. 00800 Supplementary General Conditions

    c. 01000 Summary of Work

    d. 012200 Unit Prices: Measurement and Payment

    e. 012600 Modification Procedures

    f. 012613 Requests For Information

    g. 013113 Project Coordination

    h. 013119 Project Meetings

    i. 013200 Construction Progress Documents: Schedules & Reports

    j. 013300 Submittal Procedures

    k. 017700 Contract closeout Procedures

4. PROCORE will be utilized by all other Sections not listed above and as required by the Construction Manager.

3.2 TERMINATION OF USE

A. The County of Monterey reserves the right to terminate the use of PROCORE for the electronic submission of data to the County of Monterey. The County of Monterey may provide an alternate project control system or require the use of paper documents submitted in accordance with the Contract Documents. The Contractor will be provided in writing ten (10) days' notice that the County of Monterey intends to discontinue use of PROCORE.

3.3 ADOBE PDF

A. All information, comments, questions and statements shall be scanned and/or converted to the PDF file format and attached to the PROCORE system. Items to be sent via PROCORE system include but are not limited to large-format plan sheets (22" x 34" or larger), small-format plan sheets, pages within tabbed binders, RFIs, transmittal sheets, et al. The PDF attachments supplied to the Construction Manager shall be in a sufficient resolution to be fully legible at its native size.

B. All separate files within a given piece of correspondence shall be combined into a single PDF document (i.e. An RFI that contains a text file and two photo files shall be combined into a single PDF document prior to delivery to the Construction Manager.)

3.4 LABELING FORMAT

A. The subject line of each email, and the file name of any attached files shall begin with the file labeling scheme:

RFI_XXXY_(Contractor Name)_(Subject)
Letter_XXXY_(Contractor Name)_(Subject)
Transmittal_XXXY_(Contractor Name)_(Subject)
PCO_XXXY_(Contractor Name)_(Subject)
Submittal_XXX.ZZY_(Contractor Name)_(Subject)

B. The first section of the label indicates the type of correspondence (i.e RFI). "XXX" indicates a unique number, sequentially assigned for the given piece of correspondence. "Y" is a sequential letter assigned for revised or resubmitted documents, i.e. A, B, or C being the 1st, 2nd, and 3rd revision or resubmittal, respectively. "(Contractor Name)" indicates to the database that the correspondence is from the Contractor. The Contractor will indicate the subject at the end of the numbering scheme. For submittals, "ZZ" indicates a unique number, sequentially assigned for each package item (see C. Submittals). Each piece of correspondence shall be sent in a separate email.

C. Submittals - If a submittal package has multiple items, each item shall be considered a separate piece of correspondence and sent separately. For example, if "Submittal 3: Concrete" had two items, "3.01: Mix Design," and "3.02: Curing Compound," two separate items would be emailed to the Construction Manager labeled as:
Submittal_003.01_(Contractor Name)_Mix Design
Submittal_003.02_(Contractor Name)_Curing Compound

3.5 ORIGINAL DOCUMENTS

A. Where possible, the Contractor will obtain the electronic document from its original source to maintain the integrity, legibility, and searchability of the document.

3.6 ORGANIZATION

A. The information included in the attachments shall be organized in a logical and thoughtful manner. Where the information originated in a tabbed format (a binder, for example), the scanned and/or converted PDF file shall be electronically bookmarked accordingly using the "bookmark" function of Adobe Acrobat 9 Standard.

3.7 PRINTING

A. Except where otherwise indicated, the Contractor will receive no hard copies of the above outlined correspondence. The Contractor will be required to print for its use, in color if necessary, any record copies, field copies, sub-contractor copies, etc., if such copies are desired.

3.8 PROJECT FORMS

A. The Contractor shall use its own correspondence forms for attachments uploaded to PROCORE. These forms shall include the identifying information specific to the PDF document succeeding the cover form. Additionally, the Contractor shall input all identifying information within PROCORE as requested when generating a new document within the system.

END OF SECTION

SECTION 012200 - UNIT PRICES: MEASUREMENT AND PAYMENT

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. This Section includes the description requirements and procedures for determining amount of work done and for obtaining payment for work done.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 011000 - Summary of Work

C. Section 012600 - Modification Procedures

D. Section 013300 - Submittal Procedures

E. Section 013200 - Construction Progress Documentation – Schedule

F. Section 017700 - Contract Closeout Procedures

1.3 REFERENCES

A. Public Contract Code

1.4 SCOPE OF WORK

A. Work under Contract, or under any bid item, allowance or alternate, shall include all abetment, labor, materials, transport, handling, storage, supervision, administration and all other items necessary for the satisfactory completion of work, whether or not expressly specified or shown.

1.5 DETERMINATION OF QUANTITIES

A. Quantity of work to be paid for under any item for which a unit price is fixed in Contract shall be number, as determined by Architect, of units of work

satisfactorily completed in accordance with Plans and Specifications and as directed pursuant to Plans and Specifications. Unless otherwise provided, determination of number of units of work so completed will be based, so fares practicable, on actual measurement or count within prescribed or ordered limits, and no payment will be made for work done outside of limits. Measurements and computations will be made by methods as Architect may consider appropriate for class of work measured.

1.6 SCOPE OF PAYMENT

A. Except as otherwise expressly stipulated in Section 011000 Summary of Work, payment to Contractor at the unit price or other price fixed in the contract for performing the work required under any item, or (if the contract is on a lump sum price basis) at the lump sum price fixed in the contract for performing all work required under the contract, and as either may be adjusted pursuant to any approved change order, shall be full compensation for completing, in accordance with the Contract Documents, all work required under the item or under the contract, and for all expense incurred by Contractor for any purpose in connection with the performance and completion of said work, including all incidental work necessary for completion of the Work.

B. The Contract Sum, whether lump sum, unit price or otherwise, shall be deemed to include all costs necessary to complete required Work, shall also include any costs for loss or damage arising from nature of Work or, prosecution of the Work, or from action of elements. Unless the Contract Documents expressly provide otherwise, the Contract Sum shall be deemed to include:

1. Any and all costs arising from any unforeseen difficulties which may be encountered during, and all risks of any description connected with, prosecution of Work until acceptance by the County of Monterey.

2. All expenses incurred due to suspension, or discontinuance of Work as provided in Contract;

3. Escalation to allow for cost increases between time of Contract Award and completion of Work.

C. Whenever it is specified herein that Contractor is to do work or furnish materials of any class for which no price is fixed in the Contract, it shall be understood that Contractor is to do such work or furnish such materials without extra charge or allowance or direct payment of any sort, and that cost of doing work or furnishing materials is to be included in price bid, unless it is expressly specified herein, in particular cases, that work or material is to be paid for as extra work.

D. No payment shall be made for materials or equipment not yet incorporated into the Work, except as follows:

NONE.

E. For the above listed materials and equipment, where Contractor requests payment on the basis of such materials and equipment not incorporated in the Work, Contractor must satisfy the following conditions:

1. The materials and/or equipment shall be delivered and suitably stored at the site or at another location agreed to in writing, for example, a mutually acceptable warehouse;

2. Full title to the materials and/or equipment shall vest in County of Monterey at the time of delivery to the site, warehouse or other storage location;

3. Contractor shall obtain a negotiable warehouse receipt, endorsed over to the County of Monterey for materials and/or equipment stored in an off-site warehouse. No payment shall be made until such endorsed receipts are delivered to Architect;

4. Stockpiled materials and/or equipment shall be available for the County of Monterey inspection. Materials and/or equipment shall be segregated and labeled or tagged to specifically identify this specific Contract;

5. After delivery of materials and/or equipment, if any inherent or acquired defects are discovered, defective materials and/or equipment shall be removed and replaced with suitable materials and/or equipment at Contractor's expense;

6. At its expense, Contractor shall insure the materials and/or equipment against theft, fire, vandalism, and malicious mischief, as well as any other coverages required under the Contract Documents;

7. Contractor's application for payment shall be accompanied by a bill of sale, invoice or other documentation warranting that the County of Monterey has received the materials and equipment free and clear of all liens and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the County of Monterey’s interest therein, all of which must be satisfactory to the County of Monterey.

1.7 BASIS OF PAYMENT

A. Unit Pay Quantities: When estimated quantity for specific portions of Work is listed in Bid Form, quantity of work to be paid for shall be actual number of units satisfactorily completed in accordance with Plans and Specifications.

B. Lump Sum: When estimated quantity for specific portion of Work is not indicated and unit is designated as Lump Sum, payment will be on a Lump Sum basis for Work satisfactorily completed in accordance with Plans and Specifications.

C. Allowances: Allowance items will be paid for as provided in Section 011000 Summary of Work. Funds authorized for Allowance work will not be released for contract payments unless additional work has been authorized in writing by the County of Monterey.

D. Payment for all work included in Contract Documents shall be included in lump sum or unit price or prices bid, and no direct or additional payments will be made for any incidental work.

E. The County of Monterey does not expressly, or by implication, agree, warrant, or represent in any manner, that actual amount of Work will correspond with amount shown or estimated and reserves right to increase or decrease amount of any class or portion of Work, to leave out entire Bid Item or Items, or to add work not included in Bid, when in its judgment such change is in best interest of the County of Monterey. No change in Work shall be considered waiver of any other condition of Contract. No claim shall be made for anticipated profit, for loss of profit, for damages, or for extra payment whatever, except as otherwise expressly provided for in Contract Documents, because of any differences between amount of work actually done and estimated amount as set forth herein, or for elimination of extra Bid Items.

1.8 PROGRESS PAYMENTS

A. Progress payments will be made monthly.

B. Schedule of Values:

1. Within thirty (30) calendar days from issuance of Notice of Award and prior to the Contractor's application for the first progress payment, the Contractor shall submit a detailed breakdown of its bid by scheduled Work items and/or activities, including coordination responsibilities and project record document responsibilities. The Contractor shall furnish such breakdown, of the total Contract Sum, by assigning dollar values (cost estimates) to each applicable Progress Schedule network activity, which cumulative sum equals the total Contract Sum. The format and detail of the breakdown shall be as directed by the Architect to facilitate and clarify future progress payments to Contractor for direct Contact Work. This breakdown shall be referred to as the Schedule of Values.

2. The Contractor's overhead, profit, insurance, cost of bonds and/or other financing, as well as "general conditions costs," (for example, site cleanup and maintenance, temporary roads and access, off site access roads,

temporary power and lighting, security and the like), shall be prorated through all activities so that the sum of all the Schedule of Values line items equal the Contractor's total Contract Sum, less any allowances designated by the Architect.

3. The Architect will review the breakdown in conjunction with the Progress Schedule to ensure that the dollar amounts of this Schedule of Values are, in fact, fair market cost allocations for the Work items listed. Upon favorable review by the Architect, this Schedule of Values will be accepted for use by the Architect. The County of Monterey and the Architect shall be the sole judges of fair market cost allocations.

4. Any attempt to increase the cost of early activities, that is, "front loading," will be rejected by the County of Monterey, resulting in a complete reallocation of monies until such "front loading" is corrected. Repeated attempts at "front loading" may result in suspension or termination of the Work or refusal to process progress payments, until such time as the Schedule of Values is acceptable to the County of Monterey.

C. Payment Requests:

1. On or before the 25th day of each month, the Contractor shall submit to the Architect a request for payment for the cost of the Work put in place during the period from the [1st] day of the previous month to the [30th] day of the previous month. Such requests for progress payments shall be based upon Schedule of Values prices of all labor and materials incorporated in the Work up until midnight of the last day of that one month period, less the aggregate of previous payments. If Contractor is late submitting its payment request, that payment request may be processed at any time during the succeeding one month period, resulting in processing of Contractor's payment request being delayed for more than a day for day basis.

2. Payment requests may include, but are not necessarily limited to the following:

   a. Material, equipment and labor incorporated into the Work, less any previous payments for the same;
   b. Up to seventy-five percent (75%) of the cost of major equipment identified in paragraph 1.05.D above, if purchased and delivered to the site or stored off site, as may be approved by the Architect.

   c. Up to fifty percent (50%) of the cost of materials identified in paragraph 1.05.D above specifically fabricated for the Project that are not yet incorporated into the Work.

3. Contractor shall, at the time any payment request is submitted, certify in writing the accuracy of the payment request and that Contractor has fulfilled all scheduling requirements of the Contract General Conditions (refer to AIA Document A201-1997, included in Part A of this book) and Section 013200, Construction Progress Documentation -Schedules and Reports, including updates and revisions. The certification shall be executed by a responsible officer of the Contractor.

4. No progress payment will be processed prior to Architect receiving all requested, acceptable schedule update information.

5. Each payment request shall list each Change Order executed prior to date of submission, including the Change Order Number, and a description of the work activities, consistent with the descriptions of original work activities. Contractor shall submit a monthly Change Order status log to Architect.

6. If Architect requires substantiating data, Contractor shall submit information requested by Architect, with cover letter identifying Project, payment request number and date, and detailed list of enclosures. Contractor shall submit one copy of substantiating data and cover letter for each copy Payment request submitted.

7. Monthly progress payments shall be made, based on total value of activities completed or partially completed, as determined by the County of Monterey with participation of Contractor, and based upon approved activity costs. Accumulated retainage will be shown as separate item in payment summary. If Contractor fails or refuses to participate in construction progress evaluation with the County of Monterey, Contractor shall not receive current payment until Contractor has participated fully in providing construction progress information and schedule update information for the County of Monterey.

8. No progress payment will be processed prior to Architect receiving all requested, acceptable prevailing wage and certified payroll information.

D. Progress Payments:

1. Upon receiving Contractor's payment request, Architect will review the payment request and make necessary adjustments to percent of completion of each activity. One copy will be returned to Contractor with description of adjustments made. All parties will update percentage of completion values in the same manner, that is, express value of an accumulated percentage of completion to date.

2. The payment request may be reviewed by Architect, Architect/Engineer and/or inspectors, for the purpose of determining that the payment request is a proper payment request, and shall be rejected, revised or approved by the Architect pursuant to the cost breakdown prepared in accordance with Section 1.7B of this Section.

3. If it is determined that the payment request is not a proper payment request suitable for payment, Architect shall return it to the Contractor as soon as practicable, but no later than seven (7) days after receipt, together with a document setting forth in writing the reasons why the payment request is not proper.

4. Pursuant to Public Contract Code Section 20104.50, if the County of Monterey fails to make any progress payment within thirty (30) days after receipt of an undisputed and properly submitted payment request from a contractor, the County of Monterey shall pay interest to the Contractor equivalent to the legal rates set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure. The thirty (30) day period shall be reduced by the number of days by which the County of Monterey exceeds the seven (7) day return requirement set forth herein.

5. As soon as practicable after approval of each request for progress payment, the County of Monterey will pay to Contractor in manner provided by law, an amount equal to ninety percent (90%) of Architect's estimate, or a lesser amount if so provided in Contract Documents, provided that payments may at any time be withheld if, in judgment of Architect, Work is not proceeding in accordance with Contract, or Contractor is not complying with requirements of Contract.

6. Before any progress payment or final payment is made, the Contractor may be required to submit satisfactory evidence that Contractor is not delinquent in payments to employees subcontractors, suppliers, or creditors for labor and materials incorporated into Work.

7. The County of Monterey reserves and shall have the right to withhold payment for any equipment and/or specifically fabricated materials that, in the sole judgment of the Architect, is not adequately and properly protected against weather and/or damage, prior to or following incorporation into the Work.

8. Granting of progress payment or payments by the County of Monterey or receipt thereof by Contractor, shall not be understood as constituting in any sense acceptance of Work or of any portion thereof, and shall in no way lessen liability of Contractor to replace unsatisfactory work or material, though unsatisfactory character of work or material may have been apparent or detected at time payment was made.

9. When the County of Monterey shall charge sum of money against Contractor under any provision of Contract, amount of charge shall be deducted and retained by the County of Monterey from amount of next succeeding progress payment or from any other monies due or that may become due Contractor under Contract. If, on completion or termination of Contract, such monies due Contractor are found insufficient to cover the County of Monterey charges against him, the County of Monterey shall have right to recover balance from Contractor or Sureties.

1.9 RETENTION

A. Pursuant to provisions of Public Contract Code Section 22300, substitution of securities for any monies withheld under Contract to insure performance is permitted under following conditions:

1. At request and expense of Contractor, securities listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by Contractor and the County of Monterey which are equivalent to the amount withheld under retention provisions of Contract shall be deposited with Controller or with a state or federally chartered bank in California, as the escrow agent, who shall then pay such monies to Contractor. Upon satisfactory completion of Contract, securities shall be returned to Contractor.

2. Alternatively, Contractor may request and the County of Monterey shall make payment of retentions earned directly to the escrow agent at the expense of the Contractor. At the expense of the Contractor, the Contractor may direct the investment of the payments into securities and the Contractor shall receive the interest earned on the investments upon the same terms provided for in this Section for securities deposited by the Contractor. Upon satisfactory completion of the Contract, the Contractor shall receive from escrow agent all securities, interest, and payments received by the escrow agent from the County of Monterey, pursuant to the terms of this Section. The Contractor shall pay to each subcontractor, not later than twenty (20) days after receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each subcontractor, on the amount of retention withheld to insure the performance of the Contractor.

3. Contractor shall be beneficial owner of securities substituted for monies withheld and shall receive any interest thereon.

4. Contractor shall enter into escrow agreement with Controller as authorized under Public Contract Code Section 22300, specifying amount of

securities to be deposited, terms and conditions of conversion to cash in case of default of Contractor, and termination of escrow upon completion of Contract.

1.10 FINAL PAYMENT

A. As soon as practicable after all required Work is completed in accordance with Contract, including Contractor maintenance after Final Acceptance, the County of Monterey will pay to Contractor, in manner provided by law, unpaid balance of contract price of Work, or whole contract price of Work if no progress payment has been made, determined in accordance with terms of Contract, less sums as may be lawfully retained under any provisions of Contract or by law.

B. Prior progress payments shall be subject to correction in the final payment. Architect's determination of amount due as final payment shall be final and conclusive evidence of amount of Work performed by Contractor under Contract, and shall be full measure of compensation to be received by Contractor.

C. Contractor and each assignee under an assignment in effect at time of final payment, and as a condition precedent to final payment, shall release the County of Monterey, its officers, agents, employees, Architect and all consultants from liabilities, obligations, and claims arising under Contract.

1.11 EFFECT OF PAYMENT

A. Payment will be made by the County of Monterey, based on the Architect's observations at the site and the data comprising the Application for Payment. Payment will not be a representation that the Architect has:

1. Made exhaustive or continuous on-site inspections to check the quality or quantity of Work;

2. Reviewed construction means, methods, techniques, sequences or procedures;

3. Reviewed copies of requisitions received from subcontractors and material suppliers and other data requested by the County of Monterey to substantiate Contractor's right to payment; or

4. Made examination to ascertain how or for what purpose Contractor has used money previously paid on account of the Contract Sum.

2.0 PRODUCTS

A. Not applicable to this Section.

3.0 EXECUTION

A. Not applicable to this Section.

END OF SECTION

SECTION 012600 - MODIFICATION PROCEDURES

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. This Section includes the description of general procedural requirements for alterations, modifications and extras.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 011000 - Summary of Work

C. Section 012100 - Project Control System

D. Section 012200 - Unit Prices: Measurement and Payment

E. Section 012613 - Requests for Information

1.3 GENERAL

A. Any change in scope of work or deviation from Drawings or Specifications shall be accomplished only when authorized in writing by Architect.

B. Changes in scope of Work or deviation from Drawings or Specifications may be initiated only by the Contractor or the Architect.

1. Contractor may initiate changes by submitting Requests for Information (RFI), Notice of Concealed or Unknown Conditions, or Notice of Hazardous Waste Conditions.

    a. RFIs shall be submitted to seek clarification of Contract Documents.

2. Contractor shall be responsible for its costs to implement and administer RFIs throughout the Contract duration. Regardless of the number of RFIs submitted, Contractor will not be entitled to additional compensation. Contractor shall be responsible for both the County of Monterey's

Architect's administrative costs for answering its RFIs where the answer could reasonably be found by reviewing the Contract Documents, as determined by Architect; such costs will be deducted from progress payments.

3. Architect may initiate changes by issuing a Supplemental Instruction.

4. Architect may initiate changes by issuing Requests For Proposal (RFP) to Contractor. Such RFPs will detail all proposed changes in the Work and request a quotation of changes in Contract Sum and Contract Times from Contractor.

1.4 PROCEDURE

A. Contractor shall submit RFI to Architect. Architect shall respond by issuing a Clarification.

1. If Contractor is satisfied with the Clarification and does not request change in Contract Sum or Contract Times, then the Clarification shall be executed without a change.

2. If Contractor believes that the Clarification results in change in Contract Sum or Contract Times, Contractor shall notify Architect who may then deny request for change or issue RFP.

B. Contractor shall submit Notices of Concealed or Unknown Conditions to resolve unanticipated conditions incurred in the execution of the Work. If Architect determines that a change in Contract Sum or contract Times is justified, Architect shall issue RFP. Architect shall issue Supplemental Instruction to Contractor. Contractor shall not proceed with Supplemental Instruction until Architect approves it in writing.

1. If Contractor is satisfied with Supplemental Instruction and does not request change in Contract Sum or Contract Times, then Supplemental Instruction shall be executed without a Change Order.

2. If Contractor believes that Supplemental Instruction results in change in Contract Sum or Contract Times, Contractor shall notify Architect. Architect may then deny request for change, cancel Clarification or issue RFP.

C. Responses by recipients shall be within a reasonable time.

D. Contractor shall respond to Architect's RFP within fifteen (15) working days by furnishing a complete breakdown of costs of both credits and extras; itemizing

materials, labor, taxes, overhead and profit. Subcontract work shall be so indicated.

E. Upon approval of RFP, Architect will issue a Change Order directing Contractor to proceed with extra work.

F. Payment shall be made as follows:

1. Change Orders which increase Contract Sum or Contract Times shall be included in next Contract Modification Form, signed by Architect, accepted by Contractor.

2. Payment shall be made for Change Order work along with other work in progress payment following completion of Change Order work. Partial completion of Change Order work shall be paid for that part completed during the period covered by the monthly payment request.

1.5 COST DETERMINATION

A. Total cost of extra work shall be the sum of labor costs, material costs, equipment rental costs and specialist costs as defined herein plus overhead and profit as allowed herein. This limit applies in all cases of claims for extra work, whether calculating Change Orders, RFPs, or calculating claims of all types, and applies even in the event of fault, negligence, strict liability, or tort claims of all kinds, including misrepresentation, concealment, strict liability or negligence. No other costs arising out of or connected with the performance of extra work, of any nature, may be recovered by Contractor. No special, incidental or consequential damages may be claimed or recovered against the County of Monterey, its representatives or agents, whether arising from breach of contract, negligence or strict liability, unless specifically authorized in the Contract Documents.

B. Overhead and Profit:

1. Overhead shall be as defined in Article 1.8, below.

2. Overhead and profit on labor for extra work shall be 15 percent (15%).

3. Overhead and profit on materials for extra work shall be 15 percent (15%).

4. Overhead and profit on equipment rental for extra work shall be 15 percent (15%).

5. When extra work is performed by a first tier subcontractor, Contractor shall receive a 10 percent (10%) markup on subcontractors' total costs of extra work.

6. When extra work is performed by a lower tier subcontractor, Contractor shall receive a 10 percent (10%) markup on the lower tier subcontractors' total costs of extra work. Contractor and first tier subcontractors shall divide the markup as mutually agreed.

7. Credit for overhead and profit on deleted work shall be 5% for the Contractor actually performing the work plus applicable reductions insurance and bond cost.

C. Taxes:

1. Monterey County Sales Tax should be included.

2. Federal and Excise Tax shall not be included.

D. County-Operated Equipment: When County-operated equipment is used to perform extra work, Contractor will be paid for equipment and operator as follows:

1. Payment for equipment will be made in accordance with Paragraph 1.5D, below.

2. Payment for cost of labor will be made at no more than rates of such labor established by State of California Department of Industrial Relations schedule of Prevailing Wages at the time such work was performed, whether or not the labor was actually covered by such an agreement.

1.6 COST BREAKDOWN

A. Contractor to submit complete breakdown cost proposal identifying labor hours x rate, material quantity x unit price, equipment rental hours x rate and subcontract cost proposals. Markups shall be shown as a separate line-item on the proposal in accordance with Article 1.4B, above. Subcontractors and vendors shall also provide cost breakdowns in accordance with the requirements of the Contract and this Section.

B. Labor: Contractor will be paid cost of labor for workers (including forepersons when authorized by Architect) used in actual and direct performance of extra work. Labor rate, whether employer is Contractor, subcontractor or other forces, will be sum of following:

1. Actual Wages - Actual wages paid shall include any employer payments to or on behalf of workers for health and welfare, pension, vacation and similar purposes.

2. Labor Surcharge - Payments imposed by the County of Monterey, State and Federal laws and ordinances, and other payments made to, or on behalf of, workers, other than actual wages as defined in subparagraph 1 above, such as taxes and insurances. Labor surcharge shall be as set forth in California Department of Industrial Relations labor rate classification schedule which is in effect on date upon which extra work is accomplished and which schedule is incorporated herein by reference as though fully set forth herein.

C. Material: Only materials furnished by Contractor and necessarily used in performance of extra work will be paid for. Cost of such materials will be cost, including sales tax, to purchaser (Contractor, subcontractor or other forces) from supplier thereof, except as the following are applicable:

1. If cash or trade discount by actual supplier is offered or available to purchaser, it shall be credited to the County of Monterey notwithstanding fact that such discount may not have been taken.

2. For materials salvaged upon completion of extra work, salvage value of materials shall be deducted from cost, less discount, of materials.

3. If cost of a material is, in opinion of Architect, excessive, then cost of material shall be deemed to be lowest current wholesale price at which material is available in quantities concerned delivered to Site, less any discounts as provided in subparagraph 1 above.

D. Equipment Rental: For Contractor or subcontractor-owned equipment, payment will be made at rental rates listed for equipment in California Department of Transportation official equipment rental rate schedule which is in effect on date upon which extra work is accomplished and which schedule is incorporated herein by reference as though fully set forth herein. For rented equipment, payment will be made based on actual rental invoices. Equipment used on extra work shall be of proper size and type. If, however, equipment of unwarranted size or type and cost is used, cost of use of equipment shall be calculated at rental rate for equipment of proper size and type. Rental rates paid shall be deemed to cover cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals. Unless otherwise specified, manufacturer's ratings, and manufacturer approved modifications, shall be used to classify equipment for determination of applicable rental rates. Individual pieces of equipment or tools not listed in said publication and having a replacement value of one hundred dollars ($100) or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefor as payment is included in payment for labor. Rental time will not be allowed while equipment is inoperative due to breakdowns.

1. For equipment on Site, rental time to be paid for equipment shall be time equipment is in operation on extra work being performed or on standby as approved by Architect. The following shall be used in computing rental time of equipment:

    a. When hourly rates are listed, less than thirty (30) minutes of operation shall be considered to be one-half (1/2) hour of operation.

    b. When daily rates are listed, less than four (4) hours of operation shall be considered to be one-half (1/2) day of operation.

2. For equipment which must be brought to Site to be used exclusively on extra work, cost of transporting equipment to Site and its return to its original location shall be determined as follows:

    a. The County of Monterey will pay for costs of loading and unloading equipment.

    b. Cost of transporting equipment in low bed trailers shall not exceed hourly rates charged by established haulers.

    c. Cost of transporting equipment shall not exceed applicable minimum established rates of California Public Utilities Commission.

    d. Payment for transporting, and loading and unloading equipment as above provided will not be made if equipment is used on Work in any other way than upon extra work.

3. Rental period shall begin at time equipment is unloaded at Site of extra work and terminate at end of day on which Architect directs Contractor to discontinue use of equipment. Excluding Saturdays, Sundays, and legal holidays, unless equipment is used to perform extra work on such days, rental time to be paid per day shall be four (4) hours for zero (0) hours of operation, six (6) hours for four (4) hours of operation and eight (8) hours for eight (8) hours of operation, time being prorated between these parameters. Hours to be paid for equipment which is operated less than eight (8) hours due to breakdowns, shall not exceed eight (8) less number of hours equipment is inoperative due to breakdowns.

E. Work Performed by Special Forces or Other Special Services: When Architect and Contractor, by agreement, determine that special service or item of extra work cannot be performed by forces of Contractor or those of any subcontractors, service or extra work item may be performed by specialist. Invoices for service or item of extra work on basis of current market price thereof may be accepted without complete itemization of labor, material, and equipment rental costs when

it is impracticable and not in accordance with established practice of special service industry to provide complete itemization. In those instances wherein Contractor is required to perform extra work necessitating a fabrication or machining process in a fabrication or machine shop facility away from Site, charges for that portion of extra work performed in such facility may, by agreement, be accepted as a specialist billing. Architect must be notified in advance of all off site work. To specialist invoice price, less credit to the County of Monterey for any cash or trade discount offered or available, whether or not such discount may have been taken, will be added 15 percent (15%) in lieu of overhead and profit provided in Paragraph 1.4B, above.

F. Deleted Work and Credits: When a change request, RFI, RFP, or Construction Change Directive includes both additive and deductive work, the total mark-up shall be on the net sum of the change.

1.7 FORCE-ACCOUNT

A. If it is impracticable because of nature of work, or for any other reason, to fix an increase or decrease in price definitely in advance, a Construction Change Directive may be issued in accordance with Article 7.3 Construction Change Directives from General Conditions of the Contract for Construction, AIA Document A201-1997 (included in Part A of this book) to fix a maximum price which shall not under any circumstances be exceeded, and subject to such limitation, such alteration, modification or extra shall be paid for at actual necessary cost as determined by the County of Monterey, which cost shall be determined pursuant to Article 1.4, above, and shall be known as Force-Account work.

B. Whenever any Force-Account work is in progress, definite price for which has not been agreed on in advance, Contractor shall report to Architect each day in writing in detail amount and cost of labor and material used, and any other expense incurred in Force-Account work on preceding work day, and no claim for compensation for Force-Account work will be allowed unless report shall have been made.

C. Above described methods of determining payment for work and materials shall not apply to performance of work or furnishings of material which, in judgment of Architect, may properly be classified under items for which prices are established in Contract.

1.8 FURNISHED MATERIALS

A. The County of Monterey reserves right to furnish materials as it deems advisable, and Contractor shall have no claims for costs and overhead and profit on such materials.

1.9 OVERHEAD DEFINED

A. The following constitutes charges that are included in overhead for all contract modifications, including Force-Account work:

1. Drawings: field drawings, shop drawings, etc. including submissions of drawings.

2. Routine field inspection of work proposed.

3. General Superintendence.

4. General administration and preparation of change orders.

5. Computer services.

6. Reproduction services.

7. Salaries of project engineer, project manager, superintendent, timekeeper, storekeeper and secretaries.

8. Janitorial services.

9. Temporary on-site facilities.

a. Offices

b. Telephones

c. Plumbing

d. Electrical: Power, lighting

e. Platforms

f. Fencing, and so on.

g. Home office expenses.

h. Procurement and use of vehicles and fuel used coincidentally in base bid work.

i. Surveying

j. Estimating

k. Protection of work

l. Final cleanup

m. Other incidental work

1.10 RECORDS AND CERTIFICATION

A. Force-Account (cost reimbursement) charges shall be recorded daily upon Cost Breakdown for Contract Modification Form obtained from or approved by the Architect. Contractor or authorized representative shall complete and sign form. Architect or Inspector shall sign form indicating approval of labor and equipment hours and material used only. Contract Modification Form shall provide names and classifications of workers and hours worked by each, itemize materials used, and also list size type and identification number of equipment, and hours operated, and shall indicate work done by specialists.

B. No payment for Force-Account work shall be made until Contractor submits original invoices substantiating materials and specialist charges.

C. The County of Monterey shall have the right to audit all records in possession of Contractor relating to activities covered by Contractor's claims for modification of Contract, including Force-Account work, as set forth in Article 7.3 Construction Change Directives from General Conditions of the Contract for Construction, AIA Document A201-1997 (included in Part A of this book).

D. Further, the County of Monterey shall have right to audit, inspect, or copy all records maintained in connection with this Contract, including financial records, in possession of Contractor relating to any transaction or activity occurring or arising out of, or by virtue of, Contract. If Contractor is a joint venture, right of the County of Monterey shall apply collaterally to same extent to records of joint venture sponsor, and of each individual joint venture member.

2.0 PRODUCTS

A. Not applicable to this Section.

3.0 EXECUTION

A. Not applicable to this Section.

END OF SECTION

SECTION 012613 - REQUESTS FOR INFORMATION

1.0 GENERAL

1.1 SUMMARY

A. This Section includes the procedures to be followed by the Contractor upon discovery of any apparent conflicts, omissions, or errors in the contract documents, or upon having any questions concerning interpretation.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 012100 - Project Control System

1.3 PROCEDURES

A. Notification by Contractor: Should the Contractor discover conflicts, omissions, or errors in the contract documents, or have any questions concerning interpretation or clarification of the contract documents, or if it appears to the contractor that work to be done or any matter relative thereto are not sufficiently detailed or explained in the contract documents, then, before proceeding with the work affected, the Contractor shall immediately notify the Architect in writing and request interpretation, clarification, or additional detailed instructions concerning the work. The Contractor shall ask for any clarification or request for information immediately upon discovery, but no less than fifteen (15) days prior to the start date of the activities related to the clarification, based on the latest updated version of the accepted contract schedule.

B. Form: The Contractor shall submit all requests for clarification and/or additional information in writing to the Architect using the Request For Information (RFI) procedure as outlined in Section 012100, Project Control System.

C. The Contractor will number RFIs consecutively with the date of issue, except for reissuance of a respective RFI in which the subscript a, b, c, and so on, will be added until the RFI is resolved.

D. Response Time: The Architect, whose decision will be final and conclusive, shall resolve such questions and issue instruction to the Contractor within a reasonable amount of time, but no less than 14 calendar days. In some cases, this time may need to be lengthened or shortened for emergency situations as mutually agreed upon by all parties. Should the Contractor proceed with the work affected before receipt of a response from the Architect within the response time described above, any portion of the work which is not done in accordance with the Architect's interpretation,

clarifications, instructions, or decisions subject to removal or replacement and the Contractor shall be responsible for all losses.

E. Reason for Submission: The Contractor may submit RFIs if one of the following conditions occur:

1. The Contractor discovers an unforeseen condition or circumstance that is not described in the contract documents.

2. The Contractor discovers an apparent conflict or discrepancy between portions of the contract documents and appears to be inconsistent or is not reasonably inferred from the intent of the contract documents.

3. The Contractor discovers what appears to be an omission from the contract documents that cannot be reasonably inferred from the intent of the contract documents.

F. Rejections: RFIs will not be recognized or accepted if in the opinion of the Architect one of the following conditions exists:

1. The Contract submits an RFI as a submittal.

2. The Contractor submits the RFI under the pretense of a contract documents discrepancy or omission without thoroughly reviewing the documents.

3. The Contractor submits the RFI in a manner that suggests that specific portions of the contract documents are assumed to be excluded, or taken as an isolated portion of the contract documents in part rather than whole.

4. The Contractor submits an RFI in an untimely manner without proper coordination and scheduling of work or related trades.

G. Subject: Each RFI shall be limited to one subject.

H. Additional Detailed Instructions: The Architect may furnish additional detailed written instructions to further explain the work, and such instructions shall be a part of the contract documents. Should additional detailed instructions in the opinion of the Contractor constitute work in excess of the scope of the contract the Contractor shall submit notification immediately and written notification thereof to the Architect no more than seven calendar days following receipt of such instruction, and in any event prior to the commencement of work thereon. The Architect will then consider such notice, and if the Architect considers it justified, the Architect's instructions will be revised or a proposed change order will be issued. The Contractor shall have no claim for additional compensation or extension of the schedule because of any such additional instructions unless the Contractor provides the Architect written notice thereof within the time frame specified above. In addition, the Contractor shall within 15 days from the date of notification provide detailed justification and analysis as well as compete pricing and schedule CPM network analysis to support any request

for time extension. For more details, see Article 7 Changes in the Work from General Conditions of the Contract for Construction, AIA Document A201-1997 (Part A of this book).

2.0 PRODUCTS

A. Not applicable to this Section.

3.0 EXECUTION

A. Not applicable to this Section.

END OF SECTION

SECTION 013113 - PROJECT COORDINATION

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Coordinate the Work; do not delegate the responsibility for coordination to any Subcontractor.

1. Resolve differences or disputes concerning coordination, interference, or extent of Work of the various Sections.

2. The Contractor's decisions regarding work by subcontractors, if consistent with the requirements of the Contract Documents, shall be final.

C. Coordinate Work to assure efficient and orderly sequence of installation of construction elements.

D. Perform and complete checking and coordination before commencing Work in the affected areas.

E. Verify characteristics of interrelated operating equipment are compatible; coordinate Work having interdependent responsibilities for installing, connection to, and placing such equipment in service.

F. Provide basic layouts of grid lines and station points on subfloors as necessary to facilitate coordination and layout of partitions and Work at and above ceilings.

G. Make provisions for accommodating Work to be provided by others.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

1.3 COORDINATION DRAWINGS

A. Prepare large-scale coordination drawings before beginning fabrication or delivery of materials and equipment to the job site.
1. Drawings shall clearly indicate coordination of mechanical, electrical, and equipment installations with structural and architectural elements.

B. Keep copies of coordination drawings at the job site.

C. The Architect will verify that coordination drawings have been made, but no review of the drawings will be made.

1.4 MECHANICAL AND ELECTRICAL COORDINATION

A. Use coordination drawings of mechanical and electrical Work, together with Shop Drawings and layout drawings of affected Work to check; coordinate and integrate the Work to prevent interferences.

B. Coordinate space requirements and installation of mechanical and electrical Work which are indicated diagrammatically on Drawings.

C. Routing shown for pipes, ducts, and conduits is diagrammatic only; make runs parallel with lines of building.

D. Utilize spaces efficiently to maximize accessibility for other installation, for maintenance, and for repairs.

E. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated; coordinate locations of fixtures and outlets with finish elements.

2.0 PRODUCTS

A. Not applicable to this Section.

3.0 EXECUTION

A. Not applicable to this Section.

END OF SECTION

SECTION 013119 - PROJECT MEETINGS

1.0 GENERAL

1.1 PRECONSTRUCTION CONFERENCE

A. Prior to commencement of Work, a preconstruction conference will be held to discuss procedures to be followed during the progress of the Work.

1. The preconstruction conference will be held at a location designated by the Architect.

B. Attending the conference shall be:

1. County of Monterey representatives.

2. Architect's representatives.

3. County of Monterey’s consultants.

4. Architect's subconsultants.

5. Contractor's representatives.

6. Contractor's superintendent.

7. Designated major Subcontractors.

8. Others requested by the Architect.

1.2 PROGRESS MEETINGS

A. Weekly progress meetings will be held throughout the progress of the Work; location shall be in Architect's field office.

B. The Architect will prepare agenda with copies for participants, preside at meetings, record minutes and distribute copies within three (3) work days to the Architect, meeting participants, and those affected. Procore will be used for the meeting documentation.

C. Attendance and Participation: Project superintendent, County of Monterey’s representatives, Architect, Architect's subconsultants, County of Monterey representatives, County of Monterey’s representative consultants, and major subcontractors as appropriate to agenda topics for each meeting.

D. Suggested Agenda: Review of Work progress, status of progress CPM schedule and adjustments, delivery schedules, submittal status report, RFI status report, maintenance of quality standards, pending changes, and substitutions.

E. Special Meetings: Schedule and administer other meetings as required by the progress of the Work and to review provisions and tests specified elsewhere in the Contract Documents.

1. Schedule special meetings when so requested by the Architect.

1.3 BILLING MEETINGS

A. As part of the last progress meeting each month, schedule and hold a billing meeting, with the Architect in attendance.

1. Purpose of billing meeting is for agreeing on the percentage of Work completed to that date and to establish the sum to be requested in the Application for Payment.

B. Prepare an itemized draft of the month's proposed billing for review at the meeting.

1.4 PRE-INSTALLATION/APPLICATION MEETINGS

A. Meetings to review installation and application shall be scheduled a minimum of fourteen (14) days prior to the start of installations and applications.

1. Attending shall be Project superintendent, County of Monterey’s representatives, Architect, manufacturers' representatives and installers of products involved, other installers whose Work may affect or be affected by the Work to be reviewed, and Testing Laboratory Inspector.

B. Review in detail the Contract Documents and manufacturers' requirements, Specifications, installation drawings and details, and Drawings and Details of affected Work.

1. Resolve discovered and anticipated conflicts, incompatibilities, and inadequacies at the conference.

C. Review in detail Project conditions, schedules, construction sequence, requirements for applications and qualities of completed applications, and protection of adjacent Work and property.

D. Review in detail means of protecting the completed applications during the remainder of the construction period.

1.5 SCHEDULE APPROVAL MEETINGS

A. Prior to approval of the CPM schedule, the Architect may require that the Contractor and its Subcontractors attend meetings to ascertain information for approval of the CPM schedule.

B. This information may include, but will not be limited to, productivity, manpower loading, equipment planning, activity durations, logic, cost loading, and other pertinent matters.

C. Attending shall be the Contractor, Subcontractors as appropriate, suppliers as appropriate, and others as appropriate.

2.0 PRODUCTS

A. Not applicable to this Section.

3.0 EXECUTION

A. Not applicable to this Section.

END OF SECTION

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION: SCHEDULES AND REPORTS

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Scheduling of Work under this Contract shall be performed by Contractor in accordance with requirements of this Section.

C. Upon Award of Contract, Contractor shall immediately commence development of the Schedule to ensure compliance with schedule submittal requirements.

D. Contract schedule shall be based on and incorporate Contract milestone and completion dates specified in Contract Documents.

E. Overall time of completion and time of completion for each milestone shown on Contract schedule shall adhere to times specified in the Contract Special Provisions.

1. The Architect is not required to accept an earlier (advanced) schedule.

2. Contractor shall not be entitled to any compensation for any field or home office overhead in event agreement is not reached on an earlier (advanced) schedule and Contractor completes its Work, for whatever reason, beyond completion date shown in earlier (advanced) schedule.

3. A schedule showing the work completed in less than the Contract time, which has been accepted by the Architect, shall be considered to have Project Float. The Project Float is the time between the scheduled completion of the work and Contract Substantial Completion.

4. Project Float is a resource available to both the Architect and the Contractor.

F. Contract schedule shall be basis for evaluating job progress, payment requests, and time extension requests. Responsibility for developing Contract CPM schedule and monitoring actual progress as compared to schedule rests with Contractor.

G. Failure of Contract schedule to include any element of the Work or any inaccuracy in Contract Schedule will not relieve Contractor from responsibility for accomplishing the Work in accordance with the Contract.

H. Float Ownership:

1. The Project owns the float. As such, liability for delay of the Substantial Completion Date rests with the party whose actions, last in time, actually cause delay to the Substantial Completion.

a. For example, if Party A uses some, but not all of the float and Party B later uses remainder of the float as well as additional time beyond the float, Party B shall be liable for the time that represents a delay to the Substantial Completion Date.

b. Under this scenario, Party A would not be responsible for the time since it did not consume all of the float and additional float remained; therefore, the Substantial Completion Date was unaffected.

I. Progress Schedule shall be the basis for evaluating job progress, payment requests, and time extension requests. Responsibility for developing Contract schedule and monitoring actual progress as compared to Progress Schedule rests with Contractor.

J. Failure of Progress Schedule to include any element of the Work or any inaccuracy in Progress Schedule will not relieve Contractor from responsibility for accomplishing the Work in accordance with the Contract. The County of Monterey's acceptance of Schedule shall be for its use in monitoring and evaluating job progress, payment requests, and time extension requests, and shall not, in any manner, impose a duty of care upon the County of Monterey or act to relieve Contractor of its responsibility for means and methods of construction.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

1.3 ORIGINAL CPM SCHEDULE

A. Within thirty (30) calendar days after the Notice to Proceed date, submit a detailed proposed Original CPM Schedule presenting an orderly and realistic plan for completion of the Work, in conformance with requirements as specified herein.

B. Contract schedule shall furnish or comply with following requirements:

1. Time-scaled CPM schedule.

2. No activity on schedule shall have duration longer than fifteen (15) workdays, with exception of submittal, approval, fabrication and procurement activities, unless otherwise approved by the Architect.

    a. Activity durations shall be total number of actual work days required to perform that activity excluding consideration of weather impact on completion of that activity.

3. Procurement of major equipment, through receipt and inspection at jobsite, identified as a separate activity.

4. District furnished materials and equipment, if any, identified as separate activities.

5. Dependencies (or relationships) between activities.

6. Processing/approval of submittals and shop drawings for all Contract-required material and equipment. Activities that are dependent on submittal acceptance or material delivery shall not be scheduled to start earlier than expected acceptance or delivery dates.

    a. The duration for review and approval of submittals and shop drawings shall be as specified in Section 013300, Submittal Procedures. Contractor shall be responsible for all impacts resulting from resubmittal of shop drawings and submittals.

7. Twenty (20) workdays for developing punch list(s), completion of punch list items, and final clean-up for the Work or any designated portion thereof.

    a. No other activities shall be scheduled during this period.

8. Interface with the Work of other contractors (and agencies such, as but not limited to, utility companies).

9. Show detailed Subcontractor Work activities.

10. Activity durations shall be in Work days.

C. Adjustments to Original CPM Schedule: Within fourteen (14) calendar days after receipt of the Architect's response to the Contractor's Original CPM Schedule, the

Contractor shall have adjusted the Original CPM Schedule submittal to address all review comments and resubmit for the Architects review.

1. The Architect, within ten (10) calendar days from date that Contractor submitted the revised schedule, will either (1) accept schedule as submitted, or (2) advise Contractor in writing to review any part or parts of schedule which either do not meet Contract requirements or are unsatisfactory for the Architect to monitor Project's progress, resources and status or evaluate monthly payment request by Contractor.

2. The Architect may accept schedule with conditions. At the first monthly meeting the CPM schedule update shall be revised to correct deficiencies identified.

3. When schedule is accepted, it shall be considered as the "Original CPM Schedule" which will then be immediately updated to reflect the current status of the work.

4. The Architect reserves right to require the Contractor to adjust, add to, or clarify any portion of schedule which may later be discovered to be insufficient for monitoring of Work or approval of partial payment requests. No additional compensation will be provided for such adjustments, additions, or clarifications.

D. Acceptance: Acceptance of Contractor's schedule by the Architect will be based solely upon schedule's compliance with Contract requirements.

1. By way of Contractor assigning activity durations and proposing sequence of Work, Contractor agrees to utilize sufficient and necessary management and other resources to perform work in accordance with the schedule.

2. Upon submittal of schedule update, updated schedule shall be considered "current" CPM schedule.

3. Submission of Contractor's schedule to the Architect shall not relieve Contractor of total responsibility for scheduling, sequencing, and pursuing Work to comply with requirements of Contract Documents, including adverse effects such as delays resulting from ill-timed work.

E. Submittal of Original CPM Schedule, and subsequent schedule updates, shall be understood to be Contractor's representation that the Schedule meets requirements of Contract Documents and that Work shall be executed in sequence indicated on the schedule.

F. Contractor shall distribute Original CPM Schedule to Subcontractors for review and acceptance.

1.4 MONTHLY CPM SCHEDULE UPDATE SUBMITTALS

A. Following acceptance of Contractor's Original CPM Schedule, Contractor shall monitor progress of Work and adjust schedule each month to reflect actual progress and any anticipated changes to planned activities.

1. Each schedule update submitted shall be complete, including all information requested for the Original CPM Schedule submittal.

2. Each update shall continue to show all work activities including those already completed.

3. These completed activities shall accurately reflect "as built" information by indicating when activities were actually started and completed.

4. Within seven (7) calendar days of receipt of above noted update, the Architect will either accept or reject monthly schedule update submittal.

a. If accepted, percent complete shown in monthly update will be basis for Application for Payment by the Contractor. The schedule update shall be submitted as part of the Contractor's Application for Payment.

b. If rejected, update shall be corrected and resubmitted by Contractor before the Application for Payment is submitted.

1.5 SCHEDULE REVISIONS

A. Updating the Schedule to reflect actual progress shall not be considered revisions to the Schedule. Since scheduling is a dynamic process, revisions to activity durations and sequences are expected on a monthly basis.

B. If the Contractor's revision is not accepted by the Architect, and the Contractor disagrees with the Architect's position, the Contractor has seven (7) calendar days from receipt of the Architect's letter, to provide a written narrative explaining its position. If the Architect still does not agree with the Contractor's position, the Architect's position shall govern, and the schedule shall be updated in accordance with the Architect's request. The Contractor's failure to respond in writing within seven (7) calendar days shall be contractually interpreted as acceptance of the Architect's position, and the Contractor waives its rights to subsequently dispute or file a claim regarding the Architect's position.

C. At the Architect's discretion, the Contractor can be required to provide subcontractor certifications for revisions affecting said subcontractors.

1.6 RECOVERY SCHEDULE

A. If the Schedule Update shows a substantial completion date fourteen (14) calendar days beyond the Contract Substantial Completion date, the Contractor shall submit to the Architect the proposed revisions to recover the lost time within seven (7) calendar days. As part of this submittal, the Contractor shall provide a written narrative for each revision made to recapture the lost time.

B. If the Contractor's revisions are not accepted by the Architect, the Contractor shall follow the procedures in Paragraph 1.4, above.

C. At the Architect's discretion, the Contractor can be required to provide subcontractor certifications for revisions affecting said subcontractors.

1.7 TIME IMPACT EVALUATION FOR CHANGE ORDERS, AND OTHER DELAYS

A. When the Contractor is directed to proceed with changed work, the Contractor shall prepare and submit, within fourteen (14) calendar days from the direction to proceed, a Time Impact Evaluation (TIE) which includes both a written narrative and a schedule diagram depicting how the changed work affects other schedule activities. The schedule diagram shall show how the Contractor proposes to incorporate the changed work in the schedule, and how it impacts the current schedule update critical path. The Contractor is also responsible for requesting time extensions based on the TIE's impact on the critical path. The diagram must be tied to the main sequence of schedule activities to enable the County of Monterey to evaluate the impact of changed work to the scheduled critical path.

B. The Contractor shall be required to comply with the requirements of Paragraph 1.6A, above, for all types of delays such as, but not limited to, Contractor/Subcontractor delays, adverse weather delays, strikes, procurement delays, fabrication delays, and so on.

C. The Contractor shall be responsible for all costs associated with the preparation of Time Impact Evaluations, and the process of incorporating them into the current schedule update.

D. Once agreement has been reached on a TIE, the Contract Times will be adjusted accordingly. If agreement is not reached on a TIE, the Contract Times may be extended in an amount the County of Monterey allows, and the Contractor may submit a claim for additional time claimed by contractor.

1.8 TIME EXTENSIONS

A. The Contractor is responsible for requesting time extensions for time impacts that, in the opinion of the Contractor, impact the critical path of the current schedule update. Notice of time impacts shall be given in accordance with Article 4 and 8

of the Contract General Conditions (refer to AIA Document A201-1997, included in Part A of this book).

B. Where an event for which the County of Monterey is responsible impacts the projected Substantial Completion date, the Contractor shall provide a written mitigation plan, including a schedule diagram, which explains how (for example, increase crew size, overtime, and so on) the impact can be mitigated. The Contractor shall also include a detailed cost breakdown of the labor, equipment and material the Contractor would expend to mitigate the County of Monterey caused time impact. The Contractor shall submit its mitigation plan to the County of Monterey within fourteen (14) calendar days from the date of discovery of said impact. The Contractor is responsible for the cost to prepare the mitigation plan.

C. Failure to request time, provide TIE, or provide the required mitigation plan will result in Contractor waiving its right to a time extension and cost to mitigate the delay.

D. No time will be granted under this Contract for cumulative effect of changes.

E. The County of Monterey not be obligated to consider any time extension request unless requirements of Contract Documents are complied with.

F. Failure of the Contractor to perform in accordance with the current schedule update shall not be excused by submittal of time extension requests.

G. If the Contractor does not submit a TIE within the required fourteen (14) calendar days for any issue, it is mutually agreed that the Contractor does not require a time extension for said issue.

H. The County of Monterey will grant day-for-day non-compensable time extensions for delays to the critical path due to inclement weather.

2.0 PRODUCTS

A. Not applicable to this Section.

3.0 EXECUTION

A. Not applicable to this Section.

END OF SECTION

SECTION 013300 - SUBMITTAL PROCEDURES

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. This Section describes general requirements for submittals for the work specified in these Contract Documents.

1. Procedures.
2. Safety Plan.
3. Progress Schedule.
4. Shop Drawings.
5. Samples.
6. Quality Control Submittals.
    a. Design Data.
    b. Test Reports.
    c. Certificates.
    d. Manufacturers' Instructions.
7. Operations and Maintenance Manuals.
8. Project Record Documents.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 011000 - Summary of Work

C. Section 012100 - Project Control System
D. Section 012200 - Unit Prices: Measurement and Payment

E. Section 012600 - Modification Procedures

F. Section 017700 - Contract Closeout Procedures

1.3 PROCEDURES

A. Provide all submittals through Procore

B. Submit at own expense Schedule of Shop Drawing and Sample Submittals, Safety Plans, Progress Schedule, Product Data, Shop Drawings, Samples, Operations and Maintenance Manuals, and Project Record Documents required by the Contract Documents.

C. Transmit each item with a standard letter of transmittal in form approved by Architect.

D. Identify project, Contractor, subcontractor, major supplier, pertinent drawing sheet and data number, and specification Section number as appropriate. Provide space for Contractor and Architect review stamps.

E. Where manufacturer's standard drawings or data sheets are used, they shall be marked clearly show those portions of the data which are applicable to this project.

F. Submit Shop Drawings, Samples and other submittals to Architect for review and approval in accordance with accepted Contract Schedule. If no such schedule is agreed upon, then all Shop Drawing, Samples and product data submittals shall be completed within thirty (30) days after receipt of Notice to Proceed from the County of Monterey. The data shown on the Shop Drawings shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to show Architect the materials and equipment Contractor proposes to provide and to enable Architect to review the information for the limited purposes specified below. Samples shall be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which it is intended and otherwise as Architect may require to enable Architect to review the submittal. The number of each Sample to be submitted will be as specified in the Specifications.

G. At the time of each submission, Contractor shall give Architect specific written notice of all variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, and the reasons therefore. This written notice shall be in a written communication separate from the submittal. In addition, Contractor shall cause a specific notation to be made on

each Shop Drawing and Sample submitted to Architect for review and approval of each such variation. If the County of Monterey accepts deviation, the District shall issue appropriate Contract Modification.

H. Submittal coordination and verification is responsibility of Contractor; this responsibility shall not be delegated in whole or in part to subcontractors or suppliers. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

1. All field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto;

2. All materials with respect to intended use, fabrication, shipping, handling, storage assembly and installation pertaining to the performance of the Work;

3. All information relative to Contractor's sole responsibilities and of means, methods techniques, sequences and procedures of construction and safety precautions and programs incident thereto.

I. Contractor shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

J. Contractor's submission to Architect of a Shop Drawing or Sample submittal will constitute Contractor's representation that it has satisfied its obligations under the Contract Documents, and as set forth immediately above, with respect to Contractor's review and approval of that submittal.

K. Designation of work "by others," if shown in submittals, shall mean that work will be responsibility of Contractor rather than subcontractor or supplier who has prepared submittals.

L. After review by Architect of each of Contractor's submittals, one of set of duplicates of material will be returned to Contractor with actions defined as follows:

1. APPROVED - Accepted subject to its compatibility with future submittals and additional partial submittals for portions of the work not covered in this submittal. Does not constitute approval or deletion of specified or required items not shown on the submittal.

2. APPROVED AS NOTED (NO RESUBMISSIONS REQUIRED) - Same as 1 above, except that minor corrections as noted shall be made by Contractor.

3. REVISE AND RESUBMIT - Rejected because of major inconsistencies or errors which shall be resolved or corrected by Contractor prior to subsequent review by Architect.

4. REJECTED - RESUBMIT - Submitted material does not conform to Plans and Specifications in major respect, that is, wrong size, model, capacity, or material.

M. It is considered reasonable that Contractor shall make a complete and acceptable submittal at least by second submission. The County of Monterey reserves the right to deduct monies from payments due Contractor to cover additional costs of Architect's review beyond the second submission. Illegible submittals will be rejected and returned to Contractor for resubmission.

N. Favorable review will not constitute acceptance by the County of Monterey or Architect of any responsibility for the accuracy, coordination and completeness of the submittals.

O. Accuracy, coordination, and completeness of Submittals shall be sole responsibility of Contractor, including responsibility to backcheck comments, corrections, and modifications from the County of Monterey's or Architect's review before fabrications. Submittals may be prepared by Contractor, subcontractors, or suppliers, but Contractor shall ascertain that submittals meet requirements of Contract Documents, while conforming to structural space and access conditions at point of installation. Architect's review will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Favorable review of submittal, method of work, or information regarding materials and equipment Contractor proposes to furnish shall not relieve Contractor of responsibility for errors therein and shall not be regarded as assumption of risks or liability by Architect or the County of Monterey, or any officer or employee thereof, and Contractor shall have no claim under Contract on account of failure or partial failure or inefficiency or insufficiency of any plan or method of work or material and equipment so accepted. Favorable review shall be considered to mean merely that Project Management or the County of Monterey has no objection to Contractor using, upon his own full responsibility, plan or method of work proposed, or furnishing materials and equipment proposed.

P. Architect's review will not extend the means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

Q. Submit complete initial submittal for those items where required by individual specification Sections. Complete submittal shall contain sufficient data to demonstrate that items comply with Specifications, shall meet minimum requirements for submissions cited in technical specifications, shall include motor data and seismic anchorage certifications, where required, and shall include necessary revisions required for equipment other than first named. If Contractor submits incomplete initial submittal, when complete submittal is required, submittal may be returned to Contractor without review.

R. It shall be Contractor's responsibility to copy, conform and distribute reviewed submittals in sufficient numbers for Contractor's files, subcontractors and vendors.

S. After Architect review of submittal, revise and resubmit as required. Identify changes made since previous submittal.

1. Begin no fabrication or work which require submittals until return of submittals not requiring resubmittal.

2. Normally, submittals will be processed and returned to Contractor within [15] working days of receipt.

T. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

1.4 SAFETY PLAN

A. Submit Safety Plan specific to this Contract to Architect within fifteen (15) calendar days after Start Date of the Contract Times.

B. Electronic copy of accepted Safety Plan will be returned to Contractor.

C. No on-site work shall be started until Safety Plan has been reviewed and accepted by Architect and/or Local Building Official. Acceptance of Safety Plan shall not affect Contractor's responsibility for maintaining a safe working place and instituting safety programs in connection with project.

1.5 PROGRESS SCHEDULE

A. See Section 013200, Construction Progress Documentation: Schedules and Reports, for schedule and report requirements.

B. Submit an electronic copy of schedule at each of the following times:

1. Original CPM (Critical Path Method) Schedule within thirty (30) days of the Notice to Proceed.

2. Adjustments to the CPM Schedule as required.

3. CPM Schedule updates monthly, five (5) days prior to monthly progress meeting.

C. Progress Schedules and Reports shall be submitted through Procore.

1.6 SHOP DRAWINGS

A. All Shop Drawings shall be submitted through Procore.

B. Minimum Sheet Size: 8-1/2 inches by 11 inches. All others: Multiples of 8-1/2 inches by 11 inches, 34 inches by 44 inches maximum.

C. Original electronic copy will be marked with Architect's review comments and returned to Contractor.

D. Mark each copy to identify applicable Products, models, options, and other data; supplement manufacturers' standard data to provide information unique to Work.

E. Include manufacturers' installation instructions when required by specification Section.

1.7 SAMPLES

A. Submit full range of manufacturers' standard colors, textures, and patterns for Architect's selection.

B. Submit samples to illustrate functional and aesthetic characteristics of Product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.

C. Include identification on each sample, giving full information.

D. Submit two (2) samples unless otherwise specified. One (1) will be retained.

E. Sizes: Unless otherwise specified, provide the following:

1. Paint Chips: Manufacturers' standard.

2. Flat or Sheet Products: Minimum 6 inches square, maximum 12 inches square.

3. Linear Products: Minimum 6 inches, maximum 12 inches long.

4. Bulk Products: Minimum 1 pint, maximum 1 gallon.

F. Full size samples may be used in Work upon approval.

G. Mock-ups:

1. Erect field samples and mock-ups at Project site in accordance with requirements of specification Sections.

2. Modify or make additional field samples and mock-ups as required to provide appearance and finishes approved by Architect.

3. Approved field samples and mock-ups may be used in Work upon approval.

1.8 QUALITY CONTROL SUBMITTALS

A. All Quality Control Documents shall be submitted through Procore.

B. Design Data: N/A.

C. Test Reports: Original electronic copy will be marked with Architect's review comments and returned to Contractor.

1. Indicate that material or product conforms to or exceeds specified requirements.

2. Reports may be from recent or previous tests on material or product, but must be acceptable to Architect. Comply with requirements of each individual specification Section.

D. Certificates: Original electronic copy will be marked with Architect's review comments and returned to Contractor.

1. Indicate that material or product conforms to or exceeds specified requirements.

2. Submit supporting reference data, affidavits, and certifications as appropriate.

3. Certificates may be recent or from previous test results on material or product, but must be acceptable to Architect.

E. Manufacturers' Instructions: Original electronic copy will be marked with Architect's review comments and returned to Contractor.

1. Include manufacturer's printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing.

2. Identify conflicts between manufacturer's instructions and Contract Documents.

1.9 OPERATIONS AND MAINTENANCE MANUALS

A. Submit electronic copies of manufacturers' operations and maintenance manuals. If necessary, original electronic copy will be marked with Architect's review comments and returned to Contractor for correction until satisfactory information is provided. The County of Monterey will retain satisfactorily corrected manuals for its own use.

B. Submit all Manuals through Procore.

C. Operations and maintenance manuals shall include the following as appropriate:

1. Operating instructions.

2. Preventive maintenance instructions.

3. Cleaning instructions.

4. Safety precautions.

5. Trouble shooting procedures.

6. Theory of operation to discrete component level.

7. Schematic diagrams, flow diagrams, wiring diagrams, logic diagrams, and so on, to discrete component level.

8. Parts lists showing all discrete components with part number, current prices and availability.

9. List of replaceable supplies; paper, ink, ribbon, etc. with part numbers, current prices and availability.

10. Recommended levels of spare parts and supplies to keep on hand.

11. Manufacturers' service and maintenance technical manuals.

12. Names, addresses and telephone numbers of service and repair firms for the equipment.

D. Manuals shall be the same as are used by manufacturers' authorized technicians to completely service and repair the equipment.

1.10 PROJECT RECORD DOCUMENTS

A. Submit one copy of each of the Project Record Documents listed in Section 017700 - Contract Closeout Procedures.

1.11 DELAY OF SUBMITTALS

A. Delay of submittals by Contractor is considered avoidable delay. Liquidated damages incurred because of late submittals will be assessed to Contractor.

2.0 PRODUCTS

A. Not applicable to this Section.

3.0 EXECUTION

A. Not applicable to this Section.

END OF SECTION

SECTION 017400 - CONSTRUCTION CLEANING & WASTE MANAGEMENT

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. This Section includes the following:

1. Waste Management Goals
2. Waste Management Plans
3. Waste Management Plan Implementation
4. Special Programs

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 011000 - Summary of Work

C. Section 013119 - Project Meetings

D. Section 013300 - Submittals

E. Section 017700 - Contract Closeout Procedures

1.3 REFERENCES

A. County Of Santa Clara Recycling and Waste Reduction Division

1.4 DEFINITIONS

A. Construction and Demolition Waste: Solid wastes such as building materials, packaging and rubble resulting from construction, remodeling, demolition and repair of buildings/facilities, paving and infrastructure.

B. Recyclable Materials: Products and materials that can be recovered and manufactured into new products. Recyclable materials include, but are not limited to, the following:

1. Asphaltic paving
2. Portland cement concrete
3. Brick and masonry
4. Land-clearing debris
5. Native rock and granular fill
6. Wood products
7. Ferrous materials
8. Non-Ferrous metals including copper and aluminum
9. Mechanical and electrical products and equipment
10. Gypsum products
11. Acoustical ceiling tile
12. Cardboard and plastic film
13. Office recycling, including paper, glass, plastic and cans
14. Carpet and padding
15. Oil used for equipment
16. Fluorescent lights and ballasts
17. Batteries

C. Recycling Facility: A business that specializes in collecting, handling, processing, distributing, or remanufacturing waste materials, generated by demolition and new construction projects, into products or materials that can be used for this project or by others.

1. As recommend by the County of Monterey

D. Trash: Product or material unable to be salvaged for resale, salvaged and reused, returned, or recycled.

E. Waste Materials: Product or material that can be salvaged for resale, salvaged and reused, returned to vendors, or recycled.

1.5 PERFORMANCE REQUIREMENT

A. The Contractor shall use all means available to divert at least 75% construction and demolition waste from landfills.

1.6 CONSTRUCTION WASTE MANAGEMENT OPERATIONS

A. Take a proactive, responsible role in management of construction waste and require all subcontractors, vendors and suppliers to participate in the effort. Establish a construction waste management program that includes the following categories:

1. Waste prevention including minimizing packaging waste

2. Salvage and reuse

3. Salvage for resale and donation

4. Recycling

5. Disposal

B. Encourage waste prevention practices as an efficient waste management strategy when sizing, cutting, and installing products and materials. Salvage and reuse is a better waste management method than recycling because little or no reprocessing is necessary; less pollution is created when items are reused in their original form. Therefore a diligent effort shall be made to salvage and reuse product and materials. Waste materials that cannot be salvaged and reused yet have value as recyclables, shall be recycled. Only trash shall be transported to a landfill.

1.7 CONSTRUCTION WASTE MANAGEMENT PLAN

A. Perform a waste analysis to determine the types and quantity of construction waste anticipated and identify salvage for resale, salvage and reuse, recycling, and disposal options available. Within 10 days after contract award and prior to performing any demolition work, submit a Waste Management Plan for review and approval. The Waste Management Plan shall include the following:

1. Waste Materials: A list of waste materials that will be salvaged for resale, salvaged and reused, and recycled. A list to address packaging materials

including banding, crates, pallets, plastic film, polystyrene and cardboard (packaging waste consumes 15% of the waste stream).

2. Haulers: Name, address and phone number for each hauler providing service.

3. Facilities: Identification of each recycling facility to be utilized.

4. Separation and Protection: Description of the method to be employed in handling waste materials and description of the method that will be used to protect recycled materials from contamination.

5. Transportation: Description of the means of transportation of waste materials and the destination of the materials.

6. Subcontractor Participation: A description of requirements for subcontractors to adhere to that includes waste prevent measures such as salvage for resale or reuse and recycling for the waste materials generated by each subcontractor's scope of work, including packaging and shipping materials.

7. Meetings: A description of the regular meetings held in which waste management will be addressed. Refer to Section 013119, Project Meetings.

2.0 PRODUCTS

Not Used.

3.0 EXECUTION

3.1 PROGRAM IMPLEMENTATION AND MONITORING

A. Implement and maintain, for the duration of the project, the construction waste management program.

1. Manager: The Contractor shall designate an onsite party (or parties) responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.

2. Distribution: The Contractor shall distribute copies of the Waste Management Plan to the Contractor, each Subcontractor, the County of Monterey, and Architect.

3. Instruction: The Contractor shall provide onsite instruction of appropriate separating, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

4. Separation Facilities: The Contractor shall lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, and return. Provide a site map that calls out areas identified. Provide the necessary containers and bins to facilitate the waste management program. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials. Separate construction waste at the project site by one of the following methods:

    a. Source Separated Method: Waste products and materials that are recyclable are separated from trash and sorted into appropriately marked separate containers and then transported to the respective recycling facility for further processing. Trash is transported to a landfill.

    b. Co-Mingled Method: Selected waste materials are placed into a single container and then transported to a recycling facility where the recyclable materials are sorted and processed and the remaining trash and waste materials are handled separately.

    c. Other methods proposed by the Contractor and approved by the Contracting Officer.

END OF SECTION

SECTION 017700 - CONTRACT CLOSEOUT PROCEDURES

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. This Section describes contract closeout procedures including:

1. Removal of temporary construction facilities.
2. Substantial completion.
3. Final completion.
4. Final cleaning.
5. Project record documents.
6. Material, equipment and finish data.
7. Project guarantee
8. Warranties
9. Turn-in.
10. Release of claims.
11. Guaranty and Maintenance Bonds

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

1.3 REMOVAL OF TEMPORARY CONSTRUCTION FACILITIES

A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion Inspection.

B. Clean and repair damage caused by installation or use of temporary facilities.
C. Restore permanent facilities used during construction to specified condition.

1.4 SUBSTANTIAL COMPLETION

A. When Contractor considers Work or designated portion thereof is substantially complete, submit written notice, with list of items to be completed or corrected.

B. Within reasonable time, Architect will inspect to determine status of completion.

C. Should Architect determine that Work is not substantially complete, Architect will promptly notify Contractor in writing, listing all defects and omissions.

D. Remedy deficiencies and send a second written notice of substantial completion. Architect will re-inspect the Work.

E. When Architect determines that Work is substantially complete, Architect will issue a Certificate of Substantial Completion.

F. Manufactured units, equipment and systems which require startup must have been started up and run for periods prescribed by Architect before a Certificate of Substantial Completion will be issued.

1.5 FINAL COMPLETION

A. When Contractor considers Work is complete, submit written certification that:

1. Contractor has inspected Work for compliance with Contract Documents.

2. Work, except for Contractor maintenance after Final Acceptance, has been completed in accordance with Contract Documents and deficiencies listed with Certificate of Substantial

3. Completion has been corrected.

4. Work is complete and ready for final inspection.

B. In addition to submittals required by conditions of Contract, provide submittals required by governing authorities and submit final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.

C. When Architect finds Work is acceptable and final submittal is complete, Architect will issue final change order reflecting approved adjustments to Contract Sum not previously made by Change Order.

1.6 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

1. Clean equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment operated during construction, clean ducts, blowers and coils of units operated without filters during construction.

2. Employ skilled workers for final cleaning.

C. Clean Site; mechanically sweep paved areas.

D. Remove waste and surplus materials, rubbish, and construction facilities from Site.

1.7 PROJECT GUARANTEE

A. Requirements for Contractor's guarantee of completed Work are included in Warranty from General Conditions of the Contract for Construction. Contractor shall guarantee Work done under Contract against failures, leaks or breaks or other unsatisfactory conditions due to defective equipment, materials or workmanship, and perform repair work or replacement required, at Contractor's sole expense, for period of [1] year from date of Final Acceptance.

B. Neither recordation of final acceptance nor final certificate for payment nor provision of the Contract nor partial or entire use or occupancy of premises by the County of Monterey shall constitute acceptance of Work not done in accordance with Contract Documents nor relieve Contractor of liability in respect to express warranties or responsibility for faulty materials or workmanship.

C. The County of Monterey may make repairs to defective Work as set forth in Warranty from General Conditions of the Contract for Construction, if, within 5 working days after mailing of written notice of defective work to Contractor or authorized agent, Contractor shall neglect to make or undertake with due diligence repairs; provided, however, that in case of leak or emergency where, in opinion of the County of Monterey, delay would cause hazard to health or serious loss or damage, repairs may be made without notice being sent to Contractor, and Contractor shall pay cost thereof.

D. If, after installation, operation or use of materials or equipment to be furnished under Contract proves to be unsatisfactory to Architect, the County of Monterey shall have right to operate and use materials or equipment until it can, without damage to the County of Monterey, be taken out of service for correction or

replacement. Period of use of defective materials or equipment pending correction or replacement shall in no way decrease guarantee period required for acceptable corrected or replaced items of materials or equipment.

E. Nothing in this Section shall be construed to limit, relieve or release Contractor's, subcontractors' and equipment suppliers' liability to the County of Monterey for damages sustained as result of latent defects in equipment caused by negligence of suppliers' agents, employees or subcontractors. Stated in another manner, warranty contained in the Contract Documents shall not amount to, nor shall it be deemed to be, waiver by the County of Monterey of any rights or remedies (or time limits in which to enforce such rights or remedies) it may have for defective workmanship or defective materials under laws of this State pertaining to acts of negligence.

1.8 WARRANTIES AND BONDS

A. Execute Contractor's submittals and assemble documents executed by subcontractors, suppliers, and manufacturers.

1. Provide table of contents and assemble in a single electronic file.

2. Assemble in Specification Section order.

3. Submit through Procore.

B. Submit material prior to final application for payment.

1. For equipment put into use with the County of Monterey’s permission during construction, submit within ten (10) working days after first operation.

2. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten (10) working days after acceptance, listing date of acceptance as start of warranty period.

C. Warranties are intended to protect the County of Monterey against failure of work and against deficient, defective and faulty materials and workmanship, regardless of sources.

D. Limitations: Warranties are not intended to cover failures which result from the following:

1. Unusual or abnormal phenomena of the elements.

2. Vandalism after substantial completion.

3. Insurrection or acts of aggression including war.

E. Related Damages and Losses: Remove and replace Work which is damaged as result of defective Work, or which must be removed and replaced to provide access for correction of warranted Work.

F. Warranty Reinstatement: After correction of warranted Work, reinstate warranty for corrected Work to date of original warranty expiration or to a date not less than 365 days after corrected Work was done, whichever is later.

G. Replacement Cost: Replace or restore failing warranted items without regard to anticipated useful service lives.

H. Warranty Forms: Submit drafts to Architect for approval prior to execution. Forms shall not detract from or confuse requirements or interpretations of Contract Documents.

1. Warranty shall be countersigned by manufacturers.

2. Where specified, warranty shall be countersigned by subcontractors and installers.

I. Rejection of Warranties: the County of Monterey reserves right to reject unsolicited and coincidental product warranties which detract from or confuse requirements or interpretations of Contract Documents.

J. Term of Warranties: For materials, equipment, systems and workmanship warranty period shall be two (2) years minimum from date of substantial completion of entire Work except where:

1. Detailed specifications for certain materials, equipment or systems require longer warranty periods.

2. Materials, equipment or systems are put into beneficial use the County of Monterey prior to Substantial Completion as agreed to in writing by Architect.

K. Warranty of Title: No material, supplies, or equipment for Work under Contract shall be purchased subject to any chattel mortgage, security agreement, or under a conditional sale or other agreement by which an interest therein or any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all work to deliver premises, together with improvements and appurtenances constructed or placed thereon by Contractor, to the County of Monterey free from any claim, liens, security interest, or charges, and further agrees that neither Contractor nor any person, firm, or corporation furnishing any

materials or labor for any Work covered by Contract shall have right to lien upon premises or improvement or appurtenances thereon. Nothing contained in this Paragraph, however, shall defeat or impair right of persons furnishing materials or labor under bond given by Contractor for their protection or any rights under law permitting persons to look to funds due Contractor in hands of the County of Monterey.

1.9 TURN-IN

A. Contract will not be closed out and final payment will not be made until all personnel Identification Media, vehicle permits and keys issued to Contractor during prosecution of Work are turned in to the County of Monterey.

2.0 PRODUCTS

A. Not applicable to this Section.

3.0 EXECUTION

A. Not applicable to this Section.

END OF SECTION

SECTION 018119 – CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. This Section includes procedures for achieving an environmentally conscious Work Product. The Contractor shall:

1. Prepare a Construction Indoor Air Quality Management Plan (IAQ) in accordance with this Section (refer to parts 1.2 and 1.3 below).

2. Adhere to the methods and procedures outlined in the Construction IAQ during construction and closeout.

3. Document compliance with the Construction IAQ during construction.

4. Submit certification to the County at closeout demonstrating compliance with the Construction IAQ requirements.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

1.3 SPECIAL SUBMITTAL REQUIREMENTS

A. Construction Indoor Air Quality Management Plan (IAQ): Not less than 21 days prior to installation of HVAC ductwork or equipment, or application of coatings, sealants and/or finishes inside the enclosed building shell.

B. Revise and resubmit IAQ as required by the County of Monterey or Architect.

1. Approval of the Contractor’s Environmental Procedures Compliance plans will not relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures required by Federal, state, county or local agencies.

1.4 PROVIDE A CONSTRUCTION IAQ MANAGEMENT PLAN THAT INCLUDES:

A. Procedures for meeting the applicable SMACNA (Sheet Metal and Air Conditioning National Design/Builders Association) Construction IAQ requirements.

B. Procedures for protection and remediation plans for damaged absorptive materials.

C. Training sessions for all contractors and subcontractors that they understand and agree to comply with the Construction IAQ Management Plan requirements.

1. Schedule and sequence of events for HVAC system installation/startup, application of interior coatings and finishes, and installation of building furnishings.

2.0 PRODUCTS

A. Not Applicable to this Section.

3.0 EXECUTION

3.1 DURING CONSTRUCTION THE CONTRACTOR SHALL:

A. Meet or exceed the applicable minimum requirements of the current SMACNA and the IAQ Guidelines for Occupied Buildings Under Construction, Chapter 3, for the items listed below which the contractor shall supply during construction:

1. HVAC Protection:

a. Protect all air handling and distribution equipment, and air supply and return ducting during construction.

b. Adequately cover and protect all exposed air inlet and outlet openings, grilles, ducts, plenums, etc., to prevent water, moisture, dust, and other contaminant intrusion.

c. Apply protection immediately after installation of equipment and ducting.

d. Ducting runs that require more than a single day to install shall be protected at the end of each day’s Work.

2. Source Control:

a. Protect stored onsite or installed absorptive or porous materials including, but not limited to, batt insulation, drywall, and carpeting from exposure to moisture.

b. Do not use moisture-damaged porous materials in the building.

c. Provide adequate ventilation of packaged dry products prior to installation to allow for gassing of volatile organic compounds (VOCs). Remove from packaging and ventilate in a a secure, dry, well-ventilated space free from strong contaminant sources and residues. Provide a temperature range of 60 degrees F minimum to 90 degrees F maximum continuously during the ventilation period. Do not ventilate within limits of Work unless otherwise approved by the Architect.

3. Housekeeping:

a. Minimize accumulation of dust fumes, vapors, or gases in the building.

b. Suppress dust with wetting agents or a sweeping compound.

c. Clean up dust using a wet rag or damp mop.

d. Increase the cleaning frequency when dust buildup is noted.

e. Remove spills or excess applications of solvent-containing products as soon as possible.

f. Remove accumulated water and keep work areas as dry as possible.

g. Vacuum using HEPA-filtered vacuum cleaners.

h. Store volatile liquids, including fuels and solvents, in closed containers and outside of the building when not in use.

i. Keep volatile liquid containers closed when the container is inside of the building and not in use.

4. Scheduling:

a. Develop schedule for application of interior finishes including time frames for the application of wet materials onto dry materials, dry materials onto wet materials, and expected curing times for applied wet materials.

b. Schedule application of wet material floor coverings, wall coverings, and other porous finish materials after activation of building HVAC and exhaust systems.

c. Wet materials include all paints, adhesives, sealants, coatings, finishes and spray-applied materials.

d. Insure that all wet applied interior finish materials are properly and fully cured before installing other finish materials over them.

e. Install carpets and furnishings after all other interior finish materials have been applied and fully cured.

f. Provide sufficient ventilation, air circulation and air changes to properly cure materials. Run HVAC system and exhaust fans 24 hours per day during this period. Return air dampers shall be closed to provide 100% fresh air intake. Temperatures shall be maintained at approximately 75 degrees F (verify specific recommended temperature settings with coating and finish manufacturer's product data).

g. Provide sufficient ventilation, air circulation and air changes to dissipate excess humidity when present. Relative humidity shall not be allowed to exceed 40%.

B. Use nontoxic cleaning materials and procedures to avoid the release of toxic fumes and VOCs into finished spaces within the building.

C. Replace all filtration media immediately prior to occupancy.

1. Filtration media shall have a Minimum Efficiency Reporting Valve (MERV) of 13, as determined by ASHRAE 52.2-2007 for media installed at the end of construction.

2. Provide cut sheets of filtration media used during construction and installed prior to occupancy with MERV highlighted.

3. Provide a letter declaring that all filtration media was replaced prior to occupancy.

D. During construction provide photographs of Construction IAQ management measures such as protection of ducts and onsite stored or installed absorptive materials to document compliance with the Construction IAQ management plan.

END OF SECTION

Division 2:
Existing Conditions

SECTION 020500 - SELECTIVE DEMOLITION & SITE CLEARING

1.00 GENERAL

1.01 DESCRIPTION

A. Principal work in this Section:

1. Selective demolition, dismantling, cutting and alterations as indicated, specified, and necessary for the completion of the Contract, including site clearing.

2. Removing trees, shrubs and other plants designated for removal.

3. Disconnecting, cutting, and capping live utilities.

4. Salvaging, storing, and protecting existing work to remain.

5. Removing demolished materials off the site.

6. Temporary rerouting of vehicles and pedestrians during construction, including traffic control.

1.02 JOB CONDITIONS

A. Existing conditions: Intent of Drawings is to show existing conditions with information developed from original construction documents, field surveys, and Owner's records and to generally show the extent and type of demolition required to prepare the existing areas for new work.

B. Site Review: Make a detailed review of existing conditions prior to commencing demolition, and report discrepancies or conflicts between Drawings and actual conditions in writing to the Engineer for clarifications and instruction. Do not proceed where such conflicts or discrepancies occur prior to receipt of Owner's Representative's instructions.

2.00 PRODUCTS (Not Applicable)

3.00 EXECUTION

3.01 GENERAL

A. Protection: Do not begin clearing work until temporary fences, barricades, warning signs and other pedestrian control devices are installed.

B. Noise control: Exercise caution and care to prevent generation of unnecessary noise. Keep noise levels to the minimum possible.

C. Dust control: Control dust by frequent sprinkling with water or other methods acceptable to the Owner's Representative as well as limiting the vehicle speeds to 15 mph.

D. Water control: Control the use of water to prevent damage to the existing site improvements to remain.

E. Protection measures: Provide all safeguards, including warning signs and lights, barricades, and the like, that may be necessary to protect the public, Contractor's employees and adjacent property during demolition.

F. Protection of existing facilities and landscape: Protect and maintain all trees, plants, utilities and existing improvements that are not to be removed. Such items shall be protected from injury or damage resulting from the Contractor's operation. Replace all damaged landscaping, improvements or utilities in kind.

G. Security: Take all necessary precautions to keep trespassers out of demolition areas. Properly secure demolition areas from entry when work is not in progress.

H. Safety: If at any time the safety of existing construction appears to be endangered, take immediate measures to support such endangered construction; cease operations and immediately notify the Owner's Representative. Do not resume demolition until Owner's Representative instructions are received.

I. Disconnecting services: Notify authorities owning or controlling wires, conduits, pipes, and other services affected by the work of this Section, before commencing demolition.

3.02 DEMOLITION

A. The Contractor shall be fully responsible for the adequacy and installation of all temporary shoring and bracing systems used during the performance of this work.

B. Work shall be performed by skilled and properly equipped personnel. Promptly repair damages caused by demolition operations to materials to remain.

C. Remove existing construction only to the extent necessary for the proper installation of new construction and junction with existing work. Cut back finished surfaces to straight, plumb or level lines as required.

D. Where openings are cut oversize or in an improper location, replace the excess removed material as instructed by the Owner's Representative at no additional cost to the Owner.

E. Coordinate demolition with other trades to assure the proper sequence, limits, methods and time of performance. Schedule work so as to impose a minimum of hardship on the present operation of the facilities and the performance of the work of other trades.

F. Remove concrete structures or portions of structures extending below grade completely.

G. Work not mentioned to be removed that interferes with new construction shall be cut and removed to provide for proper interface with new construction, or patching and repair, as required.

3.03 SALVAGE

A. No materials are to be salvaged.

3.04 PATCHING

A. Patch materials to remain when damaged by this work. Patch to the satisfaction of the Owner. Finish materials and appearance of the patch or repair work shall match the existing contiguous materials and finishes in all respects, as approved by the Owner's Representative.

3.05 CLEANUP AND DISPOSAL

A. Debris, waste, and removed materials, other than items to be salvaged, are the Contractor's property for legal disposal off the site. Continuously clean up and remove these items and do not allow them to accumulate on the site.

END OF SECTION 020500

SECTION 022000 - EARTHWORK

1.00 GENERAL

1.01 DESCRIPTION

A. Principal work in this Section:

1. All excavating, filling, backfilling, compacting and grading required for the Project.

2. Adjusting manhole rims, grates, valve boxes, etc. to finished grade indicated.

3. Pumping, draining, shoring, cribbing and other protective measures.

4. Importing fill materials.

5. Shoring and cribbing.

6. Removing excess and unsatisfactory excavated materials from the site.

B. Related work in other Sections:

1. Demolition and site clearing: Section 020500.

2. Trenching, backfilling and compacting for utilities: Section 022100.

3. Disconnecting utilities: Section 020500.

4. Re-routing utilities: Sections 024000, and 027000.

5. Aggregate base under asphalt paving: Section 025130.

6. Finish grading for landscaping and asphalt paving: Section 025130.

1.02 QUALITY ASSURANCE

A. Lines and levels: All construction staking shall be provided by Contractor.

B. Inspections and tests: The Owner will employ a Geotechnical Consultant to inspect and test the work of this Section. At completion of this work, the Geotechnical Consultant will be required to submit written report certifying that the site was developed with acceptable materials in accordance with these Specifications and/or the recommendations of the Soil Investigation Report.

1. The Geotechnical Consultant will:

a. Make inspections of the structural subgrades required by the nature of the subsurface conditions discovered during the progress of the earthwork operations.

b. Approve for use of imported fill material.

c. Inspect all filling, backfilling, and compacting of the soils.

1.03 SUBMITTALS

A. Imported fill materials: Submit samples of proposed imported materials, minimum 40 lbs., tagged with source location and manufacturer to the Owner's Representative at least 15 days prior to import. Material shall not be imported to job site without written approval by the Owner's Representative.

1.04 GEOTECHNICAL INVESTIGATION

A. A geotechnical investigation report has been prepared for the site by Earth Systems Pacific (831) 240-4624, (Project No. 305777-001, dated March 10, 2023) and is available for the Contractor's review from the Owner, the Owner's Representative or the Geotechnical Engineer. All grading, excavation, compaction, and expansive soil remediation shall be per the geotechnical investigation report.

B. Geotech report is incorporated into the construction documents and thus holds responsibility for its findings. However, the Contractor shall independently examine the site and evaluate all conditions affecting the work, as neither the Owner nor the Owner’s representatives guarantee subsurface conditions beyond the boring locations specified in the report.

C. In case of conflict between these Specifications and the recommendations of the geotechnical investigation, the geotechnical investigation shall govern.

2.00 PRODUCTS

2.01 FILL MATERIALS

A. Select (porous) fill under building slab-on-grade and behind retaining and basement walls: Clean gravel or crushed rock complying with CalTrans Standard Specifications, Section 68, Class 2.

B. Imported fill materials and on-site select materials shall be granular in nature, non-expansive, free of organic materials, with a plasticity index of less than 12, and an expansion index of less than 20 and graded as follows:

Sieve Size	Percentage Passing Sieve
3"	100
No. 4	60 - 100
No. 200	Less than 20

C. On-site materials, less debris and organic matter, shall be approved by the Geotechnical Engineer.

D. Import shall be approved by the Geotechnical Engineer.

3.00 EXECUTION

3.01 PROTECTIVE MEASURES

A. Underground utilities: Report any lines encountered that are not indicated, or are in location other than indicated, on the Drawings to the Engineer's attention who will issue instruction for proceeding with the work.

B. Moisture control: Remove water and debris, which would interfere with construction, from excavated areas and keep working areas dry when work is in progress. Grade perimeter of excavations so that water run-off drains away from the excavations.

1. Keep excavations free from loose material and water while fill is placed and compacted.

2. Dispose of water resulting from dewatering operations in a manner that will not cause damage to public or private property, or constitute a nuisance or menace to the public.

3. Make sure that debris and dirt generated by this work does not block existing storm drain system. Keep adjacent paving (outside Contract area) broom clean and free of debris and dirt. Clean any existing facilities that become plugged.

C. Shoring, cribbing and bracing: Provide and install shoring, cribbing and bracing of the excavations as necessary to prevent cave-ins and to support and protect adjacent construction in accordance with Federal, State and local laws. Contractor shall be completely responsible for adequacy and safety of shoring design, construction, and removal.

D. Benchmarks and monuments: Protect benchmarks, monuments and other reference points against displacement and damage. Repair or replace benchmarks, monuments and other permanent survey data that becomes displaced or damaged due to the performance of the work of this Section.

E. Dust palliation: Keep down dust at the site by intermittent watering and sprinkling while the work of this Section is being performed. Earthwork operations shall be conducted so as to prevent windblown dust and dirt. Assume liability for all claims related to windblown dust and dirt. Apply water in accordance with applicable provisions of Section 17 of California Transportation Standard Specifications and with Section 1590 (e) of CAL/OSHA, Title 8.

F. Protection of existing facilities and landscape: Protect all trees, plants, utilities and existing improvements to remain from injury and damage resulting from the work of this Section. Replace all damaged landscaping, improvements or utilities in kind. Refer to Section 02050 for additional requirements on tree protection. Clean staging and other use areas of debris and dust upon completion of project. Re-stripe portions of parking lot where, in the opinion of the Owner's Representative, the striping was damaged or destroyed by Contractor's operations.

G. Protection of completed work:

1. Protect finished areas from weather damage to prevent erosion of graded areas.

2. Hauling and other activities on prepared grades which will deform them from required cross sections will not be permitted. Repair and re-compact damage to prepared grades caused by such operations at no additional cost to the Owner.

3.02 EXCAVATING AND FILLING

A. Site clearing is specified in Section 02050 and/or soils report. Verify that existing paving, curbs, light posts and other improvements, and all debris are removed from the site.

B. After site has been properly cleared, stripped, and excavations to rough grade have been made, exposed surface soils in those areas to receive engineered fills, concrete slabs-on-grade, or pavements should be scarified to a depth of 12 inches, moisture conditioned, and compacted (see D). In building areas to receive concrete slabs-on-grade, sub-grade preparation shall extend at least 5 feet beyond the limits of the proposed structures and any adjoining flat work. In pavement areas and for exterior flatwork not connected to buildings, sub-grade preparation shall extend at least 2 feet beyond the back of the curbs or outside limits of flatwork.

C. Any portions of the site which are disturbed or softened by standing water shall be re-graded and re-compacted to 90% of maximum density (ASTM D-1557) as recommended by the Owner's Representative. Portions of the site which show evidence of "pumping" or movement under load shall be excavated, dried out, or filled with bridging rock or other material determined to be suitable by the Owner's Representative, then recompacted to the above standards. All this work shall be done at no additional cost to the Owner.

D. Place fill materials in loose lifts no more than 8" in uncompacted thicknesses. Compaction of fill should be accomplished by mechanical means only. Compact engineering fills consisting of expansive clay soil between 88% to 93% relative compaction at soil moisture content of between 3 and 5 percent above the laboratory optimum moisture content. Compact on-site or imported soils with low expansion potential to at least 90% relative compaction at soil moisture content of between 1 and 3 percent above the laboratory optimum moisture content. In pavement areas, the upper 12 inches of sub-grade shall be compacted to at least

95% percent relative compaction at soil moisture content 1 to 3 percent above optimum value. Aggregate base material in pavement areas shall be compacted slightly above the optimum moisture content to at least 95% relative compaction. Behind retaining walls, care should be taken to avoid over-compaction of the backfill materials. Avoid excessive wall movements and lateral pressures use lightweight hand-operated equipment to compact backfill within 3 feet behind retaining walls.

E. Do not place fill during unfavorable weather conditions. If work is interrupted by heavy rain, do not resume operations until the proper moisture content and density of the materials have been achieved.

F. Earth and rock, regardless of character and subsurface conditions, shall be excavated to depths shown on Drawings and to the neat dimensions of the footings wherever practicable, to permit pouring of footings and grade beams without use of side forms, except at slab perimeters.

3.04 BACKFILLING

A. Place backfill in loose layers not exceeding 8" thick, as construction operations permit, but not before work to be covered has been inspected and approved, and loose soils and debris have been removed from the excavations.

B. Do not place backfill during unfavorable weather conditions as specified for fill above.

C. Compact backfill to 95% of maximum density (ASTM D1557).

D. Where backfill is required on both sides of a structure, place it simultaneously so that the height of fill remains approximately equal on both sides at all times.

E. Brace construction which has not been designed to withstand eccentric loading during backfilling.

F. Backfill only after the structure to be backfilled against has attained its design strength or has been properly braced, to resist the load of the backfill. No compacting by jetting permitted.

G. Keep rollers and other heavy equipment at least 4 feet from footings, foundations, piers and walls of building and appurtenances.

3.05 GRADING

A. The locations and elevations of all construction are indicated on the Drawings and, unless inconsistencies are brought to the Owner's Representatives attention prior to commencement of work, the Contractor will be held responsible for the proper location and elevations of the completed work.

B. Grade all areas to the lines and levels required. Keep grades straight between changes in elevations. Finish grading tolerance shall not exceed plus or minus one half inch (½") of required elevations, if evenly distributed.

C. The required subgrade elevation shall be such that when subbase and indicated construction are added, the final elevations will be those shown on the Drawings.

3.07 FRAMES, COVERS, GRATES AND VALVE BOXES

A. Adjust frames, grates, valve boxes, and covers of existing manholes, inlets, or other facilities to grade in conformance with Sections 15 of the CDT Standard Specifications.

B. A structure located in a paved area shall not be constructed to final grade until the adjacent pavement or surfacing has been compacted.

3.08 DISPOSAL OF SURPLUS AND UNSUITABLE EXCAVATED MATERIALS

A. Remove these materials from the Owner's site and dispose of them in a legal manner; this includes materials resulting from all excavations including elevator cylinder, concrete piles and utility excavations. Burning and burying materials on-site is prohibited.

3.09 FIELD QUALITY CONTROL

A. Field density tests: To check the degree of compaction of native soils and fill will be taken by the Owner's Representative. The location and frequency of the tests will be at the Owner's Representative discretion.

B. Verification of elevations: Owner will provide the services of a licensed Civil Engineer or Land Surveyor upon completion of earthwork operations to verify that grades are within the tolerances specified. Should the grades be found to be out of tolerance, the site shall be reworked and resurveyed by the Owner at the Contractor's expense.

END OF SECTION 022000

SECTION 022100 - TRENCHING, BACKFILLING & COMPACTING

1.00 GENERAL

1.01 DESCRIPTION

A. Principal work in this Section:

1. Trenching, backfilling and compacting.

2. Surface restoration.

B. Related work in other Sections:

1. Earthwork: Section 022000.

2. Site drainage: Section 024000.

3. Piped Utilities: Section 027000.

1.02 QUALITY ASSURANCE

A. Reference standards: The applicable provisions of the following govern the work of this Section.

1. American Society for Testing and Materials (ASTM).

a. D1556: Density of Soil in Place by Sand Cone Method.

b. D1557: Moisture Density Relations of Soils and Soil-Aggregate Mixtures Using a 10 lb (4.5 kg) Rammer and 18" (457mm) drop.

2. California Department of Transportation (CDT).

a. Standard Specifications.

b. Standard Test Methods: No. 202, 216, and 231.

3. CAL/OSHA Regulation for Construction: Section 29 CFR.

B. The degree of compaction specified herein shall be determined by California Test Method No. 216 or No. 231. Unless otherwise noted, the percentage specified shall be the minimum allowable.

1.03 SUBMITTALS

A. Submit Product Data under 2.01 Materials, certifying that each material item complies with specified requirements.

1.04 SITE CONDITIONS

A. Comply with OSHA Construction Safety Orders, and specifically with those provisions dealing with trenching and underground construction.

1.05 SYSTEM DESCRIPTION

A. Definitions:

1. A trench is defined as an excavation in which the depth is greater than the width of the bottom of the excavation.

2. Excavations for appurtenant structures, such as but not limited to manholes, transition structures, junction structures, vaults, valve boxes, catch basins, thrust blocks, and boring pits shall be deemed to be in the category of trench excavation.

B. Unless otherwise indicated on the Drawings, excavation for pipelines shall be open cut.

2.00 PRODUCTS

2.01 MATERIALS

A. Select backfill material:

1. Sand or granular materials, free from organic matter, of the quality herein specified. Select backfill material shall have a size and gradation falling within the following limits when determined by California Test No. 202:

Sieve Size	Percentage Passing Sieve
1"	100
No. 4	50-100
No. 200	5 max.

2. The minus 200 portion of the material expressed as a percentage multiplied by the Plasticity Index shall not exceed 100.

B. Detectable tape: Detectable tape shall be 5.0 mil composition film containing metalized foil laminated between layers of inert plastic film, such as Detectable Terra Tape or approved equal. The tape shall be highly resistant to alkalis and acids found in the soil. The tape, when buried 4' deep, shall be detectable by buried pipe or cable locating equipment. The tape shall be 3" wide and bear a continuous printed message warning of the type of utility buried beneath.

3.00 EXECUTION

3.01 PREPARATION

A. General:

1. Prior to trenching excavate at locations where new lines cross other utilities of uncertain depth and determine the elevation of the utility in question to ensure that the new line will clear the potential obstruction.

2. If, after excavation, the crossing utility does present an obstruction, then the line and grade of the new line will be adjusted as directed by the Engineer to clear the utility.

3.02 TRENCHING

A. General:

1. Trenching shall include removal of all water and materials that interfere with construction. Remove water which may be encountered in the trench by pumping or other methods during the pipe laying, bedding and backfill operations. Material shall be sufficiently dry to permit approved jointing.

2. Excavation shall include the construction and maintenance of bridges required for vehicular and pedestrian traffic, support for adjoining structures and where necessary, the rearrangement and repair of adjoining utilities.

3. It shall be the Contractor's responsibility to direct vehicular and pedestrian traffic through or around his work area at all times.

4. Except as specified in other Sections, the Contractor shall relocate, reconstruct, replace or repair, at his own expense, existing utilities, walls, fences, services, other structures or improvements of what ever nature, which are in the line of construction or which may be damaged, removed, disrupted or otherwise disturbed by the Contractor whether specifically identified on the Drawings or not. The Contractor shall connect such utilities to existing systems and leave all in a workable and operating condition.

5. Tree roots over 2" in diameter and crossing pipelines shall be protected by using hand excavation; refer to Section 02050. Hand excavation shall mean excavation using the smallest piece of motorized equipment available in combination with manual use of hand equipment, with the intent to minimize the damage to low hanging tree limbs, tree roots and utilities.

B. Existing paving and concrete: The following supplements the requirements of Section 02050.

1. Existing pavement over trench shall be sawcut, removed and hauled away from the job. Existing pavement shall be neatly sawcut along the limits of excavations. If a longitudinal pavement joint or edge of pavement is located within 3' of the limit of excavation, all intervening pavement shall be removed and replaced after completion of backfilling.

2. Existing concrete over the trench shall be sawcut to a minimum depth of 1½" in straight lines either parallel to the curb or at right angles to the alignment of sidewalk. No section to be replaced shall be smaller than 30" in either length or width. If the sawcut would fall within 30" of a construction joint, expansion joint, or edge, or within 12" of a score mark, the concrete shall be removed to the joint, edge or mark.

3. Place boards or other suitable material under backhoe outrigging to prevent damage to paved surfaces.

C. Trench Width:

1. The maximum allowable trench widths at the top of the pipe shall be the following:

Pipe Type	Trench Width (Max.)
Cast-iron	Outside diameter of barrel plus 18"
Ductile-iron	Outside diameter of barrel plus 18"
PVC	Outside diameter of barrel plus 18"
VCP	Outside diameter of barrel plus 18"
Concrete cylinder	Outside diameter of barrel plus 18"
Welded steel	Outside diameter of barrel plus 18"
Corrugated metal	Outside diameter of barrel plus 18"
RCP	Outside diameter of barrel plus 18"

a. The maximum trench width shall be inclusive of all shoring.

b. If the maximum trench width is exceeded, the Architect may direct the Contractor to embed or cradle the pipe in concrete at no additional charge to the Owner.

2. In no case shall the free working space on each side of the pipe barrel be less than 6".

D. Open trench:

1. The maximum length of open trench shall be 300' or the distance necessary to accommodate the amount of pipe installed in a single day, whichever is greater. No trench shall be left open at the end of the day.

2. Provisions for trench crossings and free access shall be made at all street crossings, driveways, water gate valves and fire hydrants.

E. Excavation bracing:

1. The excavation shall be supported and excavation operations conducted in accordance with the California Industrial Accident Commission, State of California, Division of Industrial Safety requirements, and OSHA.

2. The Contractor shall, at his own expense, furnish, put in place, and maintain such sheeting and bracing as may be required to support the sides of all excavations (whether above or below the pipe grade), and to prevent any movement which could in any way diminish the required trench section or otherwise injure or delay the work. The sheeting and bracing shall be withdrawn to prevent any earth movement that might overload the pipe.

F. Excavated material:

1. Material excavated and not required for backfill shall be immediately removed and properly disposed of off the Owner's site.

2. Material excavated in streets and roadways shall be laid alongside the trench and kept trimmed to minimize inconvenience to public traffic.

3. Provisions shall be made whereby all storm and wastewater can flow uninterrupted in gutters or drainage channels.

4. Excavated material shall not be stored on landscaping.

3.03 PIPE BEDDING

A. Bedding excavation: Excavate the trench below the grade of the pipe bottom to the following minimum depths:

Pipe Type	Depth
Cast-iron	6"
Ductile-iron	6"
PVC	6"
VCP	6"
Concrete cylinder	4"
Welded steel	4"
Corrugated metal	3"
RCP	3"

B. Stabilization of trench bottom: When the trench bottom is unstable due to wet or spongy foundation, trench bottom shall be stabilized with gravel or crushed rock. The Engineer will determine the suitability of the trench bottom and the amount of gravel or crushed rock needed to stabilize a soft foundation. Soft material shall be removed and replaced with gravel or crushed rock when ordered by the Soils Consultant.

C. Placement of bedding material: Sufficient select backfill material as specified in Paragraph 2.01 A (above) shall be placed in trench and tamped to bring trench bottom up to grade of the bottom of pipe. The relative compaction of tamped material shall be not less than 90% as determined by ASTM D1556 or California Test 216. It is the intent of these Specifications to provide uniform bearing under the full length of pipe to a minimum width of 60% of the external diameter.

3.04 TRENCH BACKFILL

A. Initial backfill:

1. Prior to trench backfill, the Owner's Representative will inspect the condition of the trench and laying of pipe.

2. Select backfill material as specified in Paragraph 2.01 A (above) shall be used for initial backfill. After the pipe has been properly laid and inspected, select backfill material shall be placed on both sides of the pipe and compacted to final depth as follows:

Pipe Type	Depth
Cast-iron	12" above top of pipe
Ductile-iron	12" above top of pipe
PVC	12" above top of pipe
VCP	12" above top of pipe
Concrete cylinder	12" above top of pipe
Welded steel	12" above top of pipe
Corrugated metal	½ outside diameter of pipe
RCP	(Pipe spring line)

3. Compaction:

a. Initial backfill compaction shall be by mechanical means. The initial backfill material shall be hand tamped in layers not exceeding 4" in uncompacted depth and shall be brought up uniformly on both sides of the pipe to avoid bending or distortional stress. After hand tamping, the relative compaction of the initial backfill material shall be not less than 90%.

b. Compaction testing will be in accordance with one or more of the following methods: California Test No. 216, California Test No. 231, ASTM 1556, or ASTM 1557.

B. Detectable Tape: In trenching continuing non-metallic pipes, detectable tape shall be placed on top of the initial backfill, except with reinforced concrete pipe where the tape shall be placed 12" above top of pipe.

C. Subsequent Backfill:

1. Above the level of initial backfill, the trench shall be backfilled with native material from trench excavation or with select imported material. Subsequent backfill shall be free of vegetable matter, stones, or lumps exceeding 3" in greatest dimension, and other unsatisfactory material. The Soil Engineer shall approve the backfill material prior to replacement.

2. Subsequent backfill compaction shall be by mechanical means. The backfill material shall be placed in layers not exceeding 6" in loose depth, and each layer shall be thoroughly compacted before succeeding layers are placed. The use of machine tampers, except manually held types, shall not be permitted.

3. Relative compaction shall be at least 90%.

D. Backfill Cap: trench backfill shall be capped with 12 inches of backfill compacted to 95% of relative compaction. Lift shall be no more than 6".

3.05 TRENCH SURFACING

A. General: In areas to be improved under separate contract, the trench shall be backfilled and graded to the level of adjacent surfaces. No mounds of earth shall be left along the trench.

B. Temporary surfacing in areas to remain in use by the public:

1. Temporary surfacing shall be 2½" of cut back asphalt on 12" of Class 2 aggregate base.

2. Temporary surfacing shall be laid within one day after backfilling.

3. Before the trenching area is opened to traffic, excess dirt, rock and debris shall be removed and the street surface shall be swept clean.

4. Temporary surfacing shall be maintained to prevent the occurrence of mudholes and prevent the surface from settling below 1" or rising more than 1" from the existing pavement grade.

3.06 INSPECTION

A. Pipes shall be inspected/tested prior to backfilling and compaction, tests as required shall be performed to ensure compliance with these Specifications. The test(s) shall be conducted at no cost to the Owner.

B. A final inspection upon completion of the paving operation shall be made to ensure conformity with the existing pavement surface.

END OF SECTION 022100

SECTION 024000 – SITE DRAINAGE

1.00 GENERAL

1.01 DESCRIPTION

A. Principal work in this Section:

1. Storm drain pipe and appurtenances.

2. Concrete inlet and outlet structures, manholes, and miscellaneous drainage structures.

B. Related work in other Sections:

1. Trenching, Backfilling and Compacting: Section 022100.

2. Piped Utilities: Section 027000.

1.02 QUALITY ASSURANCE

A. Reference Standards: Applicable provisions of the following govern the work of this Section.

1. American Association of State Highways and Transportation Officials (AASHTO), M36.

2. American Society for Testing and Materials (ASTM):
   a. A74: Cast Iron Soil Pipe and Fittings.

   b. A615: Deformed and Plan Billet-Steel Bars for Reinforcement.

   c. B32: Solder Metal.

   d. C76: Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.

   e. C150: Portland Cement.

   f. C478: Precast Reinforced Concrete Manhole Sections.

   g. C700: Vitrified Clay Pipe, Extra Strength, Standard Strength and Perforated.

   h. D3030: Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.

3. California Department of Transportation (CDT), Standard Specifications: Sections 51, 52, 55, 66, 70, 72, 75 and 90.

1.03 SUBMITTALS

A. Submit the following:

1. Submit product data for drainage piping specialties.

2. Submit shop drawings for pre-cast concrete storm drainage manholes, catch basins, and cleanout boxes, including frames, covers, and grates.

2.00 PRODUCTS

2.01 REINFORCED CONCRETE PIPE (RCP)

A. Reinforced Concrete Pipe: ASTM C76 with tongue-and-groove or bell-and-spigot joints. Unless indicated otherwise on the Drawings, reinforced concrete pipe shall be of Class shown on the Drawings, 1350-D pipe. Joint grout shall conform to Section 65 of CDT Standard Specifications.

2.02 ASBESTOS-CEMENT PIPE (ACP)

A. Asbestos-cement storm drain pipe: Asbestos-Cement pipe is NOT allowed on this project.

2.03 CAST IRON PIPE (CIP)

A. Cast Iron Pipe and fittings: ASTM C74. Joints shall be rubber-gasket bell-and-spigot type.

2.04 POLYVINYL CHLORIDE PIPE (PVC)

A. Polyvinyl chloride pipe and fittings: ASTM D3034, SDR 35 with bell-and-spigot type rubber-gasket joints.

2.05 VITRIFIED CLAY PIPE (VCP)

A. Vitrified clay pipe fittings: ASTM C700, extra strength.

2.06 MANHOLES AND CATCH BASINS

A. Precast drainage structures: Section 70-1.02H of the CDT Standard Specifications and ASTM C478 and of size and shape indicated. Equivalent cast-in-place structures may be used at Contractor's option.

B. Frames and covers: Cast iron conforming to Section 55-2.03 and 75.1.02 of the CDT Standard Specifications. Manhole covers shall have 24" clear opening with the words STORM SEWER in letters not less than 2" high cast into the cover (except where grated covers are shown on the Drawings).

C. Grates for catch basins shall have reticulin bars suitable for use in area with bicycle and pedestrian traffic, ½" maximum gaps perpendicular to flow of traffic.

2.07 FILTER FABRIC

A. One of the following:

1. Mirafi 140N.
2. Typar 4 oz.
3. True Tex MG-100.
4. Bidim C-22.

2.08 PAINT

A. For exterior galvanized metal:

1. First coat: Zinc dust, zinc oxide primer house and trim paint.

2. Second coat: Type and color to match existing building walls and/or trim where applicable.

B. For exterior ungalvanized metal:

1. First coat: Rust Block primer.

2. Second coat: House and trim paint, type and color to match existing building walls and/or trim where applicable.

2.09 PORTLAND CEMENT CONCRETE

A. Concrete: Class A concrete conforming to Section 90 of the CDT Standard Specifications.

B. Cement: Type II cement conforming to ASTM Designation C150 as modified by Section 90 of the CDT Standard Specifications.

C. Aggregate: ¾" maximum size conforming to Section 90 of the CDT Standard Specifications.

D. Water: Clear and free from injurious amounts of oil, acid, alkali, organic matter or other deleterious substances.

E. Reinforcing bars: ASTM A615, intermediate grade, and deformed in accordance with Section 52 of the CDT Standard Specifications.

F. No admixtures will be allowed without Owner's Representative approval.

3.00 EXECUTION

3.01 PIPE INSTALLATION

A. Install in conformance with Section 02700, Piped Utilities.

3.02 CAST-IN-PLACE CONCRETE

A. Mix concrete in accordance with standards for class B concrete per Section 90 of the CDT Standard Specifications.

B. Construction of concrete structures shall conform to applicable provisions of Section 51 of the CDT Standard Specifications. Unless noted otherwise in these Specifications, exposed surfaces of structure shall have Class 1 surface finish.

C. Curing shall conform to applicable portions in Section 90 of the CDT Standard Specifications. No pigment shall be used in curing compounds.

D. Work is subject to inspection. No concrete shall be placed until the Owner's designated representative has approved the forms and reinforcement.

END OF SECTION 024000

SECTION 025130 - ASPHALT CONCRETE PAVING

1.00 GENERAL

1.01 DESCRIPTION

A. Principal work in this Section:

1. Aggregate base material.

2. Prime coating.

3. Paint binder as required herein.

4. Asphalt concrete.

5. Seal coat.

B. Related work in other Sections:

1 Earthwork: Section 022000.

2 Curbs and gutters: Section 025280.

1.02 QUALITY ASSURANCE

A. Reference standards: Applicable provisions of the following govern the work of this Section.

1. American Association of State Highway and Transportation Officials (AASHTO), M 288-96 or Latest Version Thereof.

2. California Department of Transportation (CDT).
   a. Standard Specifications: Sections 26, 37, 39, 92, 93, and 94.

   b. Standard Test Method No. 399A.

B. All work in this Section shall conform to Sections 26, 37, 92, 93, and 94 of the Standard Specifications (CDT).

1.03 SUBMITTALS

A. Certificates: Submit the following:

1. Two copies of material certificates signed by the material producer and the Contractor, certifying that each material item complies with, or exceeds specified requirements.

2. Certified weight or load slip to the Owner's representative for each load of material used in the construction of the asphalt concrete pavement.

1.04 SITE CONDITIONS

A. Prime coat, seal coat and paint binder.

1. Apply only when the ambient temperature is above 50°F and when temperature has not been below 30°F for 12 hours immediately prior to application.

2. Do not apply when base or surfaces are wet or contain an excess of moisture.

B. Construct asphalt concrete surface course only when atmospheric temperature is above 40°F and when base is dry.

2.00 PRODUCTS

2.01 AGGREGATE BASE

A. Class 2 aggregate base, three quarter inch (¾") maximum size, as specified in Section 26 of the CDT Standard Specifications.

B. Mineral aggregate shall be Type B mineral aggregate as specified in Section 39 of the CDT Standard Specifications.

C. Grading of combined aggregates for new pavement shall be ½" maximum size, medium grading, except asphaltic concrete for overlaying existing paved surfaces shall be 3/8" maximum size.

D. Liquid asphalt for prime coat: Grade SC-70 in conformance with Section 93 of the CDT Standard Specifications.

E. Asphaltic emulsion for paint binder and fog seal coat: Emulsified asphalt, Type SS-1h, conforming to Section 94 of the CDT Standard Specifications.

3.00 EXECUTION

3.01 PREPARATION

A. Subgrade: The upper 12" of subgrade shall be compacted to 95% per Section 02200 of these Specifications.

B. Crack sealing:

1. Before sealing, cracks shall be cleared of dirt, dust, soil vegetation debris, and other deleterious materials by means of air blowing to a depth of ¼" to ½".

2. Cracks 1/8" in width and greater in existing AC paving to be overlaid and shall be sealed.

3. Applications of crack sealer shall be in accordance with the manufacturer's recommendations or as directed by the Owner's representative.

3.02 AGGREGATE BASE

A. Place, spread and compact in conformance with Section 26 of the CDT Standard Specifications.

3.03 ASPHALT CONCRETE PAVING

A. Proportion, mix, place, spread and compact in conformance with Section 39 of the CDT Standard Specifications.

B. Before placing asphalt concrete on untreated base, apply liquid asphalt prime coat to base course in conformance with Section 39 of the CalTrans Standard Specifications. Apply prime coat at the rate of 0.25 gallons per square yard.

C. Before placing asphalt concrete, apply an asphalt emulsion tack coat (paint binder) to vertical surfaces of existing pavement, curbs, gutters, construction joints and existing pavement to be surfaced, in conformance with Section 39 of the CDT Standard Specifications.

D. Spread and compact asphalt concrete in accordance with Section 39 of CDT Standard Specifications.

E. Apply seal coat to all finished surfaces of asphalt concrete pavement in accordance with Section 37 of the CDT Standard Specifications.

F. After seal coat has been applied, allow ample time for drying before traffic is allowed on the pavement or paint striping is applied.

3.04 FIELD QUALITY CONTROL

A. Aggregate Base: The surface of finished aggregate base shall vary no more than 0.05' above or below the grade indicated.

B. Asphalt Concrete Paving:

1. The finished asphalt pavement, where not controlled by adjacent structures or features, shall not vary more than 0.05 feet above or below the planned grade, providing it is uniform and free of sharp breaks and does not pond water.

2. The cross section of the finished pavement shall be free of ridges and valleys and shall not vary more than 0.03' above or below the theoretical section at any point on the cross section.

3. The specified thickness of the finished pavement shall be the minimum acceptable.

4. Conforms shall form a smooth, pond free, transition between existing and new pavement.

END OF SECTION 025130

SECTION 025280 - CURBS AND GUTTERS

1.00 GENERAL

1.01 DESCRIPTION

A. Principal work in this Section:

1. Construction of concrete curbs, gutters, walks, driveway cuts, pedestrian ramps and other concrete surfacing as required.

2. Concrete retaining wall.

B. Related work in other Sections:

1. Earthwork: Section 022000.

2. Asphalt concrete paving: Section 025130.

1.02 QUALITY ASSURANCE

A. Reference standards: The applicable provisions of the following govern the work of this section.

1. American Society for Testing Materials (ASTM).

a. A615: Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

b. C150: Portland Cement.

2. California Department of Transportation (CDT), Standard Specifications: Sections 51, 52, 73 and 90.

1.03 SUBMITTALS

A. If requested, submit mill test reports on the cement, reinforcement bars and aggregates, showing compliance with the respective specifications. The Owner's Testing Agency may make concrete test cylinders and slump tests as deemed necessary to determine compliance with Specifications.

2.00 PRODUCTS

2.01 PORTLAND CEMENT CONCRETE (PCC)

A. Concrete: Class A (6 sacks of cement per cubic yard of concrete) conforming to Section 90 of the CDT Standard Specifications.

B. Cement: Type II conforming to ASTM C150 as modified by Section 90 of the CDT Standard Specifications.

C. Aggregate: ¾" maximum size conforming to Section 90 of the CDT Standard Specifications.

D. Water: Clear and free from injurious amounts of oil, acid, alkali, organic matter or other deleterious substances.

E. Reinforcing Bars: ASTM A615, intermediate grade, deformed in accordance with Section 52 of the CDT Standard Specifications.

F. Filled Joints: Unless noted otherwise on the Drawings 1/2" thick, the full depth of the concrete section and conforming to Section 51 of the CDT Standard Specifications.

G. Joint Filler: bitumen-treated fiber board per CDT Standard Specifications, Section 51. Premolded expansion joint filler shall conform to the requirements in ASTM Designation D 1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

H. Waterproof Joint Sealant: flexible polyurethane.

I. Carbon black shall be added to concrete for curbs, gutters and sidewalks as required to match existing work.

J. No admixtures will be allowed without Owner's Representative approval.

K. Maximum water cement ratio (w/c) of 0.50.

L. Maximum slump of 4".

M. Aggregate Base: Class 2 aggregate base, three quarter inch (¾") maximum size, as specified in Section 26 of the CalTrans Standard Specifications.

3.00 EXECUTION

3.01 CONCRETE CONSTRUCTION

A. Concrete shall be mixed in accordance with applicable provisions of Section 90 of the CDT Standard Specifications.

B. Construction of concrete substances shall conform to applicable provisions of Section 51 of the CDT Standard Specifications. Unless noted otherwise in these Specifications, exposed surfaces of structure shall have Class 1 surface finish.

C. Construct concrete curbs and sidewalks in accordance with applicable provisions of Section 73 of the CDT Standard Specifications.

D. Curing shall conform to applicable portions of Section 90 of the CDT Standard Specifications. Do not use pigment in curing compounds.

E. All work shall be subject to inspection. No concrete shall be placed until the Owner's Representative has approved the forms and reinforcement.

F. Place expansion joints on curbs, gutters and walks at 20' on center, adjacent to structures, and at all returns, and fill with joint filler. Score joints shall be formed at 10' on center; the score shall be 1" deep.

G. Do not drop concrete freely where reinforcing bars will cause segregation, nor more than 6'-0" vertically. Use spouts, elephant trunks, or other approved means to prevent segregation.

END OF SECTION 025280

SECTION 027000– PIPED UTILITIES

1.00 GENERAL

1.01 DESCRIPTION

A. Principal work in this Section:

1. Connection to existing systems.

2. Pipe installation and connection to building stubouts.

B. Related work in other Sections:

1. Trenching, backfilling and compacting: Section 31 23 33.

2. Storm Drainage Utilities: Section 33 40 00.

1.02 QUALITY ASSURANCE

A. Refer to specific utility Sections as noted above.

1.03 HANDLING

A. Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosures or under protective covering. Store plastic piping, insulation, joint materials, fittings, valves and rubber gaskets under cover out of direct sunlight. Do not store materials directly on ground. Keep interiors of pipes and fittings free of dirt and debris.

B. Handle pipe, fittings, valves and other accessories in such a manner as to ensure deliver to the trench in sound and undamaged condition. Take special care to avoid injury to coatings and linings on pipe and fittings; make satisfactory repairs if coatings or linings are damaged. Carry pipe to the trench; do not drag it.

C. The pipe will be inspected at destination to assure compliance with specified requirements. Any pipe or couplings that are found to be defective or that do not meet the requirements of the Specifications shall be replaced. Rejection of 10% of any shipment shall be cause of, and will be considered sufficient reason for, rejection of the entire shipment.

2.00 PRODUCTS

A. Refer to specific utility Sections as noted above.

3.00 EXECUTION

A. Any connections to public improvements require notification of, and inspection by the City or Public Utility Company.

3.01 CONNECTION TO EXISTING SYSTEM(S)

A. Make connections to existing lines at a time which will cause a minimum of disruption to the existing system. Any service interruption(s) shall be coordinated with and approved by the Engineer. Overtime costs shall be paid for by the Contractor.

B. Contractor shall coordinate with and arrange for "hot" tap connections to existing mains by forces of the Water Service Agency. Owner will pay separately for work to be done by the Water Service Agency.

3.02 PIPE INSTALLATION

A. Laying and jointing of pipe and fitting shall be in accordance with the manufacturer's recommendations. Joint deflections shall not exceed the maximum recommended by the manufacturer. There shall be no shoulder or unevenness along the interior of the pipe at the shoulder joints.

B. Provide proper facilities for lowering sections of pipe into trenches. Do not under any circumstances drop or dump pipe, valves, fittings or other appurtenances into trenches. Do not drag pipe with preformed rubber joint seals against trench walls and damage the seals.

C. Cut pipe accurately to measurements established at the site and work into place without springing or forcing. Do not use pipe or fitting that does not allow sufficient space for proper installation of jointing material.

D. Pipe fittings, valves and accessories shall be carefully inspected before and after installation and those found defective shall be replaced. Remove fins and burrs from pipe and fittings. Before the pipe is laid, the interior of the joint of the preceding pipe and fitting shall be carefully cleaned. After each section of the pipe has been laid to line and grade and jointed to the preceding section, and after jointing procedure has commenced, there shall be no movement of the pipe in subsequent operations.

E. Take care to place sand under the haunches on either side of the pipe. Lay bell and spigot pipe with the bell end pointing in the direction of laying. Drainage and sewerage pipe shall be laid uphill commencing at the lowest invert elevation. Grade the pipeline in straight lines, taking care to avoid the formation of any dips or low points. Wood support blocking will not be permitted. Lay pipe so that the full length of each section

of pipe and each fitting will rest solidly on the pipe bedding; excavate recesses to accommodate bells, joints and couplings.

F. Before the Contractor leaves the work at any time, the pipe shall be securely closed at its open end. After the work is completed, the pipe shall be carefully and thoroughly cleaned of all refuse, earth or any objectionable material.

3.03 STRUCTURES AND APPURTENANCES

A. Structures and appurtenances shall be installed at the locations and to the lines and dimensions and/or as herein specified.

B. Valves shall be set plumb and valve boxes shall be centered over valve stems.

C. Connections in manholes shall be constructed with concrete channels directed toward the outlet pipe or as indicated on the plans.

D. Penetrations into manholes, vaults and building walls shall be by preformed breakout or coredrill holes. Breakout or coredrill holes in concrete structures shall be grouted all around to prevent groundwater infiltration.

END OF SECTION 027000

Division 3:
Concrete

SECTION 030000: CONCRETE WORK - GENERAL

PART 1 - GENERAL

1.01 APPLICABLE SECTION

A. Submit Shop Drawings, Product Data, Mill Certificates and Samples required by other portions of Contract Documents. The requirements/provisions of the General and Supplementary Conditions and Division 1 Specification Section shall apply to this section.

1.02 DESCRIPTION OF WORK

A. The work included under this section consists of furnishing all material, supplies, equipment, tools, transportation, and facilities, and performing all labor and services necessary for, required in connection with or properly incidental to furnishing, and installing concrete work as described in this section of the specifications, shown on the accompanying drawings, or reasonably implied therefrom, except as hereinafter specifically excluded.

B. Work Included:

1. All formwork, including any special forms necessary to produce architectural details and/or to accommodate the work of others and removal of forms.

2. All concrete reinforcement, placement, bending and forming thereof.

3. All concrete and cement finishing; all surface treatment and curing, including non-slip finishes and color work.

4. Installation of all reglets, bolts, anchors, cans, sleeves, column anchor bolts, etc., whether furnished under this section or by others (except cans and sleeves required under the Electrical and Mechanical Divisions).

5. The furnishing of all items required to be or shown on the drawings as embedded in concrete, which are not specifically required under other sections.

6. Setting headers and screeds. Curing and protecting concrete.

7. Grouting of column bases.

PART 2 - PRODUCTS - see other portions of specifications.

PART 3 - EXECUTION

3.01 DEFECTIVE WORK

A. General: Work considered to be defective may be ordered by the Architect to be replaced in which case the Contractor shall remove the defective work at his expense. Work considered to be defective shall include, but not be limited to, the following:

Reinforcing:

1. Kinks and bends therein which are not scheduled or indicated on the drawings; reinforcing improperly placed, or previously heated, or excessively cold worked reinforcing.

Concrete:

1. Concrete in which defective or inadequate reinforcing steel has been placed.

2. Concrete incorrectly formed or not conforming to details and dimensions on the drawings or with the intent of these documents, or concrete the surfaces of which are out of plumb or level.

3. Concrete below specified strength.

4. Concrete not meeting the maximum allowable drying shrinkage requirements.

5. Concrete containing wood, cloth, or other foreign matter, rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the drawings.

3.02 CORRECTION OF DEFECTIVE WORK

A. The Contractor shall, at his expense, make all such corrections and alleviation measures as directed by the Engineer.

B. Concrete work containing rock pockets, voids, honeycombs, cracks or cold joints not scheduled or indicated on the drawings, shall be chipped out until all unconsolidated material is removed.

C. Secure approval of chipped-out areas before patching. Patch per ACI 301.

END OF SECTION

SECTION 031000: CONCRETE FORMWORK

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Wood formwork for cast-in-place concrete, complete with shoring, bracing and anchorage.

B. Coordinate and install items supplied by other sections of work.

1.02 RELATED WORK

A. Section 033000 – SITE CAST-IN-PLACE CONCRETE

1.03 QUALITY ASSURANCE

A. Construct and erect concrete formwork in accordance with ACI 318, ACI 347 and applicable construction safety regulations for place of work.

1.04 REFERENCE STANDARDS

A. Standard Specifications: The American Concrete Institute (ACI) "Specifications for Structural Concrete for Buildings" ACI 301-95 shall be used as a standard specification. All formwork shall conform with the standard specification except as modified by the requirements specified herein and/or the details on the drawings.

B. Codes: The current edition of the California Building Code, Chapter 19, "Concrete". All formwork shall meet the requirements of this code. This code supplements the standard specification and shall supersede the standard specification in cases where provisions are in conflict.

C. ACI 318-Building Code Requirements for Reinforced Concrete.

D. ACI 347-Recommended Practice for Concrete Formwork.

1.05 SUBMITTALS

A. General Requirements:

1. Submittals shall be made to Architect/Engineer in accordance with the requirements of Section 013300, "Shop Drawings, Product Date and Samples" of these specifications.

2. Construction of elevated slab formwork shall not begin until Contractor has received submittals reviewed by Architect/Engineer governing all aspects of the intended work.

B. Shop Drawings:

1. Shop drawings for elevated slab and beam formwork submitted for review shall include shoring, bracing, reshoring (where required), stringer, joist and beam layout, details of installation and method of installing and maintaining reshores tight against concrete surfaces. In addition to the above drawings, calculations for stresses and deflections shoring and framing caused by dead, live and construction loads shall be submitted to the Engineer for review. Drawings and calculations shall be signed by a registered civil engineer of the State of California.

C. Product Data: Manufacturer's catalog sheets including instructions for use and description of application shall be provided on each of the following materials:

1. Shoring system
2. Reshoring system

PART 2 - PRODUCTS

2.01 WOOD FORM MATERIALS

A. Plywood: U.S. Product Standard PS 1-74 grade B-B Plyform Class I or II, 5/8 inch minimum thickness or equal as approved by the Architect/Engineer.

B. Douglas Fir (DF): Standard Grading and Dressing Rules #16, West Coast Lumber Inspection Bureau, as amended to date. Pressure treated material shall bear the stamp of treated process and plant where treatment was conducted. Grade stamp shall be clearly visible.

C. Redwood (RW): Standard specification for grades of California redwood lumber; Redwood Inspection Service, latest edition.

D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required; of sufficient strength and character to maintain formwork in place while pouring concrete.

E. High Density Overlay (HDO) concrete form: For use at exposed architectural concrete. Forms to be plastic coated, smooth faced, with sharp edges for flush butt joints between forms.

2.02 FORMWORK ACCESSORIES

A. Form Release Agent: Colorless non-toxic mineral oil which will not stain concrete or

impair natural bonding or color characteristics of coating intended for use on concrete.

B. Fillets for Chamfered corners: wood type; size as shown on plans with maximum possible lengths.

PART 3 - EXECUTION

3.01 GENERAL

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

B. Construct formwork, shoring and bracing to meet design and code requirements, so that resultant finished concrete conforms to required shapes, lines and dimensions.

C. Arrange and assemble formwork to permit dismantling and stripping, so that concrete is not damaged during removal.

D. Align joints and make watertight, to prevent leakage of mortar. Keep form joints to minimum.

E. Arrange forms to allow stripping without removal of principal shores, when required to remain in place.

F. Obtain Architect/Engineer's review before framing openings in structural members which are not indicated on drawings.

G. Provide bracing to ensure stability of formwork.

H. Provide chamfer strips on external corners as shown on drawings.

I. Apply form release agent as required on formwork in accordance with manufacturers recommendations. Apply prior to placing reinforcing steel, anchoring devices and embedded items.

J. Do not apply form release agent where concrete surfaces will receive finishes or applied coverings which are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces wet prior to placing concrete.

3.02 INSERTS, EMBEDDED PARTS AND OPENINGS

A. Provide formed openings where required for pipes, conduits, sleeves and other work to be embedded in, or passing through, concrete members.

B. Locate and set in place items which will be cast directly into concrete.

C. Coordinate work of other sections and cooperate with trades involved in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors and other inserts. Do not perform work unless specifically indicated on drawings or reviewed prior to installation.

D. Install concrete accessories in accordance with manufacturer's recommendations; straight, level and plumb. Ensure items are not disturbed during concrete placement.

E. Provide temporary openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain. Close temporary openings with tight fitting
panels, flush with inside face of forms, neatly fitted so that joints will not be apparent in exposed concrete surfaces.

3.03 FIELD QUALITY CONTROL

A. Inspect and check completed formwork, shoring and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties and parts are secure.

B. Form lumber reused in the structure shall be cleaned and grade marked Douglas Fir of the grade specified for the purpose. Plywood shall be cleaned and recoated. Do not patch formwork.

C. Architect/Engineer shall approve lumber to be reused.

3.04 - CLEANING

A. Clean forms as erection proceeds to remove foreign matter. Remove cuttings, shavings and debris from within forms. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

3.05 FORM REMOVAL

A. Do not remove forms and bracing until all the following conditions have been met:

1. Concrete has gained sufficient strength to carry its own weight, construction loads and design loads which are liable to be placed upon it.

2. The appropriate number of days as listed below has passed, (1 day = 24 hours where average temperature is above 55 degrees).

3. The concrete has achieved a minimum of 75% of the design compressive strength as shown by field cured test cylinders.

B. Edge forms 8 inches or less in height at slabs and panels, and forms at foundations and curbs shall remain in place a minimum of one day after pouring.

C. Forms for cast-in-place wall columns and bond beams shall remain in place 2 days minimum after pouring. At cast-in-place walls, forms shall remain in place seven (7) days minimum after pouring and shall not be removed until concrete has set adequately to prevent damage during and after removal.

D. Forms for structural non-post-tensioned slabs and beams shall remain in place for a minimum of 21 days. Forms for post-tensioned slabs and beams shall remain in place until the post-tensioning tendons have been stressed and the elongations have been reviewed and approved by the Engineer of Record.

E. Remove formwork progressively and in accordance with code requirements and so that no shock loads or unbalanced loads are imposed on structure.

F. Loosen forms carefully. Do not wedge pry bars, hammers or tools against concrete surfaces.

G. Store removed forms for exposed architectural concrete in manner that surfaces to be in contact with fresh concrete will not be damaged. Marked or scored forms will be rejected.

END OF SECTION

SECTION 032000 - SITE CONCRETE REINFORCEMENT

1.00 GENERAL

1.01 DESCRIPTION

A. Principal work in this Section:

1. Reinforcing steel for site cast in place concrete.

2. Accessories such as chairs and tie wires.

B. Related work in other Sections:

1. Curb and Gutters: Section 025280.

2. Site Cast-in-Place Concrete: Section 033000.

1.02 QUALITY ASSURANCE

A. Source quality control:

1. The Contractor shall ensure that the material delivered for use is that represented by the mill reports and obtain copies of mill reports, examine them, certify whether the material represented complies with Specifications requirements, and make distribution of reports as required. Report chemical composition of each heat, as determined by ladle analysis.

2. Where materials proposed for use cannot be identified, the Contractor shall pay for an approved testing laboratory to make one series of tests (tensile and bend) from each 2.5 tons, or fraction thereof, of each size and kind of reinforcing steel.

B. Standards: The applicable provisions of the following govern the work of this Section:

1. ACI 301 Specifications for Structural Concrete for Buildings.

2. ACI 318 Building Code Requirements For Reinforced Concrete.

3. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice.

3. ACI SP 66 American Concrete Institute Detailing Manual.

4. ANSI/ASTM A497 Welded Deformed Steel Wire Fabric for Concrete Reinforcement.

1.03 SUBMITTALS

A. Submit bar drawings, schedules and placing diagrams for reinforcing steel. Submit bar drawings and schedules with the corresponding placing diagrams. Drawings shall be complete for any specific area of Project at the time they are submitted.

1.04 HANDLING

A. Comply with the requirements of Specification.

B. Marking and shipping reinforcement: Bundle and tag with suitable identification. Transport to and store at the site to avoid damage to material. Maintain tags after bundles are broken.

2.00 PRODUCTS

2.01 MATERIALS

A. Reinforcement Steel - Bar Reinforcement - ASTM A 615 Grade 60 (ASTM A 615M Grade 400), deformed.

B. Reinforcement Steel - Reinforcing Fabric - Welded wire fabric - ASTM A 185, welded steel wire fabric.

C. Stirrup steel: ANSI/ASTM A1064.

D. Tie wire: 16 gauge (min.) annealed steel wire.

E. Chairs and similar support items:

1. Standard manufactured products conforming to CRSI Manual of Standard Practice, MSP-2.

2. Use dense precast concrete bar support with embedded wire ties for reinforcement placed on grade; elsewhere reinforcement shall be supported by wire bar supports.

2.02 FABRICATION

A. General: Except as modified by the Drawings and the Specifications, comply with CRSI and WCRSI Manual of Standard Practice for Reinforced Concrete Construction, for fabrication of reinforcing steel.

B. Bending and forming:

1. Fabricated steel bars, wire and fabric of indicated sizes, lengths, and gauges and accurately form to shapes indicated by methods that will not injure the materials.

2. Do not heat reinforcement for bending. Do not install bars with unscheduled kinks or bends.

3.00 EXECUTION

3.01 PLACING

A. Cleaning: Clean reinforcement of oil or other coating that might destroy or reduce its bond with concrete before placing it.

B. Placing: Conform to the Manual of Standard Practice for Reinforced Concrete Construction by CRSI and WCRSI, and the following:

1. Accurately place reinforcement and securely tie in position with steel wire at points where bars cross to hold them against displacement.

2. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

C. Spacing of reinforcement:

1. Space reinforcement to maintain the proper distance and clearance between parallel bars and between bars and forms. Provide metal spreaders and spacers to hold horizontal steel in position.

2. Support steel at proper height by using galvanized "S" chairs, or "Support Bars" and galvanized "S" chairs, with hangers, or in other manner, as necessary.

3. Where "Support Bars" are used to hold the slab reinforcement in place, space chairs under the support bars not to exceed the distances specified previously.

D. Splicing:

1. Stagger all lap splices. Bars shall be in contact, unless noted otherwise on the Drawings, at lapped splices and shall be firmly wired together before placing concrete. Lap bars as indicated.

2. Extend stubs and dowels required to receive and engage subsequent work a sufficient length to develop the strength of the bar. Place dowel and stub bars in the forms and secure against displacement during placing of concrete.

E. Maintain clear distances between reinforced steel and face of concrete indicated on the Drawings.

F. Dowels in existing concrete:

1. When drilling for dowels in existing concrete, use sharp bits, drill hole full depth and slightly oversize, fill with a 6000 psi epoxy and hammer dowel to refusal

END OF SECTION 032000

SECTION 033000 - SITE CAST-IN-PLACE CONCRETE

1.00 GENERAL

1.01 DESCRIPTION

A. Principal work in this Section:

1. Site Cast-in-place concrete.

2. Shotcrete.

3. Replacement concrete (patios, walks, steps, etc.).

B. Related work in other Sections:

1. Site Reinforcing steel: Section 032000.

2. Earthwork: Section 022000.

1.02 QUALITY ASSURANCE

A. Reference standards: Applicable provisions of the following govern the work of this Section.

1. ACI 301, Specifications for Structural Concrete for Buildings.

2. ACI302, Recommended Practice for Concrete Floor and Slab Construction.

3. ACI 304, Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

4. ACI 305, Recommended Practice for Hot Weather Concreting.

5. ACI 306, Recommended Practice for Cold Weather Concreting.

B. Source quality control:

1. Employ a testing laboratory, acceptable to the Owner, and Engineer, to test the materials for conformance with these Specifications before concrete mixes are established, and when source is changed, unless recent test results of materials to be used on the Project, performed by an acceptable testing laboratory, are accepted by the Engineer.

2. Testing coarse aggregates:

a. Test aggregate before and after concrete mix is established and whenever the character source of material is changed, but not less than one test for each 50 cubic yards.

b. Perform a sieve analysis to determine conformity with limits of gradation. Perform sampling and testing according to ASTM C33, and as follows:

1) Sampling of aggregates: ASTM D75. Take samples of aggregates at source of supply, or if source of supply has been approved, from storage bunkers at ready- mixed concrete plant.

2) Testing of aggregates shall include:

a) Sieve analysis: ASTM C136.

b) Organic impurities: ASTM C40. Fine aggregate shall develop a color not darker than the referenced standard color.

c) Soundness: ASTM C88. Loss after 5 cycles not over 8% for coarse aggregate, nor 10% for fine aggregate.

d) Abrasion of concrete aggregate: ASTM C131. Weight loss not over 10-1/2% after 100 revolutions, nor 42% after 500 revolutions.

e) Deleterious materials: ASTM C33.

f) Materials passing No. 200 sieve: ASTM C117, not over 1% for gravel, 1.5% for crushed aggregate per ASTM C33.

g) Reactive materials: ASTM C289. aggregates shall indicate no potential deleterious reactivity.

h) Definitions: ASTM C125.

3. Cement test:

a. The cement mill laboratory will be acceptable as testing laboratory for this purpose when approved by the Building Department. Submit evidence to show that the cement mill laboratory is qualified to perform tests. The laboratory shall make tests for every 500 barrels or fraction thereof for of cement used in accordance with ASTM C150.

b. Make tensile strength test at 7 days. Tag the cement for identification at the location of sampling. A representative of the Testing Laboratory shall certify that materials being used are taken from the lots sampled and tested for this report.

2.00 PRODUCTS

2.01 MATERIALS

A. Portland cement: ASTM C150, Type II low alkali with air entrainment as required. Do not change brand or type of cement without Engineer's written approval.

B. Aggregates:

1. Hardrock aggregates: ASTM C33 graded so that coarse aggregates nominal size is not larger than 1/5 the narrowest dimensions between form faces; nor 3/4 of the minimum clear spacing between individual reinforcing bars or bundles of bars, but never greater than 3/4" in any dimension for slabs 4" thick or less; 1-1/2" at all other locations.

C. Admixtures: ASTM C494, Type A, admixtures shall contain no chlorides and may be used only with the Engineers approval, except as specified. Submit manufacturer's data for products proposed for use to the Engineer.

D. Pozzolanic Fly Ash: ASTM C618, Class F.

E. Water: Fresh, clean, and free of oil and other materials injurious to concrete.

F. Concrete curing compound:

1. Liquid membrane-curing compound containing a fugitive dye, conforming to ASTM C309, Type I, guaranteed not to affect the bond, adhesion, or effectiveness of finishes and surface treatment specified herein to be applied to concrete.

G. Expansion joint materials:

1. Joint filler: Homex Expansion Joint by Homasote Co. or equal non-bituminous product compatible with sealant per ASTM D 1751.

2. Joint sealant: Sikaflex 2c NS by Sika Corporation meeting ASTM C-920 and other requirements indicated for each sealant specified or approved equal.

3. Sealant Backing: Material and type that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing meeting ASTM C 1330, Type C.

H. Dry pack and grout: One of the following or equal.

1. Masterflow 713 by Master Builders.

2. Five Star Grout by U.S. Grout Corporation.

3. Fondag Nonshrink Grout by Specrete Products, Ltd.

I. Aggregate Base: Class 2 aggregate base, three quarter inch (¾") maximum size, as specified in Section 26 of the CalTrans Standard Specifications.

2.02 MIXES

A. Mix design:

1. Employ a testing laboratory, acceptable to the Owner's Representative, to design all structural concrete mixes required for the Project to provide:

a. Normal weight concrete with 3000 psi 28-day compressive strength, unless noted otherwise on the Drawings.

b. Adequate workability and proper consistency to permit concrete to be worked readily into the forms and around reinforcement without segregation and excessive bleeding.

c. Other requirements of these Specifications.

2. Proper proportions for design mixes shall be in accordance with ACI 211 or ACI 318.

3. Proper water-cement ratio shall be determined by the preliminary test made in accordance with ASTM C192.

4. Slump limits: Proportion and design mixes to result in the following concrete slump at point of placement.

a. Tieback anchors: Not more than 7".

b. Piers: Not less than 4" and not more than 6".

c. All other concrete: Not less than 1" and not more than 4".

5. Use air-entering admixture in all concrete, unless otherwise shown or specified. Add air-entering admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content within 3% to 6%.

6. Tests shall be conducted in accordance with ASTM C39.

B. Submit report showing results of sieve analysis, mix design and results of compression tests. Make test specimens from not less than 3 batches of each design specimens from not less than 3 batches of each design mix. The trial batch strength for each mix shall exceed indicated f'c by 25% or a lesser amount based on standard deviations of strength test records according to ACI 318. Do not start concrete production until mixes have been reviewed and are acceptable to the Engineer.

C. For each batch, weigh the fine and coarse aggregate separately, measure cement and water separately and introduce separately into the mix so that proportions can be accurately controlled and easily checked.

D. Do not change proportions established by the accepted mix design without the Engineer's written approval.

1. Cement: If concrete develops less than required minimum strength, adjust mix proportions and increase the amount of cement, as necessary.

2. Water: Do not exceed predetermined amount of water because of slowness of discharge from mixer necessary to produce concrete that will work readily into corners and angles of forms and around reinforcements, without segregation of materials and without free water collecting on the surface.

3. Aggregates: Reasonable variations in grading will be allowed by the Engineer because of characteristics of available materials and the need for workability and strength.

E. Concrete mixing:

1. Mixing and delivery shall comply with ASTM C94, these Specifications, and applicable Building Code requirements. If the referenced specifications, these Specifications or the Building Code conflict, comply with the most restrictive requirement.

2. The Owner's Testing Agency will perform check sieve analysis of the aggregates being used, check compliance with mix design and the cement being used against mix design; check that water has been removed from the drum before adding mix ingredients for the following load and shall witness the loading of mixing trucks. The Owner's Testing Agency will send a written report of each inspection to Engineer indicating compliance with these Specifications.

3. Provide a ticket signed by an authorized representative of the batching plant with each mixer truck of concrete delivered to the site indicating:

Name of Project.
Date of Delivery
Supplier of Concrete.

Brand of Cement.
Truck Identity and
Cement Content.
Ticket Serial Number.
Strength Classification.
Batching Time.
Admixture Content.
Point of Deposit.
Name of Contractor.
Total Amount of Water.
Water Added at Jobsite.
Name of Driver.
Weight of Aggregate.
Time loaded and First
Daily Temperature
Mixing Concrete.
Number of Cubic Yards
Reading of Revolution in Load.

4. Store batch tickets at time concrete is delivered in job file for reference at the site.

5. Remove all materials, including water, remaining in the ready-mix truck drum completely before ingredients for the following loads are introduced into the drum.

6. Retempered concrete: Do not use concrete which has not been placed 30 minutes after leaving the mixer, or concrete that is not placed within 60 minutes after water is introduced into the mix.

3.00 EXECUTION

3.01 PREPARATION

A. Inspect excavations, subgrades and formwork, as applicable for each placing operation, for accuracy of lines, levels, elevations and dimensions. Make necessary corrections to obtain concrete within the tolerances specified.

B. Inspect placement of reinforcement and accessories for proper positions, sizes, clearances, fastenings, laps and splices.

C. Moisten, do not saturate, earth subgrade and bearing surfaces. Moisten the sand base under slabs-on-grade the day before concrete is to be cast thereon.

D. Wet wood forms thoroughly when they are not treated with form release agent. Wet other materials sufficiently to reduce suction and maintain concrete workability.

E. Recompact disturbed gravel fill and install vapor barrier under building slabs on grade. Lap joints 4". Lap on walls 2". Cut patches at penetrations for a tight fit. Tape all joints to make moisture tight. Cover vapor barrier with a minimum of 2" of damp concrete sand.

F. Embedded items including, but not limited to, conduits, anchors and rough hardware, built into concrete as indicated or required.

1. Do not embed piping and conduits, other than electrical conduits, in structural concrete. Locate conduits so as to reduce strength of the structure the least amount, as approved by the Engineer, and as indicated on the Drawings.

2. Embed bolts, inserts and other items in the concrete, accurately secured so that they are not displaced during concrete placing and compacting operations.

3. Set embedded bolts for materials and equipment attached to concrete to template, layouts and shop drawings. Verify size, length and location of electric conduit with respect to equipment supports.

G. Do not proceed with placement of concrete until all conditions are satisfactory.

3.02 CONVEYING

A. Rapid handling: Transport concrete from the mixer to location of placing as rapidly as practical to avoid separation or loss of ingredients.

B. Transporting methods: Use cranes, carts, buggies or other approved means to deliver concrete to final locations. Do not use delivery systems (pipe, chutes, etc.) formed of aluminum for transporting concrete. If pumping of concrete is contemplated, first obtain Engineer's approval for the design mix and the placement method before placing concrete.

C. Free fall: Not more than 4 ft. in concrete which will remain exposed in the Work; no more than 6 ft. elsewhere. Avoid large concentration of concrete in one location which would produce unacceptable deflection in supporting formwork or on one side of steel soldier beam.

D. Lifts: No more than 2 ft. high.

E. Concrete flow: Carry concrete up uniformly for the length of walls being placed to reduce lateral flow of concrete to 5 ft. maximum.

F. Runways: Construct substantial runways and scaffolding to avoid movement and vibration in the forms and rein- forcing steel as a result of transporting and placing concrete.

3.03 PLACING

A. General: Comply with ACI 304. Do not place concrete in or under water.

B. Consolidation: Thoroughly consolidate concrete and work it around reinforcement and embedded items and into corners and angles of forms, by spading, rodding and tamping to exclude rock pockets, air bubbles and "honeycombs" and to obtain required density and strength.

C. Internal vibration:

1. Use mechanical vibrators to consolidate each layer with that previously placed, to completely consolidate the concrete in forms. Take care to avoid over-vibration, causing separation of ingredients. Keep extra standby vibrator at the site.

2. Vibration of pier concrete below grade is not required.

D. Flow of concrete: Keep surface of concrete level during placing, with a minimum of concrete allowed to flow from one position to another. Place concrete in a continuous operation until each section or panel has been completed.

E. Record: Keep records showing location, date and time of placement of all concrete batches.

F. Temperature: Do not place concrete when the ambient temperature is above +85 °F or below +40 °F. at the time of placing, or if it is likely to go above +85 °F or below +40 °F before the concrete has taken its initial set, unless special precautions recommended by ACI 305 and 306 are provided.

G. Construction joints:

1. Location:

a. Locate construction joints where indicated. When not shown, submit layout showing location of construction joints and placing procedure, for the Engineer's approval, before placing concrete.

b. Locate construction joints to least impair the strength and appearance of structure.

c. Off-set construction joints not less than 5 ft. with a minimum of 2 offsets.

2. Joints in channels: Locate as detailed on the Drawings.

3. Contact surfaces: Keep exposed face of construction joints continuously moist from time of initial set until subsequent placing of concrete against them, but not to exceed the curing period.

a. Clean contact surfaces thoroughly by chipping entire surface not earlier than 5 days after initial placing.

b. As an option, jet wash or sandblast the surface to expose clean aggregate solidly embedded in the mortar matrix; remove wash water entirely from surface.

c. If a contact surface becomes coated with foreign materials of any nature, after being cleaned, chip or rechip the surface completely, to suitable condition.

H. Tolerances: In compliance with ACI 117 as follows.

1. Paragraph 2.1, except for reference to slip-forming.

2. Paragraph 2.2, Class AX.

3. Paragraph 3.6.

3.04 FINISHING

A. Formed concrete surfaces:

1. General:

a. Remove fins, laitance and loose material from concrete surfaces when forms are removed.

b. Repair concrete honeycombs, rock pockets, sand runs, spalls, or otherwise damaged surfaces by removing the damaged or unsatisfactory area to sound concrete, with slightly undercut edges, and filling-in with the same mix as the adjacent concrete minus the coarse aggregate.

c. Tamp and float the patch flush with adjacent surface.

2. Shotcrete walls: Provide a "rubbed finish" as defined in ACI 301 to produce a uniform surface by float trowel or rub board immediately after shotcrete is applied.

3. Clean surface of pier cast below grade by sandblasting. Apply a sand-cement mortar, trowel and rub to match shotcrete finish.

B. Top of grade beams, footings and pier caps: Screed to elevations indicated.

C. Channels:

1. Protection: Protect exposed flatwork as necessary to prevent damage resulting from impact or from subsequent work.

    a. Protect work of other trades from damage by covering it with heavy kraft paper securely taped in place. Leave protection in place as long as its need exists.

    b. Control the use of water and other contaminants within the area so that no damage to previously installed work or existing structure and finish occurs.

2. Compacting and floating:

    a. Bring channels to proper elevations and strike off with a straightedge. Remove excess water and laitance.

        1) Compact by rolling with weighted rollers or by tamping with grid tampers. Thoroughly hand-tamp areas not accessible to rollers.

        2) Float and test surfaces with a 10 ft. straightedge and eliminate high and low spots to comply with tolerances specified.

        3) From this point, use the methods and tools necessary to produce surface tolerances and finishes specified.

    b. Use screeds to type and spacing required to produce specified channel tolerance.

3. Moisture control: In addition to other finishing requirements, use a water fog spray to reduce plastic shrinkage cracks during flatwork finishing operations when conditions of low humidity and/or high temperature exist.

    a. Immediately after concrete has been brought to a flat surface and the shiny film of moisture disappears, restore it and maintain until final troweling by applying a light film of moisture with an atomizing type fog sprayer.

    b. Use frequent light applications of moisture rather than excessive amounts at any one time. Adjust the amount and refrequency of fog spray as required by variable conditions of weather, wind, temperature and humidity.

4. General requirements:

    a. Finish surfaces to produce a uniform appearance throughout area involved and throughout adjacent areas with the same treatment.

b. Where concrete finishing occurs adjacent to finished metal or other surfaces, particularly where serrated or indented surfaces before allowing to harden.

c. Use no troweling machines within 12" of electrical junction and outlet boxes which are set to finish flush with concrete floors. Float and trowel such areas by hand with wood floats and steel trowels, taking care to see that concrete is finished flush with box cover and matches adjacent surfaces.

5. Schedule of finishes:

a. Float surfaces to produce a uniform broom sweep texture and finish throughout.

b. Provide an equivalent of a medium salted finish along concrete surfaces at slopes of less than 6%.

c. Provide an equivalent of a heavy broom slip resistant finish along concrete surfaces at slopes of 6% and greater.

D. Curbs: Immediately after removing forms, finish faces and top with a steel trowel.

3.05 CURING

A. Formed concrete:

1. Wet the tops and exposed portions of formed concrete and keep moist until forms are removed.

2. If forms are removed before 14 days after concrete is cast, coat concrete with curing compound as specified for flatwork below.

B. Concrete flatwork:

1. After finishing, spray the specified curing compound uniformly in 2 coats at 90° to each other not exceeding coverage rates recommended by the manufacturer.

2. Inspect treated surfaces daily for 14 days for evidence of drying. Re-wet the surfaces and apply a new application of curing compound if premature drying occurs, as soon as can be done after finishing without marring the surfaces.

C. Pits, trenches and curbs: Construct pits for transformers, sumps, valves, trenches, curbs, gutters, and other miscellaneous concrete work.

D. Grouting and drypacking: Install as indicated and required, except for items grouted by other trades.

1. Mix material, in accordance with its manufacturer's instructions, with sufficient water so it flows under its own weight for grout, and to just moisten and bind the materials together for drypack.

2. Place drypack by forcing and rodding to fill all voids and provide complete bearing under plates. Place fluid grout from one side only and puddle to completely fill voids; do not remove dams or forms until grout attains initial set. Finish exposed surfaces smooth, and damp cure at least 3 days.

E. Splash block: Precast in tight molds, to the dimensions and profiles indicated. Use a mix with coarse aggregates passing 3/8" sieve to obtain a compressive strength of 3,500 psi minimum at 28 days. Steel trowel unformed surface.

3.06 PROTECTING AND CLEARING

A. Protect finished surfaces from stains or abrasions. Do not allow fire in direct contact with concrete. Provide adequate protection against injurious action by sun or wind. Protect fresh concrete from heavy rain and mechanical injury.

B. Upon completion, wash and clean exposed concrete and leave free of oil, paint, plaster and foreign substances, ready to receive applied finishes or to be left exposed.

3.07 DEFECTIVE CONCRETE

A. Concrete finishes which are not within the specified tolerances nor finished as specified which do not connect properly to adjoining work, do not slope to drains or are not properly cured, or do not meet other provisions of the Specifications, will be deemed defective.

B. Remove defective concrete as directed by Engineer and replace with concrete of specified strength.

3.08 FIELD QUALITY CONTROL

A. Concrete quality control: The following will be performed by the Owner's Testing Agency.

1. Samples will be taken during progress of the work for determination of slump, compression strength, aggregate sieve analysis, and grout-mix tests, with assistance furnished by the Contractor.

2. 3 cylinders will be made for each day's pour or for each 100 cubic yards or less, or once for each 5,000 square feet of surface area, whichever is less, for each type of concrete being cast.

3. 1 cylinder will be tested at 7 days, and 1 cylinder at 28 days. The remaining cylinder will be kept in reserve in case tests are unsatisfactory.

4. Samples will be made in accordance with ASTM C172.

5. Specimens will be made and laboratory cured in accordance with ASTM C31.

6. The 28-day values will be the criteria for acceptance of concrete regarding strength only.

   a. 7-day tests may be regarded as indicative of compliance or non-compliance with the 28-day strength requirements, and the Contractor should be guided accordingly in matter of adjusting proportions, if necessary, and notify the Engineer.

   b. 7-day tests shall also be a guide to the Contractor regarding time for form removal.

7. Slump tests will be made for each set of tests cylinders in accordance with ASTM C142.

B. Tests evaluation:

1. Concrete cylinder test will be evaluated in accordance with ACI 214 and 318.

2. If 28-day test results indicate the concrete strength is not as specified, core concrete as directed by the Engineer in accordance with ASTM C42.

   a. Plug core hole solid as specified in Article 3.04 of this Section.

   b. The cost of cores, tests and patching shall be borne by the Contractor.

3. In the event that additional core tests do not show strength required, or as determined by load tests made in accordance with ACI 318, the defective concrete shall be removed and replaced or shall be reinforced as directed by the Engineer at the Contractor's expense.

4. If core tests results fall below design strength specified, adjust the concrete mix or water content for future batches, at not additional cost to the Owner.

END OF SECTION 033000

SECTION 033519 - INTEGRALLY COLORED CONCRETE FINISHING

1.0 GENERAL

1.1 Summary

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install integrally colored concrete where indicated on project drawings. Minimum color palette of 1.

1.2 Related Sections

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 032000, Concrete Reinforcement

C. Section 033000, Cast in Place Concrete

D. Section 022000, Earthwork

E. Section 022100, Trenching, backfilling & compacting

F. Section 091000, Sandblasting

1.2 Reference Standards

A. [ACI 117 – Tolerances for Concrete Construction and Materials]

B. ACI 301 – Structural Concrete.

C. ACI 303.1 – Cast-in-Place Architectural Concrete.

D. ACI 305.1 – Hot Weather Concreting.

E. ACI 306.1 – Cold Weather Concreting.

F. ACI 308R – Curing Concrete.

G. ACI 318 – Building Code Requirements for Structural Concrete.

H. [ACI 347 – Formwork for Concrete]

I. ASTM C309 – Liquid Membrane-Forming Compounds for Curing Concrete.

J. ASTM C979 – Pigments for Integrally Colored Concrete.

1.3 Submittals

A. Submit according to Conditions of the Contract and Division 1 Specification Sections.

B. Product Data: For each product indicated.

C. Mix Designs: For each type of integrally-colored concrete mix required.

D. Samples for Initial Selection: Manufacturer's color charts.

E. Sample Panels: 2 by 2 feet minimum, to demonstrate finish, color, and texture of decorative cement concrete

F. Qualification Data: For Installer and manufacturer specified in Quality Assurance Article,including names and addresses of completed projects, architects, and owners.

G. Material Test Reports: From testing agency indicating compliance of concrete materials, reinforcing materials, admixtures, and similar items with requirements.

1.4 Quality Assurance

A. Installer Qualifications: Two year's experience with projects of similar scope and quality.

B. Installer Qualifications: Trained or approved by Manufacturer of decorative concrete systems.

C. Manufacturer's Qualifications: Three year's experience manufacturing products required.

D. Source Limitations: Obtain products from same source throughout Project.

E. Field Samples: Locate at site and obtain approval before start of final work. Field samples shall be minimum 5 by 5 feet by full thickness.
   1. Demonstrate range of finishes and workmanship, including curing procedures.

2. Approved field samples set quality standards for comparison with remaining work.
3. Approved field samples may become part of the completed Work if undisturbed at completion of Project.

F. Preinstallation Conference: Conduct conference at site to comply with requirements of Division 1 Section “Project Meetings.”

G. Work shall conform with California Building Code (CBC), 2022 Edition,

1.5 DELIVERY, STORAGE AND HANDLING

A. Color Additive: Deliver, store, and handle in accordance with manufacturer's instructions.

B. Concrete: Schedule delivery to provide consistent mix times from time color additive is placed in mixture until placement of integrally colored concrete.

1.6 Environmental Requirements

A. Do not place concrete when base surface temperature is less than 40 degrees, or surface is wet or frozen.

B. Comply with requirements of Division 3 Section “Cast-in-Place Concrete”

2.0 PRODUCTS

2.1 Form Materials

A. Comply with Division 3 Section “Concrete Formwork”

2.2 Reinforcement

A. Comply with Division 3 Section “Concrete Reinforcement”

2.3 Concrete Materials

A. Concrete Materials: As specified in Section 033000, Cast-In-Place Concrete.

B. Admixtures: Do not use calcium chloride admixtures.

2.3 Color Additives

A. Manufacturer: Davis Colors, 800-356-4848 or 323-269-7311, www.daviscolors.com

B. Type:

1. Concentrated pigments specially processed for mixing into concrete and complying with ASTM C979.

2. Color additives containing carbon black are not acceptable.

C. Color Additive Delivery:

1. Automated Dispensing: Meter and dispense colors using computer-controlled automated color weighing and dispensing system. Use Davis Colors Chameleon liquid metering system and Hydrotint liquid color additives.

2. Manual Dispensing: Use Davis Colors Mix-Ready powdered color additives in pre-measured disintegrating bags.

2.4 Concrete Flatwork

A. Surface Retarder: As recommended by manufacturer

B. Curing Compound for Flatwork: As recommended by manufacturer complying with ASTM C309 and designed for use on integrally colored concrete.

C. Moist Curing Blankets: McTech Group disposable curing blankets designed for use on colored or decorative concrete and to keep surface of concrete moist for seven days.

2.5 Accessories

A. Cleaning Agents: Use products known to be compatible with integrally colored concrete

2.6 MIXES

A. Slump: 4 inches. If greater slump is required, use water-reducing or super-plasticizing admixture; do not add water.

B. Color Additives: Mix in accordance with manufacturer's instructions. Mix until color additives are uniformly dispersed throughout mixture and disintegrating bags, if used, have disintegrated.

C. Do not retemper mix or add water in field.

2.6 Concrete Colors

A. Minimum color palette of 1. Location as indicated on project drawings.

1. Provide Architect with full Davis color chart, to be selected during course of construction.

3.0 EXECUTION

3.1 Examination

A. Do not place integrally colored concrete where standing water is present.

3.2 Installation

A. Comply with color admixture manufacturer's recommendations unless otherwise specified in this Section.

3.3 Joints

A. As specified in Section 033000, Cast-In-Place Concrete.

3.4 Formed Surfaces

A. Architectural Concrete

1. Exposed Aggregate Finish: Comply with section 091000, Sandblasting

B. Curing and Stripping:

1. Curing: Cure for 28 days Maintain concrete between 65° and 85°F during curing.

2. Leave forms in place for as long as practical, and do not strip until concrete has reached a consistent age.

3. Stripping: If forms are removed before required curing duration, apply curing compound for formed surfaces. To extent practical, integrally colored concrete throughout project should be cured using the same methods and for the same durations.

D. Repair:

1. Fill holes and defects in concrete surface within 48 hours of form removal.

2. Use patching materials and techniques approved in mock-up.

3. Make patches with stiff mortar made with materials from same sources as concrete. Adjust mortar mix proportions so dry patch matches dry adjacent concrete. Add white cement to mortar mix if necessary to lighten it. [With exposed aggregate finishes, add aggregate to mortar mix so patches will have the same texture and appearance as adjacent concrete.]

3.5 Flatwork

A. Finishing:

1. Medium (non-slip) broom and trowel joint edges as indicated on Architectural drawings.

B. Curing

1. Apply curing compound for flatwork or moist curing blanket in accordance with manufacturer's instructions. Apply curing at consistent time for each pour.

2. Maintain concrete between 65° and 85°F during curing

3.6 Appearance Tolerances

A. Appearance: Minor variations in appearance of integrally colored concrete that are similar to natural variations in color and appearance of uncolored concrete are acceptable.

3.7 Cleaning

A. Efflorescence: Remove efflorescence as soon as practical after it appears and as part of final cleaning

B. Use least aggressive cleaning techniques possible

C. If proprietary cleaning agents are used, pre-wet surface, test cleaning agent on small, inconspicuous area, and check effects prior to proceeding. [At walls, begin cleaning at top and work down.] Thoroughly rinse surface afterwards with clean water. Follow cleaner manufacturer's instructions.

D. Do not use muriatic or hydrochloric acid on integrally colored concrete.

3.8 Protection

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

B. Do not permit pedestrian or vehicular traffic over pavement for 7 days minimum after finishing.

END OF SECTION

Division 5:
Metals

SECTION 055000 – METAL FABRICATIONS

1.1 GENERAL

1.2 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

1. Miscellaneous channels, angles and other shapes as required.

2. Rough Hardware.

1.3 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 099100 - Painting: For finish painting of items not specified to have factory finish.

1.4 REFERENCES

A. AISC - American Institute of Steel Construction

B. ANSI - American National Standards Institute

1. A14.3 - Safety Requirements for Fixed Ladders.

2. B18.6.3 - Machine Screws and Machine Screw Nuts (M4)

3. B18.21.1 - Lock Washers (Inch Series)

4. B18.22.1 - Plain Washers.

C. ASTM - American Society for Testing and Materials

1. A27 - Standard Specification for Steel Castings, Carbon, for General Application.

2. A36 - Standard Specification for Structural Steel.

3. A47 - Standard Specification for Ferritic Malleable Iron Castings.

4. A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on

Iron and Steel Products.

5. A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

6. A276 - Standard Specification for Stainless Steel and Heat-Resisting Steel Bars and Shapes.

7. A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 Psi Tensile Strength.

8. A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

9. A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

10. A563 - Standard Specification for Carbon and Alloy Steel Nuts.

11. A780 - Practice for Repair of Damaged Hot-Dip Galvanized Coatings.

12. B221 - Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.

13. B633 - Standard Specification for Electro-Deposited Coatings of Zinc on Iron and Steel.

14. C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink).

15. E488 - Test Method for Strength of Anchors in Concrete and Masonry Elements

16. F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws and Studs.

17. F594 - Standard Specification for Stainless Steel Nuts.

D. AWS - American Welding Society

1. D1.1 - Structural Welding Code - Steel.

2. D1.3 - Structural Welding Code - Sheet Steel.

E. CBC - California Building Code, 2022 Edition

F. FS - Federal Specification

1. FF-B-588 - Bolt, Toggle and Expansion Sleeve, Screw.

G. NAAMM - National Association of Architectural Metal Manufacturers

1. MFM - Metal Finishes Manual for Architectural and Metal Products.

H. SSPC - The Society for Protective Coatings

1. PA-1 - Paint Application Specification No. 1.

2. SP-2 - Surface Preparation Specification No. 2: Hand Tool Cleaning.

3. SP-3 - Surface Preparation Specification No. 3: Power Tool Cleaning.

4. SP-6 - Surface Preparation Specification No. 6: Commercial Blast Cleaning.

1.5 SYSTEM DESCRIPTION

A. Design Requirements

1. Design work to support normally imposed loads and in conformity with AISC requirements.

2. Provide for expansion and contraction.

1.6 SUBMITTALS

A. Product Data: Submit manufacturer's product data for paint products and grout.

B. Shop Drawings: Submit shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.

C. Samples: Submit samples representative of materials and finished products as may be requested by the Architect.

D. Quality Control Submittals

1. Certificates: Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.

1.7 QUALITY ASSURANCE

A. Qualifications

1. Fabricator Firm experienced in producing metal fabrications similar to those indicated for this Project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the Work.

B. Welding Standards: Comply with applicable provisions of AWS D1.1 and AWS D1.3.

1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.8 PROJECT CONDITIONS

A. Field Measurements

1. Check actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings.

2. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

a. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

2.1 PRODUCTS

2.2 MATERIALS

A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names or roughness.

B. Steel and Iron

1. Steel Plates, Shapes and Bars: ASTM A36.

2. Stainless Steel Shapes: ASTM A276.

3. Cold-Formed Steel Tubing: ASTMA500.

4. Hot-Formed Steel Tubing: ASTMA501.

    a. Where indicated, provide tubing with hot-dip galvanized coating per ASTM A53.

5. Concrete Inserts: Anchors of type indicated below, fabricated from corrosion resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E488, conducted by a qualified independent testing agency.

    a. Threaded or wedge type; galvanized ferrous castings, either ASTM A47 malleable iron or ASTM A27 cast steel. Provide bolts, washers, and shims as required, hot-dip galvanized in accordance with ASTM A153.

C. Aluminum Extrusions; ASTM B221, alloy 6063-T6.

D. Fasteners: Provide plated fasteners complying with ASTM B633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.

1. Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A, with hex nuts, ASTM A563, and, where indicated, flat washers.

2. Machine Screws: ANSI B18.6.3.

3. Plain Washers: Round, carbon steel, ANSI B18.22.1.

4. Lock Washers: Helical, spring type, carbon steel, ANSI B18.21.1.

5. Expansion Anchors; Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E488 conducted by a qualified independent testing agency.

    a. Material: Carbon steel components zinc-plated to comply with ASTM B633, Class Fe/Zn 5.

    b. Material: Group 1 alloy 304 or 316 stainless steel bolts and nuts complying with ASTM F593 and ASTM F594.

6. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as required.

E. Welding Materials: AWS D1.1, type required for materials being welded.

F. Coatings

1. Coatings for Protection of Dissimilar Materials

a. Dissimilar Metals: Bituminous type materials conforming with MIL Standard 889.

b. Aluminum in Contact with Concrete, Metal, Wood or other Absorptive Material.

2. Shop Primer for Ferrous Metal: VOC compliant, fast-curing, lead and chromate free, universal modified alkyd primer with good resistance to corrosion, compatible with finish paint systems.

3. Galvanizing Repair Paint: High zinc dust content paint, with dry film containing not less than 94 percent zinc dust by weight, as manufactured by Parker Amchem, "Galvaprep SG"; Sherwin Williams, "Zinc Clad I"; Alvin Products, Inc., “Galvax”; ZRC Chemical Products Co., “ZRC Cold Galvanizing Compound", or equal.

G. Nonshrink, Nonmetallic Grout

1. Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2. Manufacturer, CMG Incorporated or equal

a. Exterior = Super Por-Rock
b. Interior = Por-Rok

2.3 FABRICATION, GENERAL

A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.

B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.

1. Temperature Change (Range): 100 degrees Fahrenheit.

D. Shear and punch metals cleanly and accurately. Remove burrs.

E. Ease exposed edges to a radius of approximately 1/32-inch, unless otherwise indicated. Form bent-metal comers to smallest radius possible without causing grain separation or otherwise impairing work.

F. Remove sharp or rough areas on exposed traffic surfaces.

G. Weld comers and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.

H. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

K. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

L. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.4 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports for applications indicated that are not a part of the structural steel framework as required to complete the Work.

B. Fabricate units to sizes, shapes, and profiles indicated and required to receive other adjacent construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.

1. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.

a. Except as otherwise indicated, space anchors 24 inches on center and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4-inch thick by 8 inches long.

C. Galvanize all miscellaneous interior and exterior plates, framing and supports.

2.5 FINISHES, GENERAL

A. Comply with NAAMM MFM for recommendations relative to applying and designing finishes. Finish metal fabrications after assembly.

2.6 STEEL AND IRON FINISHES

A. Galvanizing: For those items indicated for galvanizing, apply zinc coating by the hot-dip process complying with the following requirements:

1. ASTM A153 for galvanizing iron and steel hardware.

2. ASTM A123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299-inch thick or thicker.

B. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Typical: SSPC SP-2, SSPC SP-3 as required.

2. Architectural Exposed Steel Fabrications: SSPC SP-6.

C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes or to be embedded in concrete or masonry, unless otherwise indicated. Comply with requirements of SSPC PA-1 for shop painting.

D. Finish Painting: As specified in Section 099100, for steel where indicated.

2.7 ALUMINUM FINISHES

A. Aluminum

1. Mill finish or anodized finish, where indicated on the Drawings.

2. Powder Coat Finish: Manufacturer's standard with color as selected by the Architect, where indicated on the Drawings.

3.1 EXECUTION

3.2 PREPARATION

A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

B. Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entry.

3.3 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

B. Cutting, Fitting and Placement: Perform cutting, drilling, and Fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment and elevation; with edges and surfaces level, plumb, true and free of rack; and measured from established lines and levels.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.

E. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop

strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.

F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.4 ADJUSTING AND CLEAN UP

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC PA-1 requirements for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a 2.0-mil minimum dry film thickness.

B. For galvanized surfaces, clean welds, bolted connections and abraded areas, and apply galvanizing repair paint to comply with ASTM A780.

END OF SECTION

SECTION 055200 – HOT DIPPED GALVANIZED METAL RAILINGS

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install metal handrails as shown on the Project Drawings and as specified herein.

1.2 RELATED SECTIONS

A. Division 3 – Concrete

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A36 Specification for Structural Steel
2. ASTM A53 Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless
3. ASTM A123 Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
4. ASTM A143 Recommended Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
5. ASTM A153 Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
6. ASTM A307 Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile
7. ASTM A384 Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies
8. ASTM A385 Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
9. ASTM A449 Specification for Quenched and Tempered Steel Bolts and Studs
10. ASTM A563 Specification for Carbon and Alloy Steel Nuts

11. ASTM A780 Practice for Repair of Damaged Hot-Dip Galvanized Coatings

12. ASTM D2092 Practices for Preparation of Zinc-Coated Galvanized Steel Surfaces for Paint

B. National Association of Architectural Metal Manufacturers (NAAMM):

1. "Pipe Railing Manual, Including Round Tube"

C. Steel Structures Painting Council (SSPC):

1. SSPC-SP 1 Solvent Cleaning

2. SSPC-SP 3 Power Tool Cleaning

3. SSPC-SP 10 Near-White Blast Cleaning

4. SSPC-SP 11 Power Tool Cleaning to Bare Metal

1.4 SUBMITTALS

A. General: Refer to Section 013300 - Submittal Procedures for submittal requirements and procedures.

B. Shop Drawings: Submit detailed Shop Drawings of metal handrails and railings, showing sizes, details of fabrication and construction, bends and radii, handrail brackets, locations of hardware, anchors, and accessories, and installation details.

C. Product Data: Submit manufacturers' product data of railing system and railing components, handrails, and handrail brackets. Include corrosion-inhibitive shop coat painting system.

2.0 PRODUCTS

2.1 MATERIALS

A. Hot Dipped Galvanized Metal Handrails: Standard Steel Pipe, Architectural Handrail Grade, of diameter and sizes indicated. Exterior metal handrails shall be hot dipped galvanized following assembly.. Provide terminal safety returns for all stair handrails. Handrail brackets shall be hot dipped galvanized malleable iron, manufactured for the purpose, for anchorage to concrete walls. Include all fittings and components, sleeves, hardware, backing plates, and accessories as required for complete and finished handrail installations.

B. Steel Pipe: Pipe for railings, pipe supports, and pipe sleeves shall be seamless steel pipe, conforming to ASTM A53, Type S, Grade A, of diameters and sizes indicated. Special instructions shall be given the pipe manufacturer to provide Architectural Handrail Grade pipe.

C. Plate: Steel plate for anchor plates shall be standard steel plate, conforming to ASTM A36, weldable quality.

D. Arc-welding Electrodes: Arc-welding electrodes shall be E70 series electrodes for A36, A572 and A992 material. Electrodes shall be as recommended by their manufacturers for the positions and conditions of actual use. All welds used in members and connections in the seismic Force Resisting System shall be made with filler metals meeting the requirements specified in AWS D1.8 clause 6.3.

E. Anchors, Fasteners, and Accessories: Provide all required anchors, fasteners, miscellaneous components, and accessories as required for complete and finished railing installations. Bolts and studs, nuts, and washers shall conform with ASTM A307, A449, and A563, as applicable, and shall be galvanized in accordance with ASTM A153.

1. Expansion Bolts: Where anchors are not included in the concrete construction, provide galvanized expansion type anchors with matching galvanized steel bolts or studs with nuts, of sizes as indicated or required. Provide washers under all bolt heads and nuts. Expansion bolts require approval of the Engineer before they may be installed in post-tensioned slabs. Expansion bolts will not be permitted for use on concrete curbs or along the edge of concrete or a concrete joint.

F. Grout: Refer to Section 033000 – SITE CAST-IN-PLACE CONCRETE, for requirements.

2.2 FABRICATION

A. Metal handrails and railings shall be fabricated by firms or shops experienced and skilled in the custom fabrication of architectural metal handrails and railings, and shall meet the quality requirements of NAAMM's Pipe Railing Manual.

B. Bends in rails shall be precision-formed to a smooth continuous radius by skilled workers. Work quality and finish shall be true to detail. Butt joints shall have internal pipe sleeve or dowel. Ends shall be closed with similar materials, welded and ground smooth.

C. Welding procedure specifications for all prequalified joints shall be submitted per AWS D1.1, 5.1.2 to the Engineer and reviewed prior to beginning fabrication. Non prequalified joints shall be qualified per AWS requirements. Welding shall be by operators who are qualified by test as per AWS "Standard Qualification Procedure" to perform type of work required. Welding shall be performed in the shop unless otherwise indicated. Welded joints of handrails and railings shall be ground and dressed smooth to match adjacent surfaces and so that the shape and profile of the item welded is maintained.

D. Metal handrails and railings shall be prefabricated and preassembled in the factory or shop as far as practicable.

2.3 HOT-DIP GALVANIZING

A. Ferrous metal railings and related items on the exterior of the building, or as otherwise indicated, shall be galvanized, after fabrication, by the hot-dip process in accordance with ASTM A123 and ASTM A385. Weight of zinc coating shall conform with requirements specified under "Weight of Coating" in ASTM A123.

B. Safeguarding against steel embrittlement shall conform to applicable requirements of ASTM A143.

C. Safeguarding against warpage and distortion of steel members shall conform to applicable requirements of ASTM A384.

D. Shop galvanized metalwork necessitating field welding which in any manner removes original galvanizing shall be restored by galvanizing repair in accordance with ASTM A780.

E. Bolts and screws for attachment of galvanized items shall be galvanized in accordance with ASTM A153, or of compatible, non-corrodible material.

2.4 CLEANING

A. All surfaces of metal handrails and railings shall be cleaned and treated to assure maximum paint adherence, prior to application of the shop prime coat, in accordance with SSPC-SP 1, SSPC-SP 3, SSPC-SP 10, SSPC-SP 11 as applicable for the type of substrate, exposure, and application.

B. Ferrous metalwork shall be given a shop coat of rust-inhibitive metal primer as specified in Section 099100 – PAINTING, or other approved rust-inhibitive metal primer standard with the railing manufacturer.

C. After erection, all field welds, field bolts and abraded or scratched surfaces shall be cleaned and given an additional spot coat of the same paint used for the shop coat. The entire work shall be left in a neat, clean and acceptable condition.

3.0 EXECUTION

3.1 INSTALLATION

A. Install metal handrails and railings as indicated and in accordance with the approved Shop Drawings, using workers skilled and experienced in the installation of the type of work involved. Conform with the installation requirements of NAAMM's Pipe Railing Manual, as applicable.

B. Install metal handrails and railings with accessories furnished by the railing fabricator as required for complete and finished railing installations.

C. Installation of handrails and railings shall be in accordance with approved Shop Drawings, true and horizontal, perpendicular, or at the required angle, as the case may be, level and square, with angles and edges parallel with related lines of the building or structure.

D. Field welding, where required, shall be in accordance with AWS "Standard Qualification Procedure".

E. Where railing base plates require grouting, conform with requirements per section 033000 – SITE CAST-IN-PLACE CONCRETE, as applicable.

3.2 HOT DIPPED GALVANIZING REPAIR

A. Galvanized surfaces which have become damaged from welding, handling, or installation shall be repaired immediately after installation with galvanizing repair material in accordance with ASTM A780 as approved by the architect.

END OF SECTION

Division 6:
Wood, Plastics & Composites

SECTION 062000 - FINISH CARPENTRY

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install all non-structural architectural wood items that are exposed to view as shown on project Drawings, including items not specifically installed under the work of other Sections.

1.2 RELATED SECTIONS

A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of Contract Documents.

B. Section 085113, Aluminum Windows

C. Section 099100, Painting

1.3 REFERENCES

A. APA - The Engineered Wood Association

1.4 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. All work shall conform to the California Building Code in effect at time of project approval.

1.5 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Shop Drawings: provide Shop Drawings showing layout of siding and trim pieces, including nailing schedule.

C. Samples: For each material/product used, provide a sample.

1.6 DELIVERY, STORAGE AND HANDLING

A. Keep material dry at all times. Protect panels against exposure to weather and contact with damp or wet surfaces.

B. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

C. For lumber and plywood pressure treated with water borne chemicals, provide for air circulation at each course.

D. Use all means necessary to protect finish carpentry materials before, during, and after installation and to protect the installed work and materials of other trades.

E. In the event of damage, immediately make all repairs and replacements necessary for the approval of the Architect and at no additional cost to the County.

1.7 PROJECT CONDITIONS

A. Protect framing from moisture during construction. Allow framing to dry for as long as feasible before enclosing, to reduce conditions favorable to growth of mold. Construct framing assemblies to allow moisture to escape.

B. For individuals with chemical sensitivities, test proposed products before installation. Aromatic woods may also cause problems for individuals with chemical sensitivities.

2.0 PRODUCTS

2.1 MANUFACTURER

A. Manufacturer shall be an approved APA Engineered Wood Association manufacturer for the materials specified herein.

2.2 MATERIALS

A. General:

1. All products shall be new, first quality of their respective kinds, and subject to the approval of the Architect.

B. Wood Trim

1. White Maple, Clear

D. Screws and Fasteners:

1. As indicated on drawings.

3.0 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to all work of this section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where this installation may properly commence.

2. Verify that finish carpentry may be completed in accordance with the original design and all pertinent codes and regulations.

B. Correction:

1. In the event of discrepancy, immediately notify the Architect.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been resolved.

3.2 INSTALLATION

A. General:

1. Install all items straight, true, level, plumb and securely anchored in place for long life under hard use.

2. Scribe and closely fit all items, concealing all fastenings and setting all nails for putty.

B. Trim:

1. Install all trim in pieces as long as possible and where joints are unavoidable, join only where solid fastening can be made.

2. Cope all interior angles; miter all exterior angles; miter or scarf all end-to-end joints.

3. Screw interior trim with screws of proper dimension to hold the member firmly in place without splitting the wood.

a. Use fastening system as specified herein.

b. Install continuous bead of construction glue prior to installation of trim pieces. Do not use glue over the ends of trim pieces.

C. Finishing:

1. No coarse grained sandpaper mark, hammer mark, or other imperfection will be permitted.

3.3 CLEAN UP

A. Each day, or more often if required, during the execution of this portion of the work thoroughly sweep down the areas in which finish carpentry is being performed and remove all debris resulting from this installation, leaving the buildings and site in a neat and orderly condition.

END OF SECTION

SECTION 064116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install custom architectural casework surfaced in plastic-laminate as shown on project Drawings and as specified herein, including bases and uppers.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 064196, Quartz Agglomerate Countertops

C. Section 079000, Sealants and Caulking

D. Section 092900, Gypsum Board

E. Section 099100, Painting

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D256 - Standard Test Method for Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.

2. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.

3. ASTM D696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 Degrees C and 30 Degrees C.

4. ASTM D1037 - Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials

5. ASTM E84 - Standard Test Method for Surface Burning Characteristics

6. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

7. ASTM G22 - Standard Practice for Determining Resistance of Plastics to Bacteria.

B. American National Standards Institute (ANSI):

1. ANSI A208.1

2. ANSI A208.2

C. Woodwork Institute (WI)’s Manual of Millwork, 2001.

1.4 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Product data: Within 5 calendar days after the Contractor has received the Client's Notice to Proceed, submit:

1. Manufacturer's recommended methods of installation which, when approved by the Architect, will become the basis for acceptance or rejection of actual installation procedures used on the work of this Section.

2. Manufacturer’s MSDS for all adhesives and sealants.

3. Written assurance that contract schedule shall be met.

C. Shop Drawings:

1. Submit full-size shop drawings complete with hardware, drawers, and adjustable shelves.

a. Show materials, dimensions, cabinet cut details, anchoring devices, spacing and sizes, and sink locations.

b. Show relation of material furnished under this Section to work of other trades.

c. Confirm all dimensions and installation conditions prior to fabrication.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials to site in manufacturer's original unopened packaging, with labels clearly identifying product name and manufacturer.

B. Store materials indoors in a clean and dry area in accordance with manufacturer's recommendations. Keep material dry at all times. Protect panels against exposure to weather and contact with damp or wet surfaces.

C. Store materials on a flat, level surface with adequate support to prevent sagging.

1. Stack materials in a manner to provide air circulation within and around stacks and under temporary coverings, including polyethylene and similar materials.

2. For materials pressure-treated with water borne chemicals, provide for air circulation at each course.

D. Condition materials to final environment for 48 - 72 hours prior to installation and finishing.

E. Use all means necessary to protect materials before, during, and after installation and to protect the installed work and materials of all other trades.

F. In the event of damage, immediately make all necessary repairs and replacements to the approval of the Architect and at no additional cost to the Client.

1.6 QUALITY ASSURANCE

A. Qualification of Fabricators and Installers:

1. For actual fabrication and installation of materials, use adequate numbers of skilled work persons who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper installation and completion of the work of this Section.

2. In the acceptance or rejection of materials, no allowance will be made for lack of skill on the part of workpersons.

B. Codes and Standards:

1. All work shall conform to the California Building Code in effect at time of project approval.

2. In addition to complying with all pertinent codes and regulations, comply with WI's Manual of Millwork for the grades specified, except that certification will not be required.

3. Compliance with Standards:

a. The County of Monterey reserves the right to request and pay for an inspection by a representative of WI to determine that all work of this Section has been performed in accordance with the referenced standards.

b. In the event such inspection determines that materials do not comply with the referenced standards, the Contractor shall pay the costs of the inspection and shall immediately replace the non-complying work with items complying with the referenced standards as specified in this Section, all at no additional cost to the County of Monterey.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. MDF: SierraPine, 3010 Lava Ridge Court, Suite 220, Roseville, CA 95661, 1-916-772-3422, www.sierrapine.com, or approved equal.

B. Laminated Plastic: Wilsonart International, 2400 Wilson Place, Temple, TX, 76503, 1-800-433-3222, www.wilsonart.com.

2.2 MATERIALS

A. MDF: Medite II Medium Density Fiberboard panel

1. Wood fiber: 100% post-industrial recycled wood material

2. Binder: Formaldehyde-free adhesive system

3. Panel Thickness: 3/4 inch

4. Conformance: ANSI A208.2 industrial-grade MDF

5. Certifications:

a. SCS Certified: Post-industrial recycled wood fiber. No added formaldehyde.

b. CPA Certified: Environmentally Preferable Product

B. Laminated Plastic:

1. High pressure plastic laminate in accordance with NEMA LD-1 standards unless otherwise indicated.

    a. Sheet thickness: 0.050” thick, complying with NEMA LD3 for horizontal surfaces and 0.030” thick for vertical surfaces.

    b. Surface burning characteristics shall be in accordance with ASTM E48; unbonded

    c. Exposed edges of cabinets, drawers, and doors shall be edged with 3-mil PVC tape matching the plastic laminate facing plastic laminate.

    f. Contractor to verify that color selection is available to meet project schedule.

C. Adhesives:

1. Adhesives used shall be approved by the manufacturer of the materials specified herein, as specified in manufacturer’s printed installation instructions.

D. General Construction

1. Doors, shelves, bases, ends, and dividers shall be 3/4-inch thick.

2. All bases and framing members shall be doweled into end panels and secured with glue and screws.

3. Backs shall be rabbeted, set flush into end panels, and secured with screws.

4. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fittings. Verify location of cutouts from on-site dimensions.

E. Drawers

1. Drawer fronts shall be 3/4-inch plastic laminate on exposed face and plastic laminate cabinet liner on interior surfaces.

2. Drawer sides and backs shall be laminated on both sides with plastic laminate cabinet liner.

3. Drawer bottoms shall be fully housed into front, sides and back.

A. Shelves

1. Adjustable

2. Shelf core material and thickness to meet W.I. Table 14-1 for 50 lb/sqft loading.

G. Fasteners: Size and type to suit application.

2.4 FABRICATION

A. Custom Casework:

1. Refer to Drawings for locations, type, and size of casework.

1. Fabricate all architectural wood casework in strict accordance with the referenced standards and the approved Shop Drawings.

2. Verify location, detail, and dimensions of electrical receptacles and switches to ensure proper fit and accurate alignment integral with casework and other items.

3. Coordinate details with other work supporting, adjoining, or fastening to casework and other items.

4. Fabricate paneling to dimensions, profiles and details indicated with openings pre-cut, where possible, to accommodate other items and work. Complete fabrication, assembly, finishing, and other work before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming and fitting.

6. All casework shall meet WI standards.

7. Materials, hardware, component construction:

a. Hinges: Blum #71T5580, 120 degrees concealed, self closing

b. Shelf Supports: Aluminum and Steel standards with related supports

c. Cabinet Pulls: 4 inch U-pulls at cabinets/casework for accessible storage per 1125B.4

d. Cabinet Locks:

i. Doors National #C8173
ii. Drawers National #C8177

e. Drawer Slides: Drawers up to 24 inch - Accuride 3832 Series, 100 lbs., full extension.

8. Where laminate horizontal grain finish is used insert Schluter System .334wx 98.5-in L aluminum edge trim between sheets.

2.5 SCHEDULE

Reference #	Location	Series	Color	Grain Orientation
PL-1	Doors, drawers, aprons, legs, face frames, cabinet box exterior	Wilsonart Laminate	Asian Sand 7952K-18 w/ Linearity Finish	horizontal
PL-2	Cabinet Interior, Adjustable shelves	Melamine	White	N/A
Note: Verify location, type and size with drawings				

3.0 EXECUTION

3.1 SURFACE CONDITIONS

A. Field Measurements:

1. Take all necessary measurements in the field to ensure proper dimensions for materials.

B. Inspection:

1. Prior to installation of the work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where the installation included in this Section may properly commence.

2. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3. Verify that materials may be installed in accordance with the original design and the approved Shop Drawings.

C. Discrepancies:

1. In the event of a discrepancy, immediately notify the Architect.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.3 INSTALLATION

A. General:

1. Precondition surfacing materials and surfaces to receive surfacing materials in accordance with manufacturer’s printed installation instructions.

2. Install the approved laminated plastic in strict accordance with the manufacturer's recommendations as approved by the Architect.

3. Install all materials and accessories true, square, plumb, level, and firmly anchored for long life under hard use.

4. Scribe and closely fit all items, concealing all fastenings and setting all nails for putty.

B. Trim:

1. Install all trim in pieces as long as possible and where joints are unavoidable, join only where solid fastening can be made.

2. Cope all interior angles; miter all exterior angles; miter or scarf all end-to-end joints.

3. Make all joints to exclude water and seal in waterproof glue or caulking as described in Section 079000, Sealants and Caulking.

C. Finishing:

1. No coarse grained sandpaper mark, hammer mark, or other imperfection will be permitted.

3.4 SCHEDULE

A. Verify location, type and size of cabinetry with drawings before installation.

3.5 FINAL INSPECTION

A. Prior to final inspection and acceptance by the Architect, completely check each installed item; touch-up all scratches and imperfections of finish for the approval of the Architect.

3.6 CLEAN UP

A. Each day, or more often if required, during the execution of this portion of the work thoroughly sweep down the areas in which finish carpentry is being performed and remove all debris resulting from this installation, leaving the buildings and site in a neat and orderly condition.

B. Upon completion, clean the work of this Section in accordance with recommendations of the manufacturer(s) of the materials used.

C. Remove all debris resulting from this work.

3.7 WARRANTY

A. The products delivered shall be free of defects.

B. Manufacturer’s standard performance warranty, as available for specified installation and environmental conditions.

END OF SECTION

SECTION 064196 – QUARTZ AGGLOMERATE COUNTERTOPS

1.0 GENERAL

1.1 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

C. Provide and install quartz agglomerate countertops including hardware as shown on project Drawings.

D. Section includes:

1. Quartz agglomerate surfacing countertops
2. Quartz agglomerate backsplashes
3. Quartz agglomerate end splashes
4. Adhesives and sealants

1.2 RELATED SECTIONS

A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 061000 - Rough Carpentry

C. Section 064116 - Plastic Laminate-Clad Architectural Cabinets

D. Section 079000 - Sealants and Caulking

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C97 – Standard Test Methods for Absorption ad Bulk Specific Gravity of Dimension Stone.
2. ASTM C170 – Standard Test Method for Compressive Strength of Dimension Stone.

3. ASTM C501 – Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by Taber Abraser.

4. ASTM C834 – Standard Specification for Latex Sealants.

5. ASTM C920 – Standard Specification for Elastomeric Joint Sealants.

6. ASTM D790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulation Materials.

7. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

8. ISO – International Organization of Standardization.

9. ISO 9001 – Quality Management Systems.

10. NSF/ANSI Standard 51 – Food Equipment Materials.

11. SCAQMD Rule 1168 – Adhesive and Sealant Applications.

12. UL 2818 – GREENGUARD Certification Program for Chemical Emissions for Building Materials, Finishes, and Furnishings.

1.4 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Product Data: For countertop materials.

1. For each time, dimensional plans and elevations, large scale details, attachment devices and other components.

2. Submit data for each specified product. Include manufacturer's technical data sheets and polished installation instructions.

C. Material Safety Data Sheets (MSDS) for products and accessories

D. Shop Drawings: Provide plans, sections, and large-scale details. Include attachment provisions and fabrication methods. Include joinery, edge conditions, terminations, substrate construction, cutouts, and holes.

1. Show locations and details of joints.

2. Show plumbing installation provisions.

E. Samples for Verification:

1. Countertop material, 6 inches (150 mm) square.

2. One full-size quartz agglomerate countertop, with front edge and backsplash, 8 by 10 inches (200 by 250 mm), of construction and in configuration specified.

F. Information Submittals:

1. Qualifications Data: For fabricator.

2. Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties.

3. Warranty: Submit specimen copy of specified warranty.

G. Quality Assurance Submittal: Submit certified test reports showing compliance with specified performance characteristics and physical properties.

1. Fabricator Qualifications: Minimum of five years documented installation experience for projects similar in scope and complexity to this Project, and currently certified by the manufacturer as an acceptable installer.

2. Certificates: Copies of ISO certifications.

3. Test Reports:

a. Flammability test reports

b. Food preparation zone use test reports.

4. Manufacturer's Fabrication and Installation Manual

5. Manufacturer’s Fabrication and Installation Check List

H. Closeout Submittals: Submit the following:

1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Section 017700, Contract Closeout Procedures. Include methods for maintaining installed products, precautions against cleaning materials, methods detrimental to finishes and performance, and special warranties. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Fabricator/Installer Qualifications: Minimum three years experience in fabrication and installation of quartz Surface materials or certification by Distributor.

B. Certifications:

1. Manufacturer must hold current ISO 9002 and 14001 certificates

C. Applicable Standards:

1. American National Standards Institute (ANSI)
2. American Society for Testing and Materials (ASTM)
3. National Electrical Manufacturers Association (NEMA)

D. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and execution.

1. Build mockup of typical countertop as shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed work if undisturbed at time of substantial completion.

1.6 DELIVERY, STORAGE AND HANDLING

A. Reference Section 016000−Product Requirements.

B. Follow manufacturer’s instructions.

C. Special Instructions: do not deliver components to project site until spaces are ready for installation.

1.7 PROJECT CONDITIONS

A. Environmental Requirements: Installation spaces must be maintained at normal occupancy temperature and humidity levels for minimum 72 hours prior to and continuously following installation.

B. Adhesives: Acclimate adhesives to occupancy room temperatures with maximum temperature not to exceed 75 deg F (24 deg C)

C. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays. Coordinate locations of utilities that will penetrate countertops or backsplashes.

1.8 WARRANTY

A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

C. Special Warranty: Ten year limited warranty against manufacturing defects in slab material.

1.9 MAINTENANCE

A. Extra Materials: Provide for future repair use by Owner.

1. Minimum 4 sf (0.37m2) per 50 lf (15 m) of each countertop color.

2. Color shall be from same dye-lot as installed countertops.

2.0 **PRODUCTS**

2.1 MANUFACTURER

A. Wilsonart International, 2400 Wilson Place, Temple, TX, 76503, 1-800-433-3222, www.wilsonart.com

2.2 MATERIALS

A. Materials: Composition – 93 percent quartz aggregate combined with polyester resin binders and proprietary pigments that are fabricated into slabs using Bretonstone vacuum vibrocompaction technology.

1. Material shall have minimum physical and performance properties specified.

a. 3 cm (1-1/4”) product is typically for horizontal installation and 2 cm (3/4”) product is typically for both horizontal and vertical installations.

b. See manufacturer’s product data for panel size limitations.

c. The thicker the material, the more the cost in both product and labor.

B. Thickness: 2 cm (3/4”)

C. Edge Treatment: Straight

D. Quartz Finish: Polished finish with Glossometer reading greater than 45.

E. Seam Width: Less than 1/16” unless otherwise noted

F. Sink Mounting:

1. Refer to plumbing drawings and specifications.

G. Backsplash: Applied, dimension as shown on drawings

H. Endsplash: Applied

I. Performance Characteristics: Reference Radianz Quartz Surface physical properties data sheet

J. Core Material

1. Material: Exterior Grade Plywood

2. Core Thickness: 3/4", unless otherwise specified on drawings

a. Build up countertop thickness to 1-1/2” at front, back, and ends with additional layers of core material laminated on top, unless otherwise specified on drawings.

3. Paper backing: Provide paper backing on underside of countertop substrate.

2.3 ACCESSORY PRODUCTS

A. Adhesives to create color-matched seams

B. Physical Performance Characteristics:

1. Flexural Strength: Greater than 4,500 psi (31.0 MPa); ASTM D 790.

2. Flexural Strain: Less than 0.375 percent; ASTM D 790.

3. Flexural Modulus: Greater than 3.75 MPsi; ASTM D 790.

4. Stain resistance (24 Hour): No effect to moderate effect; NEMA LD-3.

5. Abrasion Resistance: Greater than 100 in. lbs.; ASTM C 501.

6. Density: Greater than 2.1 g/.cu. m per ASTM C 97.

7. Compressive Strength (One Axis - Div.): Greater than 20,000 psi (138 MPa) per ASTM C 170.

8. Moisture Absorption: Less than 0.03 percent per ASTM C 97.

9. Surface Burning Characteristics: Class I and Class A per ASTM E 84.

2.4 FABRICATION

A. Weight of product is approximately 12 – 15 PSF and is typically field assembled.

B. Shop Assembly: Fabricate components in shop to the greatest extent practical, using manufacturer's printed instructions and technical bulletins.

1. Avoid seams within 3" (75 mm) of inside or outside corners.

2. Joint locations: Not within 18" of a sink or cooktop and not where a countertop section less than 36" long would result, unless unavoidable.

C. Provide holes and cutouts for penetrations and sinks and bowls as shown on Drawings and scheduled in other sections. Form cutouts to required template or pattern, with smooth, even curves and eased edges.

2.5 FINISHES

A. Color: Rio Upano Q3008

3.0 **EXECUTION**

3.1 EXAMINATION

A. Examine cabinets upon which countertops will be installed.

1. Verify that cabinets are level to 1/8" in 10'.

2. Review manufacturer's Fabrication and Installation Check List.

B. Coordinate with responsible entity to correct unsatisfactory conditions.

C. Commencement of work by installer is acceptance of cabinet conditions.

3.2 INSTALLATION

A. Install countertops and secure to cabinets in accordance with manufacturer's Fabrication and Installation Manual.

B. Install Sinks and Bowls:

1. Mounting Type: As shown on Drawings.

2. Secure under mount sinks and bowls to countertops with clip system as recommended by manufacturer.

3.3 REPAIR

A. Repair minor imperfections and cracked seams in accordance with manufacturer's Fabrication and Installation Manual.

B. Remove and replace quartz surfacing components that are damaged and cannot be satisfactorily repaired.

3.4 CLEANING

A. Remove temporary coverings and protection of adjacent work areas.

B. Repair or replace any damaged products of this Section.

C. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance.

D. Remove construction debris from project site and legally dispose of debris. Leave site in a neat and clean condition.

3.5 PROTECTION

A. Cover surfaces in accordance with manufacturer's Care and Maintenance Instructions.

END OF SECTION

SECTION 068200 - FIBERGLASS REINFORCED PLASTIC PANELS

1.0 GENERAL

1.1 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

C. Provide and install full-height fiberglass reinforced plastic wall panels including fasteners, adhesive and trim as shown on project Drawings.

1.2 RELATED WORK

A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 079000 - Sealants and Caulking

C. Section 092900 - Gypsum Board

D. Section 099565 – Epoxy Coatings

1.3 REFERENCES

A. ASTM D2583 Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.

B. ASTM D5319 Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.

C. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

A. Comply with pertinent provisions of Section 01300, Submittal Procedures.

B. Product Data: Submit product data, including manufacturer's product sheet, for specified products.

C. Shop Drawings:

1. Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors, patterns and textures.
   a. Indicate location and dimension of joints and fastener attachments.

D. Samples:

1. Submit selection and verification samples for finishes, colors and textures.

2. Submit 3 inch ∞ 3 inch samples of each surface and color required.

3. Submit 3 inch samples of each trim profile and trim color required.

E. Quality Assurance Submittal: Submit the following:

1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics, criteria and physical requirements.

3. Manufacturer's Instructions: Submit manufacturer's Installation Guide #2505, and submit manufacturer’s information for recommended methods of cleaning, including cleaning materials and methods of application with precautions.

F. Closeout Submittals: Submit the following:

1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.

2. Warranty: Warranty documents specified herein.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Installer Qualifications: Installer should be experienced in performing work of this section and should have specialized in installation of work similar to that required for this project.

2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction and capable of approving application method.

B. Mock-Ups: Install at project site a job mock-up using acceptable products and manufacturer approved installation methods. Obtain District and Architect acceptance of finish color, texture, pattern and workmanship standards.

1. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when it is no longer required.

2. Incorporation: Mock-up may be incorporated into final construction upon District's approval.

C. Source Quality: Obtain fiberglass reinforced plastic (FRP) panels from a single manufacturer. Provide panels and molding only from manufacturer specified to ensure warranty and color harmonization of accessories.

D. Extra Materials: Deliver to District extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals Section.

1.6 DELIVERY, STORAGE & HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Package sheets on skids or pallets for shipment to project site.

C. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

1. Store products indoors and protect from moisture, construction traffic and damage.

2. Store panels flat on clean, dry surface. Do not stand on edge or stack on fresh concrete or other surfaces that emit moisture.

3. Store panels at least 24 hours with temperature and humidity conditions approximating the average environment of the finished room.

D. Handling: Remove foreign matter from face of panel by use of a soft bristle brush, avoiding abrasive action.

1.7 PROJECT CONDITIONS

A. Environmental Requirements:

1. Installation shall not begin until building is enclosed, permanent heating and cooling equipment is in operation and residual moisture from plaster, concrete or terrazzo work has dissipated.

2. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.

3. Provide ventilation to disperse fumes during application of adhesive as recommended by adhesive manufacturer.

B. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.8 WARRANTY

A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.

B. Manufacturer's Warranty: Submit, for District's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights District may have under Contract Documents.

2.0 PRODUCTS

2.1 MANUFACTURER

A. Crane Composites, 23525 W Eames Street, Channohon, IL 60410, 1-815-467-8600, www.cranecomposites.com

2.2 MATERIALS

A. Varietex Class C Fire-Rated, .09” (2.3 mm)

a. Size: 48"W and shall run from cove to ceiling; refer to Drawings.

B. Rivets: Nonstaining nylon drive rivets shall be used and shall match panel colors and length to suit project conditions.

C. FRP Moldings: Manufacturer standard vinyl molding matching the color of panels. 1-1/2 inch corner moldings and other moldings as indicated from a single production run for uniformity of color.

D. Aluminum Reglet: As specified in Section 09250, Gypsum Board.

E. Certification:

a. Flame spread 25 or less, smoke developed 450 or less (per ASTM E-84).

b. Meets USDA/FSIS requirements.

c. UL Classified.

2.3. SCHEDULE

Reference #	Series	Style	Color
FRP-1	Varietex	Linen Texture	1130 Cotton White
Note: Verify location, type and size with drawings			

2.4 ACCESSORIES

A. Adhesive: Nontoxic, non-allergenic adhesive recommended by the wall covering manufacturer and meeting Code requirements for flammability and toxicity.

B. Sealant: As specified in Section 079000, Sealants and Caulking.

3.0 EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions: Verify that substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

B. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails are countersunk, and joints and cracks are filled flush and smooth with the adjoining surface.

C. Do not begin installation until backup surfaces are in a satisfactory condition.

3.2 FABRICATING RECOMMENDATIONS

A. Note: Protect your eyes with goggles and cover your nose and mouth with a filter mask when cutting panels.

B. Hand fabrications: Drilling high-speed drill bit (60 degree cutting angle with 12 degree to 15 degree clearance) or hole saw.

C. Cutting: Sheet metal shears or circular saw with reinforced carborundum or carbide tipped blade.

D. Production fabrications: Use carbide-tipped tools. Straight cuts can be sheared (90 degree cutting edge with 0.002 inch clearance) or sawed. For irregular cuts, use die punch or band saw.

3.3 INSTALLATION

A. Comply with manufacturer's recommended methods of installation, only using products that are acceptable to panel manufacturer.

B. FRP Installation:

1. Carefully locate penetrations and openings through paneling, including electrical outlets and piping, and provide minimum sized openings as required. Size openings so they will be covered by switch plates, flanges and other required trim.

2. Cut and drill panels with carbide tipped saw blades or drill bits, or cut with snips.

3. Install panels with manufacturer's recommended gap for panel field and corner joints.

4. Predrill fastener holes in panels with 1/8 inch oversize.

5. For trowel type and application of adhesive, follow adhesive manufacturer's recommendations.

6. Butt joints for an even and tight fit along entire length of joint. Make joints plumb and level.

7. If a vertical splice is required and is acceptable to the Architect, balance the splice symmetrically with the length of the wall so that each run is not less than 2 feet long.

8. Glue paneling securely to substrate.

C. Trim and Molding Installation:

1. Provide trim and molding at all edges of paneling.

2. Install true to line.

3. Use full-length stock trim and moldings for run less than or equaling the stock length.

4. Miter corners as necessary.

3.4 FINISHED PANEL QUALITY

A. Panels shall have a wear side with a pebble-like embossed or smooth finish. Color shall be uniform throughout, as specified. The backside shall be smooth. Backside imperfections which do not affect functional properties are not cause for rejection.

3.5 CLEAN UP

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to District's acceptance. Remove construction debris from project site and legally dispose of debris.

B. Remove any excess adhesive or sealant from panel face or joints immediately using solvent or cleaner recommended by panel manufacturer.

C. Remove scraps and debris from the site, and leave in a neat and clean condition.

END OF SECTION

Division 7:
Thermal & Moisture Protection

SECTION 072116 - BLANKET INSULATION

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install building insulation as indicated on the project Drawings and as specified herein, including insulation of ceiling areas, sound insulation of interior walls, and insulation of exterior walls.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 092900, Gypsum Board

C. Section 133419, Metal Building Systems

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C665 – Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

2. ASTM E84 – Test Method for Surface Burning Characteristics of Building Materials.

B. National Fire Protection Association (NFPA):

1. Test of Surface Burning Characteristics of Building Materials.

C. Underwriters Laboratories, Inc. (UL):

1. UL 723- Tests for Surface Burning Characteristics of Building Materials.

D. California Building Code, 2016.

1.4 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the site and store in a safe dry place with all labels intact and legible at time of installation.

B. Use all means necessary to protect insulating materials before, during and after installation and to protect the installed work and materials of other trades.

2.0 PRODUCTS

2.1 MANUFACTURER

A. Johns Manville, www.jm.com, 1-800-654-3103, or approved equal.

2.2 MATERIALS

A. General:

1. Comply with California Energy Code, CCR Title 24, Part 6, Subchapter 2, Section 118: Certification that insulation complies with California Quality Standards for Insulating material (CCR Title 20, Chapter 4, Article 3.)

2. Comply with California Building Code Section 707: Flame spread rating not to exceed 25 and smoke density not to exceed 450 when tested in accord with UBC Standard 8-1.

B. Thermal Insulation:

1. Microlite “L” Formaldehyde- Free Thermal and Acoustical Metal Building Insulation

   a. R-value as specified by Title 24 requirements. Applicable to Exterior Walls

C. Sound Insulation:

1. Sound- SHIELD Unfaced formaldehyde-free fiber glass insulation

3.0 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

2. Verify that building insulation may be installed in accordance with the original design and the manufacturer’s recommendations.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Architect and County Representative.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 INSTALLATION

A. General:

1. Except as otherwise directed by the Architect, install all insulation in accordance with instructions of the manufacturer.

B. Inspection:

1. Upon completion of the installation, visually inspect each insulated area and verify that all insulation is complete and properly installed.

3.3 CLEANUP

A. Upon completion, remove all debris resulting from work of this Section.

3.4 WARRANTY

A. Product delivered shall be free of defects.

END OF SECTION

SECTION 072616 - BELOW-GRADE VAPOR BARRIER

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install below-grade vapor barrier where shown on the project Drawings and as specified herein in any location where there is new concrete.

1.2 RELATED SECTIONS

A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. See structural drawings.

1.3 REFERENCES

A. American Society for Testing & Materials (ASTM):

1. ASTM D1709-04: Impact Resistance of Plastic Film by the Free-Falling Dart Method.

2. ASTM E96-95: Water Vapor Transmission of Materials.

3. ASTM E154-99: Standard Test Method for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.

4. ASTM E1745-97: Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slab.

5. ASTM E631: Terminology of Building Constructions

6. ASTM E1643-98: Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

7. ASTM F1249-90: Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.

8. ASTM D882-02: Tensile Properties of Thin Plastic Sheeting.

B. American Concrete Institute (ACI)

1. ACI302.1R-96 – Minimum Thickness (10-mils)

C. Soils report per Section 310513, Soils for Earthwork

1.4 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Submit manufacturer's product data for each material specified herein, including test reports or manufacturer's certificates indicating materials comply with specified requirements.

C. Submit sample of each material specified herein.

1.5 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods necessary for proper performance of the work of this Section.

B. Cooperate as required in performance of the specified testing and inspecting.

1.6 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer's recommendations for storage and handling of product.

2.0 PRODUCT

2.1 MANUFACTURER

A. Stego Industries LLC, San Clemente, CA, Tel: 949-257-4100, Toll Free: 877-464-7834, Fax: 949-257-4113, www stegoindustries.com, or approved equal.

2.2 MATERIALS

A. Stego Wrap Vapor Barrier (underslab): multi-layer plastic extrusion with a proprietary formulation of prime, virgin, polyolefin resins - 15 Mil

1. Thickness: 15-mils

2. Roll Dimensions: 14 ft. x 140 ft.

3. Roll Weight: 140 lbs.

4. Permeance: 0.0084 perms, 0.0035 WVTR per ASTM F1249

B. Other Materials: Provide other materials not specifically described herein but required for a complete and proper installation, as selected by the Contractor and subject to the approval of the Architect and the manufacturer of underslab vapor retarder.

3.0 EXECUTION

3.1 EXAMINATION OF SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed.

1. Correct conditions detrimental to timely and proper completion of the work.

2. Do not proceed until satisfactory conditions are corrected.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommended methods of installation, and in accordance with procedures outlined in ASTM E1643.

B. After base for concrete has been leveled, compacted and tamped, install the vapor barrier over the base and compacted fill, with the longest dimension parallel to the direction of the pour of the concrete.

C. All joints should be lapped 6 inches and sealed with tape. Seal penetrations.

D. Screed pin(s) shall not be driven through vapor barrier.

E. All penetrations must be sealed using a combination of Stego Wrap, Stego Tape and/or Stego Mastic.

F. Product should be as clean and dry as possible before sealing with tape. Verify with manufacturer of underslab vapor barrier.

END OF SECTION

SECTION 076000 - FLASHING AND SHEET METAL

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install all sheet metal and all flashing, including items not specifically described in other Sections but required to prevent the penetration of water through the exterior shell of the building as shown on project Drawings, including:

1. Roof penetrations

2. Miscellaneous sheet metal fabrications as indicated on the Project Drawing

3. Sealants associated with shop fabrication of sheet metal work

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Division 7 - Thermal and Moisture Protection: All Sections

C. Section 133419, Metal Building System

1.3 REFERENCES

A. ASTM A525 - Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

B. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process.

C. ASTM A792 - Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

D. Sheet Metal and Air Conditioning Contractors National Association, Inc.

1. Architectural Sheet Metal Manual, current edition.

E. National Roofing Contractors Association

1. Roofing and Waterproofing Manual, current edition.

1.4 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Product Data: submit manufacturer's product information, including installation instructions, product specifications and standard details, including manufacturer's standard range of colors and finish options.

1. Submit color chips for Architect's review and selection.

C. Samples: submit the following for Architect's review and acceptance:

1. Hanger brackets, braces, and stiffeners: one of each type.

2. Fasteners: six of each type.

D. Shop Drawings: submit Shop Drawings and installation details showing methods of installation, sections and details, flashings and all other accessories.

1. Shop Drawings must show interface with all related work of other trades and proposed identification of component parts and finishes.

2. Submit large-scale Shop Drawings (minimum 3/4" = 1'0').

E. Warranty: submit manufacturer's standard warranty information for review and acceptance. Warranty shall cover corrosion of metal components.

1. Installer's warranty shall cover fastener failure, water penetration at joints or failure to drain.

1.5 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer's recommendations for storage and handling.

B. Use all means necessary to protect flashing and sheet metal before, during, and after installation and to protect the installed work and materials of other trades.

C. Stack materials to prevent twisting, bending and abrasion, and store in a manner that allows for proper ventilation.

D. Slope materials and components to ensure proper drainage.

E. Prevent contact with materials that may cause discoloration or staining.

F. In the event of damage, immediately make all repairs and replacements necessary for the approval of the Architect at no additional cost to the District.

1.6 QUALITY ASSURANCE

A. Qualifications of Manufacturer: Manufacturer shall specialize in manufacturing products specified in this Section.

B. Qualifications of Installers:

1. Installer shall be thoroughly experienced in the work of this Section, including all materials and methods required, and shall provide at least one person who shall be present at all times during the execution of work of this Section.

a. This qualified person shall direct the entire flashing and sheet metal fabrication and installation and shall ensure materials are installed in accordance with all pertinent local codes and regulations, including SMACNA's Architectural Sheet Metal Manual, current edition at time of construction.

C. Field Measurements: Verify all field measurements prior to fabrication of materials.

2.0 PRODUCTS

2.1 MATERIALS

A. General: Where sheet metal is required and no material or gauge is indicated herein or on the Drawings, furnish and install the highest quality commensurate with the referenced standards.

1. Minimum thickness of sheet metal shall be no less than 20 gauge galvanized metal.

2. Galvanized Iron:

a. Sheet metal or iron shall be a standard brand of openhearth

copperbearing steel, copper-molybdenum iron, or pure iron sheets.

3. Zinc Coating:

a. All galvanized sheets shall have a zinc coating applied by hot dip process to all surfaces per ASTM A653.

b. Zinc coating shall weigh not less than 1-1/4 ounces per square foot nor more than 1-1/2 ounces per square foot of surfaces covered and shall conform with ASTM A525.

B. Nails, Rivets and Fasteners:

1. Use only soft iron rivets having rust-resistance coating, galvanized nails, and cadium plated screws and washers in connection with galvanized iron and steel.

C. Flux:

1. All flux used for galvanized iron or steel shall be raw muriatic acid.

D. Solder:

1. All solder used on galvanized sheet steel shall conform with the current ASTM B32.

E. Other Materials:

1. All other materials not specifically described but required for a complete and proper installation of flashing and sheet metal shall be new, first quality of their respective kinds, and subject to the approval of the Architect.

3.0 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to work of this Section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where this installation may properly commence.

2. Verify that flashing and sheet metal may be installed in accordance with the original design, approved Shop Drawings, and the referenced

standards.

B. Correction:

1. In the event of discrepancy, immediately notify the Architect.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been resolved.

3.2 INSTALLATION

A. General:

1. Form all sheet metal accurately to the dimensions and shapes required, finishing all molded and broken surfaces with true, sharp, and straight lines and angles and, where intercepting other members, coping to an accurate fit and soldering securely.

2. Unless otherwise specifically permitted by the Architect, turn all exposed edges back 1/2 inch.

B. Expansion:

1. Form, fabricate, and install all sheet metal so as to adequately provide for expansion and contraction in the finished work.

C. Weatherproofing:

1. Finish watertight and weathertight where so required.

2. Make all lock seam work flat and true to line, and sweated full of solder.

3. All flat lock seams and lap seams, when soldered, shall be at least 1/2 inch wide.

4. Lap seams not soldered shall lap according to pitch but in no case less than three inches.

5. Make all flat and lap seams in direction of flow.

D. Joints:

1. Join parts with rivets or sheet metal screws where necessary for strength or stiffness.

2. Provide suitable watertight expansion joints for all runs of more than 40 feet except where closer spacing is indicated on the Drawings or required for proper installation

E. Nailing:

1. Where ever possible, secure metal by means of clips or cleats without nailing through the metal.

2. In general, space all nails, rivets, and screws not more than eight inches apart and, where exposed to the weather, use lead washers.

3. For nailing into wood, use barbed roofing nails 1-1/4 inches long by 11 gauge.

4. For nailing into concrete, use drilled plugholes and plugs.

F. EMBEDMENT

1. Embed all metal in connection with roofs in a solid bed of caulking, using the materials and methods described in Section 079000, Sealants and Caulking.

G. SOLDERING

1. General:

a. Thoroughly clean and tin all joint materials prior to soldering.

b. Perform all soldering slowly with a well heated copper in order to heat the seams thoroughly and to completely fill them with solder.

c. Perform all soldering with a heavy soldering copper of blunt design, properly tinned for use.

d. Make all exposed soldering on finished surfaces neat, full flowing, and smooth.

3.3 TESTS

A. Upon request of the Architect, demonstrate by hose or standing water that all sheet metal is completely watertight.

3.4 CLEAN UP

A. Upon completion, remove all debris resulting from work of this Section.

3.5 WARRANTY

A. The products delivered shall be free of defects.

B. Manufacturer's standard performance warranty, as available for specified installation and environmental conditions.

END OF SECTION

SECTION 076526 – SELF-ADHERING SHEET FLASHING

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install a moisture-retardant self-adhering sheet flashing system over exterior wall sheathing, including sealing, joints and protrusions through membranes as shown on project Drawings, including all related accessories.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 076000, Flashing and Sheet Metal

C. Section 081100, Metal Doors and Frames

D. Section 083213, Sliding Aluminum-Framed Glass Doors

E. Section 085113, Aluminum Windows

1.3 REFERENCES

A. American Society for Testing and Materials:

1. ASTM E2112-07: Standard Practice for Installation of Exterior Windows, Doors and Skylights.

2. ASTM F1249: Standard Test Method for Water Vapor Transmission Rate.

3. ASTM D779: Water Resistance of Paper, Paperboard, and other Sheet Materials by the Dry Indicator Method (Boat Test).

4. ASTM E96: Water Vapor Transmission of Materials.

5. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
6. ASTM G21: Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

7. ASTM C920: Standard Specification for Elastomeric Joint Sealants.

8. ASTM E154-99: Standard Test Method for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.

B. PSTC-1: Peel Adhesion of Single Coated Tapes, 180 Degree Peel.

1.4 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Product Data: Submit manufacturer's product data, technical data and installation instructions for each material specified herein, including test reports or manufacturer's certificates indicating materials comply with specified requirements.

C. Submit sample of each material specified herein.

1.5 QUALITY ASSURANCE

A. Qualifications: Installer must have successful experience in the installation of air barrier/secondary weather resistant barriers.

B. Install job mock-up using specified flashing system with system of fastening and taping seams as per manufacturer's instructions.

1. Obtain Architect's approval of system for appearance and workmanship standard.

C. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods necessary for proper performance of the work of this Section.

D. Cooperate as required in performance of the specified testing and inspecting.

1.6 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer's recommendations for storage and handling of materials specified.

2.0 PRODUCTS

2.1 MANUFACTURER

A. Fortifiber Building Products Systems, 419 W. Plumb Lane, Reno, NV 89509, 800-773-4777, www.fortifiber.com, or approved equal.

2.2 MATERIALS

A. Flexible Flashings: Moistop E-Z Seal Self-Adhesive Flashing system:

1. Reinforced multi-layer polymer membrane employing polyethylene and fiberglass reinforcers.

2. Meets Federal Specification per ASTM E2112.

3. Water Vapor Permeance: less than 0.1 perms per ASTM F1249.

4. Water Resistance: 150 hours minimum per ASTM D779.

B. Other Materials and Accessories: Provide other materials not specifically described herein but required for a complete and proper installation, as selected by the Contractor and subject to the approval of the Architect and the manufacturer of building wrap, including but not limited to the following:

1. Adhesives: types as recommended by manufacturer of materials specified herein.

2. Joint Sealers: Moistop Tape and/or Sheathing Tape; pressure sensitive tape or mastic as recommended by manufacturer of materials specified herein.

3. Sealant: Moistop Sealant; polyurethane, one-component balanced modulus, moisture curing, non-sag elastomeric sealant.

a. Reference Standards: AAMA 808.3-92 and ASTM C920 Type S, Grade NS, Class 25.

4. Penetration Seal: The Boot; pre-sized, multi-purpose penetration seal manufactured from puncture resistant polyolefin membrane.

3.0 EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examine the areas and conditions under which work of this Section will be performed.

1. Correct conditions detrimental to timely and proper completion of the work.

2. Do not proceed until satisfactory conditions are corrected.

B. Ensure items which pass through membrane are properly and rigidly installed and that substrate is free of projections and irregularities which may be detrimental to proper installation of membrane.

3.2 INSTALLATION

A. Install flashing and accessories in accordance with manufacturer's recommended methods of installation.

B. Materials shall be laid smooth without folds or bunches of material.

1. Seam Overlap: as recommended by manufacturer.

2. Sealing: items that are projecting through vapor retarders and/or vapor barriers shall be sealed per manufacturer's instructions.

C. Install flashing over exterior side of exterior wall sheathing after sheathing is installed and before windows and doors are installed.

D. Seal edges and items projecting through building paper. Tape all horizontal and vertical seams of flashing and seal all tears and cuts.

E. Inspect and repair flashing prior to application of finish material over flashing, ensuring there are no tape tears, perforations or similar damage.

.

END OF SECTION

SECTION 079000 - SEALANTS AND CAULKING

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install all sealants and caulking where required as shown on project Drawings and as specified herein.

1. Provide a positive barrier against the penetration of air and moisture at joints between items where caulking is essential to the continued integrity of the barrier.

2. Such caulking will normally be performed under the work of various Sections but shall be performed in strict accordance with the provisions herein.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Division 9 – Finishes

C. Division 26 – Electrical

1.3 REFERENCES

A. A;merican Society for Testing and Materials (ASTM):

1. ASTM E90 & C919

2. ASTM C834, Type C and Type OP, Grade -18 degrees C.

3. ASTM C1193, Standard Guide for Use of Joint Sealants.

4. ASTM C1472, Standard Guide for Calculating Movement and Other Effects When Establishing Sealant Joint Width.

1.4 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Before work is started, a sample opening of each type of joint shall be caulked where directed. Samples shall show materials, workmanship, bond, and color or caulking material as selected for the work. The materials, workmanship, bond, and color of the caulking work throughout the project shall match that of the approved sample joints.

1.5 DELIVERY, STORAGE AND HANDLING

A. Storage:

1. Store all caulking materials and equipment under conditions recommended by its manufacturer.

2. Do not use materials stored for a period of time exceeding the maximum recommended shelf-life of the material.

3. Sealant must be stored in original unopened container between 50 and 80 degrees F.

B. Protection:

1. Use all means necessary to protect caulking materials before, during, and after installation and to protect the installed work and materials of other trades.

C. Repairs:

1. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the County.

1.6 QUALITY ASSURANCE

A. Qualifications of Applicators:

1. Applicator of caulk and sealants shall be fully qualified with a minimum of five years' prior experience in similar work and who have been specially trained in the techniques of caulking and who are completely familiar with the written recommendations of the manufacturer of the material being used.

2. Indication of lack of skill on the part of caulking installers shall be sufficient grounds for the Architect to reject installed caulking and to require its immediate removal and complete recaulking at no additional cost to the County.

B. Qualification of Manufacturer(s):

1. All caulking and sealant materials shall be new stock, manufactured not more than six months prior to use in the project.
2. Whenever the materials are specified by the name of the manufacturer, it shall be taken as intended to mean and specify the materials described, or any other approved made equal thereto, for the purpose intended. the Architect shall be the sole judge as to such equality.

3. Where mixing is required, mix no more material than can be installed within four hours maximum and in amounts not to exceed 5-gallon-unit increments.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Provide materials that are low-emitting.

1. Materials shall meet the limits of the State of California DHS Standard Practice for the Testing of Volatile Organic Compounds or shall be identified by the following certification programs:

a) Greenguard Environmental Institute

b) Scientific Certification Systems

2. Provide cut sheet and MSDS showing VOC limits for each adhesive used in the building.

a. Adhesives must meet and/or exceed VOC limits of South Coast Air Quality Management District Rule #1168.

3. Provide cut sheet and MSDS showing VOC limits for each sealant used in the building.

a. All sealants used as filler must meet or exceed Bay Area Resources Board Re. 8, Rule 51.

b. Limits on VOCs for sealants for architectural use are 250 grams/liter (different levels for roadways, roofing material installation, PVC welding, and other).

c. Limits on VOCs for sealant primers for architectural-nonporous are 250 grams/liter; for architectural-porous are 775 grams/liter.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Pacific Polymers International, Inc., 12271 Monarch Street, Garden Grove, CA 92841, 1-714-898-0025, www.pacpoly.com, or approved equal.

B. ER Systems- 12055 Cutten Road, Houston, TX 77066 800-878-7876 www.ersystems.com

C. DAP - dap.com

2.2 MATERIALS

A. General:

1. All caulking and sealant materials, unless otherwise specifically approved by the Architect, shall be a single or double component, primerless, non-sagging type in neutral color or other color approved by the Architect where exposed to view, and shall be one of the following or an equal approval by the Architect.

B. Joint Compound Sealant: Sikaflex 2c NS by Sika Corporation meeting ASTM C-920 and other requirements indicated for each sealant specified or approved equal.

C. RCS20 SILICONIZED ACRYLIC SEALANT

1. Basic Uses: Sealant is designed to provide water and weather protection by airtight seal when used on interior and exterior surfaces. Sealant can be used for caulking window and door frames, vinyl, steel, aluminum, plywood siding, drywall, baseboards, bathroom and kitchen fixtures, primed fiber cement siding, and conventional stucco.

   a. Sealant is useful as an acoustical sealant in construction of walls, windows, doors, ceilings, and floors to reduce sound transmission in wall partitions to maintain specified STC and OITC values.

2. Limitations:

   a. Do not use for structural repairs.

   b. Not recommended for below grade or water immersion applications.

   c. Not to be used in applications where the surrounding materials will exceed sustained temperatures of 180 degrees F.

   d. Do not expose to water or rain for at least 24 hours after application.

e. Application is recommended when temperature of air and surface is 50 degrees F or above for a 24 hour period.

f. Do not apply if relative humidity is above 90%.

g. Do not freeze.

3. Packaging & Sizes: Sealant is available in 10.1 fl. oz. plastic caulking cartridges and 5-gallon plastic pails.

4. Standards:

a. Meets or exceeds the requirements of ASTM C834, Type C (clear) and Type OP (opaque colors), Grade -18 degrees C.

b. Meets or exceeds the requirements of ASTM E90 and C919.

C. DAP SIDE WINDER ADVANCED POLYMER SIDING & WINDOW SEALANT – CRYSTAL CLEAR

1. Basic Uses: Sealant is designed to provide water and weather protection by airtight seal when used on interior and exterior surfaces. Sealant can be used for caulking window and door frames, vinyl, steel, aluminum, plywood siding, drywall, baseboards, bathroom and kitchen fixtures, primed fiber cement siding, and conventional stucco.

a. Sealant is useful as an acoustical sealant in the construction of walls, windows, doors, ceilings, and floors to reduce sound transmission in wall partitions to maintain specified STC and OITC values.

2. Limitations:

a. Do not use for structural repairs.

b. Not recommended for below grade or water immersion applications.

c. Not to be used in applications where the surrounding materials will exceed sustained temperatures of 180 degrees F.

d. Do not expose to water or rain for at least 24 hours after application.

e. Application is recommended when temperature of air and surface is 50 degrees F or above for a 24 hour period.

f. Do not apply if relative humidity is above 90%.

g. Do not freeze.

3. Packaging & Sizes: Sealant is available in 10.1 fl. oz. plastic caulking cartridges and 5-gallon plastic pails.

4. Standards:

    a. Meets or exceeds the requirements of ASTM C834, Type C (clear) and Type OP (opaque colors), Grade -18 degrees C.

    b. Meets or exceeds the requirements of ASTM E90 and C919.

3.0 EXECUTION

3.1 CAULKING SCHEDULE

A. Carefully study the Drawings and furnish and install the proper caulking at each point where called for on the Drawings plus at all other points where caulking is required to maintain the continued integrity of the watertight barrier.

3.2 SURFACE CONDITIONS

A. Inspection:

1. Prior to all caulking, carefully inspect the surface to which caulking is to be applied and verify that they are clean, sound, and free from deleterious material which might adversely affect the bond.

2. Verify that caulking may be installed in accordance with the manufacturer's recommendations.

B. Corrections:

1. Clean all surfaces as necessary in accordance with manufacturer’s instructions.

2. In the event of discrepancy, immediately notify the Architect and do not proceed with installation of caulking in areas of discrepancy until all such discrepancies have been resolved.

    a. Non-structural shrinkage cracks larger than 1/16" and up to 1/4" must be treated and repaired accordingly prior to sealant application.

3. Use of a suitable latex or oil-based primer prior to application of sealant may be appropriate and shall be applied in accordance with manufacturer’s instructions and per the Architect’s approval.

3.3 INSTALLATION

A. Install caulking in strict accordance with the manufacturer's recommendations, taking care to produce beads of proper width and depth, to tool as recommenced by the manufacturer, and to immediately remove all surplus caulking.

B. Joint Design:

1. Suitable for all properly designed joints following accepted engineering practices.

2. Joint width must be a minimum of 4 times the anticipated movement.

C. Surface Preparation:

1. All joints must be absolutely clean and all curing compounds, old caulks, grease, waterproofing compounds, etc., must be removed.

2. For non-porous surfaces such as glass, metal, etc., cleaning with M.E.K. or Toluene is recommended.

3. Polyethylene rod or polyurethane foam is recommended as a joint-filler and back-up material. Fillers treated with bituminous products, grease or oil, should not be used. Where present, they must be removed or separated by vinyl tape or polyethylene film. Some surfaces may require the Elasto-Thane Primer.

a. Backer rod must be installed when joint is larger than 3/8".

D. Application:

1. Apply by caulking gun, hand-pressure-type, or pour from container.

2. Bulk sealant can be applied by pumping equipment, trowel or putty knife.

3. Press firmly into joint to assure good contact to the sides of the joint.

3.4 CLEAN-UP

A. Upon completion, remove all debris resulting from work of this Section.

3.5 WARRANTY

A. Product delivered shall be free of defects.

B. All products proven to be defective in manufacture will be replaced at no cost to the County. Since the use of these products is beyond our control we cannot

assume any risk or liability for results obtained, nor can we accept damages in excess of the purchase price of these products.

END OF SECTION

Division 8: Openings

SECTION 081100 – METAL DOORS AND FRAMES

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install standard galvanized metal doors and door frames as shown on the Door Schedule and project Drawings.

1. Provisions of non-fire rated doors for exterior locations.

2. Provision of non-rated steel frames for interior and exterior doors.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 055000 - Metal Fabrications: Provision of grout.

C. Section 079200 - Joint Sealants: Provision of acoustical sealant

D. Section 081400 – Wood & FRP Doors

E. Section 088000 - Glazing: Provision of glass and glazing.

F. Section 099000 - Painting and Coating: For field painting primed doors and frames.

G. Products Installed But Not Furnished Under This Section

1. Section 087100 - Door Hardware: Furnishing of finish hardware.

1.3 REFERENCES

A. ANSI - American National Standards Institute

1. A224.1 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

B. ASTM - American Society for Testing and Materials

1. A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

2. A366 - Standard Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.

3. A525 - Standard Specification for General Requirements for Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process.

4. A526 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.

5. A568 - Standard Specification for General Requirements for Steel, Sheet, Carbon and High-Strength, Low Alloy, Hot-Rolled and Cold Rolled.

6. A569 - Standard Specification for Steel, Carbon (0.15 Maximum, Percent) Hot-Rolled Sheet and Strip, Commercial Quality.

7. A642 - Standard Specifications for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Drawing Quality, Special Killed.

8. E90 - Test Method for Laboratory Measurement of Airborne-Sound Transmission Loss of Building Partitions.

9. E152 - Test Methods for Fire Tests of Door Assemblies.

10. E413 - Classification for Rating Sound Insulation.

C. DHI - Door and Hardware Institute

1. RL - Recommended Locations for Builder’s Hardware on Standard Steel Doors and Frames.

D. NFPA - National Fire Protection Association

1. 80 - Fire Doors and Windows.

E. SDI - Steel Door Institute

1. 100 - Recommended Specifications Standard Steel Doors and Frames.

2. 105 - Recommended Erection Instructions for Steel Frames.

3. 112 - Galvanized Standard Steel Doors and Frames.

4. 117 - Manufacturing Tolerances Standard Steel Doors and Frames.

F. UL - Underwriters Laboratories, Inc.

1.4 SUBMITTALS

A. Product Data: Submit product data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles and finishes.

B. Shop Drawings: Submit shop drawings showing fabrication and installation of standard steel doors and frames referenced to the Architect's door mark and hardware group. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

1. Provide schedule of doors and frames using same reference numbers for details and openings as those on the Contract Drawings.

2. Indicate coordinate of glazing frames and stops with glass and glazing requirements.

1.5 QUALITY ASSURANCE

A. For actual fabrication and installation of metal doors and frames, use only personnel who are completely trained and experienced in that work and who are completely familiar with the requirements of the work of this Section.

B. All materials shall conform to the requirements of ANSI A250.8 - "SDI 100 Recommended Specifications for Standard Steel Doors and Frames.

C. Certification of Label Construction: For components exceeding Underwriters Laboratories, Inc. (UL), furnish inspection certificate stating that component construction conforms to UL rating requirements only if Architect is aware of such a limitation and has allowed the non-labeled unit.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site

1. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage.

2. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to the Architect; otherwise, remove and replace

damaged items as directed.

B. Storage and Protection: Store doors and frames at building site under cover. Place units on minimum 4 inches high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4-inch spaces between stacked doors to promote air circulation. Use all means necessary to protect metal doors and frames before, during, and after installation and to protect the installed work and materials of all other trades.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Doors: Republic Doors, 155 Republic Drive, McKenzie, TN 38201, 1-800-733-3667, www.republicdoor.com, or approved equal.

B. Frames: Acceptable Manufacturers: Republic Builders Products; Steelcraft Manufacturing Co., or equal.

2.2 MATERIALS – GENERAL

A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A569 and ASTM A568.

B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A366 and ASTM A568.

C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A526, or drawing quality, ASTM A642, hot dipped galvanized in accordance with ASTM A525 with A60 or G60 coating designation, mil phosphatized.

D. Supports and Anchors: Fabricate of not less than 18 gauge sheet steel; galvanized where used with galvanized frames.

E. Inserts, Bolts, and Fasteners: Manufacturer’s standard units. Where items are to be built in at exterior walls, hot-dip galvanize in compliance with ASTM A153, Class C or D as applicable.

2.3 DOORS - DM SERIES FULL FLUSH DOORS

A. Doors shall be 1-3/4" thick full flush, fabricated from 18 gauge steel and shall conform to Commercial Standard CS242-62, Product Standard PS4-66 and Steel Door Institute Standard SDI-100.

B. Doors shall have a reinforced 3/4" cell honeycomb core 100% bonded to skins to ensure exceptional strength and flatness.

1. Honeycomb core shall have an STC rating of 38 standard and a U Factor of .342.

C. Doors shall have 16 gauge flush top and inverted bottom channels projection welded to both skins every 2 1/2" on center.

1. Top channel shall be flush with visible seam

a. When required, top channel shall be filled with epoxy and ground smooth.

2. Bottom channel shall be inverted and reinforced

D. Doors shall be factory prepared to receive finish hardware per Schedule.

E. Hinge edges shall be non-beveled and shall be reinforced with a continuous 16 gauge channel projection welded to each skin at a maximum of 5" on center.

1. Hinge channels shall have an additional 9 gauge reinforcement at each hinge location, and shall provide over 3/16" reinforcement.

F. Doors are prepared for 4 1/2" standard on heavy weight, full mortise template hinges and shall have standard cylindrical or mortised lock hardware.

2.4 DOOR FRAMES

A. Frames: Steelcraft F Series Flush Frame

1. Provide metal frames for doors and windows of types and styles as indicated on the Drawings and schedules. Conceal fastenings, unless otherwise indicated.

a. Interior: Fabricate knockdown frames of minimum 16 gauge cold-rolled steel. Frames shall have mitered corners.

b. Exterior. Fabricate knockdown frames of minimum 14 gauge hot-rolled steel and galvanized. Frames shall have mitered corners.

2. Door Silencers: Except on weatherstripped and smoke gasketed frames, drill stops to receive 3 silencers on strike jambs of single door frames and 2 silencers on heads of double door frames. Prep for field application after finish painting.

3. Frames shall have 2” face jambs and heads unless noted otherwise.

4. Frames shall have 9 gauge steel universal hinge tap plate protection welded with provisions for 4 ½” x 4 ½” template type hinges and 14 gauge steel strike reinforcement plate, extruded and formed to the equivalent of 10 gauge, protection welded with provisions for Unversal ANSI A115.1 or ANSI 115.2 strike.

B. Hardware: As specified in Section 087100.

C. Glass and Glazing: As specified in Section 088100.

D. Acoustical Sealant; As specified in Section 079000.

2.4 FABRICATION

A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer’s plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with SD1100 requirements.

1. Internal Construction: Manufacturer's standard vertical steel stiffeners or unitized steel grid with internal sound deadener on inside of face sheets in accordance with SDI standards.

2. Clearances: Not more than 1/8-inch at jambs and heads except between non-fire rated pairs of doors not more than 1/4-inch. Not more than 3/4-inch at bottom.

B. Tolerances: Comply with SD1117.

C. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot-rolled steel.

D. Fabricate exterior frames from galvanized sheet steel in accordance with SD1112.

E. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

F. Hardware Preparation: Prepare frames to receive mortised and concealed hardware in accordance with final Door Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 Series Specifications for door and frame preparation for hardware.

G. Reinforce frames to receive surface applied hardware. Drilling and

tapping for surface applied hardware may be done at Project site.

H. Locate hardware as indicated on final shop drawings or, if not indicated, in accordance with DHI RL.

I. Shop Painting: Clean, treat and paint exposed surfaces of steel frame units, including galvanized surfaces.

1. Clean steel surfaces of mill scale, rust, oil, grease, dirt and other foreign materials before application of paint.

2. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

J. Glazing Stops: Minimum 20 gauge steel.

1. Provide non-removable stops on outside of exterior doors and on secure side of interior doors for glass, louvers and other panels in doors.

2. Provide screw applied removable glazing beads on inside of glass, louvers, and other panels in doors.

2.5 FINISHES

A. GENERAL

1. All door and frame components shall arrive from manufacturer cleaned, phosphatized, and finished as standard. One coat of oven cured rust inhibiting gray prime paint shall be applied, capable of passing a 120-hour salt spray test in accordance with ANSI A250.10 or ASTM B117 and a 240 hour humidity test in accordance with ASTM D1735.

2. Finish painted doors shall be painted with a two-coat process, with each coat being oven cured in separate operations. The finish coat shall be alkyd acrylic enamel applied over standard oven cured primer. The two-coat finish paint process shall be capable of passing a 250-hour salt spray test and a 500-hour humidity test. Accelerated weathering in accordance with ASTM D822 shall yield less than a 10% color change after 500 hours of testing.

3. Color: As specified in Section 099000.

3.0 EXECUTION

3.1 INSTALLATION – GENERAL

A. Follow manufacturer’s instructions for complete installation.

B. Verify condition of openings for compliance with plans and shop drawings.

C. Correct any installation deficiencies as directed by the District.

D. All clearances shall be, unless otherwise specified, subject to a tolerance of +/- 1/32".

3.2 SURFACE CONDITIONS

A. Prior to installation of the work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

B. Verify that metal doors may be installed in accordance with the original design and the manufacturer's recommendations.

C. In the event of discrepancy, immediately notify the Architect.

D. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.3 INSTALLATION

A. General: Install steel doors, frames, and accessories in accordance with final shop drawings, manufacturer’s data, and as herein specified.

B. Placing Frames: Comply with provisions of SD1105, unless otherwise indicated.

1. Place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

2. Install fire rated frames in accordance with NFPA Standard No. 80.

3. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In closed steel stud partitions, attach wall anchors to studs with screws.

4. Pack acoustic door frames with mineral wool.

C. Door Installation: Fit hollow metal doors accurately in frames, within

clearances specified in SD1100.

3.4 ADJUST AND CLEAN UP

A. Provide required protection of product to prevent damage and wear prior to acceptance of the Work by the District.

B. Upon completion, clean the work of this Section in accordance with recommendations of the manufacturers of the materials used.

C. Remove all debris from opening and wipe frames to clean any dust or other foreign material from the frames.

D. Adjust moving parts to ensure a smooth operation. Use shims if necessary to allow for proper closing.

E. Before any finish coating is applied, fill all dents, holes, etc., with metal filler. Sand, smooth and flush with adjacent surfaces.

F. Final Adjustments: Check and readjust operating hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

3.5 WARRANTY

A. The product delivered shall be free from defects.

B. Manufacturer’s standard performance warranty, as available for specified installation and environmental conditions.

C. Repair or replace any doors and frames shown to be defective or damaged prior to project close-out as stated in standard warranty.

END OF SECTION

SECTION 081416 – FLUSH WOOD DOORS

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install interior wood doors required for work of this Section as indicated on the project Drawings.

1.2 RELATED SECTIONS

A. Section 081100, Metal Doors and Frames

B. Section 084113, Aluminum-Framed Entrances and Storefronts

C. Section 087100, Door Hardware

D. Section 088100, Glass & Glazing

E. Section 099100, Painting

1.3 REFERENCES

A. Door and Hardware Institute - Installation Guide for Doors and Hardware

B. Woodwork Institute (WI)

1.4 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Submit manufacturer’s full range of standard veneer finishes available for selection by the Architect.

C. Submit manufacturer’s lifetime warranty information.

D. Shop Drawings: Submit for door openings, elevations, sizes, types, swings, undercuts, etc.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to project site in manufacturer’s protective packaging. Store in a dry area and ensure materials will not come into contact with any form of moisture.

B. Protection:

1. Use all means necessary to protect wood doors before, during and after installation and to protect the installed work and materials of all other trades.

C. Replacements:

1. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the County.

1.6 QUALITY ASSURANCE

A. Qualifications of Fabrications and Installers:

1. For actual fabrication and installation of wood doors, use only workmen who are thoroughly trained and experienced in the products and the recommended methods for their fabrication and installation.

2. In the acceptance or rejection of wood doors, no allowance will be made for lack of skill on the part of workmen.

B. Codes and Standards:

1. In addition to complying with all pertinent codes and regulations, comply with Manual of Millwork of the Woodwork Institute for the grades specified, except that certification will not be required.

C. Verification of Compliance:

1. The District reserves the right to request and pay for an inspection by a representative of the Woodwork Institute to determine that all work of this Section has been performed in accordance with the referenced standards.

2. In the event such inspection determines that wood doors do not comply with the referenced standards, the Contractor shall pay the costs of the inspection and shall immediately remove the non-complying items and immediately replace them with items complying with the referenced standards and these Specifications, all at no additional cost to the District.

1.7 WARRANTY

A. Manufacturer’s standard warranty - "Full Life of Original Installation," which includes hanging and finishing. Warranty shall cover delamination, warping, bow, cup, and telegraphing of core construction beyond warrant tolerances.

2.0 PRODUCTS

2.1 MANUFACTURER

A. Wood Doors - Marshfield Door Systems, Inc., 1401 East Fourth Street, Marshfield, WI 54449, 1-800-869-3667, www.marshfielddoors.com, or approved equal.

2.3 INTERIOR FLUSH WOOD DOORS

A. Interior wood doors: 5-ply doors per Architectural Woodwork Standards.

1. Clear Finish Doors - White Maple Plain Sliced Veneer Staved Lumber Core

B. Furnish a Woodwork Institute (WI) certified compliance label for each door.

C. Seal the tops and bottoms of all wood doors.

D. Furnish Environmentally Certified Doors which carry a certification authorized under a recognized authority.

E. Provide fire rated door label for rated door and frame.

2.4 DOOR GLAZING

A. See section 088100 Glass and Glazing

2.5 FRAMES

A. Refer to Section 081100, Metal Doors and Frames and project Drawings for frame detail.

2.6 OTHER MATERIALS

A. All other materials such as shims and bracing, not specifically described but required for a complete and proper installation of wood doors shall be as selected by the Contractor and will be subject to approval of the Architect.

3.0 EXECUTION

3.1 FABRICATION

A. Wood doors shall be fabricated in strict accordance with the original design, the referenced standards, and the approved Shop Drawings.

3.2 EXAMINATION

A. Surface Conditions:

1. Prior to installation of the work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to point where this installation may properly commence.

a. Verify that substrate opening conditions and opening sizes and tolerances are acceptable and ready to receive work of this Section.

2. Do not install doors in frame openings that are not plumb or are out of tolerance for size or alignment.

3.3 INSTALLATION

A. Install doors in accordance with manufacturer's recommended methods of installation.

B. Doors shall be installed plumb and true.

C. Frames shall be rigid and securely anchored in place.

D. Exercise caution when drilling pilot holes and installing hinges so that pilot holes are not over-drilled and screws are not over-torqued.

E. Provide metal head flashing at all exterior door and storefront frames.

F. Provide sill pans with fully welded seams at all exterior doors and storefront systems.

G. Water test (ASTM E1105.00) all exterior doors upon completion of the doors installation (prior to project closeout).

3.4 ADJUSTING AND CLEAN UP

A. Adjust doors for smooth and balanced door movement.

B. Upon completion, clean the work of this Section in accordance with recommendations of the manufacturers of the materials used.

C. Provide required protection of product to prevent damage and wear prior to acceptance of the work by the District.

3.5 WARRANTY

A. The product delivered shall be free from defects.

B. Manufacturer's standard performance warranty, minimum ten (10) years, covering parts and labor, as available for specified installation and environmental conditions.

END OF SECTION

SECTION 083113 – ACCESS DOORS AND FRAMES

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provision of access doors and frames as shown on project Drawings and as specified herein.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 092900 - Gypsum Board: Provision of gypsum board.

C. Section 099100 - Painting: For finish painting.

D. Division 23 - Heating, Ventilating and Air-Conditioning (HVAC): Provision of access doors into ducts.

E. Division 26 - Electrical: For electrical requirements.

1.3 REFERENCES

A. UL - Underwriters Laboratories, Inc.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer’s data completely describing products.

B. Shop Drawings: Submit drawings showing attachment to structure in each typical condition. Refer to Divisions 23 and 26 regarding requirements for showing locations of access doors provided under those Divisions.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packaging and Shipping: Identify type and size of each door.

B. Storage and Protection

1. Deliver and store packaged products in original containers with seals unbroken and labels intact until time of use.

2. Deliver products only after proper facilities are available; handle carefully to prevent damage and store on dean concrete surface or raised platform in safe, dry area.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Milcor, Inc.; Karp Associates, Inc.; J. L. Industries, or equal.

2.2 MATERIALS

A. Recessed steel door and flanged frame for gypsum board walls and ceiling installations.

1. General; Equip with screw driver turned locks.

2. Manufacturer Acudor, “Model DW-5015"; Karp Associates, Inc., “RDW", or equal.

3. Size as indicated on Drawings.

B. Finishes

1. Steel: Chemically etch and apply baked-on rust inhibitive zinc dust prime coat.

2. Stainless Steel: Manufacturer’s standard #4 finish.

3. Finish Painting: As specified in Section 099100.

3.0 EXECUTION

3.1 EXAMINATION

A. Examine construction to receive access door and verify dimensions and other supporting or adjoining conditions.

B. Do not install doors until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate details with other work supporting, adjoining or requiring access doors.

B. Verify location of items requiring access so that access door location will be compatible with planned finishing of spaces and the location of other wall or ceiling mounted equipment or fixtures.

3.3 INSTALLATION

A. Install access doors in accordance with manufacturer's instructions and at locations authorized by the Architect in accordance with requirements for work of Divisions 23 and 26.

B. Securely attach frames to supporting work and ensure doors operate smoothly and are free from warp, twist and distortion.

3.4 ADJUSTING AND CLEAN UP

A. Thoroughly clean surfaces of grease, oil, or other impurities, touch-up abraded prime coat, and otherwise prepare for finish painting where required.

END OF SECTION

SECTION 083213 – SLIDING ALUMINUM-FRAMED GLASS DOORS

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provision of Thermal Sliding Glass Door as shown on project Drawings and as specified herein.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 05500 - Metal Fabrications

C. Section 07900 - Sealants and Caulking

D. Section 087100 - Door Hardware: Provision of lock cylinder.

E. Section 088200 - Glazing

1.3 REFERENCES

A. ANSI - American National Standards Institute

1. A156.4 - American National Standard For Door Controls - Closers..

2. ANSI/UL 325 Standard for Door Operators and Systems.

B. ASTM - American Society for Testing and Materials

1. A123 - Standard Specification for Zinc (Hot-dip) Galvanized, Coatings on Iron and Steel Products.

2. B209 - Standard Specification for Aluminum and Aluminum-alloy Sheet and Plate.

3. B211 - Standard Specification for Aluminum and Aluminum Alloy

Bars, Rods and Wire.

4. B221 - Standard Specification for Aluminum-alloy Extruded Bars, Rods, Wire, Shapes and Tubes.

5. E152 - Methods for Fire Tests of Door Assemblies.

6. E283 - Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.

C. AWS - American Welding Society

D. NFPA - National Fire Protection Association

1. 80 - Fire Doors and Windows.

E. UL - Underwriters Laboratories, Inc.

1.4 DEFINITIONS

A. Exterior Sliding Door: Consist of the manufacturer's assembled sliding door unit including doors and frame, door hardware, and accessories.

1.5 SYSTEM DESCRIPTION

A. Performance Requirements

1. General: Sliding Aluminum-framed glass doors system which have been manufactured, fabricated and installed to withstand the specified uniform loads and to maintain the manufacturer's performance criteria without defects, damage or failure. See structural drawings.

B. Air Leakage:

1. The test specimen shall be tested in accordance with ASTM E 283.

2. The air leakage rate shall not exceed 0.30 cfm/ft2 (1.5 l/s · m2) at a pressure differential of 1.56 psf (75 Pa).

C. Water Resistance:

1. The test specimen shall be tested in accordance with ASTM E331 and ASTM E547.
   a. There shall be no leakage when tested to a pressure differential of

15 psf (718 Pa).

b. Optional 4 psf (192 Pa)

D. Uniform Load Deflection:

1. A static air design load of 40 psf (1915 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330.
2. There shall be no deflection in excess of L/175 of the span of any framing member at design load.

E. Uniform Load Structural:

1. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.

F. Thermal transmittance (U-factor):

1. in Accordance with Title 24 requirements.

G. Condensation Resistance Factor (CRF) or Temperature Index (TI):

1. Condensation resistance test results in accordance with AAMA 1503 or CSA A440 are based upon 1" (25.4 mm) clear low emissivity coated insulating glass, (1/4" e=0.035, #2), 1/2" warm edge spacer and argon fill gas, 1/4").

2. If using CRF: When tested using AAMA 1503, the CRFframe and CRFglass shall not be less than 57 and 66 respectively.

3. If using TI: When tested to CSA A440-00, the TIframe and TIglass shall not be less than 39 and 53 respectively.

H. Sound Transmission Loss:

1. Sound transmission loss test results in accordance with ASTM E90 are based upon 1" (25.4 mm) clear double laminated insulating glass with PVB interlayer (1/8", 0.030", 1/8", 1/2" AS, 1/8", 0.030", 1/8").

2. Sound Transmission Class (STC) shall not be less than STC 38.

3. Outdoor-Indoor Transmission Class (OITC) shall not be less than OITC 33.

I. Windborne-Debris-Impact Resistance Performance:

1. Performance shall be tested in accordance with ASTM E1886 and information in ASTM E1996:

2. Large-Missile Impact: For aluminum-framed systems located within 30 feet (9.1 m) of grade

3. Small-Missile Impact: For aluminum-framed systems located above 30 feet (9.1 m) of grade

J. Environmental Product Declaration (EPD): Shall have a Type III Product-Specific EPD created from a Product Category Rule.

1.6 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of sliding storefronts indicated.

1. Recycled Content:

a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.

b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.

c. Indicate location recovery of recycled content.

d. Indicate location of manufacturing facility.

2. Environmental Product Declaration (EPD):

a. Include a Type III Product-Specific EPD created from a Product Category Rule.

B. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.

C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.

D. Samples for Verification: For sliding storefronts and components required.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type, class, grade, and size of sliding storefronts. Test results based on use of downsized test units will not be accepted.

F. Sliding Door Hardware Schedule:

1. Hardware:

a. Exterior: “D” pull with cylinder.

b. Interior: “D” pull with lever.

c. Lock: MS Hookbolt Lock

2. Schedule shall be prepared by or under the supervision of supplier.

2. Schedule shall detail fabrication and assembly of sliding door hardware, including procedures and diagrams.

3. Coordinate final sliding door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of sliding door hardware.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.

B. Manufacturer Qualifications: A manufacturer capable of fabricating sliding storefronts that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.

C. Source Limitations: Obtain sliding storefront through one source from a single manufacturer.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of sliding storefronts and are based on the specific system indicated. Refer to Division 01 Section “Product Requirements”. Do not modify size and dimensional requirements.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup for type(s) of sliding storefront(s) indicated, in location(s) shown on Drawings.

F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".

1.8 PROJECT CONDITIONS

A. Field Measurements: Check openings by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of the Work.

1. Where necessary, proceed with fabrication without field measurements, and coordinate fabrication tolerances to ensure proper fit.

1.9 WARRANTY

A. Warranty: Submit a written warranty, executed by the manufacturer, agreeing to repair or replace components of the sliding door system that fail in materials or workmanship within the specified warranty period. Failures include, but are not necessarily limited to:

1. Structural failures including excessive deflection, excessive leakage or air infiltration.

2. Faulty operation of operators and hardware.

3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

B. Warranty Period: 2 years after the date of Substantial Completion.

C. The warranty shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and is in addition to, and runs concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Kawneer Company Inc.; www.kawneer.com; or approved equal.

2.2 MATERIALS

A. Aluminum Extrusions: Alloy and temper recommended by sliding storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" (1.8 mm) wall thickness at any location for the main frame and sash members.

1. Recycled Content: Shall have a minimum of 50% mixed pre- and post-consumer recycled content.

a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.

b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.

c. Indicate location recovery of recycled content.

d. Indicate location of manufacturing facility.

B. Fasteners: Nonmagnetic stainless steel or other materials must be non-corrosive and compatible with aluminum members, trim hardware, anchors, and other components.

C. Anchors, Clips, and Accessories:

1. Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating.

2. Anchors, clips, and accessories shall provide sufficient strength to withstand the design pressure indicated.

D. Reinforcing Members:

1. Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating.

2. Reinforcing members must provide sufficient strength to withstand the design pressure indicated.

E. Sliding-Type Weather Stripping:

1. Provide woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric.

2. Provide weather stripping with integral barrier fin or fins of semi-rigid, polypropylene sheet or polypropylene-coated material.

3. Comply with AAMA 701/702.

F. Sealant: For sealants required within fabricated sliding door, provide sliding door manufacturer's standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

2.3 SLIDING ALUMINUM FRAMED GLASS DOOR SYSTEM

A. Kawneer AA®3200 Thermal Sliding Glass Doors:

1. 6-3/4" (171.5 mm) frame depth

2. AW-PG135-SD

B. Brackets and Reinforcements:

1. Manufacturer's standard high-strength aluminum with non-staining, non-ferrous shims for aligning system components.

C. Fasteners and Accessories:

1. Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories must be compatible with adjacent materials.

2. Where exposed, fasteners and accessories shall be stainless steel.

D. Perimeter Anchors:

1. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

E. Packing, Shipping, Handling, and Unloading:

1. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

F. Storage and Protection:

1. Store materials so that they are protected from exposure to harmful weather conditions.

2. Handle material and components to avoid damage.

3. Protect material against damage from elements, construction activities, and other hazards before, during, and after installation.

2.4 GLAZING

A. Glazing shall comply with requirements in Division 08 Glazing Section and must meet Title 24 requirements.

B. Glazing System:

1. Glazing method shall be a wet/dry type in accordance with manufacturer's standards.

2. Exterior glazing shall be silicone back bedding sealant.

3. Interior glazing shall be snap-in type glazing beads with an interior gasket in accordance with AAMA 702 or ASTM C 864.

2.5 HARDWARE

A. General Hardware Requirements:

1. Provide manufacturer's standard hardware.

2. Hardware shall be fabricated from aluminum, stainless steel, or other corrosion-resistant material that is compatible with aluminum.

3. Hardware shall be designed to smoothly operate, tightly close, and securely lock sliding aluminum-framed glass doors.

B. Standard Operating Panel Hardware:

1. One pair of stainless steel tandem rollers per sliding panel.

2. Stainless steel roller track cover.

3. Hookbolt lock: 1-point hookbolt lock or 2-point hookbolt lock.

4. Pull handle exterior: standard pull (Satin Nickel PVD finish required ≤ 4 miles from coast) or standard pull – with cylinder (Satin Nickel PVD finish required ≤ 4 miles from coast).

5. Pull handle interior: standard pull or standard pull with lever.

2.6 FABRICATION

A. Fabricate sliding aluminum-framed glass doors in sizes indicated.

B. Include a complete system for assembling components and anchoring doors.

C. Fabrication requirements:

1. Thermally broken sliding aluminum-framed glass doors shall be reglazable without dismantling perimeter framing.

2. Sliding Door construction:

a. Master Frame shall be joined together with butt type joints, neatly sealed and assembled by a minimum of 2 stainless-steel fasteners per joint anchored into continuous integral screw raceways.

b. Sliding panels shall have coped butt type joinery with stainless-steel fasteners and shall not be removable when in locked position.

c. Fixed panels shall have coped butt type joinery with stainless-steel fasteners.

D. Weather-stripping:

1. Provide weather-stripping locked into extruded grooves in door panels or frames as indicated on manufacturer's drawings and details.

E. Weep Holes:

1. Provide weep holes and internal drainage passages to conduct infiltrating water to exterior as detailed.

F. Factory-Glazed Fabrication:

1. Comply with requirements in Division 08 Section "Glazing" and with AAMA/WDMA/CSA 101/I.S./A440.

2. Glaze sliding aluminum-framed glass doors in the factory where practical for applications indicated.

2.7 FINISHES

A. Comply with AAMA-AFPA "Anodic Finishes/Painted Aluminum" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.8 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Factory Finishing:

1. Kawneer Permanodic™ AA-M10C21A31, AAMA 611, Architectural Class II Clear Anodic Coating, Color #17 Clear

3.0 EXECUTION

3.1 PREPARATION

A. Templates and Diagrams: Furnish templates, diagrams, and other data to fabricators and installers of related work, as necessary, for coordination of the automatic entrance door installation.

3.2 EXAMINATION

A. With installer present, examine openings, substrates, structural support, anchorage, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work:

1. Verify rough opening dimensions.

2. Verify levelness of sill plate.

3. Verify operational clearances.

4. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components for proper water management.

5. Metal Surfaces:

   a. Metal surfaces must be dry and clean (free of grease, oil, dirt, rust, corrosion, and welding slag).

   b. Ensure that metal surfaces are without sharp edges or offsets at joints.

   c. Proceed with installation only after correcting unsatisfactory conditions.

3.3 INSTALLATION

A. Comply with drawings, shop drawings, and manufacturer's written instructions for installing sliding aluminum-framed glass doors, hardware, accessories, and other components.

B. Install sliding aluminum-framed glass doors so that the doors:

1. Are level, plumb, square, and true to line

2. Are without distortion and do not impede thermal movement

3. Are anchored securely in place to structural support

4. Are in proper relation to wall flashing and other adjacent construction

C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.

D. Install sliding doors and components to drain condensation, water penetrating joints, and moisture migrating within sliding door to the exterior.

E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.4 FIELD QUALITY CONTROL

A. Field Tests:

1. Architect shall select sliding aluminum framed glass door units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured.

2. Conduct tests for air infiltration and water penetration with manufacturer's representative present.

3. Tests that do not meet the specified performance requirements and units that have deficiencies shall be corrected as part of the contract amount.

4. Testing shall be performed per AAMA 502 by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements.

B. Air Infiltration Tests:

1. Conduct tests in accordance with ASTM E 783.

2. AW rating: Test shall be conducted at a minimum uniform static pressure of 6.2 psf (300 Pa). The maximum allowable rates of air infiltration for field testing shall not exceed 1.5 times the project specifications

C. Water Infiltration Tests:

1. Conduct tests in accordance with ASTM E 1105.

2. No uncontrolled water infiltration is permitted when tested at a static test pressure equal to two-thirds of the tested laboratory performance test pressure.

D. Manufacturer's Field Services:

1. Upon owner's written request, provide periodic site visit by manufacturer's field service representative.

3.5 ADJUSTING

A. Adjust operating door panels, screens, hardware, and accessories for tight fit at contact points and weather stripping for smooth operation and weather tight

closure.

B. Lubricate hardware and moving parts.

3.6 CLEAN UP

A. Avoid damaging protective coatings and finishes.

B. Clean glass and aluminum surfaces of product immediately after installation.

C. Comply with glass manufacturer's written recommendations for final cleaning and maintenance.

D. Remove non-permanent labels and clean surfaces.

E. Remove excess sealants, glazing materials, dirt, and other substances.

F. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during the construction period.

G. Remove construction debris from project site and legally dispose of debris.

3.7 PROTECTION

A. Protect installed product’s finish surfaces from damage during construction.

END OF SECTION

SECTION 084329 – SLIDING STOREFRONTS

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provision of interior sliding storefront doors as shown on project Drawings and as specified herein.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 05500 - Metal Fabrications

C. Section 07900 - Sealants and Caulking

D. Section 087100 - Door Hardware: Provision of lock cylinder.

E. Section 088200 - Glazing: For glazing requirements for entrance door and sidelight.

1.3 REFERENCES

A. ANSI - American National Standards Institute

1. A156.4 - American National Standard For Door Controls - Closers..

2. ANSI/UL 325 Standard for Door Operators and Systems.

B. ASTM - American Society for Testing and Materials

1. A123 - Standard Specification for Zinc (Hot-dip) Galvanized, Coatings on Iron and Steel Products.

2. B209 - Standard Specification for Aluminum and Aluminum-alloy Sheet and Plate.

3. B211 - Standard Specification for Aluminum and Aluminum Alloy

Bars, Rods and Wire.

4. B221 - Standard Specification for Aluminum-alloy Extruded Bars, Rods, Wire, Shapes and Tubes.

5. E152 - Methods for Fire Tests of Door Assemblies.

6. E283 - Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.

C. AWS - American Welding Society

D. NFPA - National Fire Protection Association

1. 80 - Fire Doors and Windows.

E. UL - Underwriters Laboratories, Inc.

1.4 DEFINITIONS

A. Interior Sliding Door: Consist of the manufacturer's assembled sliding door unit including doors and frame, door hardware, and accessories.

1.5 SYSTEM DESCRIPTION

A. Performance Requirements

1. General: Provide aluminum sliding storefronts which have been manufactured, fabricated and installed to withstand the specified uniform loads and to maintain the manufacturer's performance criteria without defects, damage or failure.

2. Environmental Product Declarations (EPD): Shall have a Type III Product-Specific EPD created from a Product Category Rule.

1.6 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of sliding storefronts indicated.
1. Recycled Content:

a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.

b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.

c. Indicate location recovery of recycled content.

d. Indicate location of manufacturing facility.

2. Environmental Product Declaration (EPD):

a. Include a Type III Product-Specific EPD created from a Product Category Rule.

B. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.

C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.

D. Samples for Verification: For sliding storefronts and components required.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type, class, grade, and size of sliding storefronts. Test results based on use of downsized test units will not be accepted.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.

B. Manufacturer Qualifications: A manufacturer capable of fabricating sliding storefronts that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.

C. Source Limitations: Obtain sliding storefront through one source from a single manufacturer.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of sliding storefronts and are based on the specific system indicated. Refer to Division 01 Section “Product Requirements”. Do not modify size and dimensional requirements.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup for type(s) of sliding storefront(s) indicated, in location(s) shown on Drawings.

F. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".

1.8 PROJECT CONDITIONS

A. Field Measurements: Check openings by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of the Work.

1. Where necessary, proceed with fabrication without field measurements, and coordinate fabrication tolerances to ensure proper fit.

1.9 WARRANTY

A. Warranty: Submit a written warranty, executed by the manufacturer, agreeing to repair or replace components of the sliding door system that fail in materials or workmanship within the specified warranty period. Failures include, but are not necessarily limited to:

1. Structural failures including excessive deflection, excessive leakage or air infiltration.

2. Faulty operation of operators and hardware.

3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

B. Warranty Period: 2 years after the date of Substantial Completion.

C. The warranty shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and is in addition to, and runs concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Kawneer Company Inc.; www.kawneer.com; or approved equal.

2.2 MATERIALS

A. Aluminum Extrusions: Alloy and temper recommended by sliding storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" (1.8 mm) wall thickness at any location for the main frame and sash members.

1. Recycled Content: Shall have a minimum of 50% mixed pre- and post-consumer recycled content.

a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.

b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.

c. Indicate location recovery of recycled content.

d. Indicate location of manufacturing facility.

B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with sliding storefront members, trim hardware, anchors, and other components.

C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

E. Sliding-Type Weather Stripping: Provide woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric. Comply with AAMA 701/702.

1. Weather Seals: Provide weather stripping with integral barrier fin or fins of semi-rigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.

F. Sealant: For sealants required within fabricated sliding storefront, provide sliding storefront manufacturer's standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

2.3 SLIDING STOREFRONTS

A. Series 1010 Sliding Mall Front

1. Framing Member Profile: 1-3/8" (34.9) Deep Frame

2. Not intended to be used as an exterior front. It can be used as an exterior front only when air, water penetration and deflection are not critical.

2.4 GLAZING

A. Glass and Glazing System: Refer to Division 08 Section “Glazing” for glass units and glazing requirements applicable to glazed sliding storefront units.

B. Glass: Comply with Division 08 Section “Glazing” for requirements applicable to safety glazing, insulating-glass units, and laminated glass units.

C. Glazing System: Glazing method shall be a channel type PVC gasket (marine glazed) which is compatible with aluminum and shall be resistant to deterioration by all forms of weathering and suitably retained to maintain a watertight seal between the glass and the surrounding frame.

2.5 HARDWARE

A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock sliding storefronts.

B. Standard Hardware:

1. One pair of stainless steel tandem rollers per sliding panel

2. Stainless steel roller track

3. Adams Rite MS 1850A-505 Hookbolt Lock

4. Interior and Exterior Cylinders

5. Flush Face Pulls.

2.6 FABRICATION

A. General:

1. Fabricate Components per the Manufacturer's most current Installation Instruction manuals with minimum suggested clearances and shim spacing around the perimeter of the assembly while enabling installation and dynamic movement of the perimeter seal.

2. Accurately fit and secure all joints and corners. Make joints flush, hairline and waterproof.

3. Prepare frames to receive anchor devices as required.

4. When possible, arrange fasteners and attachments to conceal from view.

5. Shop assemble frames to the greatest extent possible and shop seal all horizontal to vertical joints.

2.7 FINISHES

A. Comply with AAMA-AFPA "Anodic Finishes/Painted Aluminum" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.8 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Factory Finishing:

1. Kawneer Permanodic™ AA-M10C21A31, AAMA 611, Architectural Class II Clear Anodic Coating, Color #17 Clear

3.0 EXECUTION

3.1 PREPARATION

A. Templates and Diagrams: Furnish templates, diagrams, and other data to fabricators and installers of related work, as necessary, for coordination of the door installation.

3.2 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight sliding storefront installation.

5. Metal Surfaces:

a. Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.

b. Proceed with installation only after correcting unsatisfactory conditions.

3.2 INSTALLATION

A. Comply with manufacturer's specifications and recommendations.

B. Set units plumb, level and true to line without warp or rack of frames or door. Anchor securely in place. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

C. Set sill members in a bed of sealant or with joint fillers or gaskets as indicated to provide weathertight construction. Comply with requirements of Section 07900 for sealants, fillers and gaskets to be installed during installation of doors and frames.

D. Install complete door operator system in accordance with manufacturer's instructions.

E. Set tracks, header assemblies, operating brackets, rails and guides level and true to location with adequate anchorage for permanent support.

3.3 ADJUSTING

A. Adjust operating door panels, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weather tight closure. Lubricate hardware and moving parts.

3.4 CLEAN UP

A. Clean aluminum surfaces immediately after installing sliding storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

B. Clean factory-glazed glass immediately after installing sliding storefronts. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

3.5 PROTECTION

A. Protect sliding storefront surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor sliding storefront surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, mortar, alkaline deposits, stains, or other contaminants. If contaminating substances do contact sliding storefront surfaces, remove contaminants immediately according to manufacturer's written recommendations.

END OF SECTION

SECTION 085113 – ALUMINUM WINDOWS

1.0 GENERAL

1.1 SUMMARY

A. This section specifies Aluminum Windows as fixed windows as indicated with integral glazing units and accessories.

1.2 RELATED SECTIONS

A. Section 07 60 00 – Flashing and Sheet Metal

B. Section 07 92 00 – Joint Sealants

C. Section 08 80 00 - Glazing

1.3 REFERENCES

A. Reference Standards:

1. American Architectural Manufacturer's Association (AAMA):

   a. AAMA/WDMA/CSA101/I.S.2/A440, North American Fenestration Standard/Specification for Windows, Doors, and Skylights, Includes Update No. 1.

   b. AAMA 502-12 Voluntary Specification for Field Testing of Newly Installed Fenestration Products.

   c. AAMA 609 Cleaning and Maintenance Guide for Architecturally Finished Aluminum.

   d. AAMA 611 Voluntary Standards for Anodized Architectural Aluminum.

   e. AAMA 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).

2. Glass Association of North America (GANA):

   a. GANA 01-0300 Proper Procedures for Cleaning Architectural Glass Products.

3. ASTM International (ASTM):

a. ASTM E283 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

b. ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

c. ASTM E547 Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference.

d. ASTM F588 Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact.

4. National Fenestration Rating Council (NFRC):

a. NFRC 100A Procedure for Determining Fenestration Attachment Product U-Factors.

b. NFRC 200A Procedure for Determining Attachment Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

c. NFRC 500 Procedure for Determining Fenestration Product Condensation Resistance Values.

1.4 SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 - Submittal Procedures.

B. Product Data: Manufacturer’s standard specifications and descriptive literature, including:

1. Certified test laboratory reports to show compliance with requirements.

a. Windows with sizes exceeding the gateway sizes do not qualify under these tests.

b. Windows manufactured with configurations different than the tested configurations do not qualify under these tests; windows can be tested for performance outside the already tested gateway sizes.

c. Windows with hardware different from what is referenced on the test reports do not qualify under these tests.

2. Manufacturer’s standard head, jamb and sill details.

3. Installation methods.

    a. Submit manufacturer's written installation instructions.

C. Manufacturer's Certificates: Submit certified independent testing agency reports indicating window unit meets or exceeds specified performance requirements.

D. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Provide shop drawings indicating details of construction and installation including, but not limited to, window location chart, window schedule, size, muntin type and design, sections and details of multiple window assemblies, hardware, glazing details, frame type, STC, glass types, screens and handing operation.

E. Samples

1. Window Section:

    a. Submit 8 × 8 inch minimum corner section sample of frame for each glazing type specified.

    b. Sample will be used to verify construction, corner joint, frame finish and color.

    c. Quantity 1.

2. Glazing:

    a. Insulated Glazing 12 × 12 inch.

3. Finish: AAMA 611 Anodized Architectural Coatings; AAMA 2605 for Organic Coatings on Aluminum Extrusions.

    a. Class 1 Anodized.

F. Manufacturer's written instructions, including:

1. Delivery, storage and handling recommendations.

2. Preparation and installation recommendations.

G. Installer's Experience: Submit verification of evidence of work similar to work of this section.

H. Warranty: Fully executed, issued in [Owner's] name and registered with manufacturer, including:

1. Manufacturer's 10 year warranty from date of accepted delivery, covering defects in materials.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 10 years experience in producing aluminum windows of the type specified.

1. Manufacturer must be certified through the PPG Certified Window Fabricator Program.

B. Installer Qualifications: Licensed contractor with a minimum [3 years] experience installing similar windows.

C. Mock-ups: Provide and install at job site a mock-up using acceptable products and manufacturer approved installation methods. Obtain Owner's and Architect's acceptance of finish color and workmanship standard.

1. Size: Any window shown on the drawings.

2. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.

3. Incorporation: Mock-up may be incorporated into final construction upon Owner's and Architect's approval.

4. Modify mock-up as required to produce acceptable work.

1.6 DELIVERY, STORAGE AND HANDLING

A. Delivery

1. Deliver materials in accordance with manufacturer's written instructions and labeling.

2. Deliver materials in manufacturer's original, unopened, undamaged containers or packaged with identification labels intact, and product name and manufacturer clearly visible and in sizes to suit project.

B. Storage

1. Store materials upright and protected from exposure to harmful environmental conditions, clean, dry, frost-free and at manufacturer's recommended temperature and humidity levels.

C. Handling:

1. Exercise care during off-loading and installation to avoid damage and marring of finishes.

2. Handle in a manner to evenly distribute material load and prevent twisting, ending and cracking of windows doors and associated parts.

3. Replace materials damaged during handling.

1.7 WARRANTY

A. Manufacturer's warranty:

1. Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.

2. Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.

2.0 PRODUCTS

2.1 MANUFACTURER

A. Acceptable Manufacturer: All Weather Architectural Aluminum, 777 Aldridge Road, Vacaville, California 95688;
Phone: (707) 452-1600; Fax: (707) 452-1616; Email: randy.agno@allweatheraa.com;
Website: www.allweatheraa.com.

B. Basis for Design: Series 5000 by All Weather Architectural Aluminum.

C. Related Requirements:

1. Section 01 25 13 Product Options and Substitutions for submitting comparable product submittals for products by listed manufacturers.

2. Information, including sample size and configuration per Architect's requirements must be submitted for consideration a minimum of 10 days before project bid date.

2.2 PERFORMANCE REQUIREMENTS

A. Design pressure, air infiltration and water penetration.

1. Comply with AAMA/WDMA/CSA 101/I.S.2/A440 [CW-PG35].

B. Uniform Load Deflection and Uniform Load Structural to ASTM E330.

C. ASTM E283, Air Leakage: 1.57 psf: 0.3 cfm/ft2 maximum.

D. ASTM E547, Water Penetration: at 4.59 psf: no leakage.

E. ASTM F588, Forced Entry Resistance: Type B Grade 10: Pass for no entry.

F. Minimum U-Factor of 0.58

G. Solar Heat Gain Coefficient (SHGC) 0.41 maximum

2.3 DESCRIPTION

A. Acceptable Material: Series 5000 Windows by All Weather Architectural Aluminum.

B. Aluminum framed fixed, hopper and, combination windows as indicated, insulating glazing units (IGU) and accessories.

1. Window Dimensions:

a. See drawings for window types and configurations

2.4 MATERIALS

A. Frames: 2 1/4 inches Pour and Debridge, thermally broken extruded aluminum Type 6063 age hardened to T-6 rating for strength and durability.

1. Integral extrusion wall thickness: 0.094 inches.

2. Nominal web thickness: 1/8 inch.

3. Include full perimeter exterior snap in glazing stops.

4. Corners of frame and ventilators: Mitered and welded; muntin and intermediate bars attached to cross joints and abutting sash sections.

5. Operating Sash: Mitered, corner keyed and crimped frames.

6. Finish Types:

a. Aluminum to AA DAF-45, Class 1, clear anodized.

B. Glazing in accordance with Section [08 80 00 – Glazing].

C. Window sill flashing pan: 24 gauge galvanized sheet metal

1. Flashing pans shall preformed and soldered for a fully waterproof installation.

2. Flashing pans shall extend 2 inches vertically at each jamb.

2.5 FABRICATION

A. Miter and weld corner joints of frames.

B. Vents; mitered, corner keyed and crimped.

C. Attach muntin and intermediate bars to cross joints and abutting sections.

D. Ensure sill, vents and intermediate bars have weep holes and are sloped for positive drainage to exterior.

E. Pre-drill and tap frames to receive screen attachment hardware as required.

F. Ensure surfaces to be glazed include bead retaining notch.

G. Ensure operable windows include two rows of weather-stripping in extruded slot at perimeter of vent or opening.

H. Install hardware specified.

2.6 ACCESSORIES

A. Hardware:

1. For hopper windows where operating handle is above 8’-0” from the finish floor: 4 bar heavy duty stainless steel concealed hinges, die cast zinc cam handles with pole ring.

B. Screens: Painted roll formed aluminum frames finished to match window frames, factory-drilled/tapped to receive screen attachment hardware.

1. Screen hardware:

a. Charcoal fiberglass.

b. Plastic wicket doors.

C. Weatherstripping: 64A durometer black santoprene bulb insert.

2.7 SOURCE QUALITY CONTROL

A. Use only fabricators who have training and experience with similar work of this Section.

B. Ensure all window framing materials come from single manufacturer

3.0 EXECUTION

3.1 INSTALLER

A. Use only licensed installers who have training and experience with similar work of this Section.

3.2 EXAMINATION

A. Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for aluminum window installation in accordance with manufacturer's written recommendations.

1. Visually inspect substrate.

2. Verify openings are dimensionally correct and within allowable tolerances, and substrates are plumb, level and clean.

3. Verify in the presence of the Architect that anchoring surface is in accordance with approved shop drawings.

4. Inform Architect of unacceptable conditions immediately upon discovery.

5. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Architect.

6. Starting window installation implies substrate conditions are acceptable for Work of this Section.

3.3 INSTALLATION

A. Install aluminum windows in accordance with manufacturer's written recommendations.

1. Ensure operable windows are closed and locked during installation.

3.4 SEALANTS

A. Apply sealant in accordance with manufacturer's written installation guidelines.

3.5 FIELD QUALITY CONTROL

A. Comply with AAMA 502-12.

B. Field Testing Performance:

1. To AAMA 502-12, Section 1.1.

C. Proper Execution of the Field Test:

1. Ensure window is plumb, level and square.

a. If conditions fall outside the +/-1/8 inch tolerance, do not test product.

b. Test at a pressure greater than 2/3 the fenestration product laboratory test pressure.

D. Qualification of the agency performing the test:

1. Ensure agency is an AAMA accredited independent testing agency.

E. Site Visits:

1. Schedule site visits to review work at stages listed:

a. After delivery and storage of aluminum windows and when preparatory work on which Work of this Section depends is complete, but before application begins.

b. Twice during progress of work at 25% and 60% complete.

c. Upon completion of work, after cleaning is carried out.

d. Obtain reports within three days of review and submit immediately to Architect.

3.6 CLEANING

A. Clean sealants, caulking and other materials from surfaces, including adjacent work.

B. Clean window frames, casings and glass using materials and methods recommended by the window and glass manufacturer that do not cause defacement of work.

1. Clean using methods which comply with AAMA 609.

2. Clean glass using methods which comply with GANA 01-0300.

C. Protect installed products until completion of project.

D. Touch-up, repair or replace damaged products before Substantial Completion.

3.7 PROTECTION

A. Protect installed aluminum windows from damage during construction.

B. Repair or replace adjacent materials damaged by installation of aluminum windows.

END OF SECTION

SECTION 087100 – DOOR HARDWARE

1.0 GENERAL

1.9 SUMMARY

J. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

K. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

C. This Section includes commercial door hardware for the following:

1. Swinging doors.

2. Sliding Doors

3. Other doors to the extent indicated.

D. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.

2. Cylinders specified for doors in other sections.

1.2 RELATED SECTIONS

A. Section 081100 - Metal Doors and Frames

B. Section 083213 – Sliding Aluminum-Framed Glass Doors

C. Section 084329 – Sliding Storefronts

D. Section 081416 - Flush Wood Doors

1.3 REFERENCES

A. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.

2. ICC/IBC - International Building Code.

3. NFPA 70 - National Electrical Code.

4. NFPA 80 - Fire Doors and Windows.

5. NFPA 101 - Life Safety Code.

6. NFPA 105 - Installation of Smoke Door Assemblies.

7. State Building Codes, Local Amendments.

B. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series

2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.4 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

    a. Type, style, function, size, label, hand, and finish of each door hardware item.
    b. Manufacturer of each item.
    c. Fastenings and other pertinent information.
    d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    e. Explanation of abbreviations, symbols, and codes contained in schedule.
    f. Mounting locations for door hardware.

g. Door and frame sizes and materials.
h. Warranty information for each product.

C. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

2. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.5 QUALITY ASSURANCE

D. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

E. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

F. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

G. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

H. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

I. California Building Code: Provide hardware that complies with CBC Section 11B.

1. All openings as a part of an accessible route shall comply with CBC Section 11B-404.

2. The clear opening width for a door shall be 32" minimum. For a swinging door it shall be measured between the face of the door and the stop, with the door open 90 degrees. There shall be no projections into it below 34" and 4" maximum projections into it between 34" and 80" above the finish floor or ground. Door closers and stops shall be permitted to be 78" minimum above the finish floor or ground. CBC Section 11B-404.2.3.

3. Operable hardware on accessible doors shall comply with CBC Section 11B-309.4 and shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. Operable parts of such hardware shall be 34" minimum and 44" maximum above finish floor or ground. Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides.

G. Hardware (including panic hardware) shall not be provided with "nightlatch" function for any accessible doors or gates unless the following conditions are met:

1. Such hardware has a 'dogging' feature and is dogged during the time the facility is open.

2. All 'dogging' operation is performed only by employees as their job function (non-public use).

H. The force for pushing or pulling open a door shall be in accordance with CBC Section 11B-404.2.9.

1. Interior hinged doors, sliding or folding doors, and exterior hinged doors: 5 pounds (22.2 N) maximum. Required fire doors: the minimum opening force allowable by the DSA authority, not to exceed 15 pounds (66.7N). These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position.

2. The force required for activating any operable parts, such as lever hardware, or disengaging other devices shall be 5 pounds (22.2N) maximum to comply with CBC Section 11B-309.4.

I. Door closing speed shall comply with CBC Section 11B-404.2.8. Closers shall be adjusted so that the required time to move a door from an open position of 90 degrees

to a position of 12 degrees from the latch is 5 seconds minimum. Spring hinges shall be adjusted so that the required time to move a door from an open position of 70 degrees to the closed position is 1.5 seconds minimum.

J. Floor stops shall not be located in the path of travel and 4" maximum from walls.

K. Thresholds shall comply with CBC Section 11B-404.2.5.

L. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

G. Keying Conference: Conduct conference to comply with requirements in Division 01, Section Project Meetings. Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.

2. Plans for existing and future key system expansion.

3. Requirements for key control storage and software.

4. Installation of permanent keys, cylinder cores and software.

5. Address and requirements for delivery of keys.

H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01, Section Project Meetings with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.

2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.

3. Review sequence of operation narratives for each unique access controlled opening.

4. Review and finalize construction schedule and verify availability of materials.

5. Review the required inspecting, testing, commissioning, and demonstration procedures

I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.6 DELIVERY, STORAGE, AND HANDLING

F. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

G. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

H. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.7 COORDINATION

F. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

G. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.8 WARRANTY

F. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

G. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.

2. Faulty operation of the hardware.

3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

4. Electrical component defects and failures within the systems operation.

H. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

I. Special Warranty Periods:

1. Ten years for mortise locks and latches.

2. Seven years for heavy duty cylindrical (bored) locks and latches.

3. Twenty five years for manual surface door closer bodies.

1.9 MAINTENANCE SERVICE

F. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

2.0 PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

G. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

B. Quantity: Provide the following hinge quantity:

1. Two Hinges: For doors with heights up to 60 inches.

2. Three Hinges: For doors with heights 61 to 90 inches.

3. Four Hinges: For doors with heights 91 to 120 inches.

4. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

C. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

1. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.

2. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

D. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

1. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.

2. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

E. Hinge Options: Comply with the following:

1. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

F. Manufacturers:

a. Hager Companies (HA).

b. Ives; Allegion Architectural Door Accessories (IVE).

2.3 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.

2. Furnish dust proof strikes for bottom bolts.

3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.

4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Manufacturers:

    a. Pemko/Rockwood Products; ASSA ABLOY Architectural Door Accessories (PE/RO).

    b. Door Controls International (DC).

B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

1. Manufacturers:

    a. Pemko/Rockwood Products; ASSA ABLOY Architectural Door Accessories (PE/RO).

    b. Door Controls International (DC).

C. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.

2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.

3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.

D. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

1. Manufacturers:

a. PE/Rockwood Products; ASSA ABLOY Architectural Door Accessories (PE/RO).

b. Ives; Allegion Architectural Door Accessories (IVE).

2.4 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Cylinders: Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.

2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.

3. Bored-Lock Type: Cylinders with tailpieces to suit locks.

4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.

5. Keyway: Match Facility Standard.

C. Keying System: Each type of lock and cylinders to be factory keyed.

1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.

2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.

3. New System: Key locks to a new key system as directed by the Owner.

D. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2).

2. Master Keys (per Master Key Level/Group): Five (5).

3. Construction Keys (where required): Ten (10).

E. Construction Keying: Provide construction master keyed cylinders.

F. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.

2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified.

B. Furnish with solid cast levers, standard 2 3/4” backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.

C. Locks are to be non-handed and fully field reversible.

D. Manufacturers:

a. Schlage Hardware (SCH).

2.6 AUXILIARY LOCKS

A. Cylindrical Deadlocks: ANSI/BHMA A156.36, Grade 1, cylindrical type deadlocks to fit standard ANSI 161 preparation and 1 3/8" to 1 3/4" thickness doors. Provide tapered collars to resist vandalism and 1" throw solid steel bolt with hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other locksets.

E. Manufacturers:

1. Schlage Hardware (SCH).

2.7 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

B. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.

C. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.

D. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

E. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

F. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.

2. Strikes for Bored Locks and Latches: BHMA A156.2.

3. Strikes for Auxiliary Deadlocks: BHMA A156.36.

4. Dustproof Strikes: BHMA A156.16.

2.8 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.

3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

B. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

1. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.

2. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

C. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

D. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.

E. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

F. Rail Sizing: Provide exit device rails factory sized for proper door width application.

G. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

H. Conventional Push Rail Exit Devices (Commercial Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Fabricate latchbolts from cast stainless steel, Pullman type, incorporating a deadlocking feature.

I. Manufacturers:

1. Von Duprin; Allegion Architectural Door Accessories (VON) – 900 Series.

2.10 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.

4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper

installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Commercial Duty): ANSI/BHMA 156.4, Grade 1 certified surface mounted, institutional grade door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck, closing sweep, and latch speed control valves. Provide non-handed units standard.

C. Manufacturers:

1. Norton Door Controls (NO) - 8500 Series.

2.11 ARCHITECTURAL TRIM

A. Door Protective Trim – General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

B. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

C. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.

D. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:

1. Stainless Steel: 300 grade, 050-inch thick.

E. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

F. Manufacturers:

1. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2. Trimco (TC).

3. Hiawatha, Inc. (HI).

2.12 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

C. Manufacturers:

1. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2. Trimco (TC).

3. Hiawatha, Inc. (HI).

D. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

E. Manufacturers:

1. Norton Door Controls (NO).

2. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.13 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

C. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

D. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

E. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

F. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

G. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

H. Manufacturers:

1. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).

2. National Guard Products (NG).

3. Reese Enterprises, Inc. (RE).

2.14 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.15 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

3.0 EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

B. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

C. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

D. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

E. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

F. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."

G. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

H. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door

hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

I. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

J. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect based on drawings dated 04/12/2019. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.

C. MANUFACTURER'S SYMBOLS

SCH	SCHLAGE	LOCKSETS, STRIKE, CYLINDERS
PE (RO)	PEMKO (Rockwood)	THRESHOLD, GASKETING, WEATHER-STRIPPING
HAG	HAGER	BUTTS, HINGES
IVE	IVES	KICK PLATES, DOOR STOP, HINGES
VON	VON DUPRIN	EXIT DEVICE
NOR	NORTON	CLOSERS

Hardware Sets

Set: A
Exterior Doors: 100A, 102A

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Classroom Lock	AL70PD	630	SCH
1	Cylinder	23-065, C123 Keyway	626	SCH
1	Surface Closer	CLP8501R	689	NO
1	Drop Plate	As Required	689	NO
1	Kick Plate	8400 10”H x 1” LDW CSK BEV	630	IVE
1	Door Stop	FS18S or OH stop where floor stop presents tripping hazard	Black	IVE
1	Threshold	270A series x Width, per detail		PE
1	Perimeter Seal	S88D		PE
1	Gasketing	2891 APK		PE
2	Sweep	18061 CNB		PE

Set: B
Exterior Storeroom Door: 104A

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Storeroom Lock	AL80PD	630	SCH
1	Cylinder	23-065, C123 Keyway	626	SCH
1	Surface Closer	CLP8501R	689	NO
1	Drop Plate	As Required	689	NO
1	Kick Plate	8400 10”H x 1” LDW CSK BEV	630	IVE
1	Door Stop	FS18S or OH stop where floor stop presents tripping hazard	Black	IVE
1	Threshold	270A series x Width, per detail		PE
1	Rain Guard	346C x full frame		PE
1	Perimeter Seal	S88D		PE
1	Gasketing	2891 APK		PE
2	Sweep	18061 CNB		PE

Set: C
Interior Storage Door: 106A

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Storeroom Lock	AL80PD	626	SCH
1	Cylinder	23-065, C123 Keyway	626	SCH
1	Wall Holder	WS45	626	IVE
3	Silencer	608-RKW Gray		RO

Set: D
Interior Hallway Door: 102E

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Classroom Lock	AL70PD	626	SCH
1	Cylinder	23-065, C123 Keyway	626	SCH
1	Wall Stop	WS402CCV Gray	US26D	IVE
3	Silencer	608-RKW Gray		RO

Set: E
Restroom & Lactation Room Privacy Lock: 103A, 105A, 107A

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Privacy Set Lock	AL85PD	626	SCH
1	Surface Closer	8501 S/P arm to suit location	689	NO
1	Kick Plate	8400 10”H x 1” LDW CSK BEV	630	IVE
1	Wall Stop	WS402CCV Gray	US26D	IVE
1	Gasketing	S88BL Width x Height		RO

Set: F
Sliding Doors: 102B, 102C, 102D

1	Cylinder	23-065, C123 Keyway	626	SCH
1	Balance of Hardware	By Door Manufacturer		

END OF SECTION

SECTION 087110 – GATE HARDWARE

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

1. “Hardware groups” have been assigned to the various gates required for this work, as indicated in the Gate Schedule on the Drawings. The hardware groups are described in detail in the “Hardware Schedule," Section 3.2 A and B of this Section.

2. Unless otherwise approved by the Architect, furnish all finish hardware described in the Hardware schedule and all other finish hardware not described but required for a complete and operable facility.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to the drawings and project manual.

B. Section 323113 - Chainlink Fences and Gates

1.3 QUALITY ASSURANCE

A. Qualifications of Supplier:

1. The finish hardware supplier shall have an AHC member of the American Society of Hardware Consultants who shall be made available for consultation at no additional cost to the Owner during construction.

2. The AHC shall be present at completion of the work and shall check the installation of finish hardware and shall report to the Architect all obvious misapplication of finish hardware.

1.4 SUBMITTALS

A. Comply with pertinent provisions of these Contract Documents.

B. Materials List:

1. Within 15 days after award of Contract, and before any finish hardware is ordered or purchased for this work, submit to the Architect for his approval a complete

list of all finish hardware proposed to be furnished for this work, giving manufacturer's name and catalog number for each item.

2. This shall in no way be construed as permitting substitution of items for the items specified.

1.5 DELIVERY, STORAGE AND PRODUCT HANDLING

A. Delivery:

1. Deliver all finish hardware to the job site with all labels intact and legible.

B. Packaging:

1. Furnish all finish hardware with each unit marked or numbered in accordance with the Hardware schedule.

2. Pack each item complete with all necessary pieces and fasteners.

3. Properly wrap and cushion each item to prevent scratches during delivery and storage.

C. Protection:

1. Use all means necessary to protect materials before, during and after installation and to protect the installed work and materials of other trades.

D. Replacement:

1. In the event of damage, immediately make all repairs and replacements necessary for the approval of the Architect and at no additional cost to the Owner.

2.0 PRODUCTS

2.1 FASTENINGS

A. Furnish all finish hardware with all necessary screws, bolts, and other fasteners of suitable size and type to anchor the hardware in position for long life under hard use.

B. Furnish fastenings where necessary with expansion shields, toggle bolts, hex bolts, and other anchors approved by the Architect, according to the material to which the hardware is to be applied and the recommendation of the hardware manufacturer.

C. When flush bolts occur in path of travel, provide accessible flush bolt (automatic).

D. Door closer shall comply with 11B-404.2.8.1, door closer delay time. Minimum Delay Time: 5 seconds to move from 90° to 12° from latch. Maximum closer-effort: 5 pounds exterior doors, 5 pounds interior doors and minimum effort to latch door.

E. The Authority having Jurisdiction, may increase the maximum effort to operate fire doors to achieve positive latching, but not to exceed 15 lbs max.

F. All fastenings shall harmonize with the hardware as to material and finish.

2.2 FINISH HARDWARE REQUIREMENTS

A. Refer to 3.2 A & B of this Section for Schedule.

B. Thresholds in the path of travel shall conform with 11B-404.2.5.

C. Hand-activated hardware, including lever-type hardware, panic bars, push-pull activating, shall be between 34" to 44" AFF.

D.. Maximum effort to unlatch panic hardware must be 15 lb. in direction of travel.

2.3 KEYING

A. Construction Keying:

1. Construction key all locks; provide six construction keys and one extractor key.

B. Final Keying System:

1. Furnish a Grand Master, Master, keyed alike or keyed different system as directed by the Owner or Architect

C. Deliver all keys to the Owner.

D. Contractor shall provide a method independent of the final keying system for securing the building during construction and shall provide the Owner with construction keys and IC control keys.

E. Primus E cylinders should be 0 bitted. When contractor is ready for installing the cylinders, the Owner will pin them according to their keying schedule. Contractor will then install the pinned cylinders.

3.0 EXECUTION

3.1 INSTALLATION

A. Install the work of this Section in strict accordance with the manufacturer's recommendations as approved by the Architect, anchoring all components firmly into position for long life under hard use.

B. Doorstops must be mounted within 4-inches of wall in path of travel.

3.2 HARDWARE SCHEDULE

A. MANUFACTURER'S SYMBOLS

SCH	SCHLAGE	LOCKSETS, STRIKE, CYLINDERS
VON	VON DUPRIN	EXIT DEVICE
LCN	LCN	CLOSERS
D&D	D&D TECHNOLOGIES	SELF CLOSING HINGES

B. FINISH HARDWARE

1. General:

a. Finish throughout to be powdercoat black unless noted otherwise.

b. Hinges shall be non-removable pin (NRP) type.

c. Gate spring hinges shall be adjusted so that from the open position on 70 degrees, the gate shall move to the closed position in 1.5 sec min

2. Hardware Groups

a. Group A - Double gate with hasp and padlock

4 Each	Hinge	(180 Degree Industrial Hinge)
1 Each	Hasp	(Fulcrum Locking Center Hasp)
2 Each	Cane Bolt	(¾" dia. can bolt)
1 Each	Padlock	(per Owner)

b. Group B - Chainlink Sliding Gate with bracket latch and padlock.

1 Each	Hasp	(Bracket Latch by gate manufacturer)
1 Each	Cane Bolt	(¾" dia. can bolt)
1 Each	Padlock	(per Owner)

c. Group C - Single gate with hasp and padlock

4 Each	Hinge	(180 Degree Industrial Hinge)
1 Each	Hasp	(Fulcrum Locking Center Hasp)
1 Each	Cane Bolt	(¾" dia. can bolt)
1 Each	Padlock	(per Owner)

3.3 CLEANING

A. Upon completion, clean the work of this Section in accordance with recommendations of the manufacturers of the materials used.

B. Provide required protection of products to prevent damage and wear prior to acceptance of the work by the Owner.

3.4 WARRANTY

A. The products delivered shall be free from defects.

B. Manufacturer's standard performance warranty, as available for specified installation and environmental conditions.

END OF SECTION

SECTION 088100 – GLASS AND GLAZING

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install glass and glazing units and required accessories as shown on project Drawings and as specified herein, including:

1. Exterior Glazing Systems

a. 083213 – Sliding Aluminum-Framed Glass Doors

b. 085113 – Aluminum Windows

2. Interior Glazing Systems

a. 084329 – Sliding Storefronts

b. See Architectural drawings for interior non-thermal glazing.

2. Exterior and Interior Door Glazing

a. 081100 – Metal Doors And Frames

b. 081416 – Flush Wood Doors

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. As shown in section 1.1 “Summary”.

1.3 REFERENCES

A. American Architectural Manufacturers Association:

1. AAMA 800 - Voluntary Specifications and Test Methods for Sealants

B. ASTM International (ASTM):

1. ASTM C509 - Specification for Elastomeric Cellular Preformed Gasket and Sealing Material

2. ASTM C864 - Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers

3. ASTM C920 - Specification for Elastomeric Joint Sealants.

4. ASTM C1036 - Specification for Flat Glass

5. ASTM C1048 - Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass

6. ASTM C1087 - Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems

7. ASTM C1115 - Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories

8. ASTM C1172 - Specification for Laminated Architectural Flat Glass

9. ASTM C1281 - Specification for Preformed Tape Sealants for Glazing Applications

10. ASTM C1330 - Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants

11. ASTM C1376 - Specification for Pyrolytic and Vacuum Deposition Coatings on Glass

12. ASTM E774 - Specification for the Classification of the Durability of Sealed Insulating Glass Units

13. ASTM E1300 - Practice for Determining Load Resistance of Glass in Buildings

14. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation

C. Code of Federal Regulations:

1. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials

D. Glass Association of North America (GANA):

1. Glazing Manual

2. Laminated Glass Design Guide

3. Engineering Standards Manual

E. The Insulating Glass Manufacturers Alliance (IGMA):

1. IGMA TB-3001 - Sloped Glazing Guidelines

2. SIGMA TM-3000 - Glazing Guidelines for Sealed Insulating Glass Units

F. Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; Building Technologies Department; Windows & Daylighting Group, windows.lbl.gov/software:

1. LBL-44789 WINDOW 5.0 - A PC Program for Analyzing Window Thermal Performance

G. National Fenestration Rating Council (NFRC):

1. NFRC 100 - Procedure for Determining Fenestration Product Thermal Properties

2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficients at Normal Incidence

3. NFRC 300 - Procedures for Determining Solar Optical Properties of Simple Fenestration Products

1.4 DEFINITIONS

A. Manufacturers of Primary Glass: Firms that produce primary glass, as defined in referenced industry publications.

B. Manufacturers/Fabricators of Glass Products: Firms that utilize primary glass in the production of glass products that may include coated glass, laminated glass, and insulating glass.

C. Sealed Insulating Glass Unit Surfaces:

1. Surface 1: Exterior surface of outer lite

2. Surface 2: Interspace-facing surface of outer lite

3. Surface 3: Interspace-facing surface of inner lite

4. Surface 4: Interior surface of inner lite

1.5 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems that will withstand indicated loads and normal thermal movement without failure, including loss or glass breakage resulting from defective manufacture, fabrication, or installation; failure of glazing systems to remain watertight and airtight; or deterioration of glazing materials.

B. Glass Design: Glass thicknesses indicated are minimums. Select actual glass lite thicknesses by analyzing loads and conditions. Provide glass lites in the thicknesses and in strengths required to meet or exceed the following criteria:

1. Glass Thicknesses: Comply with ASTM E1300, as follows:

a. Specified Design Wind Loads: As indicated

b. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set within 15 degrees of vertical and under wind load for a load duration of three (3) seconds.

c. Probability of Breakage for Sloped Glazing: 1 lite per 1000 for lites set more than 15 degrees off vertical and under wind and snow loads for a duration of thirty (30) days.

d. Thickness of Tinted Glass: Provide the same thickness for each tint color for all applications.

C. Thermal Movements: Allow for thermal movements of glazing components and glass framing members resulting from a temperature change range of 120 deg F ambient and 180 deg F material surfaces.

D. Thermal and Optical Performance Properties: Provide glass meeting specified performance properties, based on manufacturer's published test data for units of thickness indicated and as required by Title 24.

1.7 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Product Data: Provide manufacturer’s data sheets for each glass product and glazing material.

C. Samples: Provide 12-inch-square for each type of glass product other than monolithic clear float glass or clear float glass only set in insulated glass units.

D. Provide Shop Drawings.

E. Glazing Schedule: Prepare schedule using designations used on Drawings.

F. Product Certificates: Signed by manufacturers/fabricators of glass products certifying that products furnished comply with project requirements.

G. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer, based on submitted samples or acceptable data from previous testing of current formulations with similar products.

H. Qualification Information: For Installer firm and Installer’s manufacturer/fabricator-trained field supervisor.

I. Warranties: Submit sample meeting warranties requirements of this Section.

1.8 QUALITY ASSURANCE

A. Manufacturer/Source: Obtain each type of glass product from a single primary glass manufacturer and a single manufacturer/fabricator for each glass product type.

1. For glass sputter-coated with solar-control low-e coatings, obtain glass products in fabricated units from a manufacturer/fabricator certified by the primary glass manufacturer.

B. Installer Qualifications: Experienced Installer with minimum of 5 successful completed projects of similar materials and scope, approved by glass product manufacturer/fabricator.

C. Preconstruction Adhesion and Compatibility Testing: Submit glass units, glazing materials, and glass-framing members with applicable finish to elastomeric glazing sealant manufacturer for determination of sealant compatibility, priming, and preparation requirements for optimum adhesion and performance.

D. Safety Glazing Products: Comply with size, glazing type, location, and testing requirements of 16 CFR 1201 for Category I and II glazing products, and requirements of authorities having jurisdiction.

E. Glazing Industry Publications: Comply with glass product manufacturer’s recommendations and the following:

1. GANA Publications: GANA Laminated Division's "Laminated Glass Design Guide" and GANA's "Glazing Manual."

2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."

F. Insulating-Glass Certification Program: Indicate compliance with requirements of Insulating Glass Certification Council on applicable glazing products.

G. Preinstallation Conference: Conduct conference at Project site in compliance with Sections 013113, Project Coordination and 013119, Project Meetings.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials during shipping, handling, and storage to prevent breakage, scratching, damage to seals, or other visible damage. Deliver, unload, store, and erect glazing materials without exposing panels to damage from construction operations.

1. Comply with manufacturer’s venting and sealing recommendations for shipping and handling of insulating glass units exposed to substantial altitude change.

1.10 WARRANTY

A. Warranty for Coated-Glass Products: Manufacturer's standard form, signed by coated-glass product primary manufacturer or manufacturer/fabricator, as applicable, agreeing to replace coated-glass units that display peeling, cracking, and other deterioration in metallic coating under normal use, within ten (10) years of date of Substantial Completion.

B. Warranty for Insulating Glass: Manufacturer's standard form, signed by insulating-glass product manufacturer/fabricator, agreeing to replace insulating-glass units that exhibit failure of hermetic seal under normal use evidenced by the obstruction of vision by dust, moisture, or film on interior surfaces of glass, within ten (10) years of date of Substantial Completion.

C. Installer's Warranty: Form acceptable to County, signed by glass product Installer, agreeing to replace glass products that deteriorate, or that exhibit damage or deterioration of glass or glazing products due to faulty installation, within two (2) years of date of Substantial Completion.

2.0 PRODUCTS

2.1 MANUFACTURER

A. PPG Industries, Inc, Pittsburgh, PA, 1-888-774-4332, www.corporateportal.ppg.com.

2.2 MATERIALS

A. Exterior Glazing Systems

1. Sputter-Coated Float Glass: ASTM C1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process following primary glass product manufacture. Glazing required to meet Title 24 requirements.

2. Insulating-Glass Units: Factory-assembled units consisting of dual-sealed lites of glass separated by a dehydrated interspace, with manufacturer's standard spacer material and construction, per ASTM E774 and E2190. Glazing required to meet Title 24 requirements.

B. Interior Glazing Systems

1. Annealed Float Glass, General: ASTM C1036, Type I, Quality-Q3, class indicated.

2. Heat-Treated Float Glass, Heat-Strengthened: ASTM C1048; Type I (transparent flat glass); Quality-Q3; Kind HS, of class and condition indicated: where indicated, where needed to resist thermal stresses and where required to comply with performance requirements.

3. Pyrolytic-Coated Float Glass: ASTM C1376, float glass with metallic-oxide coating applied by pyrolytic deposition process during primary glass product manufacture.

C. Exterior and Interior Door Glazing

1. Cut-outs for vision lites shall be dimensioned from the top of the door and from strike-side edge of door to allow mounting space for door hardware such as door closers, panic devices and lever handles as shown on drawings.

2. Use manufacturers' vision lite kits and louvers.

3. Acceptable manufacturer: Anemostat "Lo-Pro" or equal.

4. Non-rated doors with vision lites, use 7/32" laminated safety glass. Provide etched label on the glass.

6. Acceptable Manufacturer as listed below; or approved equal

   a. Firelite Glass, Distributed by Technical Glass Products, Kirkland Washington, www.fireglass.com, 800-426-0279

   b. Anemostat, Distributed by R.E. Edwards, Dublin, California, 925-829-2942

   c. Vetrotech Saint Gobain, www.vetrotechusa.com, 888-803-9533

D. Glazing Accessories:

1. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

2. Glazing Tape: Closed cell polyvinyl chloride foam, maximum water absorption by volume 2 percent, designed for 25 percent compression percent for air barrier and vapor retarder seal, black color, coiled on release paper over adhesive on two sides; widths required for specified installation, and complying with AAMA 800.

3. Glazing Gaskets:

   a. Dense Compression Gaskets: ASTM C864, neoprene or EPDM, or ASTM C1115, silicone or thermoplastic polyolefin rubber, as recommended by glazing product manufacturer for application, molded or extruded shape to fit glazing channel retaining slot; black color.

   b. Soft Compression Gaskets: ASTM C509, Type II, black, molded or extruded, neoprene, EPDM, silicone or thermoplastic polyolefin rubber, of profile and hardness required to maintain watertight seal.

4. Setting Blocks: ASTM C864, neoprene, 80 to 90 Shore A durometer hardness; length 4 inches, width of glazing rabbet space less 1/16 inch, height required for glazing method, pane weight, and pane area.

5. Spacer Shims: ASTM C864, neoprene, 50 to 60 Shore A durometer hardness; length 3 inches, one half height of glazing stop, thickness required for application, one face self-adhesive.

6. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

7. Glazing Sealants: ASTM C920, type recommended by glazing product manufacturer for application indicated, complying with requirements of Section 079000, Joint Protection: Sealants and Caulking, color as selected by Architect.

8. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.3 FABRICATION OF GLAZING UNITS

A. General: Fabricate glazing units in dimensions required, with edge and face clearances, edge and surface conditions, and bite in accordance with glazing product manufacturer/fabricator's instructions and referenced glazing publications.

1. Tempered units: Entrance Doors and side lights.

2. Annealed units: Windows.

3.0 EXECUTION

3.1 EXAMINATION OF SURFACE CONDITIONS

A. Prior to work of this Section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where the work of this Section may properly commence.

1. Verify that glazing may be performed in strict accordance with all pertinent codes and regulations, the original design, and the referenced standards.

B. Verify that glazing channels are clean and ready to accept glazing installation, and that weeps are unobstructed. Confirm that minimum required face and edge clearances will be maintained.

C. Examine glazing units prior to setting. Reject units that display edge or face damage that may impede performance of unit or that will be visible when installed.

D. In the event of discrepancy, immediately notify the County. Do not proceed with glazing in areas of discrepancy until all such discrepancies and unsatisfactory conditions have been fully resolved and corrected.

3.2 PREPARATION

A. Clean glazing channels with recommended solvent and wipe dry. Apply primers to joint surfaces to ensure adhesion of sealants, unless preconstruction sealant-substrate testing indicates no primer is required.

3.3 GLAZING INSTALLATION

A. General: Install glass and glazing materials in accordance with instructions of manufacturers and requirements of GANA Glazing Manual.

1. Set glazing material in a true plane, tight and straight, allowing for expansion in accordance with manufacturers published recommendations, using compression gaskets, glazing, tape and sealant in accordance with manufacturer's recommendations.

2. Install setting blocks of size and in location required by glass manufacturer. Set blocks in bed of approved sealant.
3. Provide spacers for glass lites as recommended, based upon size of glass unit.

4. Comply with glass manufacturer’s limits on edge pressures.

5. Ensure that glazing units are set with proper and consistent orientation of glass units toward interior and exterior.

6. Provide edge blocking where recommended.

7. Install sealants in accordance with requirements of Section 079000, Joint Protection: Sealants and Caulking.

B. Tape Glazing: Place tapes on fixed stops positioned to be flush or protrude slightly when compressed by glass. Install tapes continuously. Form butt joints at corners and where required, and seal tape joints with approved sealant.

1. Apply heel bead of glazing sealant along intersection of permanent stop and frame for continuity of air and vapor seal.

2. Set glass lites centered in openings on setting blocks.

3. Install removable stops, and insert dense compression gaskets at corners, working toward centers of lites, compressing glass against tape on fixed stops.

4. Apply cap bead of elastomeric sealant over exposed edge of tape or gasket on exterior of glass unit.

C. Sealant Glazing: Install continuous spacers between glass lites and glazing stops. Install cylindrical sealant backing where recommended, in width and depth recommended to provide proper depth and width of sealant bead. Ensure sealant cannot block weep system.

1. Install sealant under pressure to completely fill glazing channel without voids, with full bond to glass and channel surfaces.
2. Tool sealant bead to proper profile providing wash away from glass.

D. Sealant Glazing for Butt Glazing:

1. Brace glass in position for duration of glazing process

2. Mask edges of glass at adjoining glass edges and between glass edges and framing members.

3. Secure small diameter non-adhering foamed rod on back side of joint.

4. Apply sealant to open side of joint in continuous operation; completely fill joint without displacing foam rod; tool sealant surface smooth to concave profile.

5. Allow sealant to cure, then remove foam backer rod.

6. Apply sealant to opposite side; tool sealant smooth to concave profile.

7. Remove masking tape.

E. Gasket Glazing: Fabricate gaskets to fit openings exactly. Allow for stretching of gaskets during installation.

1. Set soft compression gasket against fixed stop or frame, secure, with bonded miter cut joints at corners.

2. Set glass lites centered in openings on setting blocks.

3. Install removable stops, and insert dense compression gaskets at corners, working toward centers of lites, compressing glass against soft compression gaskets and to produce a weathertight seal. Seal joints in gaskets. Allow gaskets to protrude past face of glazing stops.

3.4 CLEANING AND PROTECTION

A. Protect installed glass from damage. Attach streamers or warning tape to framing members, away from contact with glass. Remove nonpermanent labels.

B. Protect glass from contact with contaminating substances during construction. Immediately clean glass exposed to contamination using methods as recommended by glass manufacturer.

C. Within 5 working days prior to inspection for Substantial Completion, clean all exposed glass surfaces using methods recommended by manufacturer. Remove glazing compounds from framing surfaces.

1. Clean with a mild soap or detergent and lukewarm water, using a clean sponge or soft cloth. Rinse well with clean water. Do not use abrasive or highly alkaline cleaner, razor blades, benzene, acetone, gasoline or carbon tetrachloride. Avoid cleaning during times when surface is exposed to hot direct sun.

D. Remove and replace broken or damaged glass at no cost to the County.

END OF SECTION

SECTION 088700 – ARCHITECTURAL WINDOW FILM

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned, or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install window film where shown on Drawings and as specified herein.

C. Custom graphic design to be developed and submitted for approval during the course of work. Basis of design: 'Custom Wheat Design' with gradient similar to SXJ-0545 'Beach Grass Gradient.' Final design subject to Architect's review and approval.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 088100 – Glass and Glazing

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. ASTM D 882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.

2. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers -- Tension.

3. ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers

4. ASTM D 1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.

5. ASTM D 1044 - Standard Method of Test for Resistance of Transparent Plastics to Surface Abrasion (Taber Abrader Test).

6. ASTM D 2240 - Standard Method for Rubber Property - Durometer Hardness.

7. ASTM D 2582 - Standard Test Method for Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.

8. ASTM D 5895 - Standard Test Methods for Evaluating Drying or Curing During Film Formation of Organic Coatings Using Mechanical Recorders.

9. ASTM E 84 - Standard Method of Test for Surface Burning Characteristics of Building Materials.

10. ASTM E 308 - Standard Recommended Practice for Spectophotometry and Description of Color in CIE 1931 System.

11. ASTM E 903 - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.

12. NFRC 100/200 (Formerly ASTM E903) - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.

1.4 PREFORMANCE REQUIREMENTS

A. Fire Performance: Surface burning characteristics when tested in accordance ASTM E 84:

1. Flame Spread: 25 maximum

2. Smoke Developed: 450 maximum.

1.5 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Custom Design Drawings:

1. Submit design concept(s) for decorative window film indicating pattern, scale, gradient, and color range, based on design intent described in Section 2.2. Provide up to (2) two design revisions.

2. Include mockups, material samples, and digital renderings sufficient to convey proposed custom design. Provide up to (2) two design revisions.

3. Final design to be developed in coordination with Architect during the course of work.

4. Do not proceed with fabrication or installation until written approval of custom design is received from the Architect.

C. Shop Drawings: Showing the location of window films shall be submitted to Architect for approval prior to installation. Copy of approved shop drawings to be available on job site during installation.

C. Product Data: Provide data on specified products, describing physical and performance characteristics, sizes, patterns, and method of installation.

D. Samples: Provide (2) full size samples of approved color and pattern.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

F. Maintenance Data: Include maintenance procedures manual, recommendations for maintenance materials and equipment, and suggested schedule for cleaning.

G. Sample Warranties: For special warranties.

1.6 DELIVERY, STORAGE, & HANDLING

A. Deliver materials to the site in manufacturer's original packaging listing manufacturer's name, product name, identification number, and related information.

B. Store in a dry location, between 60 degrees F and 80 degrees F and a relative humidity below 65%. Protect from damage and soiling.

C. Make stored materials available for inspection by the School District's representative.

D. Store materials in area of installation for minimum period of 48 hours prior to installation.

1.7 PROJECT CONDITIONS

A. Maintain minimum 65 degrees F and maximum 100 degrees F ambient temperature 72 hours prior to, during, and 48 hours after installation.

B. Do not install window film until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

1.8 WARRANTY

A. Special Warranty on Window Film: This product will be free from defects in material and manufacture for a period of five (5) years from the date of installation.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Decorative Films, LLC, 1-888-657-5224, www.decorativefilm.com

B. 3M Company, 3M Center, Building 0220-12-E-04, St. Paul, MN 55144-1000, 1-888-560-3497, www.3m.com

2.2 MATERIALS

A. Window film:

1. Custom Architectural Film. Product to be designed and approved during the course of construction.

a. Design: Custom “Wheat” pattern with gradient effect.

i. Appearance: Gradient style to resemble Solyx SXJ-0545 “Beach Grass Gradient”

b. Product Family: Gradient

c. Film Type: Polyester

d. Adhesive Type: Clear, Pressure-Sensitive

e. Usage: Interior

f. Available Height: 24”-48”as determined by approved design.

g. Full Roll Length: As determined by approved design.

h. Thickness: 4 mil

i. Visible Light Transmission Average - 18-34%

B. Accessories:

1. Materials as recommended by manufacturer.

3.0 EXECUTION

3.1 EXAMINATION/PREPARATION

A. Do not scale the Architect's drawings or calculate sizes from dimensions shown. Measure each space to receive film as a basis of supplying and cutting.

B. Meet with General Contractor several days prior to installation. Discuss various areas of responsibility so that installation and acceptance of film will be a smooth transition between trades, preventing costly down-time. Discuss these subjects:

1. Remove all deleterious substances from substrate(s) that would interfere with or be harmful to the installation.

2. Verify that window surface is dust-free and free of substances that would impair bonding of product.

3. There will be no exceptions to the provisions stated in the Manufacturer's installation instructions.

3.2 INSTALLATION – GENERAL

A. Install product in accordance with manufacturer's installation instructions.

B. Keep materials and adhesives at 65˚-80˚F for 24 hours before, during, and after installation. Surface to receive window film must be clean, dry and free of any foreign substances.

C. Cut film edges neatly and square at a uniform distance of 1/8 inch to 1/16 inch of window sealant. Use new blade tips after 3 to 4 cuts.

D. Spray the slip solution, comprised of one cupful of baby shampoo or dishwashing liquid to 1 gallon of water, on window glass and adhesive to facilitate proper positioning of film.

E. Apply film to glass and lightly spray film with slip solution.

F. Squeegee from top to bottom of window. Spray slip solution to film and squeegee a second time.

G. Bump film edge with lint-free towel wrapped around edge of a 5-way tool.

H. Upon completion of film application, allow 30 days for moisture from film installation to dry thoroughly, and to allow film to dry flat with no moisture dimples with viewed under normal viewing conditions.

I. If completing an exterior application, check with the manufacturer as to whether edge sealing is required.

3.3 CLEANING & PROTECTION

A. Remove all debris resulting from installation, including removal of excess adhesive from window glazing, frame and wall surfaces without incurring damage.

B. All rubbish, wrappings, debris, trimmings, etc., to be removed from site and disposed of properly.

C. Touch-up, repair or replace damaged products before Substantial completion.

D. After application of film, wash film using common window cleaning solutions, including ammonia solutions, 30 days after application. Do not use abrasive type cleaning agents and bristle brushes to avoid scratching film. Use synthetic sponges or soft cloth.

END OF SECTION

Division 9:
Finishes

SECTION 092900 - GYPSUM BOARD

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install abuse-resistant and moisture-resistant gypsum board as indicated on the Drawings, including all joint treatment products, accessories, and trim materials required for completion of work.

C. Patching gypsum board due to wall relocation and float to a level 5 finish in all exposed areas and ceilings.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 099100, Painting

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. C 473, Test Methods for Physical Testing of Gypsum Panel Products.
2. C 514, Specification for Nails for the Application of Gypsum Board.
3. C 840, Specification for Application and Finishing of Gypsum Board.
4. C 1002, Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.
5. C 1047, Specification for Accessories for Gypsum Board and Gypsum Veneer Base.
6. C 1396, Specification for Gypsum Board.
7. D 3273, Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

8. E 695, Standard Method of Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact Loading.

B. Gypsum Association (GA):

1. GA-214, Recommended Specifications: Levels of Gypsum Board Finish.

1.4 SUBMITTALS

A. Comply with pertinent provisions of Volumes 1 and 2 of these Contract Documents.

B. Product Data:

1. Submit manufacturer's specifications and installation instructions for each product specified.

C. Samples:

1. Provide minimum 12" x 12" coated gypsum board panel of each type and texture of textured coating.

1.5 QUALITY ASSURANCE

A. Qualifications of Installers:

1. Use only skilled and experienced gypsum board installer for laying up the gypsum board, fastening, taping and finishing.

2. Helpers and apprentices used in this portion of the Work shall be under full and constant supervision at all times by thoroughly skilled gypsum board installers.

3. In the acceptance or rejection of installed gypsum board, no allowance will be made for lack of skill on the part of installers.

1.6 PRODUCT STORAGE AND HANDLING

A. Storage:

1. Deliver the materials to the job site in manufacturer's original packages and store them in their original containers with all labels intact and legible at time of use.

2. Store materials inside and protected from damage by the elements, and ensure materials will be kept dry before, during, and after installation.

3. Where it is necessary to store outside, stack the materials off the ground, properly supported on a level platform, and fully protected from the weather.
4. Stack gypsum panels neatly and flat, taking care to prevent sagging.

5. Protect all edge, ends, and faces of gypsum board panels.

B. Protection:

1. Use all means necessary to protect gypsum board materials before installation, during, and until substantial completion.

2. Ensure the protection of the installed work and materials of all other trades.

3. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the District.

1.7 PROJECT CONDITIONS

A. Environmental Requirements: Establish and maintain application of finishing environment in accordance with ASTM C 840.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. National Gypsum Company, 2001 Rexford Road, Charlotte, NC 28211, (704)365-7300, www.nationalgypsum.com, or approved equal.

2.2 MATERIALS – GENERAL

A. General - All Gypsum panels shall meet the following requirements:

1. Shall comply with ASTM C1396

2. 5/8-inch interior panels shall comply with ASTM C1396, Type X, unless otherwise specified.

3. Surface Burning Characteristics, per ASTM E84:

a. Flame Spread Index: 15

b. Smoke Developed: 0

4. Tapered edge for finished surfaces; butt edge for concealed surfaces.

5. 4-feet wide by 8-feet long.

6. Recycled content of panels shall be as follows:

    a. 100% recycled paper on front and back panels.

    b. 10% (minimum) recycled content for inside material.

2.3 GYPSUM BOARD PANELS

A. Sheetrock® Brand EcoSmart Panels Mold Tough® Firecode® X

1. For use at all restrooms

    a. Thickness: 5/8 in.

    b. Width: 48 in. wide x 8 ft.-12 ft.

    c. Weight: 1.85 lb./sq. ft.

    d. Edges: Tapered

2.4 JOINT SYSTEM

A. General:

1. Compound / Gyp Mud shall be a minimum of 25% recycled content and must meet required maximum VOC standards.

2. A single compound may be used for embedment of tape, skim coating, and finishing if the compound is recommended for that purpose by the manufacturer of gypsum panels.

B. Compatibility:

1. Control Joints shall comply with ASTM C 1047.

2. All joint systems, including reinforcement tape and compounds, shall be a system recommended by the manufacturer of the gypsum panels as being compatible with the panels specified herein.

2.5 METAL BEADS AND TRIM

A. All metal beads, trim and accessory items shall be a system recommended by the manufacturer of the gypsum panels as being compatible with the panels specified herein.

B. Reglet: Aluminum profiles #1360 and #2054 as indicated by Fry Reglet Corporation, or approved equal. Exposed screw type as indicated on Drawings.

C. Corner bead shall be a formed galvanized steel angle with minimum base steel 0.014" thick, and shall comply with ASTM C 1047.

D. Casing beads shall be a formed galvanized steel trim with minimum base steel 0.014" thick, and shall comply with ASTM C 1047:

1. L-Bead

2.6 OTHER MATERIALS & ACCESSORIES

A. All other materials and accessories required for a proper and complete installation of gypsum board shall be new, first quality of their respective kinds, and subject to the approval of the Architect.

B. Fasteners:

1. In addition to complying with all pertinent code requirements, fasteners shall be as recommended by the manufacturer of gypsum panels specified herein.

2. Screws: ASTM C1002, Type “S" steel drill screws for fastening gypsum board to gypsum board, and steel framing members less than 0.033-inch thick. ASTM C954 Type “S-12" steel drill screws for fastening gypsum board to steel framing members 0.033 to 0.112-inch thick.

C. Screws:

1. Screws shall conform to ASTM C 954 or ASTM C 1002, or both, with heads, threads, points, and finish as recommended by the manufacturer of gypsum panels specified herein.

D. Nails:

1. Nails shall conform to ASTM C 514 with heads, lengths, configurations, and finish as recommended by the manufacturer of gypsum panels specified herein.

E. Acoustical Sealant:

1. Sealant shall be non-drying, non-hardening, non-skinning, non-staining, non-bleeding, gunnable type as recommended by the manufacturer of gypsum panels specified herein. CGSB 19-GP-21M.

F. Floor and Ceiling Runners:

1. L-shaped runner(s) weighing 545 lbs. per 1,000 linear feet with a minimum base steel of 0.0329", galvanized.

G. Textured Coatings:

1. Refer to Drawings for a complete Schedule of textured coating finishes.

2. All textured coating systems shall be a system recommended by the manufacturer of the gypsum panels as being compatible with the panels specified herein.

H. Hat Channel:

1. Refer to Drawings for location.

2. Material: Steel 33 mil

3. Height: 7/8"

4. Shape: F

3.0 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to all work of this Section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where installation may properly commence.

2. Verify that gypsum board may be installed and finished with all surfaces true to line and detail, level, plumb, and in accordance with the design but without excessive thicknesses of skim coating or texture.

B. Corrections:

1. In the event of discrepancy, immediately notify the Architect.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been resolved.

3.2 INSTALLING GYPSUM BOARD

A. General:

1. Install all panels plumb, level, and with all vertical joints on bearing, and in accordance with manufacturer's recommended methods for installation.

2. Single-Layer Application:

   a. Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C840.

   b. Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.

3. Double-Layer Application:

   a. Install gypsum board for base layer and exposed gypsum board for face layer.

   b. Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.

   c. Apply base layers at right angles to supports unless otherwise indicated.

   d. Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.

4. Patching: Patch gypsum board as required for demolition of existing walls, see drawings. See section 3.4.B.1 for finishing requirements.

B. Cutting:

1. When cutting gypsum panels is required, cut by scoring and breaking or by sawing, working from the face side.

2. When cutting by scoring, cut through the face paper and then snap the panel back away from the cut face; then break the back paper by snapping the gypsum panel in the reverse direction or by cutting the back paper.

3. Smooth all cut ends and edges of panels as necessary to obtain a smooth joint.

4. For cut-outs on panels or pipes, fixtures, and other small openings, make holes and cut-outs by sawing or by such other method as will not fracture the core or tear the covering, and with such accuracy that plates, escutcheons, or trim will cover the edges.

5. The use of "score-and-knockout" method will not be permitted.

C. Fastening:

1. Properly space all fasteners in careful accordance with the manufacturer's recommendations and code requirements, with heads driven slightly below the surface for proper cementing but without breaking the paper cover.

2. Loosely butt all joints to be taped; firmly butt all joints to be left exposed.

3. Stagger all end joints and the joints between panels to achieve a maximum of bridging, and a minimum of continued joints.

D. Caulking:

1. Using the materials and methods described in Section 07900 of these Specifications, caulk at all points where gypsum panels are penetrated by the work of other trades; caulk solidly, using all necessary backing.

3.3 INSTALLING METAL TRIM

A. General:

1. Carefully inspect the Drawings and verify the desired location of metal trim. The drawings do not purport to show all metal trim required; verify with the Architect the precise locations and types of trim to be used.

B. Installation:

1. Install all trim in strict accordance with the manufacturer recommendations as submitted, paying particular attention to make all trim installation level, plumb, true to line, and with firm attachment to supports.

3.4 TAPING AND FINISHING

A. Environmental Conditions:

1. Control heating and ventilating during finishing operations to ensure the maintenance of 55 degrees F minimum temperature.

B. Finishing:

1. Finish shall be level 5 for all exposed surfaces. Float any exposed existing surfaces to a level 5 finish.

2. Finish shall be level 2 for all other concealed surfaces.

3.5 CLEAN UP

A. General:

1. Do not allow the accumulation of scraps and debris arising from the work of this Section but maintain the areas in a neat and safe condition at all times.

B. Spillage:

1. In the event of spilling or splashing compound onto other surfaces, immediately remove the spilled or splashed material and all traces of the residue to the approval of the Architect.

3.6 WARRANTY

A. The product delivered shall be free of defects.

B. Manufacturer's standard performance warranty, as available for specified installation and environmental conditions.

END OF SECTION

SECTION 095100 – ACOUSTICAL CEILINGS

1.0 GENERAL

1.1 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

C. Provision of sloped suspension ceiling systems as shown on project Drawings and as specified herein.

D. Provision of suspended acoustic clouds as shown on project Drawings and as specified herein.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 092900 - Gypsum Board: Provision of gypsum board wall surfaces.

C. Division 23 - Heating, Ventilating, and Air-Conditioning (HVAC): Provision of mechanical work to be performed above suspended acoustical ceilings.

D. Division 26 - Electrical: Provision of electrical work to be performed above suspended ceilings.

1.3 REFERENCES

A. ASTM - American Society for Testing and Materials

1. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
2. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
4. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

5. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
6. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
7. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
8. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
9. ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint
10. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems
11. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
12. ASTM E 1264 Classification for Acoustical Ceiling Products

B. CBC - California Building Code, 2016 Edition

C. UL - Underwriters Laboratories, Inc.

1. FRD - Fire Resistance Directory.

1.4 SYSTEM DESCRIPTION

A. Design Requirements: Architectural reflected ceiling plan drawings shall govern over Mechanical and Electrical Drawings.

B. Continuous/Wall-to-Wall

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

B. Shop Drawings: Show complete ceiling layouts, methods and details of installation, and information required for related work. Include height, orientation and angle of each suspended cloud.

C. Samples

1. Acoustical Materials: 1 panel of each type specified.

D. Quality Control Submittals

1. Manufacturer’s Instructions: Submit manufacturer's installation instructions including technical guides for suspended clouds and sloped

ceilings.

1.6 QUALITY ASSURANCE

A. Qualifications: Installer shall have completed at least 3 previous projects of similar size and complexity.

B. Regulatory Requirements

1. Fire Resistive Ceilings: Install fire rated ceiling systems in accordance with CBC and UL FRD listing and requirements of agency having jurisdiction.

C. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer

1.7 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver and store packaged products in original containers with seals unbroken and labels intact until time of use.

B. Storage and Protection

1. Keep materials dry by storing off ground; under watertight covers.

2. Immediately before installation, panels shall be stored for sufficient time to stabilize temperature and humidity conditions ambient during installation and anticipated for occupancy.

3. Panel Grilles: Store flat and level in a fully enclosed space. Store panel grilles in the room in which they will be installed for a minimum 72 hours immediately prior to ceiling installation. The temperature and humidity of the room shall closely approximate those conditions that will exist when the building is occupied. Panel grilles must be stored off the floor.

1.8 PROJECT CONDITIONS

A. Environmental Requirements: Do not begin work until residual moisture has dissipated and comply with the following:

1. Acoustical Ceilings: Maintain uniform temperature of minimum 60 degrees Fahrenheit and maximum of 90 degrees Fahrenheit and humidity of 20 to 40 percent but no more than 90 percent prior to, during and after installation.

1.9 SEQUENCING AND SCHEDULING

A. Schedule installation of acoustic units after interior wet work is dry.

B. Coordinate installation of ceilings with mechanical and electrical work.

1.10 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.

2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

1.11 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:

1. Acoustical Panels: Sagging and warping.

2. Acoustical panels with BioBlock performance: growth of mold and mildew.

2. Grid System: Rusting and manufacturer's defects.

B. Shapes: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:

1. Shape Panels: Sagging and warping as a result of defects in materials or factory workmanship.

2. Suspension System: Rusting and manufacturer's defects.

C. Warranty Period:

1. Ceiling System: Thirty (30) years from date of substantial completion

2. Shapes: One (1) year from date of substantial completion

3. Shapes Suspension System: Ten (10) years from date of substantial completion

D. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Armstrong World Industries, Inc., www.armstrongceilings.com, 1-877-ARMSTRONG.

2.2 MATERIALS

A. AT-1 Suspended Acoustical Ceiling

1. Panels: Armstrong Ultima Lay-In panels with moisture resistant wet formed mineral fiber with factory applied vinyl latex paint, mildew resistant, and with the following properties:

a. Panel Size: 24" x 48"

b. Panel Thickness: 3/4"

c. Material: Mineral fiber

d. Surface Finish: Factory-applied latex paint

e. Color: White

f. Surface Texture: Fine Texture

g. Edge Profile: Square Lay-In

h. Acoustics Ratings:
   1. NRC Range: .75
   2. CAC Range: 35

i. Light Reflectance: ASTM E 1477; 0.85

j. Sag Resistance: HumiGuard Plus

k. Anti-Microbial: BioBlock Plus

l. Fire Resistance: Class A

m. Recycled Content: 28-39%

n. Dimensional Stability: HumiGuard Plus with BioBlock

2. Mechanical Suspension System: Prelude XL 15/16" exposed Tee suspension system:

a. Standard for Metal Suspension Systems: Provide commercial quality metal suspension systems of type, structural classification and finish indicated which comply with applicable ASTM C635 requirements.

1. Main Beams and cross tees are double-web steel construction with type exposed flange design.

2. Exposed surfaces chemically cleansed, capping pre-finished galvanized in baked polyester paint.

3. All non-extruded aluminum or stainless steel main beams and cross tees shall have rotary stitching

b. Finishes and Colors: Provide manufacturer's standard factory-applied finish for type of system indicated.

1. For exposed suspension members and accessories with painted finish, provide color indicated or, if not otherwise indicated, as selected by the Architect from manufacturer's full range of standard colors.

c. Attachment Devices: Size for five times design load indicated in ASTM C635, Table 1, Direct Hung unless otherwise indicated.

d. Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least three times the design load, but not less than 12 gauge.

e. Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated, or if not indicated, manufacturer’s standard moldings for edges and penetrations, including light fixtures, that fit type of edge detail and suspension system indicated.

1. Provide moldings with exposed flange of the same width as exposed runner.

2. Trim will be attached to wood frame in some locations to gypsum board wall in others as noted.

f. Where the Drawings indicate a sloped ceiling provide additional components as recommended by the manufacturer for a seismic slope ceiling condition.

B. Suspended Clouds AT-2 & AT-3

1. Armstrong SoundScapes Shapes:

a. Surface Texture: Fine

b. Composition: Fiberglass

c. Color: See Schedule

d. Shape Design: See Schedule

e. Edge Profile: Square

f. Acoustics: Sound absorption up to 1.00 Noise Reduction Coefficient (NRC) ASTM C 423

g. Flame Spread: ASTM E 1264; Class A (UL)

h. Products shall comply with the Build America, Buy America Act (BABA)

2. Suspension Systems:

a. Clouds are suspended at various heights and angles, see drawings for additional information.

b. Individual Cable Suspension: As recommended by Armstrong World Industries

b. Group Suspension Systems: As recommended by Armstrong World Industries

3. Accessories:

a. As required for installation.

C. Fasteners and Attachments

1. 12 gauge (minimum) hanger wires may be used for up to and including 4 feet by 4 feet grid spacing and shall be attached to main runners.

2. Provide 12 gauge hanger wires at the ends of all main and cross runners within 8 inches of the support or within 1/4 of the length of the end tee, whichever is least, for the perimeter of the ceiling area. End

connections for runners that are designed and detailed to resist the applied vertical and horizontal forces may be used in lieu of the 12 gauge hanger wires, subject to Division of the State Architect (DSA) review and approval.

3. Provide trapeze or other supplementary support members at obstructions to typical hanger spacing. Provide additional hangers, struts or braces as required at all ceiling breaks, soffits or discontinuous areas. Hanger wires that are more than 1 in 6 out of plumb are to have counter-sloping wires.

4. Ceiling grid members may be attached to not more than 2 adjacent walls. Ceiling grid members shall be at least 1/2-inch free of other walls. If walls run diagonally to ceiling grid system runners, one end of main and cross runners should be free, and a minimum of 1/2-inch clear of wall.

5. At the perimeter of the ceiling area where main or cross runners are not connected to the adjacent wall, provide interconnection between the runners at the free end to prevent lateral spreading. A metal strut or a 16 gauge wire with a positive mechanical connection to the runner may be used Where the perpendicular distance from the wall to the first parallel runner is 12 inches or less, this interlock is not required.

6. Provide bracing assemblies consisting of a compression strut and 4 each 12 gauge splayed bracing wires oriented 90 degrees from each other at the following spacing:

    a. Place bracing assemblies at a spacing not more than 12 inches by 12 inches on center.

    b. Provide bracing assemblies at locations not more than one half the spacings given above, from each perimeter wall and at the edge of vertical ceilings offsets. The slope of these wires shall not exceed 45 degrees from the plane of the ceiling and shall be taut Splices in bracing wires are not permitted.

    c. Suspended acoustical ceiling systems with a ceiling area of 144 square feet or less, and fire rated suspended acoustical ceiling systems with a ceiling area of 96 square feet or less, surrounded by walls which connect directly to the structure above, do not require bracing assemblies when attached to 2 adjacent walls.

D. Accessories

1. Light Fixture Protection and Hold Down Clips: Provide light fixture protection panels, fasteners and hold down clips if required by UL FRD listing, manufacturer’s standard types.

2. Edge Moldings: Profiles as indicated. Factory finish to match exposed suspension system components.

3. Interior Ceiling Closures: Sheet steel or aluminum formed and bent to profiles indicated. Prefinished white. All edges and ends hemmed or returned. All splices butt with concealed mechanical connectors. Field verify dimensions prior to fabrication.

2.3 SCHEDULE

Symbol	Series	Size	Color
AT-1	Ultima Square Lay-In	24” x 48”	White
	Prelude XL	15/16”	White
AT-2	Trapezoid 60 degree	40" x 93.5"	Boxwood DBW
AT-3	Trapezoid 60 degree	40" x 93.5"	Mist DMT

3.0 EXECUTION

3.1 EXAMINATION

A. Examine areas to receive acoustical treatment and verify that:

1. Installation of building components located in ceiling plenum is complete.

2. Spacing, direction and details of grid members and supports to accommodate installation of light fixtures, diffusers and other ceiling located items are correct.

3. Areas are clean and free of materials or rubble that could damage acoustical surfaces.

B. Do not start work until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.

1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.3 INSTALLATION

A. Suspended Ceiling Systems

1. Install acoustical material and suspension system, including necessary hangers and other supporting hardware in accordance with manufacturer's instructions and ASTM C636.

2. Lay work out symmetrically about centers of rooms and provide symmetrical borders not less than half size of tile specified unless noted otherwise on the Drawings.

3. Make penetrations through ceiling panels in such a manner to ensure tight fit and neat appearance. Center penetrations in tile unless otherwise noted.

B. Sloped Ceilings

1. The maximum ceiling slope shall not exceed 30º

2. Use of a maximum hold down clip is required for all sloped ceiling applications except Metalworks Vector which have integrated spring clips in the panel.

3. Main beams MUST NOT be installed perpendicular to the slope as this may result in suspension system failure.

4. Main beams must be spaced a maximum of 4' on center.

5. Panels installed at a slope will tend to slide downhill. Shims must be used to prevent this.bIf needed, place 1/8" or 3/32" shims (depending on panel type) between the panel edge and the web of the cross tee at the lower edge of each panel to center the panel in the suspension system opening.

6. Vector panels MUST be installed with the access kerf (side A) oriented toward the top of the slope. Panels may fall out if not configured with the A side at the top of the slope.

7. Maintenance personnel who may be removing and replacing specific panels must be trained on how to properly replace the panel with proper clips and orientation.

8. 12 gauge hanger wire must comply with ASTM C636 requirements.

9. Hanger wires should be suspended vertically and plumb.

10. If lateral force bracing is required in severe seismic areas, it shall remain vertical and the splay wires shall be installed at maximum 45° to the horizontal.

C. Suspension System

1. Fasten hanger wires with not less than 3 tight turns. Fasten bracing wires with 4 tight turns. Make all tight turns within a distance of 1-1/2 inches. Hanger or bracing wire anchors to the structure should be installed in such a manner that the direction of the wire aligns as closely as possible with the direction of the forces acting on the wire.

    a. Wire turns made by machine where both strands have been deformed or bent in wrapping can waive the 1-1/2 inch requirement, but the number of turns should be maintained, and be as tight as possible.

2. Separate all ceiling hanging and bracing wires at least 6 inches from all unbraced ducts, pipes, conduit, etc. It is acceptable to attach lightweight items, such as single electrical conduit not exceeding 3/4-inch nominal diameter, to hanger wires.

3. When drilled-in concrete anchors or shot-in anchors are used in reinforced concrete for hanger wires, 1 out of 10 must be field tested for 200 pounds in tension. When drilled-in concrete anchors are used for bracing wires, 1 out of 2 must be field tested for 440 pounds in tension. Shot-in anchors in concrete are not permitted for bracing wires. If any shot-in or drilled-in anchor fails, see CBC, Section 1923A.3.5.

4. Attach ail light fixtures and ceiling mounted air terminals or services, to the ceiling grid runners to resist a horizontal force equal to the weight of the fixtures. Screws or approved fasteners are required.

5. Flush or recessed light fixtures and air terminals or services, weighing less than 56 pounds, may be supported directly on the runners of a heavy duty grid system but, in addition, they must have a minimum of 2 each 12 gauge slack safety wires attached to the fixture at diagonal comers and anchored to the structure above. All 4 feet by 4 feet fixtures shall have slack safety wires at each comer.

    a. All flush or recessed light fixtures and air terminals or services weighing 56 pounds or more must be independently supported by not less than 4 taut 12 gauge wires each attached to the fixture

and to the structure above regardless of the type of ceiling grid system used.

b. The 4 taut 12 gauge wires, including their attachment to the structure above, must be capable of supporting 4 times the weight of the unit.

6. All fixtures and air terminals or services supported on intermediate duty grid systems must be independently supported by not less than 4 taut 12 gauge wires each attached to the fixture or terminal, and to the structure above.

7. Support surface mounted light fixtures by at least 2 positive devices which surround the ceiling runner and which are each supported from the structure above by a 12 gauge wire. Spring clips or clamps that connect only to the runner are not acceptable.

a. Provide additional supports when light fixtures are 8 feet or longer.

8. Support pendant mounted light fixtures directly from the structure above with hanger wires or cables passing through each pendant hanger and capable of supporting 4 times the weight of the fixture. A bracing assembly is required where the pendant hanger penetrates to the ceiling. Special details are required to attach the pendant hanger to the bracing assembly to transmit horizontal forces.

9. Level grid assembly in each area after installation of mechanical and electrical equipment within 1/8-inch in 12 inches or conforming to slope as appropriate to area of installation.

D. Perimeter Trim Members

1. Install at intersections with perpendicular surfaces as shown.

2. Lap joints where trim pieces meet at wall angles. Do not bend trim around corners.

3. Sloped Ceilings:

i. Wall angles are painted and wall shimmed to achieve the correct angle. 7/8" wall angle Item 7800 should be used. The field crafted wall shim must keep the angle 90° to the slope in order to use Seismic Rx BERC2 clips.

3.3 FIELD QUALITY CONTROL

A. Acoustical Ceiling Connection Devices; Test devices for capability to support the following loads:

1. Hanger Wires: 200 pounds in accordance with requirements of CBC.

2. Lateral Force Bracing Wires: 440 pounds.

3.4 CLEAN UP AND ADJUSTING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove any ceiling products that cannot be successfully cleaned and or repaired. Replace with attic stock or new product to eliminate evidence of damage.

C. Before disposing of ceilings, contact the Armstrong Recycling Center at 877-276-7876, select option #1 then #8 to review with a consultant the condition and location of building where the ceilings will be removed. The consultant will verify the condition of the material and that it meets the Armstrong requirements for recycling. The Armstrong consultant will help facilitate the recycle of the ceiling.

3.5 PROTECTION

A. Protect acoustical treatment installation from damage during remainder of construction.

END OF SECTION

SECTION 096516 – VINYL SHEET FLOORING

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install resilient flooring and accessories where shown on project Drawings and as specified herein.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, Volumes 1 and 2 and 3 of these Contract Documents.

1.3 REFERENCES

A. ASTM E 662: Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials

B. ASTM E 648: Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source

C. ASTM F 970: Standard Test Method for Static Load Limit

D. ASTM F 1066-99: Standard Specification for Vinyl Composition Floor Tile

E. ASTM F 710: Standard Practice for Preparing Concrete Floors and other Monolithic Floors to Receive Resilient Flooring.

F. ASTM D 2047: Coefficient of friction .6

1.4 QUALITY ASSURANCE

A. Use adequate numbers of skilled workpersons who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Installer: Selected installer must be qualified in writing by flooring Manufacturer for installation of homogeneous vinyl flooring using heat welded seams.

1. Installer must have minimum of 5 years successful experience installing vinyl composition tile and accessories.

2. Installer shall provide a mock-up of each type of installation using approved materials and specified methods of installation as called-out on Drawings.

    a. Installer must obtain Architect's approval prior to commencement of work.

C. Manufacturer: Whenever possible, provide each type of resilient flooring and accessories as produced by a single Manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.

D. Fire Test Performance: Provide resilient flooring which complies with the following fire test performance criteria as determined by an independent testing laboratory acceptable to authorities having jurisdiction.

1. Critical Radiant Flux (CRF): Not less than the following rating per ASTM E 648.

    a. 0.45 watts per square cm.

2. Flame Spread: Not more than 75 per ASTM E 84.

3. Smoke Developed: Not more than 450 per ASTM E 84.

4. Smoke Density: Not more than 450 per ASTM E 662.

E. Floor finish will comply with governing codes and regulations (per CAC T-24), with coefficient of friction at least .6 per ASTM D2047.

1.5 SUBMITTALS

A. Comply with pertinent provisions of Volumes 1 and 2 of these Contract Documents.

B. Within ten calendar days after the Contractor has received the County's Notice to Proceed, submit:

1. Product Data:

    a. Provide 2 copies of Manufacturer's brochures and shop drawings of all items herein showing types, sizes, and methods of construction, including technical data and installation instructions for each type of resilient flooring and accessory.

    b. Manufacturer's recommended installation procedures will become the basis for accepting or rejecting actual installation procedures used in/on the Work.

2. Samples:

    a. Submit 3 sets of samples of each type, color, and finish of resilient flooring and accessory required, indicating full range of color and pattern variation.

b. Provide full-size tile units and 12" square samples of sheet flooring and 6" long samples of accessories.

3. Maintenance Instructions:

a. Submit 2 copies of Manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.

4. Flame Spread Certification:

a. Submit Manufacturer's certification that resilient flooring furnished for areas indicated to comply with required flame spread rating has been tested and meets or exceeds indicated standard.

C. Extra Stock/Replacement Material: Upon completion of work, deliver to the District an extra stock, from the same manufactured lot, of approximately 10% of each color, pattern, and finish of each material installed under this Section, including packaging and type of material separately and distinctly marked and adequately protected against deterioration.

1. Sheet Flooring: Not less than 5 linear yards for each type, pattern, and color installed.

2. Adhesives

a. Provide waterproof and stabilize type adhesive as recommended by the manufacturer of the material being installed.

b. Asphalt emulsions and other non-waterproof adhesives will not be acceptable.

3. Concrete slab primer: Provide non-staining type as required and as recommended by the manufacturer of the material being installed. Provide moisture barrier over new and existing floor area to allow for installation over recently poured concrete.

1.6 PRODUCT STORAGE & HANDLING

A. Sheet Vinyl:

1. Sheet vinyl, adhesive, and subfloor must be allowed to stabilize to a consistent temperature between 64 degrees F at installation area for a minimum of 48 hours prior to and during installation, and a minimum of 24 hours after installation.

B. Maintain minimum temperature of 55 degrees F (13 degrees C) in areas where work is completed.

2.0 PRODUCTS

2.1 MANUFACTURER

A. Sheet Vinyl: Armstrong, P.O. Box 3001, Lancaster, PA 17604, 1-877-276-7876, www.armstrong.com, or approved equal.

2.2 MATERIALS – GENERAL

A. Colors: Submit full color chart of the Armstrong Medintone Collection to Architect for selection during the course of construction.

B. Provide other materials not specifically described but required for a complete and proper installation as selected by Contractor and subject to approval of Architect.

2.3 SHEET VINYL WITH INTEGRATED COVE

A. Description: An inlaid sheet flooring consisting of an embossed wear layer of vinyl chips/granules consolidated on a flexible fibrous backing. Protected by a UV-cured polyurethane finish, the colors and pattern detail are dispersed uniformly throughout the wear layer of the product. Color pigments are insoluble in water and resistant to cleaning agents and light.

B. Inlaid vinyl sheet flooring shall conform to the requirements of ASTM F1303 Standard Specification for Sheet Vinyl Floor Covering with Backing, Type II, Grade 2, with Class A backing

C. Width: 6 ft. (1.83 m).

D. Length: up to 82 lineal feet (25 meters)

E. Thickness: 0.080 in. (2.0 mm)

2.4 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Architect.

B. Vinyl Weld Rod:

1. Provide solid color vinyl weld rod as produced by Armstrong Flooring Inc., and intended for heat welding of seams. Color shall be compatible with field color of flooring or as selected by Architect to contrast with field color of flooring. Color selected from the range currently available from Armstrong Flooring Inc.

C. Seam Adhesives:

1. Water and alkali-resistant, zero VOC-emitting stabilized type adhesive to suit material and substrate conditions as recommended by the Manufacturer of material being installed.

2. Adhesive shall contain no asbestos materials.

3. Asphalt emulsions and other non-waterproof adhesives will not be acceptable.

D. Subfloor Filler:

1. Portland cement based material designed for providing thin solid surface for leveling and for minor ramping of subsurface to adjacent floor finishes.

2. Use material capable of being applied and feathered out to adjacent floor without spalling.

E. Resilient Edge Strips: homogeneous vinyl or rubber composition, tapered or bullnose edge, color to match flooring, or as selected by the Architect from standard colors available; not less than 1" wide.

F. Metal Edge Strips: Of width shown and of required thickness to protect exposed edge of resilient flooring. Provide units of maximum available length, to minimized number of joints.

1. Material: Extruded aluminum with mill finish, unless otherwise shown.

2. Type: Butt type metal edge strips for concealed anchorage.

G. Concrete Slab Primer: Nonstaining type as recommended by the Manufacturer of material being installed. Provide moisture barrier over new and existing floor area to allow for installation over recently poured concrete.

H. Leveling and Patching Compounds: Latex types as recommended by flooring Manufacturer.

2.5 WALL BASE MATERIALS

A. For integral flash cove base: Provide integral flash cove wall base by extending sheet flooring 6 in up the wall using adhesive, welding rod, and accessories recommended and approved by the flooring manufacturer.

3.0 EXECUTION

3.1 EXAMINATION: PRE-INSTALLATION INSPECTION OF SURFACE CONDITIONS

A. Installer must examine areas and conditions under which resilient flooring and accessories are to be installed and must notify Contractor in writing of conditions

detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

B. Install resilient flooring and accessories after they have the same temperature as the space and after other finishing operations, including painting, have been completed. Moisture content of concrete slabs and environmental conditions must be within limits recommended by Manufacturer of products being installed.

C. Concrete to comply with ASTM F 710, to be free of materials which could interfere with adhesion of resilient flooring, to be tested using the quantitative calcium chloride test as detailed under ASTM F 1869 with results of 5 lbs. or less of vapor transmission, surface alkali of 9 or less as measured by pH test paper, and free of carbonized dust.

D. Wood underlayment to have a smooth, fully sanded face, free of irregularities, and to be free of substances which could interfere with adhesion of resilient tile.

3.2 PREPARATION

A. Start of flooring installation indicates the acceptance of subfloor conditions and full responsibility for completed work.

B. Subfloors:

1. Verify that substrate is smooth, level, at required finish elevation, and without more than 1/8 in 10'-0 variation from level or slopes shown on the Drawings.

2. Prior to laying materials, broom clean or vacuum the surfaces to be covered, and inspect the subfloors.

3. Old concrete subfloors must be cleaned of all paint, varnish, grease or wax and all uneven places leveled by chipping or filing.

   a. All expansion joints, grooves, cracks, potholes, etc. must be filled using manufacturer’s specified underlayment mixture.

   b. Subfloor must be uniformly smooth, level, and solid before accepted as satisfactory to receive installation of vinyl flooring.

4. Perform moisture tests on concrete slabs to determine that concrete surfaces are sufficiently cured and dry as well as to ascertain presence of curing compounds, and ready to receive flooring.

C. Priming:

1. Apply concrete slab primer if so recommended by the resilient flooring manufacturer.

2. Apply in accordance with the manufacturer's recommendations as approved by the Architect.

3.3 INSTALLATION – GENERAL

A. Comply with Manufacturer’s recommendations and instructions for complete installation.

B. Install materials only after finishing operations, including painting, have been complete and after permanent heating system is operating.

C. Verify that moisture content of concrete slabs, building air temperature, and relative humidity are within the limits recommended by the manufacturers of the materials used.

D. Maintain reference markers, holes, and openings that are in place or plainly marked for future cutting by repeating on the finish surface as marked in the subfloor. Use chalk or other non-permanent marking device.

E. Where movable partitions are shown, install resilient flooring before partitions are erected.

F. Place flooring with adhesive cement in strict compliance with Manufacturer’s recommendations. Butt tightly to vertical surfaces, thresholds, nosings, and edgings. Scribe around obstructions to produce neat joints, laid tight, even and straight. Extend flooring into toe spaces, door reveals, and into closets and similar openings.

G. Install flooring on covers for telephone and electrical ducts, and other such items as occur within finished floor areas.

H. Maintain overall continuity of color and pattern with pieces of flooring installed in these covers. Tightly cement edges to perimeter of floor around covers and to covers.

I. Tightly cement flooring to subbase without open cracks, voids, raising and puckering at joints, telegraphing or adhesive spreader marks, or other surface imperfections. Hand roll flooring at perimeter of each covered area to assure adhesion.

3.4 INSTALLATION - SHEET VINYL

A. Lay sheet flooring to provide as few seams as possible with economical use of material. Match edges for color shading and pattern at seams in compliance with manufacturer’s recommendations, such as reversing adjoining sheets so that the abutting edges are from the same edge of roll.

B. Adhere sheet flooring to substrates using method approved by flooring manufacturer for type of sheet flooring and substrate condition indicated.

C. Prepare seams in vinyl sheet flooring without backing with manufacturer's special routing tool and heat weld with vinyl thread in accordance with manufacturer's instructions.

D. Prepare seams in vinyl sheet flooring with backing in accordance with manufacturer's instructions for most inconspicuous appearance, sealing continuously with fluid applied sealant or adhesive as standard with manufacturer to provide a "seamless" installation.

E. Provide integral flash cove base where shown on drawings, including cove support strip and metal top edge strip. Construct coved base in accordance with manufacturer's instructions.

3.5 INSTALLATION - ACCESSORIES

A. Accessories:

1. Apply butt type metal edge strips where shown on drawings, and prior to resilient flooring. Secure units to substrate with countersunk stainless steel anchors, complying with Manufacturer's recommendations.

2. Apply resilient accessories at stair systems as indicated and in strict accordance with Manufacturer's installation instructions.

3.6 CLEANING AND PROTECTION

A. Immediately upon completion of the resilient flooring and just prior to final inspection of work, remove any excess adhesive and/or other surface blemishes from floor, base, and wall surfaces and thoroughly clean all floors and accessories as recommended by manufacturer of materials used.

1. Use neutral type cleaners as recommended by flooring Manufacturer.

B. Protect all installed flooring with heavy Kraft paper or other covering.

C. Repair any damage(s) to adjacent materials caused during installation of flooring. Use methods recommended by the manufacturer(s) of adjacent material.

D. Apply floor finish in accordance with Manufacturer's recommendations.

3.7 WARRANTY

A. The product delivered shall be free of defects.

B. Manufacturer's standard performance warranty, as available for specified installation and environmental conditions.

END OF SECTION

SECTION 096519.23 - RESILIENT TILE FLOORING

1.0 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Flooring and accessories as shown on the drawings and schedules and as indicated by the requirements of this section.

B. Related Documents
   1. Drawings and General Provisions of the Contract (including General and Supplementary Conditions and Division 1 sections) apply to the work of this section

C. Related Sections:
   1. Other Division 9 sections for floor finishes related to this section but not the work of this section
   2. Division 3 Concrete; not the work of this section
   3. Division 6 Wood and Plastics; not the work of this section
   4. Division 7 Thermal and Moisture Protection; not the work of this section

1.2 REFERENCES

A. Armstrong Flooring Technical Manuals
   Armstrong Flooring Guaranteed Installation Systems instructions.

B. ASTM International:
   1. ASTM E 648 Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
   2. ASTM E 662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
   3. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
   4. ASTM F 1482, Standard Guide to Wood Underlayment Products Available for Use Under Resilient Flooring
   5. ASTM F 1700 Standard Specification for Solid Vinyl Tile
   6. ASTM F 1861 Standard Specification for Resilient Wall Base
   7. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
   8. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

1.3 SYSTEM DESCRIPTION

A. Performance Requirements: Provide flooring which has been manufactured, fabricated, and installed to performance criteria certified by manufacturer without defects, damage, or failure.

B. Administrative Requirements
   1. Pre-installation Meeting: Conduct an on-site pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.
   2. Pre-installation Testing: Conduct pre-installation testing as follows: [Specify testing (i.e., moisture tests, bond test, pH test, etc.).]

C. Test Installations/ Mock-ups: Install at the project site a job mock-up using acceptable products and manufacturer approved installation methods, including concrete substrate testing. Obtain Owner's and Consultant's acceptance of finish color, texture and pattern, and workmanship standards.

   1. Mock-Up Size: [Specify mock-up size].
   2. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when no longer required.
   3. Incorporation: Mock-up may be incorporated into the final construction with Owner's approval.

D. Sequencing and Scheduling
   1. Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring.
   2. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond, moisture tests and pH test.

1.4 SUBMITTALS

A. Submit shop drawings, seaming plan, coving details, and manufacturer's technical data, installation, and maintenance instructions (latest edition of Armstrong Flooring Guaranteed Installation Systems instructions for flooring and accessories.

B. Submit the manufacturer's standard samples showing the required colors for flooring and applicable accessories.

C. Submit Safety Data Sheets (SDS) available for adhesives, moisture mitigation systems, primers, patching/leveling compounds, floor finishes (polishes) and cleaning agents and Material Information Sheets for flooring products.

D. If required, submit the manufacturer's certification that the flooring has been tested by an independent laboratory and complies with the required fire tests.

E. Closeout Submittals: Submit the following:

1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

2. Warranty: Warranty documents specified herein.

1.5 QUALITY ASSURANCE

A. Single-Source Responsibility: provide types of flooring and accessories supplied by one manufacturer, including moisture mitigation systems, primers, leveling and patching compounds, and adhesives.

B. Select an installer who is experienced and competent in the installation of Armstrong resilient solid vinyl tile flooring and the use of Armstrong Flooring subfloor preparation products.

1. Engage installers certified as Armstrong Commercial Flooring Certified Installers

2. Confirm installer's certification by requesting their credentials

C. Fire Performance Characteristics: Provide resilient tile flooring with the following fire performance characteristics as determined by testing material in accordance with ASTM test methods indicated below by a certified testing laboratory or other testing agency acceptable to authorities having jurisdiction:

1. ASTM E 648 (NFPA 253) Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I

2. ASTM E 662 (NFPA 258) (Smoke Generation) Maximum Specific Optical Density of 450 or less

3. CAN/ULC-S102.2 – Flame Spread Rating and Smoke Developed – Results as tested

1.6 DELIVERY, STORAGE AND HANDLING

A. Comply with Division 1 Product Requirements Sections.

B. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

C. Deliver materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.

D. Store materials in a clean, dry, enclosed space off the ground, protected from harmful weather conditions and at temperature and humidity conditions recommended by the manufacturer. Protect adhesives from freezing. Store flooring, adhesives, and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.

1.7 PROJECT CONDITIONS

A. Maintain a minimum temperature in the spaces to receive the flooring and accessories of 65ºF (18ºC) and a maximum temperature of 85ºF (29ºC) for at least 48 hours before, during, and for not less than 48 hours after installation. Thereafter, maintain a minimum temperature of 55ºF (13ºC) in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances. Refer to the Armstrong Flooring Guaranteed Installations Systems instructions for a complete guide on project conditions.

1.8 LIMITED WARRANTY

A. Resilient Flooring: Submit a written warranty executed by the manufacturer, agreeing to repair or replace resilient flooring that fails within the warranty period.

B. Limited Warranty Period: 20 years for Natural Creations Luxury Flooring.

C. The Limited Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

D. For the Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.

1.9 EXTENDED SYSTEM LIMITED WARRANTY

A. Resilient Flooring System: Submit a written warranty executed by the manufacturer, agreeing to repair or replace system (subfloor preparation products, adhesive, and floor covering) that fails within the warranty period.

B. Limited Warranty Period: 10 years on top of the Resilient Flooring Limited Warranty.

C. The installation of an Armstrong Flooring product along with the recommended Armstrong Flooring adhesive, as well as any one of the Strong System subfloor preparation products listed above, provides 10 additional years of limited warranty coverage. The Strong System limited warranty covers the installation integrity for the length of the flooring product warranty plus 10 years. To qualify for the Strong System Warranty, any subfloor preparation product needed for an installation must be an Armstrong Flooring product.

D. For the System Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.

E. When Armstrong Flooring Strong System subfloor preparation products are used with other manufacturers' floor coverings, adhesives, or other subfloor preparation products, Armstrong Flooring warrants our products to be free from manufacturing defects from the date of purchase through the limited warranty period of 15 years.

1.10 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials from same production run as products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Quantity: Furnish quantity of flooring units equal to 5% of amount installed.
2. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage, and protection of extra material.

2.0 PRODUCTS

2.1 MANUFACTURER

A. Resilient tile flooring, wall base, adhesives and subfloor preparation products and accessories:

1. Armstrong Flooring Inc., 1770 Hempstead Road, Lancaster, PA 17605, armstrongflooring.com/commercial.

2. Manufacturer must have a headquarters in the United States of America.

2.2 RESILIENT TILE FLOORING MATERIALS

A. Provide Natural Creations Luxury Flooring manufactured by Armstrong Flooring Inc.

1. Description: A layered construction consisting of a tough, clear, rigid vinyl wear layer protecting a high-fidelity print layer on a solid vinyl backing. Protected by a diamond-infused UV-cured polyurethane finish, the wear surface is embossed with different textures to enhance each of the printed visuals. Colors are insoluble in water and resistant to cleaning agents and light.

2. Reference specification - ASTM F 1700, "Standard Specification for Solid Vinyl Tile", Class III, Type B – Embossed Surface. Meets requirements for

size, squareness, thickness, thickness of wear layer, residual indentation, resistance to chemicals, resistance to light and resistance to heat.

3. Pattern and Color: Ironwood Oak Sands of Time: NA160

4. Size: 6 in. x 48 in.

5. Wear layer thickness: 0.020 in. (0.5 mm).

6. Thickness: 0.125 in. (3.2 mm).

2.4 WALL BASE MATERIALS

A. Reference Section 096810 – Rubber Base And Accessories

2.5 ADHESIVES

A. Provide Armstrong S-995 Flooring Adhesive under the flooring and Armstrong S-725 Wall Base Adhesive at the wall base as recommended by the flooring manufacturer. or

B. Provide Armstrong S-319 Adhesive for field areas and S-725 Wall Base Adhesive at the wall base as recommended by the flooring manufacturer. or

C. Provide Armstrong S-1000 Flooring Adhesive under the flooring and Armstrong S-725 Wall Base Adhesive at the wall base as recommended by the flooring manufacturer.

2.6 ACCESSORIES

A. For patching, smoothing, and leveling monolithic subfloors (concrete, terrazzo, quarry tile, ceramic tile, and certain metals), provide Armstrong [S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive] [S-463 Level Strong™ cement based self-leveling compound] [S-466 Patch Strong™ flexible patching and smoothing compound].

B. For priming porous substrates to aid in adhesive bond strength and reducing subfloor porosity, provide S-464 Prime Strong™ acrylic primer for porous substrates. For non-porous substrates, provide S-465 NP Prime Strong™ acrylic primer for non-porous substrates.

C. For creating a moisture barrier, provide S-462 Seal Strong™ two-part moisture mitigation system.

D. For sealing joints between the top of wall base or integral cove cap and irregular wall surfaces such as masonry, provide plastic filler applied according to the manufacturer's recommendations.

E. Provide transition/reducing strips tapered to meet abutting materials.

F. Provide threshold of thickness and width as shown on the drawings.

G. Provide resilient edge strips of width shown on the drawings, of equal gauge to the flooring, homogeneous vinyl, or rubber composition, tapered or bullnose edge, with color to match or contrast with the flooring, or as selected by the Architect from standard colors available.

H. Provide metal edge strips of width shown on the drawings and of required thickness to protect exposed edges of the flooring. Provide units of maximum available length to minimize the number of joints. Use butt-type metal edge strips for concealed anchorage or overlap-type metal edge strips for exposed anchorage. Unless otherwise shown, provide strips made of extruded aluminum with a mill finish.

3.0 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including technical bulletins, product catalog, installation instructions, and product carton instructions for installation and maintenance procedures as needed.

3.2 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions (i.e., moisture tests, bond test, pH test, etc.).

B. Visually inspect flooring materials, adhesives, and accessories prior to installation. Flooring material with visual defects shall not be installed and shall not be considered as a legitimate claim.

C. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.

D. Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.

E. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.

F. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

3.3 PREPARATION

A. Subfloor Preparation: Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, and other defects with Armstrong Flooring [S-184 Fast-Setting Cement-Based Patch and Underlayment][S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive] [S-463 Level Strong™ cement based self-leveling compound] [S-466 Patch Strong™ flexible patching and smoothing compound] [S-464 Prime Strong™ acrylic primer for porous substrates] [S-465 NP Prime Strong™ acrylic primer for non-porous substrates] as recommended by the flooring manufacturer. Refer to Armstrong Flooring Guaranteed Installation Systems instructions and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.

B. Subfloor Preparation Moisture Mitigation if required: Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, mitigate moisture and other defects with Armstrong Flooring [S-194 Cement-Based Patch, Underlayment and Embossing Leveler / S-195 Underlayment Additive] [S-463 Level Strong™ cement based self-leveling compound] [S-466 Patch Strong™ flexible patching and smoothing compound] [S-462 Seal Strong™ two-part moisture mitigation system] [S-464 Prime Strong™ acrylic primer for porous substrates] [S-465 NP Prime Strong™ acrylic primer for non-porous substrates] as recommended by the flooring manufacturer. Refer to Armstrong Flooring Guaranteed Installation Systems instructions and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.

C. Subfloor Cleaning: The surface shall be free of dust, solvents, varnish, paint, wax, oil, grease, sealers, release agents, curing compounds, residual adhesive, adhesive removers, and other foreign materials that might affect the adhesion of resilient flooring to the concrete or cause a discoloration of the flooring from below. Remove residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents. Spray paints, permanent markers and other indelible ink markers must not be used to write on the back of the flooring material or used to mark the concrete slab as they could bleed through, telegraphing up to the surface and permanently staining the flooring material. If these contaminants are present on the substrate, they must be mechanically removed prior to the installation of the flooring material. Refer to the Armstrong Flooring Guaranteed Installation Systems instructions and ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring for additional information on subfloor preparation.

D. When using S-995 Adhesive, perform subfloor moisture testing in accordance with ASTM F 2170, “Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *in-situ* Probes” and Bond Tests as described in publication instructions "Armstrong Flooring Guaranteed Installation System," to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. Internal relative humidity of the concrete

shall not exceed 99%. On installations where both the Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.

E. When using S-319 Adhesive, perform subfloor moisture testing in accordance with ASTM F 2170, "Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *in-situ* Probes" and Bond Tests as described in "Armstrong Flooring Guaranteed Installation System," instructions to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. Internal relative humidity of the concrete shall not exceed 99%. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.

F. When using S-1000 Adhesive, perform subfloor moisture testing in accordance with [ASTM F 2170, "Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *in-situ* Probes"] [ASTM F 1869,"Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride"] and Bond Tests as described in "Armstrong Flooring Guaranteed Installation System" instructions to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. [Internal relative humidity of the concrete shall not exceed 100%.] [MVER shall not exceed 14 lbs./1000 sq. ft./24 hrs.] On installations where both the Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.

G. Concrete pH Testing: Perform pH tests on concrete floors regardless of their age or grade level. All test results shall be documented and retained.

3.4 INSTALLATION OF FLOORING

A. Install flooring in strict accordance with the latest edition of Armstrong Flooring Guaranteed Installation Systems instructions. Failure to comply may result in voiding the manufacturer's warranty listed in Section 1.08.

B. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.

C. If required, install flooring on pan-type floor access covers. Maintain continuity of color and pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.

D. Scribe, cut, and fit to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.

E. Roll with a 100-lb. (45.36 kilogram) roller in the field areas. Refer to specific rolling instructions of the flooring manufacturer.

F. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.

3.5 INSTALLATION OF ACCESSORIES

A. Apply top set wall base to walls, columns, casework, and other permanent fixtures in areas where top-set base is required. Install base in lengths if practical, with inside corners fabricated from base materials that are mitered or coped. Tightly bond base to vertical substrate with continuous contact at horizontal and vertical surfaces.

B. Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.

C. Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.

D. Apply metal edge strips where shown on the drawings. Secure units to the substrate, complying with the edge strip manufacturer's recommendations.

3.6 CLEANING

A. Perform initial and on-going maintenance according to the latest edition of the maintenance recommendations for Natural Creations.

3.7 PROTECTION

A. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings. (See Finishing the Job in the latest edition of Armstrong Flooring Guaranteed Installation Systems instructions.

END OF SECTION

SECTION 096800 – CARPET TILE

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned, or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install carpet and all accessories where shown on Drawings and as specified herein.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Division 9 - Finishes

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C1028 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method

2. ASTM D1667-Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam)

3. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials

4. ASTM D5116 - Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products

5. ASTM D5417 - Standard Practice for Operation of the Vettermann Drum Tester

6. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Material.

7. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
8. ASTM E662 -Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
9. ASTM F1861 - Standard Specification for Resilient Wall Base

B. American Association of Textile Chemists and Colorists (AATCC):

1. AATCC 20 - Fiber Analysis: Qualitative
2. AATCC 134 - Electrostatic Propensity of Carpets

C. Carpet and Rug Instute (CRI):

1. CRI TM 102 - Florochemical Finishes

D. National Fire Protection Association (NFPA):

1. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source

1.4 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Shop Drawings: Showing the extent of carpet, seam direction of carpet, location of molding and edge strips, and accessories shall be submitted to Architect for approval prior to installation. Check pattern match, if any, for matching during installation and possible waste factors in ordering required amounts. Indicate columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet. Copy of approved shop drawings to be available on job site during installation.

1.5 DELIVERY, STORAGE, & HANDLING

A. Accept delivery of materials to the site in manufacturer's original packaging listing manufacturer's name, product name, identification number, and related information.

B. Store in a dry location, between 60 degrees F and 80 degrees F and a relative humidity below 65%. Protect from damage and soiling.

C. Make stored materials available for inspection by the Owner's representative.

D. Store materials in area of installation for minimum period of 48 hours prior to installation.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:

1. Flooring contractor must be certified by the carpet manufacturer prior to bid.

2. Flooring contractor to be a specialty contractor normally engaged in this type of work and shall have prior experience in the installation of these types of materials of a minimum of 5 years.

3. Certify payment of Prevailing Wage Rates to the installers.

4. Flooring contractor possessing Contract for the carpet installation shall not sub-contract the labor without written approval of the Project Manager.

5. Flooring contractor will be responsible for proper product installation, including floor testing and preparation, as specified by the carpet manufacturer and Part 1.6, Project Conditions herein.

6. Flooring contractor to provide the Owner with a written installation warranty that guarantees the completed installation to be free from defects in materials and workmanship for a period of one year after job completion.

1.7 PROJECT CONDITIONS

A. Sub-floor preparation is to include all required work to prepare the existing floor for installation of the product as specified in this Section and manufacturer's installation instructions.

B. The maximum amount of moisture evacuation from the floor is 3.0 pounds per 1,000 square feet in 24 hours. The acceptable pH level of the substrate is between 7.0 and 9.0. Flooring contractor is responsible for floor testing.

C. All material used in sub-floor preparation and repair shall be recommended by the carpet manufacturer and shall be chemically and physically compatible with the carpet system being bid.

D. Maintain minimum 65 degrees F ambient temperature and 65% Relative Humidity for 72 hours prior to, during, and 48 hours after installation.

E. Do not install carpet until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient

temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

1.8 EXCESS MATERIALS

A. Provide additional 5% of each type, color, and pattern furnished;

1.9 CARPET WARRANTY

A. Warranty to be sole source responsibility of the Manufacturer. Second source warranties and warranties that involve parties other than the carpet manufacturer are unacceptable.

B. If the product fails to perform as warranted when properly installed and maintained, the affected area will be repaired or replaced at the discretion of the Manufacturer.

C. Chair Pads are not required for carpet warranty coverage.

D. Warranty shall not exclude carpet product installed on stairs provided it is properly installed and maintained.

E. Warranty shall be for a specifically defined non-prorated period of twenty years. "Lifetime" warranties are not acceptable.

F. The non-prorated twenty-year warranty shall cover against and specifically define the following:

1. Excessive Surface Wear: More than 15% loss of pile fiber weight

2. Excessive Static Electricity: Warrant that carpet will give protection from static discharges in excess of 3.0 kV when tested under the Standard Shuffle Test method (at 70 degrees F and 20% R. H.) during Life of Carpet. (per AATCC 134)

3. Resiliency Loss of the Backing: More than 10% loss of backing resiliency

4. Backing Delamination: Warrant that secondary backing of carpet will not delaminate during Life of Carpet.

5. Edge Ravel: Warrant that under normal use, carpet will not edge ravel at seams or edges during Life of Carpet.

6. Zippering.

7. Tuft Bind warranty in lieu of edge ravel and zippering is not acceptable. Warrant that carpet will have average face yarn tuft bind of twenty pounds STM D-1-335-67 method. This portion of warranty must protect against insufficient tuft bind, whether the carpet is dry or wet (as it might be during steam cleaning, hot water extraction, or as a result of a broken pipe or flood).

8. Adhesive: Carpet manufacturer shall fully guarantee substrate and adhesive performance for the Life of Carpet installation, provided adhesive is made by Carpet manufacturer. Use of Third party warranties are not acceptable. Use of an adhesive that has not been approved by Carpet manufacturer will void warranty.

9. Stain Resistance: 10 year Lightfastness and Atmospheric Contaminant Warranty, refer to Part 2.3Di of this Section.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Interface; www.interface.com

2.2 MATERIALS GENERAL

A. Carpet Tile: Modular

1. Construction: Engaged Tufted Sheared

2. Dye Method: 100% solution dyed

3. Finish Pile Thickness: 0.212 in

4. Total Thickness: 0.27 in

5. Static Control: (AATCC - 134) < 3.0 KV

6. Radiant Panel/Flammability: Passes Methenamine Pill Test (DOC-FF1-70)

7. Smoke Density: (ASTM E662) ≤ 450

8. Warranties: Minimum of non-prorated, 15 year warranty covering material and labor against edge ravel, backing delamination, wet or dry, static protection, face yam loss no more than 10 percent or 20 lb. tuft bind.

9. Odor Emissions: Meet CRI Green Label standards.

11. Carpet shall economically maximize the following appearance retention characteristics:

    a. Minimize crushing and matting.

    b. Manage dry soil concerns and ease of maintenance.

    c. Manage staining.

    d. Eliminate seam failure and unravelling.

    e. Eliminate moisture exposure concerns.

    f. Minimize loss of coloration and fading.

2.3 ACCESSORIES

A. See section 096810 Rubber Base and Accessories for Material Transitions.

B. Seaming Cement Hot-melt adhesive tape or similar product recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

C. Adhesives: As recommended by carpet manufacturer, or approved equal.

2.4 CARPET SCHEDULE

CARPET TILES				
Reference #	**Series**	**Size**	**Color**	**Pattern**
CT-1	HN810 Human Nature Collection	9.845” x 39.38”	104214 Nickel	Ashlar
Note: Verify location, type and size with drawings				

3.0 EXECUTION

3.1 EXAMINATION/PREPARATION

A. Prepare sub-floor to comply with criteria established in Manufacturer's installation instructions. Use only preparation materials that are acceptable to the Manufacturer.

B. Do not scale the Architect’s drawings or calculate sizes from dimensions shown. Measure each space to receive carpeting as a basis of supplying, cutting, and seaming the carpet

C. Meet with General Contractor several days prior to installation. Discuss various areas of responsibility so that installation and acceptance of floor will be a smooth transition between trades, preventing costly down-time. Discuss these subjects:

1. Remove all deleterious substances from substrate(s) that would interfere with or be harmful to the installation. (i.e., floor wax)

2. Remove sub-floor ridges and bumps. Fill cracks, joints, holes, and other defects.

3. Verify that sub-floor is smooth and flat within specified tolerances and ready to receive carpet.

4. Verify that substrate surface is dust-free and free of substances that would impair bonding of product to the floor.

5. Verify that concrete surfaces are ready for installation by conducting moisture and pH testing. Results must be within limits recommended by Manufacturer. Moisture Test requires the following:

    a. A concrete nail must be driven into floor surface no more than 1/2".

    b. Remove nail and place small amount of anhydrous calcium chloride or calcium sulfate crystals over hole.

    c. Cover crystals and the hole with a piece of flat glass and seal edges with waterproof tape or putty. As concrete pourings vary, repeat this test every 1,500 square feet. (139.35 M2) Leave glass plate in place for 72 hours.

    d. Any color change in crystals indicates the presence of moisture and must be reported to General Contractor.

    e. An electronic moisture meter may be used to measure moisture. The percent total moisture should not exceed 4-5%.

6. Verify floor temperature. Temperature should remain at 65 degrees F for 24 hours before and 40 hours after the installation. Take temperature readings from thermometer placed on the floor. Repeat in scattered areas.

7. Verify that a carpet installer will return 5 days after installation to monitor and remove any carpet buckles that may occur.

8. Verify porosity of floor. Pour a cup of water on floor, repeat in scattered areas. If water breaks into beads or remains on surface, floor is relatively

non-absorbent and adhesive will dry at its normal rate. If water is absorbed rapidly, the floor is very porous and adhesive will dry too quickly. In the event of very porous floor, damp mopping prior to spreading adhesive will slow down absorption rate of floor.

9. There will be no exceptions to the provisions stated in the Manufacturer's installation instructions.

3.2 INSTALLATION – GENERAL

A. Install product in accordance with manufacturer's installation instructions.

B. Pallet and Box Sequencing - It is very important to install carpet tiles in the order they were manufactured. This is easily accomplished by selecting pallets in sequential order and following the numbers located on each carton of tiles to ensure the most uniform look. Typically, an installation will begin with the lowest carton numbers and progress through the highest numbers until the project is complete.

C. Adhesive Application

1. The adhesive must be applied in a FULL SPREAD – NOT grid.

2. The spread rate for roll on application is 35 to 40 yards per gallon when using a 3/4” nap roller. Ensure the proper application amount of adhesive to the subfloor. Prior to installation, mark off a small area of the subfloor and determine the adhesive spread rate. This will allow you to determine the proper coverage level and amount of pressure to apply to the roller during installation.

3. On smooth surfaces, be careful not to apply too little adhesive. Just because a surface is smooth and/or sealed, it still requires a proper coating of adhesive.

4. Allow the adhesive to dry to a clear and tacky state. Tiles must be installed immediately after adhesive has dried. To determined if the adhesive is dry, press finger into adhesive. When dry, adhesive must not transfer to finger.

IMPORTANT: Set-up time is approximately 45 to 90 minutes depending on the climate. & humidity. Use of blower fans will speed drying time.

5. Roll Floor with 75 to 100 pound Roller

C. Install carpet tight and flat on sub-floor, with a uniform appearance.

D. Recommended Adhesives:

1. Manufacturer recommended pressure sensitive adhesive. Coverage will depend on type of substrate and trowel size. Installer is responsible for determining exact spread rate, however, in most conditions a spread rate of 10-12 square yards per gallon is required.

3.4 CLEAN UP & PROTECTION

A. Remove all debris resulting from installation, including removal of excess adhesive and/or seam sealer from floor and wall surfaces without incurring damage.

B. All rubbish, wrappings, debris, trimmings, etc., to be removed from site and disposed of properly.

C. Clean and vacuum carpet surfaces using a beater brush/bar commercial vacuum. Remove spots with dry cleaning method (not steam) and leave areas ready for use. After each area of carpet is installed, protect from soiling and damage by other trades.

END OF SECTION

SECTION 096810 – RUBBER BASE AND ACCESSORIES

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned, or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install base and accessories where shown on Drawings and as specified herein.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Division 9 – Finishes

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. ASTM D5116 - Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products

2. ASTM D5417 - Standard Practice for Operation of the Vettermann Drum Tester

3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Material.

4. ASTM E662 -Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials

5. ASTM F1861 - Standard Specification for Resilient Wall Base

6. ASTM D 2240 - 85 Shore A

1.4 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Shop Drawings: Showing the location of molding and edge strips, and accessories shall be submitted to Architect for approval prior to installation. Copy of approved shop drawings to be available on job site during installation.

C. Product Data: Provide data on specified products, describing physical and performance characteristics, sizes, patterns, and method of installation.

D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

E. Maintenance Data: Include maintenance procedures manual, recommendations for maintenance materials and equipment, and suggested schedule for cleaning.

F. Certifications: Manufacturer to submit copies of the following independent laboratory reports showing compliance with requirements per these methods outlined in Part 2 of this Section. Submitted results shall represent average results for production goods of the specified style.

1 ASTM E648: Critical Radiant Flux- Class 1

2. ASTM E662: Smoke Density

3. ASTM D3936: Delamination

4. Other from methods specified in Part 2

1.5 DELIVERY, STORAGE, & HANDLING

A. Deliver materials to the site in manufacturer's original packaging listing manufacturer's name, product name, identification number, and related information.

B. Store in a dry location, between 60 degrees F and 80 degrees F and a relative humidity below 65%. Protect from damage and soiling.

C. Make stored materials available for inspection by the Owner’s representative.

D. Store materials in area of installation for minimum period of 48 hours prior to installation.P

1.6 PROJECT CONDITIONS

A. Maintain minimum 65 degrees F ambient temperature and 65% Relative Humidity for 72 hours prior to, during, and 48 hours after installation.

B. Do not install base until space is enclosed and weatherproof, wet-work in space is

completed and nominally dry, work above ceilings is complete and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

1.7 EXCESS MATERIALS

A. Provide additional 5% of each type, color, and pattern furnished; product to be rolled and bound. Coordinate storage location with the Owner.

B. Deliver all unused base and large scraps to the Owner for "attic stock." Dispose of scraps less than 8" in length.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Base: Burke Flooring Products, 2250 S. 10th St., San Jose, CA 95112, 1-800-447-8442. www.burkeflooring.com

2.2 MATERIALS – BASE

A. Rubber Wall Base:

1. 1/8" Molded Rubber Wall base Type TS.

2. Type & Thickness: 1/8" coved base

a. Height: 4”

b. Length: Roll

c. Vulcanized thermoset rubber; 1/8 inch thick, satin finish.

d. Color: 208 Light Gray

e. Substrate adhesives pursuant to manufacturer’s recommendations.

f. Conformance:

1) ASTM F1861-98, Type TS, Group 1, Styles A & B.

2) FS SS-W-40a, Type I, Styles A & B.

3) ASTM E84 > Class B rating with smoke density of 150-200.

2.3 MATERIALS – TRANSITIONS

A. 152 Carpet to Resilient Transition

1. Transitions 1/4” or 15/16” glue-down carpet to 1/16” to 1/8” resilient

2. Color: Match Carpet Tile

2.4 ACCESSORIES

A. Materials recommended by manufacturer(s) for patching, priming, chemically welding the seams, etc.

B. Adhesives: Products to be supplied with a pre-cured, mill-applied or other "dry" adhesive system when available. Otherwise, adhesive should be full spread, extremely low VOC in compliance with CRI Indoor Air Quality Adhesive Testing Program requirements, compatible with materials being adhered, as recommended by the Manufacturer.

3.0 EXECUTION

3.1 EXAMINATION/PREPARATION

A. Do not scale the Architect’s drawings or calculate sizes from dimensions shown. Measure each space to receive base as a basis of supplying and cutting.

B. Meet with General Contractor several days prior to installation. Discuss various areas of responsibility so that installation and acceptance of base will be a smooth transition between trades, preventing costly down-time. Discuss these subjects:

1. Remove all deleterious substances from substrate(s) that would interfere with or be harmful to the installation. (i.e., floor wax)

2. Fill cracks, joints, holes, and other defects.

3. Verify that substrate surface is dust-free and free of substances that would impair bonding of product.

4. There will be no exceptions to the provisions stated in the Manufacturer's installation instructions.

3.2 INSTALLATION – GENERAL

A. Install product in accordance with manufacturer's installation instructions.

B. Keep materials and adhesives at 65˚-80˚F for 24 hours before, during, and after installation. Surface to receive Burke Base must be clean, dry and free of any foreign substances.

C. NOTE: For base installations on any non-porous surfaces, a co-adhesive method of installation applied to both surfaces with contact bond adhesive should be used. Vinyl wall covering must be cut up to the height of wall base or just below top of base for proper base installation.

D. Wall areas to receive the base must be completely clean, dry, smooth, and free of oil, grease, rust, paint, varnish, shellac, or any other foreign substances. Cracks, holes, or major wall imperfections should be filled with latex underlayment.

E. All coiled wall base shall be unrolled and allowed to lay flat for a period of at least 24 hours at 65ºF prior to installation. Resilient wall base shall be rolled, with a J-hand roller, after installation, to ensure proper bonding.

F. On dry, porous, absorbent surfaces, the base should be cemented with Burke BR-101, adhesive and firmly pressed to the walls.

G. After the Installation:

1. Remove all excess adhesive before it dries. Use cloth dampened with water.

2. Allow adhesive to set firm for approximately 24 hours before washing or applying any pressure.

3.3 CLEANING & PROTECTION

A. Remove all debris resulting from installation, including removal of excess adhesive from floor and wall surfaces without incurring damage.

B. All rubbish, wrappings, debris, trimmings, etc., to be removed from site and disposed of properly.

C. Clean surfaces and leave areas ready for use. After each area is installed, protect from soiling and damage by other trades.

END OF SECTION

SECTION 099100 - PAINTING

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide surface preparation, painting, and touch up paint for exterior fence posts and other fences, gates and accessories both new and existing.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, these Contract Documents.

B. Division 9, Finishes

1.3 SUBMITTALS

A. Comply with pertinent provisions of these Contract Documents.

B. Submit 3 brushouts of each color including the specific paint sheen specified.

C. Submit MSDS to verify that each paint and coating used complies with the current VOC and chemical component limits of Green Seal's Standard GS-11 requirements.

1.4 QUALITY ASSURANCE

A. Comply with governing codes and regulations.

B. Deliver, handle and store materials in accordance with their manufacturer's instructions.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Paint shall comply, at a minimum with the regulations of the California Air Resources Board for the Bay Area.

B. Water-Borne Latex Emulsion Paint: Shall not be formulated or manufactured with formaldehyde, halogenated solvents, aromatic hydrocarbons, mercury or mercury compounds, or tinted with pigments of lead, cadmium, chromium VI and their oxides.

1. Zero-low VOC paint: Flat and eggshell. VOC content less than .10g/l.

2. Low VOC paint: Semi-gloss and Gloss. VOC content less than 100 g/l.

C. Oil-Based Paint: Low VOC paint. VOC content shall not exceed 380 g/l. Shall not contain halogenated solvents. Shall not be formulated or manufactured with formaldehyde, mercury or mercury compounds, or tinted with pigments of lead, cadmium, chromium VI and their oxides. Shall not be formulated or manufactured with aromatic hydrocarbons in excess of 10%. For increased resistance to yellowing, specify high quality Soya-based oil paints.

D. Recycled Latex Paint: Minimum 90% post-consumer recycled content. VOC content unknown. Available in pastel colors only.

E. Low Biocide Paint: Shall not contain formaldehyde. Shall not contain fungicides or bactericides that are classified as mercury acetates, phenol phenates, or phenol formaldehyde. Reduced shelf life. Paints are made to order, lead time may be 1 to 2 months. Interior use. Enviro-Safe - Chem-Safe Products 210-657-5321; Safecoat - American Formulation Manufacturing (AFM) 619-239-0321, or equal.

F. Natural Plant and Mineral-Based Finishes: Contain extracts from plant sources and minimally processed earth minerals, such as chalk or iron oxides. Solvents include citrus oils and small amounts of low-odor petroleum solvents (de-aromaticized issoparafinics). Contains natural VOCs, test paint with chemically sensitive individuals prior to installation. AURO available from Earthsake in Berkeley, CA 510-559-8440; Bioshield, Livos available from Eco Design Company 505-438-3448, or equal.

G. Urethane Finishes: Water emulsion urethane. Flecto Elite Diamond Finish - Flecto Company, Inc. 800-635-3286.

H. Penetrating Oil Finishes: Shall not contain lead acetate or cobalt manganese (drying agents). Interior use only. Woodfinisher’s Pride - Woodworkers Store Catalog 612-4528-2199; Tried and True Wood Finishes 607-387-9280.

I. Conventional Pigments: Pigments used in conventional paints contain the following toxic compounds. Their use should be avoided. If used, avoid heavily pigmented paints.:

1. White: Antimony oxide, titanium dioxide, rutile titanium dioxide.

2. Yellow-orange-red: Cadmium, cadmium lithopone, chrome yellow, molybdate orange, strontium chromate, zinc chromate.

3. Blue: Phthalocyanine blue.

4. Green: Chrome green, Chromium oxide, hydrated chromium oxide, phthalocyanine green.

5. Biocides: Specify levels below 0.025%

2.0 PRODUCTS

2.1 MANUFACTURER

A. Benjamin Moore Company, www.benjaminmoore.com, unless otherwise noted.

2.2 INTERIOR PAINT SYSTEMS:

A. Interior Painting Schedule - minimum color pallet of three (3).

1. Color WP-1: Typical interior wall color BM OC-45 Swiss Coffee
2. Color WP-2: Raindance 1572
3. Color CP-1: Ceiling BM OC-45 Swiss Coffee
4. Interior HM Frames: Raindance 1572
5. Painted Trim: As shown on drawings.
6. Exposed conduit: Match adjacent finish

B. Gypsum Board Walls:

1. First Coat: Ultra Spec 500 Primer (534) DTF of 1.4 mils
2. Second Coat: Ultra Spec 500 Eggshell (538) DTF of 1.8 mils
3. Third Coat: Ultra Spec 500 Eggshell (538) DTF of 1.8 mils

C. Gypsum Board Ceilings:

1. First Coat: Ultra Spec 500 Primer (534) DTF of 1.4 mils
2. Second Coat: Ultra Spec 500 Eggshell (538) DTF of 1.8 mils
3. Third Coat: Ultra Spec 500 Eggshell (538) DTF of 1.8 mils

D. Gypsum Board Walls & Ceilings at restrooms or wet areas:

1. First Coat: Ultra Spec 500 Primer (534) DTF of 1.4 mils
2. Second Coat: Ultra Spec 500 Semi-Gloss (539) DTF of 1.7 mils
3. Third Coat: Ultra Spec 500 Semi-Gloss (539) DTF of 1.7 mils

G. Metal, Structural Steel, and all exposed electrical and mechanical conduit. Paint conduit to match adjacent surfaces.

1. First Coat: Ultra Spec HP Primer (HP04) DTF of 2.3 mils
2. Second Coat: Ultra Spec HP DTM Semi Gloss (HP29) DTF of 2.3 mils
3. Third Coat: Ultra Spec HP DTM Semi Gloss (HP29) DTF of 2.3 mils

H. Wood Trim (non-bleeding woods)

1. Prep: Lightly sand and clean surfaces
2. First Coat: Minwax Polycrylic Protective Finish, Clear Satin
4. Second Coat: Minwax Polycrylic Protective Finish, Clear Satin
5. Third Coat: Minwax Polycrylic Protective Finish, Clear Satin

2.3 EXTERIOR PAINT SYSTEMS

A. Exterior Painting Schedule - minimum color pallet of three (3).

1. Color A: Pre-finished by Metal Building Manufacturer
2. Color B: Raindance 1572
3. Color C: To be selected by Architect during course of work
4. Exterior HM Doors and Frames: Raindance 1572

B. Metal, exterior railings, structural steel & all exposed electrical and mechanical conduit to be painted to match adjacent surfaces.

1. Prep: Sand and refinish areas of rust and generally re-coat

2. First Coat: Ultra Spec HP Primer (HP04) DTF of 2.3 mils

3. Second Coat: Ultra Spec HP DTM Semi Gloss (HP29) DTF of 2.3 mils

4. Third Coat: Ultra Spec HP DTM Semi Gloss (HP29) DTF of 2.3 mils

3.0 EXECUTION

3.1 INSTALLATION - GENERAL METHODS

A. Inspect surfaces and correct unsatisfactory conditions. Beginning work means acceptance of substrates.

B. Comply with paint manufacturer's printed instructions and recommendations for preparation, priming and coating work. Coordinate with work of other Sections.

C. Remove hardware, accessories, and items in place and not to be painted, provide protection prior to surface preparation and painting, reinstall removed items.

D. Use a slightly different shade for each coat of paint so that it may be readily identified.

E. Primer and intermediate coats shall be unscarred and completely integral when succeeding coats are applied. Sand and dust between each coat to remove defects visible from a distance of five (5) feet.

F. Paint interior surfaces, which are a continuation of exterior surfaces, subject to exterior exposure (such as an out-swinging door), with the applicable exterior coating system.

H. Completely cover surfaces to be painted to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage. Painted surfaces with cloudiness, spotting, laps, brush marks, runs, sags, ropiness or other imperfections will not be acceptable.

I. Exposed Metal Conduit

1. Use a suitable cleaner to remove all dirt, oil or other contamination prior to application.

I. Application: Apply paint in accordance with manufacturer's directions; use applicators and techniques best suited for substrate and type of material being applied.

1. Apply stain killing primer, when stains or blemishes show through final coat, until paint is a uniform finish, color and appearance.

2. Provide extra attention to assure dry film thickness at corners and crevices is equivalent to that of flat surfaces.

3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces; paint surfaces behind permanently fixed equipment and furniture with prime coat only.

4. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

5. Paint backsides of access panels and removable or hinged covers to match exposed surfaces.

6. Finish all doors on tops, bottoms and side edges same as faces.

7. Sand lightly between each succeeding enamel or varnish coat.

L. Drying:

1. Allow sufficient drying time between coats.

2. Modify the period as recommended by the material manufacturer to suit adverse weather conditions.

3. Oil-base and oleo-resinous solvent-type paints shall be considered dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and the application of another coat of paint does not cause lifting of loss of adhesion of the undercoat.

M. Moisture content:

1. Use a moisture-meter approved by the Architect or District to test surfaces.

2. Do not apply the initial coating until moisture meter reading is within limits recommended by the paint materials manufacturer.

N. Defects:

1. Sand and dust between coats to remove all defects visible to the unaided eye from a distance of five (5) feet.

O. Interior Wood Trim Protective Finish:

1. Stir well before and regularly during use. DO NOT SHAKE. FINISH APPEARS MILKY IN CAN, BUT DRIES CRYSTAL CLEAR.

2. Apply a thin coat of Polycrylic® Finish with a high-quality, synthetic bristle brush. Apply in the direction of the wood grain. Do not overbrush.

3. Let dry at least 2 hours, then sand with very fine sandpaper (220 grit) to ensure an even finish and proper adhesion of additional coats. Do not use steel wool. Remove all dust.

4. Apply a second coat. For additional coats, repeat Step 3 before applying. Three coats are recommended.

5. After final coat, allow 3 hours before light handling and 24 hours before normal use.

3.2 SURFACE CONDITIONS

A. Inspection:

1. Prior to all work of this Section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where this installation may properly commence.

2. Verify that paint finishes may be applied in strict accordance with all pertinent regulations and the requirements of this Section.

3. Number of Coats:

a. Do not apply additional coats until completed coat has been inspected and approved by the Project Inspector.

b. Only inspected and approved coats of paint will be considered in determining the number of coats applied.

B. Correction:

1. Examine all subsurfaces to receive work of this section. Report in writing to the General Contractor, with a copy to the Architect, any conditions which may prove detrimental to work of this section. Failure to observe this injunction will constitute a waiver to any subsequent claims to the contrary and will make this Contractor responsible for any corrections the Architect may require and this

Contractor will be required to make such corrections at their own expense. Commencement of work will be construed as acceptance of all subsurfaces.

2. Do not proceed with work in areas of discrepancy until any discrepancies have been resolved.

3.3 CLEAN UP

A. General:

1. During progress of the Work, do not allow the accumulation of empty containers or other excess items in areas specifically set aside for that purpose.

2. Prevent accidental spilling of paint materials and, in the event of such spill, immediately remove all spilled material and the waste or other equipment used to clean up the spill, and wash the surfaces to their original undamaged conditions, all at no additional cost to the District.

3.4 WARRANTY

A. The product delivered shall be free from defects.

B. Manufacturer’s standard performance warranty, as available for specified installation and environmental conditions.

END OF SECTION

Division 10: Specialties

SECTION 101400 – SIGNAGE

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install non-illuminated fence and/or gate mounted exterior identifying devices herein referred to as "signage."

1. Exterior Signage

2. Interior Signage

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, Volumes 1 and 2 of these Contract Documents.

B. Section 099100, Painting

C. Section 323113, Chain Link Fences & Gates

1.3 REFERENCES

A. Americans With Disabilities Act (ADA).

B. American National Standards Institute (ANSI).

C. Current California Building Code (CBC).

1. 1998 ICC/ANSI A117.1 - Accessible and Usable Buildings & Facilities

D. American Society for Testing and Materials (ASTM):

1. ASTM B209 - Specification for Aluminum and Aluminum-Alloy Sheet and Plate

2. ASTM D4956 - Specification for Retroreflective Sheeting for Traffic Control

E. American Architectural Manufacturer’s Association (AAMA):

1. AAMA 611 - Voluntary Specifications for Anodized Architectural Aluminum

2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

F. National Association of Architectural Metal Manufacturers (NAAMM):

1.4 SUBMITTALS

A. Comply with pertinent provisions of Volumes 1 and 2 of these Contract Documents.

B. Submit manufacturer's descriptive literature and specifications, including brochures and color samples of material for selection, as applicable for approval

C. Submit shop drawings listing sign styles, lettering and locations, and overall dimensions of each sign, including methods of construction.

D. Submit full-size sample of sign type, style and color specified including method of attachment.

E. Submit Manufacturer's standard warranty information

1.5 QUALITY ASSURANCE

A. Signage shall comply with all applicable provisions of the current CBC, ADA and ANSI A117.1-1998.

B. Manufacturer Qualifications: Manufacturer must submit 3 references showing comparable products for projects completed within the last 5 years.

C. Provide all signage systems from a single manufacturer.

D. Inspection: Tactile signs shall be field inspected for compliance after installation (11B-703.1.1.2).

1.6 DELIVERY, STORAGE AND HANDLING

A. Use all means necessary to protect signs before, during and after installation.

1. In the event of damage, make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the District.

B. Deliver materials to jobsite in manufacturer's original unopened factory packaging.

C. Inspect materials at time of delivery to assure that specified products have been received.

D. Store materials in original packaging in a climate controlled environment and away from direct sunlight.

2.0 PRODUCTS

2.1 MANUFACTURER

A. Exterior Signage (Metal): Compliance Signs.com, Safeway Sign Co. (213) 321-4608, Zumar Industries (213) 233-8231, Western Highway (714) 761-4811, or approved equal.

B. America's Instant Signs; 1260 Hancock St. #106, Anaheim, CA 92807; 714-693-2989; americasinstantsigns.com, or approved equal

2.2 ALUMINUM SIGNS

A. General: Sign(s) shall satisfy applicable codes and regulations (1129B.5):

1. Size of lettering on signage shall be no less than 1" in height.

2. Sign Sizes:

a. As indicated on Drawings.

B. Materials:

1. Aluminum: 1/2" cast aluminum letters.

2. Finish: Baked-enamel paint, color to be selected during course of work.

2. Mounting: Back stud mounting with stand-off spacers 3/4" from siding.

3. Anchors and Inserts: Non-ferrous metal or hot-dipped galvanized steel anchors and inserts for exterior installations.

4. Backing: Provide all interior supports necessary for installation. See architectural and structural drawings.

2.5 ACRYLIC SIGNS

A. Interior and Exterior Acrylic Signs

1. Colored 1/8" acrylic sign with square edges. Color to be selected by Architect during course of work.

2. Signs shall be of one-piece construction; added-on and/or engraved characters are unacceptable.

3. Lettering:

    a. Tactile characters (letters, numerals, and symbols) on signs shall be raised 1/32" from sign plate face.

    b. Character shall be accompanied by Grade 2 Braille, per 1117B.5.5.1

    c. Raised characters on all signs shall be between 5/8" and 2" high.

    d. Characters shall be centered on sign.

    e. Characters and background shall be eggshell, matte or other approved non-glare finish. Characters shall contrast with their background -either light characters on a dark background or dark characters on a light background.

2.7 BRAILLE SYMBOLS

A. Contracted California Grade 2 Braille shall be used wherever Braille symbols are specifically required.

1. Dots shall be 1/10 inch on centers in each cell with 2/10 inch space between cells.

2. Dots shall be raised a minimum of 1/40 inch above the background.

B. Mounting Location and Height: Where permanent identification is provided for rooms and spaces, raised letters shall be provided and shall be accompanied by Braille in conformance with Section 3105A.(e)7, The CalACS Accessibility Standards Interpretive Manual. Signs shall be installed on the wall adjacent to the latch outside of the door. Where there is no wall space on the latch side, including at double leaf doors, signs shall be placed on the nearest adjacent wall, preferably on the right. Mounting height shall be located 48 inches minimum above the finish floor or ground surface, measured from the baseline of lowest Braille cells and 60 inches maximum above the finish floor or ground surface, measured from the baseline of the highest line of raised characters. Mounting location shall be so that a clear floor space of 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position

2.8 ACCESSORIES

A. As required for installation.

2.9 SIGN SCHEDULES

A. See plans for signage location

3.0 EXECUTION

3.1 INSTALLATION

A. Surface Conditions: Prior to installation of signs, examine areas and conditions in which the signage system(s) will be installed to verify that all surfaces are ready and painted.

1. Complete all finishing operations, including painting, before installing signage.

2. Surface shall be dry and free from dirt, grease and loose paint.

B. Locate sign units and accessories as indicated on the Drawings. Use mounting methods of the type described and in compliance with the manufacturer's instructions. For complete specifications, see exterior sign schedules below.

C. Install signs level, plumb, and at heights indicated.

D. Mounting height for all door-mounted signage shall be 60" centered from floor, centered to the center line of the sign.

E. Mounting location and height for wall-mounted signage:

1. Signs shall be installed on wall adjacent to the latch side of the door. Where there is no wall space on the latch side, sign shall be placed on the nearest adjacent wall, preferably to the right.

2. Mounting height shall be 60" above finish floor, centered to the center line of the sign unless otherwise noted. On signs where braille symbols occur mounting height shall be 48 inches above the finish floor or ground surface, measured from the baseline of the highest line of raised characters.

3. Mounting location shall be so that a clear floor space of 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position.

4. Verbal description as to restroom usage, i.e. Men's, Women's, etc., shall be placed directly below the pictogram signage.

F. Adhesive: Follow manufacturer's instruction for complete application of recommended adhesive to ensure proper bonding of signage to the surface specified on the drawings.

3.3 CLEAN UP

A. Upon completion of installation, remove all debris resulting from work of this Section.

B. Clean all signage surfaces in accordance with manufacturer's clean-up and maintenance instructions.

3.4 WARRANTY

A. Product delivered shall be free of defects.

END OF SECTION

SECTION 102613 - CORNER GUARDS

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install full height surface-mounted rigid vinyl corner guards at all interior wall ends and corners within the scope of work as shown on project Drawings, including mounting hardware, accessories and trim

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions.

B. Section 092900, Gypsum Board

C. Section 099100, Painting

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product data for each product specified herein, including complete installation instructions.

B. Shop Drawings: Submit Shop Drawings showing locations of each item and installation details. Provide elevations of nonstandard conditions.

C. Selection Samples: Submit color charts consisting of actual product pieces demonstrating full range of available colors for initial color selection.

D. Verification Samples: Submit 12-inch long assemblies in color specified.

1.4 QUALITY ASSURANCE

A. Provide test reports showing compliance with the performance specified for:

1. Fire-rated properties.

2. Accessibility and safety properties.

3. Impact strength.

B. Performance Requirements:

1. Pullout capacity complying with the State of California requirements, as administered by the Office of Statewide Health Planning and Development (OSHPD), and ANSI A117.1 requirements.

2. Class A rating per NFPA standards.

a. ASTM E84 flame spread 5 or less; smoke developed 180 or less.

b. ULC CAN4-S102-M83 flame spread 10 or less; smoke developed 250-330 or less.

C. Installer: Installer must have a minimum of 5 years successful experience with the work as required in this Section.

1.5 WARRANTY

A. Manufacturer's standard warranty shall protect materials and workmanship against defects when installed in conformance with manufacturer's installation instructions.

1. Liability is limited to repair or replacement of materials only.

2.0 PRODUCTS

2.1 MANUFACTURER

A. Pawling Corporation, Architectural Products Division; 32 Nelson Hill Rd., Wassaic, NY 12592, 1-800-431-3456, www.pawling.com, or approved equal.

2.2 MATERIALS

A. PRO-TEK Corner Guards, Model CG-10R

1. 3" wide wings, .100" thick rigid vinyl cover over continuous .100" thick 100% recycled extruded vinyl retainer; high-impact rigid vinyl compounds with an embossed, matte finish:

a. Corner guards shall be 90-degree angled

2. Provide matching end "closure" caps for corner guards that do not extend to ceiling.

3. Corner guards and components shall pass when tested in accordance with requirements for Flammability, Pull Out and Point Load, Impact Resistance, and Chemical and Stain Resistance tests.

4. Height: 4′

5. Color: Submit color options to Architect

6. Vinyl Finish shall be a standard matte shallow-etched granular surface.

B. Accessories:

1. Provide appropriate fasteners and accessories as required by manufacturer to properly complete corner guard installation as specified herein.

2. Accessories shall be molded from the compatible base, high impact, rigid vinyl compound to ensure color matching.

3. Accessories shall allow for transitions around corners and return to wall at appropriate locations such as door openings.

3.0 EXECUTION

3.1 EXAMINATION

A. Verify that walls are in proper condition to receive installation of corner guards.

B. Surface-mounted corner guards may not be installed until all other wall finishes have been completed.

3.2 INSTALLATION

A. Install corner guards in compliance with manufacturer’s written installation instructions.

B. Fasten retainers to corners, resting directly on floor.

C. Mount caps so they overlap retainers.

D. Snap covers into place.

3.3 ADJUSTING AND CLEANING

A. Verify that corner guards are plumb and rigidly secured to substrate; make any adjustments required.

B. Clean corner guards and adjacent areas of installation using materials and methods as recommended by manufacturer.

C. Remove from project site packaging and debris caused by installation.

END OF SECTION

SECTION 102813 - TOILET ACCESSORIES

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install toilet accessories and all other items as specified herein:

1. Paper towel dispensers, recessed.
2. Toilet paper dispensers.
4. Soap dispensers, recessed.
5. Grab bars.
6. Mirrors.
7. Baby Changing Station.
8. Shelf, Mop Rack and Utility Hooks.
9. Coat hook.
10. Pullout Waste Container.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 092900 - Gypsum Board

C. Section 099100 – Painting

D. Division 22 - Mechanical

E. Division 26 - Electrical

1.3 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Submit for approval product data and accessory schedule, including manufacturer's full range of standard finish options and colors.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver, handle and store materials in accordance with manufacturer's instructions.

1.5 QUALITY ASSURANCE

A. Comply with governing codes and regulations.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: AS I; Bobrick Washroom Equipment, Inc., Bradley Corporation, or approved equal.

2.2 MATERIALS

A. Materials - General: Fabricate toilet accessory items form the following materials and according to requirements specified for individual accessory items.

1. Stainless Steel: AISl Type 302/304, with polished No. 4 finish, 22 gauge minimum thickness, unless otherwise indicated.

2. Sheet Steel: Cold-rolled, commercial quality ASTM A366, 20 gauge minimum thickness, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.

3. Galvanized Steel Sheet: ASTM A527 G60.

4. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B456, Type SC 2.

5. Galvanized Steel Mounting Devices: ASTM A153, hot-dip galvanized after fabrication.

6. Fasteners: Screws, bolts, and other devices of same material as accessory unit, or of galvanized steel where concealed.

7. Keys: Provide universal keys for access to toilet accessory units requiring internal access for servicing, resupply. Provide a minimum of 6 keys to the Owner.

2.3 ACCESSORIES

A. Provide the following accessories:

1. Towel/Waste Unit for Restrooms, Recessed: As manufactured by Bobrick, “B-3940", or equal. Supply with Towelmate and LinerMate

2. Soap Dispenser, Recessed: As manufactured by Bobrick, “B-306"; Bradley, “6437”, or equal.

3. Soap Dispenser, Countertop Mounted: Commercial Liquid Soap Dispenser, Manual-Push, Stainless Steel, 6" Spout Length. As manufactured by Bobrick “B-8226” or equal.

4. Toilet Paper Dispenser, Surface Mounted: As manufactured by Bobrick, B-4288 or equal.

5. Toilet Seat Cover Dispenser Surface Mounted: As manufactured by Bobrick, B-4221 or equal.

6. Sanitary Napkin Disposal, Surface Mounted: As manufactured by Bobrick, B-270 or equal.

7. Mirror: Inter-lock stainless steel framed mirrors, 18 gage frame, shock absorbing edge cushion, 22 gage steel back, non-absorbent filler. Glazing in compliance with Section 088000. As manufactured by Bobrick, B-357 or equal. B-165 1836

8. Grab Bars: Concealed mounting, 1-1/2 inch diameter, 18 gage, 8,000 psi M.0. R., 1,000 psi shear and pull out, stainless steel, #4 finish.

9. Baby Changing Station, Surface Mounted: As manufactured by Bobrick, KB110-SSWM or equal. 35-1/4 inches by 20 inches, 18 gauge SS with satin exterior finish, molded high-density grey polyethylene with antimicrobial interior, bed has reinforced full-length steel-on-steel hinge mechanism, molded-in graphics and safety messages in six languages, equipped with a pneumatic cylinder for controlled opening and closing of bed.

10. Shelf, Mop/Broom Holder and Hooks: As manufactured by Bobrick, B-223x24 or equal. 24 inches by 5 inches, 22 gauge 304 SS with satin finish, all welded construction.

11. Under Sink ADA Pipe Insulation: As specified in Section 072101.

12. Waste Unit W/ Disposal door for Lactation Room, Recessed: As manufactured by Bobrick, “B-35633", or equal. Supply with LinerMate.

13. Towel Unit for Lactaction Room, Recessed: As manufactured by Bobrick, “B-35903", or equal. Supply with Towelmate.

14. Commercial Coat Hook: As manufactured by Bobrick “B-76717” or equal.

15. Pullout Waste Container: Steel Bottom Mount with Soft-Close. As manufactured by Rev-a-Shelf “53WC-1835SCDM-217” or equal.

B. Mounting Plates: Non-corrosive material. Provide as required.

2.4 FABRICATION

A. General: Only a maximum 1-1/2 inch diameter, unobtrusive stamped manufacturer logo, as approved by the Architect, is permitted on exposed face of toilet or bath accessory units. On either interior surface not exposed to view or back surface, provide additional identification by either a printed, waterproof label or a stamped nameplate, indicating manufacturer’s name and product model number.

B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

3.0 EXECUTION

3.1 INSTALLATION

A. General: Install assemblies in accordance manufacturer’s printed instructions and approved submittals in proper relation with adjacent construction and with uniform appearance. Coordinate with Work of other Sections.

1. Conceal evidence of drilling in partitions for mounting accessories.

2. Restore damaged finishes and test for proper operation of each accessory. Clean and protect work from damage.

B. Towel Dispenser:

1. Check Drawings and coordinate with Mechanical and Electrical Engineers to avoid protrusion from opposite wall, pipes, conduits, electrical wiring, etc.

2. Mount 66" from floor to top of unit for ADA compliance.

3. Provide framed wall opening; recessed depth required from finish face of wall is 4".

4. Provide filler, if necessary, to prevent a gap from finished wall and flange of unit.

5. Access to towels shall be 40" above finish floor to allow for forward and side reach.

6. Unit shall not project more than 1/4" from the wall.

7. Unit shall be operable with one hand and without tight grasping, pinching, or twisting of the wrist.

C. Toilet Tissue Dispenser:

1. Provide framed wall opening with recessed depth from finish face of wall 3-3/8". Coordinate with work of other trades to avoid protrusion from opposite wall, pipes, conduits, electrical wiring, etc.

2. Toilet tissue rolls should be mounted with forward edge no more than 36" from the back of wall of stall. Unit should be mounted 37" from finish floor to top of unit. All toilet tissue dispensers should be mounted with horizontal centerline of dispensing roll at least 19" above the finished floor.

D. Soap Dispenser:

1. Mounting location for push button dispensers is 40" max from controls above the finish floor.

2. Push buttons and pistons should be operable with one hand and without tight grasping, pinching, or twisting of the wrist.

3. Activation of soap valves should not require more than 5 pounds of force when unit is completely filled.

E. Grab Bars:

1. Clearance shall be the distance between finished wall surface and the inner edge of the tubing.

2. Standard clearance furnished is 1-1/2".

3. The required mounting height is 33" from centerline of the grab bar to the finish floor.

4. Grab bars should be installed on back wall and 42" horizontal; grab bar installed side wall or partition stall.

5. Grab bars shall withstand 1300 lbs. of downward pull.

F. Mirror Units:

1. Bottom edge of reflective surface should be mounted no higher than 40" above the finish floor.

2. Unit shall be surface-mounted and shall install on a concealed wall hanger that locks into place. (Refer to wall instructions to locate mirror wall hangers.)

3. Secure unit to wall with 4 # 10 x 1-1/2" flat head full-threaded screws.

4. To remove unit from wall, see slide key instructions.

END OF SECTION

SECTION 104413 – FIRE EXTINGUISHERS AND CABINETS

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install fully-recessed fire-rated fire extinguisher cabinets and fir extinguishers as shown on project Drawings.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions.

B. Section 092900 - Gypsum Board

1.3 REFERENCES

A. ASTM A366 - Commercial Steel (CS) Sheet, Carbon (0.15 Maximum Percent) Cold-Rolled.

1.4 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Product Data: Submit manufacturer's product data, including installation instructions.

C. Test Reports: Submit test reports from Warnock Hersey for fire-rated cabinets.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials indoors in a clean, dry area in accordance with manufacturer's instructions.

C. Handling: Protect materials and finish from damage during handling and installation.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Larsen's Manufacturing Co., "Architectural Series"; J, L. Industries, "Embassy 5614V10", or approved equal.

2.2 MATERIALS

A. Fire Extinguishers

1. Multipurpose under pressure, dry chemical type bearing UL rating of 4A-60B:C, 10 pounds nominal capacity, 5 inch diameter, in enameled steel container.

B. Cabinets

1. Recessed, semi-recessed, and surface mounted type as indicated on the Drawings; 1 piece cold-rolled steel construction with 18 gauge steel box, with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.

2. Provide reviewed manufacturer's stainless steel door handles.

3. Door Style: Larsen's "Vertical Duo Door", with square trim, or approved equal.

4. Door Glazing: Float glass complying with ASTM C1036, Condition A, Type I, Quality q3, Class 1 (clear).

C. 1 Hour Fire Rated Cabinets: UL listed with UL rated listing mark with fire resistance rating of wall where it is installed.

D. Accessories

1. Brackets: Provide brackets for fire extinguishers designed to prevent accidental dislodge of extinguisher, of sizes required for type and capacity of extinguisher required.

2. Wall Mounted Signs

a. Provide wall mounted metal signs at 80 inches above the finished floor to center of sign for each fire extinguisher in cabinet.

Separate wall mounted sign shall be provided for all extinguishers located in cabinets regardless of cabinet signage available from the manufacturer.

b. Sign Colors and Lettering: Double faced, flanged, aluminum, 12 inches high by 4 inches wide, fire extinguisher symbol, arrow and red with white letters, which reads “Fire Extinguisher". Wall mounted signs shall also be provided for other extinguishers in areas where the extinguisher may be obstructed from view during normal use of the facility. Provide permanent aluminum signs as appropriate for the application.

2.3 FINISHES FOR CABINETS, GENERAL

A. Comply with NAAMM MFM for recommendations relative to applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying temporary strippable protective covering prior to shipping.

2.4 STEEL CABINET FINISHES

A. Steel Box: Manufacturer's matte paint applied to steel box.

B. Door: Primed steel.

3.0 EXECUTION

3.1 EXAMINATION

A. Examine areas to receive cabinets. Notify Architect if areas are not acceptable. Do not begin installation until unacceptable conditions have been corrected.

3.2 PREPARATION

A. Prepare rough openings using metal studs or double wood studs on all 4 sides of cabinet tub to be 1/4 inch larger than outside dimension of tub.

B. Ensure load bearing header be reinstalled if load bearing stud is cut to install cabinet.

3.3 INSTALLATION

A. Install cabinets in accordance with manufacturer's instructions at locations indicated on the drawings.

B. Install cabinets plumb, level, square, and rigid without warp or rack.

C. Secure cabinets to metal or wood studs using screws supplied by manufacturer.

D. Use manufacturer's supplied hardware.

3.4 ADJUSTING

A. Adjust doors and catches for smooth operation without binding.

B. Inspect and adjust locks to operate properly.

C. Touch-up marred finishes with manufacturer supplied paint.

D. Replace defective or damaged doors, glazing, or other components as directed by Architect.

3.5 CLEANING

A. Clean cabinets in accordance with manufacturer's instructions.

B. Do not use harsh cleaning materials or methods that would damage glazing or finish.

3.6 PROTECTION

A. Protect cabinets and finish from damage during construction.

END OF SECTION

Division 11: Equipment

SECTION 113113 - RESIDENTIAL KITCHEN APPLIANCES

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Furnish all labor, equipment test, services and incidentals necessary to supply and install the Appliances as shown on the drawing and as herein specified. Appliances shall be complete with piping, valves, fittings, and accessories that are an integral part of such equipment, ready for installation and connection to the services necessary to complete the installation.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 064116 - Plastic-Laminate-Clad Architectural Cabinets

C. Division 22 – Plumbing

D. Division 26 – Electrical

E. Roughing-in, sleeves, valves, traps, etc., for all necessary plumbing, heating, ventilating and electrical services, except if included as a standard, are specified under their respective sections.

1.3 REFERENCES

A. The Appliances shall be an approved product of a recognized manufacturer regularly engaged in its production, distribution and sale. The product shall conform in all respects with the manufacturer’s latest published specification except as here modified.

B. Electrically operated or heated equipment shall:

1. Bear the Seal of Approval of the Underwriters’ Laboratories (UL)

2. Comply with the National Electrical Code (NEC)

3. Comply with the American Institute of Electrical Engineers

4. Comply with the National Board of Fire Underwriters and all applicable local Codes and Regulations.

1.4 SUBMITTALS

A. Comply with provisions of Section 013300.

B. Within 45 calendar days after receipt of the contract, eight (8) brochures containing manufacturer's specification sheets, dimensioned drawings and/or other pertinent data describing all items of standard manufacture shall be submitted for review and approval of the Owner's Representative. These brochures shall have semi-hard covers with the name of the Subcontractor and project clearly identified in large readable type. Failure to provide brochures in the manner as described above will be cause for rejection of said brochure.

C. Printed Instructions: Upon completion of the Project (prior to final acceptance of the work), this Subcontractor shall furnish to the Owner's Representative four (4) sets of data sheets, spare parts lists, and operating instructions for each appliance, neatly bound in a plastic covered loose-leafed binder with reinforcements at the binding holes on each sheet; each set shall be complete with an index of equipment. All sets shall contain a complete list of service agencies, including phone numbers of said service agencies.

D. Within 30 days prior to the completion of work, submit for the Approval of the Owner's Representative, a list of factory-authorized service agencies for all specified appliances with electrical, gas and mechanical services. Said agencies shall be located within a radius of 75 miles from the site of the Project.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Factory certified by the manufacturer

B. Manufacturer Qualifications: A qualified manufacturer will maintain, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Energy Ratings: Provide residential appliances that carry labels indicating energy-coast analysis (estimated annual operating costs) and efficiency information as required by the FTC Appliance Labeling Rule.

1. Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.

1.6 COORDINATION

1. Coordinate with mechanical, electrical, plumbing and other trades whose work is in conjunction with equipment specified herein.

1.7 DELIVERY AND STORAGE

A. Schedule delivery of equipment so that spaces are sufficiently complete that equipment can be installed immediately following delivery.

B. Protect finished surfaces from soiling and/or damage during handling and installation. Keep covered with polyethylene film or other protective coating.

2.0 PRODUCTS

2.1 MANUFACTURER

A. GE, Whirlpool, or equal.

2.2 MATERIALS

A. Microwave:

1. GE microwave model #PEB9159SJSS or equal.

B. Refrigerator

1. GE fridge model #GTS18HYNRFS or equal w/ reverse door swing to be left hinged.

3.0 EXECUTION

3.1 INSTALLATION

A. Install the work of this Section in strict accordance with the manufacturer's recommendations as approved by the Owner's Representative, anchoring all components firmly into position for long life under hard use.

B. Installation of procedure, details and scheduling shall be so arranged that the work of other contractors may progress without unnecessary delay, interference or damage. The Subcontractor shall do all fitting, joining, fastening, scribing, caulking and adjusting necessary to install any fixed item of equipment in its designated location, as shown on the detail drawings.

C. After installation, all equipment shall be inspected and tested under operating conditions. If inspection or testing indicate defects, such defects shall be corrected and the inspection and test repeated to insure a perfect operation of all equipment.

3.2 EQUIPMENT CLEANING

A. Upon completion of work, remove all excess material, crates, equipment, debris, and dispose of same, away from the premises.

3.3 GUARANTEE/WARRANTY

A. Guaranty-Warranty: All work shall be guaranteed by the Subcontractor against all defects for 1 (one) year from the date of recording of the Notice of Completion of the Project. This guarantee shall cover replacements at the Subcontractor's expense of every particular, of defective material, including transportation and labor, but it shall not cover any cost for replacement of parts or work made necessary by carelessness or misuse of the equipment by others. The Owner's Representative may have the defects corrected if the Subcontractor, after notice, fails to proceed promptly to comply with the terms of this guarantee, and the Subcontractor and his surety shall be liable for all expenses incurred.

B. The Subcontractor shall maintain in the immediate vicinity a qualified source for service, which shall be available to the Owner's Representative on an emergency basis for a period of 90 days following the acceptance of the installation. This service shall be available without cost to the Owner's Representative, unless such service is required because of misuse, etc., as described under "Guaranty-Warranty" for equipment. This emergency service shall have on their premises or their service trucks all small components for the installed equipment whose failure would cause a disruption of service, such as thermostats, etc.

C. Provide in writing Manufacturer's One-Year Full Warranty - For non-residential installations only, from date of purchase. Kenmore replacement parts and/or repair labor to correct defect in materials or workmanship. Service must be performed by an authorized Kenmore service agent.

3.4 INSTRUCTION TO EMPLOYEES

A. A competent instruction shall be provided to the Owner's Representative at no additional expense, to instruct the employees, who will have charge of the operation and/or maintaining of the equipment. This instructor shall be available at times convenient to the Owner's Representative for a period of not less than eight (8) hours after completion and acceptance of the work, and shall be available during that period at a time scheduled and convenient to the Owner's Representative.

END OF SECTION

Division 12: Furnishings

SECTION 122413 – MANUAL ROLLER SHADES

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Roller shades, manual operation and accessories.

C. Shade fabric.

1.2 RELATED SECTIONS

A. Section 09260 - Gypsum Board Assemblies: Coordination with gypsum board assemblies for installation of shade pockets, closures and related accessories.

1.3 REFERENCES

A. ASTM International (ASTM):

1. ASTM G21 and E 2180 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. Cradle to Cradle Products Innovation Institute (C2C):

1. C2C (DIR) - C2C Certified Products Registry.

C. National Fire Protection Association (NFPA):

1. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

D. Window Covering Manufacturers Association (WCMA):

1. ANSI/WCMA A100.1-2022- Safety of Window Covering Products; 2022.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: One week prior to commencing work related to this section. Require attendance of all affected installers.

B. Sequencing:

1. Do not fabricate shades until field dimensions for each opening have been

taken with finished conditions in place. "Hold to" dimensions are not acceptable.

2. Do not install shades until final surface finishes and painting are complete.

1.5 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Product Data: Manufacturer's catalog pages and data sheets for products specified including materials, finishes, dimensions, profiles, mountings, and accessories.
1. Preparation instructions and recommendations.

2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes , accessories, and operating instructions.

3. Storage and handling requirements and recommendations.

4. Mounting details and installation methods.

5. Manufacturer's Instructions: Include storage, handling, protection, examination, preparation, and installation.

6. Project Record Documents: Record actual locations of control system components and show interconnecting wiring.

C. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, and relationship to adjacent work.

D. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.

E. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.

F. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shadecloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.

G. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

H. Warranty: Provide manufacturer’s warranty documents as specified in this Section.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience and minimum of three projects of similar scope and size in manufacturing products comparable to those specified in this section.

B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.

C. Fire-Test-Response Characteristics: Passes NFPA 701 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

D. ShadeCloth Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC9644 and ATCC9645, and E2180.

E. ShadeCloth Cleanability and Disinfecting: ShadeCloth must meet cleanability and disinfecting requirements via 3rd party testing to comply with BIFMA HCF 8.1-2014 standards using chemical solutions compliant with EPA guidelines for use against COVID-19.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in Window Treatment Schedule.

B. Store and handle products per manufacturer's recommendations.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8 WARRANTY

A. Roller Shade Hardware and Chain Warranty: Manufacturer's standard non-depreciating, transferrable warranty for interior shading.

1. Shade Hardware – 10 years unless otherwise indicated:

a. Mecho/5 and Mecho/5x with ThermoVeil, EuroTwill, Soho, Equinox, Midnite, Chelsea, or Classic Blackout shade fabric: 25-years.

b. Mecho/7 including bead chain with ThermoVeil, EuroTwill, Soho, Equinox, Midnite, Chelsea, or Classic Blackout shade fabric: 25-years.

4. Standard Shadecloth: Manufacturer's standard 25-year warranty.

5. EcoVeil and EcoVeil Sheer Shadecloth: Manufacturer's standard 10-year warranty.

6. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas, which are deemed owners responsibility.

B. In the event of a warranted product failure, provide, furnish and install all necessary components, at no cost to Owner.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer for Window Shade Control System as basis of design, performance and warranty: Mecho, which is located at: 42-03 35th St.; Long Island City, NY 11101; ASD Tel: 718-729-2020; Fax: 718-729-2941; Email: marketing@mechoshade.com; Web: www.mechoshade.com. For your local Mecho rep: https://www.mechoshade.com/find-a-rep/

2.2 COMPONENTS

A. Basis of Design: MechoShade, UrbanShade System. Manual operating, chain drive, sunscreen single roller shades and related mounting systems and accessories as indicated on drawings.

1. Shade Type: Single Roller

2. Drop Position: Regular. Fabric falls off roller tube, close to glass.

3. Mounting: Window jamb mounted

4. Size: As indicated on drawings

B. Fabric: As indicated under Shade Fabric article.

C. Brackets and Mounting Hardware: Stamped steel. As recommended by manufacturer for mounting indicated accommodating shade fabric roll-up size and weight.

C. Roller Tubes: Extruded aluminum. Capable of being removed and reinstalled without affecting roller shade limit adjustments.

1. Size: As recommended by manufacturer; for installation conditions, span, and weight of shades.

2. Fabric Attachment: Extruded channel in tube accepts vinyl spline welded to fabric edge.

a. Shade Band: Removable and replaceable without removing roller tube from brackets or inserting spline from the side of the roller tube.

D. Hembars: Maintains bottom of shade straight and flat. Style: Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.

E. Manual Operation: Stainless Steel Drive Chain. Breaking Force: 45 lbf (200 N) minimum.

D. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.

E. Accessories:

1. Fascia: Removable extruded aluminum. Size as required to conceal shade mounting. Attachable to brackets without exposed fasteners.

2. Finish: White

2.3 SHADECLOTH

A. Visually Transparent Single-Fabric Shadecloth: MechoSystems, SoHo "1100"series: 0.010 diameter (0.254 mm), Opaque, non-raveling 76 percent vinyl / 24 percent polyester yarn, fabric thickness range from 0.024 to 0.026 inches (0.609 to 0.660 mm):

1. 2 x 2 basket weave, SoHo 1100 series, 1 percent open, VLT range 0 to 15 percent.

2. Color: 1115 Greene (Smoke)

3.0 EXECUTION

3.1 EXAMINATION

A. Do not commence installation until conditions are satisfactory.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving

the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow proper clearances for window operation hardware.

B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

C. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

D. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.4 DEMONSTRATION

A. Demonstrate operation method and instruct personnel in the proper operation and maintenance of the window shade systems.

END OF SECTION

SECTION 129300 – SITE FURNISHING

1.0 **GENERAL**

1.1 SECTION INCLUDES

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install site furnishings as specified here in as and as shown on the project Drawings.

A. Bollards

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product literature, including color charts and installation details.

1.3 QUALITY ASSURANCE

A. Manufacturer: Site furnishings of all types must be supplied by a single manufacturer having the resources to provide consistent quality in appearance and physical properties.

1. Materials: Steel shall be US domestic mill certified steel. The main body of the product must be constructed from ASTM A500 steel and be accompanied with steel mill certifications/test reports for the steel being used to ensure the durability and performance of the product. Secondary and non-ASTM steel may not be substituted.

1.4 DELIVERY, STORAGE AND HANDLING

A. Package units appropriately to protect finish. Inspect materials to ensure that specified materials have been received.

B. Store units to avoid damage from moisture, abrasion, and other construction activities.

2.0. **PRODUCTS**

2.1. MANUFACTURER

A. Bollards:

1. Acceptable Manufacturer: Blue Ember Technologies, LLC MaxiForce Bollards line of products, Sykesville, MD 21784, Tel 410-552-9888, Fax 410-552-9939, Website: http://www.maxiforcebollards.com

2.2. MATERIALS

A. Bollards

1. Fixed Bollards: Provide MaxiForce Fixed Bollards by Blue Ember Technologies.

a. Model: MFRN-RS2-N5

b. Body Style: Heavy Duty MFR Round Style.

c. Base Style: Heavy Duty

d. Head Style: RS2 - Round Style 2 Head for Round Body.

2. Materials: Free from surface blemishes and defects where exposed to view in the finished installation.

   a. Steel Plate: A36; ASTM A36/A36M.

   b. Steel Tube: A500; ASTM A500.

   c. Fasteners: Series 300 Stainless Steel.

3. Finish: Factory applied after surface imperfections removed and exposed faces of welded joints dressed smooth.

   a. Galvanizing : Hot Dipped galvanized.

   b. Color: As selected by Architect from Manufacturers full line of color options.

3.0 **EXECUTION**

3.1 INSTALLATION

A. Comply with manufacturer's recommendations for installation and approved submittals. Install bollards level and true and in proper relation to adjacent surfaces.

B. Protect furnishings from damage during construction operations.

END OF SECTION

SECTION 129313 – BIKE RACKS

1.0 **GENERAL**

1.1 SECTION INCLUDES

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install site furnishings as specified here in as and as shown on the project Drawings.

A. Surface Mounted Bike Racks

1.2 SUBMITTALS

A. Product Data: Include physical characteristics such as shape, dimensions, bicycle parking capacity and finish for each bicycle rack.
B. Shop Drawings: Show installation details for each bicycle rack.
C. Samples for Verification: Submit finish samples for review and verification.
D. Maintenance Data: For each bicycle rack.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed installation of bicycle racks similar in material, design, and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance.
B. Manufacturer Qualifications: A firm experienced in manufacturing bicycle racks similar to those required for this project and with a record of successful in-service performance.
C. Source Limitations: Obtain each color, finish, shape and type of bicycle rack from a single source with resources to provide components of consistent quality in appearance and physical properties.
D. Product Options: Drawings indicate size, shape and dimensional requirements of bicycle racks and are based on the specific system indicated.

1.4 DELIVERY, STORAGE AND HANDLING

A. Package units appropriately to protect finish. Inspect materials to ensure that specified materials have been received.

B. Store units to avoid damage from moisture, abrasion, and other construction activities.

2.0. **PRODUCTS**

2.1. MANUFACTURER

A. Acceptable Manufacturer: DERO BIKE RACK CO., 42 Northern Stacks Drive, Suite 100, Minneapolis, MN 55421, 1-888-337-6729. Fax: 612-331-2731 Website: www.dero.com

2.2. MATERIALS

A. Model: RR2H – 5 bikes
B. 2.375" OD Schedule 40 Pipe per ASTM A53
C. Surface mount
   1. (2) 5.5” x 5.25” x .25” feet.
   2. (8) 3/8” wedge anchors

2.3. FINISHES

A. A 304 grade stainless steel finish with Spectra Shield and powder coated for maximum corrosion protection.
   1. TGIC powder-coated: Part is prepared for painting with hard sandblasting. An epoxy primer is electrostatically applied. A final TGIC, UV resistant polyester powder coat is applied. Final coating thickness shall be no less than 6 mils.
   2. Color: To be selected by Architect from Manufacturers full line of colors.

2.4. SPACE USE

A. Bikes will be locked perpendicular to the rack as shown in the manufacturers standard diagrams. When bikes are locked to it, the rack will use approximately the amount of space listed in the installation diagrams.
B. To ensure that the rack is convenient and safe for bicyclists, use these minimum space use configurations when installing a rack next to a wall or street.

2.5. SETBACKS

A. Wall Setback: A minimum of 27" should be left between the wall and the rack. 36" is the recommended setback.
B. Street Setback: For racks running parallel to the street, a 96" setback is recommended. For racks installed perpendicular to the street a 24" setback is the minimum setback distance between the street and the rack. 36" is recommended.

3.0 **EXECUTION**

3.1 INSTALLATION

A. Comply with manufacturer’s recommendations for installation and approved submittals. Install bollards level and true and in proper relation to adjacent surfaces.

B. Surface mount using two 5.5" x 5.25" x .25” feet plates - 8 anchors.

C. It is the responsibility of the installer to ensure that all base materials into which the rack will be installed can support the rack and will not be damaged by any required installation procedures.

D. Protect furnishings from damage during construction operations.

END OF SECTION

Division 13:
Special Construction

SECTION 133419 – METAL BUILDING SYSTEMS

1.0 GENERAL

1.1 SUMMARY

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

C. This Section establishes general requirements for a metal building system to be installed on the Project site using prefabricated components. All costs of transportation to and installation at the site are included.

1. Metal building system includes:

a. Prefabricated metal frame and lateral bracing for main structure.
b. Pre-fabricated metal front entry canopy structure.
c. Standard girts for siding attachment.
d. Insulated metal roof panels.
e. Metal wall siding.
f. Gutters and downspouts.
g. Framed openings and flashing for windows and doors.
h. Framed in-wall supports for exterior mounted signage.
i. Flashing for:
    a. Fascia and rake
    b. Wall to foundation, galv. sheet metal
    c. Wall to roof
    d. Light fixtures and mechanical pipes through walls and roof
    e. Roof cap

D. Related Sections:

1. Division 3 Sections for cast-in-place concrete, reinforcing and formwork installed in a metal building system.

2. Division 7 Sections for concrete waterproofing, vapor retarder and barriers installed in a metal building system.

3. Division 8 Sections for doors and windows installed in metal building system.

4. Division 22 Sections for plumbing systems installed in metal building system.

5. Division 23 Sections for mechanical systems installed in metal building system.

6. Division 26 Sections for Electrical systems installed in metal building system.

7. Division 32 Sections for underground site utility lines connected to metal building system.

8. Other Sections as reference elsewhere in this Section for requirements applicable to other products and materials to be installed in metal building system.

1.2 REFERENCES

A. American Institute of Steel Construction (AISC):

1. AISC Specification for Structural Steel Buildings.

2. AISC Serviceability Design Considerations for Low-Rise Buildings

B. American Iron and Steel Institute (AISI):

1. AISI North American Specification for the Design of Cold-Formed Steel Structural Members

C. American Welding Society (AWS):

1. AWS D1.1 / D1.1M – Structural Welding Code – Steel.

2. AWS D1.3 / D1.3M – Structural Welding Code – Sheet Steel

D. Association for Iron & Steel Technology (AISE):

1. AISE 13 – Specifications for Design and Construction of Mill Buildings.

E. ASTM International (ASTM):

1. ASTM A 36 – Standard Specification for Carbon Structural Steel

2. ASTM A 48 – Specification for Gray Iron Castings

3. ASTM A 354 – Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners

ASTM A449 – Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use

4. ASTM A 475 – Specification for Zinc-Coated Steel Wire Strand

5. ASTM A 500 – Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

6. ASTM A 529 – Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.

   ASTM A536 Standard Specification for Ductile Iron Castings

7. ASTM A 563 – Specification for Carbon and Alloy Steel Nuts

   ASTM A568 Standard Specification for Steel, Sheet. Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for

8. ASTM A 572 – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

   ASTM A635 – Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Alloy, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low Alloy with Improved Formability, General Requirements for

9. ASTM A 653 / A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

   ASTM A673 – Standard Specification for Sampling Procedure for Impact Testing of Structural Steel

   ASTM A755 – Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products

10. ASTM A 792 / A 792M – Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process

    ASTM A924 – Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

11. ASTM A 992 – Standard Specification for Structural Steel Shapes.

12. ASTM A 1011 – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

ASTM A1018 – Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Carbon, Commercial, Drawing, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

13. ASTM A 1039 – Specification for Steel, Sheet, Hot Rolled, Carbon, Commercial, Structural, and High-Strength Low-Alloy, Produced by Twin-Roll Casting Process

    ASTM A1063 – Standard Specification for Steel Sheet, Twin-Roll Cast, Zinc-Coated (Galvanized) by the Hot-Dip Process

    ASTM B633 – Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel

14. ASTM E 96 / E 96M – Standard Test Methods for Water Vapor Transmission of Materials.

15. ASTM E 108—Spread-of Flame Testing: Class 1A Rating.

16. ASTM E 283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

17. ASTM E 331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

18. ASTM E 1592 – Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference

19. ASTM E 1646 – Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference

20. ASTM E 1680 – Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems

21. ASTM E 2140 – Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head

22. ASTM F 436 – Specification for Hardened Steel Washers

    ASTM F 844 – Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use

23. ASTM F 1145 – Standard Specification for Turnbuckles, Swaged, Welded, Forged

24. ASTM F 1554 – Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

25. ASTM F 3125 – Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength. (replaces A325 & A490)

F. IAS – International Accreditation Service

G. LGSI – Light Gauge Steel Institute

H. SJI – Steel Joist Institute

I. Factory Mutual Approvals (FM Approvals):

1. FMRC Standard 4471 – Approval Standard for Class 1 Roofs for Hail Damage Resistance, Combustibility, and Wind Uplift Resistance.

2. FM 4881 – Approval Standard for Class 1 Exterior Wall Systems.

J. FM Global:

1. FM 1-28 – Property Loss Prevention Data Sheet 1-28, Wind Design, October 2015.

K. Metal Building Manufacturers Association (MBMA):

1. MBMA Metal Building Systems Manual, latest edition.

L. Underwriters Laboratories (UL):

1. UL-580 – Standard for Tests for Uplift Resistance of Roof Assemblies.

2. UL-790 – Standard Test Methods for Fire Tests of Roof Coverings.

3. UL-2218 – Impact Resistance of Prepared Roof Covering Materials.

1.3 DEFINITIONS

A. Terminology Standard: See MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in standards referenced by this Section.

1.4 COORDINATION

A. Coordinate sizes and locations of concrete foundations and casings of anchor rods and other inserts into foundation wall and footings. Anchor rod installation, concrete, reinforcement, and formwork requirements are specified in Division 3 Specifications sections.

B. Coordinate metal panel assemblies with rain drainage work, flashing, trim and construction supports and other adjoining work to provide a leak-proof, secure, and noncorrosive installation.

1.5 PREINSTALLATION MEETING

A. Pre-Installation/Erection Meeting: Conduct meeting at Project site.

1. Review methods and procedure related to metal building system, including but not limited to, the following:

a. Condition of foundations and other preparatory work.

b. Structural load limitations.

c. Construction schedule; verify availability of materials, erector's personnel, equipment, and facilities needed to make progress and impact on construction schedule.

d. Required tests, inspections, and certifications.

e. Unfavorable weather and forecasted weather conditions and impact on construction schedule.

2. Review methods and procedures related to metal roof panel assemblies including, but not limited to, the following:

a. Compliance with requirements for purlin and rafter conditions, including flatness and attachment to structural members.

b. Structural limitations of purlins and rafters during and after roofing.

c. Flashings, special roof details, roof drainage, roof penetrations, equipment curbs, and conditions of other construction that will affect metal roof panels.

d. Temporary protection requirements for metal roof panel assembly during and after installation.

e. Roof observation and repair after metal roof panel installation.

3. Review methods and procedures related to metal wall panel assemblies including, but not limited to, the following:

    a. Compliance with requirements for support conditions, including alignment between and attachment to structural members.

    b. Structural limitations of girts and columns during and after wall panel installation.

    c. Flashings, special siding details, wall penetrations, openings, and conditions of other construction that will affect metal wall panels.

1.6 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of the following metal building system components:

1. Metal roof panel system.

2. Metal wall siding.

B. Shop Drawings: Include plans, elevations, sections, and details of metal building system. Indicate components by other than metal building system manufacturer.

1. Shop Drawings to be signed and sealed by the qualified licensed architect and professional engineers responsible for their preparation.

    a. Coordinate and obtain approval and required permits from Authority Having Jurisdiction prior to start of fabrication.

    b. Include structural analysis data indicating compliance with performance requirements signed and sealed by the qualified professional engineer responsible for their preparation.

2. Anchor-Rod Plans: Submit anchor-rod plans before foundation work begins. Include location, diameter, projection of anchor rods required to attach manufactured building to foundation. Indicate column reactions at each location.

3. Structural Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.

4. Metal Roof and Wall Panel Layout Drawings: Show layouts of panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, clip spacing, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.

a. Show roof-mounted items including roof hatches, equipment supports, pipe supports and penetrations, lighting fixtures, and items mounted on roof curbs.

b. Show wall-mounted items including personnel doors, windows, louvers, and lighting fixtures.

C. Energy Calculations: Signed and sealed by qualified professional engineer; showing compliance with referenced codes for the following:

1. Building envelope.

D. Samples for Initial Selection: For each type of metal building system component with factory-applied color finish, submit manufacturer's full range of colors for selection by Architect.

E. Samples for Verification: For each type of exposed finish required, prepared on Sample of sizes indicated below:

1. Panels: Nominal 12 inches long by actual panel width. Include fasteners, closures, and other exposed panel accessories.

2. Flashing and Trim: Nominal 12 inches long. Include fasteners, and other exposed accessories.

3. Accessories: Nominal 12 inch long samples for each type of accessory.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For erector.

B. Welding Certificates.

C. Letter of Design Certification: Signed and sealed by the qualified professional engineer responsible for design of metal building system. Include the following:

1. Name and location of Project.

2. Order Number.

3. Name of manufacturer.

4. Name of Contractor.

5. Building dimensions including width, length, height, and roof slope.

6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.

7. Governing building code and year of edition.

8. Design Loads: Include specified designed loads per structural drawings.

   a. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing codes.

   b. Provide 5lb per linear ft for slip track of full height walls.

   c. Provide localized loads for suspended acoustic clouds, solar, etc.

9. Building-Use Category: Indicate category of building use and its effect on load importance factors.

D. Erector Certificate: Signed by metal building system manufacturer certifying that erector complies with requirements.

E. Material Test Reports: For each of the following products:

1. Structural steel including chemical and physical properties.

2. Bolts, nuts, and washers including mechanical properties and chemical analysis.

3. Tension-control, high-strength, bolt-nut-washer assemblies.

4. Shop primers.

5. Nonshrink grout.

F. Sample Warranties: For special warranties.

1.8 CLOSEOUT MATERIALS

A. Maintenance Data: For metal panel finishes, to include in maintenance manuals.

1.9 QUALITY ASSURANCE

A. Metal Building System Manufacturer: Primary products furnished by single IAS AC472 accredited manufacturer/fabricator with minimum 5 years of experience, as well as demonstrated ability to obtain approval from Authority Having Jurisdiction.

B. Erector Qualifications:

1. Single installer with minimum 5 years of experience in installing products of same or similar type and scope.
2. Installer must be certified by the metal building manufacturer.

C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or providing product that is similar to those indicated for this Project in material, design, and extent.

D. Welding Qualifications:

1. AWS D1.1, "Structural Welding Code – Steel."

2. AWS D1.3, "Structural Welding Code – Sheet Steel."

E. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1.10 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage and Handling Requirements:

1. Store and handle materials in accordance with manufacturer's instructions.

2. Keep materials in manufacturer's original, unopened containers and packaging until installation.

3. Do not store materials directly on ground.

4. Store materials on flat, level surface, raised above ground, with adequate support to prevent sagging.

5. Protect materials and finish during storage, handling, and installation to prevent damage.

C. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

D. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

1.11 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when weather conditions permit metal building system to be installed according to manufacturer’s written instructions and warranty requirements.

1.12 WARRANTY

A. Special Warranty on Metal Panel Finishes: Manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Includes color fading according to ASTM D 2244, chalking according to ASTM D 4214, cracking, checking, peeling or failure of paint to adhere to bare metal.

2. Warranty Period: 35 years from date of Substantial Completion.

B. Manufacturer’s standard 20 year weathertight roof warranty.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide metal building system by one of the following:

1. Nucor Building Group, 2380 Bellbrook Ave, Xenia, OH 45385,

(937) 352-0480, https://www.nucorbuildingsgroup.com/

2. Cornerstone Building Brands, https://www.cornerstonebuildingbrands.com/

3. BlueScope Buildings North America, 2250 SW Lower Lake Rd, St Joseph, MO

64504, (816) 238-7550, https://bluescopebuildings.com/

3. or approved equal.

2.2 CALGREEN REQUIREMENTS

A. General: Conform to all applicable requirements of the California Green Building Standards Code (CAL Green) including sealants, sealant primers, adhesives, adhesive primers, paints and coatings.

2.3 PERFORMANCE REQUIREMENTS

A. General: Provide a complete, integrated set of mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement and exposure to weather without failure, corrosion or infiltration of water into building interior.

1. Delegated Design: Engage qualified professional engineer to design metal building system, including comprehensive engineering analysis using performance requirements and design criteria indicated.

2. System Description:

a. Structural System:
i) Primary Frame: Rigid clear span, moment resisting, solid member structural framing system.
ii) Secondary Frame: Manufacturer's standard purlins, joists and girts.

b. Roof System: Manufacturer's standard insulated panel standing seam metal roof panels.

c. Exterior Wall System: Standard lap-seam ribbed metal wall siding.

B. Regulatory Requirements: Design and engineer prefabricated building system to be in conformance with all applicable codes, ordinances, and other regulations, including the following:

1. California Building Code (CCR, Title 24, Part 2).

2. California Energy Code (CCR, Title 24, Part 6).

C. Structural Loads: See structural drawings and calculations.

D. Accessibility Requirements: Comply with applicable provisions of the following:

1. California Building Code (CCR, Title 24, Part 2), Chapters 11A and 11B.

2. United States Department of Justice's 2010 ADA Standards for Accessible Design.

E. Energy Performance: Design and engineer metal building system to conform to all applicable requirements of the California Energy Code.

2.4 STRUCTURAL-STEEL FRAMING

A. Structural Steel: Comply with AISC 360, “Specification for Structural Steel Buildings”.

B. Bolted Connections: Comply with RCSC “Specification for Structural Joints Using High-Strength Bolts”.

C. Cold-Formed Steel: Comply with AISC “North American Specification for the Design of Cold-Formed Steel Structural Members” for design requirement and allowable stresses.

D. Primary Framing: Manufacturer’s standard primary-framing system, designed to withstand specified loads and meet specified requirements. Primary framing includes transverse and lean-to frames; rafters, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.

1. End walls are to be rigid frames.

2. Portal frames to provide lateral stability.

E. Secondary Framing: Manufacturer’s standard secondary-framing system, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed structural-steel sheet or roll-formed metallic-coated steel sheet, prepainted with coil coating.

2.5 METAL ROOF PANELS

A. Manufacturer’s standard insulated panel standing seam metal roof panel.

1. Product to be minimum R rating per Title 24 requirements.

2. Finish: Submit manufacturer’s standard colors for selection by Architect.

2.6 METAL WALL SIDING

A. Manufacturer’s standard lap-seam ribbed metal siding.

1. Finish: Submit manufacturer’s standard colors for selection by Architect.

2.7 THERMAL INSULATION

A. Refer to Section 072116 – Blanket Insulation

2.8 OPENINGS

A. Refer to Section 084313 – Aluminum-Framed Storefronts

B. Refer to Section 085113 – Aluminum Windows

C. Refer to Section 088100 – Glass and Glazing

2.9 ACCESSORIES

A. General: Provide accessories as standard with metal building system manufacturer and as specified.

B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, filler, closure strips and similar items. Match material and finish of metal roof panels unless otherwise indicated.

C. Wall Siding Accessories: Provide components required for a complete metal wall siding assembly including copings, fasciae, mullions, sills, corner units, sealants, gaskets, filler, closure strips and similar items. Match material and finish of metal wall panels unless otherwise indicated.

D. Flashing and Trim: Provide as standard with metal building system.

E. Gutters: Provide as standard with metal building system.

F. Downspouts: Provide as standard with metal building system.

G. Fascia and Rake: Provide as standard with metal building system. Color: Match roof.

H. Pipe Flashing: Provide as standard with metal building system.

I. Framed Opening, Flashing, and Trim for Windows and Doors: Provide as standard with metal building system.

J. Wall to Foundation Flashing: Provide as standard with metal building system.

K. Wall to Roof Flashing: Provide as standard with metal building system.

L. Light Fixture and Mechanical Pipe Flashing: Provide as standard with metal building system.

M. Roof Cap Flashing: Provide as standard with metal building system.

2.10 FABRICATION

A. General: Design components and field connections required for erection to permit easy assembly.

1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.

2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape and location. Members shall be free of cracks, tears, and ruptures.

B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.

C. Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.

1. Make shop connections by welding or by using high strength bolts.

2. Join flanges to webs of built-up members by a continuous, submerged arc-welding process.

3. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin web or girt web, so flange compressive strength is within allowable limits for any combination of loadings.

A. Flange braces not allowed on girts.

4. Weld clips to frames for attaching secondary framing if applicable, or punch for bolts.

5. Shop Priming: Provide as standard with metal building system.

a. Color: Gray.

D. Secondary Framing:

1. Make shop connections by welding or by using non-high-strength bolts.

2. Shop Priming: Provide as standard with metal building system.

a. Color: Gray.

E. Metal Panels: Fabricate and finish metal panels at the factory, to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.

1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

2.11 SOURCE QUALITY CONTROL

A. In-Plant Inspection: In-plant inspection services and reports will be provided by an independent inspector retained by County. In-Plant Inspector will verify that metal building manufacturer maintains detailed fabrication and quality-control procedures, and shall have full access to all manufacturing plant operations involving work of this Project.

1. In-Plant Inspector to be notified at least 5 working days prior to commencement of production of building.

2. In-Plant Inspector to be notified in advance of those operations requiring observation.

3. Obtain written release from In-Plant Inspector before metal building system components are removed from manufacturing plant for delivery to Project site.

B. Correct deficiencies in the Work that Inspector's reports indicate do not comply with specified requirements.

3.0 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with erector present, for compliance with requirements and metal building system manufacturer's tolerances.

1. Engage land surveyor to perform surveying.

C. Proceed with delivery and erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and prepare surfaces thoroughly prior to installation.

B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads equal in intensity to design loads. Remove temporary supports when permanent structural framing connections and bracing are in place, unless otherwise indicated.

3.2 PREPARATION

A. The erection of the metal building and the installation of accessories shall be performed in accordance with the metal building manufacturer's erection manuals and the building erection drawings. The erection shall be performed by a qualified erector using proper tools and equipment. In addition, erection practices shall conform to Section 4, Common Industry Practices found in the most current version of the Metal Building Systems Manual. There shall be no field modifications to primary structural members except as authorized and specified by manufacturer.

3.3 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: County will engage a qualified testing and inspecting agency to perform field quality control inspections and submit reports.

B. Correct deficiencies in Work that test and inspection reports indicate do not comply with specified requirements.

1. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

3.5 CLEANING

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

C. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing and accessories.

1. Clean and prepare surfaces by SSPC-SP 2 “Hand Tool Cleaning” or by SSPC-SP3, “Power Tool Cleaning”.

2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

D. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

Division 23:
HVAC

SECTION 230500 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The General Conditions, Supplementary General Conditions, and Division 1 - General Requirements, are hereby made a part of this Section as if repeated herein.

B. These General Provisions apply to the entire Division 23, Heating Ventilating and Air Conditioning (HVAC).

1.2 DESCRIPTION

A. Work Included: Furnish all labor, materials, equipment and pay all fees required to complete all HVAC work shown on the drawings and specified herein.

1.3 RELATED WORK ELSEWHERE

A. Division 03, “Concrete”.

B. Division 07, “Special Conditions”.

C. Division 07, “Penetration Firestopping”.

D. Division 07, “Joint Sealants”.

E. Division 08, “Access Doors and Frames”.

F. Division 09, “Painting”.

G. Division 26, “Electrical”.

H. Related work included in other sections:

1. Landscape Irrigation.
2. Site Work.
3. All work in every Section must also comply with such general conditions of the specifications as are applicable, including, but not limited to
    a. Instructions to Bidders
    b. General Conditions
    c. Special Conditions
    d. Supplementary Conditions
    e. Division 1 General Requirements

4. Consult all other Sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete and operable installation. This section is provided to assist Contractor in coordination of work scope but shall not be construed to limit Contractor's scope of work encompassed by the contract documents.
5. Coordination with other Trades:
   a. The following table is intended to assist the Contractors in coordinating the scope of work between Division 23 HVAC (indicated as 23 in table), Division 25 Building Automation Systems (indicated as 25), and other Divisions as indicated. However, the General Contractor is ultimately responsible for coordination among his subcontractors regardless of what is listed in this Section.

TRADE RESPONSIBILITY MATRIX					
System	Division under which the following is specified				Remarks
	Equipment	Installation	Power wiring (remark 1)	Control & interlock	
A. MECHANICAL EQUIPMENT					
1. Motors, 3 phase	23	23	26	–	
2. Motor starters, 3 phase	26	26	26	23/25	
3. Motors, 1 phase	23	23	26	26	2, 3
4. Other powered equipment	23	23	26	23/25	
5. Disconnects	23/26	26/23	26	26	4
B. BUILDING AUTOMATION SYSTEM (BAS)					
1. Central control workstations & servers	23/25	23/25	26	25	
2. Control system network backbone	23/25	23/25	25	25	
3. Line voltage control devices to 120V motors	23/25	26	26	26	3
4. Control panels	23/25	23/25	25	23/25	5
5. Control devices	23/25	23/25	23/25	23/25	
C. HVAC SHEET METAL					
1. Duct mounted sensors	22/25	23/25	23/25	23/25	

TRADE RESPONSIBILITY MATRIX					
System	Division under which the following is specified				Remarks
	Equipment	Installation	Power wiring (remark 1)	Control & interlock	
2. Filter gauges	23	23	–	–	
3. Control dampers	23	23	23/25	23/25	6
4. Control damper actuators	23/25	23/25	26	23/25	6, 7
D. MISCELLANEOUS					
1. Thermal and acoustical insulation in and on partitions and ceilings	07	07	–	–	
2. Painting of exposed piping, HVAC equipment, etc.	09	09	–	–	
3. Framing of walls and ceilings to accept air outlets, fire dampers, etc.	23	23	–	–	10
4. Ceiling and wall access doors	23	23	–	–	11

NUMBERED REMARKS:

1. Wiring includes raceway, fittings, wire, boxes and related items, all voltages.
2. Single phase 120V motors with integral motor overload protection specified under Division 23 HVAC.
3. Line voltage control device such as thermostat or switch specified under Division 25 BAS; wiring and conduit between control device and motor specified under Division 26 Electrical.
4. Disconnects are specified under Division 23 HVAC only where specifically called for in equipment schedules or specifications to be factory installed with equipment.
5. Power to all BAS control panels is specified under Division 23. Coordinate with existing building services and operators for available circuits.
6. Duct access doors required for access to control devices where required specified under Division 23 HVAC.
7. Actuators for motorized dampers supplied with fans or hoods where scheduled on HVAC drawings are specified under Division 23 HVAC, mounted but not wired.
8. Factory wired control transformer, safeties and contactors with single point power wiring connection specified under Division 23 HVAC.
9. Division 23 HVAC Contractor shall identify all mechanical related equipment and appurtenances to be retained, if applicable.
10. Additional T-bar or spline and cut ceiling tile as required to accept air outlets is specified under Division 23. Comply with UC Berkeley Facility Design Standards.
11. Access doors to mechanical equipment and coordination with Architect, specified under Division 08.

1.4 INCORPORATED DOCUMENTS

A. Published specifications, standards, tests or recommended methods of trade, industry or governmental organizations apply to work of this Section, including those noted below:

1. Associated Air Balance Council (AABC).
2. American Gas Standard (AGA).
3. Air Moving and Conditioning Association (AMCA).
4. American National Standards Institute (ANSI).
5. Adhesive and Sealant Council (ASC),
6. American Society of Mechanical Engineers (ASME).
7. American Society for Testing and Materials (ASTM).
8. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).
9. National Environmental Balancing Standards (NEBB)
10. National Electrical Manufacturers Association (NEMA).
11. National Fire Protection Association (NFPA).
12. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
13. Underwriters' Laboratories, Inc. (UL).
14. Air Moving and Conditioning Association (AMCA).
15. Air Diffusion Council (ADC).

1.5 LEGAL REQUIREMENTS AND STANDARDS

A. General: Comply with applicable sections of state and local codes, laws ordinances, rules and regulations of authorities having jurisdiction.

B. Codes and Standards: Conform to applicable sections of codes and standards, including:

1. California Energy Conservation Code, Title 24.
2. Department of Health Care Access and Information (HCAI).
3. State Fire Marshal requirements.
4. California Electric Code (CEC).
5. California Building Code (CBC).
6. California Mechanical Code (CMC).
7. California Plumbing Code (CPC).

C. Minimum Requirements:

1. Comply with requirements of authorities as minimum acceptable work.
2. The drawings and specifications take precedence when they call for materials or construction of better quality or larger size than required by codes, laws, rules and regulations.

1.6 QUALITY ASSURANCE

A. Products Criteria:

1. Supply all equipment and accessories new, free from defects.
2. Supply all equipment and accessories in compliance with the applicable standards listed in Article 1.4 of this sections and with all applicable national, state, and local codes.
3. Electrical Equipment: Listed by UL and shall bear their label.
4. Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 3 years. See other specification sections for any exceptions.
5. Products shall be supported by a service organization that maintains a complete inventory of repair parts and is located reasonably close to the site.
6. When two or more units of materials or equipment of the same type or class are required. These units shall be products of one manufacturer.
7. Manufacturers of equipment assemblies, which use components made by others, assume complete responsibility for the final assembled product.
8. Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped, or otherwise permanently marked on each item of equipment.
9. Asbestos products, equipment or materials containing asbestos shall not be used.
10. Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the Owner prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

B. Qualifications of Installers: For the actual fabrication, installation and testing of work under this Section, use only thoroughly trained and experienced workmen completely familiar with the items required and the manufacturer' current recommended methods of installation.

C. Requirements of Regulatory Agencies and Standards:

1. Permits: All fees, permits and inspections are owner's responsibility. Deliver all certificates of inspection to Architect.
2. Arrange and pay all costs for utilities required to complete all work of this Division. Connection to all utility company or on-site services, payment of service charges and provision for and installation of temporary utilities is included.
3. The requirements of authorities shall be minimum acceptable requirements for the work. When contract drawings or specifications call for materials or construction of better quality for larger size than required by codes, laws, rules and regulations, the drawings and specifications take precedence.

D. Drawings:

1. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. All scaled and figured dimensions are approximate and are given for estimating purposes only. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings,

valves, traps, and other devices that may be required to complete the installation. Before proceeding with any work, carefully check and verify all dimensions and sizes.

2. As far as possible the work has been indicated on the drawings in such position as to suit and adapt to the work of other trades, but the work as indicated is largely diagrammatic and shown primarily for clarity. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the work of all other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown.
3. When apparatus and equipment have been indicated on the drawings, dimensions have been taken from typical equipment of the class indicated. The locations of apparatus, piping, and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid al obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.
4. Where equipment is furnished by others, verify dimensions and the correct locations of this equipment before proceeding with the rough-in of connections.
5. Be responsible for any cooperative work which must be altered due to lack of proper supervision or failure to make proper provision in time. Such changes shall be directly supervised by the Architect and made to his satisfaction.
6. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for submittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

1.7 COORDINATION

A. Coordinate size and location of structural-steel support members.

B. Coordinate sizes and locations of concrete bases with actual equipment provided.

C. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

D. Refer to §1.12 for Submittal Requirements.

1.8 DEFINITIONS

A. Exposed: Piping, ductwork, and equipment exposed to view in finished rooms, or completed work.

B. Option or Optional: Contractor’s choice of an alternate material or method.

C. Install: To physically erect, mount and connect complete with related accessories.

D. Supply: To purchase, procure, acquire, and deliver complete with related accessories.

E. Furnish or Provide: To supply, install, complete connections, and ready for safe and regular operation of work referred to, unless specifically noted otherwise.

F. Work: Labor, materials, equipment, apparatus, controls, accessories, and other items required for proper and complete installation.

G. Wiring: Raceway, conduit, fittings, wire, boxes, and related items.

H. Concealed: Embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces, or in enclosures, and not exposed to view in the completed work.

I. Reviewed, Satisfactory, Accepted, or Directed: As reviewed, satisfactory, accepted or directed, by or to Engineer.

J. Motor Controllers: Manual or magnetic starters (with or without switches), individual pushbuttons or hand (HOA) switches controlling the operation of motors.

K. Control or Actuating Devices: Automatic sensing and switching devices such as thermostats, pressure, switches, and relays, etc., controlling operation of equipment.

L. Indicated, as Shown, or Noted: As indicated, shown, or noted on Drawings or Specifications.

M. Similar or Equal: Of base bid manufacturer, equal in materials, weight, size, design, and efficiency of specified product.

N. Engineer: Mechanical Engineer of Record.

O. Accessible: Capable of being reached without the use of ladders, or without climbing or crawling under or over obstacles such as motors, fans, pumps, belt guards, transformers, high voltage lines, piping, and ductwork.

1.9 ELECTRICAL WORK

A. Quality: Work shall comply with requirements of Division 16 and applicable codes.

B. Wiring: all wiring shall be in electrical conduit or as indicated on drawings.

C. HVAC Control Wiring: Provide control wiring for starter holding coils, relays, interlock, and temperature controls.

D. Provide controls, controllers, relays, transformers, switches, time clocks, etc., required by work of this Division. Install duct mounted smoke detectors furnished by Fire Alarm products.

1.10 SUBSTITUTION OF MATERIALS:

A. The design has been based on the manufacturer's name and product listed on the drawings or named first in these specifications. Other manufacturers' names or same manufacturer but different product line listed in these specifications may be selected and considered "as equal" for quality only; however, they must match the performance, construction, fit and features of those selected for design. The acceptance of these does not relieve the Contractor for responsibility of providing the required materials and providing a workable system.

1. In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".
2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be reviewed, and the submittal will not be allowed.

B. Should the contractor wish to substitute equipment or material other than those considered for the basis of design, the contractor shall submit information as called for in "Submittal of Materials and Equipment" for both the specified or scheduled item and the substitute item. These submittals will show that both the specified and the substitute material match in quality, performance, construction, fit and features of those selected for design. Any equipment or material submitted for substitution without the comparison information will not be reviewed or acceptable.

C. Liability of Substitutions:

1. Performance of substitutions must be equal to the item specified. If the substituted item fails to perform according to the specifications, replace with the originally specified item without extra compensation on request of the Architect any time within the guarantee period.
2. The contractor is responsible for the cost of any changes to other trades and additional Architectural and Consulting fees resulting from approved substitutions in mechanical equipment.
3. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications, or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
4. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.

1.11 SUBMITTAL OF MATERIALS AND EQUIPMENT

A. Submittal:

1. Submittals for a product or material or area of work must be complete. PIECEMEAL SUBMITTAL WILL NOT BE ACCEPTABLE**.** All submittals shall be factory or manufacturer certified. Vendor's submittal data not acceptable.
2. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.
   a. Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
   b. Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page, and item numbers.

3. Identify submittal with Architect's project name, number and with item designation as indicated on drawings, and referenced to applicable paragraphs of the specification. Submit in brochure form.

B. Review of Submittal: These will be reviewed for general design only, and not for method of assembly, erection, construction, or detailed compliance with contract documents. All submittals shall be factory or manufacturer certified. Submittal technical data and dimensions by Vendor are not acceptable.

C. Manufacturer's Data:

1. Include data for all material and equipment that will be installed.
2. Include complete catalog information such as construction, capacities, types, fan curves, pump curves, sizes, etc. Also include dimensional data, and sufficient information to illustrate compliance with the specifications and list labeling and/or approving agencies and standards of design employed in manufacturer data.

D. Shop Drawings:

1. Prepare dimensionally accurate floor plans and Sections in tight conditions as required of all equipment rooms and all floor plans. Show all equipment, complete ductwork, piping (including plumbing and sprinkler pipes), accessories, and clearances for operating servicing and coordination with other systems. Indicate bottom elevation for both pipes and ductwork.
2. Automatic temperature control systems, wiring diagrams, control panel boards. Include in wiring diagrams all low and line voltage wiring and equipment.
3. Drawings clearly identified with the Architect's project name and number, and a sheet title identifying its contents.
4. Show location of thermostat(s) and sensors.

1.12 SHOP, OFFICE, AND STORAGE

A. Provide temporary shop, office, and storage space on site only at locations approved by Architect, as required for execution of work. Remove these facilities upon completion of work.

1.13 JOB CONDITIONS

A. Where new pipes are to be connected to an existing pipe, verify location, size, elevation, and all other information necessary for connection. This verification shall be done prior to installation of the new pipe. Should there be a problem, contact the Architect immediately to resolve the problem.

B. Interruption of Services:

1. Before making any connections or doing any work which interrupts services to existing buildings, notify Owner in writing at least 72 hours in advance; and such work performed as quickly as possible and only at such times as designated by Owner.
2. Length of time existing services is shutdown to be approved by Owner.

C. Restoration of Damage: Repair or replace, as directed by Architect**,** materials and parts of premises which become damaged because of installation of work of this Division. Remove replaced parts from premises. Keep accumulation of dust and debris to a minimum. Remove and dispose of debris in a legal manner. Burning and/or selling material at the site is prohibited.

D. Storing Mechanical material in Premises:

1. Duct and mechanical equipment on site must be covered before installation.

E. Cleaning Equipment and Premises:

1. Clean equipment and materials: Remove all dirt, grease, splashed paint, plaster and similar foreign materials. Restore damaged finishes to original condition.
2. Site Cleaning: Remove from site all packing cartons, scrap materials and other rubbish resulting from operations.

1.14 REVIEW OF CONSTRUCTION

A. Work may be reviewed at any time by representatives of Owner or representatives of Architect.

B. Advise Architect that work is ready for review at following times:

1. Prior to backfilling buried work.
2. Prior to concealment of contract have been completed.
3. When requirements of contract have been completed.
4. Do not backfill or conceal work without Architect’s consent.

C. Maintain on job a set of specifications and drawings for use by Architect’s representative.

D. Noncompliance: Should any of the work be covered up or enclosed prior to all required inspections and approvals, uncover the work as required and, after it has been completely inspected and approved, make all repairs and replacements with such materials as are necessary to the approval of the Architect and at no additional cost to the Owner.

1.15 MATERIALS

A. In addition to material and equipment specified, also provide incidental materials required to effect complete installation. Such incidental materials and equipment shall be uniform throughout the installation. Equipment or fixtures of the same type shall be of same manufacturer.

B. Protection of Materials:

1. Protect materials, equipment and apparatus provided under this Division from damage, water, dust, or similar impairment, both in storage and installation until Notice of Completion has been filed. Materials, equipment, or apparatus damaged because of improper storage or protection will be rejected and must be removed from the site.
2. Cap openings in pipes and ends of valves with manufactured caps and fittings. Do not use taped caps.
3. Protect premises and work of other Divisions from damage arising out of installation of work of this Division.

1.16 TESTING

A. Provide tests specified hereinafter, where applicable. Provide written verification that the tests have been successfully completed.

1.17 RECORD DRAWINGS (AS-BUILT DRAWINGS)

A. Contractor shall provide and keep up to date a complete and accurate "as-built" record set of blue line prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This record shall be kept up to date on blue line prints as the job always progresses and made available for inspection. Submit completed drawings to Architect in compliance with Division 1.

B. Include on as-built drawings:

1. Changes in location of piping, duct, or equipment from construction documents. Bottom elevations of each duct and pipe.
2. Ceiling and duct access panel locations.
3. Location of temperature control devices including, stats, selected zones, etc.
4. Location of all equipment.

1.18 OPERATING AND MAINTENANCE DATA

A. General: Submit to the Architect before acceptance of the installation, complete and at one time. Partial or separate data will not be accepted. Data shall consist of the following minimum submissions:

1. Piping Identification Schedule: Copy of charts as specified under valve tags and charts.
2. Simplified and consolidated control drawings.
3. Equipment: List of nameplates, including nameplate data and system served.
4. Manufacturer's Literature: manufacturer's instructions for operation and maintenance of all mechanical equipment, including replacement parts list.
5. Written Instructions: Typewritten instructions for operation and maintenance of these systems composed of Operating Instructions and Maintenance Schedule.
6. Operating Instructions: A brief description of the system indicating proper setting of switches and other equipment furnished for providing control of the system and its components by the operator. Do not include adjustments requiring the technical knowledge of the service agency personnel.
7. Maintenance Instructions: A list of each item of equipment requiring inspection or lubrication, describing the performance of such maintenance, and the month of the year when each item of equipment should be inspected, serviced, or lubricated.
8. Maintenance Schedule: A list of each item of equipment requiring maintenance, showing the exact type of bearing on every component of each item of equipment, and the frequency when each item of equipment should be inspected or serviced.
9. Verbal Instructions: Upon completion of the work, and at a time designated by the Architect, instruct the Owner's representative in the operation and maintenance of the equipment supplied by his company.
10. Submission in PDF format.

1.19 COMPLETION

A. Before Final Review: The work hereunder will not be reviewed for final acceptance until Operating and Maintenance Data, Manufacturer's Literature, Valve Directories, Piping Identification Code Directory, and nameplates specified herein have been approved and properly posted in the building and final cleaning has been completed.

B. Demonstration of Operations: When the installation is complete and adjustments specified herein have been made, operate the systems for one week, during which time demonstrate to the Architect that systems are completed and operating in conformance with these specifications.

1.20 GUARANTEE

A. General: Conform to the GENERAL CONDITIONS of the specifications.

B. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (2) year after final acceptance. If, during this period, any materials, equipment, or any

part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

C. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of two (2) years after date of acceptance of his work.

D. Parts Warranty: Provide standard warranty of manufacturer for replacement of parts to apply after expiration of above period. Furnish replacement parts to Owner or to his service agency as directed. Furnish Owner printed manufacturer's warranties' complete with material included and expiration dates upon completion of project.

E. Warranty also applies to services including instructions, adjusting, testing, noise, balancing, etc.

PART 2 - PRODUCTS

2.1 GENERAL

A. Beyond material and equipment specified, also provide incidental materials required to effect complete installation. Such incidental materials include solders, tapes, caulking, mastic, gaskets, and similar items.

B. Materials and equipment shall be uniform throughout the installation. Equipment of the same type shall be of same manufacturer.

C. Products from other manufacturers not listed shall submit specifically in accordance with Specification Section 01630 – Product Substitution Procedures.

2.2 HANGERS AND SUPPORTS

A. All required seismic bracing shall be installed as per Title 24, Part 2, 2022 CBC for total lateral forces prescribed in ASCE 7 Section 13.3 as defined in ASCE 7-10.

B. Installation shall be based on HCAI anchorage pre-approved restraint system. All hanger material to be electroplated zinc or hot-dipped galvanized. No plain (black) finish allowed.

C. Trapeze suspension (trapeze hangers may be used for parallel lines if pipes pitch same direction): Size channel assembly in accordance with manufacturer’s published load ratings. No deflections shall exceed 1/360 of span (refer to Superstrut load tables).

D. Support and laterally brace all ducts, pipes, and equipment per latest SMACNA Manual Standards.

E. Do not support weight of piping from mechanical equipment, i.e., coil connections.

F. Do not cut or weld to any structural steel without permission of Architect.

G. Provide Semco, Trisolator, or equal pipe isolator at all hangers for non-insulated pipes.

H. Schedule of hangers and supports:

INDIVIDUAL PIPE HANGERS		
Pipe Size - inches	Hanger	Minimum Rod Size - inches
½" thru 2"	Superstrut C711	3/8"

TRAPEZE HANGERS	
Single or Double 12 Gauge Channel	Superstrut A1200 or A1202
Straps	Superstrut 70 or 702 series
Pipe Isolators	Superstrut 1-716 Cush-A-Clamp

WALL SUPPORT	
Individual pipe sizes up to 3"	Superstrut S250
Individual pipe sizes 4" thru 8"	Superstrut S251

2.3 ROOF & WALL PENETRATIONS

A. Escutcheons: Provide 1" wide chrome or nickel-plated plates on all pipes exposed to view, passing through walls, partitions, etc. Escutcheons sized to fit pipe and pipe covering and give a finished appearance. Escutcheons held in place by set screws. Provide plates on pipes extending through sleeves.

2.4 ACCESS DOORS

A. Refer to Division 08.

B. Coordinate all locations with Architect and other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, regardless of specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

2.5 SEISMIC RESTRAINTS

A. All mechanical equipment shall be braced or anchorage to resist horizontal force acting in any direction using the following criteria:

1. The total design lateral seismic force shall be determined from ASCE 7 Section 13.3.1, California Building Code (CBC) 2022. Forces shall be applied in their horizontal directions, which result in the most critical loadings for design. The value of a_p (component amplification factor) and R_p (component of modification factor) of Section 13.3.1 shall be selected from Table 13.6-1, ASCE 7. The value of I_p (seismic importance factor) and S_{DS} (special acceleration) shall be selected from Section 13.1.3 and Section 11.4.4, ASCE 7, respectively.

B. For Supported Equipment:

1. Pre-approved isolator restraint system by the State of California HSAI and bear approval number.
2. Submittal shall include load versus deflection curves up to 1/2" in the x, y, and z planes. Tests shall be conducted in an independent laboratory or under the signed supervision of an independent registered engineer. The snubber assemblies shall be bolted to the test machine as the snubber is normally installed. Test reports shall certify that neither the bridge bearing neoprene elements, nor the snubber body has sustained any obvious deformation after release from the load.
3. Submit calculations for each seismic restraint and vibration isolation signed by structural Registered Engineer.

C. Seismic Restraint Systems for Ductwork and Piping:

1. Piping, ductwork, and electrical distribution systems shall be braced to comply with the forces and displacements prescribed in ASCE 7-10 Section 13.3 as defined in ASCE 7-10 Section 13.6.8, 13.6.7, 13.6.5.6, and 2022 CBC Section 1616A.1.23, 16A.1.24, 1616A.1.25 and 1616A.1.26.
2. The bracing and attachments to the structure shall be detailed on the approved drawings or they shall comply with one of the HSAI pre-approval of manufacturer's certifications (OPM) as modified to satisfy anchorage requirements of HACI 318-14 Chapter 17.
3. Copies of the OPM manual(s) shall be on the jobsite prior to the start of hanging and bracing of the ductwork and pipe distribution systems.

2.6 IDENTIFICATIONS

A. Piping:

1. Identify all piping with Brady Perma-Code, Stenton, or approved equal, self-sticking pipe markers consisting of pipe content wording and arrow indicating directions of flow on A.S.A. color background.
2. Arrow and wording are two separate markers which shall be placed immediately adjacent to each other.
3. Markers to be 50 feet apart (maximum) on centers and shall occur where a pipe enters and leaves a concealed space.
4. Use 2" high letter size for pipe or insulation 3" or larger, and 1" size for pipe or insulation 2½" or smaller.

5. Provide at each end of each marker Brady or equal 2¼" wide self-sticking clear tape around the periphery of pipe or insulation to further secure the marker.
6. All markers shall be installed after finish painting is complete.

B. Piping Label Colors:

SERVICE	BACKGROUND COLOR	LETTER COLORS
Refrigerant	Mauve	Black

C. Equipment: Each piece of motor-driven equipment shall be identified by engraved plastic-laminate signs. Signs shall be a minimum of 4½" x 1½"with minimum of ½" high white letters on a black background, mounted permanently on equipment. The names shall correspond to those given on the control panels be identified as to the area or space served by the equipment.

2.7 TOOLS AND LUBRICANTS

A. Furnish and turn over to the owner special tools, 2 sets minimum, for each type or size of tool not readily available commercially, that are required for disassembly or adjustment of equipment and machinery furnished.

B. Grease guns with attachments for applicable fittings: one for each type of grease required for each motor or other equipment.

C. Tool containers: Hardwood or metal, permanently identified for intended service and mounted, or located where directed by the owner.

D. Lubricants: A minimum of one quart of oil and one pound of grease of equipment manufacturer's recommended grade and type in unopened containers and properly identified as to use for each different application.

PART 3 - EXECUTION

3.1 REVIEW OF CONSTRUCTION

A. Work may be reviewed any time by representative of Architect.

B. Advise Architect that work is ready for review at following times:

1. Before concealment of work in walls and above ceilings.
2. When requirements of Contract have been completed.

C. Do not conceal work without Architect's consent.

D. Maintain on project site a set of specifications and drawings for use by Architect's representative.

3.2 NOISE AND VIBRATION

A. Correct conditions at no cost to the Owner if noise or vibrations because of improper material or installation occurs in the building.

3.3 GENERAL INSTALLATION METHODS

A. Carpentry, Cutting, Patching and Core Drilling:

1. Provide carpentry, cutting, patching, and core drilling required for installation of material and equipment specified in this Division.
2. Do not cut, core or drill structural members without consent of Architect.
3. All asphalt and concrete sawing shall not have any outside corners cut.

B. Waterproof Construction:

1. Maintain waterproof integrity of penetration of materials intended to be waterproof. Caulk penetrations of foundation walls and floors watertight. Provide membrane clamps at penetrations of waterproof membranes.
2. Provide weatherproof NEMA 3R enclosures for all equipment or devices mounted outside or otherwise exposed to the weather.

C. Mechanical Equipment:

1. Where not otherwise indicated, basis for equipment and material installation is published recommendations of respective manufacturers.
2. Equipment:
   a. Accurately set and level with supports neatly placed and properly fastened. No allowance of any kind will be made for negligence on part of Contractor to foresee means of bringing in, installing equipment into position inside building.
   b. All equipment shall be installed accessible on all sides with operable areas having a minimum space clearance as recommended by the manufacturer.
   c. Where the School District determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, equipment shall be removed, and reinstalled or remedial action performed as directed at no additional cost to the Owner.

D. Piping and/or Ductwork Systems:

1. Work into complete integrated arrangement, with like elements to make work neat appearing finish.
2. Run concealed, except as shown otherwise.
3. Exposed pipes and ductwork to run parallel with walls or structural element. Do not install any exposed pipe or ductwork without prior approval of Architect.
4. Install with adequate passageways free from obstructions, as high as practicable to maintain adequate head room, as shown or as required. Coordinate with work of other Divisions to achieve proper head room as specified in this Division.

5. Clearance: Do not obstruct spaces required by code in front of electrical equipment, access doors, etc.

3.4 TESTING AND ADJUSTING

A. General: All defects disclosed as result of the following or other tests or operations shall be promptly repaired by and at expense of Contractor and to Architect's satisfaction. Test shall comply with all necessary codes, rules, and regulations as noted herein before. Contractor shall supply all instruments, labor and tools required by tests. Any defective material and/or equipment shall be repaired, adjusted, and replace by new, like materials and equipment, and retested before acceptance.

B. Clean and purge equipment and piping before each test.

C. Test various mechanical systems in portions as work progresses. Any system or portion previously tested to become part of any repeated test when it becomes part of distribution or collection system.

D. Maintain test pressures for periods stated, or as directed, without loss in pressure except that due to change in temperature or authorities having jurisdiction.

E. Operational Tests: Operational tests shall be made on all machinery and devices to determine proper compliance with specifications. All equipment shall function quietly and efficiently; any undue noise or vibration caused by malfunctioning of piping and equipment shall be promptly repaired and/or corrected before acceptance.

3.5 INSTALLATION OF PIPING AND EQUIPMENT

A. Closing-In of un-inspected Work: Do not allow or cause any of the work to be covered up or enclosed until it has been inspected, tested, and approved by the Architect. Any work enclosed or covered prior to such inspection and test shall be uncovered and, after it has been inspected, tested, and approved, make all repairs with such materials as may be necessary to restore all work, including that of other trades, to its original and proper condition.

B. Cut pipe accurately to measurements established at the building; work into place without springing or forcing; properly clear all windows, doors and other openings. Excessive cutting or other weakening of the building structure to facilitate piping installation will not be permitted.

C. Make all changes in direction with fittings and changes in main sizes through eccentric reducing fittings. Unless otherwise noted, install water supply and return piping with straight side of eccentric fittings at top of pipe.

D. Wire for hanging or strapping pipes not permitted.

E. Support each run of piping independently from all other piping.

F. Equipment Access

1. Install all piping, equipment, and accessories to permit access for maintenance. Relocate piping, equipment and accessories required to provide maintenance access at no additional cost.
2. Furnish access doors where any valves and equipment requiring access for servicing, repairs or maintenance located in walls, chases, or above ceilings. Coordinate the location of access doors of access doors with and install by the applicable Contractor installing walls or ceilings.

G. Install gauges, thermometers, valves and other devices with due regard for ease in reading or operating and maintaining said devices. Locate and position thermometers and gauges to be easily read by operator or staff standing on floor or walkway provided. Servicing shall not require dismantling adjacent equipment or pipe work.

3.6 PIPE JOINTS

A. Copper Tubing:

1. Cut square, remove burrs, and clean pipe and inside of female fitting to a bright finish with steel wool, wire brush, sandpaper or emery cloths. Apply solder flux with brush to tubing. Remove internal parts of solder-end valves prior to soldering.
2. Provide dielectric unions at points of connection of all copper tubing and any ferrous piping and equipment.
3. Joining of Copper Pipes:
   a. Piping 1 ½" and smaller: 95-5 solder
   b. Piping larger than 1-½": Sil-Fos brazing 1000°F minimum.
   c. All solder shall be lead free.

3.7 HANGERS AND SUPPORTS:

A. Piping:

1. Space hangers and supports for horizontal copper tubing according to the following schedule:

TUBE SIZE - inches	MAXIMUM SPACING
1" and smaller	6 feet on center
1¼" and 1½"	7 feet on center
2" and 2½"	8 feet on center
3" and larger	10 feet on center

2. Space hangers and supports for horizontal iron pipes according to the following schedule:

PIPE SIZE - inches	MAXIMUM SPACING
1¼" and smaller	8 feet on center
1½" thru 3"	10 feet on center

a. * Locate hangers within 18" of each joint per Uniform Building Code.

3. Safety Hanger Wires:
   a. For air diffusers and other mechanical units to be mounted on suspended grid ceiling systems and weighing less than 20 pounds may be supported directly on the runners of a heavy-duty grid system but, in addition, they must have a minimum of two (2) #12 gage slack safety wires attached to the fixture at diagonal corners and anchored to the structure above.
   b. In advance of ceiling hanger-wire work, provide to job site layouts and/or instruction necessary for proper installation of safety wires.
   c. Connect safety wires to mechanical diffusers and equipment.
   d. For diffusers and equipment units weighing 20 pounds or more must be independently supported by not less than four (4) taut #12 gage wires, each attached to the fixture and to the structure above. The four (4) taut #12 gage wires, including their attachment to the structure above, must be capable of supporting four (4) times the weight of the unit.

3.8 VIBRATION ISOLATION

A. The entire system, including equipment, air ducts, pipes, motors, and all other parts must be noiseless and free of vibration transmission.

B. The Contractor shall not install any equipment or pipe which makes rigid contact with the "building" unless it is approved in this specification or by the Architect. "Building" includes slabs, beams, studs, walls, lath, etc.

C. The installation or use of vibration isolators must not cause any change of position of equipment or piping which would result in stresses in piping connections or misalignment of shafts or bearings. To meet this objective, equipment and piping shall be maintained in a rigid position during installation. The load shall not be transferred to the isolator until the installation is complete and under full operational load.

D. The Contractor shall correct, at no additional cost, all installations which are deemed defective in workmanship or materials by the Architect.

3.9 PROTECTION, CARE, AND CLEANING

A. Provide adequate means for, and fully protect, all finished parts of the materials and equipment against physical damage from whatever cause during the progress of this work and until final completion.

B. During construction, properly cap all lines and equipment nozzles to prevent the entrance of sand, dirt, etc. Protect equipment against moisture, plaster, cement, paint, or other work of other trades by covering it with polyethylene sheets.

C. After installation has been completed, clean all systems.

D. Piping, Ductwork and Equipment to be insulated: Clean exterior thoroughly to remove rust, plaster, cement, and dirt before insulation is applied.

E. Piping, Ductwork and Equipment to be painted: Clean exterior of piping, ductwork and equipment, exposed in completed structure, removing rust, plaster cement, and dirt by wire brushing. Remove grease, oil, and similar materials by wiping with clean rags and suitable solvents. Touch up primer coat as required.

3.10 LUBRICATION

A. Upon completion of the work and before turning over to the Owner, clean and lubricate all bearings except sealed and permanently lubricated bearings. Use only lubricant recommended by the manufacturer.

3.11 PAINTING

A. Properly prepare work under this Division to be finish painted under SECTION 09 91 00, "PAINTING".

B. Paint duct black behind grilles and diffusers where duct is visible.

3.12 COMPLETION

A. Before Final Review: The work hereunder will not be reviewed for final acceptance until Operating and Maintenance Data, Manufacturer's Literature, Valve Directories, Piping Identification Code Directory and name plates specified herein have been approved and properly posted in the building and final cleaning has been completed.

B. Demonstration of Operations: When the installation is complete and adjustments specified herein have been made, operate the systems for a period of one week, during which time demonstrate to the Architect that systems are completed and operating in conformance with these specifications.

END OF SECTION

SECTION 230553 – IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Pipe labels.

1.2 SUBMITTAL

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick.
2. Letter Color: White.
3. Background Color: Black.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number.

C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to partially cover circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.

2. Lettering Size: At least 1-1/2 inches high.

PART 3 - EXECUTION

3.1 GENERAL

A. Fasten a red-headed tack to each T-bar suspended ceiling push out tile at heating/cooling coils, filter changing locations, fire and fire/smoked dampers, valves, control devices. etc. requiring any form of maintenance.

3.2 PREPARATION

A. Clean piping and equipment surface of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulates.

3.3 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.4 PIPE LABEL INSTALLATION

A. Piping Color-Coding: Painting of piping is specified in Division 09 Section "Interior Painting".

B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.

2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.

3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.

4. At access doors, manholes, and similar access points that permit view of concealed piping.

5. Near major equipment items and other points of origination and termination.

6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.

7. On piping above removable acoustic ceilings. Omit intermediately spaced labels.

C. Pipe Label Color Schedule:

1. Refer to Specification Section 23 05 00 Common Work Results for HVAC.

END OF SECTION

SECTION 230593 – TESTING, ADJUSTING & BALANCING HVAC

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Balancing Air Systems: Constant-volume air systems.

1.2 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

C. NEBB: National Environmental Balancing Bureau.

D. TAB: Testing, adjusting, and balancing.

E. TABB: Testing, Adjusting, and Balancing Bureau.

F. TAB Specialist: An entity engaged to perform TAB Work.

1.3 SUBMITTALS

A. Submittal:

1. Air-Balance Report: Documentation of work performed for ASHRAE 111-2024."

B. Strategies and Procedures Plan: Within 90 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

C. Certified TAB reports.

1.4 QUALITY ASSURANCE

A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC, NEBB or TABB.

1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC, NEBB or TABB.
2. TAB Technician: Employee of the TAB contractor and who is certified by AABC, NEBB, or TABB as a TAB technician.

B. Certify TAB field data reports and perform the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

C. TAB Report Forms: Use standard TAB contractor's forms approved by Architect.

D. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they meet the leakage class of connected ducts as specified in Division 23 Section "Metal Ducts" and are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.

F. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

H. Examine test reports specified in individual system and equipment Sections.

I. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

J. Examine motorized dampers and verify that they are accessible and their controls are connected and functioning.

K. Examine operating safety interlocks and controls on HVAC equipment.

L. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

1. Minimum procedures shall include coordination and documentation for the Title 24 2022 forms as indicated on the Title 24 compliance documents.
2. Such documentation shall include the necessary coordination with the control’s contractor.

B. Complete system-readiness checks and prepare reports. Verify the following:

1. Permanent electrical-power wiring is complete.
2. Automatic temperature-control systems are operational.
3. Equipment and duct access doors are securely closed.
4. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
5. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in ASHRAE 111-2024, or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems", or SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.

1. Comply with requirements in ASHRAE 62.1-2022, Section 7.2.2, "Air Balancing."

B. Cut insulation, ducts, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Division 23 Section "HVAC Insulation."

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

D. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

F. Verify that motor starters are equipped with properly sized thermal protection.

G. Check dampers for proper position to achieve desired airflow path.

H. Check for airflow blockages.

I. Check condensate drains for proper connections and functioning.

J. Check for proper sealing of air-handling-unit components.

K. Verify that air duct system is sealed as specified in Division 23 Section "Metal Ducts."

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.

2. Measure fan static pressures as follows to determine actual static pressure:

a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
b. Measure static pressure directly at the fan outlet or through the flexible connection.
c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
4. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in Division 23 Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Measure air outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

C. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

D. Motorized dampers shall initially be fully open when in the unoccupied and occupied modes. Dampers shall close upon command from controls when the space(s) or are unoccupied during scheduled occupied hours. Air balancer shall witness proper operation of damper sequencing and provide statement of operation in commissioning report. Balance air distribution devices with all motorized dampers fully open.

3.6 PROCEDURES FOR CONDENSING/HEAT PUMP UNITS

A. Verify proper rotation of fans.

B. Measure entering- and leaving-air temperatures.

C. Record compressor data.

3.7 TOLERANCES

A. Set HVAC system's air flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.

3.8 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare at 75% completion of construction progress report to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.9 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Fan curves.
2. Manufacturers' test data.
3. Field test reports prepared by system and equipment installers.
4. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB contractor.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans and pump performance forms including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Fan drive settings including settings and percentage of maximum pitch diameter.
    e. Settings for supply-air, static-pressure controller.
    f. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Duct, outlet, and inlet sizes.
3. Terminal units.
4. Balancing stations.
5. Position of balancing devices.

E. Air-Handling (Fan coils) Test Reports: For air-handling units with coils, include the following (as applicable):

1. Unit Data:

    a. Unit identification.
    b. Location.

c. Make and type.
d. Model number and unit size.
e. Manufacturer's serial number.
f. Number, type, and size of filters.

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.

3. Test Data (Indicated and Actual Values):

a. Total air flow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.
e. Filter static-pressure differential in inches wg.
f. Outdoor airflow in cfm.
g. Return airflow in cfm.
h. Outdoor-air damper position.
i. Return-air damper position.

F. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.

e. Suction static pressure in inches wg.

G. Air-Terminal-Device Reports:

1. Unit Data:

a. System and air-handling unit identification.
b. Location and zone.
c. Apparatus used for test.
d. Area served.
e. Make.
f. Number from system diagram.
g. Type and model number.
h. Size.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Air velocity in fpm.
c. Preliminary air flow rate as needed in cfm.
d. Preliminary velocity as needed in fpm.
e. Final air flow rate in cfm.
f. Final velocity in fpm.

3.10 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:

a. Measure airflow of at least 10 percent of air outlets.
b. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
c. Verify that balancing devices are marked with final balance position.
d. Note deviations from the Contract Documents in the final report.

B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Commissioning Authority.
2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of the Commissioning Authority.

C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:

1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.

D. Prepare test and inspection reports.

END OF SECTION

SECTION 230713 – DUCT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulating the following duct services:
   1. Indoor, concealed supply and outdoor air.
   2. Indoor, exposed supply and outdoor air.
   3. Indoor, concealed return located in unconditioned space.
   4. Indoor, exposed return located in unconditioned space.

B. Items Not Insulated:
   1. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
   2. Factory-insulated flexible ducts.
   3. Factory-insulated plenums and casings.
   4. Flexible connectors.
   5. Vibration-control devices.

C. Related Sections:
   1. Division 23 Section "HVAC Piping Insulation."

1.2 DESCRIPTION

A. Field applied insulation for thermal efficiency and condensation control for HVAC, piping systems (HVAC), ductwork and equipment.

B. Refer to Section 15400 for insulation of Plumbing Piping.

C. Definitions:
   1. Air-conditioned space: Space directly supplied with heated or cooled air.
   2. ASJ+: All service jacket, white finish facing or jacket.
   3. Cold: Equipment, ductwork or piping handling media at design temperature of 60°F or below.
   4. Concealed: Ductwork and piping above ceilings and in chases, interstitial space, and pipe spaces.
   5. Conditioned Space: A room area which is heated or cooled.
   6. Exhaust Duct: A duct transporting air from one or more rooms only to the outdoors.
   7. Exposed: Piping, ductwork, and equipment exposed to view in finished areas including mechanical and electrical equipment rooms. Attics and crawl spaces where air handling units are located are considered to be mechanical rooms. Shafts, chases, interstitial spaces, unfinished attics, crawl spaces and pipe basements are not considered finished areas.
   8. FSK:Foil-scrim-kraft facing.
   9. Hot: Ductwork handling air at design temperatures above 60°F; equipment or piping handling media above 105°F.

10. Return Duct: A duct transporting air from one or more rooms toward fan if such air can be, at any time, circulated back to any rooms.
11. Thermal conductance: Heat flow rate through materials.
    a. Flat surface: BTU per hour per square foot.
    b. Pipe or cylinder: BTU per hour per linear foot.
12. Thermal conductivity ('k'): BTU per inch thickness, per hour, per square foot, per degree Fahrenheit temperature difference.
13. Transfer duct: A duct transporting air from one or more rooms to another room or rooms.
14. Unconditioned Space: A room or area which is neither heated nor cooled.

1.3 REFERENCES

A. ASTM C518 - Steady State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

B. ASTM C553 - Mineral Fiber Blanket and Felt Insulation.

C. ASTM C612 - Mineral Fiber Block and Board Thermal Insulation.

D. ASTM E84 - Surface Burning Characteristics of Building Materials.

E. ASTM E96 - Water vapor Transmission of Materials.

F. BEES – Building Energy Efficiency Standards

G. CMC – California Mechanical Code.

H. NFPA 90A - Installation of Warm Air Heating and Air Conditioning Systems.

I. NFPA 255/UL 723 - Surface Burning Characteristics of Building Materials.

J. USGBC – U.S. Green Building Council.

1.4 CRITERIA

A. Comply with NFPA 90A, particularly paragraphs 2-1.3; 2-2; and 3-3.8, parts of which are quoted as follows:
    1. "2-1.3.1 Duct coverings, duct linings, vapor barrier facings, tapes, and core materials in panels used in duct system shall have a flame spread rating not over 25 without evidence of continued progressive combustion and a smoke developed rating not higher than 50. If coverings and linings are to be applied with adhesives, they shall be tested as applied with such adhesives, or the adhesives used shall have a flame spread rating not over 25 and a smoke developed rating no higher than 50 when in the final dry state."
    2. "2-1.3.6 Pipe insulation and coverings shall meet the requirements of 2-2.1.2(a) when installed in ducts, plenums, or concealed spaces used as part of the air distribution system."
    3. "2-2.1.2(a) All materials exposed to the air flow shall have smoke developed ratings not greater than 50 and be non-combustible or limited combustible."

4. "3-3.8.1 Where ducts pass through walls, floors, or partitions required to have a fire resistance rating and fire dampers are not required, the opening in the construction around the duct shall not exceed one inch (2.54 cm) average clearance on all sides and shall be filled solidly with an approved material capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste when subjected to the same NFPA 255 time-temperature fire conditions required for fire barrier penetration." (Note: By NFPA 101, 6-2.3.4 and 6-3.6, this requirement applies to pipe penetrations of fire or smoke barriers also.)

B. Test methods: ASTM E84-2010b, ASTM E 2231-2009, and UL 723-2008.

C. Specified 'k' factors are at 75°F mean temperature unless stated otherwise. Where optional thermal insulation material is used, select thickness to provide thermal conductance no greater than that for the specified material. For pipe, use insulation manufacturer's published heat flow tables. For domestic hot water supply and return, run out insulation and condensation control insulation, no thickness adjustment need be made.

D. All materials shall be compatible and suitable for service temperature and shall not contribute to corrosion or otherwise attack surface to which applied in either the wet or dry state.

E. Underwriters Laboratories, Inc., label or listing, or satisfactory certified test report from an approved testing laboratory will be required to show that surface burning characteristics for materials to be used do not exceed specified ratings.

F. Lining materials installed within ducts shall have mold, humidity and erosion resistant surface that meet the requirements of CMC 604.0, ASTM C 411-2005.

G. General: All insulating material required for piping, mechanical equipment and duct work etc., shall be furnished and installed under this Section of the specifications. The execution of the work shall be in strict accordance with Title 24, Energy Conservation Standards and the best practice of the trade and the intent of this specification. All insulation shall be UL listed and shall meet all code requirements.

H. Surface burning characteristics:
1. Flame spread……25
2. Smoke developed…….50

I. Every package or standard container of insulation or accessories delivered to the job site for use must have a manufacturer's stamp or label giving the name of the manufacturer and description of the material.

J. Acceptable Manufacturers:
1. Fiberglass Insulation: Owens-Corning Fiberglas, CertainTeed, Knauf.
2. Flexible Elastomeric: Armstrong, Halstead, IMOCA, or Rubatex.
3. Fiberglass Premolded Pipe Fitting Covers: Insul-Coustic/Birma Corp., Childers, Speedline, or Zeston.
4. Adhesives and Cements: Armaflex Low VOC Spray Contact Adhesive by Armacell.

5. Weld Pins: Nelson Stud Welding Div. TRW Inc. Duro Dyne Corp., Tuff-Weld, or Grip Nail.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

C. Manufacturer's products for insulation, adhesives and caulk shall be listed by the USGBC.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated.

A. Manufacturer's Literature and Data:
1. Insulation materials: Each type used. State surface burning characteristics.
2. Insulation listings for all required Standards Listing.
3. Insulation facings and jackets: Each type used. Make it clear that white finish will be furnished for exposed ductwork, casings and equipment.
4. Insulation accessory materials: Each type used.
5. Manufacturer's installation and fitting fabrication instructions for flexible unicellular insulation.
6. Make reference to applicable specification paragraph numbers for coordination.

B. Submittals:
1. Duct Liner Manufacturer's Literature and Data:
   a. Insulation materials: State surface burning characteristics, or each type used.
   b. Insulation facings and jackets: each type used. Make it clear that white finish will be furnished for exposed ductwork, casings, and equipment.
   c. Insulation accessory materials: Each type used.
   d. Manufacturer's installation and fitting fabrication instruction for flexible unicellular insulation.
   e. Make reference to applicable specification paragraph numbers for coordination

1.7 QUALITY ASSURANCE

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article. Thickness – 2".
   1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
      a. CertainTeed Corp.; SoftTouch Duct Wrap.
      b. Johns Manville; Microlite.
      c. Knauf Insulation; Friendly Feel Duct Wrap.
      d. Manson Insulation Inc.; Alley Wrap.
      e. Owens Corning; SOFTR All-Service Duct Wrap.

2.2 ACOUSTICAL DUCT LINING AND INSULATION BOARD

A. All acoustical duct lining shall incorporate means to prevent fiber entrainment in the air stream.

B. Acceptable product for lining rectangular section ducts and plenums: Owens Corning "Fiberglass Duct Liner Board".

C. Minimum sound-absorbing duct lining material:

	Octave Band Center Frequency, Hz					
	125	250	500	1000	2000	4000
1.0" thickness lining, 2-3.0 pcf density	.03	.22	.60	.84	.98	.97
1.5" thickness lining , 2-3.0 pcf density	.16	.22	.91	1.01	1.01	1.01
2.0" thickness lining, 2-3.0 pcf density	.24	.79	1.13	1.13	1.04	1.05

D. Acceptable product for lining circular duct: Casco Circliner, Johns Manville Spiracoustic.

E. Where acoustically lined circular or oval duct is required, (except underground) lining shall be positively retained in place. Acceptable manufacturers of prefabricated, internally lined duct include United McGill and Sheet Metal Products.

F. Installation
   1. Internal acoustical lining may be substituted at contractor's option where external thermal insulation wrapping is specified.
   2. Insulate acoustical duct plenums and the inside perimeter of ductwork as indicated on the drawings, otherwise insulate according to the Ductwork Liner Schedule, see §3.3.

2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
   1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.
      b. Eagle Bridges - Marathon Industries; 225.
      c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.
      d. Mon-Eco Industries, Inc.; 22-25.
   2. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

C. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
      b. Eagle Bridges - Marathon Industries; 225.
      c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-50.
      d. Mon-Eco Industries, Inc.; 22-25.
   2. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

2.4 TAPES

A. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. ABI, Ideal Tape Division; 491 AWF FSK.
      b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
      c. Compac Corporation; 110 and 111.
      d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ.
   2. Width: 3 inches.
   3. Thickness: 6.5 mils.
   4. Adhesion: 90 ounces force/inch in width.
   5. Elongation: 2 percent.
   6. Tensile Strength: 40 lbf/inch in width.
   7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

2.5 SECUREMENTS

A. Aluminum Bands: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal or closed seal.
   1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
      a. ITW Insulation Systems; Gerrard Strapping and Seals.
      b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.

B. Insulation Pins and Hangers:
   1. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
      a. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
         1) AGM Industries, Inc.; Tactoo Perforated Base Insul-Hangers.
         2) GEMCO; Perforated Base.
         3) Midwest Fasteners, Inc.; Spindle.
      b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
      c. Spindle: Aluminum, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
      d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
   2. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that can hold insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
      a. Products: subject to compliance with requirements, provide one of the following

1) AGM Industries, Inc.; Tactoo Self-Adhering Insul-Hangers.
2) GEMCO; Peel & Press.
3) Midwest Fasteners, Inc.; Self Stick.

b. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
c. Spindle: Aluminum, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
d. Adhesive-backed base with a peel-off protective cover.

3. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick, galvanized-steel or aluminum sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
   a. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following:
      1) AGM Industries, Inc.; RC-150.
      2) GEMCO; R-150.
      3) Midwest Fasteners, Inc.; WA-150.
      4) Nelson Stud Welding; Speed Clips.
4. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.

C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

2.6 CORNER ANGLES

A. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14.

2.7 JACKETS

A. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Metal Jacketing Systems.
      b. ITW Insulation Systems; Aluminum and Stainless Steel Jacketing.
      c. RPR Products, Inc.; Insul-Mate.
      d. Or equal
   2. Finish and thickness are indicated in field-applied jacket schedules.
   3. Moisture Barrier for Indoor Applications: 1-mil thick, heat-bonded polyethylene and kraft paper.
   4. Moisture Barrier for Outdoor Applications: 2.5-mil thick polysurlyn.
   5. Factory-Fabricated Fitting Covers:
      a. Same material, finish, and thickness as jacket.
      b. Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
      c. Tee covers.
      d. End caps.

B. Self-Adhesive Outdoor Jacket: 60-mil thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a cross-laminated polyethylene film covered with white aluminum-foil facing.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Polyguard Products, Inc.; Alumaguard 60.
      b. Or equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Required pressure tests and connections shall be completed and the work approved by the owner or owner's representative before application of insulation. Surface shall be clean and dry with all foreign materials, such as dirt, oil, loose scale and rust removed.

B. Apply covering (jackets) after ducts and equipment have been tested and proven tight.

C. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces, free of voids throughout the length of ducts and fittings.

D. Install insulation materials, vapor barriers or retarders, and thicknesses required for each item of duct system as specified in insulation system schedules.

E. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation in either wet or dry state.

F. Install insulation with longitudinal seams at top and bottom of horizontal runs.

G. Install multiple layers of insulation with longitudinal and end seams staggered.

H. Keep insulation materials dry during application and finishing.

I. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

J. Install insulation with least number of joints practical.

K. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
   1. Install insulation continuously through hangers and around anchor attachments.

2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

L. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches like butt joints.

A. External Ductwork Insulation:
1. Secure with 4" strips of adhesive, 8" on center.
2. For rectangular ducts 24" and wider, secure to bottom of duct with mechanical fasteners 18" on center.
3. Wrap with 18-gauge galvanized wire, 18" on center.
4. Adhesive requirements same as for duct liner.
5. Provide insulated ductwork conveying air below ambient temperature with vapor barrier jacket. Finish with tape. Seal vapor barrier penetrations with vapor barrier adhesive.
6. Provide insulated ductwork conveying air above ambient temperature with or without standard vapor barrier jacket. Where service access is required, bevel and seal ends of insulation.
7. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
8. Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging.
9. For ductwork exposed in mechanical equipment rooms or in finished spaces, finish with aluminum jacket.
10. For exterior ductwork exposed to weather, with external insulation, provide aluminum jacket sealed watertight with caulk.

B. Duct Liner:
1. Secure liner with adhesive for 100% coverage, anchor pins and speed washers. Refer to SMACNA Duct Liner Application Standards for installation.
2. Seal liner surface penetrations with adhesive.
3. Duct dimensions indicated are net inside dimensions required for air flow. Increase duct size to allow for liner thickness.
4. Surface adjacent to air flow, including at joints, shall be uniformly flat.
5. Seal butt joint edges of liner to prevent erosion. For rectangular ducts provide sheet metal end caps to cover liner edges at entering and leaving edges of lined duct section; for round

ducts use low velocity duct sealant. For plenum lining, provide sheet metal caps at exposed edges, e.g., where liner terminates at access door.

3.3 DUCTWORK INSULATION SCHEDULE

SERVICE	SUPPLY	RETURN	EXHAUST
In Mechanical and Fan Rooms	DL, 1”	DL, 1”	DL, 1”
Within 10' or 10 duct diameters of fan, whichever is greater	DL, 1”	DL, 1”	DL, 1”
Concealed between roof and ceiling	WV, 2”	W, 2”	--
Outdoors unless otherwise noted	DL, 2”	DL, 2”	--
Concealed in shaft adjacent To unconditioned space or building exterior	WV, 2”	W, 2”	--
Other concealed	WV, 2”	--	--
Exposed within space	--	--	--
Return and exhaust stub ducts from ceiling plenum into shafts	--	--	--

A. Notes for Insulation Schedule
   1. Abbreviations:
      a. DL Duct Lining
      a. W Flexible Glass Fiber Duct wrap without vapor barrier
      b. WV Flexible Glass Fiber Duct wrap with vapor barrier
   2. Where lining is specified, other insulation is not required.
   3. Where lining is specified in ducts or shafts constructed of architectural materials, apply plenum lining to such materials.
   4. Where round ducts are specified to be lined, use one of the following methods:
      a. Line ducts as specified.
      b. Provide pre-insulated duct or approved equal.
      c. Where space permits and where permitted by Architect, provide equivalent size lined rectangular ducts (based on equal friction) in lieu of lined round ducts.

B. Insulation of thickness and resulting resistance values shall meet the minimum requirements of BEES Section 120.4(a).

3.4 PENETRATIONS

A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

B. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
   1. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

C. Insulation Installation at Floor Penetrations:
   1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.

2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.5 INSTALLATION OF MINERAL-FIBER INSULATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
   1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
   2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
   3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
      a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
      b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
      c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
      d. Do not over compress insulation during installation.
      e. Impale insulation over pins and attach speed washers.
      f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
   4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
      a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
      b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
   5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
   6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
   7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

END OF SECTION

SECTION 230719 – PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulating the following HVAC piping systems:
   1. Refrigerant liquid, suction and hot-gas piping, indoors and outdoors.
   2. Condensate lines.

B. Related Sections:
   1. Section 23 07 13 "Duct Insulation."

C. Definitions:
   1. Air-conditioned space: Space directly supplied with heated or cooled air.
   2. ASJ+: All service jacket, white finish facing or jacket.
   3. Cold: Piping handling media at design temperature of 60°F or below.
   4. Concealed: piping above ceilings and in chases, interstitial space, and pipe spaces.
   5. Conditioned Space: A room area which is heated or cooled.
   6. Exposed: Piping exposed to view in finished areas including mechanical and electrical equipment rooms. Attics and crawl spaces where air handling units are located are considered mechanical rooms. Shafts, chases, interstitial spaces, unfinished attics, crawl spaces and pipe basements are not considered finished areas.
   7. FSK: Foil-scrim-kraft facing.
   8. Hot: Piping handling media above 105°F.
   9. Run-outs: 2" maximum pipe size and 12 feet maximum branch length connection to individual equipment.
   10. Thermal conductance: Heat flow rate through materials.
      a. Flat surface: BTU per hour per square foot.
      b. Pipe or cylinder: BTU per hour per linear foot.
   11. Thermal conductivity (‘k’): BTU per inch thickness, per hour, per square foot, per degree Fahrenheit temperature difference.
   12. Unconditioned Space: A room or area which is neither directly heated nor cooled.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Submittals:
   1. For adhesives and sealants, documentation including printed statement of VOC content and chemical components.
   2. For adhesives and sealants, documentation indicating that product complies with the testing and product requirements of the California Department of Health Services' "Standard

Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

1.3 QUALITY ASSURANCE

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
   1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
   2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Products shall not contain asbestos, lead, mercury, or mercury compounds.

B. Products that encounter stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

C. Glass Fiber: ASTM C547; rigid molded noncombustible.
   1. 'K' ('ksi') Value: 0.24 at 75°F mean temperature.
   2. Maximum Service Temperature; 1200°F.
   3. Vapor Barrier Jacket: White Draft paper reinforced with glass fiber yarn and bonded to aluminized film, secure with self-sealing longitudinal laps and butt strips or with outward clinch expanding staples and vapor barrier.
   4. Products: Subject to compliance with requirements, provide one of the following:
      a. Owens-Corning.
      b. Fiberglas.
      c. CertainTeed
      d. Knauf.

D. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Aeroflex USA, Inc.; Aerocel.
      b. Armacell LLC; AP Armaflex.
      c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.

E. Inserts:

1. Insulation inserts at pipe supports: Provide for all insulated piping. Install with metal insulation shields furnished with pipe supports.
2. Material: Premolded, high density mineral fiber blocks, minimum density 20 lb/ft3, of same thickness as adjacent insulation.
3. Up through 5-inch pipe use 6-inch-long insert blocks, 12” long for larger pipes.
4. Optional insert material: 180-degree segment of calcium silicate.

2.2 ADHESIVES

A. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Aeroflex USA, Inc.; Aeroseal.
      b. Armacell LLC; Armaflex 520 Adhesive.
      c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.
   2. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

B. PVC Jacket Adhesive: Compatible with PVC jacket.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Dow Corning Corporation; 739, Dow Silicone.
      b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
      c. P.I.C. Plastics, Inc.; Welding Adhesive.
      d. Speedline Corporation; Polyco VP Adhesive.
   2. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

2.3 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
   1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.
      b. Vimasco Corporation; 749.
   2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.

3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
5. Color: White.

2.4 SEALANTS

A. Joint Sealants:
   1. Joint Sealants for Cellular-Glass Products: ubject to compliance with requirements, provide one of the following:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
      b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-45.
      c. Pittsburgh Corning Corporation; Pittseal 444.
   2. Materials shall be compatible with insulation materials, jackets, and substrates.
   3. Permanently flexible, elastomeric sealant.
   4. Service Temperature Range: Minus 100 to plus 300 deg F.
   5. Color: White or gray.
   6. Use sealants that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

B. Metal Jacket Flashing Sealants:
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
      b. Eagle Bridges - Marathon Industries; 405.
      c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
   2. Materials shall be compatible with insulation materials, jackets, and substrates.
   3. Fire- and water-resistant, flexible, elastomeric sealant.
   4. Service Temperature Range: Minus 40 to plus 250°F.
   5. Color: Aluminum.
   6. Use sealants that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

C. PVC Jacket Flashing Sealants:
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
   2. Materials shall be compatible with insulation materials, jackets, and substrates.
   3. Fire- and water-resistant, flexible, elastomeric sealant.

4. Service Temperature Range: Minus 40 to plus 250°F.
5. Color: White.
6. Use sealants that comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

2.5 FIELD-APPLIED JACKETS

A. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
   1. Products: ubject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
      a. Johns Manville; Zeston.
      b. P.I.C. Plastics, Inc.; FG Series.
      c. Proto Corporation; LoSmoke.
      d. Speedline Corporation; SmokeSafe.
   2. Adhesive: As recommended by jacket material manufacturer.
   3. Color: White
   4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
      a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

B. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
   1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Metal Jacketing Systems.
      b. ITW Insulation Systems; Aluminum and Stainless-Steel Jacketing.
      c. RPR Products, Inc.; Insul-Mate.
   2. Finish and thickness are indicated in field-applied jacket schedules.
   3. Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper or 2.5-mil- thick polysurlyn.
   4. Factory-Fabricated Fitting Covers:
      a. Same material, finish, and thickness as jacket.
      b. Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
      c. Tee covers.
      d. End caps.
      e. Beveled collars.
      f. Valve covers.
      g. Field fabricated fitting covers only if factory-fabricated fitting covers are not available.

C. Self-Adhesive Outdoor Jacket: 60-mil- thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with white aluminum-foil facing.
   1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
      a. Polyguard Products, Inc.; Alumaguard 60.

2.6 SECUREMENTS

A. Aluminum Bands: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal or closed seal.
   1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
      a. ITW Insulation Systems; Gerrard Strapping and Seals.
      b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
   1. Install insulation continuously through hangers and around anchor attachments.
   2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
   3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
   4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, and seal patches similar to butt joints.

3.3 PENETRATIONS

A. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
   1. Seal penetrations with flashing sealant.
   2. Install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
   3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
   4. Seal jacket to wall flashing with flashing sealant.

B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

3.4 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, and Valves:
   1. Install insulation over fittings, valves, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
   2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
   3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
   4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
   5. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
   6. For services not specified to receive a field-applied jacket except for flexible elastomeric, install fitted PVC cover over elbows, tees and valves. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturers recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Fittings and Elbows:
   1. Install mitered sections of pipe insulation.
   2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 FIELD-APPLIED JACKET INSTALLATION

A. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints, for horizontal applications. Seal with manufacturers recommended adhesive.
   1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

3.7 PIPING INSULATION SCHEDULE

Fluid Temp Range (°F)	Conductivity Range (in Btu-inch per hour per square foot per °F)	Insulation mean rating temperature (°F)	Nominal Pipe diameter (in inches)				
			<1	1 to <1.5	1.5 to <4	4 to < 8	8 & Larger
			Minimum required insulation thickness, inches				
Space heating, Hot Water systems (steam, steam condensate, and hot water) and Service Water Heating Systems (recirculating sections, all piping and electric trace tape systems, and the first 8 feet of piping from the storage tank for non-recirculating systems)							
201-250	0.27-0.30	150	2.5	2.5	2.5	3.0	3.0
141-200	0.25-0.29	125	1.5	1.5	2.0	2.0	2.0
105-140	0.22-0.28	100	1.0	1.5	1.5	1.5	1.5
Space cooling systems (Refrigerant Suction, Chilled Water) and Condensate Drain Line							
40-60	0.21-0.27	75	NonRes 0.5 / Res 0.75		NonRes 0.5 / Res 0.75	1.0	1.0	1.0
Below 40	0.20-0.26	50	1.0		1.5	1.5	1.5	1.5

A. Mini-split systems shall have 3/4” thick elastomeric insulation on liquid, suction and hot gas piping.

3.8 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Exposed:
   1. PVC: 20 mils thick.

END OF SECTION

SECTION 230923 – ENERGY MANAGEMENT

PART 1 - GENERAL

1.1 PHYSICAL CHARACTERISTICS

A. General:

1. The advanced multi-zone controller shall be made from plastic materials with a neutral color. Each control shall have a LCD (Liquid Crystal Display) that shows On/Off, setpoint, room temperature, mode of operation (Cool/Heat/Dry/Fan/Auto), louver position, and fan speed.

1.2 Electrical characteristics

A. General:

1. The advanced multi-zone controller will require 24 VAC to power the controller. The advanced multi-zone controller shall supply 16 VDC to the communication bus on the F1F2 (out-out) terminal of the outdoor unit. The voltage may rise or fall in relation to the transmission packets that are sent and received.

B. Wiring:

1. The advanced multi-zone controller communication wiring shall be terminated in a daisy chain design at the outdoor unit, which is then daisy chained to branch selector (Heat Recovery system), then daisy chained to each indoor unit in the system and terminating at the farthest indoor unit. The termination of the wiring shall be non-polar. The remote control wiring shall run from the indoor unit control terminal block to the remote controller connected with that indoor unit.

C. Wiring size:

1. Wiring shall be non-shielded, 2-conductor sheathed vinyl cord or cable, and 18 AWG stranded copper wire.

1.3 VRV Controls Network

A. The VRV Controls Network is made up of local remote controllers, multi-zone controllers, advanced multi-zone controllers, and open protocol network devices that transmit information via the communication bus. The VRV Controls Network shall also have the ability to be accessed via a networked PC. The VRV Controls Network supports operation monitoring, scheduling, error e-mail

distribution, general user software, tenant billing, maintenance support, and integration with Building Management Systems (BMS) using open protocol via BACnet® interface, BACnet® MSTP adaptor, Lonworks® interface or Modbus® adapter; all of which blend to provide the optimal control strategy for the best HVAC comfort solution.

PART 2 - PRODUCTS

2.1 Advanced Multi-zone Controllers

A. The Daikin AC VRV advanced multi-zone controllers are compatible with all VRV, SkyAir, and Daikin RA and FTXS indoor units with the use of the KRP928BB2S RA Adapter. The advanced multi-zone controller wiring consist of a non-polar two-wire connection to the outdoor unit. The advanced multi-zone controllers may be wall-mounted and can be adjusted to maintain the optimal operation of up to 64 connected indoor unit groups and 128 indoor units. Set temperatures can be adjusted in increments of 1°F. In the cases where a system or unit error may occur, the VRV controllers will display a two-digit error code and the unit address.

B. DCM601B71: intelligent Touch Manager (iTM) V2.xx.xx

1. The intelligent Touch Manager (version 2.xx.xx) shall provide control for all VRV, SkyAir, and Daikin RA and FTXS indoor units with the use of the KRP928BB2S RA Adapter. It shall be capable of controlling a maximum or 64 indoor unit groups and 128 indoor units connected to a maximum of 10 outdoor units. The intelligent Touch Manager shall support operations superseding that of the local remote controller, system configuration, daily/weekly scheduling, monitoring of operation status, and malfunction monitoring.
2. The controller wiring shall consist of a non-polar two-wire connection to the indoor unit at terminals F1F2 (out-out) of the outdoor unit. The intelligent Touch Manager is wall mounted and can be adjusted to maintain the optimal operation of the connected indoor unit(s).
3. The intelligent Touch Manager can be used in conjunction with the BRC1E73 (Navigation Remote Controller), the BRC1H71W (Madoka Remote Controller), or the BRC4C82/7E83/7C812/7E818 (Wireless Remote Controller), BACnet interface, BACnet MSTP adaptor, Lonworks interface, and Modbus adapter to control the same indoor unit groups. The remote controller shall require daisy chain wiring for grouping multiple indoor units (up to 16) together. Manual addressing is required of each remote controller group associated with the intelligent Touch Manager. DIII-NET address can be set for one (1) indoor unit or each indoor unit in the remote controller group. No more than 2 remote controllers can be placed in the same group.

4. The intelligent Touch Manager shall be equipped with two RJ-45 Ethernet ports for 100 Mbps network communication to support interconnection with a network PC via the Internet, Local Area Network (LAN), or connection with a non-networked PC after completed installation.
5. Web access functions shall be available so that facility staff can securely log into each Intelligent Touch Manager via the PC's web browser to support monitoring, scheduling, error recognition, downloading of system operation data (trend log (refer to pints list under BACnet server)) and general user functions. Error emails are also sent to designated email addresses. An additional software options, such as, Power Proportional Distribution (PPD) tenant billing, BACnet Server Gateway, BACnet Client, and web (HTTP) Interface software shall also be available. The optional software shall require advanced purchase and can only be activated upon receipt of a license activation key from Daikin Technical Support.
6. Mounting:
    a. The intelligent Touch Manager shall be mounted on the wall or into the mounting fixtures included with the intelligent Touch Manager.

7. Display Features:
    a. The intelligent Touch Manager shall be approximately 11.42" x 9.57" x 1.97' in size with a backlit 10.4" LCD display.
    b. Display information shall be selectable from English, French, Italian, Korean, Dutch, Portuguese, Chinese, Japanese, German, or Spanish.
    c. Featured backlit LCD with auto off after 30 minutes (default) is adjustable between 1 to 60 minutes, or the choice of 3 different screen savers.
    d. Area and Group configuration

a) Area contains one (1) or more Area(s) or Group(s)
b) A Group may be an indoor unit, Di, Dio point that has a DIII-NET address
c) A Group may be an external management point such as a Di, Do, Bi, Bo, Bv, Ai, Ao, Av, Mi, Mo, Mv that does not have a DIII-NET address

    e. An Area is a tiered group where management points (indoor unit, digital input/output, and analog input/output groups) can be monitored and controlled by global settings. Up to 650 Areas can be created. Area hierarchy can have up to 10 tiered levels (ex. top level: 1st floor West, 2nd level: offices, hallways, 3rd level: Office 101, 102, and 103, etc.). Area configuration shall classify levels of monitoring and control for each management point. Areas and Groups may be assigned names (ex. Office 101, Lobby, North Hallway, etc.)
    f. The Controller shall display On/Off, Operation Mode, Setpoint, Space Temperature, Louver Position, Fan Speed for each Area or Group.

g. The Controller shall display Date (mm/dd/yyyy, yyyy/mm/dd, or dd/mm/yyyy format selectable) and day of the week along with the time of day (12hr or 24hr display selectable).
h. The Controller shall adjust for daylight savings time (DST) automatically.
i. Display information shall be updated every 3 seconds to show the latest status of the indoor unit groups.
j. System status icons shall display On/Off (color coded), Malfunction/Error (color coded), Forced Stop, Setback, Filter, Maintenance, and Screen Lock.
k. The controller shall display the temperature setpoint in one degree increments with a range of 60ºF – 90ºF, 1ºF basis (16ºC – 32ºC, 0.1ºC basis). configurable for Fahrenheit or Celsius
l. Display shall reflect room temperature in one tenth degree increments with a range of-58ºF – 248ºF, 0.1ºF basis (-50ºC – 120ºC, 0.1ºC basis) with 0.1ºC accuracy.
m. Display of room temperature information shall be configurable for Fahrenheit or Celsius
n. The Menu List shall be used to configure options and display information for each Area or Group.
o. Error status shall be displayed in the event of system abnormality/error with one of three color coded icons placed over the indoor unit icon or lower task bar.

8. Basic Operation:
a. Capable of controlling by Area(s) or Group(s)
b. Controller shall control the following group operations:
a) On/Off
b) Operation Mode (Cool, Heat, Fan, Dry, and Auto)
c) Independent Cool and Heat dual Setpoints or single Setpoint for current mode in the occupied period
d) Controller shall be able to limit the user adjustable setpoint ranges individually for cooling and heating based upon the Area or Group configurations
e) Independent Setup (Cooling) and Setback (Heating) setpoints in the unoccupied mode adjustable to 50 - 95^0F.
f) Setup and Setback setpoints can only be set outside of the occupied setpoint range
g) The Setup and Setback setpoints will automatically maintain a 2ºF fixed differential from the highest possible occupied setpoints
h) The recovery differential shall be 4^0F (default) and adjustable between 2 – 10^0F
i) Settings shall be applied based upon the Area or Group configurations
c. Fan Speed
a) Up to 5 speeds (dependent upon indoor unit type)
d. Airflow direction (dependent upon indoor unit type)

a) 5 fixed positions or oscillating
b) Remote controller permit/prohibit of On/Off, Mode, and Setpoint
c) Lock out setting for Intelligent Touch Manager display
d) Indoor unit Group/Area assignment
e. Capable of providing battery backup power for the clock at least 1 year when no AC power is applied.
a) The battery can last at least 13 years when AC power is applied
b) Settings stored in non-volatile memory

9. Programmability:
a. Controller shall support weekly schedule settings.
a) 7 day weekly pattern (7)
b) Weekday + Weekend (5 + 2)
c) Weekday + Saturday + Sunday (5 + 1 + 1)
d) Everyday (1)
e) The schedule shall have the capabilities of being enabled or disabled
f) 100 independent schedules configurable with up to 20 events settable for each days schedule
g) A maximum of 40 exception days can be schedule on the yearly schedule (repeats yearly)
h) Exception days shall be used to override specified days on the weekly schedule based upon irregular occupied/unoccupied conditions
i) Exception days can be configured on a set date (Jan 1) or floating date (1st Monday in September)
b. The schedule shall have the capability of limiting the capacity demand of the outdoor unit's compressor by 0%, 40%, 70% or 100%
c. The schedule shall have the capability to enable/disable the outdoor unit low noise operation
d. Controller shall support auto-changeover.
a) Auto-change shall provide Fixed (default), Individual, Averaging, and Vote changeover methods for both Heat Pump and Heat Recovery systems based upon the changeover group configuration. This will allow for the optimal room temperature to be maintained by automatically switching the indoor unit's mode between Cool and Heat in accordance with the room temperature and setpoint. The following changeover scheme shall be applicable to the Fixed, Individual, and Averaging methods.
e. Fixed Method
a) Changeover evaluated by room temperature and setpoint of the representative indoor unit (first registered indoor unit in changeover group) in the changeover group even when it is not operating (must be in Cool, Heat, or Auto mode)
b) Changeover affects all indoor unit groups in the changeover group.
c) Individual method (recommended for Heat Recovery Systems)
f. Average method

a) Changeover evaluated by the average of all indoor unit group's room temperatures and setpoints operating in Cool, Heat, or Auto mode in the changeover group list
b) If none of the indoor units in the group meet the above requirements the Fixed method of changeover will be applied
c) A weighted demand (0 – 3) can be configured for each indoor unit in the changeover group.
d) Changeover affects all indoor unit groups in the changeover group.

10. 5. Web/Email Function
    a. Each intelligent Touch Manager shall be capable of monitoring, operating, and scheduling a maximum of 64 indoor unit groups (up to 512 indoor unit groups with the addition of the iTM Plus Adapter) from a networked PC's web browser. It shall also be capable of creating general user access and sending detailed error emails to a customized distribution list (up to 10 email addresses).
    b. All PCs shall be field supplied
    c. The following operation data stored in iTM every minute for the last 5 days can be accessed and downloaded through ITM web function:

a) Indoor and outdoor unit (applied model only) operation data.
b) BACnet Client management data points (AI, AO, AV, BI, BO, BV, MI, MO and MV).

11. Operational Data History
    a. Operation data are stored in the iTM every minute for the last 5 days:
    b. VRV indoor and outdoor unit (if supported) operation data.
    c. BACnet Client management data points (AI, AO, AV, BI, BO, BV, MI, MO and MV).
    d. The operation data can be exported through the iTM web function or USB output with a user specified time period.
    e. Airnet addressing required for both indoor units and outdoor units to enable the operation data on the iTM.

END OF SECTION

SECTION 232300 – REFRIGERANT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Related Work specified elsewhere:
   1. Piping Insulation, 23 07 19

1.2 SUMMARY

A. This Section includes refrigerant piping used for air-conditioning applications over 7.5 tons.

1.3 PERFORMANCE REQUIREMENTS

A. Line Test Pressure for Refrigerant R-410A:
   1. Suction Lines for Heat-Pump and/or Variable Refrigerant Applications: 535 psig.
   2. Hot-Gas and Liquid Lines: 535 psig.
   3. Refer to manufacturers' installation for further guidance and adherence.

1.4 REFERENCE STANDARDS

A.	ANSI B16.22	Wrought Copper and Wrought Copper Ally Solder Joint Pressure Fittings
B.	ASTM B88	Seamless Copper Water Tube
C.	ASTM B280	Seamless Copper Tube for Air Conditioning and Refrigeration Field Service
D.	ASTM 210	Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes
E.	ASHRAE 15	Safety Code for Refrigeration Systems
F.	ASME B31.5	Refrigeration Piping and Heat Transfer Components
G.	UL207	Refrigerant-Containing Components and Accessories, Nonelectrical

1.5 QUALITY ASSURANCE

A. Order all copper refrigeration tube with each shipping unit marked with the meal or alloy designation, temper, size, and name of supplier; with soft straight lengths or coils identified with a tag indicating that the product was manufactured in accordance with ASTM B280; and with each hard temper straight length identified throughout its length by a blue colored marking not less than 3/16 inch in height and a legend at intervals of not greater than three feet that includes the designation “ACR” and pipe outside diameter.

B. Any installed material not meeting the specification requirements must be replaced with material that meets these specifications without additional cost to the Owner.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Promptly inspect shipments to ensure that the material is undamaged and complies with specifications.

B. Cover pipe to eliminate rust and corrosion while allowing sufficient ventilation to avoid condensation. Do not store materials directly on grade. Protect pipe, tube, and fitting ends so they are not damaged. Where end caps are provided or specified, take precautions so the caps remain in place. If end caps are not present on tube bearing “ACR” designation, clean and re-cap in accordance with ASTM B280. Protect fittings, flanges, and unions by storage inside or by durable, waterproof, above ground packaging.

C. Offsite storage agreements will not relieve the contractor from using proper storage techniques.

D. Storage and protection methods must allow inspection to verify products.

1.7 COORDINATION

A. Coordinate size and location of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Copper Tube: ASTM B88 type L hard drawn copper tube, cleaned and capped in accordance with ASTM B 280, and marked ACR”.

B. Wrought-Copper Fittings: ASME B16.22.

C. Brazing Filler Metals: AWS A5.8.

2.2 REFRIGERANT PIPING ACCESSORIES

A. Flexible connectors where piping to equipment from structure or supports is fixed or now space for pipe movement:
   1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
   2. End Connections: Socket ends.
   3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch- long assembly.
   4. Pressure Rating: Factory test at minimum 500 psig.
   5. Maximum Operating Temperature: 250 deg F.

B. General: install following only on equipment that manufacturer makes specific recommendations of inclusion.

C. Charging Valves: Provide 1/4" SAE brass male flare access ports with finger tight, quick seal locking type caps. Provide 2-inch-long copper extension sections.

2.3 REFRIGERANTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Atofina Chemicals, Inc.
   2. DuPont Company; Fluorochemicals Div.
   3. Honeywell, Inc.; Genetron Refrigerants.
   4. INEOS Fluor Americas LLC.

C. ASHRAE 34, R-13A: Pentafluoroethane/Difluoromethane.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS FOR REFRIGERANT R-410A

A. Hot-Gas, Liquid and Suction Lines:
   1. Copper, Type ACR, annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints per manufacturers' installation directions.

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss,

expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.

B. Install refrigerant piping according to ASHRAE 15.

C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Do not route piping through transformer vaults or above transformer, panel boards, or switch boards, including the required service space for this equipment, unless the piping is serving the equipment.

F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

G. Install piping adjacent to machines to allow service and maintenance.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Select system components with pressure rating equal to or greater than system operating pressure.

K. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

L. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Division 08 Section "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.

M. Slope refrigerant piping as follows:
   1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
   2. Install horizontal suction lines with a uniform slope downward to compressor.
   3. Install traps and double risers to entrain oil in vertical runs.
   4. Liquid lines may be installed level.

N. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

O. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

P. Identify refrigerant piping and valves according to Division 23 Section "Identification for HVAC."

Q. Install sleeves for piping penetrations of walls and ceilings. Comply with requirements for sleeves specified in Division 23 Section "Sleeves and Sleeve Seals for HVAC Piping."

R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 23 Section "Escutcheons for HVAC Piping."

3.3 PIPE JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. All joins to be brazed and have a melting point greater than 1,125 ºF. Filler impurities shall not exceed 0.15%. Tubing to be new and delivered to the job site with the original mill end caps in place.

D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
   1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
   2. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.

E. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation. Provide manual shut-off and check valves as required.

3.4 REFRIGERANT PIPING ACCESSORIES

A. Install accessories in accordance with the manufacturer's written instruction and recommendations.

3.5 HANGERS AND SUPPORTS

A. Hanger, support, and anchor products are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."

B. Install the following pipe attachments:
   1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet long.
   2. Roller hangers and spring hangers for individual horizontal runs 20 feet or longer.
   3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
   4. Spring hangers to support vertical runs.

5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

C. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:
1. Verify actual supported loads for hanger sizes and spacing. Consult structural engineer. Spacing and sizes in subparagraphs below are from the 2000 ASHRAE HANDBOOK - "HVAC Systems and Equipment."
2. NPS 1/2: Maximum span, 60; minimum rod size, 1/4 inch.
3. NPS 5/8: Maximum span, 60 inches; minimum rod size, 1/4 inch.
4. NPS 1: Maximum span, 72 inches; minimum rod size, 1/4 inch.

D. Install hangers for steel piping with the following maximum spacing and minimum rod sizes:
1. NPS 2: Maximum span, 10 feet; minimum rod size, 3/8 inch.
2. NPS 2-1/2: Maximum span, 11 feet; minimum rod size, 3/8 inch.

E. Support multi-floor vertical runs at least at each floor.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:
1. Comply with ASME B31.5, Chapter VI.
2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.
a. Fill system with nitrogen to the required test pressure.
b. System shall maintain test pressure at the manifold gage throughout duration of test.
c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
d. Remake leaking joints using new materials and retest until satisfactory results are achieved.

3.7 SYSTEM CHARGING AND ADJUSTING

A. Follow the outline below or manufacturer’s installation procedures.

B. No refrigerant is to be vented directly to the atmosphere except that which may escape though leaks in te system during leak test. During evacuation procedures, use equipment designed to recover and allow recycling or the refrigerant.

C. Leak test the system by charging the system to a pressure of 10 psig with an HFC refrigerant, with the compressor suction and discharge valves closed and with all other system valves open.

Increase pressure to 300 psig with dry nitrogen. Rap all joints with a mallet and check for leaks with an electric leak detector have a certified sensitivity of at least one ounce per year. Seal any leaks that may e found and retest.

D. After completion of leak test, evacuate the system with a vacuum pump to an absolute pressure not exceeding 1,500 microns while the system ambient is above 60ºF. Break the vacuum to 2 psig with a refrigerant to be used in the system. Repeat the evacuation process, again breaking the vacuum with refrigerant. Install a drier of the required size in the liquid line, open compressor suction and discharge valves, and evacuate to an absolute pressure not exceeding 500 microns. Leave the vacuum pump running for not less than 2-hours without interruption. Raise the system pressure to 2 psig with refrigerant and remove the vacuum pump.

E. Charge directly from original drums through a combination filter drier. Each drier may be used for a maximum of three cylinders of refrigerant and then must be replaced with a fresh filter drier. Charge the system by means of a charging fitting in the liquid line. Weigh the refrigerant drum before charging so that an accurate record can be kept of the weight of refrigerant put in the system. If refrigerant is added to the system through the suction side of the compressor, charge in vapor from only.

3.8 CONSTRUCTION VERIFICATION ITEMS

A. Contractor is responsible for utilizing the construction verification checklists supplied under specifications Section 01 91 01 or 01 91 0s in accordance with the procedures defined for construction verification checklists.

END OF SECTION

SECTION 233113 – METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Rectangular ducts and fittings.
2. Round ducts and fittings.
3. Sheet metal materials.
4. Sealants and gaskets.
5. Hangers and supports.
6. Seismic-restraint devices.

B. Related Sections:
1. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Submittals:
1. Product Data for Prerequisite EQ 1: Documentation indicating that duct system complies with ASHRAE 62.1, Section 5 - "Systems and Equipment."
2. Documentation indicating that duct system complies with ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."
3. Documentation of work performed for compliance with ASHRAE 62.1, Section 7.2.4 - "Ventilation System Start-Up."
4. For adhesives and sealants, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

1.3 QUALITY ASSURANCE

A. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."

B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA-2020 "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA-2006 "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements Comply with SMACNA-2020 "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
   1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
      a. McGill AirFlow LLC.
      b. SEMCO Incorporated.
      c. Sheet Metal Connectors, Inc.
      d. Spiral Manufacturing Co., Inc.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," using 45º lateral taps and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA-2020 "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
   1. Galvanized Coating Designation: 60.
   2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Stainless Steel: ASTM A480.

D. Aluminum Sheets: ASTM B209, alloy 3003, temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.

E. Extruded Aluminum: ASTM B221, alloy 6063, temper T6.

F. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
   1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

G. Tie Rods: Galvanized steel, quantity and size according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible.

2.4 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width:3 inches.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Water-Based Joint and Seam Sealant:
1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

2.5 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

E. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

F. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

G. Trapeze and Riser Supports:
   1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

2.6 SEISMIC-RESTRAINT DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Cooper B-Line, Inc.; a division of Cooper Industries.
   2. Ductmate Industries, Inc.
   3. Hilti Corp.
   4. Kinetics Noise Control.
   5. Mason Industries.
   6. TOLCO; a brand of NIBCO INC.
   7. Unistrut Corporation; Tyco International, Ltd.

B. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an evaluation service member of the ICC Evaluation Service or the Office of Statewide Health Planning and Development for the State of California or an agency acceptable to authorities having jurisdiction.
   1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

C. Channel Support System: Shop- or field-fabricated support assembly made of slotted steel channels rated in tension, compression, and torsion forces and with accessories for attachment to braced component at one end and to building structure at the other end. Include matching components and corrosion-resistant coating.

D. Restraint Cables: ASTM A 603, galvanized-steel cables with end connections made of cadmium-plated steel assemblies with brackets, swivel, and bolts designed for restraining cable service; and with an automatic-locking and clamping device or double-cable clips.

E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections or reinforcing steel angle clamped] to hanger rod.

F. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations.

Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Air Duct Accessories" for fire and smoke dampers.

L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

3.2 DUCT SEALING

A. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
   1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
   2. All Air Ducts: Seal Class A.

3.3 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

C. Hangers Exposed to View: Threaded rod and angle or channel supports.

D. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum interval of 16 feet.

E. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.4 SEISMIC-RESTRAINT-DEVICE INSTALLATION

A. Install ducts with hangers and anchorage designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with 2022 CBC Section 1617A.1.18 through 1617A.1.26 and ASCE 7-16 Chapters 13, 26, and 30.

B. Bracing shall conform to ASCE 7-16 Sections 13.6.5, 13.6.6, 13.6.7, 13.6.8; and 2022 CBC, Sections 1617A.1.24, 1616A.1.25 and 1617A.1.26.
   1. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.
   2. Brace a change of direction longer than 12 feet.

C. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.

D. Install cables so they do not bend across edges of adjacent equipment or building structure.

E. Install cable restraints on ducts that are suspended with vibration isolators.

F. Install seismic-restraint devices using methods approved by an evaluation service member of the ICC Evaluation Service, the Office of Statewide Health Planning and Development for the State of California or an agency acceptable to authorities having jurisdiction.

G. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.

H. Drilling for and Setting Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcement or embedded items during drilling. Notify the Architect if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Set anchors to manufacturer's recommended torque, using a torque wrench.
5. Install zinc-coated steel anchors for interior applications and stainless-steel anchors for applications exposed to weather.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Division 23 Section "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 START UP

A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

3.7 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel

B. Intermediate Reinforcement:
   1. Galvanized-Steel Ducts: Galvanized steel.

C. Elbow Configuration:
   1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
      a. Velocity 1000 fpm or Lower:
         1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
         2) Mitered Type RE 4 without vanes.
      b. Velocity 1000 to 1500 fpm:
         1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
         2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.

3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

c. Velocity 1500 fpm or Higher:
1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."
a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.

D. Branch Configuration:
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
a. Rectangular Main to Rectangular Branch: 45-degree entry.
b. Rectangular Main to Round Branch: Spin in.
2. Round: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
a. Velocity 1000 fpm or Lower: 90-degree tap.
b. Velocity 1000 to 1500 fpm: Conical tap.
c. Velocity 1500 fpm or Higher: 45-degree lateral.

E. General requirements:
1. Verify all dimensions at the site making all field measurements and shop drawings necessary for fabrication and erection of sheet metal work. Dimensions shown are net free

areas. Lined ducts shall be fabricated so that new dimensions to inside of lining shall equal the sizes shown on drawings.

2. Make allowances for beams, pipes or other obstructions in building construction and for work of other trades. Check plans showing work of other trades and consult with Architect in the event of any interference.
3. Fittings: Manufactured fittings for all exposed ductwork. Use slop fit couplings for all joints.
4. Low Pressure Ductwork: Sheet metal gauges, transverse joint type and spacing, reinforcing type and spacing, In accordance with latest ASHRAE and SMACNA Schedules for low-pressure ductwork. Figures below are from the SMACNA Manual
5. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission.
6. Elbows shall be standard radius or square with vanes as shown on Fig 4-2, 3 & 4. Single vanes with ¾" trailing edge are preferred. Adjust the vanes so that the railing edges are parallel with the downstream duct when entering and leaving duct sizes are not equal. Turning vanes used in acoustically lined duct shall use an acoustical noise reduction turning vane.
7. Offsets & transitions - Fig 4-7, branch connections as illustrated in - Fig 4-1 or as indicated on the plans.
8. Round laterals - Fig 3-5, straight tees are not acceptable.
9. Conical tees and wyes– Fig 3-6.
10. Junctions between ducts: Branch take-off with 45°or 90° tapered spin-in. No branch duct to intersect main duct on bottom.
11. Seal all longitudinal and transverse duct and plenum joints and field formed seams airtight (Seal Class A) with medium water based, low VOC, pressure duct sealant.
12. Joints between ducts: Make with beaded sleeve joints. Apply duct sealer to male end. Mechanically fasten with sheet metal screws or pop rivets. Over joint and screw or rivet heads, apply coating of duct sealer.
13. Supports for ducts and plenums shall be band iron supports according to Section 4.
14. All ductwork shall be concealed behind finished wall, ceilings or floors unless specifically noted “exposed” on the drawings. Ductwork shown to be exposed shall be installed to provide maximum headroom and/or floor space.
15. Increase duct sizes gradually, not exceeding 15° divergence wherever possible. Divergence upstream of equipment shall not exceed 30°; convergence downstream shall not exceed 45°.
16. Access Panels and Doors in Ductwork: Provide in ductwork as indicated and wherever necessary or required for proper access to all instruments, controls, fire and automatic dampers and equipment and for convenient inspection and maintenance. Size as approved by Architect.
17. Install ductwork of sizes, runs and connections as shown on drawings.
18. Fabricate ductwork in workman-like manner with airtight joints; presenting smooth surfaces on inside, neatly finished on outside; construct with curves, bends; turning vanes to aid in easy flow of air. Make internal ends of slip joints in directions of air flow.
19. Install ductwork to provide maximum headroom.

20. Adjust ducts to suit local conditions. Alter duct sizes on basis of equal friction where required to facilitate installation.
21. Provide ductwork connected to air-handling equipment or air inlet and outlet devices, with all necessary transformation pieces, flexible fabric connections as required. Secure fabric connectors tightly to fans, casings and ducts. Allow at least 1" slack in connections. Do not paint fabric connectors. Provide galvanized steel weather shield over exterior top and sides of exposed flexible connections.
22. Diagonally or transversely cross break all panels on metal rectangular ducts over 18" in either direction.
23. Avoid penetration of ducts. Provide airtight rubber grommets at unavoidable penetrations of hanger rods.
24. Duct Openings: Provide openings where required to accommodate thermometers, smoke detectors, controllers, etc.
25. Provide pitot tube openings where required for testing of systems: Complete with metal cap with spring device or screw to ensure against air leakage.
26. Where openings are provided in insulated ductwork, install insulation material inside metal ring.

END OF SECTION

Division 26:
Electrical

SECTION 260500 - GENERAL ELECTRICAL REQUIREMENTS

1.0 GENERAL

1.1 DESCRIPTION OF WORK:

A. The work of this Section consists of providing all required labor, supervision, materials and equipment to satisfactorily complete all electrical installations that are shown on the Drawings, included in these specifications, or otherwise needed for a complete and fully operating facility.

B. Furnish and install all required in-place equipment, conduits, conductors, cables and any miscellaneous materials for the satisfactory interconnection and operation of all associated electrical systems.

1.2 RELATED WORK:

A. This Section provides the basic Electrical Requirements which supplement the General Requirements of Division 01 and apply to all Sections of Division 26.

1.3 SUBMITTALS:

A. As specified in Division 01. Submit to the Architect shop drawings, manufacturer's data and certificates for equipment, materials and finish, and pertinent details for each system specified. Information to be submitted includes manufacturer's descriptive literature of cataloged products, equipment, drawings, diagrams, performance and characteristic curves as applicable, test data and catalog cuts. Obtain written approval before procurement, fabrication, or delivery of the items to the job site. Partial submittals are not acceptable and will be returned without review. Furnish manufacturer's name, trade name, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference, applicable Federal, Industry and Technical Society Publication References, and years of satisfactory service of each item required to establish contract compliance. Photographs of existing installations and data submitted in lieu of catalog data are not acceptable and will be returned without approval.

B. Organize submittals for equipment and items related to each specification section together as a package.

C. Proposed substitutions of products will not be reviewed or approved prior to awarding of the Contract.

D. Substitutions shall be proven to the Architect or Engineer to be equal or superior to the specified product. Architect’s decision is final. The Contractor shall pay all costs incurred by the Architect and Engineer in reviewing and processing any proposed substitutions whether or not a proposed substitution is accepted.

E. If a proposed substitution is rejected, the contractor shall furnish the specified product at no increase in contract price.

F. If a proposed substitution is accepted, the contractor shall be completely responsible for all dimensional changes, electrical changes, or changes to other work which are a result of the substitution. The accepted substitution shall be made at no additional cost to the owner or design consultants.

1.4 QUALITY ASSURANCE:

A. Codes: All electrical equipment and materials, including installation and testing, shall conform to the latest editions following applicable codes:

1. California Electrical Code (CEC).

2. Occupational Safety and Health Act (OSHA) standards.

3. All applicable local codes, rules and regulations.

4. Electrical Contractor shall posses a C-10 license and all other licenses as may be required. Licenses shall be in effect at start of this contract and be maintained throughout the duration of this contract.

B. Variances: In instances where two or more codes are at variance, the most restrictive requirement shall apply.

C. Standards: Equipment shall conform to applicable standards of American National Standards Institute (ANSI), Electronics Industries Association (EIA), Institute of Electrical and Electronics Engineers (IEEE), and National Electrical Manufacturers Association (NEMA).

D. Underwriter Laboratories (UL) listing is required for all equipment and materials where such listing is offered by the Underwriters Laboratories. Provide service entrance labels for all equipment required by the NEC to have such labels.

E. The electrical contractor shall guarantee all work and materials installed under this contract for a period of one (1) year from date of acceptance by owner.

F. All work and materials covered by this specification shall be subject to inspection at any and all times by representatives of the owner. Work shall not be closed in or covered before inspection and approval by the owner or his representative. Any material found not conforming with these specifications shall, within 3 days after being notified by the owner, be removed from premises; if said material has been installed, entire expense of removing and replacing same, including any cutting and patching that may be necessary, shall be borne by the contractor.

1.5 CONTRACT DOCUMENTS:

A. Drawings and Specifications:

1. In the case of conflict between the drawings and specifications, the specifications shall take precedence.

2. Drawings and specifications are intended to comply with all law, ordinances, rules and regulations of constituted authorities having jurisdiction, and where referred to in the Contract Documents, said laws, ordinance, rules and regulations shall be considered as a part of said Contract Documents within the limits specified. The Contractor shall bear all expenses of correcting work done contrary to said laws, ordinance, rules and regulations if the Contractor knew or should have known that the work as performed is contrary to said laws, ordinances, rules and regulations and if the Contractor performed same (1) without first consulting the Architect for further instructions regarding said work and/or (2) disregarded the Architect's instructions regarding said work.

B. Drawings: The Electrical Drawings shall govern the general layout of the completed construction.

1. Locations of equipment, panels, pullboxes, conduits, stub-ups, ground connections are approximate unless dimensioned; verify locations with the Architect prior to installation.

2. Review the Drawings and Specification Divisions of other trades and perform the electrical work that will be required for those installations.

3. Should there be a need to deviate from the Electrical Drawings and Specifications, submit written details and reasons for all changes to the Architect for approval.

4. The general arrangement and location of existing conduits, piping, apparatus, etc., is approximate. The drawings and specifications are for the assistance and guidance of the contractor, exact locations, distances and elevations are governed by actual field conditions. Accuracy of data given herein and on the drawings is not guaranteed. Minor changes may be necessary to accommodate work. The contractor is responsible for verifying existing conditions. Should it be necessary to deviate from the design due to interference with existing conditions or work in progress, claims for additional compensation shall be limited to those for work required by unforeseen conditions as determined by the Architect.

5. All drawings and divisions of these specifications shall be considered as whole. The contractor shall report any apparent discrepancies to the Architect prior to submitting bids.

6. The contractor shall be held responsible to have examined the site and compared it with the specifications and plans and to have satisfied himself as to the conditions under which the work is to be performed. He shall be held responsible for knowledge of all existing conditions whether or not accurately described. No subsequent allowance shall be made for any extra expense due to failure to make such examination.

1.6 CLOSEOUT SUBMITTALS:

A. Manuals: Furnish manuals for equipment where manuals are specified in the equipment specifications or are specified in Division 01.

1.7 COORDINATION:

A. Coordinate the electrical work with the other trades, code authorities, utilities and the Architect.

B. Provide and install all trenching, backfilling, conduit, pull boxes, splice boxes, etc. for all Utility Company services to the locations indicated on the Drawings. All materials and construction shall be in accordance with the requirements for all the Utility Companies. Prior to performing any work, the Electrical Contractor shall coordinate with the various Utility Companies and obtain utility company engineering drawings. Verify that all such work and materials shown on the Drawings are of sufficient sizes and correctly located to provide services on the site. The Electrical Contractor shall verify with all the Utility Companies that additional contractor furnished and installed work is not required. If additional work, materials, or changes are required by any of the Utility Companies, the Electrical Contractor shall advise the Architect of such changes and no further work shall then be performed until instructed to do so by the Architect. The Electrical Contractor shall coordinate with the various Utility Companies to schedule inspections and to obtain service connections.

C. The Electrical Contractor shall schedule all utility work necessary for utility inspections, connections, cable installation, etc. for the new electrical service to meet the construction schedule.

D. Utility Company charges shall be paid by the Owner.

E. Contractor shall pay all inspection and other applicable fees and procure all permits necessary for the completion of this work.

F. Contractor installing PG&E Facilities shall be pre-qualified by PG&E and possess an its wallet card. The its wallet card includes a QR Code that shall be available for scanning by the PG&E Inspector during inspections.

G. Where connections must be made to existing installations, properly schedule all the required work, including the power shutdown periods.

H. When two trades join together in an area, make certain that no electrical work is omitted.

1.8 JOB CONDITIONS:

A. Operations: Perform all work in compliance with 01

1. Keep the number and duration of power shutdown periods to a minimum.

2. Show all proposed shutdowns and their expected duration on the construction schedule. Schedule and carry out shutdowns so as to cause the least disruption to operation of the Owner's facilities.

3. Carry out shutdown only after the schedule has been approved, in writing, by the owner. Submit power interruption schedule 15 days prior to date of interruption.

B. Construction Power: Unless otherwise noted in Division 01 of these specifications, contractor shall make all arrangements and provide all necessary facilities for temporary construction power [from the owner's on-site source. Energy costs shall be paid for by the Owner.] [to the site. Energy costs shall be paid by the General Contractor.]

C. Storage: Provide adequate storage for all equipment and materials which will become part of the completed facility so that it is protected from weather, dust, water, or construction operations.

1.9 DAMAGED PRODUCTS:

A. Notify the Architect in writing in the event that any equipment or material is damaged. Obtain approval from the Architect before making repairs to damaged products.

1.10 LOCATIONS:

A. General: Use equipment, materials and wiring methods suitable for the types of locations in which they are located.

B. Dry Locations: All those indoor areas which do not fall within the definition below for Wet Locations and which are not otherwise designated on the Drawings.

C. Wet Locations: All locations exposed to the weather, whether under a roof or not, unless otherwise designated on the Drawings.

1.11 SAFETY AND INDEMNITY:

A. The Contractor is solely and completely responsible for conditions of the job site including safety of all persons and property during performance of the work. This requirement will apply continually and not be limited to normal working hours. The contractor shall provide and maintain throughout the work site proper safeguards including, but not limited to, enclosures, barriers, warning signs, lights, etc. to prevent accidental injury to people or damage to property.

B. No act, service, drawing review or construction review by the Owner, the Engineer or their Consultants is intended to include reviews of the adequacy of the Contractors safety measures in or near the construction site.

C. The Contractor performing work under this Division of the Specifications shall hold harmless, indemnify, and defend the Owner, the Engineer, their consultants, and each of their officers, agents and employees from any and all liability claims, losses, or damage arising out of or alleged to arise from bodily injury, sickness, or death of a person or persons and for all damages arising out of injury to or destruction of property arising directly or indirectly out of or in connection with the performance of the work under this Division of the Specifications,

and from the Contractor's negligence in the performance of the work described in the construction contract documents, but not including liability that may be due to the sole negligence of the Owner, the Engineer, their Consultants or their officers, agents and employees.

D. If a work area is encountered that contains hazardous materials, the contractor is advised to coordinate with the owner and its abatement consultant for abatement of hazardous material by the Owner's Representative. "Hazardous materials" means any toxic substance regulated or controlled by OSHA, EPA, State of California or local rules, regulations and laws. Nothing herein shall be construed to create a liability for Aurum Consulting Engineers regarding hazardous materials abatement measures, or discovery of hazardous materials.

1.12 ACCESS DOORS:

A. The contractor shall install access panels as required where floors, walls or ceilings must be penetrated for access to electrical, control, fire alarm or other specified electrical devices. The minimum size panel shall be 14" x 14" in usable opening. Where access by a service person is required, minimum usable opening shall be 18" x 24".

B. All access doors installed lower than 7'-0" above finished floor and exposed to public access shall have keyed locks.

C. Where specific information or details relating to access panels differ from Division 26 paragraph 1.12 of these specifications, or shown on the electrical drawings and details or under other Divisions of work, those requirements shall supersede these specifications.

1.13 ARC FLASH:

A. The contractor shall install a clearly visible arc flash warning to the inside door of all panelboards and industrial control panels, as well as to the front of all switchboards and motor control centers that are a part of this project.

B. The warning shall have the following wording: line 1 "WARNING" (in large letters), line 2 "Potential Arc Flash Hazard" (in medium letters), line 3 & 4 "Appropriate Personal Protective Equipment and Tools required when working on this equipment".

1.14 EMERGENCY BOXES:

A. All boxes and enclosures for emergency circuits shall be permanently marked with a readily visible red spray-painted mark.

2.0 PRODUCTS

2.1 STANDARD OF QUALITY:

A. Products that are specified by manufacturer, trade name or catalog number establish a standard of quality and do not prohibit the use of equal products of other manufacturers provided they

are established to be equal to the specified product and approved by the Architect prior to installation.

B. Material and Equipment: Provide materials and equipment that are new and are current products of manufacturers regularly engaged in the production of such products. The standard products shall have been in satisfactory commercial or industrial use for two years prior to bid opening. The two-year period includes use of equipment and materials of similar size under similar circumstances. For uniformity, only one manufacturer will be accepted for each type of product.

C. Service Support: Submit a certified list of qualified permanent service organizations including their addresses and qualification for support of the equipment. These service organizations shall be convenient to the equipment installation and able to render service to the equipment on a regular and emergency basis during the warranty period of the contract.

D. Manufacturer's Recommendations: Where installation procedures are required to be in accordance with manufacturer's recommendations, furnish printed copies of the recommendations prior to installation. Installation of the item shall not proceed until recommendations are received. Failure to furnish recommendation shall be cause for rejection of the equipment or material.

2.2 NAMEPLATES:

A. For each piece of electrical equipment, provide a manufacturer's nameplate showing his name, location, the pertinent ratings, the model designation, and shop order number.

B. Identify each piece of equipment and related controls with a rigid laminated engraved plastic nameplate. Unless otherwise noted, nameplates shall be melamine plastic 0.125-inch-thick, white with black center core. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be 0.5 by 2.5 inches unless otherwise noted. Where not otherwise specified, lettering shall be a minimum of 0.25-inch-high normal block style. Engrave nameplates with the inscriptions indicated on the Drawings and, if not so indicated, with the equipment name. Securely fasten nameplates in place using two stainless steel or brass screws.

2.3 FASTENERS:

A. Fasteners for securing equipment to walls, floors and the like shall be either hot-dip galvanized after fabrication or stainless steel.

2.4 FINISH REQUIREMENTS:

A. Equipment: Refer to each electrical equipment section of these Specifications for painting requirements of equipment enclosures. Repair any final paint finish which has been damaged or is otherwise unsatisfactory, to the satisfaction of the Architect.

B. Wiring System: In finished areas, paint all exposed conduits, boxes and fittings to match the color of the surface to which they are affixed.

3.0 EXECUTION

3.1 WORKMANSHIP:

A. Ensure that all equipment and materials fit properly in their installation.

B. Perform any required work to correct improperly fit installation at no additional expense to the owner.

C. All electrical equipment and materials shall be installed in a neat and workmanship manner in accordance with the "NECA-1 Standard Practices for Good Workmanship in Electrical Contracting". Workmanship of the entire job shall be first class in every respect.

3.2 EQUIPMENT INSTALLATIONS:

A. Provide the required inserts, bolts and anchors, and securely attach all equipment and materials to their supports.

B. Do all the cutting and patching necessary for the proper installation of work and repair any damage done.

C. Earthquake restraints: electrical components shall be anchored and installed per the details on the DSA-approved construction documents. The following components shall be anchored or braced to meet the force and displacement requirements prescribed in the 2022 CBC Sections 1617A.1.18 through 1617A.1.26 and ASCE 7-16 Chapters 13, 26, and 30: electrical distribution systems shall be braced to comply with the forces and displacements prescribed in ASCE 7-16 Section 13.3 as defined in ASVE 7-16 Sections 13.6.5, 13.6.6, 13.6.7, 13.6.8, and 2022 CBC, Sections 1617A.1.24, 1617A.1.25 and 1617A.1.26

D. Structural work: All core drilling, bolt anchor insertion, or cutting of existing structural concrete shall be approved by a California registered structural consulting engineer prior to the execution of any construction. At all floor slabs and structural concrete walls to be drilled, cut or bolt anchors inserted, the contractor shall find and mark all reinforcing in both faces located by means of x-ray, pach-ometer, or prof-ometer. Submit sketch showing location of rebar and proposed cuts, cores, or bolt anchor locations for approval.

3.4 FIELD TEST:

A. Test shall be in accordance with Acceptance testing specifications issued by the National Electrical Testing Association (NETA).

B. Perform equipment field tests and adjustments. Properly calibrate, adjust and operationally check all circuits and components, and demonstrate as ready for service. Make additional calibration and adjustments if it is determined later that the initial adjustments are not satisfactory for proper performance. Perform equipment field test for equipment where

equipment field tests are specified in the equipment Specifications. Give sufficient notice to the Architect prior to any test so that the tests may be witnessed.

C. Provide instruments, other equipment and material required for the tests. These shall be of the type designed for the type of tests to be performed. Test instrument shall be calibrated by a recognized testing laboratory within three months prior to performing tests.

D. Operational Tests: Operationally test all circuits to demonstrate that the circuits and equipment have been properly installed and adjusted and are ready for full-time service. Demonstrate the proper functioning of circuits in all modes of operation, including alarm conditions.

E. Re-testing will be required for all unsatisfactory tests after the equipment or system has been repaired. Re-test all related equipment and systems if required by the Architect. Repair and re-test equipment and systems which have been satisfactorily tested but later fail, until satisfactory performance is obtained.

F. Maintain records of each test and submit five copies to the Architect when testing is complete. All tests shall be witnessed by the Architect. These records shall include:

1. Name of equipment tested.
2. Date of report.
3. Date of test.
4. Description of test setup.
5. Identification and rating of test equipment.
6. Test results and data.
7. Name of person performing test.
8. Owner or Architect's initials.

G. Items requiring testing shall be as noted in the additional electrical sections of these specifications.

3.5 CLEANING EQUIPMENT:

A. Thoroughly clean all soiled surfaces of installed equipment and materials.

3.6 PAINTING OF EQUIPMENT:

A. Factory Applied: Electrical equipment shall have factory applied painting system which shall, as a minimum, meet the requirements of NEMA ICS 6 corrosion-resistance test and the additional requirements specified in the technical section.

B. Field Applied: Paint electrical equipment as required to match finish of adjacent surfaces.

3.7 RECORDS:

A. Maintain one copy of the contract Drawing Sheets on the site of the work for recording the "as built" condition. After completion of the work, the Contractor shall carefully mark the work as actually constructed, revising, deleting and adding to the Drawing Sheets as required. The following requirements shall be complied with:

1. Cable Size and Type: Provide the size and type of each cable installed on project.

2. Substructure: Where the location of all underground conduits, pull boxes, stub ups and etc. where are found to be different than shown, carefully mark the correct location on the Drawings. Work shall be dimensioned from existing improvements.

3. Size of all conduit runs.

4. Routes of concealed conduit runs and conduit runs below grade.

5. Homerun points of all branch circuit.

6. Location of all switchgear, panels, MCC, lighting control panels, pullcans, etc.

7. Changes made as a result of all approved change orders, addendums, or field authorized revisions.

8. As Builts: At the completion of the Work the Contractor shall review, certify, correct and turn over the marked-up Drawings to the Architect for his use in preparing "as built" plans.

9. As built Drawings shall be delivered to the Architect within ten (10) days of completion of construction.

3.8 CLEAN UP:

A. Upon completion of electrical work, remove all surplus materials, rubbish, and debris that accumulated during the construction work. Leave the entire area neat, clean, and acceptable to the Architect.

3.9 MECHANICAL AND PLUMBING ELECTRICAL WORK:

A. The requirements for electrical power and/or devices for all mechanical and plumbing equipment supplied and/or installed under this Contract shall be coordinated and verified with the following:

1. Mechanical and Plumbing Drawings.
2. Mechanical and Plumbing sections of these Specifications.

3. Manufacturers of the Mechanical and Plumbing equipment supplied.

B. The coordination and verification shall include the voltage, ampacity, phase, location and type of disconnect, control, and connection required. Any changes that are required as a result of this coordination and verification shall be a part of this Contract.

C. The Electrical Contractor shall furnish and install the following for all mechanical and plumbing equipment:

1. Line voltage conduit and wiring.
2. Disconnect switches.
3. Manual line motor starters.

D. Automatic line voltage controls and magnetic starters shall be furnished by the Mechanical and/or Plumbing Contractor and installed and connected by the Electrical Contractor. When subcontracted for by the Mechanical and/or Plumbing Contractor, all line voltage control wiring installed by the Electrical Contractor shall be done per directions from the Mechanical and/or Plumbing Contractor.

E. All low voltage control wiring for Mechanical and Plumbing equipment shall be installed in conduit. Furnishing, installation and connection of all low voltage conduit, boxes, wiring and controls shall be by the Mechanical and/or Plumbing Contractor.

F. Disconnects (Motor and Circuit)

1. Disconnect switches shall be provided and located at all motors.
2. Switches for three-phase motors shall be heavy-duty, horsepower rated three-pole, and surface mounted except as noted on drawings.
3. Switches containing more than three poles shall be as specified on the drawings.
4. Switches for single-phase, fractional horsepower motors shall be heavy-duty, horsepower rated.
5. Disconnect switches shall be as manufactured by ITE- Siemens, General Electric or Square D.

G. Disconnects (Motor: Fused):

1. Disconnect switches shall be provided and located at all motors.
2. Switches for three-phase motors shall be heavy-duty, horsepower rated three-pole, and surface mounted except as noted on drawings.
3. Switches containing more than three poles shall be as specified on the drawings.
4. Switches for single-phase, fractional horsepower motors shall be heavy-duty, horsepower rated.
5. Disconnect switches shall be as manufactured by ITE- Siemens, General Electric or Square D.

H. Manual motor starters, where required, shall have toggle type operators with pilot light and melting alloy type overload relays, SQUARE D COMPANY, Class 2510, Type FG-1P (surface) or Type FS-1P (flush) or ITE, WESTINGHOUSE or GENERAL ELECTRIC equal.

END OF SECTION

SECTION 260519 - LINE VOLTAGE WIRE AND CABLE

1.0 GENERAL

1.1 DESCRIPTION OF WORK:

A. The work of this Section consists of providing all wire and cable rated 600 volts or less, including splices and terminations, as shown on the Drawings and as described herein.

1.2 RELATED WORK:

A. See the following Specification Section for work related to the work in this Section:

1. 260542 Conduits, Raceways and Fittings.

2. 260533 Junction and Pull Boxes.

1.3 QUALITY ASSURANCE

A. Field tests shall be performed as specified in paragraph 3.04 of this Section.

2.0 PRODUCTS

2.1 CONDUCTORS:

A. Conductors shall be copper, type THHN/THWN/MTW oil and gasoline resistant, 600 volt rated insulation.

B. Conductors shall be stranded copper.

C. Minimum power and control wire size shall be No. 12 AWG unless otherwise noted.

D. All conductors used on this Project shall be of the same type and conductor material.

2.2 CABLES:

A. All individual conductors shall be copper with type THHN/THWN, 600 volt rated insulation.

B. [Non-metallic – sheathed cable (Romex): Type “NM”, 600 volts rated with insulated copper conductors, No. 12 AWG minimum size, and internal copper ground wire.]

C. Insulation Marking - All insulated conductors shall be identified with printing colored to contrast with the insulation color.

D. Color Coding - As specified in paragraph 3.03.

E. Special Wiring - Where special wiring is proposed by an equipment manufacturer, submit the special wiring requirements to the Owner's Representative and, if approved, provide same. Special wire shall be the type required by the equipment manufacturer.

F. Other Wiring - Wire or cable not specifically shown on the Drawings or specified, but required, shall be of the type and size required for the application and as approved by the Owner's Representative.

G. Manufacturer - Acceptable manufacturers including Cablec, Southwire, or equal.

2.3 TERMINATIONS:

A. Manufacturer - Terminals as manufactured by T&B, Burndy or equal.

B. Wire Terminations – Stranded conductors shall be terminated in clamping type terminations which serve to contain all the strands of the conductor. Curling of a stranded conductor around a screw type terminal is not allowed. For screw type terminations, use a fork type stake-on termination on the stranded conductor. Use only a stake-on tool approved for the fork terminals selected.

C. End Seals - Heat shrink plastic caps of proper size for the wire on which used.

2.4 TAPE:

A. Tape used for terminations and cable marking shall be compatible with the insulation and jacket of the cable and shall be of plastic material.

3.0 EXECUTION

3.1 CABLE INSTALLATION:

A. Clean Raceways - Clean all raceways prior to installation of cables as specified in Section 260542 - Conduits Raceway and Fittings.

B. All line voltage wiring shall be installed in conduit.

C. All feeder conductors shall be continuous from equipment to equipment. Splices in feeders are not permitted unless specifically noted or approved by the Electrical Engineer.

D. All branch circuit wiring shall be run concealed in ceiling spaces, walls, below floors or in crawl spaces unless noted otherwise.

E. Cable Pulling - Exercise care in pulling wires and cables into conduit or wireways so as to avoid kinking, putting undue stress on the cables or otherwise abrading them. No grease will be permitted in pulling cables. Only soapstone, talc, or UL listed pulling compound will be permitted. The raceway construction shall be complete and protected from the weather before

cable is pulled into it. Swab conduits before installing cables and exercise care in pulling, to avoid damage to conductors.

F. Bending Radius - Cable bending radius shall be per applicable code. Install feeder cables in one continuous length.

G. Equipment Grounding Conductors - Provide an equipment grounding conductor, whether or not it is shown on the Drawings, in all conduits or all raceways.

H. Panelboard Wiring - In panels, bundle incoming wire and cables which are No. 6 AWG and smaller, lace at intervals not greater than 6 inches, neatly spread into trees and connect to their respective terminals. Allow sufficient slack in cables for alterations in terminal connections. Perform lacing with plastic cable ties or linen lacing twine. Where plastic panel wiring duct is provided for cable runs, lacing is not necessary when the cable is properly installed in the duct.

3.2 CABLE TERMINATIONS AND SPLICES:

A. Splices - UL Listed wirenuts.

B. Terminations - Shall comply with the following:

1. Make up and form cable and orient terminals to minimize cable strain and stress on device being terminated on.

2. Burnish oxide from conductor prior to inserting in oxide breaking compound filled terminal.

3.3 CIRCUIT AND CONDUCTOR IDENTIFICATION:

A. Color Coding - Provide color coding for all circuit conductors. Insulation color shall be white for neutrals and green for grounding conductors. Conductor colors shall be as follows:

VOLTAGE	208/120V	480/277V
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Grey
Ground	Green	Green

B. Color coding shall be in the conductor insulation for all conductors #10 AWG and smaller; for larger conductors, color shall be either in the insulation or in colored plastic tape applied at every location where the conductor is readily accessible.

C. Circuit Identification - All underground distribution and service circuits shall be provided with plastic identification tags in each secondary box and at each termination. Tags shall identify the source transformer of the circuit and the building number(s) serviced by the circuit.

3.4 FIELD TESTS:

A. All systems shall test free from short circuits and grounds, shall be free from mechanical and electrical defects, and shall show an insulation resistance between phase conductors and ground of not less than the requirements of the CEC. All circuits shall be tested for proper neutral connections.

B. Insulation Resistance Tests: Perform insulation resistance tests on circuits with #2 AWG and larger conductors to be energized with a line-to-neutral voltage of 120 volts or more. Make these tests before all equipment has been connected. Test the insulation with a 500Vdc insulation resistance tester with a scale reading 100 megohms. The insulation resistance shall be 2 megohms or more. Submit results for review.

END OF SECTION

SECTION 260526 - GROUNDING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Conduits, wires, ground rods and other materials for the electrical grounding system.

1.2 RELATED SECTIONS:

A. Section 260500- Electrical General Requirements.

PART 2 PRODUCTS

2.1 GROUND ROD:

A. "Copperweld" ground rod conforming to or exceeding requirements of U.L. Specification No. 467 (ANSI C-33.8). Rod shall be 3/4" diameter and 10' in length, unless otherwise noted on the Drawings.

2.2 BELOW GRADE CONNECTIONS:

A. Compression fittings, Thomas & Betts, Series 52000, 53000 or 54000 or approved equal.

2.3 HARDWARE:

A. Bolts, nuts and washers shall be bronze, cadmium plated steel or other non-corrosive materials, approved for the purpose.

2.4 WATERPROOF SEALANT:

A. Use Kearney "Aqua Seal" mastic sealant on all below grade clamp or compression type connections.

PART 3 EXECUTION

3.1 GROUNDING AND BONDING:

A. Grounding and bonding shall be as required by codes and local authorities.

B. All electrical equipment shall be grounded, including, but not limited to, panel boards, terminal cabinets and outlet boxes.

C. The ground pole of receptacles shall be connected to their outlet boxes by means of a copper ground wire connecting to a screw in the back of the box.

D. A green insulated copper ground wire, sized to comply with codes, shall be installed in all conduit runs.

E. All metal parts of pull boxes shall be grounded per code requirements.

F. All ground conductors shall be green insulated copper.

G. The ground system electrodes shall be tested for resistance before the equipment ground conductors are connected. Maximum ground system resistance shall be 25 ohms. Install up to two additional ground rods to meet the 25-ohm requirement. Multiple ground rods shall not be less than 10 feet apart.

H. Grounding of the panels [,] [and] buildings [and relocatables]. shall be completed as indicated on the Drawings.

END OF SECTION

SECTION 260533 - OUTLET, JUNCTION AND PULL BOXES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

A. The work of this Section consists of providing all required labor, supervision, materials and equipment to satisfactorily complete all electrical installations shown on the drawings, included in these Specification, or otherwise needed for a complete and fully operating facility. The work shall include but not be limited to the following:
B. Furnish and install all required material, supports and miscellaneous material for the satisfactory interconnection of all associated electrical systems.

1.2 RELATED WORK:

A. See the following specification sections for work related to the work of this section.

1. 260500 General Electrical Requirements.

2. 260542 Conduits, Raceway and Fittings.

3. 260519 Line Voltage Wire and Cable.

PART 2 - PRODUCTS

2.1 OUTLET BOXES, JUNCTION AND PULL BOXES

A. Standard Outlet Boxes: Galvanized, steel, knock-out type of size and configuration best suited to the application indicated on the Drawings. Minimum box size shall be 4 inches square (octagon for most light fixtures) by 1-1/2 inches deep with mud rings as required.

B. Switch boxes: Minimum box size shall be 4 inches square by 1-1/2 inches deep with mud rings as required. Install multiple switches in standard gang boxes with raised device covers suitable for the application indicated.

C. Conduit bodies: Cadmium plated, cast iron alloy. Conduit bodies with threaded conduit hubs and neoprene gasketed, cast iron covers. Bodies shall be used to facilitate pulling of conductors or to make changes in conduit direction only. Splices are not permitted in conduit bodies. Crouse-Hinds Form 8 Condulets, Appleton Form 35 Unilets or equal.

D. Sheet Metal Boxes: Use standard outlet or concrete ring boxes wherever possible; otherwise use a minimum 16-gauge galvanized sheet metal, NEMA I box sized to Code requirements with covers secured by cadmium plated machine screws located six inches on centers. Circle AW Products, Hoffman Engineering Company or equal.

E. Flush Mounted Pull boxes and Junction boxes: Provide overlapping covers with flush head cover retaining screws, prime coated.

PART 3 - EXECUTION

3.1 OUTLET BOXES

A. General:

1. All outlet boxes shall finish flush with building walls, ceilings and floors except in mechanical and electrical rooms above accessible ceiling or where exposed work is called for on the Drawings.

2. Install raised device covers (plaster rings) on all switch and receptacle outlet boxes installed in masonry or stud walls or in furred, suspended or exposed concrete ceilings. Covers shall be of a depth to suit the wall or ceiling finish.

3. Leave no unused openings in any box. Install close-up plugs as required to seal openings.

B. Box Layout:

1. Outlet boxes shall be installed at the locations and elevations shown on the drawings or specified herein. Make adjustments to locations as required by structural conditions and to suit coordination requirements of other trades.

2. Locate switch outlet boxes on the latch side of doorways.

3. Outlet boxes shall not be installed back to back nor shall through-wall boxes be permitted. Outlet boxes on opposite sides of a common wall shall be separated horizontally by at least one stud or vertical structural member.

4. For outlets mounted above counters, benches or backsplashes, coordinate location and mounting heights with built-in units. Adjust mounting height to agree with required location for equipment served.

5. On fire rated walls, the total face area of the outlet boxes shall not exceed 100 square inches per 100 square feet of wall area.

C. Supports:

1. Outlet Boxes installed in metal stud walls shall be equipped with brackets designed for attaching directly to the studs or shall be mounted on specified box supports.

2. Fixture outlet boxes installed in suspended ceiling of gypsum board or lath and plaster construction shall be mounted to 16-gauge metal channel bars attached to main ceiling runners.

3. Fixture outlet boxes installed in suspended ceilings supporting acoustical tiles or panels shall be supported directly from the structure above where pendant mounted lighting fixture are to be installed on the box.

4. Fixture Boxes above tile ceilings having exposed suspension systems shall be supported directly from the structure above.

5. Outlet and / or junction boxes shall not be supported by grid or fixture hanger wires at any locations.

3.2 JUNCTION AND PULL BOXES

A. General:

1. Install junction or pull boxes where required to limit bends in conduit runs to not more than 360 degrees or where pulling tension achieved would exceed the maximum allowable for the cable to be installed. Note that these boxes are not shown on the Drawings.

2. Locate pull boxes and junction boxes in concealed locations above accessible ceilings or exposed in electrical rooms, utility rooms or storage areas.

3. Install raised covers (plaster rings) on boxes in stud walls or in furred, suspended or exposed concrete ceilings. Covers shall be of a depth to suit the wall or ceiling finish.

4. Leave no unused openings in any box. Install close-up plugs as required to seal openings.

5. Identify circuit numbers and panel on cover of junction box with black marker pen.

B. Box Layouts:

1. Boxes above hung ceilings having concealed suspension systems shall be located adjacent to openings for removable recessed lighting fixtures.

C. Supports:

1. Boxes installed in metal stud walls shall be equipped with brackets designed for attaching directly to the studs or shall be mounted on specified box supports.

2. Boxes installed in suspended ceilings of gypsum board or lath and plaster construction shall be mounted to 16-gauge metal channel bars attached to main ceiling runners.

3. Boxes installed in suspended ceilings supporting acoustical tiles or panels shall be supported directly from the structure above.

4. Boxes mounted above suspended acoustical tile ceilings having exposed suspension systems shall be supported directly from the structure above.

END OF SECTION

SECTION 260542 - CONDUITS, RACEWAYS AND FITTINGS

1.0 GENERAL

1.1 DESCRIPTION OF WORK:

A. The work of this section consists of furnishing and installing conduits, raceways and fittings as shown on the Drawings and as described herein.

1.2 RELATED WORK:

A. See the following specification sections for work related to the work in this section:

1. 260543 Underground Ducts
2. 260544 In Grade Pull Boxes
3. 260519 Line Voltage Wire and Cable
4. 260533 Junction and Pull Boxes

2.0 PRODUCTS

2.1 CONDUITS, RACEWAYS:

A. Electrical Metallic Tubing (EMT) shall be hot-dip galvanized after fabrication. Couplings shall be compression or set-screw type.

B. Flexible Conduit: Flexible metal conduit shall be galvanized steel.

C. Galvanized Rigid Steel Conduit (GRS) shall be hot-dip galvanized after fabrication. Couplings shall be threaded type.

D. Rigid Non-metallic Conduit: Rigid non-metallic conduit shall be PVC Schedule 40 (PVC-40 or NEMA Type EPC-40) conduit approved for underground use and for use with 90˚ C wires.

2.2 CONDUIT SUPPORTS:

A. Supports for individual conduits shall be galvanized malleable iron one-hole type with conduit back spacer.

B. Supports for multiple conduits shall be hot-dipped galvanized Unistrut or Superstrut channels, or approved equal. All associated hardware shall be hot-dip galvanized.

C. Supports for EMT conduits shall be galvanized pressed steel single hole straps.

D. Clamp fasteners shall be by wedge anchors. Shot in anchors shall not be allowed.

2.3 FITTINGS:

A. Provide threaded-type couplings and connectors for rigid steel conduits; provide steel compression (watertight), or steel set-screw type for EMT, (die-cast zinc or malleable iron type fittings are not allowed). Provide threaded couplings and Meyers hubs for rigid steel conduit exposed to weather.

B. Fittings for flexible conduit shall be Appleton, Chicago, IL, Type ST, O-Z Gedney Series 4Q by General Signal Corp., Terryville, CT, T & B 5300 series, or approved equal.

C. Fittings for use with rigid steel shall be galvanized steel or galvanized cast ferrous metal; access fittings shall have gasketed cast covers and be Crouse Hinds Condulets, Syracuse, NY, Appleton Unilets, Chicago, IL, or approved equal. Provide threaded-type couplings and connectors; set-screw type and compression-type are not acceptable.

D. Fittings for use with rigid non-metallic conduit shall be PVC and have solvent-weld-type conduit connections.

E. Union couplings for conduits shall be the Erickson type and shall be Appleton, Chicago, IL, Type EC, O-Z Gedney 3-piece Series 4 by General Signal Corp., Terryvile, CT, or approved equal. Threadless coupling shall not be used.

F. Bushings:

1. Bushings shall be the insulated type.

2. Bushings for rigid steel shall be insulated grounding type, O-Z Gedney Type HBLG, Appleton Type GIB, or approved equal.

G. Conduit Sealants:

1. Fire Retardant Types: Fire stop material shall be reusable, non-toxic, asbestos-free, expanding, putty type material with a 3-hour rating in accordance with UL Classification 35L4 or as specified on the Drawings.

3.0 EXECUTION

3.1 CONDUIT, RACEWAY AND FITTING INSTALLATION:

A. For conduit runs exposed to weather provide rigid metal (GRS).

B. For conduit run underground, in concrete or masonry block wall and under concrete slabs, install minimum ¾" size nonmetallic (PVC) with PVC elbows. Where conduits transition from underground or under slab to above grade install wrapped rigid metal (GRS) elbows and risers.

C. For conduit runs concealed in steel or wood framed walls or in ceiling spaces or exposed in interior spaces above six feet over the finished floor, install EMT.

D. Flexible metal conduit shall be used only for the connection of recessed lighting fixtures and motor connections unless otherwise noted on the Drawings. Liquid-tight steel flexible conduit shall be used for motor connections.

E. The minimum size raceway shall be 1/2-inch unless indicated otherwise on the Drawings.

F. Installation shall comply with the CEC.

G. From pull point to pull point, the sum of the angles of all of the bends and offset shall not exceed 360 degrees.

H. Conduit Supports: Properly support all conduits as required by the NEC. Run all conduits concealed except where otherwise shown on the drawings.

1. Exposed Conduits: Support exposed conduits within three feet of any equipment or device and at intervals not exceeding NEC requirements; wherever possible, group conduits together and support on common supports. Support exposed conduits fastened to the surface of the concrete structure by one-hole clamps, or with channels. Use conduit spacers with one-hole clamps.

    a. Conduits attached to walls or columns shall be as unobtrusive as possible and shall avoid windows. Run all exposed conduits parallel or at right angles to building lines.

    b. Group exposed conduits together. Arrange such conduits uniformly and neatly.

2. Support all conduits within three feet of any junction box, coupling, bend or fixture.

3. Support conduit risers in shafts with Unistrut Superstrut, or approved equal, channels and straps.

I. Moisture Seals: Provide in accordance with NEC paragraphs 230-8 and 300-5(g).

J. Where PVC conduit transitions from underground to above grade, provide rigid steel 90's with risers. Rigid steel shall be half-lap wrapped with 20 mil tape and extend minimum 12" above grade.

K. Provide a nylon pull cord in each empty raceway.

L. Provide galvanized rigid steel factory fittings for galvanized rigid steel conduit.

M. Slope all underground raceways to provide drainage; for example, slope conduit from equipment located inside a building to the pull box or manhole located outside the building.

N. Conduits shall be blown out and swabbed prior to pulling wires, or installation of pull cord in empty conduits.

END OF SECTION

SECTION 260543 - UNDERGROUND DUCTS

1.0 GENERAL

1.1 DESCRIPTION OF WORK:

A. The work of this section consists of furnishing and installing raceways, and raceway spacers with necessary excavation.

1.2 RELATED WORK:

A. See the following specification sections for work related to the work of this section.

1. 02200 Excavation and Backfill

2. 260542 Conduit Raceway and Fittings

1.3 STANDARDS AND CODES:

A. Work and material shall be in compliance with and according to the requirements of the latest revision of the following standards and codes.

1. National Electrical Code (NEC) (Latest Revision)

2. California Electrical Code (CEC).

3. Underground Installations CEC - Article 300.5

4. Rigid NonMetallic Conduit CEC - Article 347

2.0 PRODUCTS

2.1 RACEWAYS:

A. As specified in Section 260542 Conduits, Raceways and Fittings.

3.0 EXECUTION

3.1 EXCAVATION:

A. As specified in Section 02200, Excavation and Backfill and as required for the work shown on the Drawings.

3.2 INSTALL RACEWAYS AS INDICATED ON DRAWINGS.

3.3 SAND ENCASEMENT:

A. As specified in Section 02200 - Excavation and Backfill.

3.4 BACKFILL:

A. As specified in Section 02200 - Excavation and Backfill.

END OF SECTION

SECTION 260544 - IN GRADE PULL BOXES

1.0 GENERAL

1.1 DESCRIPTION OF WORK:

A. The work of this section consists of providing all labor, supervision, tools, materials, and performing all work necessary to furnish and install pre-cast concrete vaults, and pull boxes with necessary excavation.

1.2 RELATED WORK:

A. See the following specification sections for work related to the work of this section.

1. 02200 Excavation and Backfill.

2. 260543 Underground Ducts.

1.3 SUBMITTALS:

A. As specified in Section 260500 and Division 01.

1. Catalog Data: Provide manufacturer's descriptive literature - Pre-cast Vaults, Pull Boxes and Accessories.

2.0 PRODUCTS

2.1 MATERIALS AND EQUIPMENT:

A. General Requirements:

1. Pull boxes for electrical power, controls and other communication circuits shall consist of pre-cast reinforced concrete boxes, extensions' bases, and covers as specified herein and as indicated on the Drawings. Pre-cast units shall be the product of a manufacturer regularly engaged in the manufacture of pre-cast vaults and pull boxes. Acceptable manufacturers are Christy, Utility Vault, Brooks, Associated Concrete or equal.

B. Construction:

1. Pre-cast concrete vaults and pull boxes for electrical power distribution and communication circuits with associated risers and tops shall conform to ASTM C478 and ACI 318. Pull boxes shall be the type noted on the Drawings and shall be constructed in accordance with the applicable details as shown. Tops and walls shall consist of reinforced concrete. Walls

and bottom shall be of monolithic concrete construction. Duct entrances and windows shall be located near the corners of structures to facilitate cable racking.

C. Covers:

1. The word "ELECTRICAL" shall be cast in the top face of all electrical cable boxes. The word “Signal” or “Fire Alarm” shall be cast in the top of the boxes utilized for these systems.

3.0 EXECUTION

3.1 INSTALLATION:

A. Install pull boxes where required to limit bends in conduit runs to not more than 360 degrees or where pulling tension achieved would exceed the maximum allowable for the cable to be installed. Note that these boxes are not shown on the Drawings.

B. Pre-cast pull boxes shall be installed approximately where indicated on the Drawings. The exact location of each pull box shall be determined after careful consideration has been given to the location of other utilities, grading, and paving. All cable boxes and secondary pull boxes shall be installed with a minimum of 6-inch thick crushed rock or sand bedding.

C. Paved areas - Vaults and pull boxes located in areas to be paved shall be installed such that the top of the cover shall be flush with the finished surface of the paving.

D. Unpaved Areas - In unpaved areas, the top of vaults and pull box covers shall be approximately 2 inches above finished grade.

E. Joint Seals - Section joints of pre-cast vaults and pull boxes shall be sealed with compound as recommended by the manufacturer.

F. Trenching, Backfilling, and Compaction - Trenching, backfilling and compaction shall be as specified in Section 02200 - Excavation and Backfill.

END OF SECTION

SECTION 260573 - ELECTRICAL POWER SYSTEM STUDIES

1.0 GENERAL

1.1 SUMMARY:

A. The electrical equipment manufacturer shall provide electrical power system studies for the project. The type and content of each study is specified in the following articles.

1.2 SUBMITTALS:

A. Completed electrical power system studies shall be bound and submitted to the architect prior to or as a part of the switchboard and panelboard submittals.

2.0 PRODUCTS

2.1 MANUFACTURERS:

A. The specified electrical power system studies shall be performed by Square D Company or approved equal.

2.2 ELECTRICAL POWER SYSTEM STUDIES:

A. Protective Device Time-Current Coordination Analysis

1. The time-current coordination analysis shall be performed with the aid of computer software intended for this purpose, and will include the determination of settings, ratings, or types for the overcurrent protective devices supplied.

2. Where necessary, an appropriate compromise shall be made between system protection and service continuity with [service continuity considered more important than system protection] [system protection considered more important than service continuity] [system protection and service continuity considered to be of equal importance].

3. A sufficient number of computer generated log-log plots shall be provided to indicate the degree of system protection and coordination by displaying the time-current characteristics of series connected overcurrent devices and other pertinent system parameters.

4. Computer printouts shall accompany the log-log plots and will contain descriptions for each of the devices shown, settings of the adjustable devices, the short-circuit current availability at the device location when known, and device identification numbers to aid in locating the devices on the log-log plots and the system one-line diagram.

5. The study shall include a separate, tabular computer printout containing the suggested device settings of all adjustable overcurrent protective devices, the equipment where the

device is located, and the device number corresponding to the device on the system one-line diagram.

6. A computer generated system one-line diagram shall be provided which clearly identifies individual equipment buses, bus numbers, device identification numbers and the maximum available short-circuit current at each bus when known.

7. A discussion section which evaluates the degree of system protection and service continuity with overcurrent devices, along with recommendations as required for addressing system protection or device coordination deficiencies.

8. Significant deficiencies in protection and/or coordination shall be called to the attention of the architect and recommendations made for improvements as soon as they are identified.

9. The contractor shall be responsible for supplying pertinent electrical system conductor, circuit breaker, generator, and other component and system information in a timely manner to allow the time-current analysis to be completed prior to final installation.

B. Short-Circuit Analysis

1. Calculation of the maximum rms symmetrical three-phase short-circuit current at each significant location in the electrical system shall be made using a digital computer.

2. Appropriate motor short-circuit contribution shall be included at the appropriate locations in the system so that the computer calculated values represent the highest short-circuit current the equipment will be subjected to under fault conditions.

3. A tabular computer printout shall be included which lists the calculated short-circuit currents, X/R ratios, equipment short-circuit interrupting or withstand current ratings, and notes regarding the adequacy or inadequacy of the equipment.

4. The study shall include a computer printout of input circuit data including conductor lengths, number of conductors per phase, conductor impedance values, insulation types, transformer impedances and X/R ratios, motor contributions, and other circuit information as related to the short-circuit calculations.

5. Include a computer printout identifying the maximum available short-circuit current in rms symmetrical amperes and the X/R ratio of the fault current for each bus/branch calculation.

6. The system one-line diagram shall be computer generated and will clearly identify individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location and other information pertinent to the computer analysis.

7. A comprehensive discussion section evaluating the adequacy or inadequacy of the equipment must be provided and include recommendations as appropriate for improvements to the system.

8. The contractor shall be responsible for supplying pertinent electrical system conductor, circuit breaker, generator, and other component and system information in a timely manner to allow the short-circuit analysis to be completed prior to final installation.

9. Any inadequacies shall be called to the attention of the architect and recommendations made for improvements as soon as they are identified.

C. Arc-Flash Hazard Analysis

1. The Arc-Flash Hazard Analysis shall be performed with the aid of computer software intended for this purpose in order to calculate Arc-Flash Incident Energy (AFIE) levels and flash protection boundary distances.

2. The Arc-Flash Hazard Analysis shall be performed in conjunction with a short-circuit analysis and a time-current coordination analysis.

3. Results of the Analysis shall be submitted in tabular form, and shall include device or bus name, bolted fault and arcing fault current levels, flash protection boundary distances, personal-protective equipment classes and AFIE levels.

4. The analysis shall be performed under worst-case Arc-Flash conditions, and the final report shall describe, when applicable, how these conditions differ from worst-case bolted fault conditions.

5. The Arc-Flash Hazard Analysis shall be performed by a registered professional engineer.

6. The Arc-Flash Hazard Analysis shall be performed in compliance with IEEE Standard 1584-2002, the IEEE Guide for Performing Arc-Flash Calculations.

7. The Arc-Flash Hazard Analysis shall include recommendations for reducing AFIE levels and enhancing worker safety.

8. The proposed vendor shall demonstrate experience with Arc-Flash Hazard Analysis by submitting names of at least ten actual Arc-Flash Hazard Analyses it has performed in the past year.

9. The proposed vendor shall demonstrate capabilities in providing equipment, services, and training to reduce Arc-Flash exposure and train workers in accordance with NFPA 70E and other applicable standards.

10. The proposed vendor shall demonstrate experience in providing equipment labels in compliance with NEC-2002 section 110 and ANSI Z535.4 to identify AFIE and appropriate Personal Protective Equipment classes.

[D Load Flow and Voltage Drop Analysis

1. The Load Flow and Voltage Drop Analysis shall be made using a digital computer and include calculations of power flow in all three-phase branch and feeder circuits, calculated voltages at each bus and voltage drops of each feeder.

2. The analysis shall provide the calculated maximum values of kva, kW, kvar, power factor, and amperes for each power circuit.

3. The calculated power losses in each branch and total system losses shall be provided.

4. A computer printout listing all cables, transformers, loads, and other circuit data shall be included.

5. Provide tabular bus-to-bus computer printouts listing the calculated values.

6. The analysis shall include a computer generated system one-line diagram clearly identifying individual equipment buses, bus numbers, cable and bus connections, power flow throughout the system, and other information related to the analysis.

7. A discussion section evaluating the loading and voltage levels for the system shall be provided and recommendations included as appropriate to improve system operation.

8. Significant deficiencies in loading or voltage levels shall be called to attention of the architect and recommendations made for improvements at soon as they are identified.]

[E. Power Factor Correction Study

1. A Power Factor Correction Study shall be performed to determine the appropriate level of compensation needed to achieve the desired power factor.

2. Impacts on harmonic and transient concerns shall be evaluated in order to determine the optimum size and configuration of the equipment.

3. The study shall make appropriate recommendations in order to provide proper operation of the electrical system.

4. The study shall be based on [load data collected from on-site measurements] [load data collected from historical information provided by the power monitoring system] [from previous utility bills] in order to characterize the power factor of the system over a period of time and under varying load conditions.

5. System loading tables shall be provided which include power factor data and estimated levels of power factor compensation provided.

6. Evaluation of system operation using the estimated levels of compensation will be provided with consideration to harmonic and transient concerns.

7. Final levels of compensation will be determined and used as the base case condition for the harmonic and transient studies.

8. All conclusions, recommendations, and equipment specifications as a result of the Power Factor Correction Study will be summarized in the final report.]

[F. Harmonic Analysis Study

1. A Harmonic Analysis Study shall be made to determine the levels of harmonic voltages and currents in the system.

2. The type and level of compensation needed to achieve the desired power factor and acceptable levels of harmonics shall be considered.

3. Transient concerns shall be evaluated in order to determine the optimum equipment size, location in the system, and configuration.

4. The study shall make appropriate recommendations in order to provide proper protection and operation of the electrical system.

5. The study will shall be based on [load data collected from on-site measurements] [load data collected from historical information provided by the power monitoring system] [from previous utility bills] in order to characterize the power factor of the system over a period of time and under varying load conditions.

6. Harmonic measurements will be performed in order to provide nonlinear load (e.g. DC drive) characteristics, voltage distortion levels, and model verification. The measurements will be conducted over a 1-5 day period.

7. Harmonic source models will be developed for each nonlinear load (drive, etc.) type. The load characteristics [will be determined by measurement and used as harmonic sources for the computer simulations.] [shall be approximated based on the loads indicated on the project drawings.]

8. Frequency scan cases (impedance vs frequency) will be completed in order to determine the system frequency response characteristic for various system conditions.

9. If required, the application of harmonic filters will be evaluated to determine the optimum filter size and configurations.

10. Computer simulations shall be performed to determine the system harmonic voltage and current levels and voltage distortion levels (and compared with measured values to determine the effect of various system conditions).

11. If required, harmonic filter specifications shall be developed with consideration to cost, filtering options, and effectiveness of harmonic filters.]

[G. Switching Transient Analysis Study

1. A Switching Transient Analysis Study shall be made to determine the transient over voltages for various switching conditions and their effect on the operation of the electrical system.

2. Various system conditions (consistent with previously gathered data from the Power Factor Correction Study and Harmonic Analysis Study) shall be evaluated so that the proper overvoltage protection specifications may be developed.

3. Transient simulations shall be performed using a digital computer in order to determine transient voltage levels at the low voltage buses within the electrical system.

4. The electrical system parameters shall be varied to in order to determine their effect on the transient voltages.

5. Various solutions to excessive transient voltage levels shall be considered and additional computer simulations made to determine their validity.

6. The evaluation must consider solutions to power factor and harmonic concerns with respect to transient overvoltage levels.

7. Nuisance tripping of electronic power equipment (e.g., adjustable speed drives) shall be evaluated and corrective or preventive techniques suggested.]

END OF SECTION

SECTION 260923 - DISTRIBUTED DIGITAL LIGHTING CONTROL SYSTEM

1.0 GENERAL

1.1 SUMMARY:

A. Section Includes:

1. Digital Lighting Controls
2. Relay Panels
3. Emergency Lighting Control (if applicable)

B. Related Sections:

1. Section 262726 - Wiring Devices: Receptacles
2. Section 265100 –Lighting
3. [Section 250000 – Integrated Automation] Building integrator shall provide integration of the lighting control system with Building Automation Systems.]
4. Drawings and general provision of the Contract, including General and Supplementary Conditions and Division 01, Specification Sections apply to this Section
5. Electrical Sections, including wiring devices, apply to the work of this Section.

C. Control Intent – Control Intent includes, but is not limited to:

1. Defaults and initial calibration settings for such items as time delay, sensitivity, fade rates, etc.
2. Initial sensor and switching zones
3. Initial time switch settings
4. Task lighting and receptacle controls
5. Emergency Lighting control (if applicable)

1.2 REFERENCES:

A. American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE)

B. National Electrical Manufacturers Association (NEMA)

C. Underwriters Laboratories, Inc. (UL)

1. 20 – Plug Load Controls

2. 508– Industrial Controls

3. 916 – Energy Management Equipment.

4. 924 – Emergency Lighting

1.3 SYSTEM DESCRIPTION & OPERATION:

A. The Lighting Control and Automation system as defined under this section covers the following equipment:

1. Digital Occupancy Sensors – Self-configuring, digitally addressable and calibrated occupancy sensors with LCD display and two-way active infrared (IR) communications.

2. Digital Switches – Self-configuring, digitally addressable pushbutton on/off, dimming, and scene switches with two-way active infrared (IR) communications.

3. Handheld remotes for personal control – One-button dimming, two-button on/off, or five-button scene remotes provide control using infrared communications. Remote may be configured in the field to control selected loads or scenes without special tools.

4. Digital Daylighting Sensors – Single-zone closed loop, multi-zone open loop and single-zone dual-loop daylighting sensors with two-way active infrared (IR) communications can provide switching, bi-level, tri-level or dimming control for daylight harvesting.

5. Digital Room Controllers – Self-configuring, digitally addressable one, two or three relay plenum-rated controllers for on/off control. Selected models include 0-10 volt or line voltage forward phase control dimming outputs and integral current monitoring capabilities.

6. Digital Plug-Load Controllers – Self-configuring, digitally addressable, single relay, plenum-rated application-specific controllers. Selected models include integral current monitoring capabilities.

7. Configuration Tools – Handheld remote for room configuration and relay panel programming provides two-way infrared (IR) communications to digital devices and allows complete configuration and reconfiguration of the device / room from up to 30 feet away. Unit to have Organic LED display, simple pushbutton interface, and allow bi-directional communication of room variables and occupancy sensor settings. Computer software also customizes room settings.

8. Digital Lighting Management (DLM) local network – Free topology, plug-in wiring system (Cat 5e) for power and data to room devices.

9. Digital Lighting Management (DLM) segment network – Linear topology, BACnet MS/TP network (1.5 twisted pair, shielded,) to connect multiple DLM local networks for centralized control

10. Network Bridge – provides BACnet MS/TP-compliant digital networked communication between rooms, panels and the Segment Manager or building automation system (BAS) and automatically creates BACnet objects representative of connected devices.

11. Segment Manager – provides web browser-based user interface for system control, scheduling, power monitoring, room device parameter administration and reporting.

12. Programming and Configuration software – Optional PC-native application capable of accessing DLM control parameters within a room, for the local network, via a USB adapter, or globally, for many segment networks simultaneously, via BACnet/IP communication.

13. LMCP Digital Lighting Management Relay Panel – provides up to 8, 24, or 48 mechanically latching relays. Relays include a manual override and a single push-on connector for easy installation or removal from the panel. Panel accepts program changes from handheld configuration tool for date and time, location, holidays, event scheduling, button binding and group programming. Provides BACnet MS/TP-compliant digital networked communication between other lighting controls and/or building automation system (BAS).

14. Emergency Lighting Control Unit (ELCU) – allows a standard lighting control device to control emergency lighting in conjunction with normal lighting in any area within a building

1.4 LIGHTING CONTROL APPLICATIONS:

A. Unless relevant provisions of the applicable local Energy Codes are more stringent, provide a minimum application of lighting controls as follows:

1. Space Control Requirements – Provide occupancy/vacancy sensors with Manual- or Partial-ON functionality in all spaces except toilet rooms, storerooms, library stacks, or other applications where hands-free operation is desirable and Automatic-ON occupancy sensors are more appropriate. Provide Manual-ON occupancy/vacancy sensors for any enclosed office, conference room, meeting room, open plan system and training room. For spaces with multiple occupants, or where line-of-sight may be obscured, provide ceiling- or corner-mounted sensors and Manual-ON switches.

2. Bi-Level Lighting – Provide multi-level controls in all spaces except toilet rooms, storerooms, library stacks, or applications where variable dimming is used.

3. Task Lighting / Plug Loads – Provide automatic shut off of non-essential plug loads and task lighting in all spaces except toilet rooms and storerooms. Provide Automatic-ON of plug

loads whenever spaces are occupied. For spaces with multiple occupants a single shut off consistent with the overhead lighting may be used for the area.

4. Daylit Areas – Provide daylight-responsive automatic control in all spaces (conditioned or unconditioned) where daylight contribution is available as defined by relevant local building energy code:

    a. All luminaires within code-defined daylight zones shall be controlled separately from luminaires outside of daylit zones.

    b. Daytime setpoints for total ambient illumination (combined daylight and electric light) levels that initiate dimming shall be programmed in compliance with relevant local building energy codes.

    c. Multiple-leveled switched daylight harvesting controls may be utilized for areas marked on drawings.

    d. Provide smooth and continuous daylight dimming for areas marked on drawings. Daylighting control system may be designed to turn off electric lighting when daylight is at or above required lighting levels, only if system functions to turn lamps back on at dimmed level, rather than turning full-on prior to dimming.

5. Conference, meeting, training, auditoriums, and multipurpose rooms shall have controls that allow for independent control of each local control zone. Rooms larger than 300 square feet shall instead have at least four (4) pre-set lighting scenes unless otherwise specified. Occupancy / vacancy sensors shall be provided to extinguish all lighting in the space. Spaces with up to four moveable walls shall include controls that can be reconfigured when the room is partitioned.

1.5 SUBMITTALS:

A. Submittals Package: Submit the shop drawings, and the product data specified below at the same time as a package.

B. Shop Drawings:

1. Composite wiring and/or schematic diagram of each control circuit as proposed to be installed.

2. Show exact location of all digital devices and part numbers, including at minimum sensors, room controllers, and switches for each area on reflected ceiling plans. (Contractor must provide AutoCAD format reflected ceiling plans.)

3. Provide room/area details including products and sequence of operation for each room or area. Illustrate typical acceptable room/area connection topologies.

4. Network riser diagram including floor and building level details. Include network cable specification and end-of-line termination details, if required. Illustrate points of connection to integrated systems. Coordinate integration with mechanical and/or other trades.

C. Product Data: Catalog sheets, specifications and installation instructions.

D. Include data for each device which:

1. Indicates where sensor is proposed to be installed.

2. Prove that the sensor is suitable for the proposed application.

1.6 QUALITY ASSURANCE:

A. Manufacturer: Minimum [10] years experience in manufacture of lighting controls.

1.7 PROJECT CONDITIONS:

A. Do not install equipment until following conditions can be maintained in spaces to receive equipment:

1. Ambient temperature: 0° to 40° C (32° to 104° F).

2. Relative humidity: Maximum 90 percent, non-condensing.

1.8 WARRANTY:

A. Provide a five-year limited manufacturer's warranty on all room control devices and panels.

1.9 MAINTENANCE:

A. Spare Parts:

1. Provide spares of each product to be used for maintenance as listed below:
   a. Provide one of each type of room controller, switch, plug load controller and sensor on the project.

2.0 PRODUCTS

2.1 MANUFACTURERS:

A. Acceptable Manufacturer:

1. WattStopper

   a. System: Digital Lighting Management (DLM)

2. Basis of design product: WattStopper Digital Lighting Management (DLM) or subject to compliance and prior approval with specified requirements of this section, of the following:

    a. Approved equal.

B. Substitutions:

1. This specification is based on products from WattStopper, Santa Clara, CA. Complete information on any other system proposed as a substitute must be submitted in writing for approval after bid and assorted cost saving. Prior approval does not guarantee final approval by the electrical engineer. The contractor shall be completely responsible for providing a system meeting this specification in its entirety. All deviations from this specification must be listed and individually signed off by the consultant.

2.2 DIGITAL LIGHTING CONTROLS:

2.2.1 Furnish the Company's system which accommodates the square-footage coverage requirements for each area controlled, utilizing room controllers, digital occupancy sensors, switches, daylighting sensors and accessories which suit the lighting and electrical system parameters.

2.3 DIGITAL WALL SWITCH OCCUPANCY SENSORS:

2.3.1 Wallbox mounted passive infrared PIR or dual technology (passive infrared and ultrasonic) digital occupancy sensor with 1 or 2 switch buttons.

2.3.2 Digital Occupancy Sensors shall provide scrolling LCD display for digital calibration and electronic documentation. Features include the following:

1. Digital calibration and pushbutton configuration for the following variables:

    a. Sensitivity – 0-100% in 10% increments

    b. Time delay – 1-30 minutes in 1-minute increments

    c. Test mode – Five second time delay

    d. Detection technology – PIR, Dual Technology activation and/or re-activation.

    e. Walk-through mode

    f. Load parameters including Auto/Manual-ON, blink warning, and daylight enable/disable when photosensors are included in the DLM local network.

2. Programmable control functionality including:

    2.3.2.1.1 Each sensor may be programmed to control specific loads within a local network.

2.3.2.1.2 Sensor shall be capable of activating one of 16 user-definable lighting scenes.

2.3.2.1.3 Adjustable retrigger time period for manual-on loads. Load will retrigger (turn on) automatically during the configurable period of time (default 10 seconds) after turning off.

2.3.2.1.4 On dual technology sensors, independently configurable trigger modes are available for both Normal (NH) and After Hours (AH) time periods. The retrigger mode can be programmed to use the following technologies:

2.3.2.1.4.1 Ultrasonic and Passive Infrared
2.3.2.1.4.2 Ultrasonic or Passive Infrared
2.3.2.1.4.3 Ultrasonic only
2.3.2.1.4.4 Passive Infrared only

3. Independently configurable sensitivity settings for passive infrared and ultrasonic technologies (on dual technology sensors) for both Normal (NH) and After Hour (AH) time periods.

4. Two RJ-45 ports for connection to DLM local network.

5. Two-way infrared (IR) transceiver to allow remote programming through handheld configuration tool and control by remote personal controls.

6. Device Status LEDs including:

   a. PIR detection

   b. Ultrasonic detection

   c. Configuration mode

   d. Load binding

7. Assignment of occupancy sensor to a specific load within the room without wiring or special tools.

8. Assignment of local buttons to specific loads within the room without wiring or special tools

9. Manual override of controlled loads.

10. All digital parameter data programmed into an individual wall switch sensor shall be retained in non-volatile FLASH memory within the wall switch sensor itself. Memory shall have an expected life of no less than 10 years.

2.3.3 BACnet object information shall be available for the following objects:

1. Detection state
2. Occupancy sensor time delay
3. Occupancy sensor sensitivity, PIR and Ultrasonic
4. Button state
5. Switch lock control
6. Switch lock status

2.3.4 Units shall not have any dip switches or potentiometers for field settings.

2.3.5 Multiple occupancy sensors may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required.

2.3.6 Two-button wall switch occupancy sensors, when connected to a single relay dimming room controller, shall operate in the following sequence as a factory default:

1. Left button
    a. Press and release - Turn load on
    b. Press and hold - Raise dimming load
2. Right button
    a. Press and release - Turn load off
    b. Press and hold - Lower dimming load

2.3.7 Low voltage momentary pushbuttons shall include the following features:

1. Load/Scene Status LED on each switch button with the following characteristics:
    a. Bi-level LED
    b. Dim locator level indicates power to switch
    c. Bright status level indicates that load or scene is active
2. The following button attributes may be changed or selected using a wireless configuration tool:

a. Load and Scene button function may be reconfigured for individual buttons (from Load to Scene, and vice versa).

b. Individual button function may be configured to Toggle, On only or Off only.

c. Individual scenes may be locked to prevent unauthorized change.

d. Fade Up and Fade Down times for individual scenes may be adjusted from 0 seconds to 18 hours.

e. Ramp rate may be adjusted for each dimmer switch.

f. Switch buttons may be bound to any load on a room controller and are not load type dependent; each button may be bound to multiple loads.

2.3.8 WattStopper part numbers: LMPW, LMDW. Available in white, light almond, ivory, grey, red and black; compatible with wall plates with decorator opening. Contractor shall coordinate device finish with [Architect] [Owner].

2.4 DIGITAL WALL OR CEILING MOUNTED OCCUPANCY SENSOR:

A. Wall or ceiling mounted (to suit installation) passive infrared (PIR), ultrasonic or dual technology digital (passive infrared and ultrasonic) occupancy sensor.

B. Digital Occupancy Sensors shall provide graphic LCD display for digital calibration and electronic documentation. Features include the following:

1. Digital calibration and pushbutton configuration for the following variables:

a. Sensitivity – 0-100% in 10% increments

b. Time delay – 1-30 minutes in 1-minute increments

c. Test mode – Five second time delay

d. Detection technology – PIR, Ultrasonic or Dual Technology activation and/or re-activation.

e. Walk-through mode

f. Load parameters including Auto/Manual-ON, blink warning, and daylight enable/disable when photosensors are included in the DLM local network.

2. Programmable control functionality including:

a. Each sensor may be programmed to control specific loads within a local network.

b. Sensor shall be capable of activating one of 16 user-definable lighting scenes.

c. Adjustable retrigger time period for manual-on loads. Load will retrigger (turn on) automatically within a configurable period of time (default 10 seconds) after turning off.

d. On dual technology sensors, independently configurable trigger modes are available for both Normal (NH) and After Hours (AH) time periods. The retrigger mode can be programmed to use the following technologies:

(1) Ultrasonic and Passive Infrared
(2) Ultrasonic or Passive Infrared
(3) Ultrasonic only
(4) Passive Infrared only

3. Independently configurable sensitivity settings for passive infrared and ultrasonic technologies (on dual technology sensors) for both Normal (NH) and After Hour (AH) time periods.

4. One or two RJ-45 port(s) for connection to DLM local network.

5. Two-way infrared (IR) transceiver to allow remote programming through handheld commissioning tool and control by remote personal controls.

6. Device Status LEDs, which may be disabled for selected applications, including:

a. PIR detection

b. Ultrasonic detection

c. Configuration mode

d. Load binding

7. Assignment of occupancy sensor to a specific load within the room without wiring or special tools.

8. Manual override of controlled loads.

9. All digital parameter data programmed into an individual occupancy sensor shall be retained in non-volatile FLASH memory within the sensor itself. Memory shall have an expected life of no less than 10 years.

C. BACnet object information shall be available for the following objects:

1. Detection state

2. Occupancy sensor time delay

3. Occupancy sensor sensitivity, PIR and Ultrasonic

D. Units shall not have any dip switches or potentiometers for field settings.

E. Multiple occupancy sensors may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required.

F. WattStopper product numbers: LMPX, LMDX, LMPC, LMUC, LMDC

2.5 DIGITAL WALL SWITCHES:

A. Low voltage momentary pushbutton switches in 1, 2, 3, 4, 5 and 8 button configurations. Wall switches shall include the following features:

1. Two-way infrared (IR) transceiver for use with personal and configuration remote controls.

2. Removable buttons for field replacement with engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.

3. Configuration LED on each switch that blinks to indicate data transmission.

4. Load/Scene Status LED on each switch button with the following characteristics:

a. Bi-level LED

b. Dim locator level indicates power to switch

c. Bright status level indicates that load or scene is active

5. Dimming switches shall include seven bi-level LEDs to indicate load levels using 14 steps.

6. Programmable control functionality including:

a. Button priority may be configured to any BACnet priority level, from 1-16, corresponding to networked operation allowing local actions to utilize life safety priority

b. Scene patterns may be saved to any button other than dimming rockers. Once set, buttons may be digitally locked to prevent overwriting of the preset levels.

7. All digital parameter data programmed into an individual wall switch shall be retained in non-volatile FLASH memory within the wall switch itself. Memory shall have an expected life of no less than 10 years.

B. BACnet object information shall be available for the following objects:

1. Button state

2. Switch lock control

3. Switch lock status

C. Two RJ-45 ports for connection to DLM local network.

D. Multiple digital wall switches may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration shall be required to achieve multi-way switching.

E. The following switch attributes may be changed or selected using a wireless configuration tool:

1. Load and Scene button function may be reconfigured for individual buttons (from Load to Scene, and vice versa).

2. Individual button function may be configured to Toggle, On only or Off only.

3. Individual scenes may be locked to prevent unauthorized change.

4. Fade Up and Fade Down times for individual scenes may be adjusted from 0 seconds to 18 hours.

5. Ramp rate may be adjusted for each dimmer switch.

6. Switch buttons may be bound to any load on a room controller and are not load type dependent; each button may be bound to multiple loads.

F. WattStopper product numbers: LMSW-101, LMSW-102, LMSW-103, LMSW-104, LMSW-105, LMSW-108, LMDM-101. Available in white, light almond, ivory, grey, red and black; compatible with wall plates with decorator opening. Contractor shall coordinate device finish with [Architect] [Owner].

2.6 HANDHELD REMOTE CONTROLS:

A. Battery-operated handheld devices in 1, 2 and 5 button configurations for remote switching or dimming control. Remote controls shall include the following features:

1. Two-way infrared (IR) transceiver for line of sight communication with DLM local network within up to 30 feet.

2. LED on each button confirms button press.

3. Load buttons may be bound to any load on a room controller and are not load type dependant; each button may be bound to multiple loads.

4. Inactivity timeout to save battery life.

B. A wall mount holster and mounting hardware shall be included with each remote control

C. WattStopper part numbers: LMRH-101, LMRH-102, LMRH-105.

2.7 DIGITAL PARTITION CONTROLS:

A. Partition controls shall enable manual or automatic coordination of lighting controls in flexible spaces with up to four moveable walls by reconfiguring the connected digital switches and occupancy sensors.

B. Four-button low voltage pushbutton switch for manual control.

1. Two-way infrared (IR) transceiver for use with configuration remote control.

2. Removable buttons for field replacement with engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.

3. Configuration LED on each switch that blinks to indicate data transmission.

4. Each button represents one wall; Green button LED indicates status.

5. Two RJ-45 ports for connection to DLM local network.

6. WattStopper part number: LMPS-104. Available in white, light almond, ivory, grey and black; compatible with wall plates with decorator opening.

C. Contact closure interface for automatic control via input from limit switches on movable walls (by others).

1. Operates on Class 2 power supplied by DLM local network.

2. Includes 24VDC output and four input terminals for maintained third party contract closure inputs.

a. Input max. sink/source current: 1-5mA

b. Logic input signal voltage High: >18VDC

c. Logic input signal voltage Low: <2VDC

3. Four status LEDs under hinged cover indicate if walls are open or closed; supports LMPS-104 as remote status indicator.

4. Two RJ-45 ports for connection to DLM local network.

5. WattStopper part number: LMIO-102

2.8 DIGITAL DAYLIGHTING SENSORS:

A. Digital daylighting sensors shall work with room controllers to provide automatic switching, bi-level, or tri-level or dimming daylight harvesting capabilities for any load type connected to a room controller. Daylighting sensors shall be interchangeable without the need for rewiring.

1. Closed loop sensors measure the ambient light in the space and control a single lighting zone.

2. Open loop sensors measure incoming daylight in the space, and are capable of controlling up to three lighting zones.

3. Dual loop sensors measure both ambient and incoming daylight in the space to ensure that proper light levels are maintained as changes to reflective materials are made in a single zone.

B. Digital daylighting sensors shall include the following features:

1. The sensor's internal photodiode shall only measure light waves within the visible spectrum. The photodiode's spectral response curve shall closely match the entire photopic curve. The photodiode shall not measure energy in either the ultraviolet or infrared spectrums. The photocell shall have a sensitivity of less than 5% for any wavelengths less than 400 nanometers or greater than 700 nanometers.

2. Sensor light level range shall be from 1-6,553 foot-candles (fc).

3. The capability of ON/OFF, bi-level or tri-level switching, or dimming, for each controlled zone, depending on the selection of room controller(s) and load binding to room controller(s).

4. For switching daylight harvesting, the photosensor shall provide a field-selectable deadband, or a separation, between the "ON Setpoint" and the "OFF Setpoint" that will prevent the lights from cycling excessively after they turn off.

5. For dimming daylight harvesting, the photosensor shall provide the option, when the daylight contribution is sufficient, of turning lights off or dimming lights to a field-selectable minimum level.

6. Photosensors shall have a digital, independently configurable fade rate for both increasing and decreasing light level in units of percent per second.

7. Photosensors shall provide adjustable cut-off time. Cut-off time is defined by the number of selected minutes the load is at the minimum output before the load turns off. Selectable range between 0-240 minutes including option to never cut-off.

8. Optional wall switch override shall allow occupants to reduce lighting level to increase energy savings or, if permitted by system administrator, raise lighting levels for a selectable period of time or cycle of occupancy.

9. Integral infrared (IR) transceiver for configuration and/or commissioning with a handheld configuration tool, to transmit detected light level to wireless configuration tool, and for communication with personal remote controls.

10. Configuration LED status light on device that blinks to indicate data transmission.

11. Status LED indicates test mode, override mode and load binding.

12. Recessed switch on device to turn controlled load(s) ON and OFF.

13. BACnet object information shall be available for the following daylighting sensor objects, based on the specific photocell's settings:

    a. Light level

    b. Day and night setpoints

    c. Off time delay

    d. On and off setpoints

    e. Up to three zone setpoints

    f. Operating mode – on/off, bi-level, tri-level or dimming

14. One RJ-45 port for connection to DLM local network.

15. A choice of accessories to accommodate multiple mounting methods and building materials. The photosensors may be mounted on a ceiling tile, skylight light well, suspended lighting fixture or backbox. Standard tube photosensors accommodate mounting materials from 0-0.62" thickness (LMLS-400, LMLS-500). Extended tube photosensors accommodate mounting materials from 0.62"-1.25" thickness (LMLS-400-L, LMLS-500-L). Mounting brackets are compatible with J boxes (LMLS-MB1) and wall mounting (LMLS-MB2). LMLS-600 photosensor to be mounted on included bracket below skylight well.

16. Any load or group of loads in the room can be assigned to a daylighting zone

17. Each load within a daylighting zone can be individually enabled or disabled for discrete control (load independence).

18. All digital parameter data programmed into a photosensor shall be retained in non-volatile FLASH memory within the photosensor itself. Memory shall have an expected life of no less than 10 years.

C. Closed loop digital photosensors shall include the following additional features:

1. An internal photodiode that measures light in a 100-degree angle, cutting off the unwanted light from bright sources outside of this cone.

2. Automatic self-calibration, initiated from the photosensor, a wireless configuration tool or a PC with appropriate software.

3. Automatically establishes application-specific setpoints following self-calibration. For switching operation, an adequate deadband between the ON and OFF setpoints shall prevent the lights from cycling; for dimming operation a sliding setpoint control algorithm with separate Day and Night setpoints shall prevent abrupt ramping of loads.

4. WattStopper Product Number: LMLS-400, LMLS-400-L.

D. Open loop digital photosensors shall include the following additional features:

1. An internal photodiode that measures light in a 60-degree angle cutting off the unwanted light from the interior of the room.

2. Automatically establishes application-specific setpoints following manual calibration using a wireless configuration tool or a PC with appropriate software. For switching operation, an adequate deadband between the ON and OFF setpoints for each zone shall prevent the lights from cycling; for dimming operation, a proportional control algorithm shall maintain the design lighting level in each zone.

3. Each of the three discrete daylight zones can include any non-overlapping group of loads in the room.

4. WattStopper Product Number: LMLS-500, LMLS-500-L.

E. Dual loop digital photosensors shall include the following additional features:

1. Close loop portion of dual loop device must have an internal photodiode that measures light in a 100-degree angle, cutting off the unwanted light from sources outside of this con

2. Open loop portion of dual loop device must have an internal photodiode that can measure light in a 60-degree angle, cutting off the unwanted light from the interior of the room.

3. Automatically establishes application-specific set-points following self-calibration. For switching operation, an adequate deadband between the ON and OFF setpoints shall prevent the lights from cycling; for dimming operation a sliding setpoint control algorithm with separate Day and Night setpoints shall prevent abrupt ramping of load.

4. Device must reference closed loop photosensor information as a base line reference. The device must be able to analyze the open loop photosensor information to determine if an adjustment in light levels is required.

5. Device must be able to automatically commission setpoints each night to provide adjustments to electrical lighting based on changes in overall lighting in the space due to changes in reflectance within the space or changes to daylight contribution based on seasonal changes.

6. Device must include extendable mounting arm to properly position sensor within a skylight well.

7. WattStopper product number LMLS-600

2.9 DIGITAL ROOM CONTROLLERS AND PLUG-LOAD CONTROLLERS:

A. Digital controllers for lighting and plug loads automatically bind the room loads to the connected devices in the space without commissioning or the use of any tools. Room and plug load controllers shall be provided to match the room lighting and plug load control requirements. The controllers will be simple to install, and will not have dip switches or potentiometers, or require special configuration for standard Plug n' Go applications. The control units will include the following features:

1. Automatic room configuration to the most energy-efficient sequence of operation based upon the devices in the room.

2. Simple replacement – Using the default automatic configuration capabilities, a room controller may be replaced with an off-the-shelf.

3. Multiple room controllers connected together in a local network must automatically prioritize each room controller, without requiring any configuration or setup, so that loads are sequentially assigned using room controller device ID's from highest to lowest.

4. Device Status LEDs to indicate:

   a. Data transmission

   b. Device has power

   c. Status for each load

   d. Configuration status

5. Quick installation features including:

   a. Standard junction box mounting

   b. Quick low voltage connections using standard RJ-45 patch cable

6. Based on individual configuration, each load shall be capable of the following behavior on power up following the loss of normal power:

   a. Turn on to 100%

b. Remain off

c. Turn on to last level

7. Each load shall be configurable to operate in the following sequences based on occupancy:

a. Auto-on/Auto-off (Follow on and off)

8. Manual-on/Auto-off (Follow off only)

9. The polarity of each load output shall be reversible, via digital configuration, so that on is off and off is on.

10. BACnet object information shall be available for the following objects:

a. Load status

b. Electrical current

c. Total watts per controller

d. Schedule state – normal or after-hours

e. Demand response control and cap level

f. Room occupancy status

g. Total room lighting and plug loads watts

h. Total room watts/sq ft

i. Force on/off all loads

11. UL 2043 plenum rated

12. Manual override and LED indication for each load

13. Dual voltage (120/277 VAC, 60 Hz), or 347 VAC, 60 Hz (selected models only). 120/277-volt models rated for 20A total load, derating to 16A required for some dimmed loads (forward phase dimming); 347-volt models rated for 15A total load; plug load controllers carry application-specific UL 20 rating for receptacle control.

14. Zero cross circuitry for each load

15. All digital parameter data programmed into an individual room controller or plug load controller shall be retained in non-volatile FLASH memory within the controller itself. Memory shall have an expected life of no less than 10 years.

B. On/Off Room Controllers shall include:

1. One or two relay configurations

2. Efficient 150 mA switching power supply

3. Three RJ-45 DLM local network ports with integral strain relief and dust cover

4. WattStopper product numbers: LMRC-101, LMRC-102

C. On/Off/Dimming enhanced Room Controllers shall include:

1. Real time current monitoring

2. Multiple relay configurations

   a. One, two or three relays (LMRC-21x series)

   b. One or two relays (LMRC-22x series)

3. Efficient 250 mA switching power supply

4. Four RJ-45 DLM local network ports with integral strain relief and dust cover

5. One dimming output per relay

   a. 0-10V Dimming - Where indicated, one 0-10-volt analog output per relay for control of compatible ballasts and LED drivers. The 0-10-volt output shall automatically open upon loss of power to the Room Controller to assure full light output from the controlled lighting. (LMRC-21x series)

   b. Line Voltage, Forward Phase Dimming - Where indicated, one forward phase control line voltage dimming output per relay for control of compatible two-wire or three-wire ballasts, LED drivers, MLV, forward phase compatible ELV, neon/cold cathode and incandescent loads. (LMRC-22x series)

   c. Each dimming output channel shall have an independently configurable minimum and maximum calibration trim level to set the dimming range to match the true dynamic range of the connected ballast or driver.

   d. The LED level indicators on bound dimming switches shall utilize this new maximum and minimum trim.

e. Each dimming output channel shall have an independently configurable minimum and maximum trim level to set the dynamic range of the output within the new 0-100% dimming range defined by the minimum and maximum calibration trim.

f. Calibration and trim levels must be set per output channel.

g. Devices that set calibration or trim levels per controller are not acceptable.

h. All configuration shall be digital. Devices that set calibration or trim levels per output channel via trim pots or dip-switches are not acceptable.

6. Each load shall have an independently configurable preset on level for Normal Hours and After-Hours events to allow different dimmed levels to be established at the start of both Normal Hours and After-Hours events.

7. Fade rates for dimming loads shall be specific to bound switch buttons, and the load shall maintain a default value for any bound buttons that do not specify a unique value.

8. The following dimming attributes may be changed or selected using a wireless configuration tool:

   a. Establish preset level for each load from 0-100%

   b. Set high and low trim for each load

   c. Set lamp burn in time for each load up to 100 hours

9. Override button for each load provides the following functions:

   a. Press and release for on/off control

   b. Press and hold for dimming control

10. WattStopper product numbers: LMRC-211, LRMC-212, LRMC-213, LMRC-221, LMRC-222

D. Plug Load Room Controllers shall include:

1. One relay configuration with additional connection for unswitched load

2. Configurable additive time delay to extend plug load time delay beyond occupancy sensor time delay (e.g. a 10-minute additive delay in a space with a 20-minute occupancy sensor delay ensures that plug loads turn off 30 minutes after the space is vacated).

3. Factory default operation is Auto-on/Auto-off, based on occupancy

4. Real time current monitoring of both switched and un-switched load (LMPL-201 only)

5. Efficient switching power supply

    a. 150mA (LMPL-101)

    b. 250mA (LMPL-201)

6. RJ-45 DLM local network ports

    a. Three RJ-45 ports (LMPL-101)

    b. Four RJ-45 ports (LMPL-201)

7. WattStopper product numbers: LMPL-101, LMPL-201.

2.10 DLM LOCAL NETWORK (ROOM NETWORK):

A. The DLM local network is a free topology lighting control physical connection and communication protocol designed to control a small area of a building.

B. Features of the DLM local network include:

1. Plug n' Go® automatic configuration and binding of occupancy sensors, switches and lighting loads to the most energy-efficient sequence of operation based upon the device attached.

2. Simple replacement of any device in the network with a standard off the shelf unit without requiring commissioning, configuration or setup.

3. Push n' Learn® configuration to change the automatic configuration, including binding and load parameters without tools, using only the buttons on the digital devices in the local network.

4. Two-way infrared communications for control by handheld remotes, and configuration by a handheld tool including adjusting load parameters, sensor configuration and binding, within a line of sight of up to 30 feet from a sensor, wall switch or IR receiver.

C. Digital room devices connect to the local network using pre-terminated Cat 5e cables with RJ-45 connectors, which provide both data and power to room devices. Systems that utilize RJ-45 patch cords but do not provide serial communication data from individual end devices are not acceptable.

D. If manufacturer's pre-terminated Cat 5e cables are not used for the installation, the contractor is responsible for testing each cable following installation and supplying manufacturer with test results.

E. WattStopper Product Number: LMRJ-Series

2.11 DLM SEGMENT NETWORK (ROOM TO ROOM NETWORK):

3.10.1 The segment network shall be a linear topology, BACnet-based MS/TP subnet to connect DLM local networks (rooms) and LMCP relay panels for centralized control.

3.10.1.1 Each connected DLM local network shall include a single network bridge (LMBC-300), and the network bridge is the only room-based device that is connected to the segment network.

3.10.1.2 Network bridges, relay panels and segment managers shall include terminal blocks, with provisions for separate “in” and “out” terminations, for segment network connections.

3.10.1.3 The segment network shall utilize 1.5 twisted pair, shielded, cable supplied by the lighting control manufacturer. The maximum cable run for each segment is 4,000 feet. Conductor-to-conductor capacitance of the twisted pair shall be less than 30 pf/ft and have a characteristic impedance of 120 Ohms.

3.10.1.4 Network signal integrity requires that each conductor and ground wire be correctly terminated at every connected device.

3.10.1.5 Substitution of manufacturer-supplied cable must be pre-approved: Manufacturer will not certify network reliability, and reserves the right to void warranty, if non-approved cable is installed, and if terminations are not completed according to manufacturer’s specific requirements.

3.10.1.6 Segment networks shall be capable of connecting to BACnet-compliant BAS (provided by others) either directly, via MS/TP, or through NB-ROUTERs, via BACnet/IP or BACnet/Ethernet. Systems whose room-connected network infrastructure require gateway devices to provide BACnet data to a BAS are unacceptable.

3.10.2 WattStopper Product Number: LM-MSTP, LM-MSTP-DB

2.12 CONFIGURATION TOOLS:

A. A wireless configuration tool facilitates optional customization of DLM local networks using two-way infrared communications, while PC software connects to each local network via a USB interface.

B. Features and functionality of the wireless configuration tool shall include but not be limited to:

1. Two-way infrared (IR) communication with DLM IR-enabled devices within a range of approximately 30 feet.

2. High visibility organic LED (OLED) display, pushbutton user interface and menu-driven operation.

3. Must be able to read and modify parameters for room controllers, occupancy sensors, wall switches, daylighting sensors, network bridges and relay panels, and identify room devices by type and serial number.

4. Save up to eight occupancy sensor setting profiles, and apply profiles to selected sensors.

5. Temporarily adjust light level of any load(s) on the local network, and incorporate those levels in scene setting. Set room mode for testing of Normal Hours (NH) and After Hours (AH) parameter settings.
6. Adjust or fine-tune daylighting settings established during auto-configuration, and input light level data to complete configuration of open loop daylighting controls.

7. Set room mode for testing of Normal Hours (NH) and After Hours (AH) parameter settings.

8. Verify status of building level network devices.

C. WattStopper Product Numbers: LMCT-100, LMCI-100/LMCS-100

2.13 NETWORK BRIDGE:

A. The network bridge module connects a DLM local network to a BACnet-compliant segment network for communication between rooms, relay panels and a segment manager or BAS. Each local network shall include a network bridge component to provide a connection to the local network room devices. The network bridge shall use industry standard BACnet MS/TP network communication and an optically isolated EIA/TIA RS-485 transceiver.

1. The network bridge shall be provided as a separate module connected on the local network through an available RJ-45 port.

2. Provide Plug n' Go operation to automatically discover room devices connected to the local network and make all device parameters visible to the segment manager via the segment network. No commissioning shall be required for set up of the network bridge on the local network.

3. The network bridge shall automatically create standard BACnet objects for selected room device parameters to allow any BACnet-compliant BAS to include lighting control and power monitoring features as provided by the DLM room devices on each local network. BACnet objects will be created for the addition or replacement of any given in-room DLM device for the installed life of the system. Products requiring that an application-specific point database be loaded to create or map BACnet objects are not acceptable. Systems not capable of providing BACnet data for control devices via a dedicated BACnet Device ID and physical MS/TP termination per room are not acceptable. Standard BACnet objects shall be provided as follows:

a. Read/write the normal or after-hours schedule state for the room

b. Read the **detection** state of each occupancy sensor

c. Read the aggregate occupancy state of the room

d. Read/write the on/Off state of loads

e. Read/write the dimmed light level of loads

f. Read the button states of switches

g. Read total current in amps, and total power in watts through the room controller

h. Read/write occupancy sensor time delay, PIR sensitivity and ultrasonic sensitivity settings

i. Activate a preset scene for the room

j. Read/write daylight sensor fade time and day and night setpoints

k. Read the current light level, in footcandles, from interior and exterior photosensors and photocells

l. Set daylight sensor operating mode

m. Read/write wall switch lock status

n. Read watts per square foot for the entire controlled room

o. Write maximum light level per load for demand response mode

p. Read/write activation of demand response mode for the room

q. Activate/restore demand response mode for the room

B. WattStopper product numbers: LMBC-300

2.14 SEGMENT MANAGER:

A. For networked applications, the Digital Lighting Management system shall include at least one segment manager to manage network communication. It shall be capable of serving up a graphical user interface via a standard web browser utilizing either unencrypted TCP/IP traffic via a configurable port (default is 80) or 256-bit AES encrypted SSL TCP/IP traffic via a configurable port (default is 443).

B. Each segment manager shall have integral support for at least three segment and format networks. Segment networks may alternately be connected to the segment manger via external routers and switches, using standard Ethernet structured wiring. Each router shall accommodate one segment network. Provide the quantity of routers and switches as shown on the plans.

C. Operational features of the Segment Manager shall include the following:

1. Connection to PC or LAN via standard Ethernet TCP/IP via standard Ethernet TCP/IP with the option to use SSL encrypted connections for all traffic.

2. Easy to learn and use graphical user interface, compatible with Internet Explorer 8, or equal browser. Shall not require installation of any lighting control software to an end-user PC.

3. Log in security capable of restricting some users to view-only or other limited operations.

4. Automatic discovery of DLM devices and relay panels on the segment network(s). Commissioning beyond activation of the discovery function shall not be required to provide communication, monitoring or control of all local networks and lighting control panels.

5. After discovery, all rooms and panels shall be presented in a standard navigation tree format. Selecting a device from the tree will allow the device settings and operational parameters to be viewed and changed by the user.

6. Ability to view and modify room device operational parameters. It shall be possible to set device parameters independently for normal hours and after-hours operation including sensor time delays and sensitivities, and load response to sensor including Manual-On or Auto-On.

7. Ability to set up schedules for rooms and panels, view and override current status of panel channels and relays, and assign relays to groups. Schedules shall automatically set controlled zones or areas to either a normal hour or after-hours mode of operation. Support for a minimum of 100 unique schedules, each with up to four-time events per day. Support for annual schedules, holiday schedules and unique date-bound schedules.

8. Ability to group rooms and loads for common control by schedules, switches or network commands.

9. Ability to monitor connected load current and display power consumption for areas equipped with room controllers incorporating the integral current monitoring feature.

10. Provide capabilities for integration with a BAS via BACnet protocol. At a minimum, the following points shall be available to the BAS via BACnet IP connection to the segment manager: room occupancy state; room schedule mode; room switch lock control; individual occupancy sensor state; room lighting power; room plug-load power; load ON/OFF state; load dimming level; panel channel schedule state; panel relay state; and Segment Manager Group schedule state control.

11. The Segment Manager shall allow access and control of the overall system database via Native Niagara AX FOX connectivity. Systems that must utilize a Tridium Niagara controller in addition to the programming, scheduling and configuration server are not acceptable.

D. Segment Manager shall support multiple DLM rooms as follows:

1. Support up to 120 network bridges and 900 digital in-room devices (LMSM-3E).

2. Support up to 300 network bridges and 2,200 digitals in room devices, connected via network routers and switches (LMSM-6E).

E. WattStopper Product Numbers: LMSM-3E, LMSM-6E, NB-ROUTER, NB-SWITCH, NB-SWITCH-8, NB-SWITCH-16.

2.15 PROGRAMMING, CONFIGURATION AND DOCUMENTATION SOFTWARE:

A. PC-native application for optional programming of detailed technician-level parameter information for all DLM products, including all parameters not accessible via BACnet and the handled IR configuration tool. Software must be capable of accessing room-level parameter information locally within the room when connected via the optional LMCI-100 USB programming adapter, or globally for many segment networks simultaneously utilizing standard BACnet/IP communication.

1. Additional parameters exposed through this method include but are not limited to:

a. Occupancy sensor detection LED disable for performance and other aesthetic spaces where blinking LEDs present a distraction.

b. Six occupancy sensor action behaviors for each controlled load, separately configurable for normal hours and after-hours modes. Modes include: No Action, Follow Off Only, Follow on Only, follow on and Off, Follow on Only with Override Time Delay, Follow Off Only with Blink Warn Grace Time, follow on and Off with Blink Warn Grace Time.

c. Separate fade time adjustments per load for both normal and after hours from 0 - 4 hours.

d. Configurable occupancy sensor re-trigger grace period from 0 - 4 minutes separate for both normal hours and after hours.

e. Separate normal hours and after hours per-load button mode with modes including: Do nothing, on only, off only, on and off.

f. Load control polarity reversal so that on events turn loads off and vice versa.

g. Per-load DR (demand response) shed level in units of percent.

h. Load output pulse mode in increments of 1second.

i. Fade trip point for each load for normal hours and after hours that establishes the dimmer command level at which a switched load closes its relay to allow for staggered on of switched loads in response to a dimmer.

2. Generation of reports at the whole file, partial file, or room level. Reports include but are not limited to:

    a. Device list report: All devices in a project listed by type.

    b. Load binding report: All load controller bindings showing interaction with sensors, switches, and daylighting.

    c. BACnet points report: Per room Device ID report of the valid BACnet points for a given site's BOM.

    d. Room summary report: Device manifest for each room, aggregated by common BOM, showing basic sequence of operations.

    e. Device parameter report: Per-room lists of all configured parameters accessible via hand held IR programmer for use with O&M documentation.

    f. Scene report: All project scene pattern values not left at defaults (i.e. 1 = all loads 100%, 2 = all loads 75%, 3 = all loads 50%, 4 = all loads 25%, 5-16 = same as scene 1).

    g. Occupancy sensor report: Basic settings including time delay and sensitivity(ies) for all occupancy sensors.

3. Network-wide programming of parameter data in a spreadsheet-like programming environment including but not limited to the following operations:

    a. Set, copy/paste an entire project site of sensor time delays.
    b. Set, copy/paste an entire project site of sensor sensitivity settings.

    c. Search based on room name and text labels.

    d. Filter by product type (i.e. LMRC-212) to allow parameter set by product.

    e. Filter by parameter value to search for product with specific configurations.

4. Network-wide firmware upgrading remotely via the BACnet/IP network.

    a. Mass firmware update of entire rooms.

    b. Mass firmware update of specifically selected rooms or areas.

    c. Mass firmware upgrade of specific products.

B. WattStopper Product Number: LMCS-100, LMCI-100

2.16 EMERGENCY LIGHTING CONTROL DEVICES:

A. Emergency Lighting Control Unit – A UL 924 listed device that monitors a switched circuit providing normal lighting to an area. The unit provides normal ON/OFF control of emergency lighting along with the normal lighting. Upon normal power failure the emergency lighting circuit will close, forcing the emergency lighting ON until normal power is restored. Features include:

1. 120/277 volts, 50/60 Hz, 20-amp ballast rating

2. Push to test button

3. Auxiliary contact for remote test or fire alarm system interface

B. WattStopper Product Numbers: ELCU-100, ELCU-200.

3.0 EXECUTION

3.1 PRE-INSTALLATION MEETING:

A. A factory authorized manufacturer's representative shall provide the electrical contractor a functional overview of the lighting control system prior to installation. The contractor shall schedule the pre-installation site visit after receipt of approved submittals to review the following:

1. Confirm the location and mounting of all digital devices, with special attention to placement of occupancy and daylighting sensors.

2. Review the specifications for low voltage control wiring and termination.

3. Discuss the functionality and configuration of all products, including sequences of operation, per design requirements.

4. Discuss requirements for integration with other trades.

3.2 CONTRACTOR INSTALLATION AND SERVICES:

A. Contractor to install all devices and wiring in a professional manner. All line voltage connections to be tagged to indicate circuit and switched legs.

B. Contractor to install all room/area devices using manufacturer's factory-tested Cat 5e cable with pre-terminated RJ-45 connectors. If pre-terminated cable is not used for room/area wiring, the contractor is responsible for testing each field-terminated cable following installation, and shall supply the lighting controls manufacturer with test results. Contractor to install any room to room network devices using manufacturer-supplied LM-MSTP network wire. Network wire substitution is not permitted and may result in loss of product warranty per DLM SEGMENT NETWORK section of specification. Low voltage wiring topology must comply with

manufacturer's specifications. Contractor shall route network wiring as shown in submittal drawings as closely as possible, and shall document final wiring location, routing and topology on as built drawings.

C. Install the work of this Section in accordance with manufacturer's printed instructions unless otherwise indicated. Before start up, contractor shall test all devices to ensure proper communication.

D. Calibrate all sensor time delays and sensitivity to guarantee proper detection of occupants and energy savings.

1. Adjust time delay so that controlled area remains lighted while occupied.

E. Provide written or computer-generated documentation on the configuration of the system including room by room description including:

1. Sensor parameters, time delays, sensitivities, and daylighting setpoints.

2. Sequence of operation, (e.g. manual ON, Auto OFF. etc.)

3. Load Parameters (e.g. blink warning, etc.)

F. Post start-up tuning – After 30 days from occupancy contractor shall adjust sensor time delays and sensitivities to meet the Owner's requirements. Provide a detailed report to the Architect / Owner of post start-up activity.

3.3 FACTORY SERVICES:

A. Upon completion of the installation, the manufacturer's factory authorized representative shall start up and verify a complete fully functional system.

B. The electrical contractor shall provide both the manufacturer and the electrical engineer with three weeks written notice of the system start up and adjustment date.

C. Upon completion of the system start up, the factory-authorized technician shall provide the proper training to the owner's personnel on the adjustment and maintenance of the system.

3.4 COMMISSIONING SUPPORT SERVICES:

A. On this project, a commissioning agent will be hired to verify the installation and programming of all building systems, which includes the lighting control system. Manufacturer should include an extra day of technician's time to review the functionality and settings of the lighting control hardware with the commissioning agent, including reviewing submittal drawings and ensuring that instructions on how to configure each device are readily available. Manufacturer is NOT responsible for helping the commissioning agent inspect the individual devices. It will be the commissioning agent's responsibility to create and complete any forms required for the commissioning process, although the manufacturer or contractor may offer spreadsheets and/or printouts to assist the agent with this task.

B. The commissioning agent shall work with the electrical contractor during installation of the lighting control hardware to become familiar with the specific products. The agent may also accompany the manufacturer's technicians during their start-up work to better understand the process of testing, calibration and configuration of the products. However, the contractor and manufacturer shall ensure that interfacing with the agent does not prevent them from completing the requirements outlined in the contract documents.

3.5 ACCEPTANCE TESTING SUPPORT SERVICES:

A. On all California projects, a certified lighting controls acceptance test technician (CLCATT) must verify the installation of the lighting control system. Manufacturer should include an extra day of factory technician's time to assist the CLCATT review the functionality and settings of the lighting control hardware per the requirements in the California State forms. It will be the CLCATT's responsibility to create and complete any forms required for the commissioning process, although the manufacturer or contractor may offer spreadsheets and/or printouts to assist the CLCATT with this task.

3.6 LIGHTING CONTROL INSTALLATION CERTIFICATE REQUIREMENTS:

A. When certification is required by Title 24, Part 1, Section 10-103-A, the acceptance testing specified by Section 130.4 shall be performed by a Certified Lighting Controls Acceptance Test Technician (CLCATT) employed or hired by the electrical contractor. If the CLCATT is operating as an employee, the CLCATT shall be employed by a Certified Lighting Controls Acceptance Employer. The CLCATT shall disclose on the Certificate of Acceptance a valid CLCATT certification identification number issued by an approved Acceptance Test Technician Provider. The CLCATT shall complete all Certificate of Acceptance documentation in accordance with the applicable requirements in Section 10-103(a)4.

B. Lighting Control Installation Certificate Requirements. To be recognized for compliance with Part 6 an Installation Certificate shall be submitted in accordance with Section 10-103(a) for any lighting control system, Energy Management Control System, track lighting integral current limiter, track lighting supplementary overcurrent protection panel, interlocked lighting system, lighting Power Adjustment Factor, or additional wattage available for videoconference studio, in accordance with the following requirements, as applicable:

1. Certification that when a lighting control system is installed to comply with lighting control requirements in Part 6 it complies with the applicable requirements of Section 110.9; and complies with Reference Nonresidential Appendix NA7.7.1.

2. Certification that when an Energy Management Control System is installed to function as a lighting control required by Part 6 it functionally meets all applicable requirements for each application for which it is installed, in accordance with Sections 110.9, 130.0 through 130.5, 140.6 through 150.0, and 150.2; and complies with Reference Nonresidential Appendix NA7.7.2.

3. Certification that line-voltage track lighting current limiters comply with the applicable requirements of Section 110.9 and installed wattage has been determined in accordance with Section 130.0(c); and comply with Reference Nonresidential Appendix NA7.7.3.

4. Certification that line-voltage track lighting supplemental overcurrent protection panels comply with the applicable requirements of Section 110.9 and installed wattage has been determined in accordance with Section 130.0(c); and comply with Reference Nonresidential Appendix NA7.7.4.

5. Certification that interlocked lighting systems used to serve an approved area comply with Section 140.6(a)1; and comply with Reference Nonresidential Appendix NA7.7.5.

6. Certification that lighting controls installed to earn a lighting Power Adjustment Factor (PAF) comply with Section 140.6(a)2; and comply with Reference Nonresidential Appendix NA7.7.6.

7. Certification that additional lighting wattage installed for a videoconference studio complies with Section 140.6(c)Gvii; and complies with Reference Nonresidential Appendix NA 7.7.7.

END OF SECTION

SECTION 260924 - DIGITAL LIGHTING MANAGEMENT RELAY CONTROL PANEL

1.0 GENERAL

1.1 INTRODUCTION:

A. The work covered in this section is subject to the requirements in the General Conditions of division 01 and all sections of division 26 of the Specifications. Contractor shall coordinate the work in this section with the trades covered in other sections of the specification to provide a complete and operable system.

1.2 SYSTEM DESCRIPTION:

A. Extent of lighting control system work is indicated by drawings and by the requirements of this section. It is the intent of this section to provide an integrated, energy saving lighting control system including Lighting Control Panels, Occupancy Sensors, and Daylighting Controls from a single supplier. Contractor is responsible for confirming that the panels and sensors interoperate as a single system. When centralized line-voltage mounting or management is required, relay panel platforms being considered must have sufficient configuration flexibility to implement room-level code compliant controls sequences including, but not limited, to those referenced in section **2.01** of this specification.

1.3 SUBMITTALS:

A. Submit manufacturer's data on lighting control system and components including shop drawings, detailed wiring diagrams, and cut sheets as required under related specification sections.

B. Shop Drawings:

1. Composite wiring and/or schematic diagram of each control circuit as proposed to be installed.

2. Show exact location of all digital devices and part numbers, including at minimum sensors, room controllers, and switches for each area on reflected ceiling plans. (Contractor must provide AutoCAD format reflected ceiling plans.)

3. Provide room/area details including products and sequence of operation for each room or area. Illustrate typical acceptable room/area connection topologies.

4. Network riser diagram including floor and building level details. Include network cable specification and end-of-line termination details, if required. Illustrate points of connection to integrated systems. Coordinate integration with mechanical and/or other trades.

1.4 QUALITY ASSURANCE:

A. Manufacturers: Firms regularly engaged in the manufacture of lighting control equipment and ancillary equipment, of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Comply with NEC, NEMA, and FCC requirements for Class A applications.

C. UL Approvals: Relay panels and accessory devices are to be UL listed under UL 916 Energy Management Equipment. Emergency relay panels shall be co-listed under UL 924 Emergency Lighting Equipment.

1.5 MANUFACTURERS:

A. This specification is based on products from WattStopper, Santa Clara, CA. Complete information on any other system proposed as a substitute must be submitted in writing for approval after bid and assorted cost saving. Prior approval does not guarantee final approval by the electrical engineer. The contractor shall be completely responsible for providing a system meeting this specification in its entirety. All deviations from this specification must be listed and individually signed off by the consultant.

2.0 PRODUCTS

2.1 LIGHTING CONTROL PANELS:

A. Provide lighting control panels in the locations and capacities as indicated on the plans and schedules. Each panel shall be of modular construction and consist of the following components:

1. Enclosure/Tub shall be NEMA 1, sized to accept an interior with 1 – 8 relays, 1 – 24 relays and 6 four-pole contactors, or 1 – 48 relays and 12 four-pole contactors.

2. Cover shall be configured for surface or flush wall mounting of the panel as indicated on the plans. The panel cover shall have a hinged and lockable door with restricted access to line voltage section of the panel.

3. Interior assembly shall be supplied as a factory assembled component specifically designed and listed for field installation. The interior construction shall provide total isolation of high voltage (Class 1) wiring from low voltage (Class 2) wiring within the assembled panel. The interior assembly shall include intelligence boards, power supply, DIN rails for mounting optional Class 2 control devices, and individually replaceable latching type relays. The panel interiors shall include the following features:

a. Removable, plug-in terminal blocks with screwless connections for all low voltage terminations.

b. Individual terminal block, override pushbutton, and LED status light for each relay.

c. Direct wired switch inputs associated with each relay and group channel shall support two-wire, momentary or maintained contact switches.

d. Digital inputs (four RJ-45 jacks) shall support 1-, 2-, 3-, 4-, and 8-button digital switches, digital IO modules capable of receiving 0-5V or 0-10V analog photocell inputs, digital IO modules capable of receiving momentary or maintained contact closure inputs, digital photocell modules, and digital occupancy sensors.

e. True relay state shall be indicated by the on-board LED and shall be available to external control devices and systems via BACnet.

f. Automatically sequenced operation of relays to reduce impact on the electrical distribution system when large loads are controlled simultaneously.

g. Group, channel, and pattern control of relays shall be provided through a simple keypad interface from a handheld IR programmer. Any group of relays can be associated with a channel for direct on/off control or pattern (scene) control via a simple programming sequence using the relay and channel override pushbuttons and LED displays for channels 1-9 or a handheld IR programmer for channels 1-99.

h. Relay group status for each channel shall be provided through red LED indicators for groups 1-9 and via BACnet for groups 1-99. Solid red indicates that the last group action called for an ON state and relays in the group are on or in a mixed state.

i. Single-pole latching relays with modular plug-in design. Relays shall provide the following ratings and features:

(1) Electrical:
   (a) 30-amp ballast at 277V
   (b) 20-amp tungsten at 120V
   (c) 1.5 HP motor at 120V
   (d) Relays shall be specifically UL listed for control of plug loads

(2) Mechanical:
   (a) Individually replaceable, ½" KO mounting with removable Class 2 wire harness.
   (b) Actuator on relay housing provides manual override and visual status indication, accessible from Class 2 section of panel.
   (c) Dual line and load terminals each support two #14 – #12 solid or stranded conductors.
   (d) Tested to 300,000 mechanical on/off cycles.

(3) Isolated low voltage contacts provide for true relay status feedback and pilot light indication.

4. Power supply shall be a multi-voltage transformer assembly with rated power to supply all electronics, occupancy sensors, switches, pilot lights, and photocells as necessary to meet the project requirements. Power supply to have internal over-current protection with automatic reset and metal oxide varistor protection.

5. Lighting control panels shall be WattStopper model LMCP8, LMCP24 or LMCP48 as shown on the plans.

2.2 BACNET® BASED DIGITAL COMMUNICATIONS:

A. The lighting control panel shall support digital communications to facilitate the extension of control to include interoperation with building automation systems and other intelligent field devices. Digital communications shall be RS485 master/slave token passing-based using the BACnet® protocol.

1. The panel shall have provision for an individual BACnet device ID. The device ID description property shall be writable via the network to allow unique identification of the lighting control panel on the network.

2. The panel shall support MS/TP MAC addresses in the range of 0 – 127 and baud rates of 9600k, 38400k, 76800k, and 115.2k bits per second.

3. Lighting control relays shall be controllable as binary output objects in the instance range of 1 – 64. The state of each relay shall be readable and writable by the BAS via the object present value property.

4. Lighting control relays shall report their true on/off state as binary input objects in the instance range of 1 – 64.

5. The 99 channel groups associated with the panel shall be represented by binary value objects in the instance range of 201 – 299. The occupancy state of each channel group shall be readable and writable by the BAS via the object present value property. Commanding 1 to a channel group will put all relays associated with the channel into the normal hour's mode. Commanding 0 or NULL shall put the relays into the after-hours mode.

6. Setup and commissioning of the panel shall not require manufacturer-specific software or a computer. All configuration of the lighting control panel shall be performed using standard BACnet objects or via the handheld IR programming remote. Provide BACnet objects for panel setup and control as follows:

a. Binary output objects in the instance range of 1 – 64 (one per relay) for on/off control of relays.

b. Binary value objects in the instance range of 1 – 99 (one per channel) for normal hours/after-hours schedule control.

c. Binary input objects in the instance range of 1 – 64 (one per relay) for reading true on/off state of the relays.

d. Analog value objects in the instance range of 1 – 64 (one per relay) shall assign relays to channel groups in the range of 1 – 99.

e. Analog value objects in the instance range of 101 – 199 (one per channel group) shall assign a blink warn time value to each channel. A value of 5 shall activate the blink warn feature for the channel and set a 5-minute grace time period. A value of 250 shall activate the sweep feature for the channel and enable the use of sweep type automatic wall switches.

f. Analog value objects in the instance range of 201 – 299 (one per channel) shall assign an after-hours time delay value to the channel in the range of 1 – 240 minutes.

g. Multi-state value objects in the instance range of 1 – 99 (one per channel) shall provide the state of the relays assigned to the channel. Valid states shall be ALL ON, MIXED, BLINK, and ALL OFF.

7. The description property for all objects shall be writable via the network and shall be saved in non-volatile memory within the panel.

8. The BO and BV 1 – 99 objects shall support BACnet priority array with a relinquish default of off and after hours respectively. Prioritized writes to the channel BV objects shall propagate prioritized control to each member relay in a way analogous to the BACnet Channel object described in addendum aa. (http://www.bacnet.org/Addenda/Add-135-2010aa.pdf)

9. Panel-aggregate control of relay Force Off at priority 2 shall be available via a single BV5 object. Force On at priority 1 shall be available via a single BV4 object.

10. Lockout of all digital switch buttons connected to a given panel shall be command-able via a single BV2 object. The lock status of any connected switch station shall be represented as BV101-196.

11. Lighting control accessory devices connected to the panel shall be represented via BACnet objects including but not limited to the following:

a. Digital occupancy sensor detection states shall be readable as BI objects ranging from BI1-96.

b. Digital occupancy sensor configuration parameters shall each be accessible as BACnet objects when applicable to a given product.

(1) Occupancy sensor time delay in minutes shall be writeable via AV101-196.
(2) Occupancy sensor passive infrared (PIR) sensitivity percentage shall be writeable via AV201-296.
(3) Occupancy sensor ultrasonic (US) sensitivity percentage shall be writeable via AV301-396.

c. Digital switch buttons shall be readable and writeable as BI objects ranging from BI101 – 9608.

d. Digital daylight sensors foot-candle readings shall be readable as follows:

(1) Analog 0-5V/0-10V sensors connected to a digital input module shall be represented as AI1-96.
(2) Digital closed loop sensors shall be represented as AI4001-4096.
(3) Digital open loop sensors shall be represented as AI5001-5096.
(4) Digital dual loop sensors shall be represented as follows:

(a) The upward facing open loop sensor shall be represented as AI6001-6096.
(b) The downward facing closed loop sensor shall be represented as AI6101-6196.

e. Digital daylight sensor configuration shall be exposed as BACnet objects as follows:

(1) Digital closed loop sensors shall be represented as follows:

(a) Daylight Sensor Day Setpoint (ftcd) AV4201-4296.
(b) Daylight Sensor Night Setpoint (ftcd) AV4301-4396.
(c) Daylight Sensor Off Setpoint Delay (minutes) AV4401-4496.
(d) Daylight Sensor on Setpoint (ftcd) AV4501-4596.
(e) Daylight Sensor Off Setpoint (ftcd) AV4601-4696.

2.3 USER INTERFACE:

A. Each lighting control panel system shall be supplied with at least (1) handheld IR remote programming interface consisting of a keypad and associated OLED display screen. The user interface shall allow setup, configuration, and diagnostics of the panel without the need for

software or connection of a computer. The user interface shall have the following functions as a minimum:

1. Set network parameters including panel device ID, MS/TP MAC address, baud rate and max master range.

2. Relay Group creation of up to 99 groups. Group creation shall result in programming of all seven key relay parameters for member relays. The seven parameters are as follows: After-hours Override Time Delay, Normal Hours Override Time Delay, Action on Transition to Normal Hours, Action on Transition to After Hours, Sensor Action During Normal Hours, Sensor Action During After Hours, Blink-Warn Time for After Hours.

3. Program up to 254 separate scheduled events. Events shall occur on seven-day intervals with each day selectable as active or inactive, and shall be configurable as to whether the event is active on holidays. Holidays are also defined through the User Interface.

4. Program up to 32 separate Dark/Light events. Events shall have a selectable source as either calculated Astro with delay, or a digital IO module with an integral 0-5V or 0-10V analog photocell. Dark/Light events shall occur on seven-day intervals with each day selectable as active or inactive, and shall be configurable as to whether the event is active on holidays.

5. Button binding of digital switches to groups shall be accessible via the handheld IR remote and accomplished from the digital switch station.

6. Programming of panel location information shall be accomplished by the handheld IR remote and include at a minimum LAT, LON, DST zone, and an approximate city/state location.

7. An additional handheld IR remote may optionally be specified to be permanently mounted to the panel interior via a retractable anti-theft lanyard to allow for convenient programming of the panel while assuring that the handheld programmer is always present at that panel. An unlimited number of handheld IR remotes may also be purchased for facilities staff as seen fit by the end user's representative.

2.4 DIGITAL NETWORK SWITCHES:

A. Provide digital wall switches with 1, 2, 3, 4, or 8 buttons, in the colors indicated on the plans. Switches shall connect to the panel via standard Cat 5e cable with RJ-45 terminations. Digital wall switches shall have the following features:

1. Available colors: white, ivory, light almond, grey or black.

2. Single gang device shall fit standard decorator opening and use standard wall plates.

3. LED indicator on each button for status and locator function.

4. Concealed configuration button with LED indicator for binding buttons to relays, no software or computer shall be required.

5. Infrared window for use with handheld two-way wireless configuration tool,

6. Selectable function mode per button shall be momentary toggle (on/off), on only, or off only.

7. Removable button assembly for field color change or substitution of engraved buttons.

8. Two RJ-45 ports for connection to panel or other switches and/or occupancy sensors.

9. Open topology digital network via Cat 5e wire.

10. Digital switches shall be WattStopper LMSW series as indicated on the plans.

11. Digital switch buttons shall be able to control groups and group actions shall be system global such that any digital switch station can affect the state of relays present in up to (12) twelve panels networked together via BACnet.

2.5 DIGITAL OCCUPANCY SENSORS:

A. Provide digital occupancy sensors to control relays in locations as shown on the plans. Sensors shall be either passive infrared, ultrasonic, or dual technology as indicated. Sensors shall be either ceiling or wall mounded and connect to the panel using Cat 5e cable with RJ-45 terminations. Digital occupancy sensors shall have the following features:

1. Setup and calibration shall be digital and precisely repeatable from sensor to sensor.

2. User interface with pushbuttons and illuminated LCD screen for setup and calibration.

3. Ladder-free setup and calibration with optional handheld two-way infrared commissioning tool.

4. Sensitivity, 0 – 100% in 10% increments.

5. Time delay, 1 – 30 minutes in 1-minute increments.

6. Test mode with five-second time delay for simplified walk testing.

7. Digital occupancy sensors shall be WattStopper LM series as indicated on the plans.

8. Digital occupancy sensors shall be able to control groups and group actions shall be system global such that any digital occupancy sensor can affect the state of relays present in up to (12) twelve panels networked together via BACnet.

2.6 DIGITAL NETWORK CLOCK:

A. Each panel shall include a digital clock capability able to issue system wide automation commands to up to (11) eleven other panels for a total of (12) twelve networked lighting control panels. The clock shall provide capability for up to 254 independent schedule events per panel for each of the ninety-nine system wide channel groups.

1. The clock capability of each panel shall support all of the energy saving features required of ASHRAE 90.1 - 2001, IECC 2003, as well as all state and local energy codes.

2. The clock module shall provide astronomic capabilities, time delays, blink warning, daylight savings, and holiday functions and will include a battery backup for the clock function and EEPROM for program retention. Clocks that require multiple events to meet local code lighting shut off requirements shall not be allowed.

3. The clock capability of each panel shall operate on a basis of ON/OFF or Normal Hours/After Hours messages to automation groups that implement pre-configured control scenarios. Scenarios shall include:

a. Scheduled ON / OFF

b. Manual ON / Scheduled OFF

c. Astro ON / OFF (or Photo ON / OFF)

d. Astro and Schedule ON / OFF (or Photo and Schedule ON / OFF)

4. The user interface shall be a portable IR handheld remote control capable of programming any panel in the system.

5. The clock capability of each panel shall employ non-volatile memory and shall retains user programming and time for a minimum of 10 years.

6. Schedules programmed into the clock of any one panel shall be capable of executing panel local schedule or Dark/Light (photocell or Astro) events for that panel in the event that global network communication is lost. Lighting control panels that are not capable of executing events independently of the global network shall not be acceptable.

2.7 APPLICATION SEQUENCE OF OPERATIONS SUPPORT:

A. The lighting control panel shall support relay behavior parameter configuration of such an extent as to allow digital switch, digital occupancy sensor, digital automatic photocells, and scheduled events to seamlessly implement, at a minimum, the following operational sequences:

1. Title 24 operation requiring Manual On 50%, Automatic on 100%, automatic shut-off on vacancy shall be able to be implemented by using any two relays in a given panel. The sensor(s) for that space will be bound to both relays, each of which shall be given an independent operation mode of Auto on and Manual On respectively, such that on occupancy only 50% of the lighting activates. The digital switch stations for the space, having at minimum two buttons, shall be bound to both relays such that at least one button controls only 50% of the lights and at least one separate button controls only the remaining 50% of the lights allowing for independent zone control. The occupancy sensor(s) action on vacancy shall be to turn off both relays. Configuration of this operational sequence shall not require special software or tools and shall be accomplished using only the handheld IR remote control.

2. Open office spaces that must turn on automatically by sensor during the Normal Hours operating period and stay on until a scheduled sweep of the space on transition to the After Hours operating shall use the handheld IR remote control to create a group of the relays for that space with a group parameter type that automatically adjust the Normal Hours and After-Hours run-time parameters to the required values. Relay operation during Normal Hours shall therefore be for a relay to turn on when its respective occupancy sensor(s) detect motion and to stay on until the After Hours sweep time. Once the After Hours sweep occurs, all relays shall operate as automatic ON/OFF in response to their respective sensors. Systems that require individual relay parameters to be adjusted on a per relay basis are not acceptable.

3. Private office spaces that must operate as manual on/manual off during Normal Hours and automatic on/automatic off during After Hours with no sweep off on transition to After Hours operation shall use the handheld IR remote control to create a group of the relays that must follow that operational sequence using a group parameter type that automatically adjusts the Normal Hours and After-Hours run-time parameters to the required values. Relay operation during Normal Hours shall therefore be for a relay to turn on only when a digital switch station button bound to it is activated and to turn off automatically in response to the vacancy signal of all occupancy sensors bound to it. Systems that require individual relay parameters to be adjusted on a per relay basis are not acceptable.

2.8 SCHEDULE, GROUP, AND PHOTOCELL CONTROL OF RELAYS:

A. The lighting control panel shall support schedule, group, and photocell control functions via the network as configured in the optional Segment Manager controller or building automation system. The lighting control panel shall be fully compatible with building automation systems that are BACnet compliant. See related specification sections for additional information on interfacing the lighting control panel(s) to the building automation system.

2.9 BROWSER-BASED PROGRAMMING AND CONTROL:

A. The relay panel system shall be capable of use in conjunction with an optional digital web-based appliance such as the WattStopper Segment Manager. Such a controller shall be a

compact controller capable of hosting the schedule, photocell, and group relay control functions for a network of LMCP series lighting control panels. The segment manager shall provide the following features:

1. Provision for 1 to 3 separate network segments to facilitate efficient network wire routing.

2. Compact housing with screw tab mounts for surface installation and integral DIN rail mounting slot for NEMA 1 installation in the LMSM-ENC1 enclosure.

3. Web browser-based user interface; shall not require the installation of any lighting control software.

4. User interface accessible form most smart phone browsers when Internet connected.

5. Login security access control restricting some users to view-only or other limited operations.

6. Automatic discovery of the lighting control panels.

7. Familiar navigation-tree-based browsing to individual lighting control panels.

8. View/override current status of channels and relays.

9. Assign relays to groups.

10. Create and run schedules:

    a. Normal hours/afterhours schedules for channels.

    b. On/off schedules for relays.

    c. Support for a minimum of 100 unique schedules, each with up to four-time events per day.

    d. Support annual schedules, holiday schedules and unique date-bound schedules.

11. Ethernet connectivity for user access via direct-wired connection, LAN/WAN, or Internet connection.

12. BACnet IP connectivity for connection to building automation systems.

13. Segment manager shall be WattStopper LMSM-201 with one network segment or LMSM-603 with support for three network segments.

14. Support for additional segments beyond 3 must be possible via the addition of standard BACnet MS/TP routers. The use of gateway devices or other proprietary protocols for system expansion is not acceptable.

3.0 EXECUTION

3.1 SUPPORT SERVICES:

A. System Start Up and Commissioning

1. Manufacturer shall provide a factory authorized technician to confirm proper installation and operation of the lighting control panels, switches, and occupancy sensors.

2. The technician shall provide training on the lighting control features of the system and shall verify that the panel(s) is communicating with the building automation system.

3. The technician shall provide 1 – day of additional training and configuration of operation 60 days after final acceptance of project by owner.

4. The system integrator or BAS vendor shall be responsible for all integration including the mapping of BACnet objects into the BAS logic, schedules and graphics.

3.2 ACCEPTANCE TESTING SUPPORT SERVICES:

A. On all California projects, a certified lighting controls acceptance test technician (CLCATT) must verify the installation of the lighting control system. Manufacturer should include an extra day of factory technician's time to assist the CLCATT review the functionality and settings of the lighting control hardware per the requirements in the California State forms. It will be the CLCATT's responsibility to create and complete any forms required for the commissioning process, although the manufacturer or contractor may offer spreadsheets and/or printouts to assist the CLCATT with this task.

3.3 LIGHTING CONTROL INSTALLATION CERTIFICATE REQUIREMENTS:

A. When certification is required by Title 24, Part 1, Section 10-103-A, the acceptance testing specified by Section 130.4 shall be performed by a Certified Lighting Controls Acceptance Test Technician (CLCATT) employed or hired by the electrical contractor. If the CLCATT is operating as an employee, the CLCATT shall be employed by a Certified Lighting Controls Acceptance Employer. The CLCATT shall disclose on the Certificate of Acceptance a valid CLCATT certification identification number issued by an approved Acceptance Test Technician Provider. The CLCATT shall complete all Certificate of Acceptance documentation in accordance with the applicable requirements in Section 10-103(a)4.

B. Lighting Control Installation Certificate Requirements. To be recognized for compliance with Part 6 an Installation Certificate shall be submitted in accordance with Section 10-103(a) for any lighting control system, Energy Management Control System, track lighting integral current

limiter, track lighting supplementary overcurrent protection panel, interlocked lighting system, lighting Power Adjustment Factor, or additional wattage available for videoconference studio, in accordance with the following requirements, as applicable:

1. Certification that when a lighting control system is installed to comply with lighting control requirements in Part 6 it complies with the applicable requirements of Section 110.9; and complies with Reference Nonresidential Appendix NA7.7.1.

2. Certification that when an Energy Management Control System is installed to function as a lighting control required by Part 6 it functionally meets all applicable requirements for each application for which it is installed, in accordance with Sections 110.9, 130.0 through 130.5, 140.6 through 150.0, and 150.2; and complies with Reference Nonresidential Appendix NA7.7.2.

3. Certification that line-voltage track lighting current limiters comply with the applicable requirements of Section 110.9 and installed wattage has been determined in accordance with Section 130.0©; and comply with Reference Nonresidential Appendix NA7.7.3.

4. Certification that line-voltage track lighting supplemental overcurrent protection panels comply with the applicable requirements of Section 110.9 and installed wattage has been determined in accordance with Section 130. (c); and comply with Reference Nonresidential Appendix NA7.7.4.

5. Certification that interlocked lighting systems used to serve an approved area comply with Section 140.6(a)1; and comply with Reference Nonresidential Appendix NA7.7.5.

6. Certification that lighting controls installed to earn a lighting Power Adjustment Factor (PAF) comply with Section 140.6(a)2; and comply with Reference Nonresidential Appendix NA7.7.6.

7. Certification that additional lighting wattage installed for a videoconference studio complies with Section 140.6(c)Gvii; and complies with Reference Nonresidential Appendix NA 7.7.7

END OF SECTION

SECTION 262413 - SWITCHBOARDS, 600 VOLTS AND BELOW

1.0 GENERAL

1.1 DESCRIPTION OF WORK: The work of this Section consists of providing switchboards, as shown on the Drawings and as described herein.

1.2 RELATED WORK:

A. See the following Specification Sections for work related to the work in this Section.

1. 26 05 19 Line Voltage Wire and Cable

2. 26 22 00 Transformers

3. 26 28 16 Circuit Breakers

1.3 SUBMITTALS:

A. Shop Drawings - As specified in Section 26 05 00 and Division 01. For each switchboard furnished under this Contract, submit manufacturer's name, catalog data, and the following information:

1. Switchboard type.

2. Main bus and terminal connection sizes.

3. Location of line connections.

4. Section dimensions.

5. Gutter space.

6. Gauge of boxes and fronts.

7. Finish data.

8. Voltage rating.

9. Breaker manufacturer, types, trip ratings, and interrupting ratings.

B. Before construction of the main (service) switchboard, the contractor shall deliver two or more copies of the switchboard submittal to P.G.&E. for their approval. The contractor shall deliver one P.G.&E. approved copy of the submittal to the Electrical Engineer for record.

C. Submit operation and maintenance data for switchboards, and circuit breakers including nameplate data, parts lists, manufacturer's circuit breaker time current coordination curves, factory and field test reports, recommended maintenance procedures and typewritten as-built panel and switchboard schedules. Submit in accordance with Division 01.

1.4 Warranty

A. Manufacturer shall warrant equipment to be free from defects in materials and workmanship for the lesser of one (1) year from date of installation or eighteen (18) months from date of purchase

2.0 PRODUCTS

2.1 SWITCHBOARDS:

A. General: Switchboards shall be designed, built and tested in accordance with applicable portions of the latest NEMA, EUSERC, and Underwriter Laboratories standards and the latest requirements of the California Electrical Code. All sections and devices shall be UL listed and labeled.

1. Switchboards shall be dead front, completely self-supporting structure of the required number of vertical sections bolted together to form one metal, totally enclosed, switchboard. Sides, top, and rear covers shall be code gauge steel, bolted to the switchboard structure.

2. The switchboard shall be furnished with phase and neutral busses of the amps, volts and phase shown on the Drawings. The bus shall extend the full length of the switchboard. Tapered bus is not acceptable. The switchboard sections, when called for on the plans, shall be as follows:

   a. Metering Section and landing lugs; Fully Pacific Gas & Electric Company compatible.

   b. All sections shall include full capacity busing between sections.

   c. All sections shall be front aligned and shall have front-connected devices.

3. All buses shall be silver plated copper, supported with high impact, non-tracking insulating material, braced to withstand the mechanical forces exerted during short circuit conditions. The current density of the bus shall not exceed 1000 amperes per square inch of cross section area or the switchboard bussing shall be of sufficient cross-sectional area to meet UL standard 891 for temperature rise. Provisions shall be provided for future splicing of additional sections from either end. The neutral bus shall be 100% rated.

4. A ground bus shall be furnished secured to each vertical section structure, and shall extend the entire length of the switchboard. The ground bus shall be sized per UL standard 891 and be of the same material as the through bus.

5. The neutral bus in the feeder sections shall be no further than 20 inches from the front of the switchboard.

6. Vertical main bus bars shall be furnished full height to accommodate future branch devices.

7. The switchboard shall be furnished and installed complete with all underground pull sections, utility sections, main device and feeder sections as indicated on the Drawings. Underground pull sections, utility cable termination, transformer and metering sections shall be in accordance with Pacific Gas and Electric Company requirements.

8. The main device, where indicated to be individually mounted, shall be completely isolated from the utility and the feeder sections of the switchboard, both in the device section and the cable section of the switchboard cubicle. The cable section shall also be isolated from the main horizontal bus. The main device cubicle shall have UL service equipment label.

9. Feeder devices shall be group-mounted and be front accessible, furnished with vertical wiring gutter on the front of the distribution sections. Wiring gutters shall be furnished with hinged, code gauge steel formed covers. Unused device space shall be covered with blank code gauge steel covers.

10. All vertical sections comprising the switchboard shall be aligned front and rear.

11. Switchboards for outdoor installation shall be furnished in [stainless steel] NEMA 3R non-walk-in enclosures provided with thermostatically controlled space heaters in each vertical section. Space heaters shall be powered from a circuit breaker protected circuit originating within the switchboard and shall be sized adequately to prevent the formation of condensation. Space heater shall be suitable for operation at 120V AC.

12. All steel surfaces are to be chemically cleaned and treated, providing a bond between paint and metal surfaces to help prevent the entrance of moisture and formation of rust under the paint finish. Switchboard exterior shall be furnished with a grey enamel finish color over a rust inhibiting primer, unless otherwise noted.

B. Circuit Breakers

1. Circuit breakers, unless otherwise indicated, shall be the molded case type with ratings as indicated on the Drawings. Circuit breakers shall meet the requirements specified under Section 262816- Circuit Breaker.

2. Main circuit breakers, where indicated to be Molded case type, shall be 80 [100] percent rated, with the frame size and trip plug ratings shown.

3. Circuit breakers equipped with Ground-Fault Equipment Protection shall be capable of the following types of ground-fault protection: residual, source ground return, and modified differential.

a. Ground-fault settings for circuit breaker sensor sizes 1200 A or below shall be adjustable from 0.2 to 1.0 times in 0.1 in increments. The ground-fault settings for circuit breakers above 1200 A shall be adjustable from 500 to 1200 A.

4. Circuit breakers with an arc Energy-Reducing Maintenance Switch (ERMS) setting shall be equipped with a separate trip curve to reduce incident energy.

a. The ERMS trip curve shall be selected through physical selector. Trip unit [remote indicator light] shall indicate when trip unit is operating in ERMS mode.

b. Trip unit shall operate in Fast Instantaneous trip mode, 25 to 30 mS, when ERMS trip curve is active.

c. Engaging/disengaging the ERMS mode or making settings changes to the ERMS settings shall be restricted to authorized personnel by limiting access to such features by padlocks or passwords to ensure safety of the personnel working with the equipment.

C. Customer Metering

1. Instrument Transformers

a. Current transformers shall be window type conforming to, one per phase, Square D Company Class 4210, General Electric JAG-O or equal.

b. Potential transformers shall be fixed mounted, type Square D Company Class 4210, General Electric JVM, or equal.

2. Power Monitors and Meters

a. The Customer Metering equipment shall be manufactured by Square D Company, General Electric or equal.

b. Substitutions: substitutions shall be made only after proper verification

c. The switchboard shall be metered using:

i. [Square D Type PM 650] [Square D Type CM 2350]

ii. [Square D Type PM 650]

(A). Digital Power Meter with 0.25% accuracy with the following features:

(B). A, V, kW, kVAR, kVA, PF, F, kWh, kVARh, kVAh, KYZ, RS-485 communications, THD, Demand, kWd, kVARd, kVAd, date/time stamping,

(C). predicted power demand, onboard alarms, min/max. readings, data log, event log

iii. [Square D Type CM 2350]

(A). Digital Circuit Monitor with 0.2% accuracy with the following features:

(B). A, V, kW, kVAR, kVA, PF, F, THD, K-Factor, kWh, kVARd, kVAd, kVARh, kVAh, KYZ output, RS-485 communication port, kWd, kVARd, kVAd, date/time stamping, predicted power demand, onboard alarms, min/max. readings, data log, event log, extend memory (100k), wave form capture, and disturbance monitoring

D. Manufacturer

a. The switchboard shall be Square D, Siemens, [I.E.M], [General Electric], [or] [Eaton Cutler Hammer].

3.0 EXECUTION

3.1 INSTALLATION:

A. Switchboards shall be installed where indicated on the Drawings, and in accordance with the manufacturer's instructions.

B. A 1” conduit shall be installed for new PG& E services from the PG& E Metering Section to the Main Telephone Terminal Board.

C. At switchboards located indoors, a 2” conduit and pull tape shall be installed from outside the switchboard meter cabinet to a location on the exterior of the building. The installation shall meet PG&E Green Book requirements.

D. Circuit breakers for solidly grounded Wye Electrical Systems of more than 150V to Ground and 1000A or larger shall be equipped with Ground-Fault Equipment Protection.

E. Circuit breakers 1200A and larger shall be equipped with a separate trip curve for an arc Energy-Reducing Maintenance Switch (ERMS) setting to reduce incident energy.

3.2 MOUNTING:

A. Switchboards shall be mounted on a concrete pad, as indicated on the drawings. Reinforcing shall be as shown on the Drawings. The top surface of the pad shall be 2 inches above the surrounding surface.

B. The switchboard shall be bolted to the pad with ½ inch diameter bolts minimum at each corner of each section unless otherwise noted.

C. The switchboard shall be seismically qualified to withstand potential seismic forces up to UBC Seismic Zone 4.

3.3 PADLOCKS:

A. Exterior switchboard shall be provided with padlocks keyed as directed by the Owner's Representative. Padlocks shall be supplied by the contractor.

3.4 FIELD TESTS:

A. Insulation resistance Tests: Perform insulation resistance tests on circuits to be energized with a line-to-neutral voltage of 120 volts or more. Make these tests after all equipment has been connected, except that equipment which may be damaged by the test voltage shall not be connected. Test the insulation with 500V dc insulation resistance tester with a scale reading 100 megohms. The insulation resistance shall be 2 megohm or more. Submit results for review.

B. Grounding: Grounding shall conform to Section 26 05 26.

C. Continuity: Switchboard circuits shall be tested for continuity prior to energizing. continuity tests shall be conducted using a dc device with a bell or buzzer.

END OF SECTION

SECTION 262416 - PANELBOARDS AND DISTRIBUTION PANELS

1.0 GENERAL

1.1 DESCRIPTION OF WORK:

A. The work of this Section consists of providing panelboards and circuit breakers as shown on the Drawings and as described herein.

1.2 RELATED WORK:

A. See the following specification sections for work related to the work in this Section.

1. 260519 Line Voltage Wire and Cable

2. 260526 Grounding

3. 262816 Circuit Breakers

1.3 SUBMITTALS:

A. Shop Drawings - As specified in Division 01 and Section 26 05 00. For each panelboard and distribution panel furnished under this Contract, submit manufacturer's name, catalog data, and the following information:

1. Panelboard / distribution panel type.

2. Main bus and terminal connection sizes.

3. Location of line connections.

4. Cabinet dimension.

5. Gutter space.

6. Gauge of boxes and fronts.

7. Finish data.

8. Voltage rating.

9. Breaker manufacturer, types, trip rating, and interrupting ratings.

10. When information is available on the Drawings, show breaker circuit numbers and locations along with trip ratings on a panelboard layout.

B. Single Submittal - A single complete submittal is required for all products covered by this Section.

C. Closeout Submittals: Submit operation and maintenance data for panelboards and circuit breakers including nameplate data, parts lists, factory and field test reports, recommended maintenance procedures and typewritten as-built panel schedules. Submit in accordance with Division 01.

2.0 PRODUCTS

2.1 PANELBOARDS:

A. General: Lighting and Receptacle Panelboards shall be the automatic circuit breaker type. The number and arrangement of circuits, trip ratings, spares and blank spaces for future circuit breakers shall be as shown on the Drawings or, if not shown, 42 circuits. All circuit breakers shall be quick-make, quick-break, thermal-magnetic, bolt-on type (unless otherwise noted on drawings), with 1, 2 or 3 poles a shown, each with a single operating handle. Tandem or piggy-back breakers shall not be used.

B. Nameplates:

1. Each panelboard shall have a field mounted identifying, rigid, plastic nameplate giving the panel identification as shown on the Drawings.

2. Each panelboard shall have a manufacturer's nameplate showing the voltage, bus rating, number of phases, frequency and number of wires.

C. Construction:

1. Door and trim shall be finished to match finish type and color of surrounding wall. Box shall be hot-dip galvanized, and field finished to match the front.

2. Panelboards and enclosures shall conform to requirements of all relevant codes. Panelboards shall be suitable for use as service equipment.

3. Panelboards shall be furnished with hinged trim fronts with key latch and a typed directory card and holder. Panelboard circuits shall be arranged with odd numbers on the left and even numbers on the right. Provide weatherproof, NEMA type 3R enclosures for outdoor installation.

D. Busbars: Panelboard busbars shall be phase sequence type suitable for bolt-on circuit breakers. All busbars shall be copper.

E. Circuit Breakers: Circuit breakers shall be the molded case type with trip and interrupting ratings as shown on the Drawings.

F. Manufacturer:

1. Panelboard manufacturer shall be Square D, Siemens, [I.E.M], [General Electric], [or] [Eaton Cutler Hammer]. Panelboards shall be of the same manufacturer as the switchboard.

2.2 DISTRIBUTION PANELS:

A. General: Distribution panels shall be the automatic circuit breaker type. The number and arrangement of circuits, trip ratings, spares and blank spaces for future circuit breakers shall be as shown on the Drawings. All circuit breakers shall be quick-make, quick-break, thermal-magnetic bolt-on type, with 1, 2 or 3 poles a shown, each with a single operating handle. Tandem or piggy-back breakers shall not be used.

B. Nameplates:

1. Each distribution panel shall have a field mounted, identifying, rigid, plastic nameplate giving the panel identification as shown on the Drawings.

2. Each distribution panel shall have a manufacturer's nameplate showing the voltage, bus rating, number of phases, frequency and number of wires.

C. Construction:

1. Door and trim shall be finished to match color of surrounding wall. Box shall be hot-dip galvanized, field finished to match the front.

2. Distribution panels and enclosures shall conform to requirements of all relevant codes. Distribution panels shall be suitable for use as service.

3. Distribution panels shall have a front door with key latch and a typed directory card and permanently attached holder. Adhesive backed holders are not acceptable. Distribution panels circuits shall be arranged with odd numbers on the left and even numbers on the right. Provide weatherproof, NEMA type 3R enclosures for outdoor installation.

D. Busbars: Distribution panels busbars shall be phase sequence type suitable for bolt-on circuit breakers. All busbars shall be copper, sized for a maximum current density of 1000A psi.

E. Circuit Breakers:

1. Circuit breakers shall be the molded case type with trip and interrupting ratings as shown on the Drawings.

2. Circuit breakers equipped with Ground-Fault Equipment Protection shall be capable of the following types of ground-fault protection: residual, source ground return, and modified differential.

a. Ground-fault settings for circuit breaker sensor sizes 1200 A or below shall be adjustable from 0.2 to 1.0 times in in 0.1 In increments. The ground-fault settings for circuit breakers above 1200 A shall be adjustable from 500 to 1200 A.

3. Circuit breakers with an arc Energy-Reducing Maintenance Switch (ERMS) setting shall be equipped with a separate trip curve to reduce incident energy.

a. The ERMS trip curve shall be selected through physical selector. Trip unit [remote indicator light] shall indicate when trip unit is operating in ERMS mode.

b. Trip unit shall operate in Fast Instantaneous trip mode, 25 to 30 mS, when ERMS trip curve is active.

c. Engaging/disengaging the ERMS mode or making settings changes to the ERMS settings shall be restricted to authorized personnel by limiting access to such features by padlocks or passwords to ensure safety of the personnel working with the equipment.

F. Manufacturer:

4. Distribution panel manufacturer shall be Square D, Siemens, [I.E.M], [General Electric], [or] [Eaton Cutler Hammer]. [Distribution panels shall be of the same manufacturer as the switchboard.]

3.0 EXECUTION

3.1 INSTALLATION: Panelboards and Distribution Panels shall be installed where indicated on the Drawings, and in accordance with the manufacturer's instructions.

3.2 INSTALLATION:

A. Panelboards and Distribution Panels shall be installed where indicated on the Drawings, and in accordance with the manufacturer's instructions.

B. Circuit breakers for solidly grounded Wye Electrical Systems of more than 150V to Ground and 1000A or larger shall be equipped with Ground-Fault Equipment Protection.

C. Circuit breakers 1200A and larger shall be equipped with a separate trip curve for an arc Energy-Reducing Maintenance Switch (ERMS) setting to reduce incident energy.

3.3 MOUNTING:

D. Panelboards and Distribution Panels shall be mounted with the top of the box 6'-6" above the floor. Panelboards and Distribution Panels shall be plumb within 1/8-inch. The highest breaker operating handle shall not be higher than 72 inches above the floor.

3.4 FIELD TESTS:

A. Insulation Resistance Tests: Perform insulation resistance tests on circuits with #2 AWG and larger conductors to be energized with a line-to-neutral voltage of 120 volts or more. Make these tests after all equipment has been connected, except that equipment which may be damaged by the test voltage shall not be connected. Test the insulation with a 500Vdc insulation resistance tester with a scale reading 100 megohms. The insulation resistance shall be 2 megohms or more. Submit results for review.

B. Grounding: Grounding shall conform to Section 26 05 26.

C. Continuity: Panelboard and Distribution Panel circuits shall be tested for continuity prior to energizing. Continuity tests shall be conducted using a dc device with a bell or buzzer.

END OF SECTION

SECTION 262726 - DEVICES WIRING

1.0 GENERAL

1.1 DESCRIPTION OF WORK

A. The work of this section consists of:

1. Furnishing, installing, and connecting all duplex receptacles complete with wall plates and/or covers, as shown on the Drawings.

2. Furnishing, installing and connecting all light switches complete with wall plates and or handle operators, as shown on the Drawings.

1.2 RELATED WORK:

A. See the following specification sections for work related to the work of this section:

1. 26 05 42 Conduits, Raceways and Fittings.

2. 26 05 19 Line Voltage Wire and Cable.

3. 26 05 33 Junction and Pull Boxes.

1.3 SUBMITTALS: As specified in Section 26 05 00 and Division 01.

A. Submit manufacturers published descriptive literature properly marked to identify the items to be supplied.

B. A single complete submittal is required for all products covered by this Section.

2.0 PRODUCTS

2.1 RECEPTACLES:

A. General - Receptacles shall be heavy duty, high abuse, grounding type.

B. [Tamper Resistant] Duplex Receptacles:

1. Receptacles shall be specification grade, rated 20 ampere, two-pole, 3-wire, 125 volt, NEMA 5-20 configuration, self-grounding with screw terminals. Color shall be as selected by the Architect.

2. Devices shall have a nylon face, back and side wired.

3. Manufacturer: Hubbell #DR20 Series [Hubbell #DR20_ _ TR], Leviton #16352 Series [Leviton # 16352-TRE _ _ Series].

C. GFCI Receptacles [Tamper Resistant]:

1. Device shall be rated 20 ampere, 2-pole, 3-wire, 120 volt, conforming to NEMA 5-20 configuration. Face shall be nylon composition. Unit shall have an LED type red indicator light, test and reset push buttons. Color shall be as selected by the Architect.

2. GFCI component shall meet UL 943 Class A standards with a tripping time of 1/40 second at 5 milliamperes current unbalance. Operating range shall extend from -31°F to 158°F. Unit shall have transient voltage protection and shall be ceramic encapsulated for protection against moisture.

3. Manufacturer: Hubbell #GF20_ _LA Series [Hubbell # GFTR20 _ _ Series], Leviton #GFNT2 Series [Leviton #GFTR2 Series].

D. Automatically Controlled Receptacles [Tamper Resistant]

1. Receptacles shall be specification grade, rated 20 amperes, two pole, 3-wire, 125V, NEMA 5-20 configuration, self-grounding with screw terminals. Color shall be selected by the Architect.

2. Devices shall have a nylon face, back and side wired. Marking permanently printed, molded, or stamped on the face of the receptacle and in compliance with controlled receptacle marking requirements stated in California Building Energy Efficiency Standards Section 130.5(d)(3).

3. Manufacturer: Pass & Seymour 26352CD (Dual Controlled Receptacle), 26352CH (Half Controlled Receptacle) [TR26352CD (Tamper Dual Controlled Receptacle), TR26352CH (Tamper Half Switched Receptacles); Leviton 16352-1 (Half Controlled Receptacle), Leviton 16352-2 (Dual Controlled Receptacle).

E. Weather Resistant GFCI Receptacles:

1. Device shall be rated 20 ampere, 2-pole, 3-wire, 120 volt, conforming to NEMA 5-20 configuration, Face shall be nylon composition. Unit shall have a LED type red indicator light, test and reset push buttons. Color shall be as selected by the architect.

2. GFCI component shall meet UL 943 Class A standards with a tripping time of 1/40 second at 5 milliamperes current unbalance. Operating range shall extend from -31°F to 158°F. Unit shall have transient voltage protection and shall be ceramic encapsulated for protection against moisture.

3. Manufacturer: Hubbell #GFTR20 _ _ Series, Leviton #GFWR2 Series.

F. Surge Suppression Receptacles:

1. Device shall be rated 20 ampere, 2-pole, 3-wire, 120 volt. Face shall be nylon composition. Unit shall have an LED type "Power-on" indication light and damage-alert audible alarm. Color shall be as selected by the Architect.

2. Surge suppression protection shall be listed to UL standard 1449 and shall instantly absorb a transient surge of 6,000 volts minimum. A minimum of four (4) Metal Oxide Varistors shall be utilized to absorb transients.

3. Manufacturer: Hubbell #HBL8362S Series, Leviton #8380 Series.

2.2 SWITCHES:

A. Switches shall be rated 20 amperes to 120/277 volts ac. Units shall be flush mounted, self-grounding, quiet operating rocker devices. Rocker color shall be as selected by the Architect.

1. Manufacturer: Hubbell #DS_20_ _ Series, Leviton #5621 Series. See plans for single pole, three way and four way requirements.

B. Timed switches: Shall be as designed by Paragon Electric Company # ET2000f or Watt Stopper TS-400 rated for the voltage specified on drawings. Time-out shall be adjustable from 5 minutes up to 12 hours. Unit shall be provided with warning alarm.

C. Dimmer switches: Switch shall be a specified on drawings, color per architect. Heat fins shall not be removed, where dimmer switches are ganged together, care shall be taken to install correct size backbox to accommodate switches without removing fins.

2.3 PLATES:

A. General - Plates shall be of the style and color to match the wiring devices, and of the required number of gangs. Plates shall conform with NEMA WD 1, UL 514 and FS W-P-455A. Plates on finished walls shall be non-metallic or stainless steel. Plates on unfinished walls and on fittings shall be of zinc plated steel or case metal and shall have rounded corners and beveled edges.

B. Non-Metallic: Plates shall be plain with beveled edges and shall be nylon or reinforced fiberglass.

C. Stainless Steel: Plates shall be .040 inches thick with beveled edges and shall be manufactured from No. 430 alloy having a brushed or satin finish.

D. Cast Metal: Plates shall be cast or malleable iron covers with gaskets so as to be moisture resistant or weatherproof.

E. Blank Plates: Cover plates for future telephone outlets shall match adjacent device wall plates in appearance and construction.

F. Weatherproof Plate: Cover plates in wet and damp locations shall have recessed in-use covers, Taymac or equal. Back box shall be suitable for the wall material where it is installed.

G. Labeling: All switch and receptacle plates shall be labeled on the top portion of the plate with the panelboard and circuit number serving that device. Lettering shall be 3/16” minimum high, black color, on clear Mylar 3/8” tape. Manufactured by P-touch or equal.

3.0 EXECUTION

3.1 INSTALLATION OF WIRING DEVICES:

A. Interior Locations: In finished walls, install each device in a flush mounted box with washers as required to bring the device mounting strap level with the surface of the finished wall. On unfinished walls, surface mount boxes level and plumb.

B. Mounting Heights: Adjust boxes so that the front edge of the box shall not be farther back from the finished wall plane than 1/4-inch. Adjust boxes so that they do not project beyond the finished wall. Height of device shall be as follows unless otherwise noted on the drawings:

1. Receptacles 15 Inches from finished floor to bottom of box.

2. Toggle Switches 48 Inches from finished floor to top of box.

C. Receptacles:

1. Ground each receptacle using a grounding conductor, not a yoke or screw contact.

2. Install receptacles with connections spliced to the branch circuit wiring in such a way that removal of the receptacle will not disrupt neutral continuity and branch circuit power will not be lost to other receptacles in the same circuit.

3.2 INSTALLATION OF WALL PLATES:

A. General - Plates shall match the style of the device and shall be plumb within 1/16-inch of the vertical or horizontal.

B. Interior Locations, Finished Walls: Install non-metallic plates so that all four edges are in continuous contact with the finished wall surfaces. Plaster filling will not be permitted. Do not use oversized plates or sectional plates.

C. Interior (not wet) Locations, Unfinished Walls: Install stainless steel or cast metal cover plates.

D. Wet Locations: Install cast metal plates with gaskets on wiring devices in such a manner as to provide a rain tight weatherproof installation. Cover shall be [lockable] outdoor "in use" type.

E. Future Locations: Install blanking cover plates on all unused outlets.

3.3 TESTS:

A. Receptacles:

1. After installation of receptacles, energize circuits and test each receptacle to detect lack of ground continuity, reversed polarity, and open neutral condition.

END OF SECTION

SECTION 262816 - CIRCUIT BREAKERS

1.0 GENERAL

1.1 DESCRIPTION OF WORK:

A. The work of this Section consists of providing circuit breakers as shown on the Drawings and as described herein.

1.2 RELATED WORK: See the following Specification Sections for work related to the work in this Section.

A. 26 05 00 General Electrical Requirements

B. 26 24 13 Switchboards

C. 26 24 16 Panelboards and Distribution Panels

1.3 SUBMITTALS:

A. Shop Drawings - Submittals shall be in accordance with Section 260500 and Division 01. For each circuit breaker furnished under this Contract, submit manufacturer's name, catalog data, and the following information:

1. Terminal connection sizes.

2. Voltage rating.

3. Breaker manufacturer, types, trip ratings and interrupting ratings.

B. Single Submittal - A single complete submittal is required for all products covered by this Section.

C. Closeout Submittals: Submit in accordance with and Section 260500, operation and maintenance data for circuit breakers including nameplate data, parts lists, manufacturer's circuit breaker timer, current, coordination curves, factory and field test reports and recommended maintenance procedures.

2.0 PRODUCTS

2.1 CIRCUIT BREAKER: Each circuit breaker shall consist of the following:

A. A molded case breaker with an over center toggle-type mechanism, providing quick-make, quick-break action. Each circuit breaker shall have a permanent trip unit containing individual

thermal and magnetic trip elements in each pole. Multipole circuit breakers shall have variable magnetic trip elements which are set by a single adjustment to assure uniform tripping characteristics in each pole. Circuit breakers shall be of the bolt-on type unless otherwise noted.

B. Breaker shall be calibrated for operation in an ambient temperature of 40°C.

C. Each circuit breaker shall have trip indication by handle position and shall be trip-free.

D. Three pole breakers shall be common trip.

E. The circuit breakers shall be constructed to accommodate the supply connection at either end of the circuit breaker. Circuit breaker shall be suitable for mounting and operation in any position.

F. Breakers shall be rated as shown on Drawings.

G. Circuit breaker and/or Fuse/circuit breaker combinations for series connected interrupting ratings shall be listed by UL as recognized component combinations for use in the end use equipment in which it is installed. Any series rated combination used shall be marked on the end use equipment per CEC section 110-22.

H. Breakers shall be UL listed. Circuit breakers shall have removable lugs.

I. Lugs shall be UL listed for copper and aluminum conductors.

J. Breakers shall be UL listed for installation of mechanical screw type lugs.

K. Circuit breakers serving HACR rated loads shall be HACR type. Circuit breakers serving other motor loads shall be motor rated.

3.0 EXECUTION

3.1 MOUNTING:

A. The highest breaker operating handle shall not be higher than 72 inches above the floor.

END OF SECTION

SECTION 263213 - STANDBY POWER GENERATOR SYSTEM

1.0 GENERAL

1.1 RELATED DOCUMENTS:

A. The requirements of the General Conditions, Supplementary General Conditions, and Division 01 General Requirements apply to the work of this Section.

1.2 DESCRIPTION OF WORK:

A. Work included in this Section: Emergency Generator and Automatic transfer switch systems.

B. Related work included in other Sections: All other Sections of Division 26.

1.3 SUBMITTALS

A. Engine.

B. Generator.

C. Automatic Transfer Switch.

D. Schematic wiring diagrams.

E. Dimension drawing for actual unit being provided.

F. Remote annunciator panel.

G. Submit heat rate, fuel consumption, and emissions data necessary to apply for and receive Authority to Construct and Permit to Operate from Monterey Bay Unified Air Resource District (MBARD). Generator must include Best Available Control Technology (BACT) as determined by MBARD.

1.4 PRODUCT HANDLING:

A. All material shall be carefully boxed, crated, or otherwise protected for shipment.

B. Studs and exposed finished surfaces shall be thoroughly greased before shipment.

C. Inlets and outlets shall be blanked off or plugged with metal caps or covers properly secured before shipment.

1.5 WARRANTY:

A. The complete standby electric power system, including engine-generator set, shall be warranted for a period of five (5) year or fifteen hundred (1500) operating hours, whichever occurs first, from the date of initial start-up. Multiple warranties for individual components (engine, alternator, controls, etc.) will not be acceptable. Satisfactory warranty documents must be provided. In the judgment of the specifying authority, the manufacturer supplying the warranty for the complete system must have necessary financial strength and technical expertise with all components supplied to provide adequate warranty support.

B. The generator set manufacturer and its distributor shall maintain 24-hour parts and service organization. This organization shall be regularly engaged in a maintenance contract program to perform preventive maintenance and service on equipment similar to that specified. A service agreement shall be available and shall include system operation under simulated operating conditions, adjustment to the generator, transfer switch, and switchgear controls as required, and certification in the owner's maintenance log of repairs made and proper functioning of all systems.

2.0 PRODUCTS

2.1 EQUIPMENT:

A. The generator set shall be Energy Systems Volvo 100kW. It shall provide 100 kW, 125 kVA when operating at 120/208 volts, .8 power factor. The generator set shall be capable of this rating while operating in an ambient condition of 85°F (67.2°C) and 500 feet above sea level.

B. The generator set shall be capable of starting motor loads of 160 kVA inrush, with a maximum voltage dip of 35%.

C. Vibration isolators shall be provided between the engine-generator and heavy-duty steel base.

D. The engine – generator shall be enclosed in a level 2 weatherproof enclosure.

2.2 ENGINE:

A. The 300 cubic-inch-displacement engines shall deliver a minimum of 82 hp at a governed speed of 1800 rpm. The engine shall be equipped with the following:

1. An isochronous governor capable of +/- 0.5% steady-state frequency regulation.

2. 12 Volt positive engagement solenoid shift-starting motor.

3. 37- Ampere minimum automatic battery charging alternator with solid-state voltage regulation.

4. Positive displacement, full pressure lubrication oil pump, cartridge oil filters, dipstick, and oil drain.

5. Dry-type replaceable air cleaner elements for normal applications.

B. The naturally aspirated engine shall be fueled with natural vapor and be supplied with a unit-mounted electric solenoid fuel shut-off valve, flexible fuel line, and secondary fuel pressure regulator.

C. The engine shall have a minimum of 6 cylinders, and be liquid-cooled by a unit-mounted radiator, blower fan, water pump, and thermostats. This system shall properly cool the engine with up to 0.5 inches H2O static pressure on the fan in an ambient temperature up to 122F/50C.

2.3 GENERATOR:

A. The alternator shall be salient-pole, brushless, 12-lead reconnectable, self-ventilated of drip-proof construction with amortisseur rotor windings and skewed stator for smooth voltage waveform. The insulation shall meet the NEMA standard (MG1-22.40 and 16.40) for Class H and be insulated with epoxy varnish to be fungus resistant per MIL 1-24092. Temperature rise of the rotor and stator shall be limited to NEMA Class F ratings. The excitation system shall be of brushless construction controlled by a solid-state voltage regulator capable of maintaining voltage within +/- 2% at any constant load from 0% to 100% of rating. The regulator must be isolated to prevent tracking when connected to SCR loads, and provide individual adjustments for voltage range, stability and volts-per-hertz operations; and be protected from the environment by conformal coating.

B. The generator set shall meet the transient performance requirements of ISO 8528-5, level G-2.

C. The generator shall be inherently capable of sustaining at least 250% of rated current for at least 10 seconds under a 3-phase symmetrical short circuit without the addition of separate current support devices.

D. The generator, having a single maintenance-free bearing, shall be directly connected to the flywheel housing with a semi-flexible coupling between the rotor and the flywheel.

2.4 CONTROLLER:

A. Set-mounted controller capable of facing right, left, or rear, shall be vibration isolated on the generator enclosure. The controller shall be capable of being remote-mounted. The microprocessor control board shall be moisture proof and capable of operation from -40°C to 85°C. Relays will only be acceptable in high-current circuits.

B. Circuitry shall be of plug-in design for quick replacement. Controller shall be equipped to accept a plug-in device capable of allowing maintenance personnel to test controller performance without operating the engine. The controller shall include the following features:

1. Fused DC circuit.

2. Complete 2-wire start/stop control, which shall operate on closure of a remote contact.

3. Speed sensing and a second independent starter motor disengagement systems shall protect against starter engagement with a moving flywheel. Battery charging alternator voltage will not be acceptable for this purpose.

4. The starting system shall be designed for restarting in the event of a false engine start, by permitting the engine to completely stop and then re-engage the starter.

5. Cranking cycler with 15-second ON and OFF cranking periods.

6. Overcrank protection designed to open the cranking circuit after 75 seconds if the engine fails to start.

7. Circuitry to shut down the engine when signal for high coolant temperature, low oil pressure, or overspeed are received.

8. Engine cooldown timer factory set at 5 minutes to permit unloaded running of the standby set after transfer of the load to normal.

9. 3-position (AUTOMATIC-OFF-TEST) selector switch. In the TEST position, the engine shall start and run regardless of the position of the remote starting contacts. In the Automatic position, the engine shall start when contacts in the remote-control circuit close and stop 5 minutes after those contacts open. In the OFF position, the engine shall not start even though the remote start contacts close. This position shall also provide for immediate shutdown in case of an emergency. Reset of any fault shall also be accomplished by putting the switch to the OFF position.

10. Alarm horn with silencer switch per NFPA 110.

11. Standard indicating lights to signal the following shall be included:

a. Not-in-Auto (flashing red)
b. Overcrank (red)
c. Emergency Stop (red)
d. High Engine Temperature (red)
e. Overspeed (red)
f. Low Oil Pressure (red)
g. Battery Charger Malfunction (red)
h. Low Battery Voltage (red)
i. Low Fuel (red)
j. Auxiliary Pre alarm (yellow)
k. Auxiliary Fault (red)
l. System Ready (green)

12. Test button for indicating lights.

13. Terminals shall be provided for each indicating light above, plus additional terminals for common fault and common pre alarm.

2.4 INSTRUMENT PANEL:

A. The instrument panel shall include the following:

1. Dual range voltmeter 3 ½-inch, +/- 2% accuracy.

2. Dual range ammeter 3 ½-inch, +/- 2% accuracy.

3. Voltmeter-ammeter phase selector switch.

4. Lights to indicate high or low meter scale.

5. Direct reading pointer-type frequency meter 3 ½-inch, 0.5% accuracy, 45 to 65 Hz scale.

6. Panel-illuminating lights.

7. Battery charging voltmeter.

8. Coolant temperature gauge.

9. Oil pressure gauge.

10. Running-time meter.

11. Voltage-adjust rheostat.

2.5 ACCESSORIES:

A. Line circuit breaker of 175 amperes, 175 amps sensor, 3 poles, 600 volts rated, UL molded case type, generator mounted.

B. Engine block heater. Thermostatically controlled and sized to maintain manufacturers recommended engine coolant temperature to meet the start-up requirements of NFPA-110, Level 1.

C. A resettable line current sensing circuit breaker with inverse time versus current response shall be furnished which protects the generator from damage due to its own high current capability. This breaker shall not trip within the 10 seconds specified above to allow selective tripping of down-stream fuses or circuit breakers under a fault condition. This breaker shall not automatically reset, preventing restoration of voltage if maintenance is being performed. A field current-sensing breaker will not be acceptable.

D. Weather housings shall be constructed of rugged steel, cleaned, phosphate, and electrocoat painted inside and out with rust inhibiting primer and exterior coat of the manufacturer standard color. Side panels will be lockable and easily removed for servicing.

E. Battery rack, and battery cables, capable of holding the manufacturer's recommended batteries, shall be supplied.

F. 12-volt lead-antimony battery(ies) capable of delivering the manufacturer's recommended minimum cold-cranking Amps required at 0°F, per SAE Standard J-537, shall be supplied.

G. 10-Ampere automatic float and equalize battery charger with +/- 1% constant voltage regulation from no load to full load over +/- 10% AC input line variation, current limited during engine cranking and short circuit conditions, temperature compensated for ambient from -40°C to +60°C, 5% accurate voltmeter and ammeter, fused, reverse polarity and transient protected.

H. The engine exhaust silencer shall be coated to be temperature and rust resistance, rated for critical application. The silencer will reduce total engine exhaust noise by 25-35 dB(A).

I. Gas-proof, seamless, stainless steel, flexible exhaust bellows with threaded NPT connection.

J. Tow flexible fuel lines rated 300°F and 100 psi ending in pipe thread.

K. Engine crankcase emission canister.

2.6 AUTOMATIC TRANSFER SWITCH:

A. The automatic transfer switch shall be Generac 400-amp, 120/208 Volt, 3-pole, 3 phase, 4 wire, and shall be arranged to close a pilot contact for remote starting of the standby plant three (3) seconds after a drop-in voltage on any phase to 90% or less. The load circuits shall not be disconnected from the normal source during three (3) second time delay period When standby generator is delivering not less than 90% of rated voltage and frequency, load circuits shall be transferred. The transfer switch and all accessories shall be U.L. listed.

B. Upon restoration of the normal source to not less than 95% of rated voltage and rated frequency, load circuits shall be transferred to normal source after a 10-30-minute time delay.

C. Inspection and replacement of all main and separate arcing contacts (movable and stationary) shall be possible from the front of the switch without any disassembly of operating linkages or power conductors and without removal of the switch from the enclosure.

D. Normal source and Phase voltage sensor/relays.

E. A complete circuit diagram shall be attached to the inside of the cabinet door.

F. A pilot light on the door of the enclosure to indicate transfer switch position.

G. A key operated test switch on the door of the enclosure shall be provided to simulate a utility outage.

H. Additional accessory features of minor changes as may be indicated on the Drawings.

I. Minimum code compliance clearances about automatic transfer switch shall not be violated.

J. Enclosure shall be weatherproof.

K. OSP Label:

1. Each equipment/component shall have a label, issued by the OSP manufacturer, as required by CBC Section 1703.5 or 1703A.5. The label shall be affixed to the equipment by the manufacturer prior to the equipment arriving at the job site. Additionally, the label shall list:
    a. Certified acceleration parameters in accordance with ICC-ES AC 156 Table 1.
    b. If project specific:
        i. Test facility name, report number, test date(s).
        ii. Test report approved by HCAI statement.

3.0 EXECUTION

3.1 INSTALLATION:

A. Installation: Emergency electric generating system, generator set, and all components shall be installed, including all connections, at locations and as indicated on drawings and wiring diagrams as specified herein, and in accordance with approved shop drawings, manufacturer's instructions, and manufacturer's standard specification and dimension sheets.

B. Instructions: Drawings, and Operation Information: Two copies of complete instructions shall be supplied to Owner prior to final acceptance. Material shall be in booklet form and shall consist of operating and maintenance manuals, parts manuals, dimensional drawings, unit wiring diagrams and schematics, interconnection wiring diagrams, and schematics, interconnection wiring diagrams, and necessary information for proper operation, service, and maintenance of the equipment and major components supplied.

C. Owner Orientation: A representative of the supplier shall meet with a representative of the Owner at the time of final acceptance tests and shall review the operation and parts books, correct starting and control methods, and recommended preventive maintenance procedures.

D. Recommended Spare Parts:

1. Deliver with equipment. Each part to be packaged for shipment and marked for identification. Include part number and equipment identification for which it is intended for.

3.2 FIELD TESTS AFTER INSTALLATION:

A. The complete installation shall be initially started and checked out for operational compliance by factory- trained representative of the manufacturer of the generator set and the automatic transfer switch. The engine lubrication oil and antifreeze, as recommended by the manufacturer for operation under environmental conditions specified, shall be provided by the supplier of the generator set. If transfer switches and generator sets are furnished by different manufacturers, technical representatives of both transfer switch and generator set manufacturers shall be present during the field tests to verify operational compliance.

B. Tests

1. Fuel, lubricating oil, and antifreeze shall be checked for conformity to the manufacturer's recommendations, under the environmental conditions present and expected.

2. Accessories that normally function while the set is standing by shall be checked prior to cranking the engine. These shall include: block heaters, battery charger, generator strip heaters, remote annunciator, etc.

3. Start-up under test mode to check for exhaust leaks, path of exhaust gases outside the building, cooling air flow, movement during starting and stopping, vibration during running, normal and emergency line-to-line voltage and frequency, and phase rotation.

4. Automatic start-up by means of simulated power outage to test remote-automatic starting, transfer of the load, and automatic shutdown. Prior to this test, all transfer switch timers shall be adjusted for proper system coordination. Engine coolant temperature, oil pressure, and battery charge level along with generator voltage, amperes, and frequency shall be monitored throughout the test. Unit shall run for duration of all-time delays prior to automatic shutdown.

C. Upon completion of initial start-up and system checkout, the supplier of the generator set shall perform a field test, with the Engineer notified in advance, to demonstrate load carrying capability, stability, voltage, and frequency.

D. The generator set shall be run for six hours continuously connected via "Load bank". Records shall be maintained throughout this period to record water, temperature, oil pressure, ambient air temperature, voltage, current, frequency, kilowatts, and power factor. The above data shall be recorded at 15-minute intervals throughout the test. There shall be 10-minute intervals throughout conclusion of the test to allow engine to cool before shutdown. Three copies of the field test data shall be furnished to the engineer. The Contractor shall make all necessary hook-ups to accomplish field tests and shall furnish all fuel necessary for field test and start up.

3.3 SPECIAL TOOLS

A. Any special tools required for installation, adjustment or maintenance of the equipment shall be furnished with the equipment and their cost included in the price quoted.

END OF SECTION

SECTION 265100 - LIGHTING

1.0 GENERAL

1.1 DESCRIPTION OF WORK:

A. The work of this section consists of providing and installing a complete lighting system, including fixtures, LED light module, [ballasts], [sockets], [lamps], hangers, reflectors, glassware, lenses, auxiliary equipment, heat management components, LED driver (integral or remote), and housing.

1.2 RELATED WORK:

A. See the following specification sections for work related to the work of this section:

1. 26 05 00 General Electrical Requirements.

2. 26 05 42 Conduit, Raceway and Fittings.

3. 26 05 19 Line Voltage Wire and Cable.

4. 26 05 33 Junction and Pull Boxes.

1.3 SUBMITTALS: In accordance with Division 01.

A. Submit descriptive data, photometric curves for each fixture configuration proposed.

B. Submit shop drawings showing proposed methods for mounting lighting fixtures.

C. Seismic Requirements: Submit:

1. Sketch or description of the anchorage system if not provided on construction documents.

D. Submit Operation and Maintenance Data per Division 01.

1.4 WARRANTY:

A. LED light module, LED driver, [HID and Fluorescent lamps], [ballasts], batteries or other luminaire components which fail within the first year after final acceptance shall be replaced by the Contractor with the warranty clause of the General Provisions.
B. Replacement components provided under warranty to be provided by contractor, not taken from project spare stock.

2.0 PRODUCTS

2.1 GENERAL

A. Fixtures shall be of the types, wattages and voltages shown on the Drawings and be UL or equivalent classified and labeled for the intended use.

B. Substitutions will not be considered unless the photometric distribution curve indicates the proposed fixture is equal to or exceeds the specified luminaire and the substitution is consistent with the design intent.

C. Luminaire (factory or field installed) wire, and the current carrying capacity thereof shall be in accordance with the CEC.

D. Luminaires and lighting equipment shall be delivered to the project site complete, with suspension accessories, aircraft cable, stems, hangers' canopies, hickeys, castings, sockets, holders, LED light engine, [lamps], [ballasts], diffusers, frames, and related items, including support and braces.

2.2 LIGHT EMITTING DIODE (LED) LIGHT SOURCES AND LUMINAIRES:

A. General (Non-Emergency):

1. Provide identical power supply and driver within each luminaire type. Provide power supplies and drivers that are suitable and UL-listed for the electrical characteristics of the supply circuits to which they are to be connected and which are suitable for operating LED or relevant light sources.
2. Unless otherwise specified, provide power supplies of same type and same manufacturer for ease of stocking and replacement.
3. Components shall be configured and installed in luminaire by the luminaire manufacturer.
4. Luminaire housing shall be constructed of painted metal with no sharp edges unless otherwise noted.
5. Provide only luminaires whose design, fabrication and assembly prevent overheating or cycling of light engines or drivers/power supplies under any condition of use.
6. Electronic ballasts shall meet the requirements of the Federal Communications Commission Rules and Regulations, Part 18, Part C (RF Lighting Devices) Non-consumer equipment, regarding radio frequency interference (RFI) (radiated) and electromagnetic interference (EMI) (power line conducted).
7. Submit light fixture details with luminaire shop drawings.

B. Emergency Lighting: Battery-backed emergency lighting luminaires shall consist of a normal LED luminaire with some or all of the LEDs connected to a battery and charger.

1. The battery shall be nickel cadmium and sized for a minimum of 90 minutes of luminaire operation unless otherwise noted.
2. The charger shall be solid-state and include overload, short circuit, brownout and low battery voltage protection.
3. The battery and charger shall include self-diagnostic and self-exercising circuitry to exercise and test itself for 5 minutes every month and for 30 minutes every 6 months.
4. The luminaire shall include a test/monitor module with status indicating lights mounted so as to be visible to the public.
5. The luminaire shall not contain an audible alarm.
6. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

C: LED Performance and component manufacturer requirements.

1. All color characteristics, SPD (Special Power Distribution) CCT, CRI, CIE Chromaticity Coordinates shall be consistent across the entire dimming range.

2. LEDs shall comply with ANSI/NEMA/ANSLG C78.377-2008 – Specifications for the Chromaticity of Solid-State Lighting Products. Color shall remain stable throughout the life of the source. The chromaticity of the installed product shall match IES LM-80 data showing that the LED's do not shift more than .005 DuV from submitted documentation.

3. White LEDs shall have a minimum rated source life of 50,000 hours or as specified: Luminaire Schedule. Multicolor LEDs shall have a minimum rated source life of 100,000 hours. LED "rated source life" shall be determined per IES TM-21 - Projecting Long Term Lumen Maintenance of LED Light Sources based on LM-80 test data. Calculated lifetimes exceeding testing hours per TM-21 are not accepted.

4. Luminaire assembly shall include a method of dissipating heat so as to not degrade life of source, electronic equipment, or lenses. LED luminaire housing shall be designed to transfer heat from the LED board to the outside environment. Luminaire housing shall have no negative impact on life of components. Manufacturer shall provide Luminaire Efficacy (lm/W), total luminous flux (lumens), luminous intensity (candelas), chromaticity coordinates, CCT, CRI, optical performance, polar diagrams, and relevant luminance and illuminance photometric data. Provide data in IES file format in accordance with testing standards IES LM-79-08 and IES LM-82-12, based on test results from an independent Nationally Recognized Testing Laboratory or National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory.

5. Manufacturer will keep record of original chromaticity coordinates for each LED module and have replacement modules or luminaires from within three (3) MacAdamEllipses/ steps of the same coordinates available for the duration of the warranty period.

6. Manufacturer's LED light engine or equivalent system will be available for ten (10) years: Manufacturer will provide exact replacement parts, complete replacement luminaires, or provide upgraded parts that are designed to fit into the original luminaire and provide equivalent distribution and lumen output to the original, without any negative consequences.

7. All LED sources used in the LED luminaire shall be of proven quality from established and reputable LED manufacturers and shall have been fabricated within 12 months before installation per the date code on the module. Acceptable LED component or module manufacturers unless otherwise noted are:

    a. Cree, Inc.

    b. Lumileds

    c. Nichia Corporation

    d. Norlux

    e. Lextar

    f. Osram Optronic Semiconductors

    g. Xicato

    h. Bridgelux

    i. Epistar

    j. San'an

    k. Citizen Electronics

    l. General Electric Company

    m. Soraa

    n. Samsung

    o. Seoul Semiconductor

    p. Lumenetix

    q. Ledengin

2.3 LED POWER SUPPLIES/ DRIVERS:

1. LED driver shall have a minimum 50,000 hour published life while operating at maximum case temperature and 90 percent non-condensing relative humidity.
2. Driver shall be Sound Rated A+.
3. Driver shall be > 80% efficient at full load across all input voltages.
4. Driver shall include ability to turn off at low control input rather than holding at a minimum dimming level, and shall consume 0.5 Watts or less in standby/off mode. Control dead band at low control input shall be included to allow for voltage variation of incoming signal without causing noticeable variation in luminaire to luminaire output.
5. Drivers shall track evenly across multiple luminaires at all light levels, and shall have an input signal to output light level that allows smooth adjustment over the entire dimming range.
6. Control Input:
    a. 4-Wire (0-10V DC Voltage Controlled) Dimming Drivers
        (i) Must meet IEC 60929 Annex E for General White Lighting LED drivers.
        (ii) Connect to devices compatible with 0 to 10V Analog Control Protocol, Class 2, capable of sinking 0.6 ma per driver at a low end of 0.3V.
        (iii) Must meet ESTA E1.3 for RGBW LED drivers.
    b. Digital (DALI Low Voltage Controlled) Dimming Drivers
        (i) Must meet IEC 62386.
    c. Digital Multiplex (DMX Love Voltage Controlled) Dimming Drivers
        (i) Must meet DMX / RDM: USITT DMX512A and ANSI E1.20 (Explore & Address).
        (ii) Must be capable of signal interpolation and smoothing of color and intensity transitions.
7. Power Factor: The luminaire shall have a power factor of 90% or greater at all standard operating voltages and full luminaire output.
8. THD: Total harmonic distortion (current and voltage) induced into an AC power line by luminaire shall not exceed 10 percent at any standard input voltage and meet ANSI C82.11 maximum allowable THD requirements at full output. THD shall at no point in the dimming curve allow imbalance current to exceed full output THD.

9. In Rush Current: Meet or exceed NEMA 410 driver inrush standard of 430 Amps per 10 Amps load with a maximum of 370 Amps 2 – seconds.
10. RF Interference: The luminaire and associated on-board circuitry must meet Class A emissions limits referred in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 Non-Consumer requirements for EMI/RFI emissions.
11. Light engines shall be [2700] [3000] [3500] [4000] °K [80] [90] CRI minimum, U.O.N. on drawings.
12. Drivers [and ballasts] shall be accessible for maintenance or replacement without removal of recessed light fixture and without destruction of the ceiling.

2.4 [FLUORESCENT LIGHT SOURCES AND LUMINAIRES:]

A. General Fluorescent Ballasts:

1. Ballasts shall be of the types shown on the drawings. Ballasts shall be CBM certified and bear the UL label. Magnetic ballasts shall be the high-power factor type. Electronic ballasts shall be suitable for lamps specified by Advance, Magnetek/Universal, Motorola or approved equal. Electronic ballast shall be CBM certified and have a 10% maximum total harmonic distortion.

2. All ballasts for fixtures installed outdoors shall provide reliable starting of lamps at 0°F at 90% of the nominal line voltage.

3. Ballasts producing excessive noise (above 36 dB) or vibration will be rejected and shall be replaced at no expense to the Owner.

B. Fluorescent Lamps:

1. Lamps shall be new at the time of acceptance and shall be General Electric, Osram /Sylvania, Phillips, or approved equal.

2. Unless otherwise noted on the drawings, lamps shall be third generation T8, [2700] [3500] [4100] °K, and 85 CRI minimum.

3. Third Generation: Also known as High-Performance, Higher Lumen, or Super, the third generation of 32-Watt T8 lamps offers 3,100 lumens and a long-life rating of 24,000 hours. Efficacy is high, with lumens per watt in the range of 94 to 100. CRI is 82 to 86.

3.0 EXECUTION

3.1 INSTALLATION:

A. General:

1. All fixtures and luminaires shall be clean and lamps shall be operable at the time of acceptance.

2. Install luminaires in accordance with manufacturer's instructions, complete with lamps, ready for operation as indicated.

3. Align, mount, and level the luminaires uniformly.

4. Avoid interference with and provide clearance for equipment. Where an indicated position conflicts with equipment locations, change the location of the luminaire by the minimum distance necessary.

5. Recessed light fixtures in fire rated assemblies shall be installed per an approved UL rated fire rated pentation detail.

B. Mounting and Supports:

1. Mounting heights shall be as shown on the Architectural and Electrical Drawings. Unless otherwise shown, mounting height shall be measured to the centerline of the outlet box for wall mounted fixtures and to the bottom of the fixture for suspended fixtures and to the bottom of the fixture for all other types.

2. Luminaire supports shall be anchored to structural members.

3. Pendant stem mounted luminaires shall be provided with ball aligners to assure a plumb installation and shall have a minimum 45-degree clean swing from horizontal in all directions. Sway bracing shall be installed as required to limit the movement of the fixture. Fixtures shall be allowed to sway a maximum of 45º without striking any object.

4. Fixture supports shall be designed to resist earthquake forces of seismic zone 4.

5. Refer to fixture mounting details on drawings for installation requirements.

6. Pendant cable mounted luminaries shall be provided with fully adjustable stainless-steel aircraft cable hangers unless otherwise noted on the Drawings.

END OF SECTION

Division 32: Exterior Improvements

SECTION 32 13 43 – PERVIOUS CONCRETE

PART 1 GENERAL

1.01 SUMMARY

A. This section includes:

1. Pervious Concrete
2. Pavement Base
3. Geotextile for Soil Separation

B. Related Sections:

1. Earthwork: Section 022000.

1.02 STANDARDS AND CODES

A. Reference Standards This section incorporates by reference the latest versions of the following documents. These references are a part of this section as specified and modified.

Reference	Title
Caltrans	Standard Specifications
AASHTO	Standards of the American Association of State Highway and Transportation Officials, 1998 or latest edition
ACI 522.1	Specifications for Pervious Concrete Pavement
ACI 301	Specifications for Structural Concrete
ACI 305.1	Standard Specifications for Hot Weather Concreting
ACI 306.1	Standard Specifications for Cold Weather Concreting
ACI 308.1	Standard Specifications for Curing Concrete
ASTM	Annual Book of ASTM Standards, American Society for Testing and Materials, Philadelphia, PA, 1997 or latest edition.

1.03 REFERENCES

1.04 SUBMITTALS

A. Bid Submittals: The Contractor shall submit to the Owner the following as part of the bid proposal:

1. National Ready Mix Concrete Association (NRMCA) Pervious Concrete Contractor Certifications and project experience as specified in Section 1.05.A for the crew assigned to this project.

B. Pre-Installation Submittals: The Contractor shall submit to the Engineer the following a minimum of 20 calendar days prior to the construction of the pervious cement concrete pavement:

1. NRMCA Certifications for the batch plant to be used in the production of pervious concrete for this project.
2. Proposed mix design including the following:
   a. Batch weights of all constituents.
   b. Portland cement type and brand.
   c. Non-Portland cement pozzolan type and source.
   d. Microfiber brand and type.
   e. Admixture type and brand.
   f. Aggregate source(s), gradation(s), LA abrasion, and cleanness value(s).

   No concrete shall be placed until the Engineer has provided written acceptance of the mix design per Section 1.05.B.
3. Source certificates, gradations, R-values, LA abrasion, and cleanness values of aggregates for base and reservoir course materials performed within one (1) month of product delivery to site.
4. Product data sheets for all proposed admixtures and geotextiles.
5. A detailed plan of the proposed paving pattern and sequencing (if applicable) showing the location and type (saw cut or rolled in plastic concrete) of all planned joints. No deviation from the jointing pattern shown on the Plans will be allowed without written approval of the Engineer.
6. A detailed procedure for the production, transportation, placement, protection, curing, and temperature monitoring of concrete for hot and/or cold weather, unless written approval of the Engineer waiving the requirement is received.
7. Field technician qualifications as specified in Section 1.05.A.
8. Testing agency qualifications as specified in Section 1.05.A.
9. Density of fresh pervious concrete, length of cores, and density of cores for one (1) reference panel. Reference panel shall be placed, jointed, cured, and tested as specified in Section 1.05.D.1 and be within tolerance of the required thickness defined by the Contract Documents.

1.05 QUALITY CONTROL AND QUALITY ASSURANCE

A. General: Test and inspect concrete materials and operations as Work progresses as described in this section. Failure to detect defective Work or materials at any time will not prevent rejection if a defect is discovered later, nor shall it constitute final acceptance.

1. Contractor and Personnel Qualifications

   a. Contractor qualification: Unless otherwise approved by Engineer, Contractor shall provide evidence of employment for one (1) NRMCA certified Pervious Concrete Installer and four (4) NRMCA certified Pervious Concrete Technicians who must be on site, working as members of each placement crew, during all concrete placement.

      For all projects where the total pervious concrete pavement area exceeds 2,000 square feet (sf), the Contractor shall provide evidence of employment for at least one (1) NRMCA certified Pervious Concrete Craftsman who must be onsite, working as part of the placement crew, during all concrete placement. Additionally, for every 10,000 sf of pavement area over 2,000 sf, one (1) additional NRMCA certified Pervious Concrete Installer is required on site, working as part of the placement crew.

      The Contractor shall provide documentation showing three (3) successful pervious concrete projects completed in the last three (3) years collectively totaling more than 20,000 square feet. Documentation shall include name and address of project, and contact information for project owner.

   b. Field technician qualification: Field tests of concrete required in the responsibilities of the testing agency shall be performed by an individual certified as both an NRMCA Certified Pervious Concrete Technician, or equivalent, and an ACI Concrete Field Testing Technician – Grade I, or equivalent.

   c. Testing agency qualification: Agencies that perform testing on concrete materials shall meet the requirements of ASTM C1077 and provide evidence of employment for at least one (1) NRMCA Certified Pervious Concrete Technician, responsible for testing, or providing direct oversight of testing, of all concrete materials. Agencies inspecting the Work shall meet the requirements of ASTM E329. Testing agencies performing the testing shall be accepted by the Engineer before performing any Work.

   d. Batch plant qualification: Batch plant used for pervious concrete shall be a semi-automatic or automatic batching plant with a current NRMCA certification.

B. Approved Mix Design: Once accepted by the Engineer, the mix design meeting the criteria specified in Section 2.01.F shall become the Approved Mix Design and shall not be modified in any way. The Approved Mix Design shall be determined from information submitted under Section 1.04 and from results of reference panel testing as described in Section 1.05.D.1.

Modifications to the Approved Mix Design will not be allowed and any modified mix placed in the Work will be rejected. Proposed modifications to the Approved Mix Design shall be submitted as a new mix design and shall require a new reference panel to validate the proposed mix design and determine the new Approved Mix Design. If accepted by the Engineer, the new mix design shall become the Approved Mix Design. The requirement for a new reference panel may be waived at the discretion of the Engineer. Only one (1) Approved Mix Design shall be valid at any time. Admixture and water dosages may be modified as needed to maintain mix properties.

C. Responsibilities of Contractor

1. Pre-Placement Conference: A mandatory pre-placement conference will take place including at a minimum the Engineer, the Owner, general contractor, pervious concrete installer, concrete supplier, and field testing agency representative. The document Checklist for the Concrete Pre-Construction Conference (available from the National Ready Mix Concrete Association) will be used to review all materials, personnel qualifications, concrete production, delivery, maintaining moisture retention of fresh mixture, preparation, placing, curing (including timing, placement, and securing of curing cover), jointing, testing procedures, and responsibilities. Meeting emphasis will be on how pervious concrete differs from conventional concrete.

2. Reference Panel: For installations over 500 square feet, place reference panels on the project site, on a subgrade and base prepared as specified, using the material and construction requirements for pavement in this Specification. Each panel must have a surface area of at least 225 square feet, and a width and thickness as specified for the pavement in the Contract Documents. The Engineer shall observe and accept each element of the pervious concrete construction. Construction and evaluation of the reference panel(s) will occur as follows:

   a. Notify the Engineer at least ten (10) Working Days before installing pervious concrete reference panel.

   b. Coordinate the location of the reference panel with the Engineer.

   c. Notify the Engineer when each element of the reference panel is ready for inspection.

   d. Remove, replace, and dispose of any unsatisfactory portions of reference panel as determined by the Engineer and at no additional cost to the Owner.

   e. Retain and maintain approved reference panels during construction in an undisturbed condition as a standard for judging completed portions of the final installations.

Approved reference panels may remain as final installations of the Work at the discretion of the Engineer. If not retained, the reference panel shall be removed and disposed of at no additional cost to the Owner.

3. Testing facilitation: Owner's use of testing services will not relieve Contractor of the responsibility to furnish materials and construction in full compliance with the Contract Documents. Unless otherwise specified in the Contract Documents, Contractor shall assume the following duties and responsibilities:

   a. Furnish the materials to be tested, including concrete cores.

   b. Furnish any necessary labor to assist Owner's testing agency in obtaining and handling samples, including concrete cores, at the project site or at the source of materials.

   c. Provide measures to collect slurry and debris during coring operation in order to avoid sealing adjacent pavement.

   d. Fill core holes in accordance with Section 1.05.D.2.

   e. Advise Owner's testing agency at least 24 hours in advance of operations to allow for completion of quality tests and for assignment of personnel.

4. Pressure wash testing: Before final acceptance by the Engineer, the Contractor shall pressure wash the pervious concrete. Pressure washing shall be provided and completed by using portable washer equipment working at a minimum of 3,000 psi at 2.0 to 2.5 gpm. The nozzle shall be a zero degree nozzle and be held a maximum of three (3) inches off the concrete surface. The Contractor shall pressure test three (3) locations per lot or as determined by the Engineer. Any sections of pervious concrete that breaks up or ravels shall be removed and replaced with acceptable pervious concrete to the nearest joints. The Engineer will reject the concrete if the pressure washing dislodges aggregate particles from more than two (2) percent of the pervious concrete in a single panel (joint to joint).

   The Contractor shall decide, after placing the pervious concrete, when to perform the quality assurance pressure wash testing for the acceptance.

D. Testing

1. Reference Panel: Testing for the reference panel shall adhere to the requirements for testing of Pavement per Section 1.05.D.2 for approval by the Engineer. Each test shall meet the acceptance criteria for Reference Panel as defined in Section 1.05.E.1.

   The Engineer shall inspect and approve the reference panel prior to the placement of additional pervious concrete.

   Failure to install acceptable reference panels of pervious concrete will indicate an unqualified installer.

Production sections of this Work shall not be placed until achieving a complete reference panel that fully complies with the Plans and Specifications and has written acceptance issued by the Engineer.

The completed and accepted reference panels shall be maintained and protected throughout the duration of the Work and may not be demolished and disposed of without written permission from the Engineer. If a reference panel is incorporated into the Work, it shall remain in place and be accepted as a single lot.

Unless otherwise determined by the Engineer, density testing of fresh concrete and hardened cores will be used to validate the mix design per the design criteria set forth in Section 1.04.B and the acceptance criteria in Section 1.05.E.1.

The average fresh density and average hardened density of the cores shall be the densities used for the Approved Mix Design.

2. Pavement: The following testing shall be conducted for approval by the Engineer for each reference panel and each lot of pervious concrete placed, where a lot is defined as the lesser of one (1) day's production or 5,000 square feet of pervious concrete, in place, unless otherwise specified below:

   a. Density testing of at least one (1) cubic foot of fresh concrete in accordance with ASTM C1688.

   b. Thickness testing of three (3), four- (4)-inch hardened concrete cores in accordance with ASTM C174 and adhering to the following requirements:

      1) Removed not less than seven (7) days after placement of pervious concrete.

      2) Location selected in accordance with ASTM D3665.

      3) Cut in accordance with ASTM C42.

   c. Density and void content testing of the three (3) hardened concrete cores extracted for thickness testing and trimmed to produce flat core ends per ASTM C42 paragraph 7.4.1 and 7.4.2. Samples shall be tested in accordance with ASTM C1754.

   d. Surface infiltration tests per ASTM C1701 and at the frequency described below.

      1) Three (1) test locations per 3,000 square feet of pervious concrete, in place

   Core holes shall be filled with solid concrete, pre-blended grout, or pervious concrete and shall match adjacent pavement color, and grade. At the

Engineer's discretion, a sacrificial panel for cores may be required or allowed.

Each test shall meet the acceptance criteria for Pavement as defined in Section 1.05.E.2.

E. Acceptance

1. Reference Panel: Acceptance of the reference panel will be based on the criteria for acceptance of Pavement per Section 1.05.E.2 with the following deviations:

   a. Fresh Density: The fresh density shall be within or equal to five (5) pounds per cubic foot of the average fresh density of the three (3) samples.

2. Pavement: Acceptance of a lot of pervious concrete will be based on the following criteria:

   a. Smoothness: Pervious concrete pavement smoothness shall be checked with a 10-foot straightedge. Vertical measurement should be taken between the pavement's determined plane and straight edge, discounting surface void and roughness irregularities, in a direction perpendicular and parallel to the centerline. The finished pavement shall be uniform to a degree such that no variations greater than 3/8-inch are present between the straight edge and pavement surface over a distance of at least 6 inches.

   b. Grade: Pervious concrete shall be true to designed spot elevations plus or minus ½ inch and shall not deviate from designed slope more than ¼ inch in ten (10) feet. Where abutting existing facilities such as sidewalks, walkways, curbs, driveways or other pavements, the pervious concrete shall be flush.

   c. Line: Pervious concrete margins shall be true to designed lines plus or minus ½ inch at any point.

   d. Slope: Pervious concrete shall be sloped as shown on the Plans. Slope shall be consistent to within 1/4 inch in ten (10) feet.

   e. Thickness: Each core sample shall be equal to the minimum section depth or more as specified on the Plans.

   f. Hardened Density: The density of the core samples for each lot shall be within +/- five (5) percent of the average density of the three core samples from the accepted reference panel.

   g. Void Content: The total void content of the core samples for each reference panel and lot shall be twenty (20) percent, plus or minus five (5) percent, in place, as constructed.

h. Infiltration Rate: The average of all surface infiltration tests shall be greater than 250 inches per hour with no single test less than 100 inches per hour.

i. Fresh Density: The fresh density shall be within or equal to five (5) pounds per cubic foot of the fresh density indicated by the Approved Mix Design.

j. Batch Ticket: Each load of pervious concrete transported to the location of placement shall have a Batch Ticket delivered with the load. Batch Tickets shall be provided upon request for each load and shall be in accordance with ASTM C94, with the following additions:

   1) Batch weights of all constituents in the mix, including cement, aggregate, admixtures, water, and fibers

   2) Signature of responsible representative of the concrete producer, affirming the accuracy of the information provided

k. Appearance: Each lot of finished pervious concrete will be inspected for appearance by the Engineer after completion of pressure wash testing per Section 1.05.C.4. The pervious concrete shall have a consistent surface texture, shall have no more than five (5) percent of the surface area within each panel (joint to joint) filled with paste, shall be free of ridges or other surface imperfections, shall have joints that are in the specified location and are constructed per specification, shall be free of cracks and shall not be raveled.

   A panel will be considered raveled if aggregate is dislodged from a contiguous area of the pavement surface or longitudinally along a joint exceeding five times the nominal maximum aggregate size in any direction OR if aggregate particles are dislodged from more than two (2) percent of the pervious concrete within each panel (joint to joint). Raveling occurring during pressure wash testing (as defined in 1.05.C.4) or during the first three (3) months after installation is subject to complete removal and replacement of affected panels with acceptable pervious concrete at the Owner's discretion and Contractor's expense. Requirement to replace affected panels shall continue until three (3) months after the date of replacement. Written notification of defects is the sole responsibility of the Owner.

l. Conformance to Approved Mix Design: The pervious concrete used shall conform to the Approved Mix Design within the limits set forth in ASTM C94.

3. Required Inspections: Notify the Engineer at least 48 hours prior to required inspections specified in Sections 3.02, 3.03, and 3.04.B.

PART 2 PRODUCTS

2.01 PERVIOUS CONCRETE

Pervious Concrete shall comply with ASTM C94, except sections 4.2, 6.1.2, 6.1.3, 6.1.4, 6.1.5, 7, 8, 16, 17, 18, 19, 20 and the requirements specified herein. The volume of fresh concrete in a given batch shall be determined from the total mass of the batch divided by the design density of the concrete. The total mass of the batch shall be determined as the net mass of the concrete in the batch as delivered, including the total mixing water as defined in ASTM C94 Paragraph 9.3.

A. Cement: Cement in the mix design shall conform to the requirements for Portland Cement or Blended Hydraulic Cement as specified herein:

1. Portland Cement: Portland Cement shall meet the requirements of ASTM C150 Type I, II, or V Portland cement.

2. Blended Hydraulic Cement: Blended Hydraulic Cement shall be Type IP or IS Cement conforming to ASTM C595. Type IP(X), Portland Pozzolan Cement, and IS(X) where (X) dictates pozzolan and slag percentage, respectively, shall be Portland Cement and Pozzolan. The pozzolan shall be limited to fly ash or ground granulated blast furnace slag.

   The fly ash or ground granulated blast furnace slag constituent content in the finished cement shall not vary more than plus or minus 5 percent by weight of the finished cement from the certified value.

3. Supplementary cementitious material shall be as specified herein:

   a. Fly Ash: Fly ash shall conform to the requirements of ASTM C618, Class F or C.

   b. Slag Cement: Slag cement shall meet the requirements of ASTM C989, Grade 100 or Grade 120.

   c. Silica Fume: Silica fume shall meet the requirements of ASTM C1240.

B. Aggregates: Aggregates shall conform to ASTM C33 except as specified herein, unless otherwise approved by the Engineer.

1. Aggregate Gradation tested in accordance with ASTM C136 at least once per 300 cubic yards of concrete.

Sieve[1]	Percent Passing by Weight				
	Coarse Aggregate				Fine Aggregate
	ASTM No. 7	ASTM No. 8	ASTM No. 89	ASTM No. 9	
2 inch	–	–	–	–	–
1 1/2 inch	–	–	–	–	–
1 inch	–	–	–	–	–
3/4 inch	100	–	–	–	–
1/2 inch	90 to 100	100	100	–	–

3/8 inch	40 to 70	85 to 100	90 to 100	100	100
No. 4	0 to 15	10 to 30	22 to 55	85 to 100	95 to 100
No. 8	0 to 5	0 to 10	5 to 30	10 to 40	80 to 100
No. 16	–	0 to 5	0 to 10	0 to 10	50 to 85
No. 30	–	–	0 to 5	0 to 5	25 to 60
No. 50	–	–	–	–	5 to 30
No. 100	–	–	–	–	0 to 10
No. 200	–	–	–	–	0 to 3

[1] Sieve provided in nominal size square openings or United States Standard Sieve Series sizes.

In individual tests, a variation of 4 percent under the minimum percentages or over the maximum percentages will be allowed. The average of three successive tests shall be within the percentages stated above. Aggregate shall contain no pieces larger than two times the maximum sieve size for the specified grading measured along the line of greatest dimension.

2. Coarse Aggregate

   a. LA Abrasion: 35 percent (maximum) tested in accordance with ASTM C131 at least once per 300 cubic yards of concrete.

   b. Cleanness Value: 75 (minimum) tested in accordance with California Test 227 at least once per 300 cubic yard of concrete.

3. Acceptance of grading and quality of the aggregate may be based on samples taken from stockpiles at the concrete plant or a submitted gradation report at the discretion of the Engineer. The point of acceptance will be determined in the field by the Engineer.

C. Admixtures

1. Air Entraining Admixtures: Air entraining admixtures shall meet the requirements of ASTM C260.

2. Water Reducing Admixtures: Water reducing admixtures shall meet the requirements of ASTM C494, Type A.

3. Hydration Stabilizing Admixtures: Hydration stabilizing admixtures shall meet the requirements of ASTM C494, Type B or Type D.

4. Superplasticizers: Superplasticizers and retarders shall meet the requirements of ASTM C494, Type F or Type G and ASTM C1017, Type 1.

5. Viscosity Modifying Admixtures: Viscosity modifying admixtures may be used if approved by the Engineer.

6. Color Pigment: Color pigment shall meet the requirements of ASTM C979 for integrally colored concrete. Pigments shall be color stable, non-fading, and resistant to lime and other alkalis.

D. Water: Clean potable water or water conforming to ASTM C1602 shall be used in the mix design and on the jobsite. The use of hot water is not permitted.

E. Microfibers and Macrofibers: Microfibers shall conform to the requirements of ASTM C1116, Type III and shall be monofilament and ½ inch in length. Macrofibers shall conform to the requirements of ASTM C1116, Type III and shall be monofilament.

F. Mix Design:

1. General: The Contractor shall propose a mix design for pervious concrete and shall submit the mix design to the Engineer for acceptance prior to constructing the reference panels. Pervious concrete shall not be placed in the reference panels without a mix design that has been reviewed and accepted by the Engineer.

2. Mix Design Criteria: The Contractor shall include the following elements and results of the described procedures in the proposed mix design:

a. The cementitious content, including pozzolans if used, shall be a minimum of 480 and a maximum of 600 pounds per cubic yard.

b. The mix may incorporate up to 5 percent fine aggregate, by weight.

c. The mix shall incorporate a hydration stabilizing admixture.

d. The mix may incorporate microfibers, macrofibers or fibers per Manufacturer's recommendations.

e. The mix shall be designed to meet the acceptance criteria for Void Content per Section 1.05.E.2.g as determined by the testing methods specified in Section 1.05.D.

f. The water/cement ratio shall be between 0.27 and 0.35.

g. Up to 50 percent of cementitious material in the mix, by weight, may be fly ash, slag cement, or a combination of silica fume and either or both of the above, with silica fume not exceeding 10 percent.

Deviations from this mix design, such as the use of internal curing admixtures, cementitious content outside of the range specified, or finer aggregate gradations may be permitted at the sole discretion of the Engineer provided the Contractor can demonstrate the viability of the mix design through past successful installations or sound science.

2.02 PAVEMENT BASE

A. Pavement Base Material shall consist of clean, mechanically crushed stone, substantially free from adherent coatings. Materials shall be washed thoroughly to remove clay, organic matter, extraneous debris, or objectionable materials. Recycled materials or round river gravel are not permitted. Material shall be obtained only from a source(s) approved by the Engineer. Written requests for source approval shall be submitted to the Engineer not less than Working 10 days prior to the intended use of the Material. Should the proposed source be one that

the Engineer has no history of Material performance with, the Engineer reserves the right to take preliminary samples at the proposed source, and make preliminary tests, to first determine acceptability of the new source and then perform the applicable Material approval testing. Continued approval of a source is contingent upon the Materials from that source continuing to meet Contract requirements. Materials shall meet the Standard Specifications for grading and quality for use in the Work; however, allowable exceptions may be specified in the Contract. The Engineer shall reserve the right to sample and test Material at any time including at the source.

B. Pavement Base shall consist of up to two (2) layers as specified on the Plans and included herein:

1. "Base Course" shall be ASTM No. 3 (modified) or ASTM No. 57 (modified) stone per Section 2.02.C.

2. "Reservoir Course" shall be ASTM No. 2 (modified), ASTM No. 3 (modified), or ASTM No. 57 (modified) stone per Section 2.02.C.

C. Pavement Base Material shall meet the following specifications for grading and quality.

1. Aggregate Gradation tested in accordance with ASTM C136 at least once per 500 cubic yards of base material.

Sieve[1]	Percent Passing by Weight			
	ASTM No. 2 (modified)	ASTM No. 3 (modified)	ASTM No. 8 (modified)	ASTM No. 57 (modified)
3 inch	100	–	–	–
2 1/2 inch	90 to 100	100	–	–
2 inch	35 to 70	90 to 100	–	–
1 1/2 inch	0 to 15	35 to 70	–	100
1 inch	–	0 to 15	–	95 to 100
3/4 inch	0 to 5	–	–	–
1/2 inch	–	0 to 5	100	25 to 60
3/8 inch	–	–	85 to 100	–
No. 4	–	–	10 to 30	0 to 10
No. 8	–	–	0 to 10	0 to 5
No. 16	–	–	0 to 5	–
No. 100[2]	0 to 2	0 to 2	0 to 2	0 to 2

[1] Sieve provided in nominal size square openings or United States Standard Sieve Series sizes.

[2] Gradation modified from ASTM for portion passing the No. 100 sieve.

2. L.A. Abrasion: 30 percent (maximum) tested in accordance with ASTM C131.

3. Cleanness Value: 75 (minimum) tested in accordance with California Test 227 at least once per 500 cubic yards of base material.

4. Crushed Particles: 90 percent (minimum) with two (2) or more fractured faces tested in accordance with California Test 205.

5. The combined portion of Material retained on the U.S. No. 4 sieve shall not contain more than 0.1 percent wood waste by weight. The portion of Material passing a U.S. No. 10 sieve shall not have wood waste that results in more than 250 parts per million of organic matter by calorimetric tests when tested. The color shall be measured after the sample has been in the test solution for 1 hour.

2.03 GEOTEXTILE FOR SOIL SEPARATION

A. Geotextile shall be woven, consisting only of long chain polymeric fibers or yarns formed into a stable network such that the fibers or yarns retain their position relative to each other during handling, placement, and design service life. At least 95 percent by weight of the material shall be polyolefins or polyesters. The material shall be free from defects or tears. The geotextile shall also be free of any treatment or coating which might adversely alter its hydraulic or physical properties after installation. The geotextile shall conform to the properties specified herein:

Geotextile Property	Test Method	Requirement
Grab Tensile Strength, minimum in weakest direction	ASTM D4632	200 lbs/in
Apparent Opening Size (AOS)	ASTM D4751	40 to 50
Ultraviolet (UV) Radiation Stability, minimum strength retained after 500 hours in weatherometer	ASTM D4355	50%
Flow Rate, minimum	ASTM D4491	140 gal/min/ft^2

PART 3 EXECUTION

3.01 GENERAL

A. Prevent runoff from adjacent pervious and impervious surfaces from entering the permeable pavement area (e.g., stabilize adjacent areas, flow diversion) until authorization is given by the Engineer/Landscape Architect. For capital projects, redevelopment projects, and any project where the permeable pavement is in the public ROW (i.e., with an SFPW encroachment permit), refer to SFPUC Specification Section 01 57 29 Temporary Protection of Green Infrastructure Facilities.

B. Exclude equipment from permeable pavement areas that have been excavated to subgrade. No equipment shall operate on subgrade within the facility once excavation has begun, including during and after excavation. Equipment may operate on the placed aggregate surface.

C. Prevent foreign materials and substances, such as silt laden run-off, construction debris, etc. from entering or being stored in the facility at any point during construction.

D. Do not dump materials or substances except the aggregate within the permeable pavement area. Any foreign materials or substances shall be removed prior to aggregate placement.

3.02 SUBGRADE PREPARATION AND PROTECTION

A. Construct subgrade to +/- ¾ inch of the grades and slopes specified on the Plans.

B. Grading of subgrade shall be with low ground pressure equipment when within six (6) inches of final subgrade elevation.

C. Compact subgrade to 90 percent (+/- 2 percent) of the maximum dry density per standard Proctor test (ASTM D698), or as directed by the Geotechnical Engineer. Determination of in-place density shall be made using a nuclear gauge per ASTM D6939.

D. Areas of the subgrade which are over-compacted, as determined by the Geotechnical Engineer, shall be ripped/tilled to a depth of 12 inches (minimum) or as directed by the Geotechnical Engineer and shall be recompacted in accordance with Section 3.02.C. Contractor shall locate all utilities within pavement footprint prior to ripping and re-compacting subgrade.

E. Proof-roll prepared subgrade with loaded dump truck, remove soft spots, and replace with permeable structural fill as directed by the Engineer to achieve uniform subgrade.

F. After compaction and proof roll, scarify subgrade ¼- to ½-inch deep by hand rake. Once scarified, materials or equipment shall not be permitted within the prepared subgrade area so as to avoid recompaction or clogging of the scarified subgrade.

G. The subgrade shall be protected from over-compaction or contamination by silty run-off or other contaminants.

1. Provide physical barriers or direct traffic to eliminate unnecessary vehicular traffic on the subgrade during construction in accordance with SFMTA and SFDPW ordinances and specifications.

2. Provide flow diversion and erosion control measures to protect the permeable pavement area from sedimentation until the upstream catchment area is thoroughly stabilized.

H. Areas of subgrade over-compacted by construction traffic or other impacts by the Contractor or Subcontractors shall be ripped/tilled and re-compacted in accordance with Section 3.02.D. All work and materials required to correct over-compacted subgrade, including utility locates within the pavement footprint, shall be at the Contractor's expense.

I. Areas of subgrade contaminated by the accumulation of silty material following rains or other debris or contamination shall be removed and disposed at the Contractor's expense.

J. The subgrade shall be inspected and accepted by the Engineer prior to placement of the geotextile or pavement base.

K. Place geotextile, if required, on scarified subgrade. Care shall be taken to provide full coverage and to prevent the geotextile from being torn. Damaged geotextile shall be repaired as indicated by the manufacturer and to the satisfaction of the Engineer at no additional cost to the Owner. Overlaps of the geotextile shall be a minimum of one (1) foot or to the manufacturer's recommendation, whichever is greater.

3.03 PAVEMENT BASE

A. Construct pavement base to the lines, grades, and thicknesses shown on the Plans.

B. Place the pavement base so as to prevent loaded dump trucks from driving directly on the prepared subgrade.

C. Compact pavement base, in six (6) inch (maximum) lifts, by making a minimum of three passes over the pavement base material with a ten (10) ton vibratory roller, or as directed by the Geotechnical Engineer. The first two (2) passes (minimum) shall be in vibratory mode. Acceptance of the pavement base will be based on Engineer's observation that compaction has achieved an unyielding surface. Compaction equipment shall be accepted by the Engineer prior to use.

D. Pavement base shall be true to the designed grade and slope, +/- 0.05 feet, after compaction for each layer. In the event of low spots, additional material shall be added and recompacted. In the event of high spots, excess material shall be removed and the area recompacted.

E. The pavement base shall be protected from over-compaction or contamination by silty run-off or other contaminants.

1. Provide physical barriers or direct traffic to eliminate unnecessary vehicular traffic on the pavement base during construction in accordance with SFMTA and SFDPW ordinances and specifications.

2. Provide flow diversion and erosion control measures to protect the permeable pavement area from sedimentation until the upstream catchment area is thoroughly stabilized.

F. Any damage to the pavement base (including contamination by silty run-off) shall be repaired to the satisfaction of the Engineer at the Contractor's expense. Contaminated pavement base shall be removed and replaced to the limits as determined by the Engineer.

G. The pavement base shall be inspected and accepted by the Engineer prior to placing any pervious concrete.

3.04 MIXING, PLACEMENT & CURING OF PERVIOUS CONCRETE

A. Pervious concrete formwork

1. Forms shall be made of steel or wood and shall be in good condition, clean, and capable of being anchored in place so as to ensure pavement placement true to the grades, lines and slopes as specified on the Plans.
2. Forms that are bent, warped, unclean, or otherwise deemed inadequate by the Engineer shall not be used.
3. Existing curbs, structures, or the vertical face of previously placed pervious concrete may be used as a form.
4. Set, align, and brace forms to satisfy the lines, grades, and slopes on the Plans.
5. Apply form-release agent to the form face immediately before placing concrete, if used.
6. No pervious concrete shall be placed until the forms are inspected and accepted by the Engineer.
7. Slip forming is an acceptable method for placement of pervious concrete.

B. Batching, mixing, and delivery

1. Pervious concrete shall be batched and centrally mixed at a batching plant meeting the requirements set forth in Section 1.06.A.4. Pervious concrete shall not be shrink mixed or transit mixed.
2. Begin mixing immediately after cement has been added to aggregates. Batch and mix concrete in compliance with ASTM C94, with the following exceptions:
   a. Placement of concrete shall occur no more than 60 minutes from the time water or aggregate is added to the cement unless a hydration-stabilizing admixture is used.
   b. Hydration stabilizers shall be used if time from batching to placement is expected to exceed 60 minutes. The appropriate dosage rate shall be determined by the ready-mix concrete producer or contractor to allow for the necessary fresh properties required for placement of concrete as determined by the contractor. Placement shall cease immediately if the concrete mix becomes unworkable. Loss of the wet metallic sheen, combined with slowing discharge from the ready-mix truck and a rapid rise in concrete temperature are indications of loss of workability.

   Additional water may be added on site, but the fresh density must still meet the requirements of Section 2.01.F.2 after water addition.

C. Placing and consolidation

1. Pervious concrete shall not be placed on standing water or frozen pavement base.
2. In hot and or dry conditions, prior to placement of the pervious concrete, moisten sub-base aggregate to provide a dampened condition at the time

concrete is placed. If initial application of water is absorbed within a few minutes, apply a second application of water just before installing pervious concrete.

3. Place pervious concrete on the prepared pavement base as close to its final position as possible, either directly from the transporting equipment or by conveyor, unless otherwise specified. Spread the concrete using mechanized equipment or hand tools, without segregation.

4. Strike off concrete between forms using a form riding paving machine or roller screed at the appropriate height, as determined by the Contractor, to allow for compaction to finished grade. Equipment used for striking off the pervious concrete shall leave a smooth surface, free of ridges or other imperfections, without drawing excessive paste to the surface. Vibratory screeds are not permitted. Other strike-off devices may be used when accepted by the Engineer.

5. Provide secondary compaction of pervious concrete with purpose-built cross roller, float pan, or alternate method approved by the Engineer. Rollers shall be of sufficient weight and width to compact the fresh pervious concrete to grade, leaving a smooth surface, free of ridges or other imperfections, without drawing excessive paste to the surface. Compacted pervious concrete shall meet the acceptance criteria for Smoothness set forth in Section 1.05.E.2.

6. Contractor's personnel shall take care to avoid foot traffic in the pervious concrete to prevent non-uniform compaction and to keep contaminated material from entering the pavement mix. Foot traffic on the fresh concrete shall not be allowed after it has been struck off.

7. Place pervious concrete continuously. When discharge from a truck is complete or stops, and there will be a gap in time before the next truck arrives or placement continues, cover the placed material, including the leading edge, until the next truck arrives. If the gap in time between trucks is 15 minutes or more, a header shall be placed between the forms and a construction joint formed. The construction joint shall be located at a contraction joint location, unless otherwise approved by the Engineer. The pervious concrete shall be compacted and finished to the header before placement may continue. Upon resuming placement, the header may be carefully removed and a construction joint formed at that location. Any sloughing or sagging of the previously placed pervious concrete at the header location shall be corrected prior to placing new pervious concrete against the joint.

D. Edging: Edging of the top surface shall be completed in plastic concrete to a radius of not less than 1.5 times the nominal size of the aggregate. Defects shall be repaired immediately.

E. Jointing: Joints shall be of three (3) types: construction, contraction, and isolation. Wherever possible, the angle between intersecting joints shall be between 80 and 100 degrees. Construct joints at the locations and to the horizontal dimensions indicated on the Plans.

1. Construction Joints: Construction joints shall be formed at the end of a day's work or when necessary to stop production for any reason.

   a. Construction joints shall be located as near as possible to the location of a planned contraction or isolation joint.

   b. Construction joints are to be formed by placing a header between the forms, at right angles, to the full depth of the finished pervious concrete, and set to the height of the forms. Pervious concrete shall be placed against the header and compacted and finished as normal, including edging.

   c. Upon resuming paving, the header shall be carefully removed and new pervious concrete placed directly against the existing pervious concrete. The new pervious concrete shall be compacted and finished against the hardened pervious concrete as if it were a form.

   d. If an isolation joint is planned at this location, then the premolded joint filler shall be placed against the existing pervious concrete and the new pervious concrete shall be placed against the premolded joint filler. The joint shall be tooled on both sides of the premolded joint filler.

2. Contraction Joints: Contraction joints shall be used to control random cracking.

   a. Contraction joints shall be a minimum depth of 1/4 of the pervious concrete thickness, up to a maximum required depth of 1 and 1/4 inches, and shall have a joint width of no more than 1/8 inch.

   b. Contraction joints shall be placed every 15 feet unless otherwise shown on the Plans.

   c. Plastic Formed Joints: Contraction joints may be formed in the plastic concrete using a roller designed for this purpose or by other methods accepted by the Engineer.

      1) Rollers shall have sufficient weight to produce the joint and shall not otherwise damage or mar the surface.

      2) Joints shall be tooled on both sides of the joint with a radius not less than 1.5 times the nominal size of the aggregate.

   d. Saw Cut Joints: At the option of the Contractor, contraction joints may be saw cut provided joints are early-entry dry-cut type.

      1) Joints shall be cut using purpose built early-entry saw cutting equipment.

2) Saw cutting shall not be performed during the curing period.

3) Saw cut joints shall be installed no later than the same day the curing plastic is removed.

4) Remove cuttings from surface immediately after saw cutting of joints.

5) If shrinkage cracking is likely to be a concern during the curing period, plastic formed joints should be installed to relieve slab stress.

3. Isolation Joints: Isolation joints shall be used where the pervious concrete abuts existing facilities or where shown on the Plans.

a. Isolation joints shall continue through the depth of the pervious concrete using a 3/8 inch premolded joint filler.

b. Isolation joints may be formed by inserting the premolded joint filler into the plastic concrete or by forming a construction joint and affixing the premolded joint filler against one side of the joint and placing fresh pervious concrete against it.

c. Isolation joints and filler shall be flush with the surrounding pervious concrete and shall not deviate from the acceptance criteria for Grade as specified in Section 1.05.E.2.

d. The edges of the pervious concrete on either side of the premolded joint filler shall be hand tooled to a radius not less than 1/4 inch.

F. Curing

1. Begin curing within 20 minutes or as soon as possible after concrete is discharged from the truck to attain the proper moisture level as indicated by cement paste with a wet metallic sheen, unless otherwise specified or approved by the Engineer.

2. Completely cover the pavement surface and all exposed edges with a minimum six- (6)-mil-thick white polyethylene sheet, unless otherwise specified or approved by the Engineer. No wetted burlap or cloth shall be used.

3. Thoroughly secure a polyethylene sheet at all exterior edges and interior laps without using soil. The method of securing the cover material shall prevent wind from removing the sheet and from blowing under the sheet across the surface of the concrete.

4. Curing compound shall not be used on any pervious cement concrete surface.

5. Cure pavement for a minimum of 7 uninterrupted days, unless otherwise specified or approved by the Engineer.

6. With the exception of saw cutting equipment, all traffic shall be kept off of the pervious concrete during the curing period.

7. Any testing for acceptance shall not occur until the end of the curing period.

G. Cold-weather construction

1. Protect concrete from freezing and record concrete temperature no less than twice per 24-hour period in accordance with ACI 306.1.

3.05 OPENING TO TRAFFIC

A. No traffic shall be allowed on the pervious cement concrete pavement for 10 days.

B. Once open to traffic, measures must be maintained to prohibit any construction related impacts on the pervious concrete pavement surface. No construction equipment, trucks or material staging is allowed on the completed pervious concrete pavement at any time after installation and curing.

3.06 PROTECTION OF PAVEMENT

A. Cured and exposed pervious cement concrete pavement surface shall be kept clean and free of clogging debris and soils from the Contractor's operations and all upstream and adjacent debris. Neither construction equipment nor staging shall be allowed on the cured an exposed pervious cement concrete pavement surface. If debris or soils contaminate the pervious pavement voids, the pavement shall be cleaned at the Contractor's expense and to the satisfaction of the Engineer. If pervious cement concrete pavement cannot be unclogged, it shall be removed and replaced at the Contractor's expense and to the satisfaction of the Engineer.

3.07 REJECTION

A. Pervious concrete that does not meet the acceptance criteria set forth in Section 1.05.E.2 will be rejected by the Engineer on a lot-by-lot basis. Pervious concrete that has been rejected by the Engineer or the Contractor shall be removed and replaced at no additional cost to the Owner.

END OF SECTION 32 13 43

SECTION 321700 – PAVEMENT SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Parking lot striping.
B. Disabled loading zone striping and disabled parking symbol.
C. Traffic symbols.
D. Curb painting.
E. Traffic and parking control signage.
F. Precast Concrete Parking Bumpers

1.2 RELATED SECTIONS

A. Section 025130 – ASPHALT CONCRETE PAVING
B. Section033000 – SITE CAST-IN-PLACE CONCRETE
C. Section 101400 - SIGNAGE

1.3 QUALITY ASSURANCE

A. Materials and work of this section shall conform with Local Municipality Public Works standards and specifications.

1.4 REGULATORY REQUIREMENTS

A. Conform to regulations of Bay Area Air Quality Management District and California Air Resources Board regarding use of paint.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Do no painting when surface and air temperatures are below 40 degrees F or below those temperatures recommended by the paint manufacturer.

PART 2 PRODUCTS

2.1 STANDARD CATALOG PRODUCTS

A. Symbol Marking Paint and Traffic Marking Paint: Water borne product conforming to State Specification 8010-426-30; Kelly Moore Traffic Paint, Dunn-Edwards Traffic Paint W801, Sinclair 160 Vinyl Traffic Paint, or equal product.

1. International Symbol of Accessibility (ISA) Background: Blue color.

2. Parking Stall Striping, Traffic Symbols and Accessible Loading Zone shall have blue boundary and white lettering per CBC 1129B.3.1 and 1129.B.3.2.

3. Disabled Stall Curbs: Blue color.

4. Fire Lane Curbs: Red Color

B. Traffic and Parking Control Signage: 16 gauge galvanized steel or 0.080 inch aluminum; reflective surface; radiused corners.

1. Accessible Parking Signs:

a. Upper Sign: Complying with CBC Section 1129.B.4; 12 inches high x 12 inches wide; blue with white inset border and international symbol of accessibility. Add additional sign or text stating “MINIMUM FINE ALL SPACES $250” per CBC 1129B.4.

b. Lower Sign: Complying with CBC Section 1129.B.4; 6 inches high x 12 inches wide; blue with white inset border and Gothic letters minimum 2 inches high reading "VAN ACCESSIBLE" arranged in two lines.

2. Parking Control Sign - Entries to Parking Lots with Parking Reserved for Disabled: Complying with CBC Section 7202(F); 18 inches high x 27 inches wide; 1 inch high black Gothic letters reading "UNAUTHORIZED VEHICLES NOT DISPLAYING DISTINGUISHING PLACARDS OF LICENSE PLATES ISSUED FOR PHYSICALLY DISABLED PERSONS MAY BE TOWED AWAY AT THE OWNER'S EXPENSE. TOWED VEHICLES MAY BE RECLAIMED BY TELEPHONING THE SANTA CRUZ POLICE DEPARTMENT AT 831-471-1141" on white background with black inset border. Blank spaces are to be filled in with the appropriate information as a permanent part of the sign – obtain information from the City of Capitola.

3. Pipe: Galvanized steel; 2 inch inside diameter.

4. Concrete: Refer to Section 033000 – SITE CAST-IN-PLACE CONCRETE for requirements.

C. Precast Concrete Parking Bumpers:

1. Provide precast concrete parking bumpers shall meet the following criteria:

a. Shape: Half-octagonal configuration and dimensions indicated. Unless indicated otherwise, provide bumpers of 36-inch length.

b. Bumpers shall be manufactured of Class 4000 reinforced concrete, as specified in Section 321133.13 – Portland Cement-Stabilized Base Courses, to withstand constant use and rough service. Each bumper shall be reinforced with two No. 4 deformed steel reinforcing bars, minimum (ASTM A 615, Grade 40, deformed).

c. Each bumper shall be 5,000 psi, air entranced concrete. Air content shall be 6% by volume within an allowable tolerance of plus or minus 1.5%.

c. Each bumper to be installed on at-grade asphalt pavement shall be manufactured with two holes to accommodate the installation rebar. Holes shall be positioned 6 inches in from each end.

d. Bumpers to be installed on concrete slabs of parking structures, shall be manufactured without holes.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine receiving surfaces and verify that surfaces are proper for installation.

B. Do not start work until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove dirt, oil, grease, and other foreign matter from the areas of the pavement and curbs to be painted.

B. Do not apply traffic paint to surfaces which are excessively dirty, damp, and cold.

3.3 INSTALLATION

A. Apply parking lot as a 4 inch wide solid line. Apply loading zone striping as 8 inch wide solid line.

B. Stripe parking stalls to the dimensions as shown on the Drawings; traffic symbols shall be as shown. Stripe loading zone to dimensions shown on Drawings.

C. Paint the International Symbol of Accessibility in each handicap parking stall as indicated on the Drawings and in accordance with the American National Standard Institute Figure A117.1.

D. Paint horizontal and vertical face of curbs abutting handicapped parking stalls. See

Drawings for extent of painted curbs.

E. Apply traffic paint with atomizing spray type striping machine equipped with separate thermostatically controlled heating devices for each paint pot and capable of applying paint whereby the lines and markings have clear-cut edges, true and smooth alignments and uniform thicknesses.

F. Apply paint with completed lines and marking clean, sharp and to dimensions.

1. Ragged ends of segments, fogginess along the sides or objectionable dribbling of paint along the unpainted portions of the strips will not be permitted.

2. The finished paint shall have an opaque, well painted appearance with no black or other discolorations showing through.

G. Set posts for parking sign plumb in minimum 12 inch diameter concrete footings with top of footing 6 inches below finished grade and bottom of footing minimum 36 inches below finished grade. Slope top of concrete for water runoff. Cap top of pipe.

H. Secure signs to posts with saddles and vandal-proof nuts.

I. Install parking control signs with bottom of upper sign 60 inches above finished grade. Install parking stall signs with bottom of lowest sign 80 inches above finished grade. Install lower signs in two sign assemblies with top within 1 inch of bottom of upper sign.

J. Install rubber speed bumps with ½ inch rebar, 14 inches in length. Provide 12” gap between segments. Snap a chalk line on pavement to provide a straight line to set segments to.

3.4 PROTECTION

A. Exercise reasonable precautions to protect the paint, as applied, during drying time. Remove objectionable tracking.

END OF SECTION

SECTION 321726 - TACTILE WARNING SURFACING

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install cast-in-place tactile warning surfacing as shown on project Drawings.

1.2 RELATED SECTIONS

A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 321313, Portland Cement Concrete Paving.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D570-98 for water absorption.
2. ASTM C1028-96 for slip resistance.
3. ASTM D695-02a for compressive strength.
4. ASTM D638-03 for tensile strength.
5. ASTM D790-03 for flexural strength.
6. ASTM D543-95 for chemical stain resistance.
7. ASTM D2486-00 for abrasive wear.
8. ASTM C501-84 for water resistance.
9. ASTM E84-05 for fire resistance.
10. ASTM D5420-04 for impact resistance.
11. ASTM G155-05a for accelerated weathering.

1.4 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Product Data: Submit manufacturer's literature describing products, instructions for installation, and maintenance procedures.

1. Provide manufacturer's color chart for selection by the Architect.

C. Samples: Provide samples as directed by Architect for verification purposes.

D. Shop Drawings: provide Shop Drawings showing fabrication details, tile placement, installation materials and procedure.

E. Materials Test Reports: Provide materials test reports from a qualified independent testing laboratory showing that materials for use are in compliance with all applicable requirements and meet the properties indicated.

F. Warranty: Provide manufacturer's standard warranty.

1.5 DELIVERY, STORAGE AND HANDLING

A. Materials shall arrive in manufacturer's original product packaging and shall be stored unopened until installation.

B. Materials shall be stored on a flat, level, and dry surface.

1.6 QUALITY ASSURANCE

A. Provide materials from a single manufacturer.

B. Tactile warning surfacing must comply with ADA requirements as well as the California Code of Regulations (CCR) Title 24, Part 2.

C. Installer Qualifications: Contractor conducting installation shall conform to all local and state licensing and bonding requirements.

2.0 PRODUCTS

2.1 MANUFACTURER

A. Engineered Plastics, Inc., 300 International Drive # 100, Williamsville, NY 14221, 1-800-682-2525, www.armor-tile.com.

OR

B. Detectable Warning Pavers from Hanover, 240 Bender Rd., Hanover, PA 17331, 717-637-0500, www.hanoverpavers.com, or approved equal.

2.2 MATERIALS

A. Tactile warning paver shall be of an epoxy polymer composition with aluminum oxide particles in the truncated domes, and shall meet the following requirements:

1. Compressive Strength: greater than 28,000 psi.
2. Tensile Strength: greater than 19,000 psi.
3. Slip Resistance: greater than .80.
4. Water Absorption: less than .05%.
5. Flexural Strength: greater than 25,000 psi.
6. Chemical Stain Resistance: shall not discolor or stain.
7. Abrasive Wear: less than .060 after 1,000 cycles.
8. Water Resistance: greater than 500.
9. Fire Resistance: flame spread less than 15.
10. Impact Resistance: greater than 550 in. lbf/in.

B. Color: to be YELLOW

C. Size: 36" x 48" x 2".

3.0 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer’s instructions.

B. Tiles shall be installed and set in place immediately after cast-in-concrete has been poured and floated.

C. Tiles shall be set into concrete by tamping down until all air voids are removed and tile has been edged around the perimeter.

D. When tiles are firmly in place, the protective plastic sheet shall be cut off and removed from each tile.

3.2 CLEANING AND PROTECTION

A. Protect tiles against damage during project construction and tile installation period to comply with manufacturer’s recommendations.

B. In the event of rolling loads following installation, protect tiles by covering them with plywood or hardwood.

C. Clean tiles by method as recommended by manufacturer not more than four days prior to final inspection.

3.3 WARRANTY

A. Materials shall be free from all defects.

B. Tactile warning tiles shall be guaranteed in writing for a period of five years from date of final completion.

C. Warranty shall include defective work, breakage, deformation, and loosening of tiles.

END OF SECTION

SECTION 323113 - CHAINLINK FENCES AND GATES

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install Poly Vinyl Chloride (PVC) coated chain-link fencing, Poly Vinyl Chloride (PVC) coated chain link swing gates, and all related accessories as shown on project Drawings and as specified herein.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Section 033000, Cast-In-Place Concrete

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM F567 - Standard Practice for Installation of Chain-Link Fence
2. ASTM F626 - Standard Specification for Fence Fittings
3. ASTM F900 - Standard Specification for Industrial and Commercial Swing Gates
4. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework
5. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
6. ASTM A36 - Standard Specification for Carbon Structural Steel
7. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

8. ASTM B221 Standard Specification for Aluminum and Aluminum Ally Bars, Rods, Wire Profiles and Tubes.

8. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric

9. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

10. ASTM A525 - Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process

11. ASTM F668 Standard Specification for Polyvinyl Chloride (PPVC) and Other Organic Polymer-Coated Steel Chain Link Fence Fabric

12. ASTM A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-dip Galvanized Coatings

11. ASTM F1664 Standard Specification for Polyvinyl Chloride (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used With Chain Link Fence

1.4 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Shop drawings: Layout of fences and gates with dimensions, details, and finishes of components, accessories, and post foundations.

C. Product data: Manufacturer's catalog cuts indicating material compliance and specified options.

D. Samples: Provide samples of materials, including wires and accessories.

1.5 QUALITY ASSURANCE

A. Products from qualified manufacturers having a minimum of 5 years experience manufacturing galvanized chain link fencing and gates will be acceptable by the Architect as equal, if approved in writing, ten (10) days prior to bidding, and if they meet all of the following specifications for design, size gauge of metal parts and fabrication.

B. Obtain chain link fences and gates, including accessories, fittings, and fastenings, from a single source.

2.0 PRODUCTS

2.1 MANUFACTURER

A. Anchor Fence, 1015 East Market Street, Daly City, CA 94014, 1-650-757-2140, www.anchorfencecompany.com

OR

Master Halco, 3040 S. Cedar Ave., Fresno, CA 93725, www.fenceonline.com, or approved equal.

2.2 CHAIN LINK FENCE FABRIC

A. Polyvinyl Chloride (PVC) color coated steel chain link fabric per ASTM F668 Class 2b.

B. Height as indicated on plan.

C. Chain link fabric:

1. 2 in. mesh, 9 gauge steel core wire having a break load of 1290 lbf, where indicated on plans

D. Selvage of fabric knuckle at top and knuckle at bottom.

E. Color of chain link fabric per ASTM F934 Black.

2.3 PRIVACY FENCE SLATS

A. Fenpro Blade Slat, Bottom Locking - 4000 Series, or equal.

1. High-Density Polyethylene (HDPE)

2. Bottom Locking

3. Slat Width: 1-3/8"

4. Tensile Stregth 1,700 PSI

B. Height as indicated on plan.

C. Color: Submit full physical color chart to Architect. To be selected during course of work.

2.4 STEEL FENCE FRAMING

A. Steel Pipe:

1. Type I: ASTM F1083, standard weight schedule 40; minimum yield strength of 25,000 psi; sizes as indicated. Hot-dipped galvanized with minimum average 1.8 oz./ft.^{2} of coated surface area on the inside and outside. Exterior of pipe to have F1043 PVC thermally fused color coating, minimum thickness 10 mils.

B. Formed Steel ("C") Sections: Roll formed steel shapes complying with ASTM F1043, Group II, produced from 45,000 psi yield strength steel; sizes as indicated. External coating per ASTM F1043, Type A, minimum average 2.0 oz./ft.^{2} of zinc per ASTM A123, or 4.0 oz./ft.^{2} per ASTM A525 plus a minimum 10 mil thermally fused PVC color coating in accordance with F1043.

C. Steel Square Sections: ASTM A500, Grade B Steel having minimum yield strength of 40,000 psi; sizes as indicated. Hot-dipped galvanized with minimum 1.8 oz./ft.^{2} of coated surface area plus a minimum 10 mil thermally fused PVC color coating in accordance with F1043..

D.	End and Corner Post	< 12’-0” high fence	2-7/8" od 7.58 lbs/ft.
		> 12’-0 high fence	3-1/2" od 9.12 lbs/ft.
E.	Gate Support Post	< 12’-0” high fence	2-1/2" od 5.80 lbs/ft. @ hinge side
		> 12’-0” high fence	4" od 10.80 lbs/ft. @ hinge side
F.	Line (intermediate) Post	< 12’-0” high fence	2-1/2" od 5.80lbs/ft.
		> 12’-0” high fence	2-7/8” od 7.58 lbs/ft.
G.	Rail and Braces	< 12’-0” high fence	1-5/8" od 2.72 lbs/ft.
		> 12’-0 high fence	1-5/8" od 2.72 lbs/ft.

2.5 CHAIN LINK SWING GATES

A. Gate frames: Fabricate chain link swing gates in accordance with ASTM F900 using galvanized steel tubular members, 2"square, weighing 2.60 lb/ft Fusion or stainless steel welded connections forming rigid one-piece unit. Welded areas to be protected with zinc-rich paint per ASTM A780 then over coated with liquid PVC to match frame. PVC coated pipe to be Grade 1 per section 2.03. Chain link fabric to match specifications of fence system.

B. For gates over 8' high or 15' wide, provide minimum 1-1/2" square additional horizontal and vertical interior members to ensure proper strength.

C. Hardware materials: Hot dipped galvanized steel or malleable iron shapes to suit gate size.

D. Hinges: Structurally capable of supporting gate leaf and allow opening and closing without binding. Non-lift-off type hinge design shall permit gate to swing 180˚ inward or 180˚ outward per plan. May be field coated with liquid PVC.

E. Latch: Forked type capable of retaining gate in closed position and have provision for padlock. Latch shall permit operation from either side of gate. May be field coated with liquid PVC.

F. Keeper: Provide keeper for each gate leaf over 5' wide. Gate keeper shall consist of mechanical device for securing free end of gate when in full open position.

G. Gate posts: PVC color coated steel pipe ASTM F1083 standard weight schedule 40; minimum yield strength of 25,000 psi size as indicated. Hot-dipped galvanized with minimum 1.8 oz/ft^2 of zinc or respective material finished in accordance with ASTM F1043.

Gate Leaf Single Width	Post Size (round)	Weight
6 feet or less	2.875 inches	5.79 lb/ft
6 feet	4.00 inches	9.11 lb/ft
12 feet to 19 feet	6.625 inches	18.97 lb/ft
19 feet	8.625 inches	28.55 lb/ft
OR		
Gate Leaf Single Width	Post Size (square)	Weight
6 feet	2.5 inches	5.1 lb/ft
6 feet	4.0 inches	9.59 lb/ft
12 feet	6.0 inches	14.65 lb/ft
19 feet	8.0 inches	25.44 lb/ft

2.6 SETTING MATERIALS

A. Concrete: As indicated on Structural Drawings

2.7 ACCESSORIES

A. Provide items required to complete fence system. Galvanize each ferrous metal item and finish to match framing in accordance with ASTM F626.

B. All accessories and fittings to be PVC thermally fused color coated having a minimum thickness of 0.006” per ASTM F626. PVC color to match fabric and framework. Moveable parts, nuts and bolts to be field coated with PVC liquid touch up after installation.

C. Post Caps: Formed steel, cast malleable iron, or aluminum alloy weathertight closure cap for tubular posts. Provide one cap for each post. Cap to have provision for barbed wire when necessary. "C" shaped line post without top rail or barbed wire supporting arms do not require post caps. (Where top rail is used, provide tops to permit passage of top rail.)

D. Top Rail And Brace Rail Ends: Pressed steel per ASTM F626, for connection of rail and brace to terminal posts.

E. Top Rail Sleeves: 7" expansion sleeve with spring, allowing for expansion and contraction of top rail.

F. Wire Ties: Double wrap 10 gauge for rails and braces. Tie wire PVC coated and in compliance with ASTM F626. Color to match fabric color.

G. Brace and Tension (stretcher bar) bands: Pressed steel. At square post provide tension bar clips.

H. Tension Wire: Poly Vinyl Chloride (PVC) coated metallic coated steel tension wire per ASTM 1664, 7 gauge, diameter wire with tensile strength of 75,000 psi. PVC coating class and color to match chain link fabric.

I. Truss Rods & Tightener: Steel rods with minimum diameter of 5/16". Capable of withstanding a tension of minimum 2,000 lbs.

J. Nuts and bolts are galvanized. Standard PDS (self-locking using horizontal bottom channel system).

3.0 EXECUTION

3.1 EXAMINATION

A. Verify areas to receive fencing are completed to final grades and elevations.

B. Ensure property lines and legal boundaries of work are clearly established.

3.2 CHAINLINK FENCE FRAMING INSTALLATION

A. Install chain link fence in accordance with ASTM F567 and manufacturer's instructions.

B. Locate terminal post at each fence termination and change in horizontal or vertical direction of 30^{o} or more.

C. Touch up any nicks or scratches of the PVC color coating with liquid PVC paint.

3.3 CHAIN LINK FABRIC INSTALLATION

A. Fabric: Install fabric on security side, pull fabric taut; thread the tension bar through fabric and attach to terminal posts with tension bands spaced maximum of 15” on center and attach so that the fabric remains in tension after pulling force is released. Install fabric so that it is 2” +/- 1” above finish grade.

B. Secure fabric using wires ties to line posts at 15” on center and to rails and braces 24” on center, and to the tension wire using hog rings 24” on center. Tie wire shall be secured to the fabric by wrapping it two 360 degree turns around the chin link wire pickets. Cut off any excess wire and bend back so as not to protrude as to avoid injury id a pedestrian may come in contact with the fence.

3.4 CHAIN LINK SWING GATE POST INSTALLATION

A. Install gate posts in accordance with manufacturer's instructions.

B. Concrete set gate posts: Drill holes in firm, undisturbed or compacted soil. Holes shall have diameter 4 times greater than outside dimension of post, and depths approximately 6" deeper than post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Set post bottom 36" below surface when in firm, undisturbed soil. Place concrete around posts in a continuous pour. Trowel finish around post and slope to direct water away from posts.

1. Gate posts and hardware: Set keeper, stops, sleeves into concrete. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.

C. Install gates plumb, level, and secure for full opening without interference.

D. Attach hardware by means which will prevent unauthorized removal.

E. Adjust hardware for smooth operation. Max operating pressure: 5#.

F. Touch-up hardware as necessary and to the approval of the Architect.

3.5 ACCESSORIES INSTALLATION

A. Tie Wires: Bend ends of wire to minimize hazard to persons and clothing.

B. Fasteners: Install nuts on side of fence for added security.

3.6 CLEANING

A. Clean up debris and unused material, and remove from the site.

END OF SECTION

SECTION 328000 – IRRIGATION

1.0 **GENERAL**

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install all irrigation work as shown on project Drawings, including all connections, irrigation lines, sleeves and equipment, and moisture sensors and connection to existing timers necessary for a complete irrigation system.

C. Ensure that no existing irrigation to existing planting is compromised and that all main lines continue operation during construction. Provide overland lines to connect existing irrigation as required to ensure a complete system.

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Division 31 – Earthwork

C. Section 329000 - Planting: Landscape Work

1.3 QUALITY ASSURANCE

A. Standards, Specifications, and Codes

1. All work shall be in full accordance with the latest rules and regulations of the Safety Orders of the Division of Industrial Safety, the Uniform Plumbing Code, and other applicable state or local codes or regulations in effect at the time of the project. Nothing on the Drawings or in the Specifications is to be construed to permit work not conforming to these codes, rules, and regulations.

2. When the Specifications call for materials or construction of a better quality or larger size than required by the above rules and regulations, the provisions of these Specifications shall take precedence over the requirements of said rules and regulations.

3. The Contractor shall furnish, without extra charge, any additional material and/or labor when required by compliance with the above rules and regulations though the work be not mentioned in these particular Specifications or shown on the Drawings.

B. Wherever the term, “as per manufacturer's specifications and/or instructions,” is used, it shall mean in strict accordance with the manufacturer's printed directions. If these directions conflict with this Specification, the matter shall be brought to the attention of the Architect and his instructions obtained before proceeding with the work.

1.4 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Materials Lists: Complete lists of materials proposed for installation.

1. List all materials by manufacturer's name and model number.

2. Only approved materials and items of equipment shall be used.

3. Any proposed substitutions, together with descriptive material, shall be submitted to the Architect.

4. Prior to the final acceptance of the irrigation system, the Contractor shall furnish three (1) individually bound Service Manuals to the Architect for use by the Owner.

5. The manuals shall contain complete exploded drawings, diagrams, and spare-parts lists of all equipment installed showing components and catalog numbers together with the manufacturer's name and address.

6. In addition, each Service Manual shall contain the following:

a. Index sheet indicating the Contractor's name, address, and phone number.

b. Copies of equipment warranties and certificates.

c. List of equipment with names, addresses, and telephone numbers of all local manufacturer's representatives.

d. Complete operating and maintenance instructions in sufficient detail to permit operating personnel to understand, operate, and maintain all equipment.

1.5 FEES AND PERMITS

A. Work under this Section shall include all fees, permits, licenses, and required inspections by concerned governing agencies.

1.6 QUALITY ASSURANCE AND SPECIAL PROVISIONS

A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality, general configuration desired, and, in the case of sprinkler heads, distribution of water only.

B. All materials throughout the systems shall be new and in perfect condition.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver all materials in timely manner to ensure uninterrupted progress of the work; store in such a manner as will preclude damage thereto and permit ready access for inspection and identification of each shipment.

B. Manufactured materials shall be delivered in original containers with brand and maker's names marked thereon.

1.8 EXISTING CONDITIONS

A. The Contractor shall visit the subject site to review the various existing conditions. A condition found to deviate from the Plans and Specifications shall be reported to the Owner’s Authorized Representative prior to submitting his bid proposal.

B. A static water pressure test shall be taken at the points of connection by the Contractor. Should the pressure fall below 40 psi or above 60 psi, the Owner’s Authorized Representative shall be notified prior to start of work.

2.0 PRODUCTS

2.1 MATERIALS – GENERAL

A. All materials shall be as herein specified and as specified and/or indicated on the Drawings.

2.2 PIPE

A. Plastic: Polyvinyl Chloride (PVC), Type 1120-1220, ASTM D1785.

1. Class and/or Schedules as specified on the Drawings.

2. All pipe shall be free of blisters, internal striations, or any other defects or imperfections.
3. Pipe shall be continuously and permanently marked with manufacturer's name; material type, size, schedule, or class; and quality-control identifications.

B. Pipe Fittings:

1. Plastic: Polyvinyl Chloride (PVC) Type 1; ASTM D2466. Solvent weld as specified on the Drawings.

C. Remote-Control Wire: Solid Copper, 600-volt AC, Type UF-AWG, UL approved for direct burial.

1. Wire shall be continuously and permanently marked with manufacturer's name, wire size, and identification.

2. Color of Control Wires shall be as follows:

a. Pilot Wires: #14 black.

b. Common Wire: #12 white.

3.0 EXECUTION

3.1 INSPECTION

A. Examine substrate in which the work is to be performed.

B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 COORDINATION

A. Schedule and coordinate work with other trades.

1. Install pipe and sleeves under paving and through walls and footings.

2. Do not install heads until walls, curbs, headers, and other related structures are in place.

3. Do not install pipe until planting areas have been scarified under Planting work.

3.3 PREPARATION

A. Verification of Dimensions and Grades:

1. All scaled dimensions are approximate.
2. Before proceeding with any work, carefully check and verify all dimensions on the site.

3. Spacing of headers and locations of valves and quick couplers shall be as indicated on the Drawings and specified herein.

4. Above items shall be staked out and any deviation from Drawings and Specifications shall be reviewed by the Architect prior to installation.

3.4 INSTALLATION

A. Layout:

1. Lay out work as accurately as possible in accordance with the Drawings.

2. Where site conditions do not permit locating piping, valves, and heads where shown, notify the Architect immediately, and do not proceed until his instructions are obtained.

3. Do not trench through roots greater than 1" in diameter under existing tree canopies.

4. Run pipe lines in common trenches wherever practical.

5. Notify the Architect of any aspects of layout which will provide incomplete or insufficient water coverage of plant material, and do not proceed until his instructions are obtained.

6. Locate all underground utility lines prior to excavating irrigation, and bring any conflicts to the attention of the Architect.

7. Do not proceed with the work until instructions are received from the Architect.

B. Protection:

1. Protect existing and new work at all times.

2. Any existing buildings, equipment, piping, pipe coverings, sewers, sidewalks, landscaping, etc., damaged by the Contractor during the course of his work shall be replaced or repaired by the Contractor in a manner to return to prior condition, at the Contractor's own expense and before the final

payment is made.

3. The Contractor shall be responsible for damage caused by leaks in the piping systems being installed or in having been installed by him. He shall make good any damage so caused at his own expense.

C. Excavating and Trenching:

1. Excavation shall be in all cases ample in size to accommodate bedding material, to permit the pipes to be laid at the elevations intended, and to permit ample space for joining.

2. Make trenches for pipelines deep enough to provide minimum cover from finish grade as follows:

   a. 18-inch minimum cover over mainlines, except under paving where it shall be 24" inches with sand backfill.

   b. 12-inch cover over head lateral lines, except under paving where it shall be 24" inches with sand backfill.

3. Trenches shall be straight with bottoms at uniform slopes.

4. Underground lines shall have a minimum horizontal clearance of 2 inches from each other.

   a. All lines shall have a minimum horizontal clearance of 12 inches from the lines of other trades. (This requirement does not apply to any lines crossing at angles from 45 to 90 degrees with each other).

   b. A minimum 1-inch vertical clearance shall be maintained between lines which cross between these angles.

5. No line shall be installed parallel to and directly over another line.

6. Restore surfaces, existing underground installation, etc., damaged or cut as result of excavations, to original conditions.

7. Where irrigation lines interfere with other utilities, irrigation, trenching, and pipe work, adjust the trench depth as directed by the Architect.

D. Assembling Pipelines:

1. All pipe shall be assembled free from dirt and pipe scale. Field-cut ends shall be reamed to remove rough edges and burrs.

2. Solvent-Weld Joint

    a. Prepare joint by first making sure the pipe end is square, then deburring pipe end and cleaning pipe and fitting of dirt, dust, and moisture.

    b. Dry insert pipe into fitting to check for missizing; pipe should enter fitting one-third to one-half the depth of socket.

    c. Solvent Cement and Primer: Make and type approved by manufacturer(s) of pipe and fittings; cement shall be maintained at proper consistency throughout use.

    d. Coat the inside socket surface of fitting and external surface of male end of pipe with primer.

    e. Then, without delay, apply cement liberally to male end of pipe and also apply cement lightly to inside of socket.

    f. At this time apply a second coat of cement to the pipe end.

    g. Insert pipe immediately into fitting and turn one-quarter turn to distribute cement and remove air bubbles.

        1) Pipe must seat to bottom of socket and fitting.

        2) Check alignment of fitting.

        3) Pipe and fittings shall be aligned properly, without strain to either.

3. Hold joint still for approximately 30 minutes before handling and at least 6 hours before allowing water in pipe.

E. Thrust Blocks: Not Applicable

F. Threaded Joints for Plastic Pipe:

1. Field threading of plastic pipe or fittings is not permitted; factory-formed threads only will be permitted.

2. Where assembling to threaded plastic fitting, take up joint no more than one full turn beyond hand tight.

3. Use strap-type friction wrench only; do not use metal-jawed wrench.

G. Threaded Joints for Galvanized Steel Pipe - Not Applicable

H. Laying Pipe:

1. Bed in at least 2 inches of finely divided material with no rocks or clods over 1 inch in diameter to provide a firm uniform bearing.

2. PVC pipe shall be snaked from side to side of trench bottom to allow for expansion and contraction. One additional foot per 100 feet of pipe of the minimum allowance for snaking.

3. Do not lay pipe where there is water in trench or when temperature is 32 degrees F. or lower.

4. Cap or plug openings as pipeline is assembled to prevent entrance of dirt or obstruction. Remove caps or plugs only when necessary to continue assembly.

5. Where pipes pass through sleeves, provide removable nondecaying plug at ends of sleeve to prevent entrance of earth.

I. Remote Control Valves:

1. Remote Control Valves to be of same Manufacturer or be compatible, as shown on Drawings.

2. Install where shown and group together where practicable; limit one RCV per valve box.

3. Locate valves no closer than 12 inches from walk edges, buildings, and walls.

4. Thoroughly flush mainline before installing valve.

5. Place all control valves in valve box.

a. Use Extensions as necessary to keep soil away from valves and solenoids.

b. No soil shall be allowed around valve.

c. Fill in area below valve with pea gravel.

d. Attach a 2-inch-diameter aluminum identification tag with valve numbers stamped on it to each valve; secure with wire.

J. Automatic Control Wiring:

1. Run lines along main wherever practicable.

2. Tie wires in bundles with pipe-wrapping tape at 10-foot intervals, and allow slack for contraction between strapping.

3. Loop minimum of 2 (two) feet of extra wire in each valve box; both control wire and ground wire.

4. Connections shall be made with twist-type (wire nut) connectors and sealed with epoxyresin sealer packs.

5. Splicing will be permitted only on runs exceeding 2,500 feet. Locate all splices at valve locations.

6. Each control valve shall be connected to its respective controller with its own individual control wire. Common ground wire shall be common to only those valves controlled by each individual controller.

K. Flushing Lines:

1. Flush all rock, sand, and debris from the lines.

2. Flush mainlines prior to installing valves and connecting lateral lines.

3. Flush long dead-end runs prior to capping pipe.

4. Flush lateral lines prior to installing heads.

5. Continue flushing process with water running slowly as heads are installed, starting closest to valve and working outward.

L. Testing Pipe:

1. Pipe shall be center loaded with sufficient backfill in accordance with the paragraph on backfilling to anchor pipe before testing.

2. No fittings shall be covered during testing.

3. No testing shall be done until the last solvent welded joint has had twenty-four (24) hours to set and cure.

4. Install control valves prior to testing.

5. Notify the Architect at least three (3) days in advance of testing.

6. Tests will be observed and approved by the Architect.
7. Perform testing and furnish all equipment for testing of work of this Section.

8. Apply the following tests after solvent-weld plastic pipe joints have cured at least 24 hours.

    a. Test mainlines hydrostatically at 125 psi minimum. Lines will be approved if test pressure is maintained for 24 hours.

    b. Test lateral lines with water at line pressure, and visually inspect for leaks.

    c. The Contractor shall make tests and repairs as necessary until test conditions are met.

    d. Retest after correcting defects.

M. Backfilling Pipe:

1. Do not backfill until pipe has been tested and approved by the Architect.

2. Backfill materials shall be like material excavated.

    a. Backfill to depth of 6 inches above top of pipe shall be finely divided material free of rocks or clods over 2 inches in diameter.

    b. Remaining backfill shall be free of rocks and clods over 2 inches in diameter.

    c. Place backfill in 6-inch lifts, and compact by tamping as follows:

        1) Planting Areas: Percentage equal to adjacent soil.

        2) Under Paving: Percentage to that specified for the paving subgrade and base material.

N. Automatic Controller:

1. Existing

O. Backflow Prevention: Existing

P. Coverage Test:

1. When the irrigation system has been completed, a coverage test shall be performed in the presence of the Architect to determine if coverage of water afforded planting areas is complete.

2. Make minor changes in heads and head location to provide adequate coverage at no additional cost to the Owner.

Q. System Tests:

1. Prior to final acceptance, the irrigation system shall be tested and inspected for correctness of coverage in the presence of the Architect. All inadequate coverage will be corrected before final acceptance.

R. As-Builts:

1. Provide and keep up to date a complete “Record” set of blueline prints, which shall be corrected daily, and show every change from the original Drawings and Specifications as well as dimensioned locations of pipe and equipment.

2. This set of Drawings shall show dimensions of all mainlines and gate valves from the nearest structure.

3. “Record” Drawings shall show dimensions of all mainlines and gate valves from the nearest structure.

4. These Drawings shall also serve as work progress sheets, and neat and legible annotations shall be made daily as the work proceeds, showing the work as actually installed.

S. Wrenches, Keys, and Couplers:

A. Provide the Owner at completion of the planting maintenance period with three each of all operating and servicing keys and wrenches required for complete maintenance and operation of all valves. Include all wrenches necessary for complete disassembly of all valves.

3.5 WARRANTY

A. Repair of Damage: All damage to paving, planting, structures, and other improvements due to settlement of improperly compacted trench backfill shall be promptly repaired to the satisfaction of the Owner 's Representative and without additional expense to the Owner.

B. All materials and workmanship shall be as specified and shall for minimum period of one (1) year.

C. At the end of this period all required repairs and adjustments, including adjustment to grade shall be made including all repairs to other work made necessary thereby, without additional expense to the Owner.

D. Present to the Architect at time of final acceptance, warranties for all materials used.

END OF SECTION

SECTION 329000 - PLANTING: LANDSCAPE WORK

1.0 GENERAL

1.1 SUMMARY

A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned, or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

B. Provide and install all landscaping as shown on project Drawings and as specified herein, including all planting and maintenance under a sixty (60) calendar-day maintenance period (see part 3.8 of this Section).

1.2 RELATED SECTIONS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

B. Division 31 - Earthwork

C. Section 328000 - Irrigation

1.3 GENERAL CONDITIONS

A. The contractor shall maintain adequate protection of his work from damage and shall protect the Owner 's and adjacent property and related appurtenances from injury or loss arising from this Contract. Damaged or disturbed items shall be replaced with equal by the Contractor at no cost to the Owner.

B. The Contractor shall pay Federal, State, and Local Sales and/or Use Taxes to materials, processes, or devices purchased or used in connection with the work. Local, Municipal, and State Laws and Rules and Regulations governing or relating to any portion of this work are hereby incorporated into these Specifications.

1.4 PERMITS, LICENSES, AND INSPECTIONS

A. Any permit, license and/or inspection required by the legal authorities or agencies having jurisdiction over the construction or installation of the work as shown on the Plans or specified herein, shall be paid and obtained by the Contractor at the proper time.

1.5 BONDS AND INSURANCES

A. The Contractor shall furnish the appropriate bond(s) in the amount of the required per cent of his bid proposal and carry insurance as required by the Owner. The Contractor shall be informed of these requirements from the Owner prior to submitting his bid proposal.

1.6 EXISTING CONDITIONS

A. The Contractor shall visit the subject site to review the various existing conditions. A condition found to deviate from the Plans and Specifications shall be reported to the Owner 's Authorized Representative prior to submitting his bid proposal.

1.7 PURPOSE OF DOCUMENTS

A. The intent of the documents is to include, unless otherwise stated, the labor, materials, equipment, appliances, and transportation for the proper execution of the work as required for complete construction as shown on the Plans and specified herein. The Contractor shall be responsible for complete layout of improvements as shown on the Plans and as specified herein. Written dimensions shall take precedence over scaled dimensions. Follow as closely as practical making no alterations unless prior review and appropriate action is taken by the Owner 's Authorized Representative.

B. Each plant shall be installed in locations as shown on the Plans. Plants improperly located shall be relocated at no additional cost to the Owner. Notwithstanding is the fact that these documents may be deficient in setting forth a complete detailed description of the work to be done.

1.8 RECORD DRAWINGS

A. On one set of the Plans, the Contractor shall record accurately changes in the work which constitute departures from the original Contract Drawings. The Contractor shall dimension from two permanent points of reference (building corners, sidewalks, or road intersections, etc.) the location of the following items:

1. Connections to existing water lines

2. Routing of pressure supply lines

3. Sprinkler control valves

B. Upon completion of each increment of work, the Contractor shall transfer information including the dimensions to a clean set of Ozalid prints of the Plans and the changes. The dimensions and changes shall be recorded in a legible and workmanlike manner to the satisfaction of the Owner 's Authorized Representative. Prior to stage acceptance, these Plans shall be presented to the

Owner 's Authorized Representative for review.

2.0 PRODUCTS

2.1 MATERIALS

A. Plant Material:

1. Plants and planting material shall meet the specifications of Federal, State, and County laws requiring inspection for plant disease and insect control. Inspection certificates required by law shall accompany shipments, of which a copy of each inspection certificate shall be given to the Owner.

2. Plants shall be true to botanical name and one of each bundle or lot shall be tagged with the botanical name and container size of the plants in accordance with the standards of practice recommended by the American Association of Nurserymen.

3. Plants shall be healthy, vigorous stock, free of insects and disease, and not root-bound. Quality and size shall conform with the current edition of "Horticultural Standards" for number one grade nursery stock as adopted by the American Association of Nurserymen. Plants which are not true to botanical name shall be removed from the site and replaced with acceptable plants at no extra cost to the Owner. Botanical names shall take precedence over common names.

4. Due to ever changing availability of plant material, the Contractor may submit plant type substitution requests to the Owner 's Authorized Representative for review, prior to ordering.

3.0 EXECUTION

3.1 PREPARATION

A. Finish Grading:

1. Planting areas shall be graded to the elevations indicated on the site plan. Grades not otherwise indicated shall be uniform levels or slopes between points where elevations are given. Minor adjustments of finish grades shall be made at the direction of the Owner's Authorized Representative, if required, at no additional cost to the Owner.

2. Finish grade shall be smooth, even, and of a uniform plane with no abrupt changes of surface. Soil area adjacent to buildings shall slope away from the buildings to allow a natural runoff of water, and surface drainage shall be directed as indicated on the drawings by remodeling surfaces to

facilitate the natural runoff of water. Low spots and pockets shall be graded to drain properly.

3. Shrub areas: The finish grade of shrubbery areas shall be 1-1/2 inches below the grade of adjacent pavement, walks, curbs, header, or walls. An exception to the above requirements shall be made wherever drainage conditions may require flush grade.

B. Soil Preparation:

1. Prior to planting, Contractor shall obtain soils test from certified soil testing lab and send copy to Architect. Commercial fertilizer shall be as per recommendations of soils lab. It shall be delivered to the site in bags labeled with manufacturer's guaranteed analysis. If stored at the site, fertilizer shall be protected from the elements prior to use.

2. Organic Soil Amendment (OSA): Shall be nitrogenized fine grained Redwood sawdust, or approved equal. The Contractor shall submit samples to the Architect for review prior to ordering of material. Particle size, mix proportions, Ph, and salinity content shall conform to manufacturer's literature.

3. Backfill Mix for Shrubs and Trees: Shall consist of 70% native soil excavated from the planting holes (free of rock/debris 1 inch or greater in size), 30% nitrogenized redwood sawdust (OSA), and the following additional amendments:

Soil Amendments

Container Size	Soil Fertility
1. Shrubs (1, 5, & 15 gallon)	1. As per soils lab recommendation
2. Trees (5 & 15 gallon & 24" box)	2. As per soils lab recommendation

4. Using a rotary-cultivator, thoroughly till three inches of OSA a minimum of two passes of all planting areas six inches deep in two directions 90 degrees to each other. Rake entire area to remove clods and stones over one inch in diameter, and sticks, etc. Maintain adequate distance from mud sills in accordance with local codes.

C. Planter Preparation

1. Excavate planter areas and tree wells in paved interior to a depth of 10" or below paving base rock, which ever is deeper.

2. Dispose of all base rock from planter areas off site.

3. Back fill planters with top soil. Submit source and sample to Architect prior to installation.

4. Back fill into existing sub soil to a depth of 6" to create a transitional layer of soil.

5. Water down and lightly compact topsoil to remove air pockets and achieve specified grade.

3.2 SHRUB AND TREE PLANTING

A. Excavation of planting holes shall be a minimum of twice the depth and diameter of the plant root ball.

B. Sides and the bottom of the planting hole shall be thoroughly “broken up” and loosened so that no “auger slick” or compaction of soil exists.

C. Planting trees: minimum 1" per hour drainage from planting pit. If not achieved, notify Architect.

D. Fill holes with amended backfill mixture to the proper height to receive the plant and thoroughly tamp the mixture.

E. Lightly loosen the outer edge of the root ball soil and set the plant in the center of the hole.

F. Compact backfill mixture around root ball until 2/3 of the hole is filled, then water thoroughly.

G. Place remaining backfill in hole so that crown of plant is 1-1/2" to 2" above surrounding grade.

H. A four-inch-high water basin shall be constructed around each shrub and tree as per detail on the Plans (except when plant is located within turf area).

I. Each plant basin shall be mulched by applying nitrogenized redwood sawdust to a depth of two inches, evenly spread over the entire basin area and soaked thoroughly.

J. Trees to be planted in interior paved walkways as indicated on the drawings shall be planted with deep-root planters with perforated pipe and sock for aeration.

3.3 INSTALLATION OF TOP DRESSING

A. Following all plant material planting, refined raking of finish grades, application and watering-in of weed control treatment, all shrubs and/or ground cover areas shall be top dressed.

B. All top dressing will be “redwood chips”. Contractor shall submit samples to Owner 's Authorized Representative for review and appropriate action. Maximum chip size shall be 1/2" to 3/4" diameter of uniform color and consistency.

C. The Contractor shall spread the top dressing a minimum of 2 inches deep over all areas, and shall uniformly rake so as to create a smooth plane. Neat uniform appearance of all top dressing shall be maintained at all times and is solely the responsibility of the contractor.

3.4 STAKING AND GUYING TREES

A. Trees shall be staked as per details on the Drawings.

B. Tree stakes shall be treated Lodge Pole Pine: two, 2 inch in diameter, 10 feet long for 15 G.C./24" box size trees; 3 inch in diameter, 12 foot poles for 36 inch box or larger.

C. Trees shall be tied as per tree staking detail. Over-sized trees shall have 12' poles and two or more ties, as determined by the Architect.

D. Staking poles shall not interfere with the lateral branching of trees.

3.5 WEED CONTROL

A. Shrub and/or ground cover areas shall be weed-free with acceptable pre-emergent herbicide.

B. Prior to laying down of mulch, a letter stating that the work has been completed shall be signed and verified by the Architect and delivered by the Contractor to the Owner.

3.6 CLEAN-UP

A. After planting and irrigation operations have been completed, the Contractor shall remove trash, empty plant containers, and tools and equipment used in this work, or any other debris accumulated by the work, as specified herein, from the site of the work.

B. Scars, ruts, or other marks in the area caused by this work shall be repaired at the Contractor's expense, and the ground left in a neat and orderly condition throughout the site or work at no additional cost to the Owner. All hard surface paved areas shall be thoroughly cleaned.

3.7 FIELD OBSERVATIONS AND ACCEPTANCE

A. The Owner 's Authorized Representative shall perform at least two project field observations upon completion of each phase of the work. Field observations shall be arranged by the Contractor by notification to the Owner 's Authorized Representative two days prior to field observation date.

1. The first field observation shall take place upon completion of the designated maintenance period. Discrepancies noted by the Owner 's Authorized Representative must be corrected and written notice of completion of remedial work delivered to the Owner prior to the next field observation.

2. The second field observation will take place upon completion of all remedial work. If the job is satisfactory and to the best of the Owner 's Authorized Representative's knowledge, information, and belief, that the work is carried out in general conformance with the Plans, Specifications, and Contract, and general design intent, a written notice of final review shall be prepared by the Owner 's Authorized Representative and submitted for stage approval to the Owner, prior to termination of the maintenance period and stage acceptance. The Owner shall issue stage acceptance to the Contractor.

B. If the job is **NOT** satisfactory, the Contractor shall continue the maintenance period at no cost to the Owner until stage acceptance by the Owner has been issued.

C. Irrigation:

1. Field observation of final pressure rating of mainline testing and observation of pressurized lateral line tests.

2. Field observation of irrigation coverage test.

3. Field observation of overall irrigation system operation and compliance with the plans and installation procedures as specified herein.

D. Planting:

1. Field observation of final finish grading to review drainage and general appearance before planting.

2. Field observation of plants in containers prior to planting.

3. Field observation of plant locations to review general conformance with the Plans and planting procedures as specified herein.

3.8 MAINTENANCE

A. It shall be the sole responsibility of the Contractor to maintain grades, planting, and irrigation as specified herein through stage acceptance by the Owner and review by the Owner 's Authorized Representative. Maintenance shall include responsibility for losses due to neglect or vandalism, and continue for a full 60 calendar days initiating after the job is fully completed and written notice of start of maintenance is received from the Owner.

B. Finish grade shall be maintained to facilitate run-off with silt build-up at back of walk and headers removed.

C. Irrigation system to be checked minimum once a week, heads lowered or raised as needed. Leaks, damage, and/or settling shall be repaired immediately.

D. Plantings shall be weeded, fertilized, cultivated, sprayed, and pruned as necessary to produce a healthy plant specimen.

E. Irrigation shall be checked, heads adjusted for coverage and over-spray, no water on buildings, walks, parking areas, etc. Controller shall be labeled to location of valves per Irrigation Plans.

F. Guarantee of planting and irrigation for one calendar year shall commence at the time of stage acceptance by Owner or Authorized Representative.

3.9 GUARANTEE PERIOD

A. The guarantee period will commence upon issuance of stage acceptance by the Owner to the Contractor at the termination of the maintenance period.

B. Planting Guarantee

1. The Contractor will guarantee the planting (as specified herein) for a period of one calendar year. The signing of the Contract for work is considered as the written guarantee to carry out this provision.

2. Plant material which is lost due to improper planting or plant diseases or pests which were present at the time of the start of the guarantee period shall be replaced by the Contractor at no cost to the Owner.

C. Completion of Guarantee Period and Final Acceptance

1. A final field observation will take place upon completion of the designated guarantee period.

2. Discrepancies noted by the Owner's Authorized Representative, which are a direct cause of the Contractor's work as shown on the Plans and specified herein, shall be made correct and complete to the satisfaction of the Owner, at no additional cost to the Owner.

END OF SECTION

APPENDIX A

GEOTECHNICAL ENGINEERING AND GEOLOGIC HAZARDS EVALUATION NEW BRADLEY BRANCH LIBRARY FEASIBILITY 65607 DIXIE STREET, APN 424-351-038 BRADLEY, CALIFORNIA

March 10, 2023

Prepared for:

Monterey County Public Works, Facilities, and Parks
Ms. Nancy Ayala

Prepared by:

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March 10, 2023 File No.: 305777-001

Ms. Nancy Ayala Avila
Monterey County Public Works, Facilities, and Parks
1441 Schilling Place, South 2nd Floor
Salinas, CA 93901

PROJECT: NEW BRADLEY BRANCH LIBRARY FEASIBILITY
65607 DIXIE STREET, APN 424-351-038
BRADLEY, CALIFORNIA

SUBJECT: Geotechnical Engineering and Geologic Hazards Evaluation Report

REF.: Proposal for a Geotechnical Engineering and Geologic Hazards Evaluation Report, New Bradley Branch Library Feasibility 65607 Dixie Street, APN 424-351-038, Bradley, California, by Earth Systems Pacific, dated November 16, 2022, *Revised November 29, 2022*.

Dear Ms. Ayala:

In accordance with your authorization, this geotechnical engineering and geologic hazards report has been prepared for use in development of plans and specifications for the feasibility of the New Bradley Branch Library to be constructed at 65607 Dixie Street, in Bradley, California. This report was prepared to comply with provisions of the California Building Code, 2022 Edition. The general site geologic/seismic characteristics are described herein, and potential geologic/seismic hazards have been identified and addressed. Preliminary geotechnical recommendations for site preparation and grading, foundations, slabs-on-grade and exterior flatwork, utility trenches, drainage and maintenance, and observation and testing are also presented herein.

We appreciate the opportunity to have provided services for this project and look forward to working with you in the future. If there are any questions concerning this report, please do not hesitate to contact the undersigned.

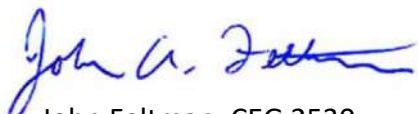
Sincerely,

Earth Systems Pacific



Ajay Singh, GE 3057
Geotechnical Engineer





John Feltman, CEG 2530
Engineering Geologist



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1.0 INTRODUCTION AND SITE SETTING

The project site is located at 65607 Dixie Street, in Bradley, California. The property is bordered by vacant land on the west, Bradley Road on the north, a residential parcel on the east, and Dixie Street on the south. Bradley Elementary School is located across Dixie Street to the south. The Salinas River is located approximately 850 feet southwest of the site.

The property is owned by the Bradley School District and currently contains a modular building, water well and pump, and perimeter fencing with gates. The Site Plan prepared by Weston Miles Architect provided by County of Monterey Public Works, Facilities, & Parks via email on December 5, 2022, indicates a 2,800 square foot, single story library building with a 480 square foot covered patio area are planned in the western portion of the property. We anticipate loads will be typical of a light-frame building. Based on a review of the current site constraints, we anticipate the grading to be minor with cuts and fills on the order of 2 feet or less.

The site is essentially flat and lies at an elevation of about 534 feet above mean sea level (MSL). The parcel is approximately centered at 35.863535 degrees north latitude and -120.805166 degrees west longitude on the U.S. Geological Survey's Bradley 7.5-minute quadrangle. The site location is shown on a Vicinity Map (Figure 1).

2.0 SCOPE OF SERVICES

The scope of work for this report included a site reconnaissance by a geologist, exploration of subsurface conditions from a geotechnical engineering standpoint, laboratory testing of samples collected during the field investigation, geotechnical and geologic analyses of the data, and preparation of this report.

This report and preliminary geotechnical recommendations are intended to comply with the following: the considerations of Sections 1803A.1 through 1803A.7 and J104.3 of the 2022 California Building Code (CBC); California Geological Survey Note 48 (CGS 2019); IR Document A-4.13 (DSA 2013); and common geotechnical engineering and engineering geology practice in this area under similar conditions at this time. The tests were performed in general conformance with the standards noted, as modified by common geotechnical engineering practice in this area under similar conditions at this time.

Preliminary geotechnical recommendations for site preparation and grading, utility trenches, foundations, slabs-on-grade and exterior flatwork, drainage and maintenance, and geotechnical observation and testing are presented to guide the development of project plans and specifications. It is our intent that this report be used exclusively by the client in the preparation of plans and specifications.

This report does not address issues in the domain of contractors such as, but not limited to, site safety, loss of volume due to stripping of the site, shrinkage of soils during compaction, excavatability, dewatering, shoring, temporary slope angles, construction means and methods, etc. Analyses of the soil for mold potential, asbestos in building materials, lead, radioisotopes, hydrocarbons, or chemical properties other than geotechnical corrosivity are beyond the scope of this report. Evaluation of the site for suitability for drainage basins, if added, is beyond the scope of this report. Ancillary features such as temporary access roads, fences, flag and light poles, signage; and nonstructural fills are not within our scope and are also not addressed.

As there may be unresolved geotechnical or geologic issues with respect to this project, the geotechnical engineer and engineering geologist should be retained to provide consultation as the design progresses, to review project plans as they near completion, to assist in verifying that pertinent geotechnical issues have been addressed, and to aid in conformance with the intent of this report. In the event there are any changes in the nature, design, or location of improvements, or if any assumptions used in the preparation of this report prove to be incorrect, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed, and the conclusions of this report are verified or are modified in writing. The criteria presented in this report are considered preliminary until such time as any peer review or review by any jurisdiction has been completed, conditions are observed by the geotechnical engineer and/or engineering geologist in the field during construction, and the recommendations have been verified as appropriate or modified in writing.

3.0 FIELD INVESTIGATION

On December 8, 2022, four cone penetrometer tests (CPT) were performed on the site. The CPT soundings were performed by Middle Earth Geo Testing, Inc. (MEGT) using a 25-ton truck mounted CPT rig. Refusal conditions were encountered in each CPT at depths of 23 to 26 feet below ground surface (bgs). The CPTs we conducted in accordance with ASTM specifications. Copies of the CPT logs are included in Appendix A.

Subsequently, on December 28, 2022, two exploratory borings were drilled at the site using a truck-mounted B-53 drill rig equipped with a 6-inch outside diameter hollow-stem auger. Four additional borings were drilled to perform tests to measure infiltration rates at the site. Boring B-1 was drilled to a depth of 15 feet bgs. Boring B-2 was drilled to 34.5 feet bgs where refusal conditions were encountered. Percolation P-1, P-2, P-3, and P-4 were drilled to depths of 7 feet, 5 feet, 6.5 feet, and 5 feet bgs respectfully. The groundwater monitoring hole M-1 was drilled to a final depth of 30 feet bgs. The approximate locations of the CPT soundings and borings are shown on the Site Geologic and Exploration Location Map (Figure 2).

A CPT involves pushing a standardized size instrument of a conical shape into the ground at a specified constant rate. The cone used for this project had a tip area of 15 cm^2 and a friction sleeve area of 225 cm^2. The cone was pushed into ground at a constant rate of approximately 20-mm per second using the 25-ton truck as reaction weight. The cone was fitted with load cells, which continuously recorded the total force acting on the cone (Qc), sleeve friction (Fs), and pore pressure (u) readings. The data collected from the CPT was processed to interpret site stratigraphy and many other engineering properties of soil using published relationships. Generally, cohesive soils (clays) have high friction ratios (sleeve friction divided by cone bearing – Rf), low cone bearing, and generate large excess pore water pressures. Cohesionless soils (sands) have lower friction ratios, high cone bearing, and generate little in the way of excess pore water pressures.

Soil samples were obtained from the borings using an internally-lined barrel sampler (ASTM D 3550-17, with shoe similar to D 2937-17), Standard Penetration Tests - SPT (ASTM D 1586-18) were conducted at selected depths, and bulk soil samples were obtained from the auger cuttings.

Soils encountered in the borings were categorized and logged in general accordance with the Unified Soil Classification System and ASTM D 2488-17. Copies of the boring logs and a boring log legend are included in Appendix A. In reviewing the boring logs and legend, the reader should recognize that the legend is intended as a guideline only, and there are a number of conditions that may influence the soil characteristics as observed during drilling. These include, but are not limited to, the presence of cobbles, cementation, variations in soil moisture, presence of groundwater, and other factors.

4.0 LABORATORY ANALYSIS

A near-surface sample from Boring B-2 was tested for Atterberg Limits (ASTM D 4318-17) and particle size analysis (ASTM D 7928-16). Test results were used to aid in soil classification and to qualitatively estimate shrinkage/swelling potential. Nine samples were tested to measure moisture content and dry unit weight (ASTM D 2216-17 and D 2937-17). A bulk sample obtained from Boring B-1 soil cuttings from the near surface soils in the proposed pavement area was tested for R-value (ASTM D 2844-18) for use in the development of pavement design criteria. Please see Appendix B for the results of the laboratory tests.

A sample of the near surface soil from Boring B-2 was tested by CERCO Analytical to measure Redox Potential, pH, resistivity, chloride and sulfate concentrations. These parameters were used to evaluate corrosion potential of near surface soils at the site. A description of their test methods, results and a brief evaluation of the test results are contained in the Corrosivity Analysis in Appendix B.

5.0 GENERAL SUBSURFACE PROFILE

The results of Atterberg Limits test performed on the near surface soils within the proposed building area indicates Liquid Limit of 39 and Plasticity Index of 22. Based on the laboratory test results the near surface soil at the site was classified as Lean Clay with moderately high shrinkage/swelling potential.

Based on the results of subsurface exploration, the soil stratigraphy at the site is generally uniform, flat-lying, and laterally continuous at the location of the proposed building, as shown on Cross Sections A-A' and B-B' (Figure 4a and 4b). The upper 5 to 6 feet of the soil profile consists of medium stiff to stiff clay. Layers of loose to dense silty sands and sands were encountered below the clay. Increasing gravel content was encountered from a depth of 14 feet to the bottom of Boring B-2 at 34.5 feet where auger and sampler refusal was encountered. Boring B-1 located in an existing paved area encountered approximately three feet of fat clay below the pavement section which consisted of 2 inches of asphalt concrete over 3 inches of sand. Based on the field observations, this fat clay layer may be localized and possibly fill. Below the fat clay layer B-1 encountered similar materials as those found in B-2. The CPT's achieved maximum depths of 23 to 26.4 feet where refusal was encountered.

Based on the results of our subsurface exploration data, it is our opinion that the Site Class per Table 20.3-1 of ASCE 7 (per Section 1613A.3.2 of the 2019 CBC) is taken as Stiff Soil profile. The Stiff Soil profile is based on the results of unconfined compressive strength data.

Earth Systems issued a geotechnical engineering investigation for Bradley Elementary School, New Modular Classroom, 65600 Dixie Street, Bradley, California, dated May 7, 2014, which is located just south of the subject site and closer to Salinas River. As a part of our investigation in 2014, we drilled two soil borings. Boring B-1 was terminated at 16.5 feet bgs and boring B-2 was terminated at 29.5 feet bgs because refusal conditions were encountered in very dense sand and gravel very similar to what we encountered at the site as a part of the current investigation.

Kleinfelder also performed a geotechnical investigation at the Bradley Elementary School and presented the results of their investigation in a report issued on July 11, 2014. Similar soil conditions were encountered in the soil borings drilled by Kleinfelder.

6.0 GROUNDWATER

Subsurface water was encountered in exploratory boring B-2 at approximately 28 feet below ground surface. We reviewed the State Water Resources Control Board Geotracker website for nearby well data. Groundwater monitoring records for well BY-E1 installed at the closed Bradley Landfill, located 460 feet west of the site, shows groundwater levels ranged between 23.67 and 27.87 feet below ground surface between 1996 and 2010. We also reviewed the California Department of Water Resources website for nearby well data. Well Completion Report No. 757967, prepared for a domestic water supply well located approximately 430 feet northeast of the site, shows a groundwater depth of 31 feet below ground surface in 2003. Based on the above information, we consider the historical high groundwater level at the site to be 23.67 feet below ground surface.

7.0 GEOLOGY

Geologic Setting

The site is located in the seismically active central California Coast Ranges geomorphic province in the southern portion of the Salinas Valley. The Coast Ranges geomorphic province is characterized by northwest-trending mountain ranges resulting from tectonic uplift that has been interpreted to have been occurring since Pliocene-Pleistocene time (beginning

approximately 3 to 5 million years before present). The Salinas Valley was formed by related tectonic processes during Pleistocene time.

The predominant structural feature in the California Coast Ranges is the San Andreas fault zone, which is the structural boundary between two tectonic plates: the Pacific Plate west of the San Andreas fault zone and the North American Plate east of the fault zone. These two plates are moving past each other at approximately 5.1 cm/year at the mouth of the Gulf of California and 1 to 3 cm/year in the central and northern parts of California (Brown, 1990).

At the latitude of the site, the Salinas valley is bounded by the Santa Lucia Range on the west, and the Cholame Hills (a sub-range of the southern Diablo Range) to the east of the Site. The Salinas River is located approximately 850 feet southwest of the site and flows northwest toward its mouth at Monterey Bay, located approximately 80 miles northwest of the site. The northwest-trending Rinconada fault is located within the Santa Lucia Range approximately 6.6 miles southwest of the site. The northwest-trending San Andreas fault is located on the east side of the Cholame Hills approximately 16.7 miles northeast of the site.

Based on mapping by Dibblee and Minch (2006), the site is underlain by surficial sediments of Quaternary age (Qa) and described as “unindurated, undissected alluvial sediments” consisting of “alluvial clay and sand of valley areas”. These sediments are flanked on the east by older surficial sediments (younger lower terrace deposits; Qoa2), described as “dissected alluvial gravel and sand”. Alluvial gravel and sand of stream channels (Qg) are mapped within the modern Salinas River channel to the west of the site. Bedrock terrain on both sides of the Salinas River drainage is mapped as Paso Robles Formation (QTp), described as “alluvial conglomerate of pebbles, mostly of white siliceous shale from Monterey Formation in a matrix of sand and clay” (see Figure 3 Local Geologic Map). Site geologic conditions are shown on the Site Geologic and Boring Location Map (Figure 2), and Geologic Cross Sections (Figures 4a and 4b).

Faulting

The subject site is located within the seismically active Coast Ranges region. Several active and potentially active faults have been identified in this region. Until recently, faults were historically described by the California Geological Survey (CGS) as “active” and “potentially active”. As of 2018 (CGS, 2018), the CGS no longer uses the terms “Active” and “Potentially active” to describe

faults. Faults are now described as “Holocene-active” for faults having activity within the last 11,700 years; “Pre-Holocene” for faults which have not been active within the last 11,700 years (Pre-Holocene faults may still have potential for rupture but are not regulated by the Alquist-Priolo Act); and “Age-undetermined” is used for faults where timing of last rupture is unknown. However, within Alquist-Priolo Earthquake Fault Zones age undetermined faults are considered active unless data can be obtained to demonstrate otherwise.

There are no known faults that cross the site, and the site is not located in a State Earthquake (Alquist-Priolo) Fault Zone (Jennings and Bryant, 2010). The closest Holocene-active fault to the site is the San Andreas fault (Parkfield segment), located approximately 16.7 miles northeast (Figure 6). The closest fault to the site is the pre-Holocene Rinconada fault, located approximately 6.6 mile to the southwest of the site. The pre-Holocene Oceanic-West Huasna fault is located approximately 21.4 miles southwest of the site, and the Hosgri fault is located approximately 26.2 miles to the southwest. The locations of these and other faults of the San Andreas fault system relative to the site are shown on a Regional Faults and Earthquakes map (Figure 6). The earthquake locations are keyed to the Selected Earthquakes table (Figure 7). Table C-2 (Appendix C) includes a list of historical earthquakes in the vicinity of the subject site, including date, location, magnitude, and distance from the site.

A brief discussion of characteristics for nearby faults is provided below.

Rinconada Fault Zone

The Rinconada fault zone lacks obvious Holocene offset and therefore does not meet the State’s criteria for inclusion in an A-P zone; nonetheless, it is considered an active fault and is included as a seismic source in regional models. The Rinconada fault is a northwest trending high angle fault that forms the boundary between two dissimilar geologic terranes. Northeast of the Rinconada fault is the Salinian Block, composed of crystalline plutonic and metamorphic rock overlain by a thick sequence of marine sedimentary rocks. Southwest of the Rinconada fault is the Coastal Block, composed of Franciscan mélange overlain by marine sedimentary rocks (Dibblee 1976). The Rinconada fault is mapped as several anastomosing strands with the seismogenic plane modeled approximately 6.6 miles southwest of the site. The Rinconada fault is estimated to be capable of a magnitude 7.5 earthquake (Cao et al 2003).

San Andreas Fault

The San Andreas fault is considered the potential source of the largest regional earthquake. The San Andreas fault has a total length of approximately 675 miles and is divided into segments based on geometry and known historic behavior, with some segments capable of earthquakes up to magnitude 7.5 (Cao et. al. 2003). Simultaneous rupture of more than one segment could cause an earthquake of magnitude 8 or more (USGS, 2014). The Parkfield segment is located approximately 16.7 miles northeast of the site. The Cholame-Carrizo segment is located approximately 29.3 miles east of the site, is approximately 125 miles long and is in an A-P Zone (CDMG 1986a). This segment was part of the multi-segment magnitude 7.9 Fort Tejon earthquake in 1857 (USGS, 2022).

Oceanic-West Huasna Fault

The Oceanic-West Huasna fault zone separates the Santa Lucia and San Rafael Mountains from a series of distinct tectonic domains stretching from Cambria to the western Transverse Ranges (Lettis et al 2004). This fault system trends northwest-southeast for approximately 75 miles and is modeled about 21.4 miles southwest of the site. The Oceanic-West Huasna fault is considered capable of a magnitude 7.2 earthquake (BSSC 2014).

San Juan Fault

The San Juan fault zone is a roughly north-south trending right-lateral strike slip fault zone comprised of several segments with a combined length of about 60 miles. The San Juan fault is located approximately 24.7 miles southeast of the site and is reported to be capable of a magnitude 7.2 earthquake (USGS, 2014).

Hosgri-San Simeon Fault System

The Hosgri-San Simeon fault system lies approximately 26.2 miles to the southwest of the site. A northwest-trending strike-slip fault, the San Simeon fault extends from offshore of Ragged Point to just offshore of San Simeon Point, where it joins the northern end of the Hosgri fault. The Hosgri-San Simeon fault between San Simeon Point and Arroyo de la Cruz is included in A-P Zone (CDMG 1986b). This fault system ruptured in November 1927 producing the magnitude 7.1 Lompoc Earthquake, and in December 2003 producing the magnitude 6.6 San Simeon earthquake (USGS 2022).

La Panza Fault

The La Panza fault is a northwest-southeast trending reverse fault that dips to the northeast. The trace of this fault stretches for approximately 45 miles from northern Santa Barbara County to the southern Salinas Valley. The La Panza fault is approximately 29.6 miles southeast of the site and is considered to be capable of a magnitude 7.3 earthquake (USGS 2013).

Aerial Imagery

We reviewed images available on Google Earth dated between 1989 and 2021. The site appears to have been partly cultivated with orchards in the 1989 photograph. A few small structures and trailers are variably present in the photos, and orchards were gradually removed. School buildings across the street were present in the 1989 photograph. There are no obvious lineations that would suggest the presence of faulting that passes through or are on trend with the site. Additionally, there was no evidence of landslides on or adjacent to the site.

8.0 SEISMICITY

Earthquake History

The historic earthquakes in the site region were researched using the Northern California Earthquake Data Center Catalogs (NCEDC 2014, accessed 2022). The parameters used for the search consisted of earthquake Richter magnitudes ranging from 5.0 to 9.0 that occurred within a 65-mile radius from the site from 1910 to 2022.

The results of the search indicated that within the search parameters, 38 earthquakes have occurred. Some of the nearby earthquakes are shown on the Regional Fault and Earthquakes Map (Figure 6). The largest earthquake had a 6.7 magnitude and occurred in 1983 (Coalinga Earthquake) on a blind thrust fault. It was estimated to be located approximately 38 miles northeast of the site. The nearest large magnitude (5.2) earthquake occurred in 1955 and was located approximately 11.4 miles to the northwest near San Ardo.

Ground Motion Analyses

In accordance with CGS Note 48 (2022), 2022 CBC and ASCE 7-16 (2017, 2018, 2021), an assessment was made to determine the need for employing “Site-Specific Ground Motion Procedures” to calculate the ground motion parameters for the project. Based on our site evaluation, the subsurface characteristics are those of Seismic Site Class D (Stiff Soil) as defined

by ASCE 7-16 Table 20.3-1, Site Classification, based on Standard Penetration Tests (SPT) and cone penetrometer tests (CPT). The mapped S_1 ground motion value obtained from the Structural Engineers Association of California website (SEAOC, 2023) using the ASCE 7-16 (2017), for Site Class "D - Stiff Soil," was 0.452g, greater than 0.2; therefore, per Section 11.4.8 of ASCE 7-16, the project requires site-specific ground motion analyses unless certain procedures are used during the structural design that comply with the exceptions allowed. Because we have no information on the building's fundamental period, or if the structural engineer intends to use the calculations necessary to comply with an exception, we performed a site-specific ground motion analysis to develop the seismic design parameters in accordance with ASCE 7-16 Sections 11.4.8 and 21.2.

A risk-targeted maximum considered earthquake (MCE_R) modeling procedure was performed in accordance with ASCE 7-16, including a Probabilistic Seismic Hazard Analysis (PSHA) using ground motion data from the United States Geologic Survey (USGS, 2022) Unified Hazard Tool and a Deterministic Seismic Hazard Analysis (DSHA) using the Third California Earthquake Rupture Forecast (UCERF3) fault model (USGS 2013) and NGA-West2 ground motion prediction equations (PEER 2015). These analyses are based on knowledge of the regional tectonic setting, geology, and seismicity. These analyses were performed as described in ASCE 7-16 Section 21.2.1.1 (Method 1) to estimate the peak ground motion corresponding to the uniform hazards earthquake and MCE_R which has a 2% probability of being exceeded in 50 years.

Our DSHA analysis compared the ground response resulting from a magnitude 7.45 earthquake on the Rinconada fault and a multi-segment earthquake on the San Andreas fault involving the Parkfield, Cholame, Carrizo, Big Bend, North Mojave and South Mojave segments that is estimated to produce a magnitude 7.92 earthquake, emulating the M7.9 Fort Tejon earthquake of 1857. Our analysis indicate that the most severe site response would be anticipated from the Rinconada fault for periods less than and equal to 1 second. For periods greater than 1 second the probabilistic values govern. The fault parameters that we considered in our analysis are presented in Table C-1, Fault Parameters, in Appendix C, modified in accordance with the USGS Earthquake Scenario website (BSSC 2014). The primary seismic risks at the site are from earthquakes generated by the Rinconada and San Andreas faults. Although these listed faults are thought to potentially generate the most severe seismic shaking at the site any local fault could produce seismic shaking.

The 2022 CBC seismic design criteria are based on a Design Earthquake that produces ground motion $^2/_3$ of the lesser of an earthquake with 2 percent probability of occurrence in 50 years, or maximum 84th percentile of the mean deterministic MCE. The deterministic spectra calculated with NGA-West2 ground motion prediction equations are presented in Table C-3.

Seismic Design Category

Section 1613A.2.5 of the 2022 CBC states that *structures classified as Risk Category I, II or III that are located where the mapped spectral response acceleration parameter at 1-second period, S_1, is greater than or equal to 0.75 shall be assigned to Seismic Design Category E… Other structures shall be assigned to Design Category D*. The mapped S_1 for the site is 0.452, less than 0.75; therefore, the site should be assigned to the seismic design category D.

Seismic Design Parameters

This site may be subject to strong ground shaking due to potential fault movements along regional faults including the Rinconada fault, whose proximity and magnitude potential was considered during our site-specific analysis. Engineered design and earthquake-resistant construction increase safety and allow development of seismically active areas. The minimum seismic design should comply with the 2022 edition of the CBC and ASCE 7-16. The resulting seismic coefficients considering Seismic Site Class D are summarized in Table 1 below. The results of our site-specific ground motion analysis are presented in Table C-4.

TABLE 1: SITE SPECIFIC SEISMIC PARAMETERS
(2022 CBC/ASCE 7-16) (Method 1)

Seismic Design Category	D
Seismic Site Class	D
Mapped and Code Based Ground Motion	
Short Period Spectral Response, S_s	1.281 g
1 second mapped Spectral Response, S_1	0.452 g
Design Earthquake Ground Motion	
Short Period Spectral Response, S_{DS}	1.000 g
1 second Spectral Response, S_{D1}	0.973 g
Peak Ground Acceleration (PGA_M)	0.611 g
MCE Spectral Response Acceleration	
Short Period Spectral Response, S_{MS}	1.501 g
1 Second Period Spectral Response, S_{M1}	1.460 g
Site Amplification Factors	
Short Period Site Coefficient, F_a	1.00
1 Second Period Site Coefficient, F_v	2.50
Vertical Site Coefficient, C_v	1.36
Risk Coefficient (Short Period), C_{Rs}	0.977
Risk Coefficient (1 Second Period), C_{R1}	0.935

Acceleration values provided are estimates only. Vertical accelerations are typically ⅓ to ⅔ of the horizontal accelerations but can equal or exceed the horizontal accelerations depending upon the fault type, local site effects and amplification.

As an alternative, if the structural engineer uses the procedures stipulated in Section 11.4.8, Exception #1, of ASCE 7-16 Supplement 3, increasing the value of S_{M1} by 50-percent for all applications of S_{M1}, then the general procedure seismic parameters may be applicable. The structural engineer should make the determination if the exception applies. The ***unscaled*** seismic design parameters calculated in accordance with the general procedure are presented in Table C-5.

9.0 GEOLOGIC HAZARDS

Surface Ground Rupture

Surface ground rupture generally occurs at sites that are traversed by, or that lie very near, a causative fault. The site is not in a State Earthquake Fault Zone, and there are no mapped faults crossing or immediately adjacent to the site. Therefore, the potential for surface ground rupture to occur within the site is considered to be very low.

Liquefaction & Dry Sand Settlement

Soil liquefaction is a phenomenon where saturated granular soils undergo a substantial loss of strength due to increased pore water pressure resulting from cyclic stress applications induced by earthquakes or other vibrations. In this process, the soil acquires mobility sufficient to permit both vertical and horizontal movements, which may result in significant deformations. Soils most susceptible to liquefaction are loose, uniformly graded, fine-grained sands. In addition, recent literature indicates that fine grained soils may also be susceptible to liquefaction or cyclic strain softening. Examples of highly susceptible fine-grained soil include "non-plastic silts and clayey silts of low plasticity (PI<12) at high water content to liquid limit ratios (w_c/LL>0.85)." Examples of soils moderately susceptible to liquefaction include "clayey silts and silty clays of moderate plasticity (12<PI<18) at natural water content and Liquid Limits ratios (w_c/LL) greater than 0.80" (Bray and Sancio, 2006). It is generally acknowledged that liquefaction will not affect surface improvements if these deposits are located at a depth greater than 50 feet below the ground surface. In the deeper deposits, the greater overburden pressure is sufficient to prevent liquefaction effects from occurring.

Based on mapping by Dibblee and Minch (2006), the site is underlain by surficial sediments of Quaternary age (Qa) and described as "unindurated, undissected alluvial sediments" consisting of "alluvial clay and sand of valley areas". According to the Monterey County Geologic Hazard Zones web application accessed online, the site lies within an area of moderate liquefaction susceptibility (Figure 5). Due to the presence of potentially liquefiable soils, and using the historical high groundwater level, we performed engineering analysis to estimate seismic settlements at the site. Details of our analysis are presented below.

Analysis

In order to evaluate liquefaction potential and estimate seismic settlement at the site, ESP performed engineering analysis using the subsurface data collected from the CPTs performed at the site. The CPT data was analyzed with the aid of computer program CLiq V.3.3.1.14 by Geologismiki using various methods including Boulanger and Idriss, 2014; Moss et al, 2006, Idriss and Boulanger, 2008, Robertson, 2009, and Robertson (NCEER, 2001). The analyses used the following input parameters; depth to groundwater of 23.67 feet (historically high groundwater level), subsurface data from CPT-01 and -02, the mapped site modified peak ground acceleration (PGA_M) of 0.611 times gravity (g) calculated in accordance with CBC 18.03A.5.12 (general procedure); and moment magnitude 7.45 earthquake, consistent with the mean characteristic moment magnitude for the Rinconada fault.

The seismic settlement analysis was performed using data from the CPTs performed at the site which met refusal conditions at 25 feet (CPT-1), 23 feet (CPT-2), 24 feet (CPT-3), and 26 feet (CPT-4). Seismic settlement of approximately 1 inch (1.1 inches) was estimated in the planned building area. The results of our liquefaction analysis are presented in Appendix D. Comparing the estimated settlement values from CPT-01 and -02, the differential settlement was estimated to be less than a ½-inch. The estimated total and differential liquefaction-induced settlements, additionally discussed in the geotechnical Recommendations sections of this report, should be considered in the design of foundations and other improvements.

As noted above, soils encountered in the CPTs were primarily sand layers. Based on this finding, and the relatively low seismically induced settlement estimated for the site (1.1 inches), we judge that surface manifestation of liquefaction, such as sand boils, is unlikely at the site.

The estimated liquefaction settlement is slightly higher than what was estimated by Earth Systems Pacific and Kleinfelder in their 2014 reports, which were reviewed and approved by CGS.

Lateral Spreading

The nearest embankment appears to be the bank of the Salinas River. The top-of-bank is located approximately 275 feet to the southwest of the site. The bank appears to slope gently to the southwest toward the modern river channel over a distance of approximately 500 feet. As such, the potential for lateral displacement at the site is considered low.

Slope Stability and Seismically Induced Landsliding

The ground surface at the site is essentially flat. There was no evidence of potential instability on or adjacent to the site. Therefore, the potentials for slope instability and seismically induced landsliding to occur on-site are considered to be low.

Tsunami and Seiche Potential

Hazardous tsunamis along the California coastline can be caused by vertical displacement of submarine faults, or by submarine landslides. The site is approximately 26 miles from the Pacific Ocean within an intermontane valley. As such, the potential for the site to be affected by a tsunami event is considered nil.

A seiche is a single water wave that can be generated in a reservoir, lake or pond as the result of long-period surface waves normally generated by strong local earthquakes or larger earthquakes at farther distances. As there are no reservoirs, lakes or ponds in the vicinity of the site, the potential for a seiche to affect the project site is considered to be nil.

Flooding

According to Flood Insurance Rate, Map Number 06053C1925G dated April 2, 2009, published by the Federal Emergency Management Agency (FEMA), the project site lies within an Area of Minimal Flood Hazard Area (Zone X). See FEMA Flood Zone Map (Figure 8).

Naturally Occurring Asbestos

The site is underlain by alluvial deposits of the Salinas River drainage. Because there are no asbestos-bearing rock formations (serpentinite or ultramafic rock) on or mapped within 10 km (Churchill and Hill, 2000) of the site, the potential to encounter naturally occurring asbestos during construction is considered to be low.

Radon

Radon is a colorless, odorless gas present in soil and rock, which is derived from the decay of uranium. The occurrence of radon correlates with the presence of specific minerals, and its concentrations in soil or rock will vary depending on the mineralogy of the surrounding bedrock, temperature, barometric pressure, moisture and other factors.

Radon in the central coast areas of California is most commonly found in areas that are underlain by bedrock of the Rincon and Monterey Formations, or soils derived from these formations. The site is located on alluvium within the Salinas River drainage.

According to the California Geological Survey's Indoor Radon Potential Zones map for Monterey County (CGS Special Report 201, accessed online), the site is located within an area of low potential for indoor radon levels above 4 pCi/L, the lowest rating mapped. The California Department of Health Services recommends that action be taken to reduce indoor radon levels if it is 4 pCi/L or greater. It is our opinion that the potential for indoor radon levels exceeding 4 pCi/L at the site is low.

10.0 CONCLUSIONS

In our opinion, the site is suitable, from a geotechnical engineering and engineering geologic standpoint, for the proposed library building as described in the "Introduction and Site Setting" section of this report. The primary geologic hazard is the potential for strong seismic ground shaking and the related potential for earthquake-induced liquefaction settlement. The proposed building could experience up to 1.1-inches of settlement during a design-level seismic event. All other geologic hazards are considered to have low to nil potentials for occurrence. The new building should be designed based on the design criteria presented in Section 8.0 of this report.

The near surface soils within the building area are sandy lean clays. The results of Atterberg Limits testing (LL=39, PI=22) performed on a sample collected from Boring B2 indicates that the near surface soils have moderately high shrinkage/swelling potenital. Similar soils generally undergo pronounced volume changes with fluctuations in the moisture content – they expand with the increase in the moisture content and shrink with the loss of moisture. When the volume changes are restricted, they could exert significant uplift pressure on the overlying structures thus causing heaving of the floor slabs and lightly loaded structures.

The results of tests performed on the soil sample submitted to Cerco Analytical Laboratory indicate that based on resistivity results the near surface soil is corrosive; therefore, all buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel and iron should be protected against corrosion depending on the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride concentration was found to be insufficient to attack steel embedded in a concrete mortar coating and the sulfate ion concentration was found to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at this location. The redox potential is indicative of aerobic soil conditions. Please refer to the Corrosivity Analysis by CERCO Analytical in Appendix B for the complete analysis.

11.0 PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

The following recommendations are for improvements constructed as described in the "Introduction and Site Setting" section of this report. If locations, elevations, structural loads, etc., vary from those assumed, the recommendations contained herein may require modification. If any other improvements not previously described are incorporated into the project, the geotechnical engineer should be contacted to review the applicability of the recommendations included in this report and prepare additional recommendations, if needed.

Unless otherwise noted, the following definitions are used in the recommendations presented below. Where terms are not defined, definitions commonly used in the construction industry are intended.

- **Building Area:** The area within and extending a minimum of 3 feet beyond the perimeter of the foundations of the proposed structure. The building area also includes the footprint of any improvements which are rigidly connected to the structure, such as retaining walls, and that are expected to perform in a similar manner.

- **Flatwork Areas:** The areas within and extending a minimum of 1 foot beyond the limits of exterior pedestrian flatwork.

- **Subgrade:** The elevation of the surface upon which a sand cushion/nonexpansive imported material or aggregate base (AB) will be placed for flatwork.

- **Existing Grade:** Elevations of the site that existed as of the date of this report.

- **Finish Pad Grade:** The elevation in the building area where earthwork operations are typically considered to be complete. It does not include any sand or gravel that might be placed below slabs in association with vapor protection for the slabs.

- **Scarified:** Thoroughly plowed or ripped in two orthogonal directions to a depth of not less than 8 inches.

- **Moisture Conditioned:** Soil moisture content adjusted to optimum moisture content, or just above, prior to application of compactive effort.

- **Compacted/Recompacted:** Soils placed in level lifts not exceeding 8 inches in loose thickness and compacted to a minimum of 90 percent of maximum dry density, unless specified otherwise. The standard tests used to establish maximum dry density and field density should be ASTM D 1557-12 and ASTM D 6938-17, respectively, or other methods acceptable to the geotechnical engineer and jurisdiction.

Site Preparation

1. The site should be prepared for grading by removing the existing modular building, asphalt concrete, vegetation, large roots, debris, and other potentially deleterious materials from areas to receive improvements. The site preparation operations should be observed by the geotechnical engineer prior to continuing grading.

2. Existing utility lines that will not remain in service should be either removed or abandoned. The appropriate method of abandonment will depend upon the location, type, and depth of the utility. Recommendations for abandonment can be made as necessary.

3. Voids created by the removal of materials or utilities described above should be called to the attention of the geotechnical engineer prior to continuing grading.

Grading

1. The site grading plans were not available when this report was prepared. As the site is flat, it is our understanding that construction of the building pad will require cuts and fills of less than 1 foot. However, due to the presence of moderately high expansive site soils, we recommend the sub-excavation on the order of 2 feet below the pad grade, mixing it thoroughly, and uniformly moisture conditioning it to a minimum of 3 percent above optimum moisture content. This moisture content should be maintained until the compacted soil receives structural concrete. The sub-excavated areas should extend a minimum of 5 feet beyond the planned building foundation perimeters and 2 feet beyond the edges of exterior flatwork and other improvements to the structure.

2. The sub-excavation should be observed by the geotechnical engineer prior to continuing grading. If soft soils, buried objects, or other potentially adverse conditions are observed, additional sub-excavation or other remedial measures may be recommended.

3. Prior to placing new fill, the surfaces exposed by sub-excavation should be scarified to an approximate depth of 8 inches. The soil should then be moisture conditioned to a level slightly above optimum moisture content and recompacted to a minimum of 90 percent of maximum dry density.

4. Fill should be placed in lifts not exceeding 8 inches in loose thickness, moisture conditioned to a level above optimum moisture content, and compacted to a minimum of 90 percent of maximum dry density. Due to the presence of moderately high expansive soils, an approval from the Geotechnical Engineer will be required prior to using fill material generated by cutting at other locations at the site. Therefore, if needed, our field representative should be contacted so they could collect a representative sample of the fill material proposed to be used within the building pad area and bring it to the laboratory for Atterberg Limits testing. The laboratory testing process could take 5 working days, therefore the contractor should plan his schedule accordingly. Organics and rock, debris, and irreducible material larger than 4 inches in diameter should be removed from the soil to be compacted.

5. If fill is to be imported for general use at the site (other than nonexpansive imported material), the fill should be coarse grained with a plasticity index of 10 or less. Proposed imported soils should be evaluated by the geotechnical engineer before being transported to the site, and on an intermittent basis during placement and compaction on the site.

6. The building area contains soils with moderate shrinkage/swelling potential at shallow depths. It may be difficult to achieve stability if the grading operation is undertaken during wet season when the soils being compacted are excessively wet. In those cases, it may be necessary to dry the soil through scarification or mixing with dry soil in order to achieve stable conditions. Other options to achieve stable conditions may include replacement of wet soil with gravel or mixing quick lime plus in the top 12 to 18 inches of subgrade. A layers of filter fabric may be needed at the interface of the native soil the gravel layer. For cost estimation purposes, percentage of quick lime may be assumed to be 5 percent of the dry unit weight of soil which may be taken as 120 lbs/cubic foot. The thickness of the lime treated soil layer may be assumed to be 18 inches. Additional testing will be required to determine the actual required percentage of quick lime plus. Addition of quick lime plus will also help in reduction of soil moisture content, creating more stable and workable surface during wet weather conditions. Detailed stabilization recommendations may be provided, if requested, upon the examination of actual field conditions by the Geotechnical Engineer.

7. Cut and fill slopes should not be steeper than 2:1, measured horizontally to vertically.

Utility Trenches

1. A select, noncorrosive, granular, easily compacted material should be used as bedding and shading immediately around utility pipes. The site soils may be used for trench backfill above the select material. However, if obtaining compaction is difficult with the site soils, use of a more easily compacted sand may be desirable. The upper foot of backfill in landscaped and unimproved areas should consist of native material to reduce the potential for seepage of water into the backfill.

2. In areas to receive asphalt concrete pavement, the upper 8 inches of trench backfill should be compacted to a minimum 95 percent of maximum dry density. Trench backfill in other areas should be compacted to a minimum of 90 percent of maximum dry density. Jetting of utility trench backfill should not be allowed.

3. Where utility trenches extend under perimeter foundations, exterior flatwork, or pavement the trenches should be backfilled entirely with compacted native soil. The zone of native soil should extend to a minimum distance of 2 feet on both sides of the foundation, flatwork, or pavement edges. If utility pipes pass through sleeves cast into the perimeter foundations, the annulus between the pipes and sleeves should be sealed.

4. Long-term settlement of properly compacted imported granular backfill material should be assumed to be about 0.25 to 0.5 percent of the depth of the backfill. Where trenches are backfilled with site soils, the anticipated settlement would be about twice that of granular backfill. Improvements that are constructed over or near trenches should be designed to accommodate the potential for settlement.

5. The recommendations of this section are minimums only and may be superseded by the specifications of the architect/engineer based upon soil corrosivity or the requirements of pipe manufacturers, utility companies or the governing jurisdiction.

Foundations

1. The proposed building should be supported by conventional spread footings bearing in firm engineered fill or native soils. The foundation trenches should be a minimum of 24 inches below the lowest adjacent grade. All footings should be reinforced as directed by the architect/engineer. The footing excavations should be observed by the geotechnical engineer prior to placement of formwork or reinforcement.

2. In the event that soft soils or other potentially adverse conditions are observed in the excavations, deepening of the footings, compaction of the soil, or other remedial measures may be recommended. Soils exposed in footing excavations should be kept moist, and no desiccation cracks should be present prior to concrete placement.

3. The foundation seismic loading should be based on the parameters presented in the Seismic Design Parameters of this report. The foundation design should be based on the following parameters:

Allowable Bearing Capacity (dead loads)	2,000 psf
Allowable Bearing Capacity (dead + live loads)	2,500 psf
Allowable Bearing Capacity (DL+LL+ wind or seismic)	3,000 psf
Modulus of subgrade reaction (K_{30})	50 psi/inch
Estimated total static settlement	1 inch
Estimated differential static settlement, within 25 feet	0.5 inch
Total liquefaction and seismically-induced settlement	1.1 inches
Differential liquefaction and seismically-induced settlement	½-inch

4. Resistance to lateral loads should be calculated based on a passive equivalent fluid pressure of 250 pcf and a friction factor of 0.3. Passive and frictional resistance can be combined in the calculations without reductions. Passive pressure from the top 1-foot of the footing should be ignored unless the area adjacent to the footings is covered with concrete or asphalt concrete pavement.

Slabs-on-Grade and Exterior Flatwork

1. Slabs-on-grade should have a minimum thickness of 4 full inches and be reinforced as directed by the architect/engineer.

2. In areas where moisture transmitted from the subgrade would be undesirable, or where moisture sensitive materials will be stored directly on the slab, a capillary break system that consists of a vapor retarder and a 4-inch-thick, clean crushed rock layer should be placed above the pad subgrade to serve as a capillary break.

3. The vapor retarder should comply with ASTM Standard Specification E 1745-17 and the latest recommendations of ACI Committee 302. The vapor retarder should be installed in accordance with ASTM Standard Practice E 1643-18a. Care should be taken to properly lap and seal the vapor retarder, particularly around utilities, and to protect it from damage during construction.

4. If sand or other permeable material is to be placed over the vapor retarder, the material over the vapor retarder should be only lightly moistened and not saturated prior to casting the slab concrete. Recent studies, including those by ACI Committee 302, have concluded that excess water above the vapor retarder would increase the potential for moisture damage to floor coverings and could increase the potential for mold growth or other microbial contamination. The studies also concluded that it is preferable to eliminate the sand layer and place the slab concrete in direct contact with the vapor retarder, particularly during wet weather construction. However, placing the concrete directly on the vapor retarder would require special attention to using the proper vapor retarder, concrete mix design, and finishing and curing techniques.

5. Assuming that movement (i.e., ¼-inch or more) of exterior flatwork beyond the structure is acceptable, the flatwork should be designed to be independent of the building foundations. The flatwork should not be doweled to foundations, and a separator should be placed between the two. If differential movement of flatwork is considered undesirable, the flatwork should be designed and constructed in roughly the same manner as the structure slabs, and reinforced footings should be provided around the perimeter of the flatwork.

6. To reduce shrinkage cracks in concrete, the concrete aggregates should be of appropriate size and proportion, the water/cement ratio should be low, the concrete should be properly placed and finished, contraction joints should be installed, and the concrete should be properly cured. This is particularly applicable to slabs that will be cast directly upon a vapor retarder and those that will be protected from transmission of vapor by use of admixtures or surface sealers. Concrete materials, placement and curing specifications should be at the direction of the architect/engineer.

Pavement Sections for Parking Areas

1. For the design of asphalt pavements, a bulk sample with an R-Value of less than 5 was obtained for the soils anticipated at subgrade soil elevation. The asphalt concrete (AC) sections were designed in accordance with the Caltrans Highway Design Method for Traffic Indices (TIs) of 4 through 7. Determination of the appropriate TI for each area to be paved is the province of the architect/engineer. The calculated base and AC

thicknesses are for compacted material. Normal Caltrans construction tolerances should apply. The aggregate base should conform to Caltrans Class 2. Project Architect should select the appropriate pavement section for the track based on the anticipated traffic.

R-Value	Traffic Index	AC Thickness	Class 2 Base Thickness
5	4.0	2.5"	7.5"
5	4.5	2.5"	9.5"
5	5.0	3.0"	10"
5	5.5	3.0"	12"
5	6.0	3.5"	12.5"
5	6.5	4.0”	13.5”
5	7.0	4.0”	15.5”

Concrete (PCC) Pavements

1. Portland Cement Concrete (PCC) pavements in automobile parking areas should be at least 6 inches thick.

2. Reinforcing of the concrete is optional. The concrete should have a minimum modulus of rupture of 650 psi. Construction joints should be doweled. The concrete pavement sections should be underlain by a minimum 6 inches of compacted Class 2 aggregate base. A modulus of subgrade reaction of 50 pci may be assumed in the design of the concrete pavements.

General Conditions

1. The subgrade soil should be scarified 8 inches, moisture conditioned as necessary and be compacted to a minimum 92 percent of maximum dry density. Aggregate base should be compacted to at least 95 percent of maximum dry density.

2. The subgrade and base should be firm and unyielding when proof-rolled with heavy, rubber-tired equipment prior to paving. The subgrade soils should be periodically moistened as necessary prior to placement of the aggregate base to maintain the soil moisture content near optimum.

3. Pavement longevity will be enhanced if the surface grade drains away from the edges of the pavement. Finished AC surfaces should slope toward drainage facilities at 2 percent where practicable, but in no case should water be allowed to pond.

4. Cutoff walls below curbs and around landscape islands should be constructed to extend the life of both asphalt and concrete pavement by reducing irrigation water and runoff that seeps into the aggregate base. Where utilized, cutoff walls should extend through the aggregate base to penetrate a minimum of 3 inches into the subgrade soils.

Management of Site Drainage and Maintenance

1. Per Section 1804A.3 of the 2022 CBC, unpaved ground surfaces should be finish-graded to direct surface runoff away from foundations and other improvements at a minimum 5 percent grade for a minimum distance of 10 feet. The site should be similarly sloped to drain away from improvements during construction. If this is not practicable due to the terrain, property lines, or other site features, swales with improved surfaces or other drainage facilities should be provided to divert runoff from those areas.

2. All eaves of the building should be fitted with roof gutters. Runoff should discharge in a nonerosive manner away from foundations and other improvements in accordance with the requirements of the governing agencies. Erosion protection should be placed at all discharge points unless the discharge is to a pavement surface.

3. To reduce the potential for planter drainage gaining access to subslab or subfloor areas, raised planter boxes adjacent to foundations should be installed with drains and sealed sides and bottoms. Drains should also be provided for areas adjacent to the structure that would not otherwise freely drain.

4. The on-site soils are erodible; stabilization of soils disturbed during construction by vegetation or other means during and following construction, is essential to reduce erosion damage. Care should be taken to establish and maintain vegetation. The landscaping should be planned and installed to maintain the surface drainage recommended above. Surface drainage should also be maintained during construction.

5. Maintenance of drainage and other improvements is critical to the long-term stability of the site and the integrity of the structures. Vegetation and erosion matting (if utilized) should be maintained and repaired or augmented as needed. Irrigation systems should be adjusted and/or repaired so that soils around structures are maintained at a relatively uniform year-round moisture content, and are neither over-watered nor allowed to dry and desiccate.

6. To reduce the potential for disruption of drainage patterns and undermining of structures, pavement, etc., rodent activity should be aggressively controlled.

Required Observation and Testing

1. It must be recognized that the recommendations contained in this report are based on a limited subsurface investigation and rely on continuity of the subsurface conditions encountered.

2. It is assumed that the geotechnical engineer will be retained to provide consultation during the design phase, to interpret this report during construction, and to provide construction monitoring in the form of testing and observation.

3. Unless, otherwise stated, the terms "compacted" and "recompacted" refer to soils placed in level lifts not exceeding 8 inches in loose thickness and compacted to a minimum of 90 percent of maximum dry density. The standard tests used to define maximum dry density and field density should be ASTM D 1557-12 and ASTM D 6938-17, respectively, or other methods acceptable to the geotechnical engineer and jurisdiction.

4. “Moisture conditioning” refers to adjusting the soil moisture to at least optimum moisture prior to application of compactive effort.

5. At a minimum, the geotechnical engineer should be retained to provide:

    - Review of final plans and specifications
    - Professional observation during grading and foundation construction
    - Oversight of soils special inspection during grading

6. Special inspection of grading and foundation construction should be provided as per Section 1705A.6 and Table 1705A.6 of the 2019 CBC. The special inspector should be under the direction of the geotechnical engineer. In our opinion, the following operations should be subject to *continuous* soils special inspection:

    - Overexcavation to the recommended depths
    - Scarification and recompaction
    - Fill placement and compaction

7. In our opinion, periodic special inspection should suffice for the following items: subject to approval by the building official, the exemption under Section 1704A.2 may be utilized to allow *periodic* special inspection of soils. The following items should be inspected and/or tested by the special inspector:

    - Site preparation
    - Foundation excavations
    - Imported materials
    - Compaction of utility trench backfills
    - Compaction of pavement subgrade and aggregate base courses

8. A program of quality control should be developed prior to the beginning of the project. The contractor or project manager should determine any additional inspection items required by the architect/engineer or the governing jurisdiction.

9. The locations and frequencies of compaction tests should be as per the recommendations of the geotechnical engineer at the time of construction. The recommended test locations and frequencies may be subject to modification by the geotechnical engineer, based upon soil and moisture conditions encountered, size and type of equipment used by the contractor, the general trend of the results of compaction tests, or other factors.

10. A preconstruction site meeting among the owner, the geotechnical engineer, the soil special inspector, the architect/engineer, the governing jurisdiction, and contractors should be convened to discuss planned construction procedures and quality control requirements.

11. The geotechnical engineer should be notified at least 48 hours prior to beginning construction operations.

12.0 PERCOLATION TESTING

As a part of the scope of our services, Earth Systems measured soil percolation rates at the site for use in the design of the proposed septic leach field areas. Percolation tests were performed in the northern and central portions of the site.

On February 10, 2023, four percolation tests were performed. The test holes for percolation testing were drilled on December 28, 2022, using a 6-inch diameter auger. Holes used for percolation testing were drilled to nominal depths of five to seven feet. The test hole locations are shown on the attached Site Geologic and Boring Location Map (Figure 2).

The tests were conducted using the Percolation Testing Methodology, as detailed in the document Onsite Wastewater Treatment Systems (OWTS) prepared by Monterey County Health Department Environmental Health Bureau. Prior to performing the tests, percolation test borings were cased with perforated PVC pipe, and the annular spaces were backfilled with gravel. The borings were then pre-saturated with clear water and left overnight. The following day, one of the four test holes contained greater than 6 inches of standing water and per the methodology, the test was terminated at this location. The remaining three test holes (P-1, P-3, and P-4) were filled with water 6 inches above the gravel bottom, and the tests were conducted as a falling head test with measurements taken approximately every 30 minutes as the water level dropped. Copies of the percolation test results are attached in Appendix E.

The test results only indicate the percolation rates at the specific locations and under specific conditions. Sound engineering judgement should be exercised in extrapolating the test results for other conditions or locations. Please note that the test results incorporate both downward and horizontal fluxes of water. Therefore, the test results will need to be adjusted to estimate the downward infiltration rates for assessment of the septic percolation facilities. Technical design references vary in methods they present for using these types of test results. However, most references include reduction and/or correction factors for several parameters including, but not limited to, size of the percolation system relative to the test volume, number of tests

conducted, variability in the soil profile, anticipated biological buildup, anticipated long-term maintenance, and other factors. Assessment of the septic system should select the appropriate reduction and/or correction factors based on these considerations.

It is also pointed out that the measured rates were for undisturbed native soils, and that site grading, fill placement, and soil compaction can have significant effects on the actual percolation rates that will be experienced following construction.

13.0 CLOSURE

This report is valid for the conditions, as they exist at this time for the type of development described herein. Our intent was to perform the investigation in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this project under similar conditions at this time. No representation, warranty, or guarantee is either expressed or implied. This report is intended for the exclusive use by the client as discussed in the "Scope of Services" section. Application beyond the stated intent is strictly at the user's risk.

If changes with respect to project type or location become necessary, if items not addressed in this report are incorporated into plans, or if any of the assumptions used in the preparation of this report are not correct, this firm shall be notified for modifications to this report. The geotechnical engineer should be retained early in the design process for the structure to provide geotechnical guidance as the design progresses. Any items not specifically addressed in this report shall comply with the CBC and the requirements of the governing jurisdiction.

The preliminary recommendations of this report are based upon the geotechnical conditions encountered at the site and may be augmented by additional requirements of the architect/engineer, or by additional recommendations provided by the geotechnical engineer based on conditions exposed at the time of construction. If Earth Systems Pacific is not retained to provide construction observation and testing services, it shall not be responsible for the interpretation of the information by others or any consequences arising therefrom.

This document, the data, conclusions, and recommendations contained herein are the property of Earth Systems Pacific. This report shall be used in its entirety, with no individual sections reproduced or used out of context. Copies may be made only by Earth Systems Pacific, the client, and the client's authorized agents for use exclusively on the subject project. Any other use is subject to federal copyright laws and the written approval of Earth Systems Pacific.

Thank you for this opportunity to have been of service. If you have any questions, please feel free to contact this office at your convenience.

End of Text

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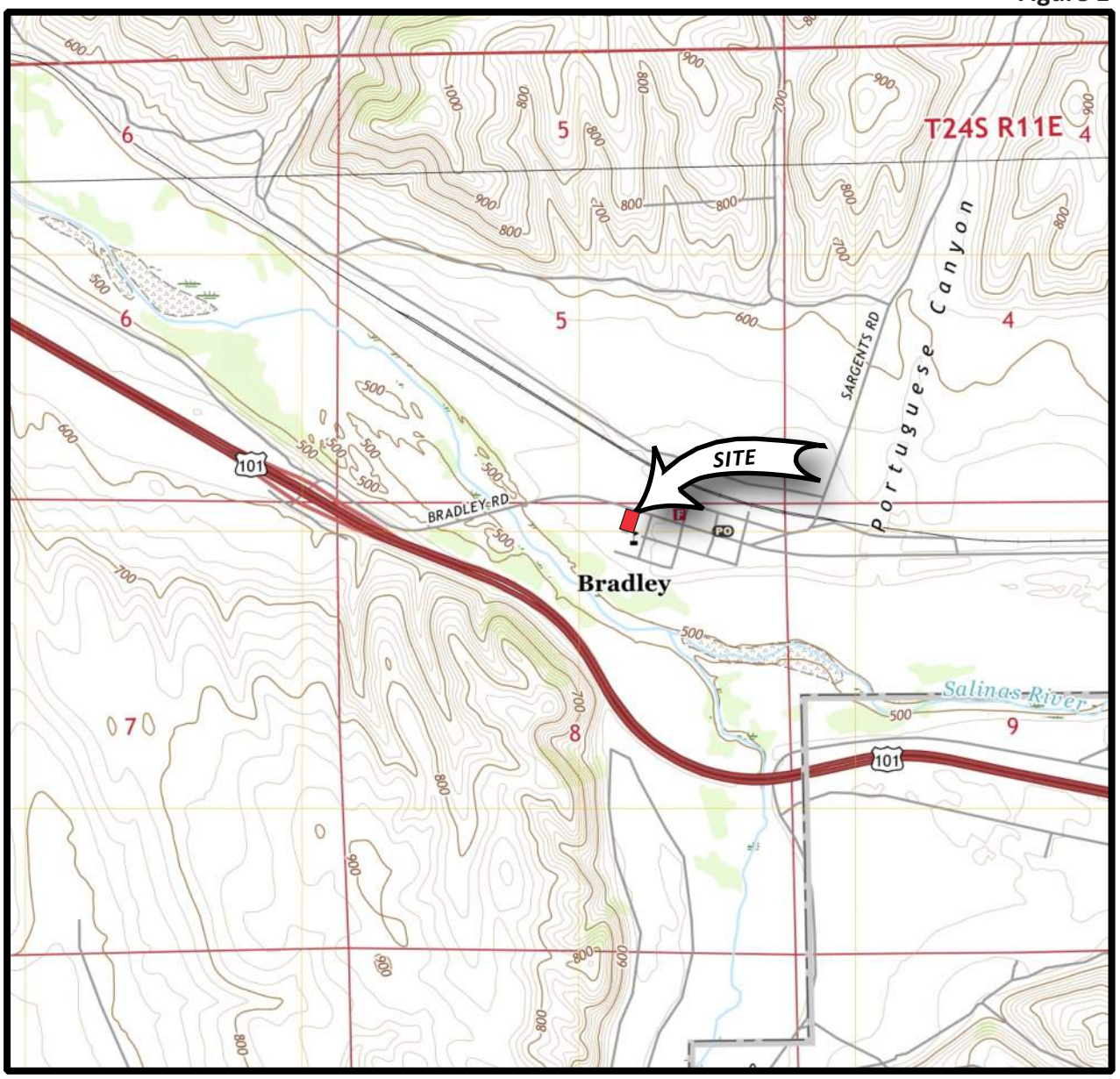
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FIGURES

Figure 1 - Vicinity Map
Figure 2 - Site Geologic and Boring Location Map
Figure 3 - Local Geologic Map
Figures 4 - Geologic Cross Section A-A’
Figure 5 – Geologic Hazard Zones
Figure 6 - Regional Faults and Earthquakes
Figure 7 - Selected Earthquakes
Figure 8 – Flood Zone Map

Figure 1



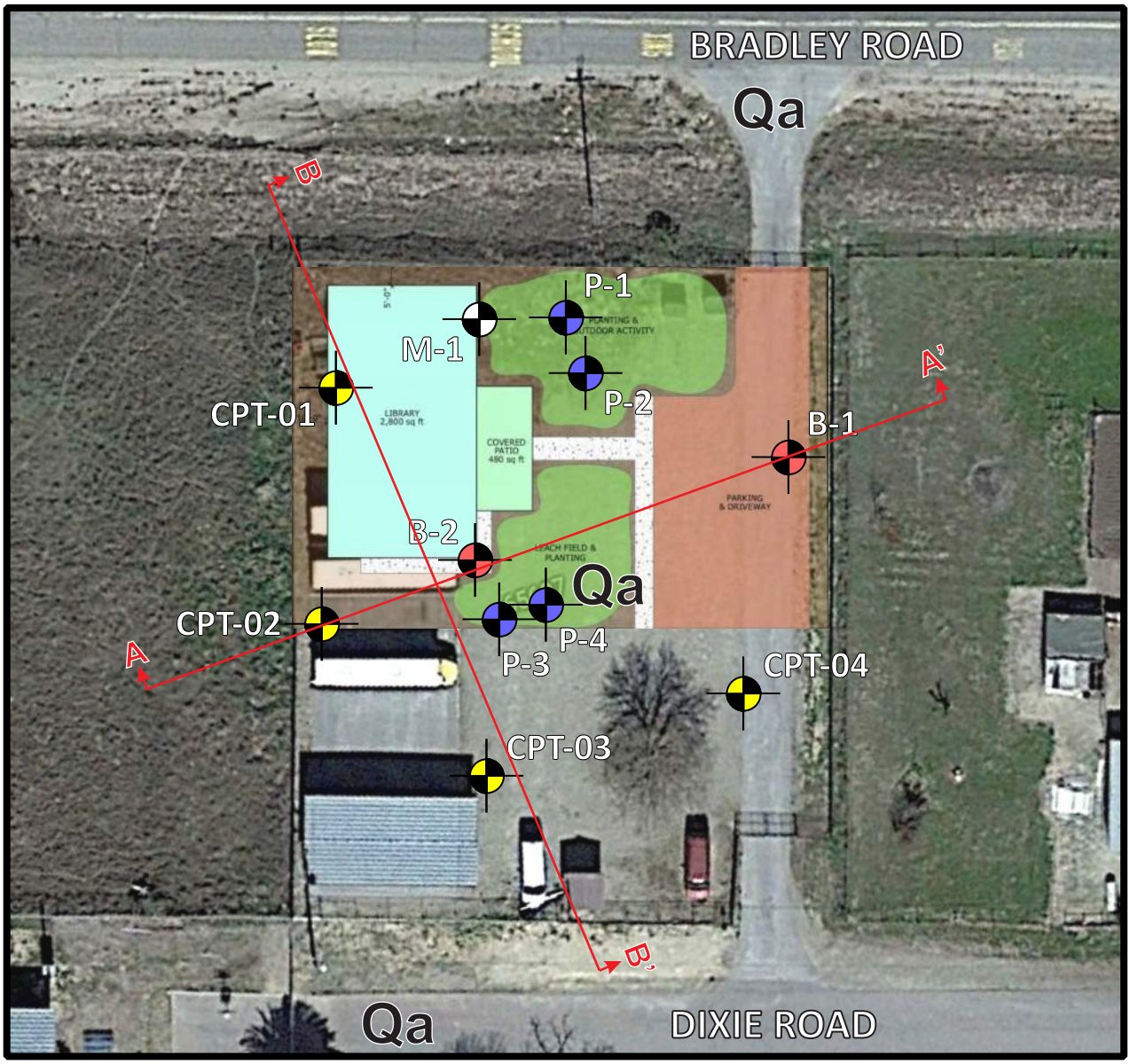
BASE: USGS. 2021. Bradley and Wunpost 7.5-minute Topographic Quadrangles

1000 0 1000

Approximate Scale in Feet

Earth Systems Pacific	New Bradley Branch Library Feasibility Study 65607 Dixie Street, APN 424-351-038 Bradley, California	SITE VICINITY MAP 305777-001

Figure 2



45 0 45 90

Approximate Scale in Feet

B-2 Approximate Boring Location

M-1 Approximate Groundwater Monitor Location

B B' Line of Geologic Cross Section

CPT-04 Approximate CPT Location

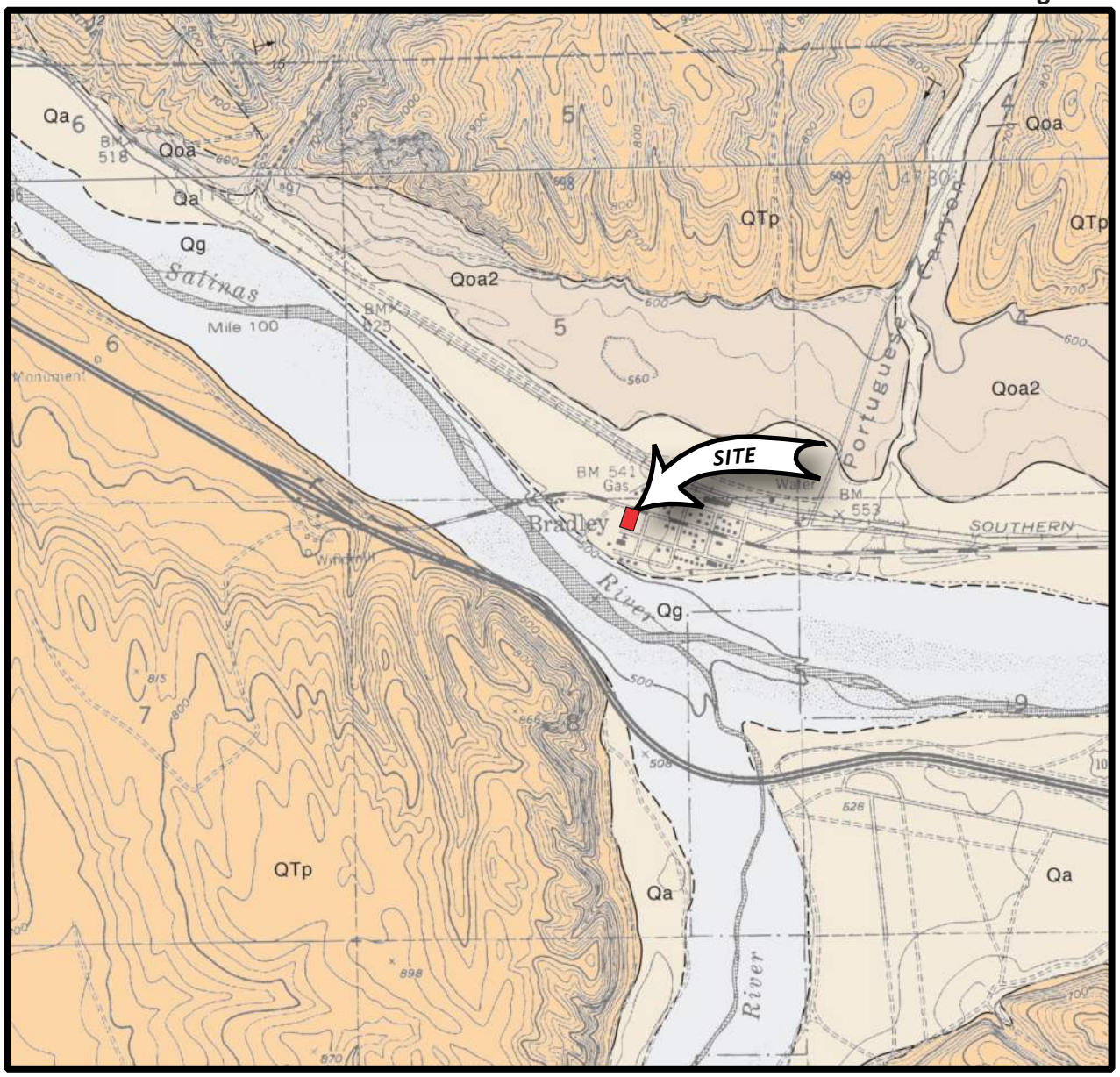
P-4 Approximate Percolation Location

Qa - Surficial Sediments

Base: Google Earth (2022)

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Figure 3



BASE: Dibblee, Thomas W, Jr. 2006. Geologic Maps of the Bradley and Wunpost 7.5-minute Topographic Quadrangles

Geologic contact, dashed where approximately located

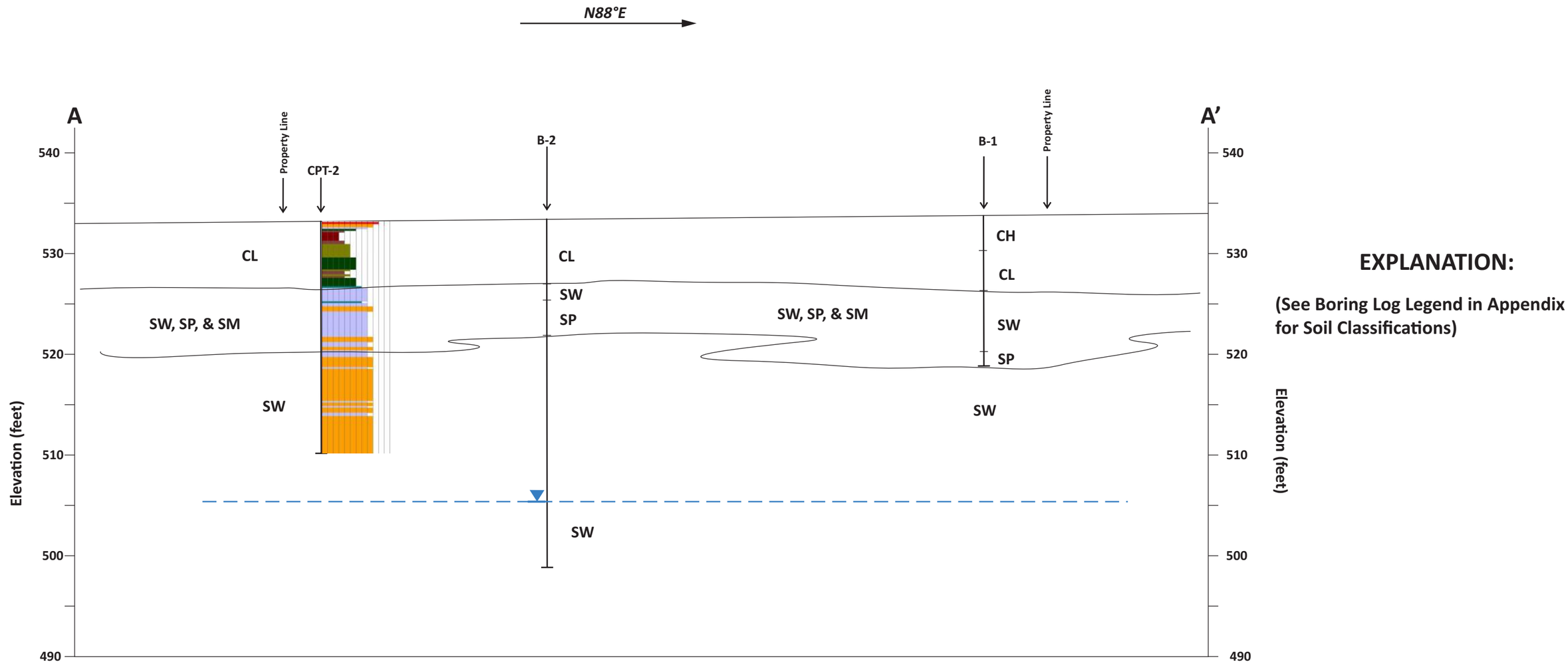
1000 0 1000

Approximate Scale in Feet

Relevant Geologic Units

Qa/Qg	Surficial Sediments (Holocene)
Qoa	Older Surficial Sediments, Alluvial Terraces (Pleistocene)
Qoa2	Younger, Lower Alluvial Terraces (Pleistocene)
Qoa1	Older, Higher Alluvial Terraces (Pleistocene)
QTp	Paso Robles formation (Pleistocene - Late Pliocene)

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EXPLANATION:

(See Boring Log Legend in Appendix A for Soil Classifications)

1 inch = 20 feet
2x Vertical Exaggeration

Groundwater Level

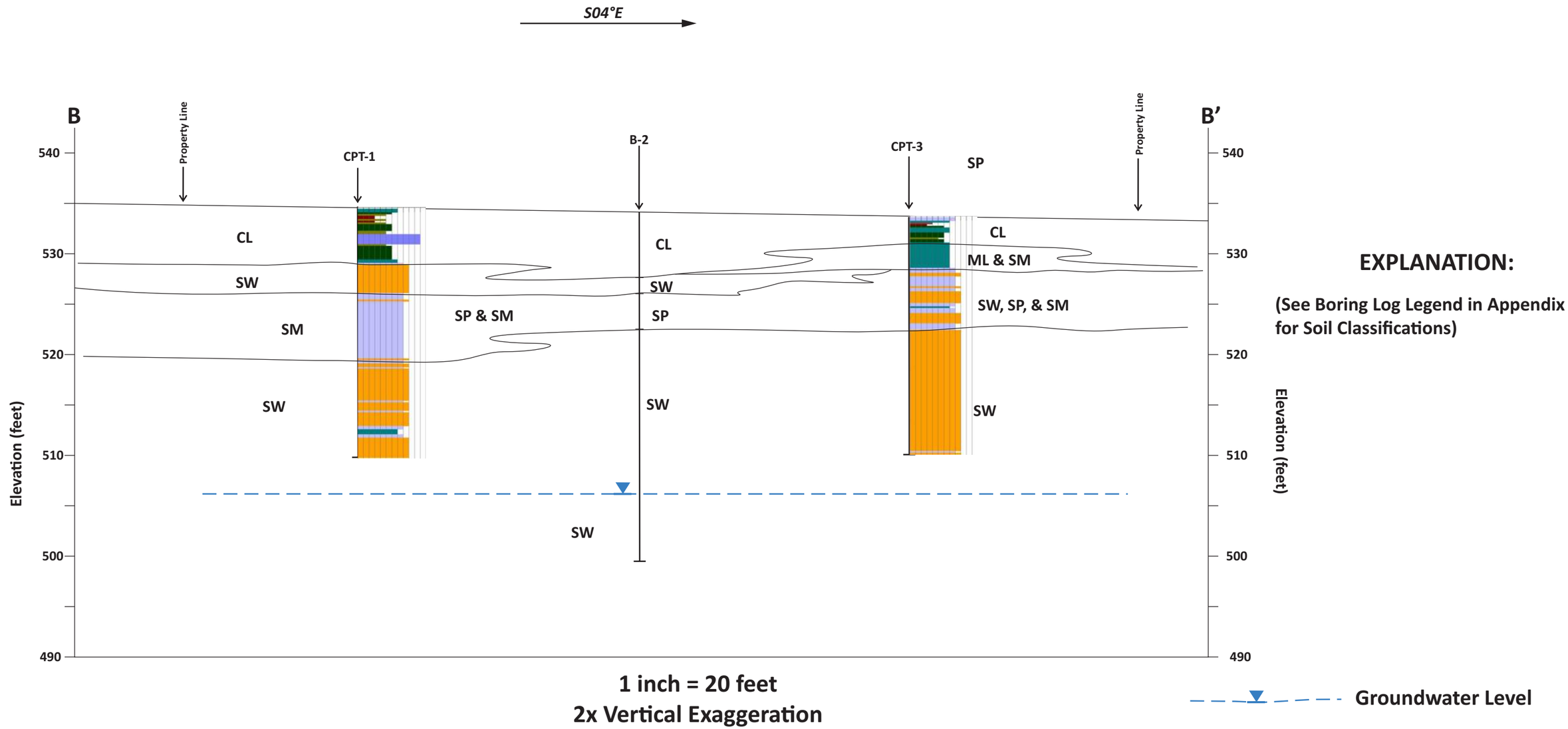
1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

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New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

GEOLOGIC CROSS-SECTION A-A'

305777-001

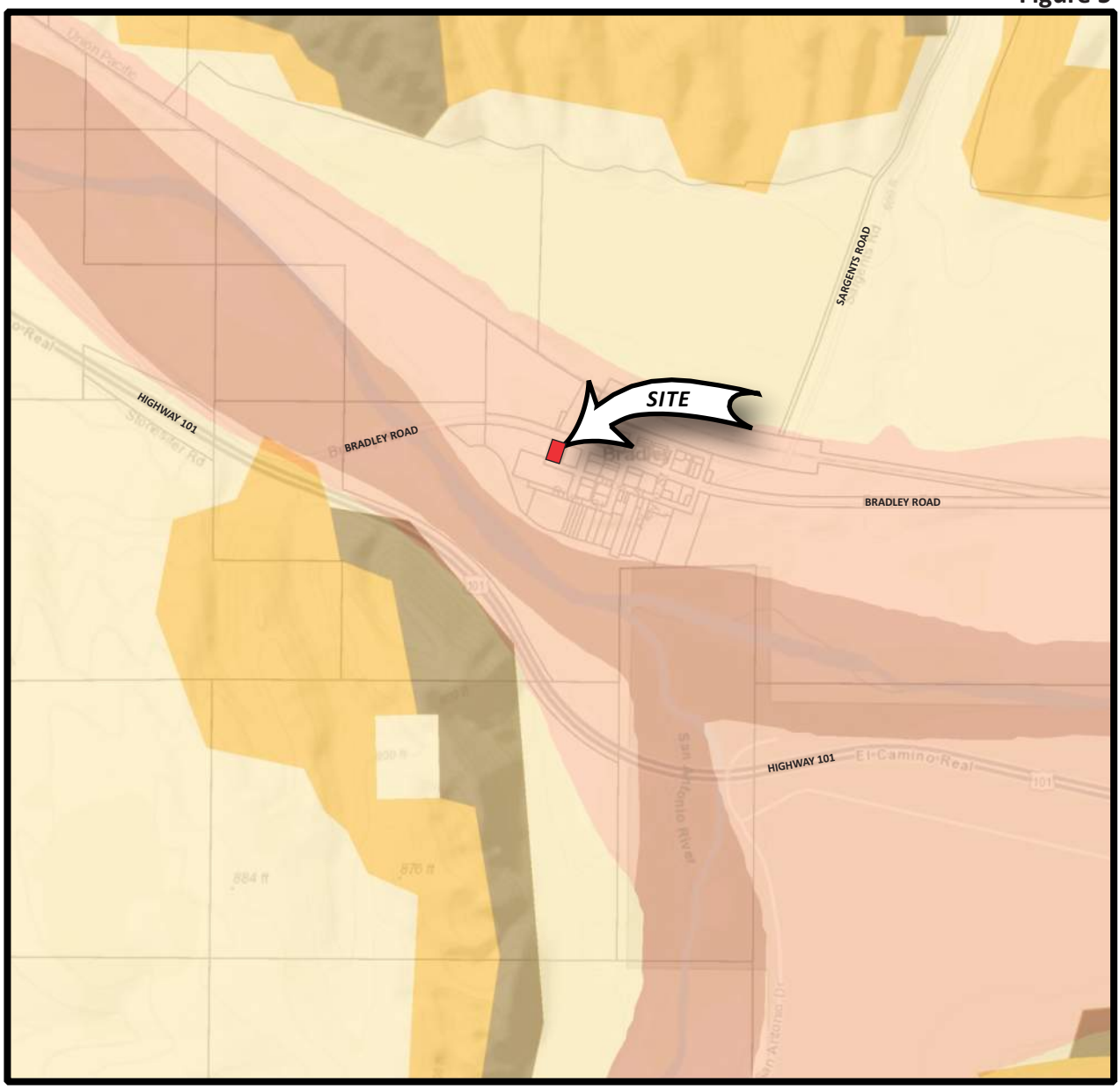


EXPLANATION:

(See Boring Log Legend in Appendix A for Soil Classifications)

Earth Systems Pacific	New Bradley Branch Library Feasibility Study 65607 Dixie Street, APN 424-351-038 Bradley, California	GEOLOGIC CROSS-SECTION B-B' 305777-001

Figure 5



County Geologic Hazard Zones

Liquefaction susceptibility

- High
- Moderate
- Low
- Variable

Landslide susceptibility

- High
- Moderate
- Low

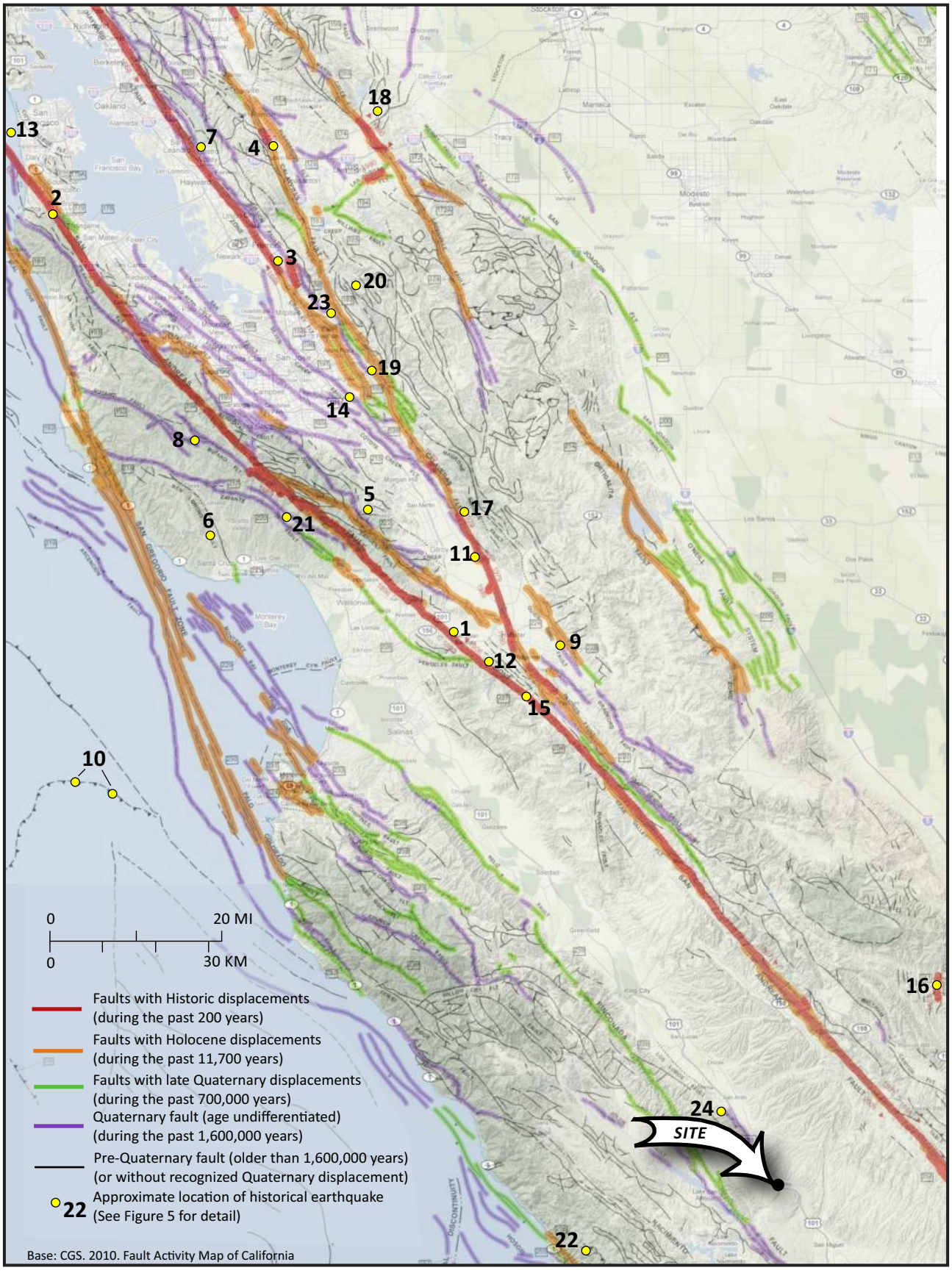
Approximate Scale in Feet

0 2000 4000 6000

Base: Monterey County Geologic Hazards Zones, web application (2022)

Earth Systems Pacific	New Bradley Branch Library Feasibility Study 65607 Dixie Street, APN 424-351-038 Bradley, California	GEOLOGIC HAZARD ZONES 305777-001

Figure 6

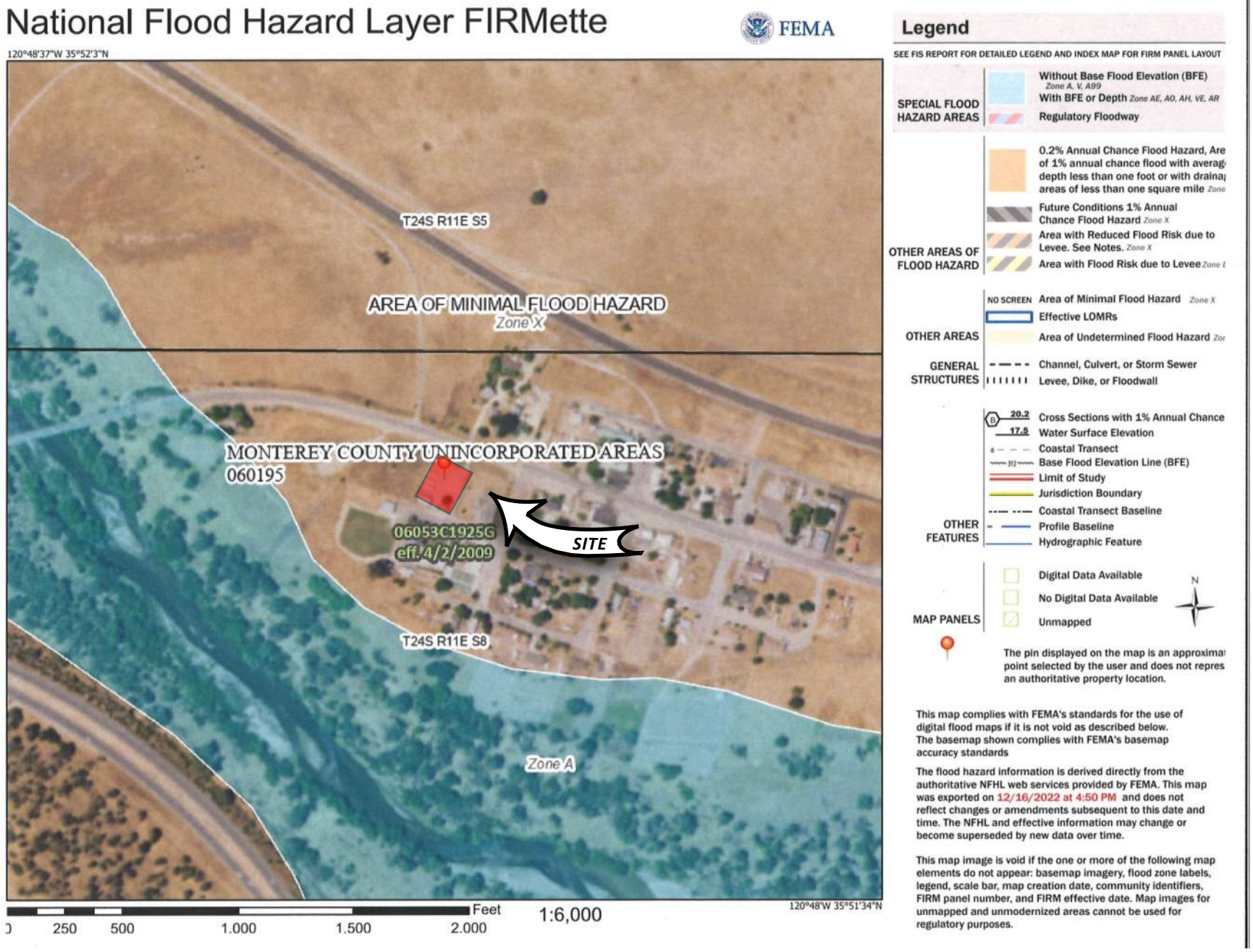


Earth Systems Pacific	New Bradley Branch Library Feasibility Study 65607 Dixie Street, APN 424-351-038 Bradley, California	REGIONAL FAULTS AND EARTHQUAKES 305777-001

Selected Monterey BayArea Earthquakes

Location Number (See Regional Faults and Earthquakes map For Locations)	Earthquake and Year	Magnitude Reported	Reference
1	Monterey Bay Area, 1836	M 6.8	Toppozada, 1998
2	San Francisco, 1838	M 7.0	Toppozada, 1981
3	Hayward, 1858	M 6.1	Toppozada, 1981
4	Calaveras-Dublin, 1861	M 5.9	Toppozada, 1981
5	Santa Clara Valley, 1864	M 5.9	Toppozada, 1981
6	Santa Cruz, 1865	M 6.3	Toppozada, 1981
7	Hayward, 1868	M 6.8	Toppozada, 1981
8	San Andreas, 1870	M 5.8	Toppozada, 1981
9	Quien Sabe, 1986	M 5.5	NCDEC, 2010
10	Monterey Bay		
	1926	M 6.1	NCDEC, 2010
	1926	M 6.1	NCDEC, 2010
11	Calaveras, 1897	M 6.2	Toppozada, 1981
12	Hollister Area, 1939	M 5.5	NCDEC, 2010
13	San Francisco, 1906	M 7.8	U.S. Geological Survey, 2010
14	San Jose, 1911	M 6.5	Toppozada and Parke, 1982
15	San Andreas, 1961	M 5.6	NCDEC, 2010
16	Nunez Fault, 1982	M 5.4	NCDEC, 2010
17	Coyote Lake, 1979	M 5.9	Hart, 1988
18	Greenville, 1980	M 5.8	Oppenheimer, 1990
19	Morgan Hill, 1984	M 6.2	Oppenheimer, 1990
20	Mount Lewis, 1986	M 5.7	U.S. Geological Survey, 1989
21	Loma Prieta, 1989	M 7.1	U.S. Geological Survey, 1989
22	Central California		
	1983	M 5.2	NCDEC, 2010
	1991	M 5.2	NCDEC, 2010
23	Calaveras Reservoir, 2007	M 5.4	U.S. Geological Survey, 2009
24	San Ardo, 1955	M 5.2	NCDEC, 2010

NOTE: Modified After Geomatrix, (1992)
Updated, 2010



Earth Systems Pacific	New Bradley Branch Library Feasibility Study 65607 Dixie Street, APN 424-351-038 Bradley, California	FLOOD ZONE MAP 305777-001

APPENDIX A

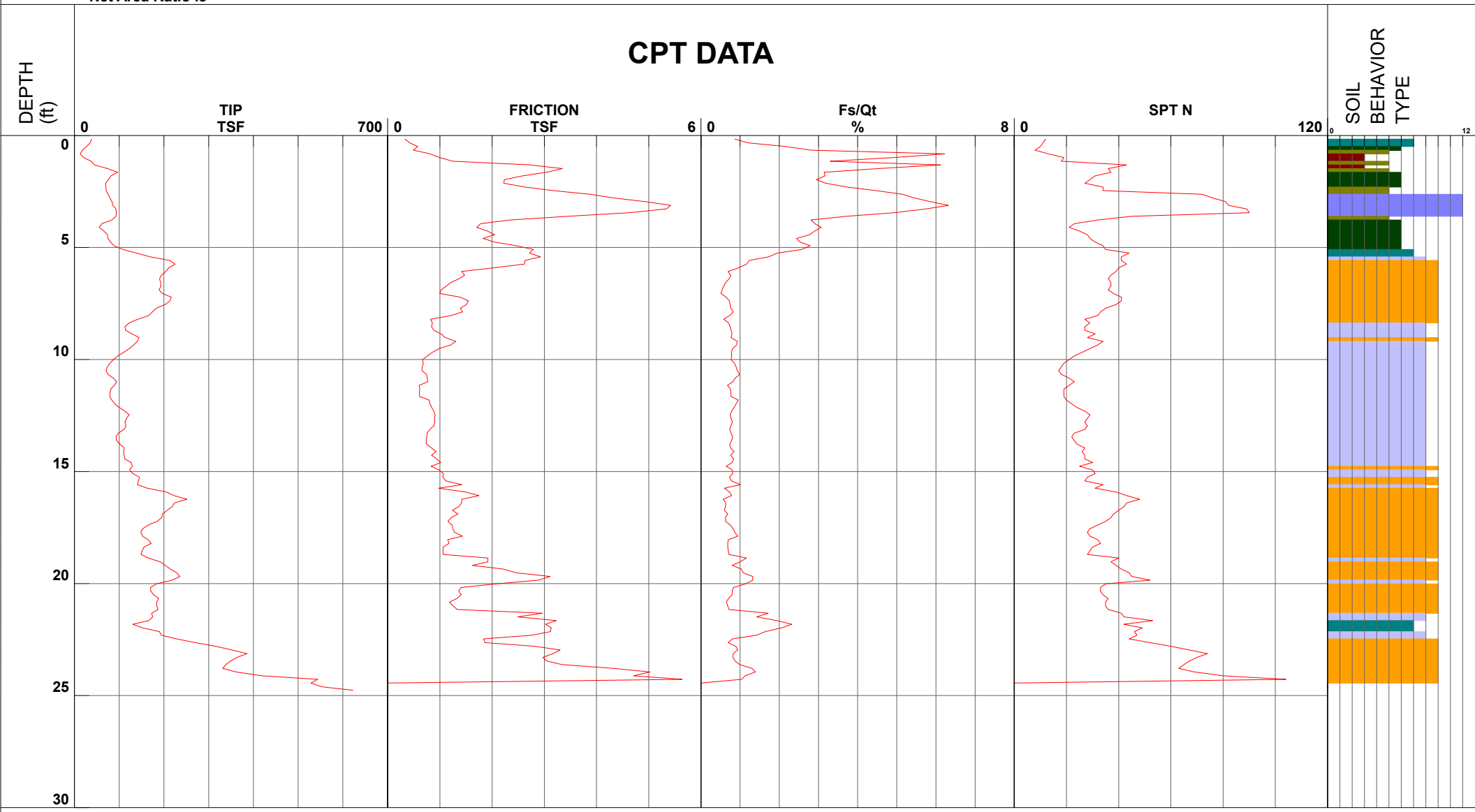
Cone Penetrometer Test (CPT) Data
Boring Logs (7)
Boring Log Legend

Earth Systems

Project	New Bradley Branch Library Feasibility Study	Operator	AJ-BH	Filename	SDF(381).cpt
Job Number	305777-001	Cone Number	DDG1587	GPS	
Hole Number	CPT-01	Date and Time	305777-001	Maximum Depth	24.77 ft
EST GW Depth During Test		NO GW			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

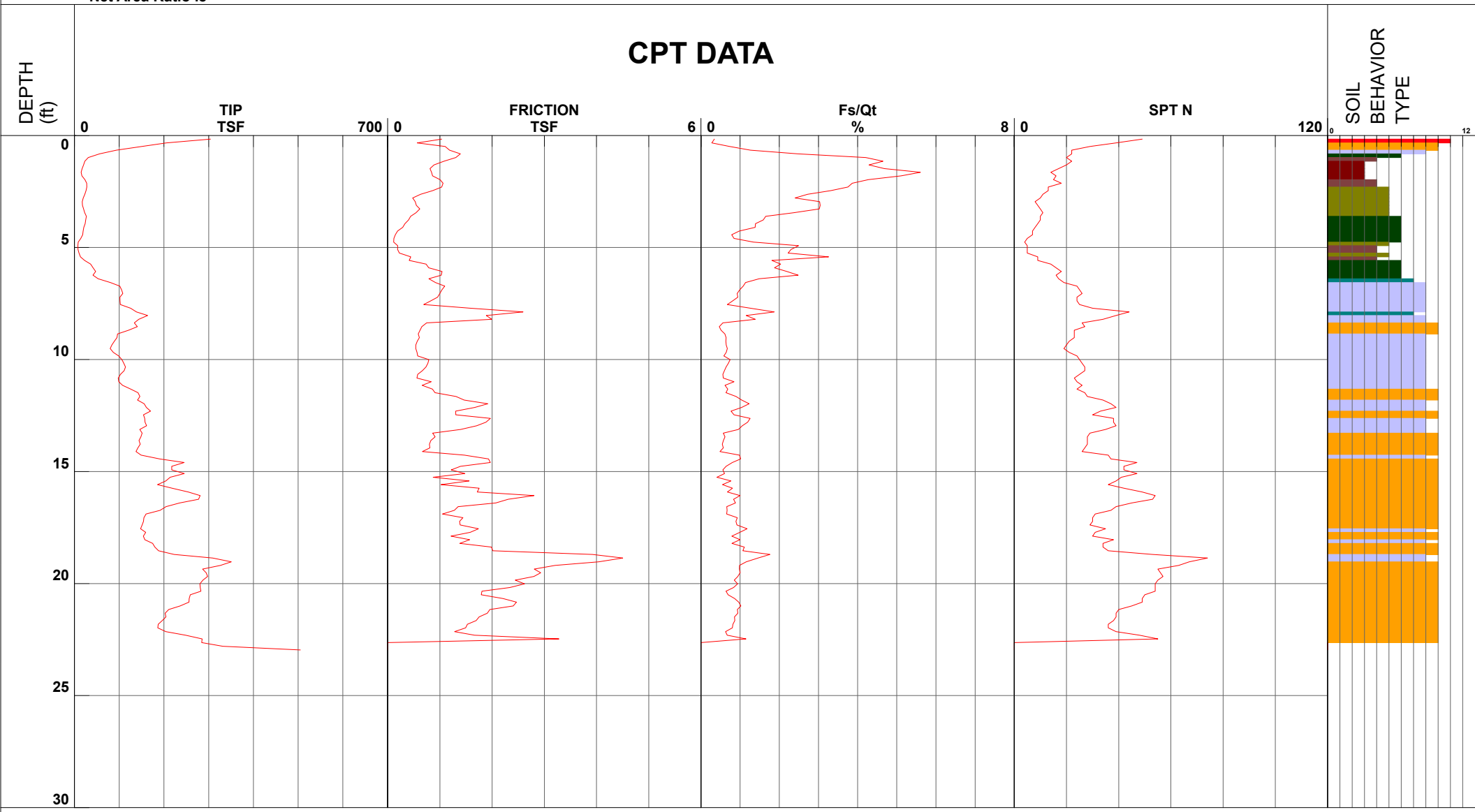
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	New Bradley Branch Library Feasibility Study	Operator	AJ-BH	Filename	SDF(382).cpt
Job Number	305777-001	Cone Number	DDG1587	GPS	
Hole Number	CPT-02	Date and Time	305777-001	Maximum Depth	22.97 ft
EST GW Depth During Test		NO GW			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

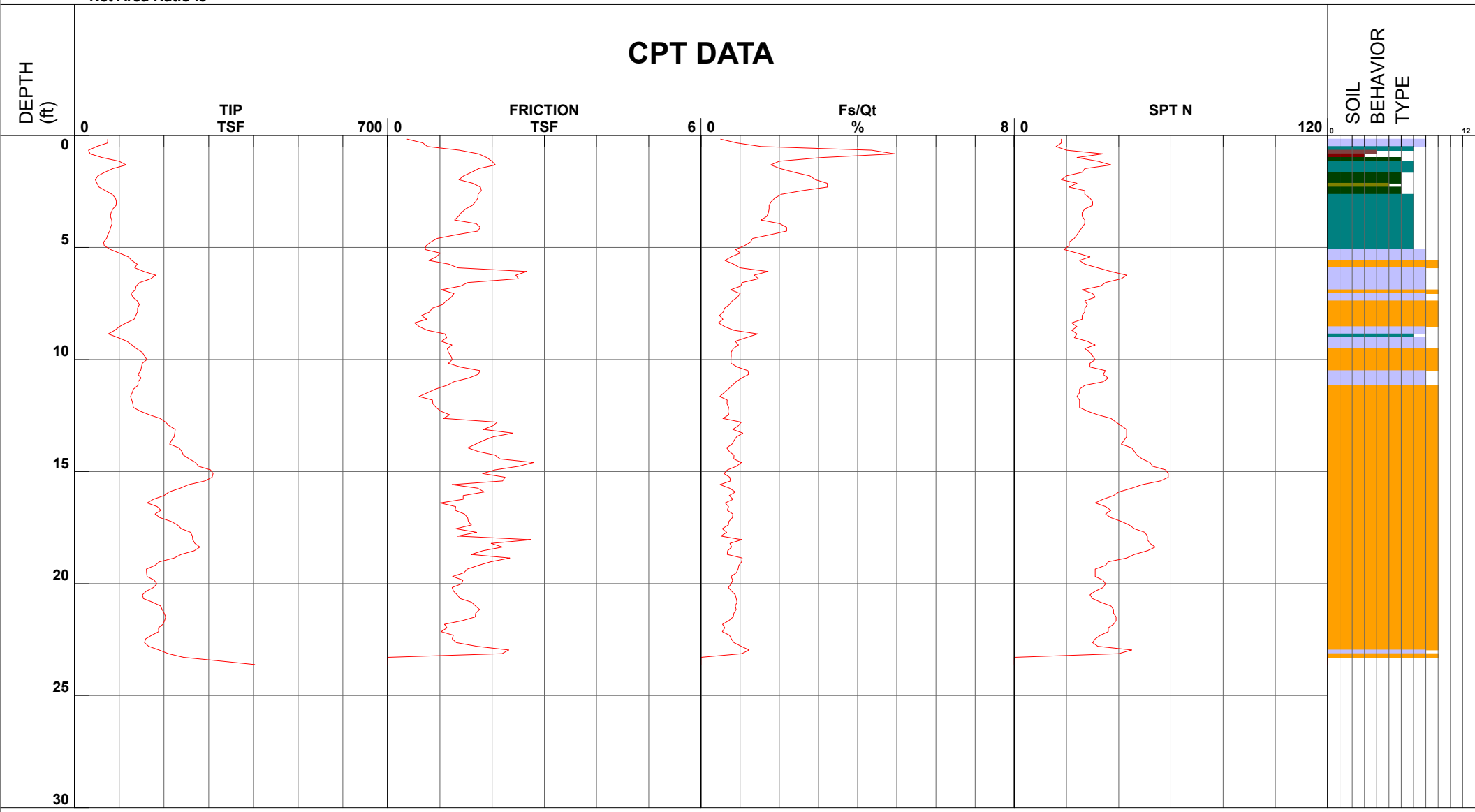
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	New Bradley Branch Library Feasibility Study	Operator	AJ-BH	Filename	SDF(380).cpt
Job Number	305777-001	Cone Number	DDG1587	GPS	
Hole Number	CPT-03	Date and Time	305777-001	Maximum Depth	23.62 ft
EST GW Depth During Test		NO GW			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

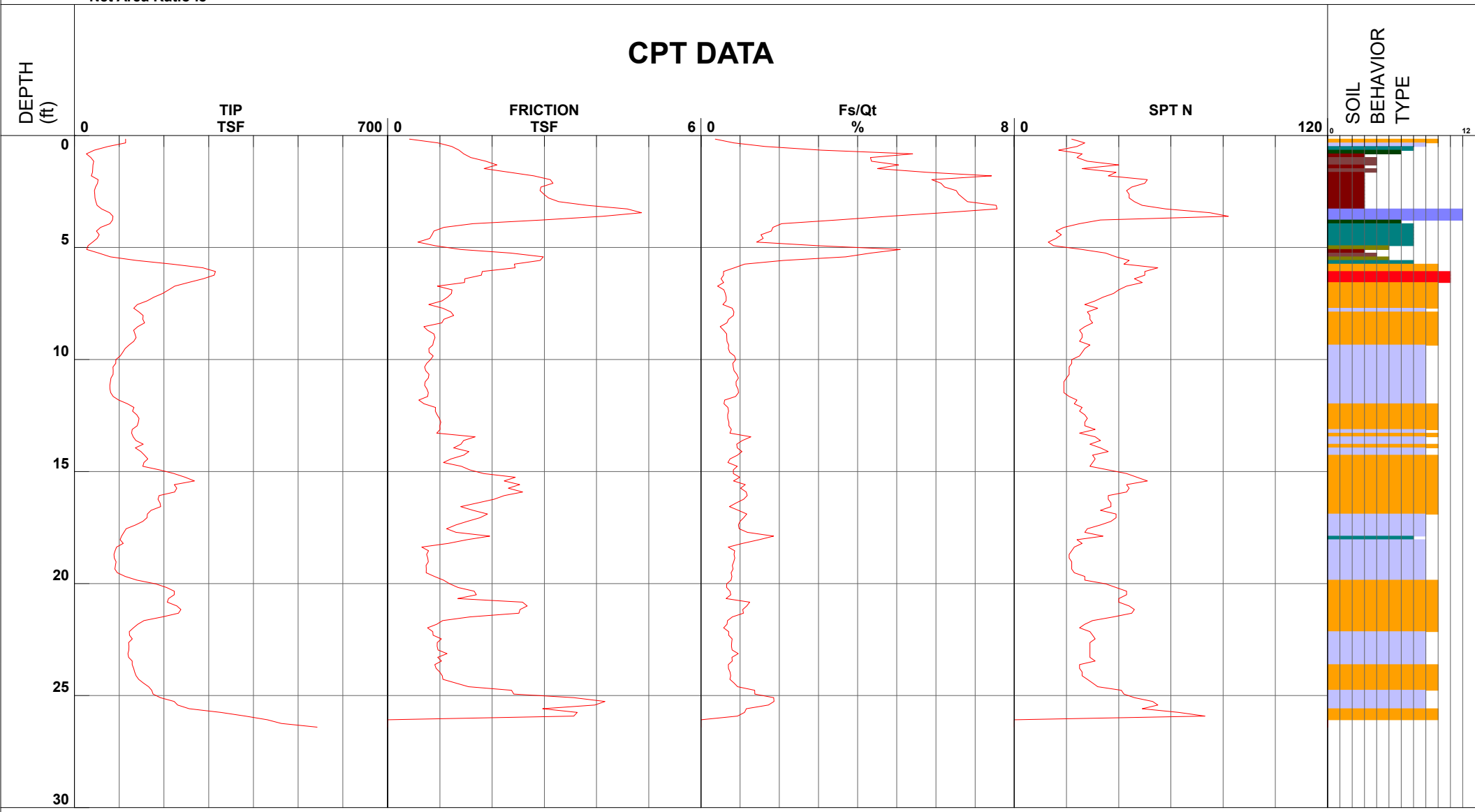
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	New Bradley Branch Library Feasibility Study	Operator	AJ-BH	Filename	SDF(383).cpt
Job Number	305777-001	Cone Number	DDG1587	GPS	
Hole Number	CPT-04	Date and Time	305777-001	Maximum Depth	26.41 ft
EST GW Depth During Test		NO GW			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems Pacific

Boring No. 1
PAGE 1 OF 1
FILE NO.: 305777-001
DATE: 12/28/2022

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0			2" AC / 3" SAND							
	CH		FAT CLAY; dark brown, moist, medium stiff, trace fine to medium grained sand	1.0 - 2.5	1-1	■	92.1	24.3	2 5 7	1.5
			- brown		1-2	■	98.6	25.1		1.5
	CL		SANDY LEAN CLAY; yellowish brown, moist, stiff, very fine grained sand	1.0 - 5.0	BAG A	◯				
				5.0 - 6.5	1-3	■	99.7	22.0	3 8 9	2.0
	SW		WELL GRADED SAND; light yellowish brown, moist, loose, fine to coarse grained sand	8.5 - 10.0	1-4	●			6 5 4	
	SP		POORLY GRADED SAND; light yellowish brown, moist, loose, fine to medium grained sand	13.5 - 15.0	1-5	●			3 4 3	
15			Bottom of boring at 15 feet. No groundwater encountered.							

LEGEND: ■ 2.5" Mod Cal Sample ▭ Shelby ● SPT ◯ Bulk Sample ▽ Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Boring No. 2
PAGE 1 OF 2
FILE NO.: 305777-001
DATE: 12/28/2022

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0	CL		SANDY LEAN CLAY; brown, moist, stiff, fine to medium grained sand, trace silt, some ½" diameter gravel							
			- reduce gravel content [LL = 39, PI = 22]	1.0 - 2.5	2-1 2-2	■ ■			5 9 12	1.5 1.5
			- yellowish brown	1.0 - 3.0	BAG B	◯				
	CL		SANDY LEAN CLAY; yellowish brown, moist, hard, fine to medium grained sand, micaceous						15 31 26	4.0 >4.0
				5.0 - 6.5	2-3 2-4	■	95.5 123.0	9.2 3.9		
	SW		WELL GRADED SAND with GRAVEL; light yellowish brown, moist, dense, fine to coarse grained sand, many ½" diameter gravel							
	SP		POORLY GRADED SAND; yellowish brown, moist, loose, fine to medium grained sand						3 4 6	0.0 0.0
				8.5 - 10.0	2-5 2-6	■ ■	94.9 93.2	2.8 5.4		
	SW		WELL GRADED SAND; yellowish brown, moist, medium dense, fine to coarse grained sand							
			- few ½" diameter gravel	13.5 - 15.0	2-7 2-8	■ ■	106.0 101.3	2.5 4.0	3 5 6	0.0 0.0
			- some fine grained gravel	18.5 - 20.0	2-9	●			3 5 6	
			- increase gravel content, some ½" diameter gravel, medium dense	24.0 - 25.5	2-10	●			4 9 18	

LEGEND: ■ 2.5" Mod Cal Sample ▭ Shelby ● SPT ◯ Bulk Sample ▽ Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Boring No. 2
PAGE 2 OF 2
FILE NO.: 305777-001
DATE: 12/28/2022

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0	SW		- some 1" to 1½" diameter gravel							
5										
10			- wet, dense, increase coarse content	28.5 - 30.0	2-11	●			25 13 21	
15										
20			- decrease coarse content, refusal, possible cobbles	33.5 - 34.5	2-12	●			21 50/5"	
25			Bottom of boring at 34.5 feet. Groundwater encountered at 28 feet.							
30										

LEGEND: ■ 2.5" Mod Cal Sample ▭ Shelby ● SPT ○ Bulk Sample ▼ Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Monitoring Well No. 1

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

FILE NO.: 305777-001
DATE: 12/28/2022

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0	CL		SANDY LEAN CLAY with GRAVEL; brown, moist, occasional ½" diameter gravel, fine to medium grained sand							
5	CL		SANDY LEAN CLAY with GRAVEL; light brown, moist, some very fine grained gravel							
10	SW		WELL GRADED SAND; yellowish brown, moist, fine to coarse grained sand							
15			- occasional very fine to ½" diameter gravel							
20			- many ½" to 1" diameter gravel							
25										

LEGEND: 2.5" Mod Cal Sample | Shelby | SPT | Bulk Sample | Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Monitoring Well No. 1

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

FILE NO.: 305777-001
DATE: 12/28/2022

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
	SW									
			Bottom of boring at 30 feet. Groundwater encountered at 28 feet.							

LEGEND: 2.5" Mod Cal Sample Shelby SPT Bulk Sample Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Percolation No. 1

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

FILE NO.: 305777-001
DATE: 12/28/2022

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0	CL		SANDY LEAN CLAY with GRAVEL; brown, moist, occasional ½" diameter gravel, fine to medium grained sand							
5	CL		SANDY LEAN CLAY with GRAVEL; light brown, moist, some very fine grained gravel							
	SW		WELL GRADED SAND; light yellowish brown, moist, loose, fine to coarse grained sand							
7			Bottom of boring at 7 feet. No groundwater encountered.							
10										
15										
20										
25										

LEGEND: ■ 2.5" Mod Cal Sample ▭ Shelby ● SPT ○ Bulk Sample ▼ Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g.
[redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Percolation No. 2

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

FILE NO.: 305777-001
DATE: 12/28/2022

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0	CL		SANDY LEAN CLAY with GRAVEL; brown, moist, occasional $\frac{1}{2}$" diameter gravel, fine to medium grained sand							
	CL		SANDY LEAN CLAY with GRAVEL; light brown, moist, some very fine grained gravel							
5			Bottom of boring at 5 feet. No groundwater encountered.							

LEGEND: 2.5" Mod Cal Sample | Shelby | SPT | Bulk Sample | Groundwater

[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Percolation No. 3

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

FILE NO.: 305777-001
DATE: 12/28/2022

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0	CL		SANDY LEAN CLAY; brown, moist, fine to medium grained sand, some $\frac{1}{2}$" diameter gravel							
5	CL		SANDY LEAN CLAY; yellowish brown, moist, fine to medium grained sand, micaceous							
			Bottom of boring at 5 feet. No groundwater encountered.							

LEGEND: 2.5" Mod Cal Sample | Shelby | SPT | Bulk Sample | Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Percolation No. 4

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

FILE NO.: 305777-001
DATE: 12/28/2022

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0	CL		SANDY LEAN CLAY; brown, moist, fine to medium grained sand, some $\frac{1}{2}$" diameter gravel							
5	CL		SANDY LEAN CLAY; yellowish brown, moist, fine to medium grained sand, micaceous							
	SW		WELL GRADED SAND with GRAVEL; light yellowish brown, moist, fine to coarse grained sand, many $\frac{1}{2}$" diameter gravel							
			Bottom of boring at 6.5 feet. No groundwater encountered.							

LEGEND: 2.5" Mod Cal Sample | Shelby | SPT | Bulk Sample | Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

BORING LOG LEGEND

SAMPLE / SUBSURFACE WATER SYMBOLS	GRAPH. SYMBOL
CALIFORNIA MODIFIED	
STANDARD PENETRATION TEST (SPT)	
SHELBY TUBE	
BULK	
SUBSURFACE WATER DURING DRILLING	
SUBSURFACE WATER AFTER DRILLING	

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

MAJOR DIVISIONS	GROUP SYMBOL	TYPICAL DESCRIPTIONS	GRAPH. SYMBOL
COARSE GRAINED SOILS (MORE THAN HALF OF MATERIAL IS LARGER THAN #200 SIEVE SIZE)	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
	GP	POORLY GRADED GRAVELS, OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES	
	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES	
	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
	SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES	
	SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES	
	SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES	
FINE GRAINED SOILS (HALF OR MORE OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE)	ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	
	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	

OBSERVED MOISTURE CONDITION

DRY	SLIGHTLY MOIST	MOIST	VERY MOIST	WET (SATURATED)

CONSISTENCY

COARSE GRAINED SOILS			FINE GRAINED SOILS		
BLOWS/FOOT		DESCRIPTIVE TERM	BLOWS/FOOT		DESCRIPTIVE TERM
SPT	CA SAMPLER		SPT	CA SAMPLER	
0-10	0-16	LOOSE	0-2	0-3	VERY SOFT
11-30	17-50	MEDIUM DENSE	3-4	4-7	SOFT
31-50	51-83	DENSE	5-8	6-13	MEDIUM STIFF
OVER 50	OVER 83	VERY DENSE	9-15	14-25	STIFF
			16-30	26-50	VERY STIFF
			OVER 30	OVER 50	HARD

GRAIN SIZES

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENING		
# 200	# 40	# 10	# 4	3/4"	3"	12"

SILT & CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

TYPICAL BEDROCK HARDNESS

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
EXTREMELY HARD	CORE, FRAGMENT, OR EXPOSURE CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CAN ONLY BE CHIPPED WITH REPEATED HEAVY HAMMER BLOWS
VERY HARD	CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CORE OR FRAGMENT BREAKS WITH REPEATED HEAVY HAMMER BLOWS
HARD	CAN BE SCRATCHED WITH KNIFE OR SHARP PICK WITH DIFFICULTY (HEAVY PRESSURE); HEAVY HAMMER BLOW REQUIRED TO BREAK SPECIMEN
MODERATELY HARD	CAN BE GROOVED 1/16 INCH DEEP BY KNIFE OR SHARP PICK WITH MODERATE OR HEAVY PRESSURE; CORE OR FRAGMENT BREAKS WITH LIGHT HAMMER BLOW OR HEAVY MANUAL PRESSURE
SOFT	CAN BE GROOVED OR GOUGED EASILY BY KNIFE OR SHARP PICK WITH LIGHT PRESSURE, CAN BE SCRATCHED WITH FINGERNAIL; BREAKS WITH LIGHT TO MODERATE MANUAL PRESSURE
VERY SOFT	CAN BE READILY INDENTED, GROOVED OR GOUGED WITH FINGERNAIL, OR CARVED WITH KNIFE; BREAKS WITH LIGHT MANUAL PRESSURE

TYPICAL BEDROCK WEATHERING

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
FRESH	NO DISCOLORATION, NOT OXIDIZED
SLIGHTLY WEATHERED	DISCOLORATION OR OXIDATION IS LIMITED TO SURFACE OF, OR SHORT DISTANCE FROM, FRACTURES: SOME FELDSPAR CRYSTALS ARE DULL
MODERATELY WEATHERED	DISCOLORATION OR OXIDATION EXTENDS FROM FRACTURES, USUALLY THROUGHOUT; Fe-Mg MINERALS ARE "RUSTY", FELDSPAR CRYSTALS ARE "CLOUDY"
INTENSELY WEATHERED	DISCOLORATION OR OXIDATION THROUGHOUT; FELDSPAR AND Fe-Mg MINERALS ARE ALTERED TO CLAY TO SOME EXTENT, OR CHEMICAL ALTERATION PRODUCES IN SITU DISAGGREGATION
DECOMPOSED	DISCOLORATION OR OXIDATION THROUGHOUT, BUT RESISTANT MINERALS SUCH AS QUARTZ MAY BE UNALTERED; FELDSPAR AND Fe-Mg MINERALS ARE COMPLETELY ALTERED TO CLAY

drafting/masters/Boring Log Legend121714.dwg

APPENDIX B

Geotechnical Laboratory Test Results
CERCO Analytical Corrosivity Test Results

New Bradley Branch
Feasibility Study

305777-001

BULK DENSITY TEST RESULTS

ASTM D 2937-17 (modified for ring liners)

December 29, 2022

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
1-1	1.5 - 2.0	24.3	114.5	92.1
1-2	2.0 - 2.5	25.1	123.4	98.6
1-3	6.0 - 6.5	22.0	121.6	99.7
2-3	5.5 - 6.0	9.2	104.3	95.5
2-4	6.0 - 6.5	3.9	127.8	123.0
2-5	9.0 - 9.5	2.8	97.6	94.9
2-6	9.5 - 10.0	5.4	98.2	93.2
2-7	14.0 - 14.5	2.5	108.7	106.0
2-8	14.5 - 15.0	4.0	105.3	101.3

New Bradley Branch
Feasibility Study

305777-001

PARTICLE SIZE ANALYSIS

ASTM D 7928-16

Boring #2 @ 2.0 - 2.5'

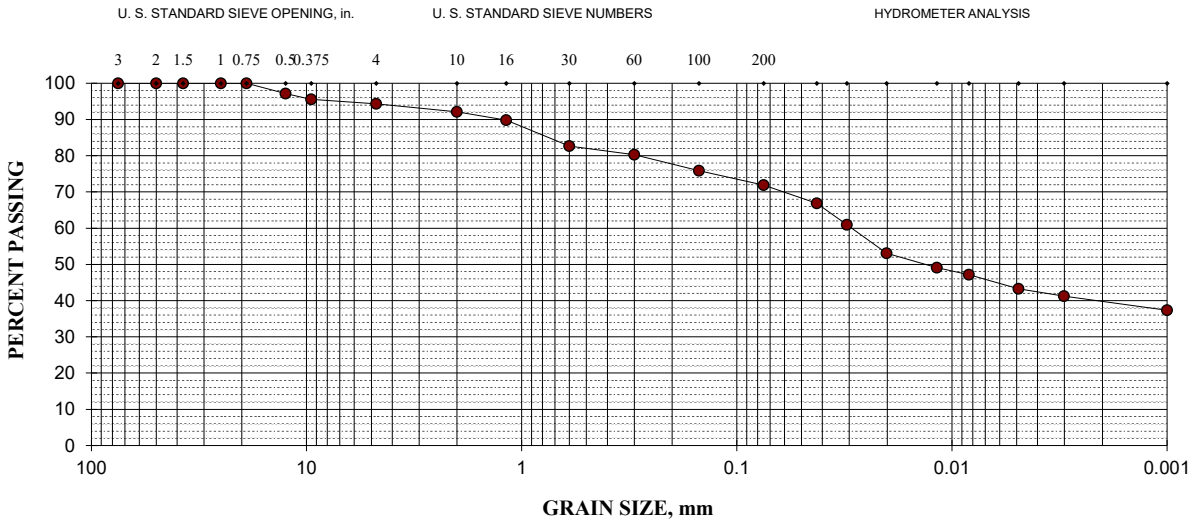
December 29, 2022

Specific Gravity = 2.65 (assumed)

LL = 39; PL = 17; PI = 22

Gravel = 6%; Sand = 22%; Silt = 29%; Clay = 43%

Sieve size	% Retained	% Passing
3" (75.0-mm)	0	100
2" (50.0-mm)	0	100
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	3	97
3/8" (9.5-mm)	4	96
#4 (4.75-mm)	6	94
#10 (2.00-mm)	8	92
#16 (1.18-mm)	10	90
#30 (600-µm)	17	83
#50 (300-µm)	20	80
#100 (150-µm)	24	76
#200 (75-µm)	28	72
Hydrometer Analysis		
42-µm		67
31-µm		61
20-µm		53
12-µm		49
8-µm		47
4.9-µm		43
3.0-µm		41
Colloids		37



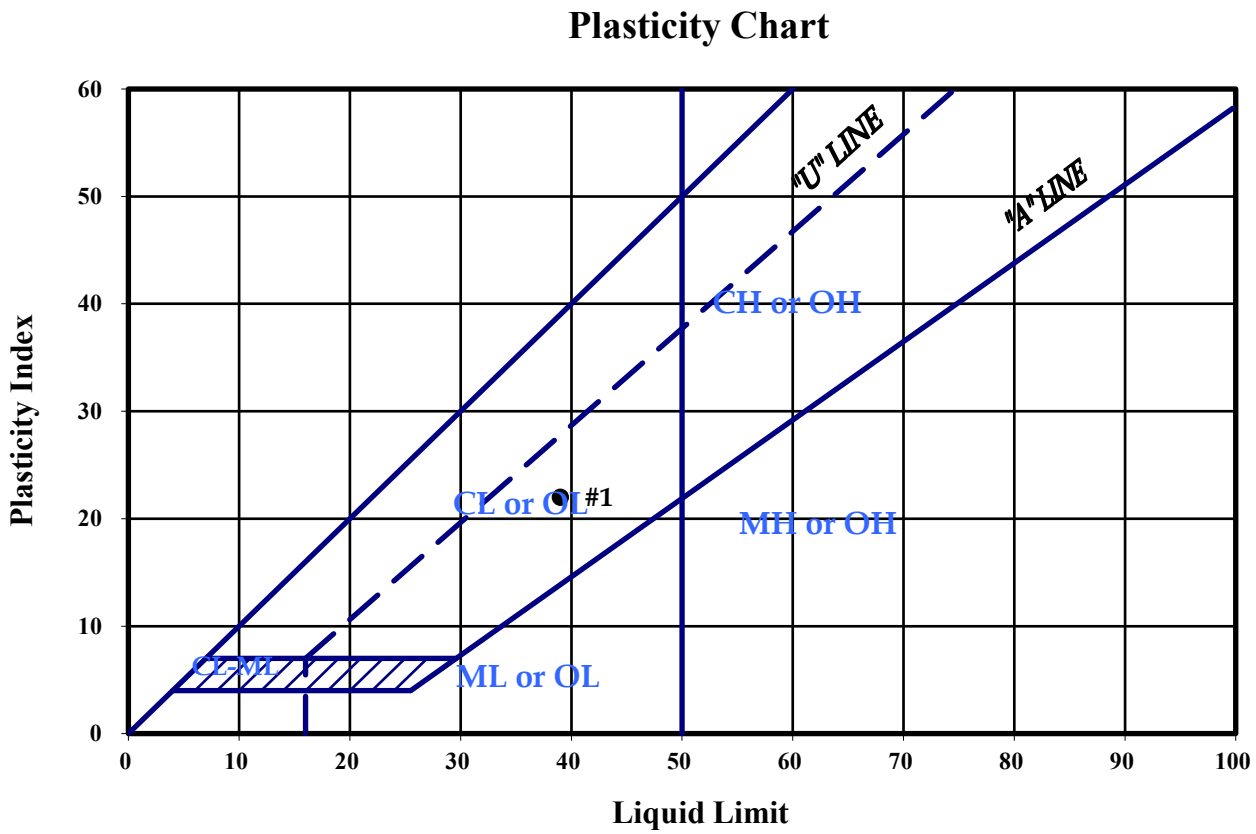
New Bradley Branch 305777-001

PLASTICITY INDEX

ASTM D 4318-17

December 29, 2022

Test No.:	1	2	3	4	5
Boring No.:	2-2				
Sample Depth:	2.0 - 2.5'				
Liquid Limit:	39				
Plastic Limit:	17				
Plasticity Index:	22				



New Bradley Branch Library
Feasibility Study

305777-001

RESISTANCE '*R* ' VALUE AND EXPANSION PRESSURE

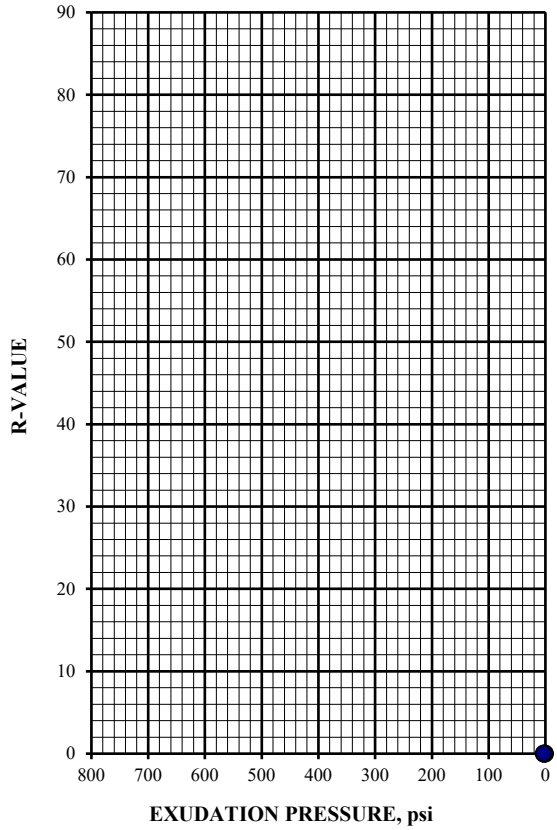
ASTM D 2844/D2844M-18

January 11, 2023

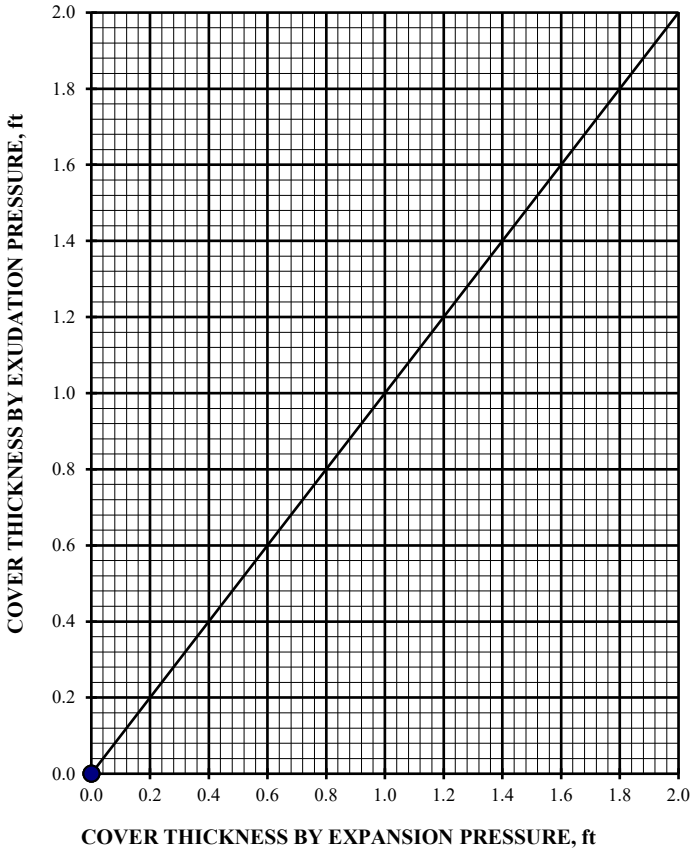
Bag A; Bulk @ 1.0 -3.0'
Brown Sandy Fat Clay (CH)

Dry Density @ 300 psi Exudation Pressure: N/A
%Moisture @ 300 psi Exudation Pressure: N/A
R-Value - Exudation Pressure: N/A
R-Value - Expansion Pressure: N/A
R-Value @ Equilibrium: Less than 5
(sample extruded from mold during testing)

EXUDATION PRESSURE CHART



EXPANSION PRESSURE CHART



CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

12 January, 2023

Job No. 2301012
Cust. No. 13342

Mr. Antonio Hernandez
Earth Systems
1514 Moffett Street, Suite A
Salinas, CA 93905

Subject: Project No.: 305777-001
Project Name: New Bradley Proposed Library Building, Bradley, CA
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Hernandez:

Pursuant to your request, CERCO Analytical has analyzed the soil sample submitted on January 05, 2023. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurement, this sample is classified as "corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentration is 90 mg/kg and is determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentration is 190 mg/kg and is determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at this location.

The pH of the soil is 7.50, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potential is 300-mV and is indicative of potentially "slightly corrosive" soils resulting from anaerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

for, Sherri Moore
J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

Client: Earth Systems
Client's Project No.: 305777-001
Client's Project Name: New Bradley Proposed Library Building, Bradley, CA
Date Sampled: 28-Dec-22
Date Received: 5-Jan-23
Matrix: Soil
Authorization: Transmittal dated 01/03/23

Date of Report: 12-Jan-2023

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Conductivity (umhos/cm)*	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
2301012-001	B2-1	300	7.50	-	680	-	90	190

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
Date Analyzed:	6-Jan-2023	6-Jan-2023	-	11-Jan-2023	-	9-Jan-2023	9-Jan-2023

Sherri Moore
Chemist

* Results Reported on "As Received" Basis
N.D. - None Detected

Quality Control Summary - All laboratory quality control parameters were found to be within established limits

APPENDIX C

Table of Site-Specific Ground Motion Spectra

Table C-1
Fault Parameters

Fault Section Name	Distance (miles)	Distance (km)	Upper Seis. Depth (km)	Lower Seis. Depth (km)	Avg Dip Angle (deg.)	Avg Dip Direction (deg.)	Avg Rake (deg.)	Trace Length (km)	Fault Type	**Mean Mag**	Mean Return Interval (years)	Slip Rate (mm/yr)
Rinconada 2011 CFM FM3.1, 3.2	6.6	10.6	0.0	8.5	82	233	180	123	B	**7.5**		1
San Andreas (Parkfield) FM3.1, 3.2	16.7	26.9	0.0	10.2	90	50	180	36	A	**6.4**	13	20
San Andreas (Creeping Section) FM3.1, 3.2	17.0	27.3	0.0	12.0	90	227	180	121	A	**6.8**	89	9
Oceanic-West Huasna FM3.1, 3.2	21.4	34.5	0.0	7.0	58	49	na	122	B'	**7.1**		
San Juan FM3.1, 3.2	24.7	39.8	0.0	13.0	90	243	180	82	B	**7.1**		1
Hosgri FM3.1, 3.2	26.2	42.2	0.0	6.8	80	59	180	171	B	**7.3**		2.5
San Andreas (Cholame) rev FM3.1, 3.2	29.3	47.2	0.0	12.0	90	51	180	63	A	**6.8**	89	3.5
La Panza FM3.1, 3.2	29.6	47.7	0.0	13.9	51	45	na	72	B'	**7.3**		
Reliz 2011 CFM FM3.1, 3.2	34.4	55.4	0.0	10.9	58	240	na	127	B'	**7.4**		
Los Osos 2011 CFM FM3.1, 3.2	36.2	58.3	0.0	12.0	45	208	90	58	B	**6.9**		0.5
Calaveras (So) - Paicines extension FM3.1, 3.2	39.9	64.3	0.0	13.0	77	na	na	60	B'	**7.0**		
Great Valley 13 (Coalinga) FM3.1, 3.2	41.5	66.8	9.1	15.2	15	226	90	32	B	**7.0**		1.5
Great Valley 14 (Kettleman Hills) FM3.1, 3.2	41.6	66.9	8.1	22.5	22	215	90	24	B	**7.1**		1.5
Great Valley 12 FM3.1, 3.2	41.6	66.9	7.0	9.6	15	243	90	17	B	**6.3**		1.5
Shoreline FM3.1, 3.2	42.6	68.6	0.0	12.0	90	na	na	23	B'	**6.5**		
East Huasna 2011 CFM FM3.1, 3.2	42.7	68.7	0.0	15.0	90	na	na	74	B'	**7.2**		
San Luis Range 2011 CFM, FM3.1	46.3	74.5	0.0	12.0	52	na	na	79	B'	**7.2**		
San Luis Bay 2011 CFM FM3.2	46.5	74.9	0.0	10.0	90	na	na	16	B'	**6.3**		
San Luis Range - Pecho FM3.1, 3.2	46.7	75.1	0.0	12.0	90	na	na	26	B'	**6.6**		
San Luis Range (So Margin) FM3.2	47.1	75.8	0.0	12.0	45	37	90	115	B	**7.1**		0.2
Great Valley 11 FM3.1, 3.2	47.9	77.2	7.0	9.6	15	221	90	24	B	**6.5**		1.5
South Cuyama FM3.1, 3.2	49.6	79.8	0.0	13.9	33	210	na	83	B'	**7.5**		
Lost Hills FM3.1, 3.2	49.6	79.9	4.2	12.0	29	233	na	33	B'	**6.8**		
Monterey Bay-Tularcitos FM3.1, 3.2	51.8	83.3	0.0	14.0	90	49	150	86	B	**7.3**		0.5
San Luis Range - Oceano 2011 CFM, FM3.1	51.9	83.6	0.0	12.0	45	na	na	21	B'	**6.6**		
Ortigalita (South) FM3.1, 3.2	52.6	84.7	0.0	11.0	90	na	na	62	B'	**6.9**		
Great Valley 10 Panoche FM3.1, 3.2	53.5	86.1	7.0	9.6	15	242	90	22	B	**6.4**		1.5
San Gregorio (South) 2011 CFM FM3.1, 3.2	54.1	87.0	0.0	11.6	75	66	180	90	B'	**7.2**		
Casmalia 2011 CFM	60.8	97.9	0.0	12.0	75	na	na	48	B'	**6.9**		
San Andreas (Carrizo) rev FM3.1, 3.2	65.0	104.5	0.0	15.1	90	224	180	59	A	**6.8**	89	3.5
Great Valley 9 Laguna Seca FM3.1, 3.2	65.3	105.1	7.0	9.6	15	237	90	39	B	**6.7**		1.5
Quien Sabe 2011 CFM FM3.1, 3.2	65.5	105.4	0.0	10.1	85	54	180	25	B	**6.5**		1
Lions Head 2011 CFM FM3.1, 3.2	67.5	108.6	0.0	12.0	75	29	90	65	B	**6.7**		0.02
Morales (West) FM3.1, 3.2	69.4	111.6	0.0	8.6	32	49	na	28	B'	**6.8**		
Hosgri (Extension) FM3.1, 3.2	69.7	112.2	0.0	7.5	80	79	na	29	B'	**6.4**		
Zayante-Vergeles FM3.2	73.9	118.9	0.0	12.0	90	36	150	58	B	**7.0**		0.1
Zayante-Vergeles 2011 CFM, FM3.1	74.5	119.8	0.0	11.8	30	211	na	90	B'	**7.5**		
San Andreas (Santa Cruz Mtn) FM3.1, 3.2	74.9	120.5	0.0	15.0	79	42	180	63	A	**7.6**	219	24
Calaveras (So) 2011 CFM FM3.1, 3.2	75.0	120.7	0.0	9.5	85	71	180	26	A	**6.0**	20	6
Sargent 2011 CFM FM3.1, 3.2	77.3	124.4	0.0	12.0	90	na	na	57	B'	**6.9**		

Reference: USGS OFR 2013-1165 (CGS SP 228)

Based on Site Coordinates of 35.863535 Latitude, -120.805166 Longitude

Mean Magnitude for Type A Faults based on 0.1 weight for unsegmented section, 0.9 weight for segmented model (weighted by probability of each scenario with section listed as given on Table 3 of Appendix G in OFR 2008-1437). Mean magntude is average of Ellworths-B and Hanks & Bakun moment area relationship.

Site Coordinates: 35.864 N 120.805 W

Table C-2
Historical Earthquakes in Vicinity of Project Site, M >= 5.5

Day	Year	Epicenter Latitude (Degrees)	Epicenter Longitude (Degrees)	Distance from Site (mi)	Magnitude M_W
1/9	1857	36.10	120.65	18.5	**6.1**
2/2	1881	36.05	120.55	19.2	**6.0**
5/6	1881	36.05	120.55	19.2	**5.5**
3/3	1901	36.00	120.50	19.5	**6.4**
2/1	1853	35.70	121.10	20.0	**5.5**
12/22	2003	35.70	121.10	20.0	**6.6**
1/14	1855	36.15	120.70	20.6	**5.5**
1/9	1857	36.20	120.80	23.2	**7.9**
4/12	1885	36.20	120.80	23.2	**6.5**
9/28	2004	35.82	120.37	24.5	**6.0**
9/2	1853	36.25	120.80	26.7	**6.3**
11/22	1952	35.76	121.27	27.0	**6.2**
6/8	1934	35.79	120.29	29.3	**6.0**
1/9	1857	36.29	120.85	29.6	**5.6**
6/28	1966	35.81	120.27	30.2	**6.0**
5/30	1877	35.70	120.30	30.5	**5.5**
3/10	1922	35.75	120.25	32.1	**6.3**
8/18	1922	35.75	120.25	32.1	**5.7**
12/7	1906	35.50	121.20	33.5	**5.7**
4/17	1860	36.35	120.95	34.5	**6.0**
7/22	1983	36.26	120.38	36.2	**5.7**
99/99	1830	35.35	120.65	36.5	**6.0**
5/2	1983	36.23	120.32	37.1	**6.3**
5/2	1983	36.23	120.29	38.3	**5.7**
4/27	1908	35.60	120.20	38.5	**5.5**
9/5	1922	35.30	120.70	39.4	**5.5**
7/4	2005	36.34	121.23	40.5	**5.7**
12/27	1926	36.40	120.40	43.4	**5.5**
5/26	1905	36.50	120.60	45.4	**6.1**
8/4	1985	36.15	120.05	46.6	**6.1**
3/6	1882	36.50	121.10	46.9	**5.9**
3/25	1903	36.10	121.60	47.3	**5.9**
7/25	1926	36.50	120.40	49.4	**5.8**
4/2	1885	36.60	121.10	53.4	**5.9**
8/6	1916	36.67	121.25	60.9	**5.8**
3/31	1885	36.70	121.20	61.8	**5.7**
4/9	1961	36.68	121.30	62.7	**5.5**
4/9	1961	36.70	121.30	64.0	**5.5**

From full earthquake catalog in USGS OFR 2008-1437h as updated with current events through 2022 (ANSS 2022). For events with an asterisk, alternate solutions are given in the OFR. Ordered By Closest Event. Maximum 40 Closest Events

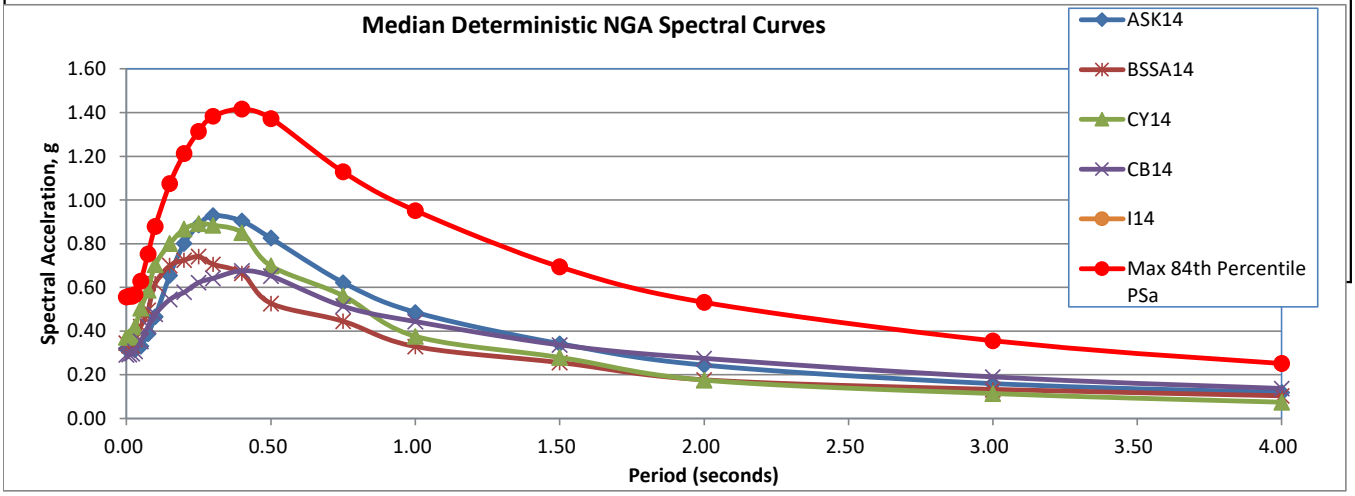
35.8635 -120.80517 Lat/Long

Table C-3 - Deterministic Spectral Response Values
Deterministic NGA Response Spectra for Largest Median Earthquake Ground Motion

Average of NGA: Abrahamson - Silva - Kamai (2014), Boore - Stewart - Seyhan - Atkinson (2013), Campbell-Bozorgnia (2013), Chiou - Youngs (2014), and Idriss (2013)

Mean Spectra Response from Attentuation Relationships

Input Variables	ASK14		BSSA14	CB14	CY14	I14	Average			
	Period (sec)	Median PSa (g)	Median PSa (g)	Median PSa (g)	Median PSa (g)	Median PSa (g)	Period (sec)	Mean PSa (g)	Max 84th Percentile PSa (g)	Max Rotated Determ. PSa
	Weight:	**0.25**	**0.25**	**0.25**	**0.25**	**0.00**				
M 7.45	**0.00**	0.32	0.34	0.29	0.37	-	**0.00**	0.330	0.555	**0.611**
	0.01	0.32	0.34	0.29	0.37	-	**0.01**	0.332	0.559	**0.615**
R_{RUP} 10.60	**0.02**	0.32	0.33	0.30	0.37	-	**0.02**	0.331	0.559	**0.615**
	0.03	0.31	0.33	0.31	0.38	-	**0.03**	0.334	0.566	**0.623**
R_{JB} 10.60	**0.05**	0.33	0.36	0.35	0.42	-	**0.05**	0.366	0.628	**0.691**
	0.075	0.39	0.42	0.42	0.50	-	**0.075**	0.433	0.753	**0.829**
$V_{S\,30}$ 270	**0.10**	0.47	0.50	0.48	0.59	-	**0.10**	0.506	0.879	**0.967**
	0.15	0.65	0.62	0.54	0.70	-	**0.15**	0.630	1.075	**1.182**
F_{RV} 0	**0.20**	0.80	0.70	0.58	0.80	-	**0.20**	0.719	1.213	**1.334**
	0.25	0.89	0.72	0.62	0.87	-	**0.25**	0.774	1.314	**1.507**
F_{NM} 0	**0.30**	0.93	0.74	0.64	0.89	-	**0.30**	0.800	1.383	**1.600**
	0.40	0.90	0.70	0.68	0.88	-	**0.40**	0.792	1.416	**1.667**
W 8.60	**0.50**	0.83	0.66	0.65	0.85	-	**0.50**	0.748	1.372	**1.644**
	0.75	0.62	0.53	0.51	0.70	-	**0.75**	0.590	1.128	**1.409**
Z_{TOR} 0.00	**1.00**	0.49	0.44	0.44	0.56	-	**1.00**	0.484	0.951	**1.236**
	1.50	0.34	0.33	0.34	0.38	-	**1.50**	0.345	0.694	**0.920**
Z_{BOT} 8.50	**2.00**	0.24	0.26	0.27	0.28	-	**2.00**	0.263	0.532	**0.718**
	3.00	0.16	0.18	0.19	0.18	-	**3.00**	0.175	0.355	**0.497**
dip 82	**4.00**	0.12	0.13	0.14	0.11	-	**4.00**	0.125	0.252	**0.365**
	5.00	0.09	0.10	0.10	0.07	-	**5.00**	0.092	0.184	**0.276**
	7.50	0.06	0.06	0.04	0.03	-	**7.50**	0.047	0.091	**0.137**
	10.00	0.04	0.03	0.02	0.02	-	**10.00**	0.027	0.051	**0.077**



35.863535 -120.80517 Lat/Long

Table C-4 - Site Specific Spectral Response Values
Probabilistic and Deterministic Response Spectra for MCE compared to Code Spectra
for 5% Viscous Damping Ratio

Natural Period T (seconds)	GeoMean Probab. 2% in 50 year MCE Spectrum (1) 2475-year (ASCE 21.2.1)	Max Rotated Probab. 2% in 50 year MCEr Spectrum (2) 2475-year (ASCE 21.2.1.1)	Max Rotated 84th Percentile Determ. MCE Spectrum (3) (ASCE 21.2.2)	Determ. Lower Limit MCE Spectrum (4) (3) * 1.00=Scaling (ASCE 21.2.2)	Determ. MCE Spectrum (5) Max (3),(4) (ASCE 21.2.2)	Site Specific MCE, Ground Response (SaM) (6) Min (2),(5) (ASCE 21.2.3)	Site Specific MCE Spectrum Comparator (6b) Max (6),1.5*(8) (ASCE 21.2.3)	2022 CBC MCE Spectrum (7)	Site Specific Design Spectrum (Sa) (8) (ASCE 21.3)	2022 CBC Design Spectrum (9) 2/3*(7)
0.00	0.637	0.685	0.611	0.611	0.611	0.611	0.611	0.512	0.407	0.342
0.05	0.897	0.964	0.691	0.691	0.691	0.691	0.691	0.730	0.460	0.487
0.10	1.156	1.242	0.967	0.967	0.967	0.967	0.967	0.948	0.645	0.632
0.15	1.378	1.481	1.182	1.182	1.182	1.182	1.182	1.166	0.788	0.777
0.20	1.535	1.650	1.334	1.334	1.334	1.334	1.334	1.281	0.889	0.854
0.30	1.642	1.846	1.600	1.600	1.600	1.600	1.600	1.281	1.067	0.854
0.40	1.566	1.782	1.667	1.667	1.667	1.667	1.667	1.281	1.112	0.854
0.50	1.507	1.735	1.644	1.644	1.644	1.644	1.644	1.281	1.096	0.854
0.75	1.194	1.414	1.409	1.409	1.409	1.409	1.409	1.281	0.939	0.854
1.00	0.973	1.182	1.236	1.236	1.236	1.182	1.182	1.130	0.788	0.753
1.50	0.714	0.885	0.920	0.920	0.920	0.885	0.885	0.753	0.590	0.502
2.00	0.531	0.670	0.718	0.718	0.718	0.670	0.670	0.565	0.446	0.377
3.00	0.360	0.472	0.497	0.497	0.497	0.472	0.472	0.377	0.314	0.251
4.00	0.269	0.365	0.365	0.365	0.365	0.365	0.365	0.283	0.243	0.188
5.00	0.210	0.295	0.276	0.276	0.276	0.276	0.276	0.226	0.184	0.151
8.00	0.155	0.217	0.157	0.157	0.157	0.157	0.157	0.141	0.104	0.094
10.00	0.148	0.208	0.077	0.077	0.077	0.077	0.090	0.113	0.060	0.075
12.00	0.146	0.205	0.042	0.042	0.042	0.042	0.075	0.094	0.050	0.063

C_{RS}:	0.977	
C_{R1}:	0.935	
Site Specific To:	0.195	$= 0.2*S_{D1}/S_{DS}$
Site Specific Ts:	0.973	$= S_{D1}/S_{DS}$

The value of Fa used in Column (3) is defined within ASCE 21.2.2 Supplement 3. This Fa value only applies within Column (3).

Site Coefficients	
F_{PGA}	1.10
F_a	1.00
F_v	2.50

Probabilistic spectrum from 2014 USGS Ground Motion Mapping Program adjusted for site conditions and scaled to represent maximum response in a horizontal plane, in accordance with ASCE 7-16 Section 21.2

Mapped MCE Acceleration Values		
PGA	0.500	g
S_S	1.281	g
S_1	0.452	g

Risk Coefficients have been applied to Column (2); If Method 1 was utilized the Risk Coefficients, CRS and CR1 are presented above, if Method 2 was utilized the Risk Coefficients were obtained from the USGS Risk Targeted Ground Motion Calculator (https://earthquake.usgs.gov/designmaps/rtgm).

Seismic Site Class	**D**
Risk Category	**II**

Reference: ASCE 7-16, Chapters 21.2, 21.3, 21.4, 21.5, 11.4, and 11.8

Calculation Utilized ASCE7-16, Section 21.2.1.1 - Method 1

Site-Specific Design Acceleration Values		
PGA_M	**0.611**	**g**
S_{DS}	**1.000**	**g**
S_{D1}	**0.973**	**g**

Short-Period Seismic Design Category:	1-Second Period Seismic Design Category:
D	D

Vertical Coefficient (C_V)
1.36

Deterministic Fault Parameters			
Rinconada 2011 CFM FM3.1, 1		R_{JB} (km)	10.6
Magnitude	7.45	R_{RUP} (km)	10.6
Distance (km)	10.6	Z_{TOR} (km)	0.0
Width (km)	8.6	Z_{BOT} (km)	8.5
Dip (Deg.)	82	V_{S30} (m/s)	270

Site-Specific MCE_R, 5% damped, Spectral Response Acceleration Parameter		
S_{MS}	**1.501**	**g**
S_{M1}	**1.460**	**g**

1 g = 980.6 cm/sec^2 =32.2 ft/sec^2

PSV (ft/sec) = $32.2(S_a)T/(2p)$

Key: Probab. = Probabilistic, Determ. = Deterministic, MCE = Maximum Considered Earthquake

Bradley Branch Library	35.863535 -120.805 Lat/Long	305777-001

Table C-5 - General Procedure Seismic Design Values

2022 California Building Code (CBC) (ASCE 7-16) Seismic Design Parameters

(Values presented should only be used by a Structural Engineer to determine if the exception in 11.4.8 (ASCE 7-16) can be used)

				CBC Reference	ASCE 7-16 Reference
Seismic Design Category		**D**			
Site Class		**D**		Table 1613.5.6	Table 11.6-1
Latitude:		35.864		Table 1613.5.2	Table 20.3-1
Longitude:		-120.805			
Maximum Considered Earthquake (MCE) Ground Motion					
Short Period Spectral Reponse	S_S	**1.281**	**g**	Figure 1613.5	Figure 22-1
1 second Spectral Response	S_1	**0.452**	**g**	Figure 1613.5	Figure 22-2
Site Coefficient	F_a	1.00		Table 1613.5.3(1)	Table 11.4-1
Site Coefficient	F_v	1.85		Table 1613.5.3(2)	Table 11-4.2
	S_{MS}	1.281	g	$= F_a*S_S$	
	S_{M1}	0.835	g	$= F_v*S_1$	
Design Earthquake Ground Motion					
Short Period Spectral Reponse	S_{DS}	**0.854**	**g**	$= 2/3*S_{MS}$	
1 second Spectral Response	S_{D1}	**0.557**	**g**	$= 2/3*S_{M1}$	

Site Specific Evaluation May Be Required Due to Site Class = D or E and S1>=0.2. The Presented SDS and SD1 are NOT Valid Unless the Exception of ASCE7-16, Section 11.4.8 Applies

To	0.13	sec	$= 0.2*S_{D1}/S_{DS}$
Ts (11.4.8 ASCE 7-16 Exception Assumed)	0.65	sec	$= S_{D1}/S_{DS}$
Risk Category	II		Table 1604.5
Seismic Importance Factor	1.00		
F_{PGA}	1.10		
PGA_M	**0.55**		
Vertical Coefficient (C_V)	1.36		Table 11.9-1

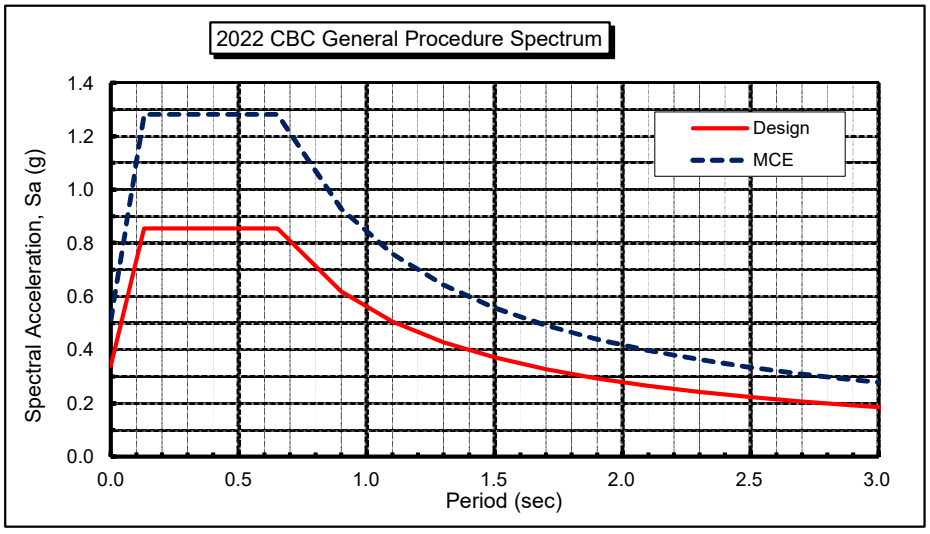


Table 11.5-1 Design

Period T (sec)	Sa (g)
0.00	0.342
0.05	0.538
0.13	0.854
0.65	0.854
0.90	0.619
1.10	0.506
1.30	0.428
1.50	0.371
1.70	0.328
1.90	0.293
2.10	0.265
2.30	0.242
2.50	0.223
2.70	0.206
2.90	0.192
3.10	0.180

APPENDIX D

Liquefaction Analysis

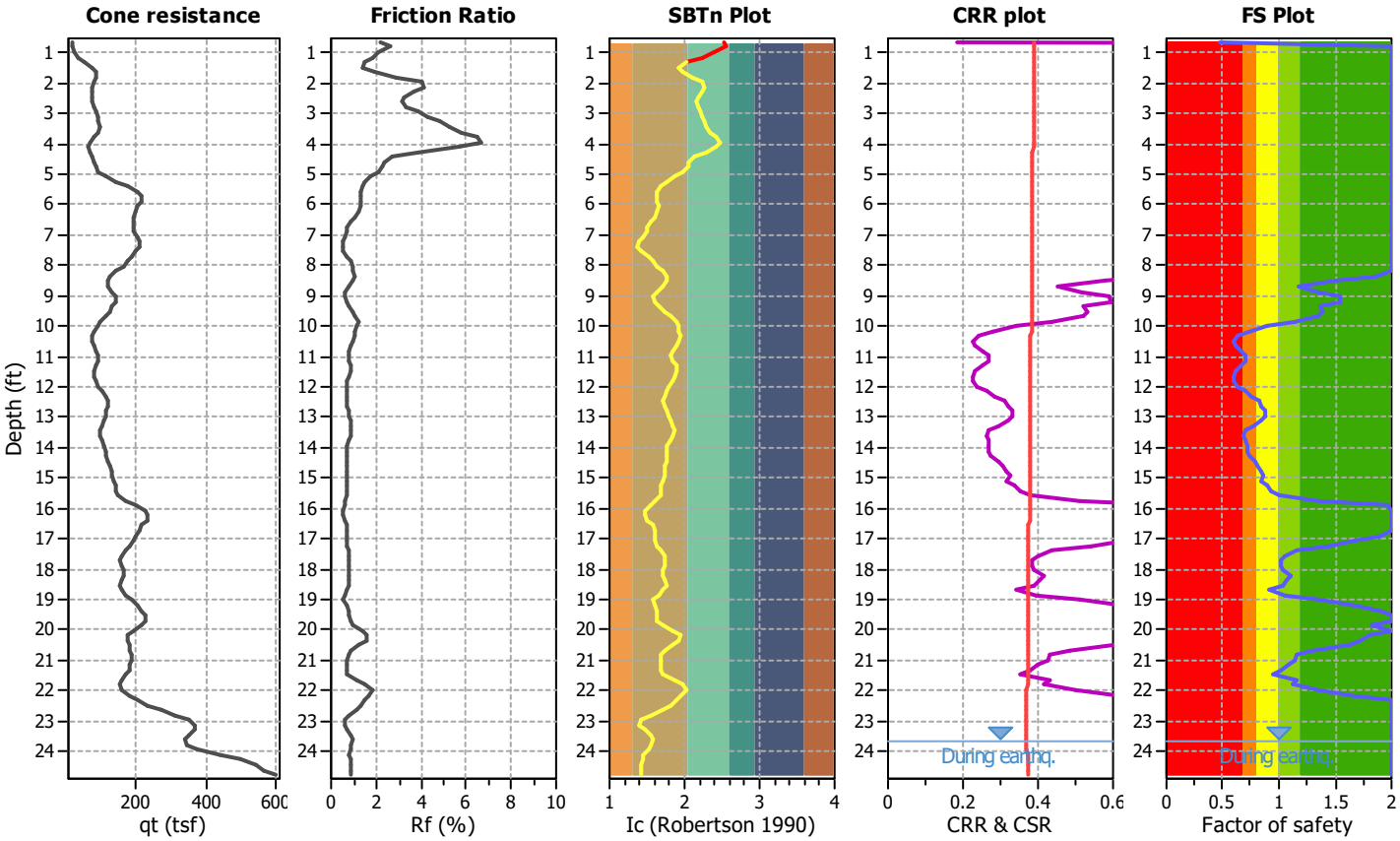
LIQUEFACTION ANALYSIS REPORT

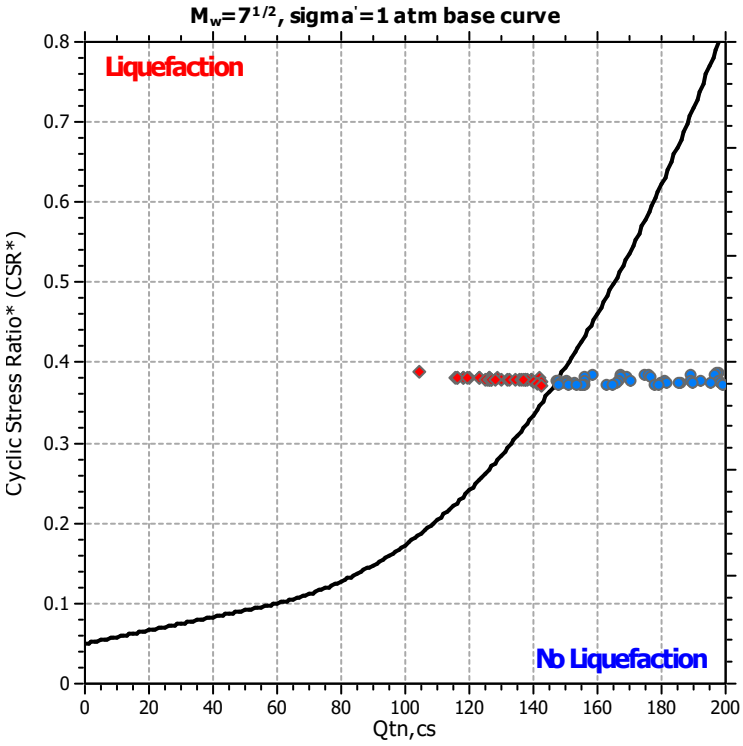
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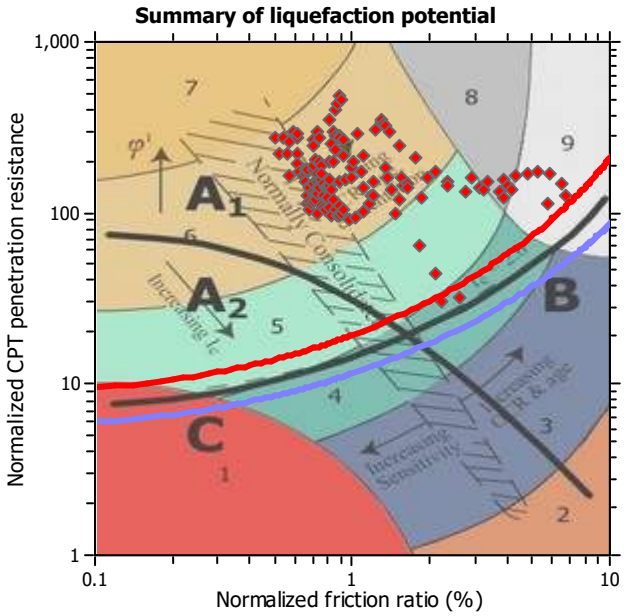
CPT file : CPT-01 - Basic

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	23.67 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	23.67 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.45	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	No		

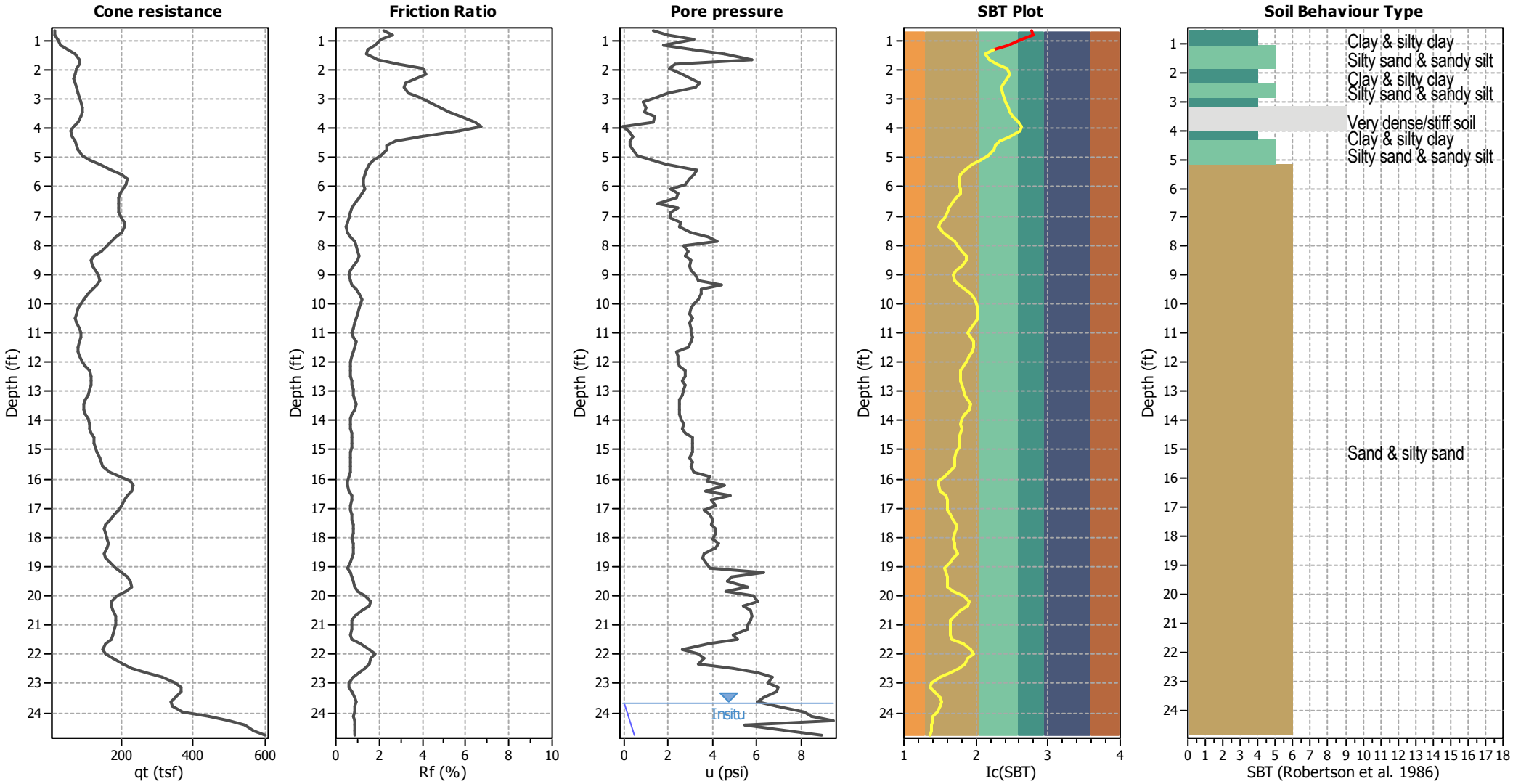






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



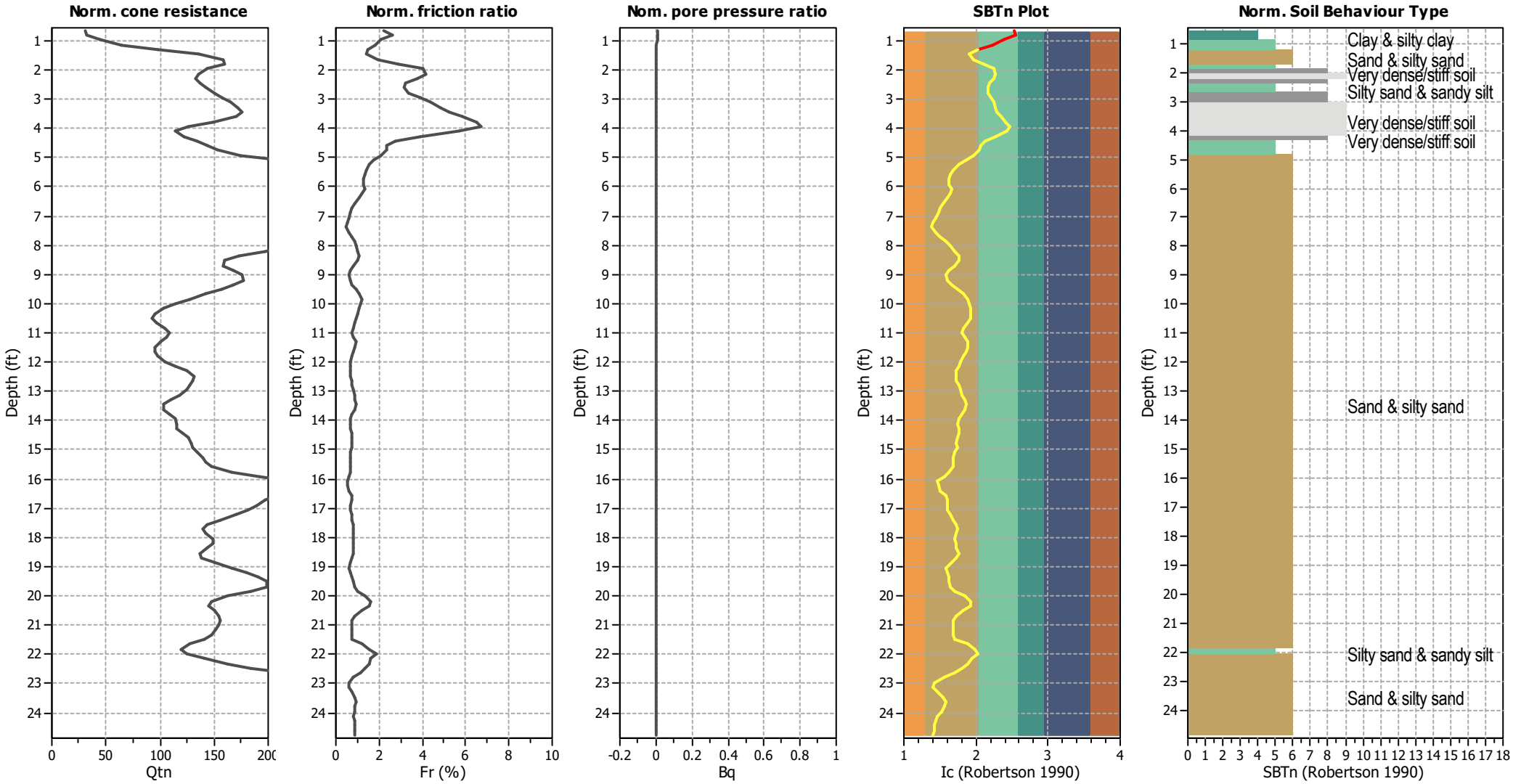
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



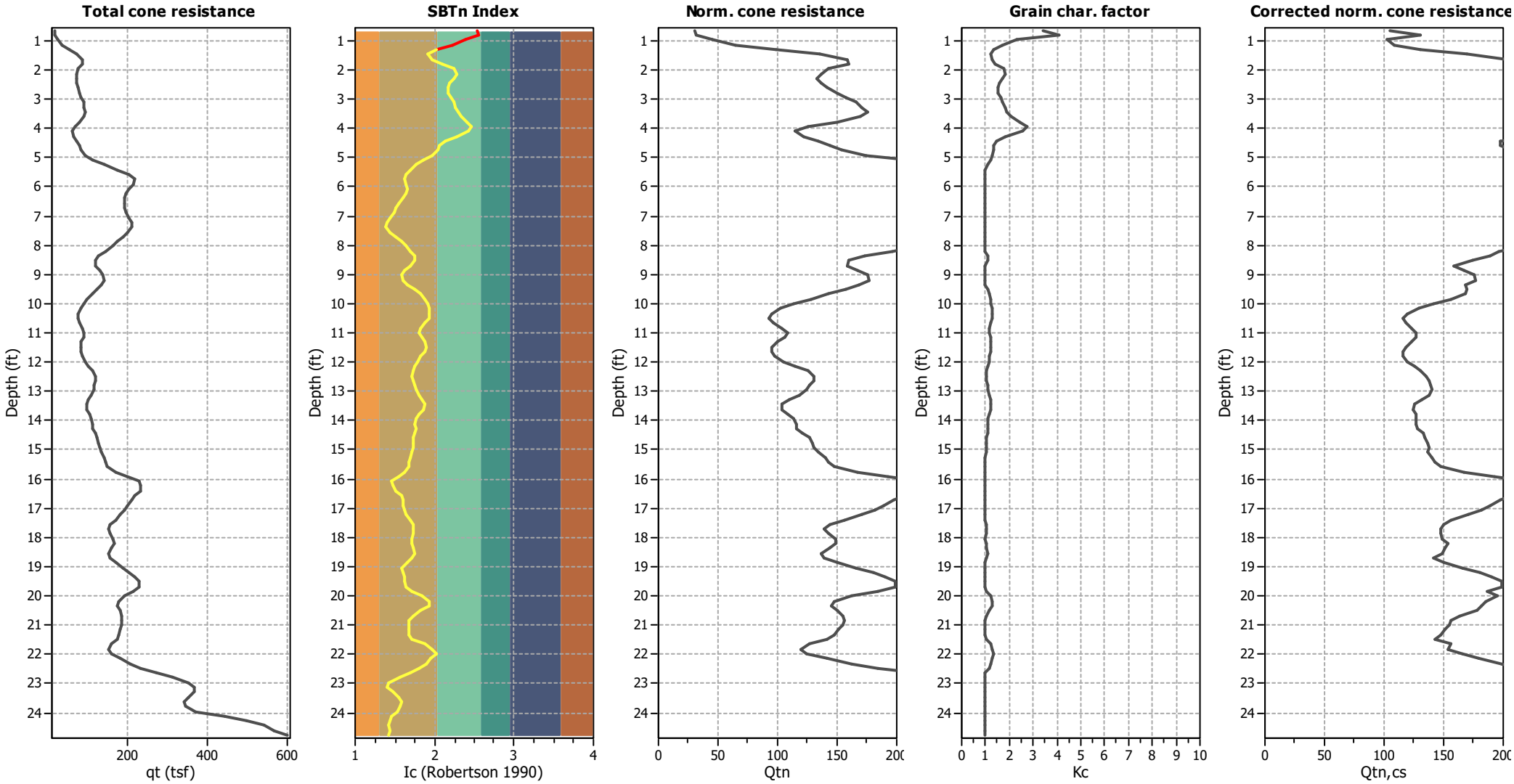
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

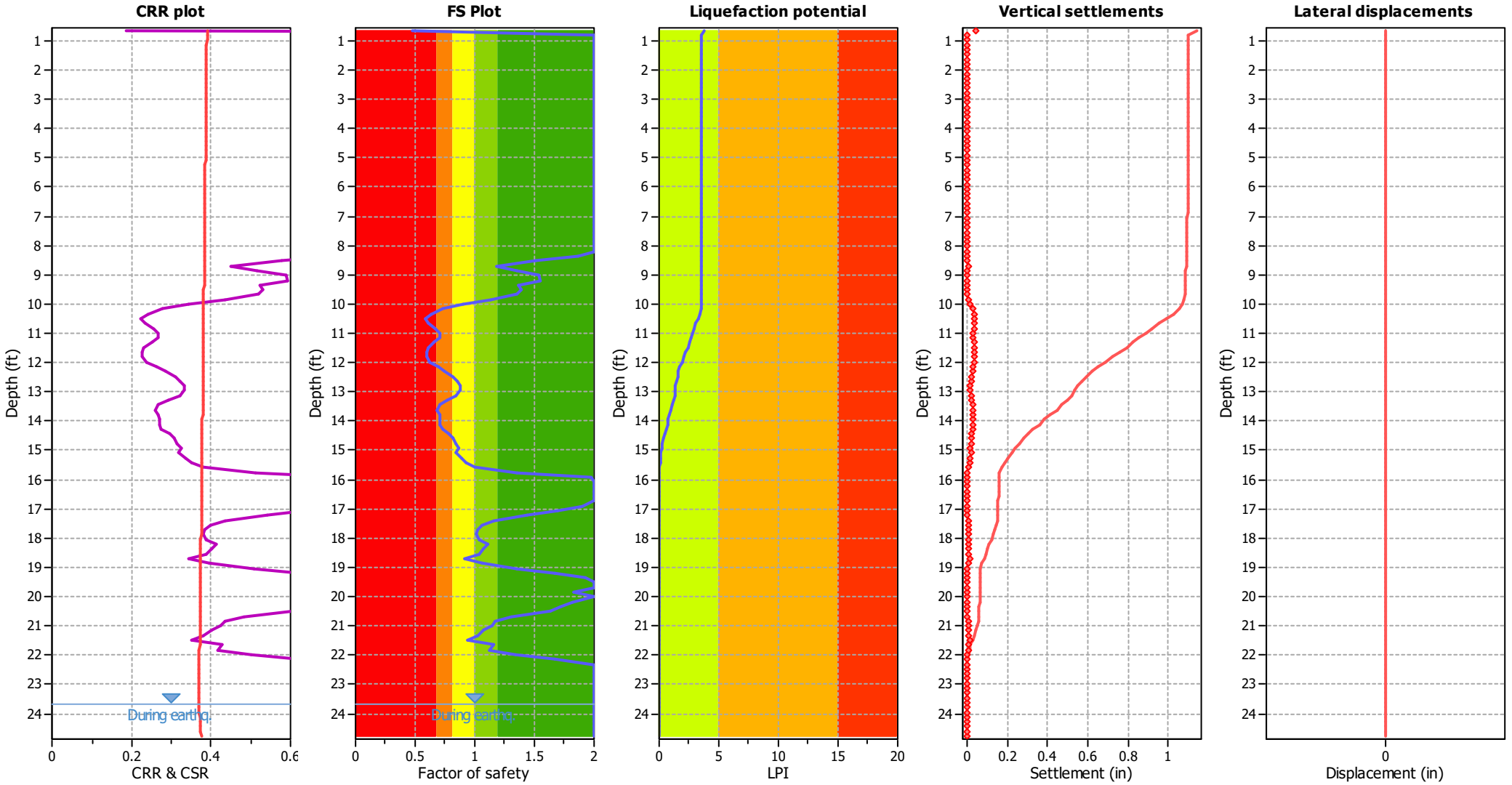
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

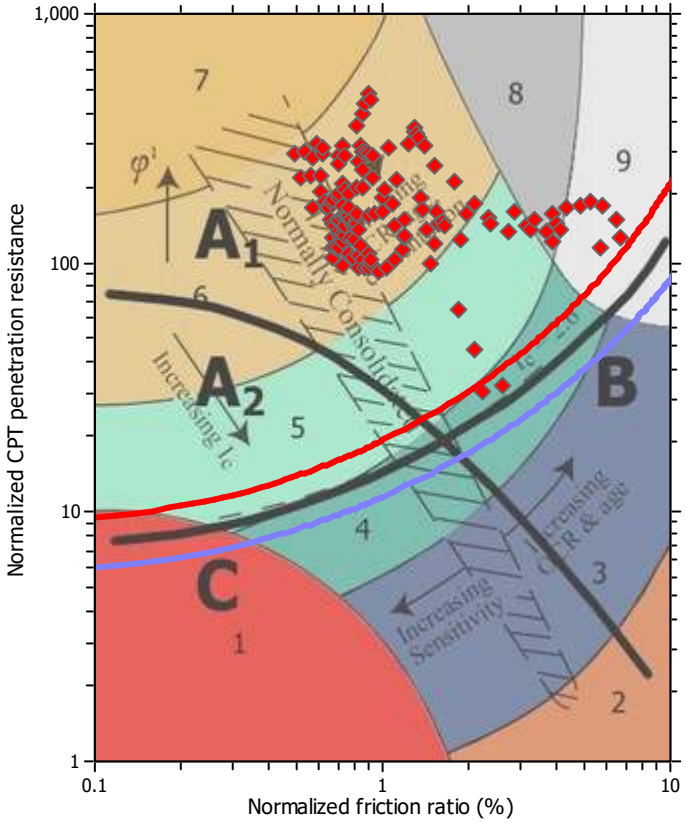
F.S. color scheme

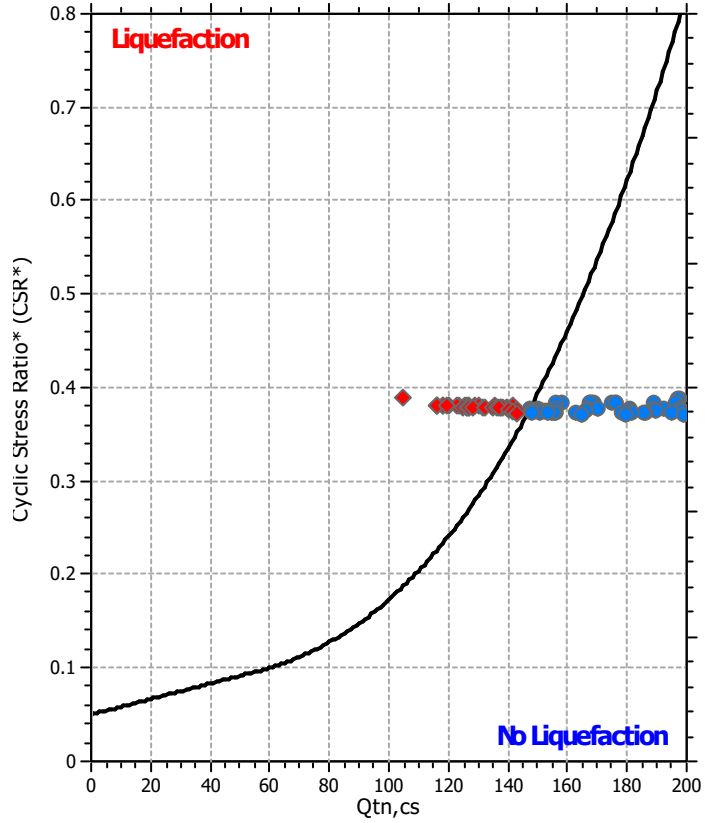
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

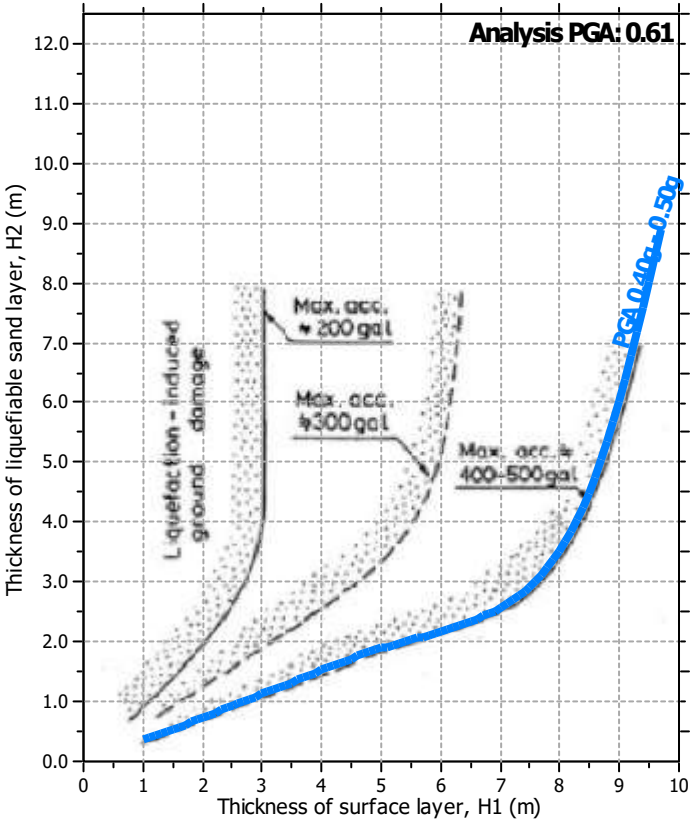
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



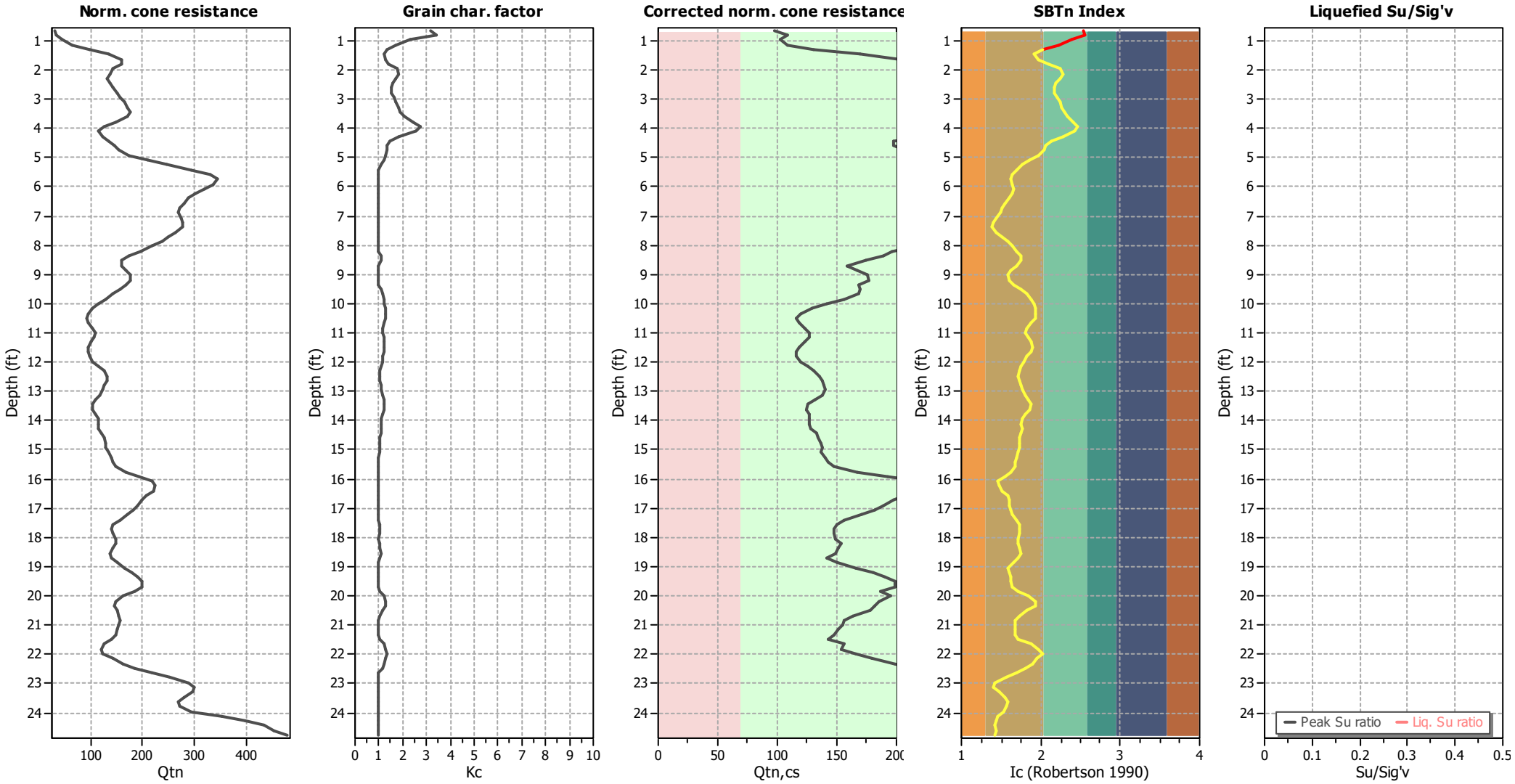




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

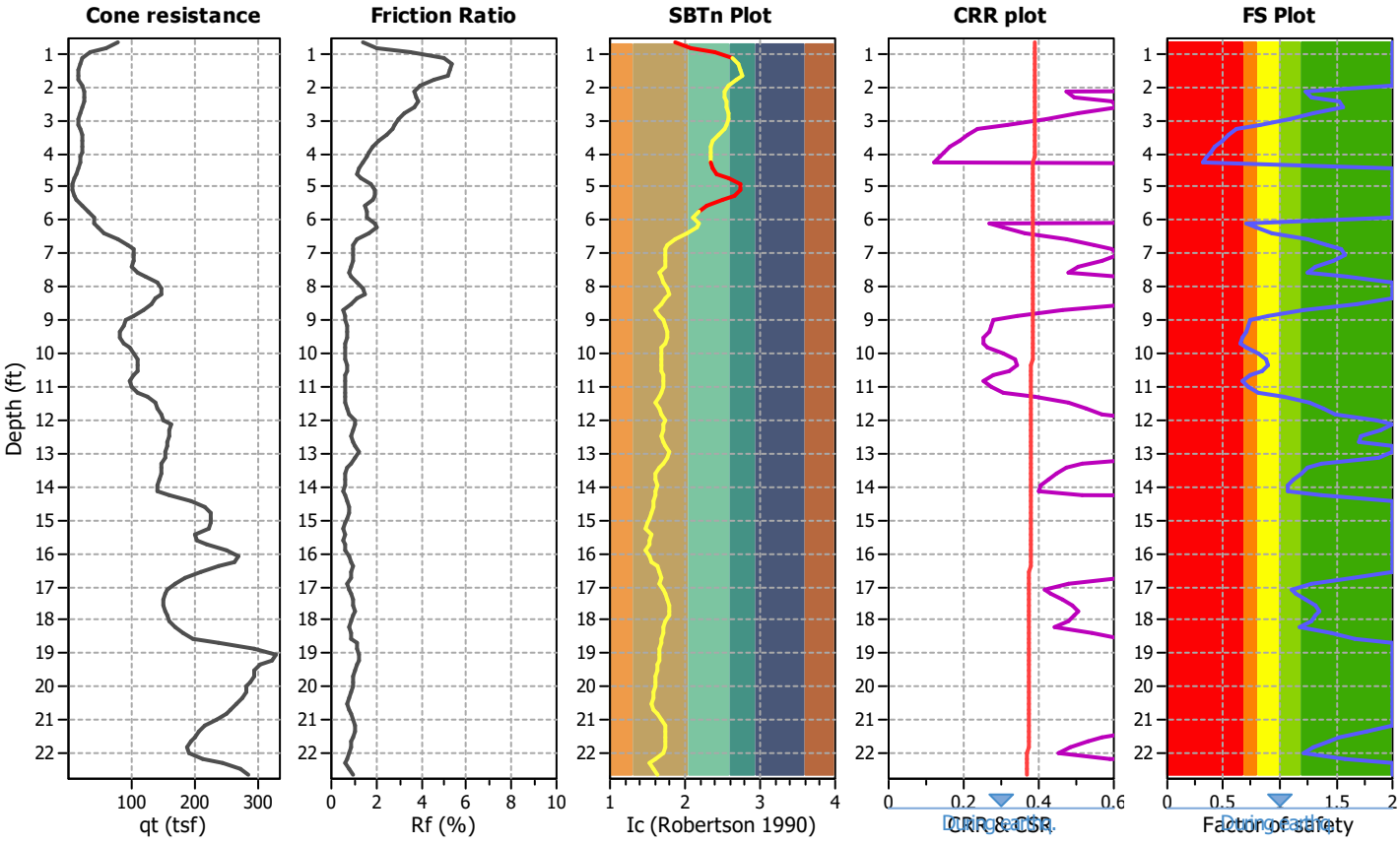
LIQUEFACTION ANALYSIS REPORT

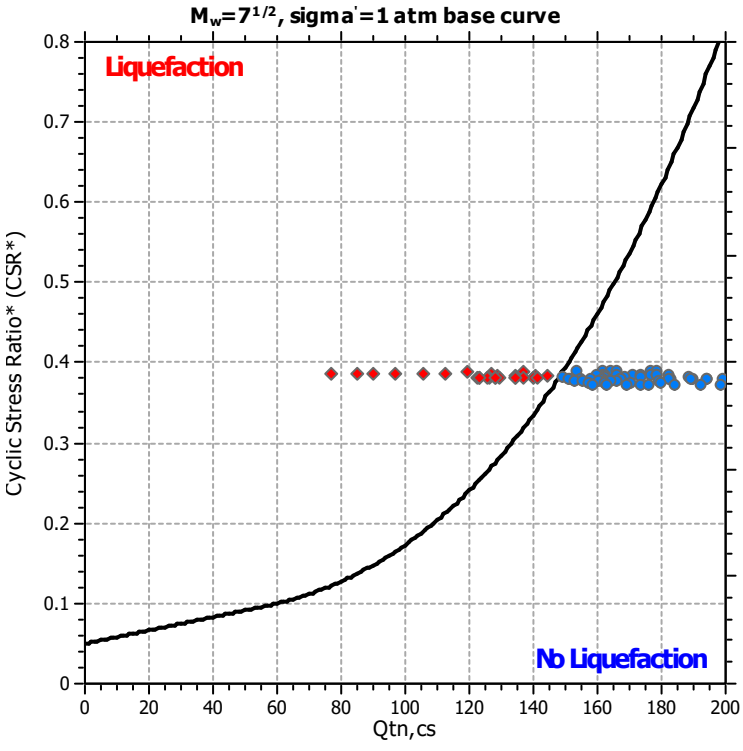
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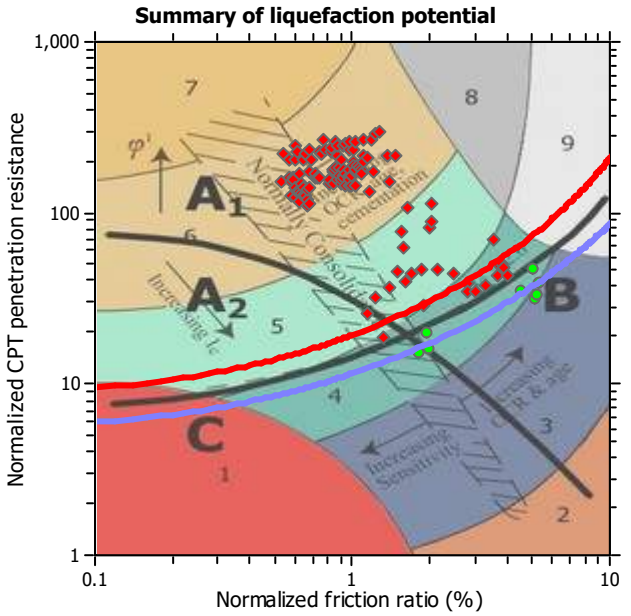
CPT file : CPT-02 - Basic

Input parameters and analysis data

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Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	23.67 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.45	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	No		

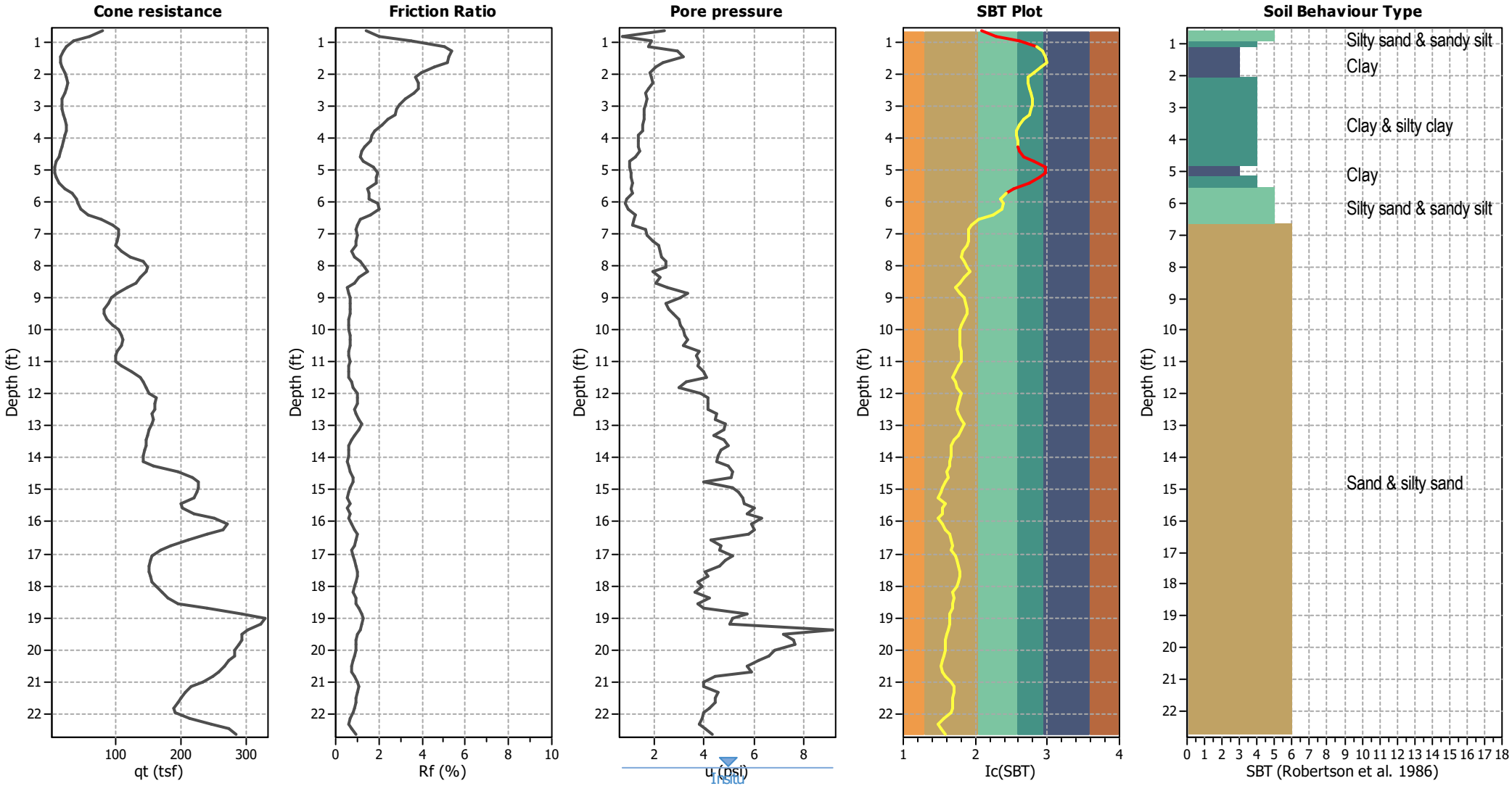






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



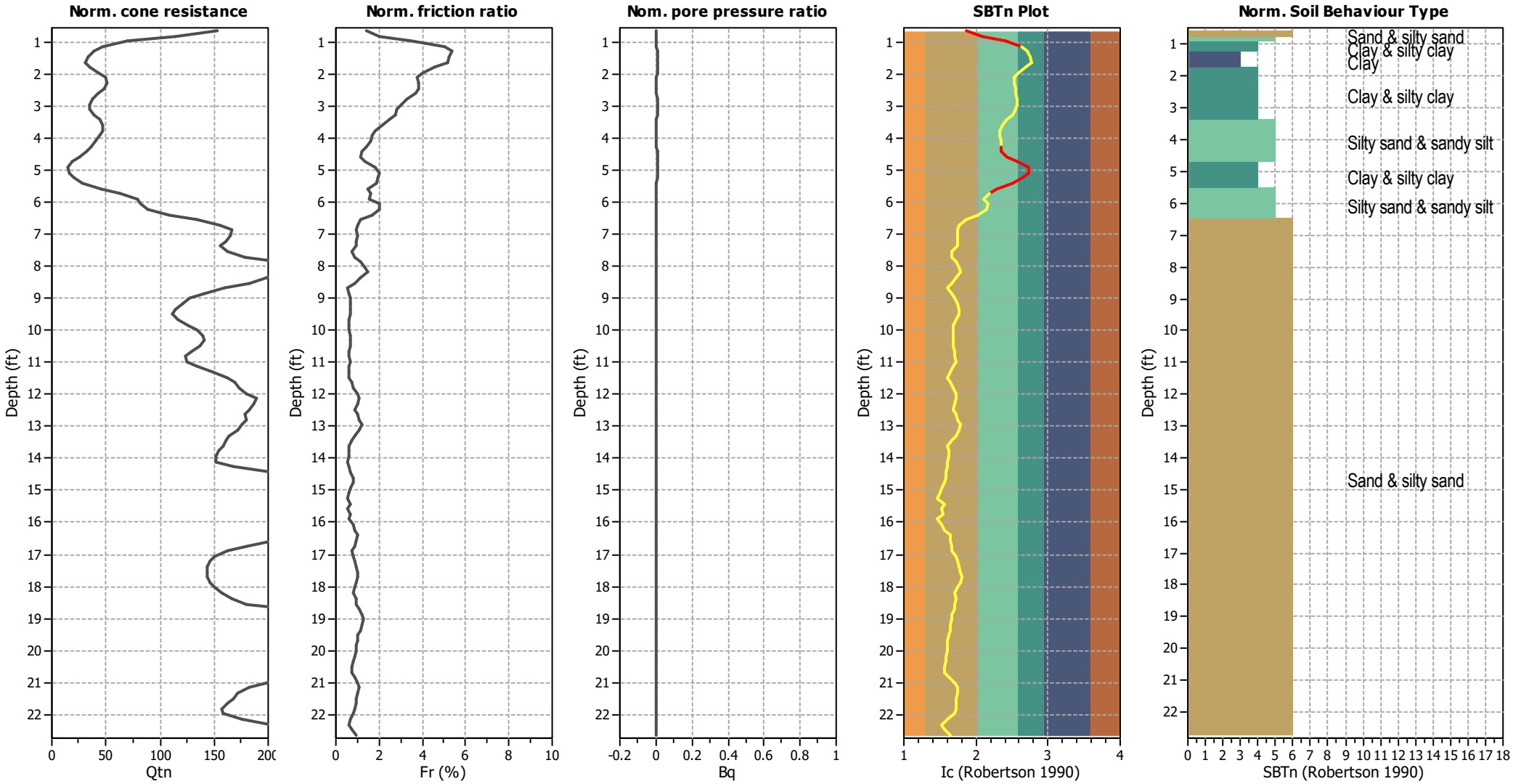
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



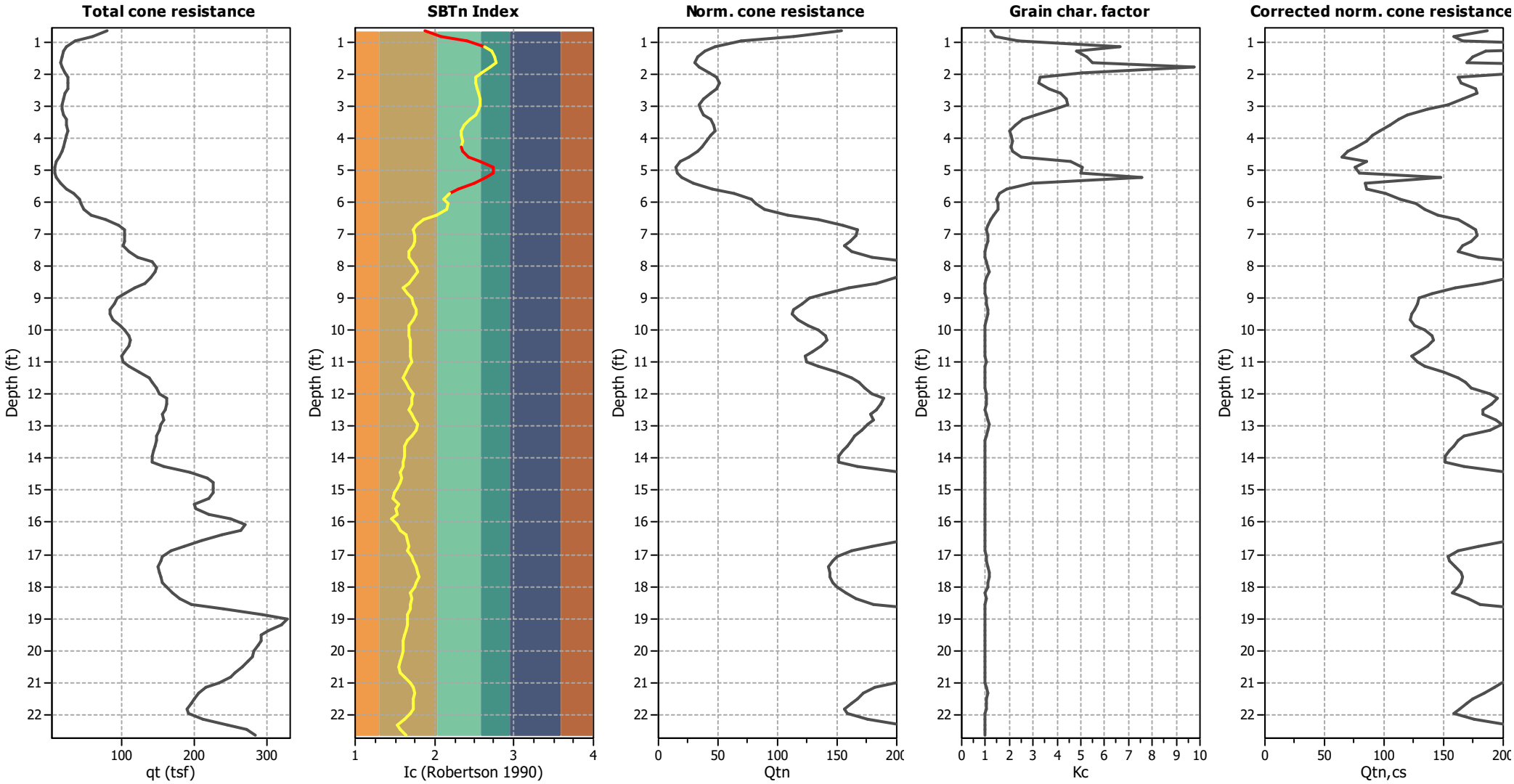
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

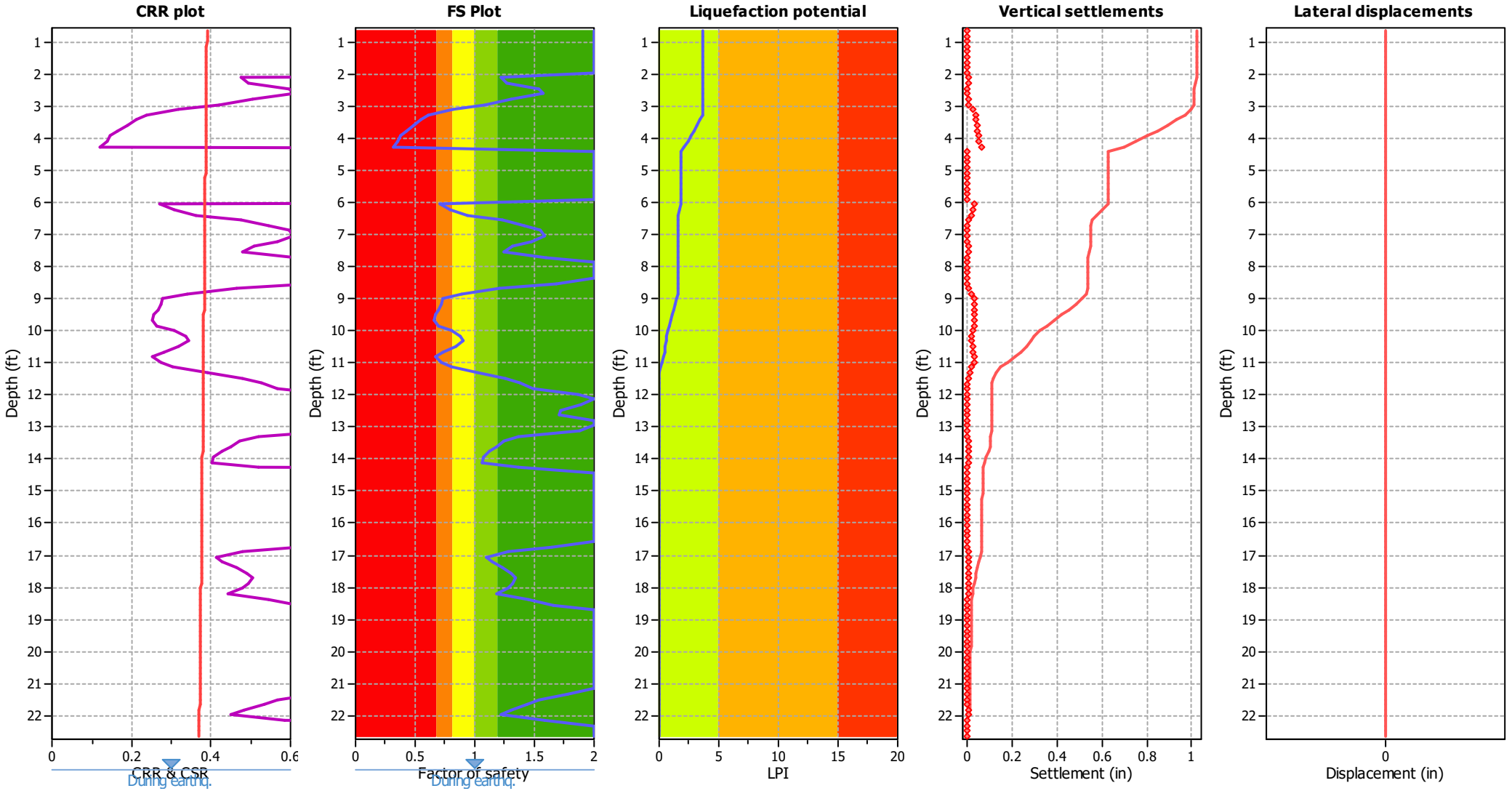
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

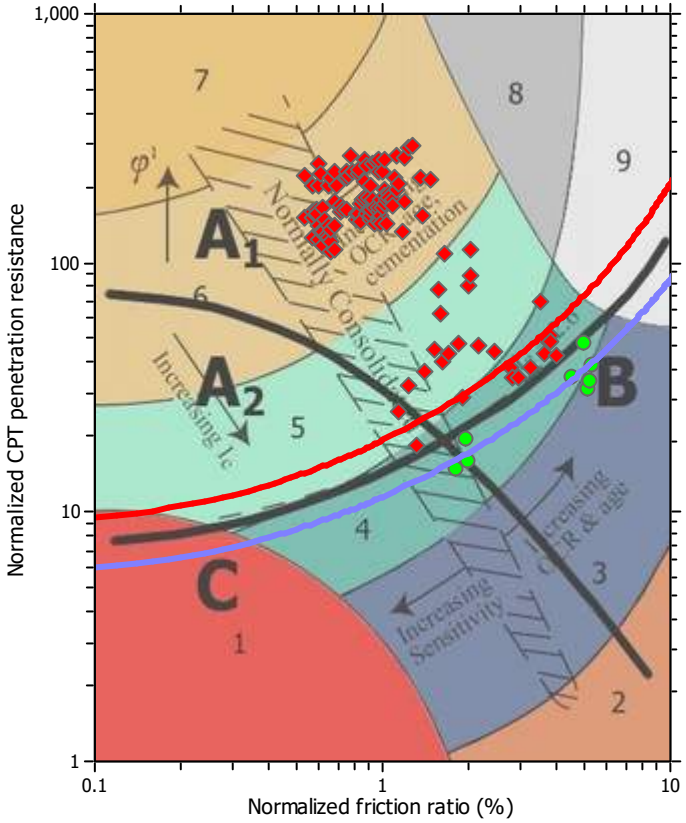
F.S. color scheme

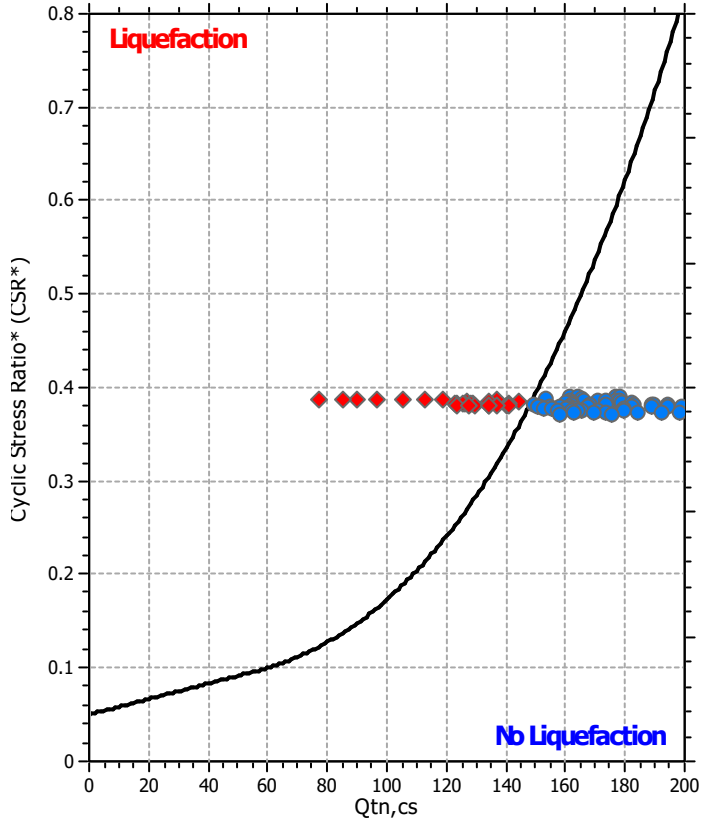
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

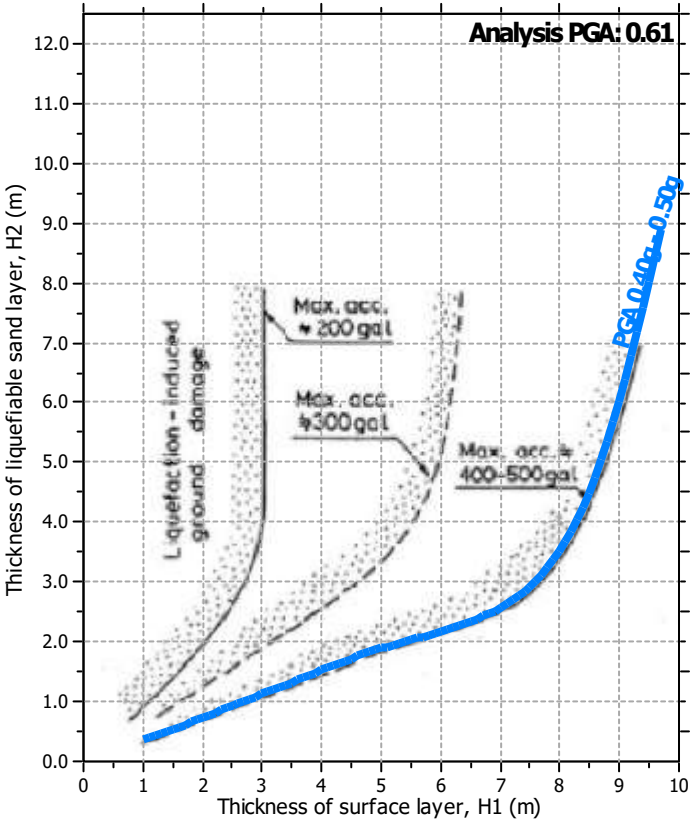
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



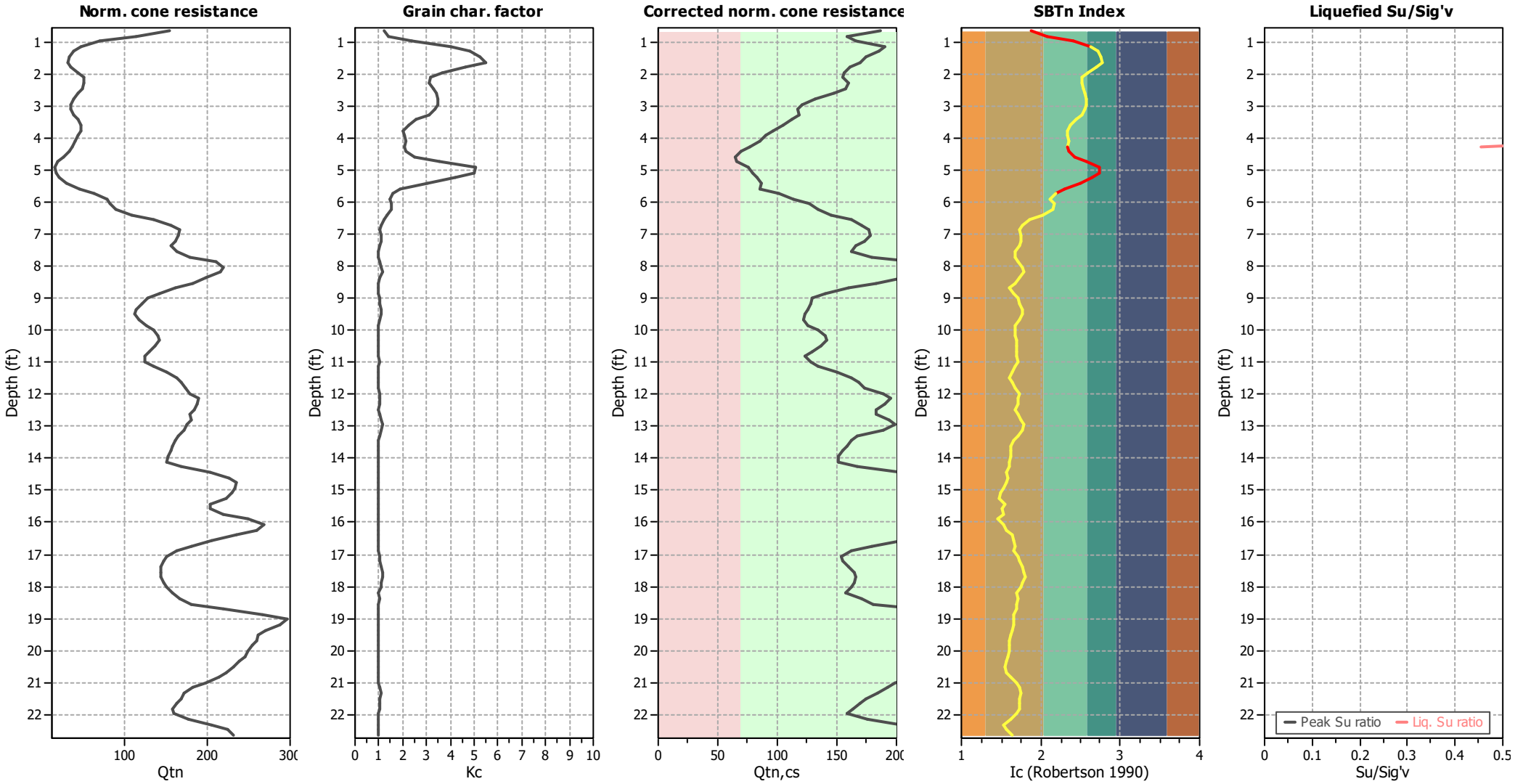




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

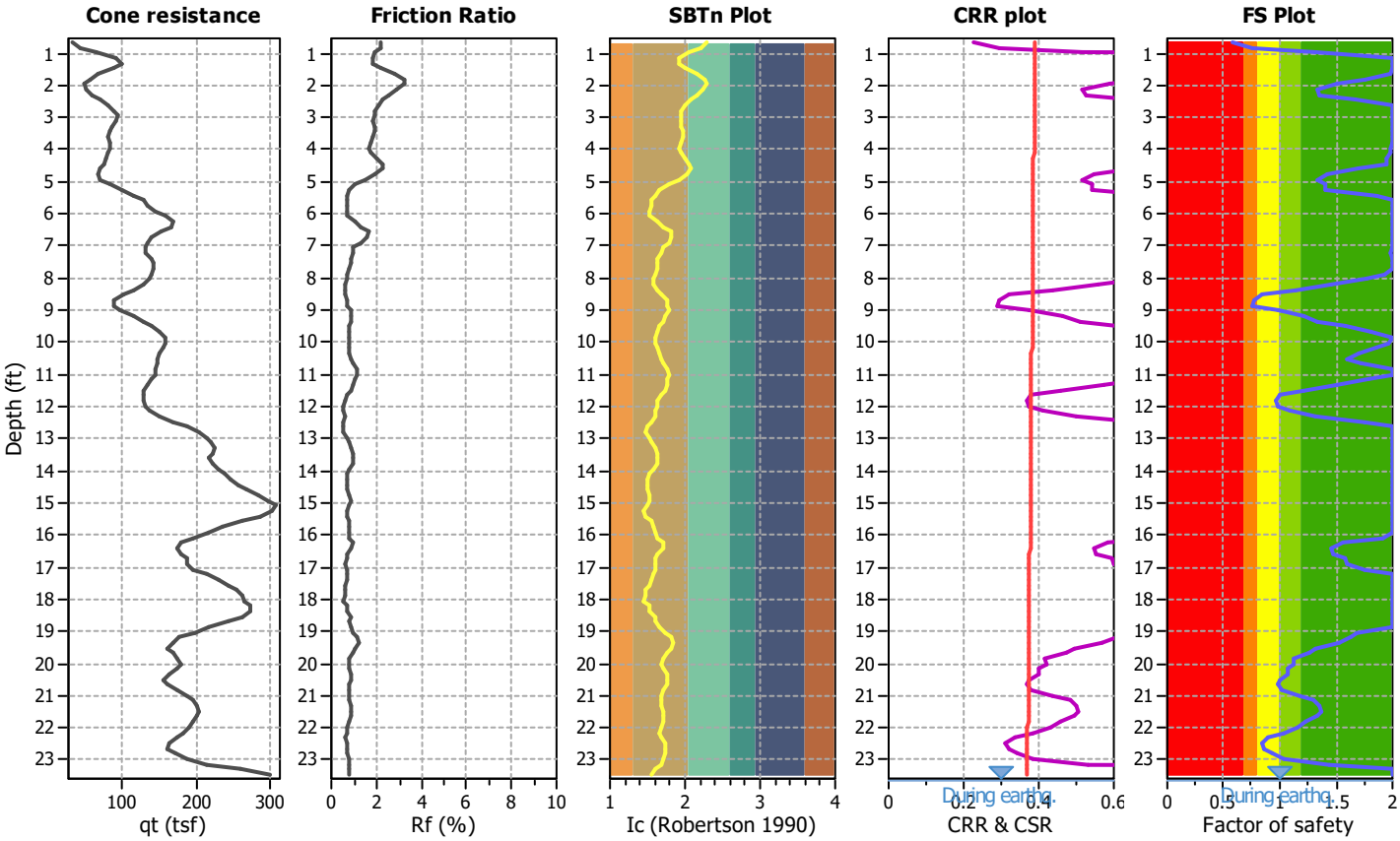
LIQUEFACTION ANALYSIS REPORT

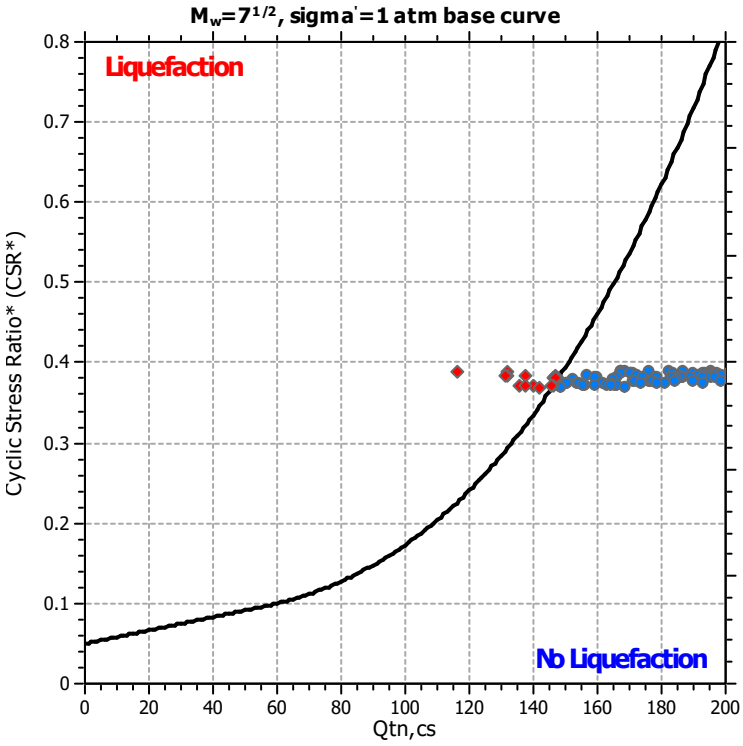
Project title : **Location :**

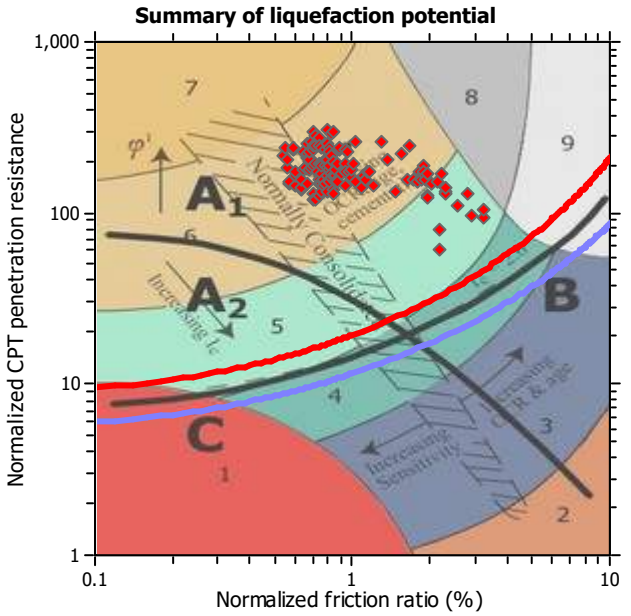
CPT file : CPT-03 - Basic

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	23.67 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	23.67 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.45	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	No		

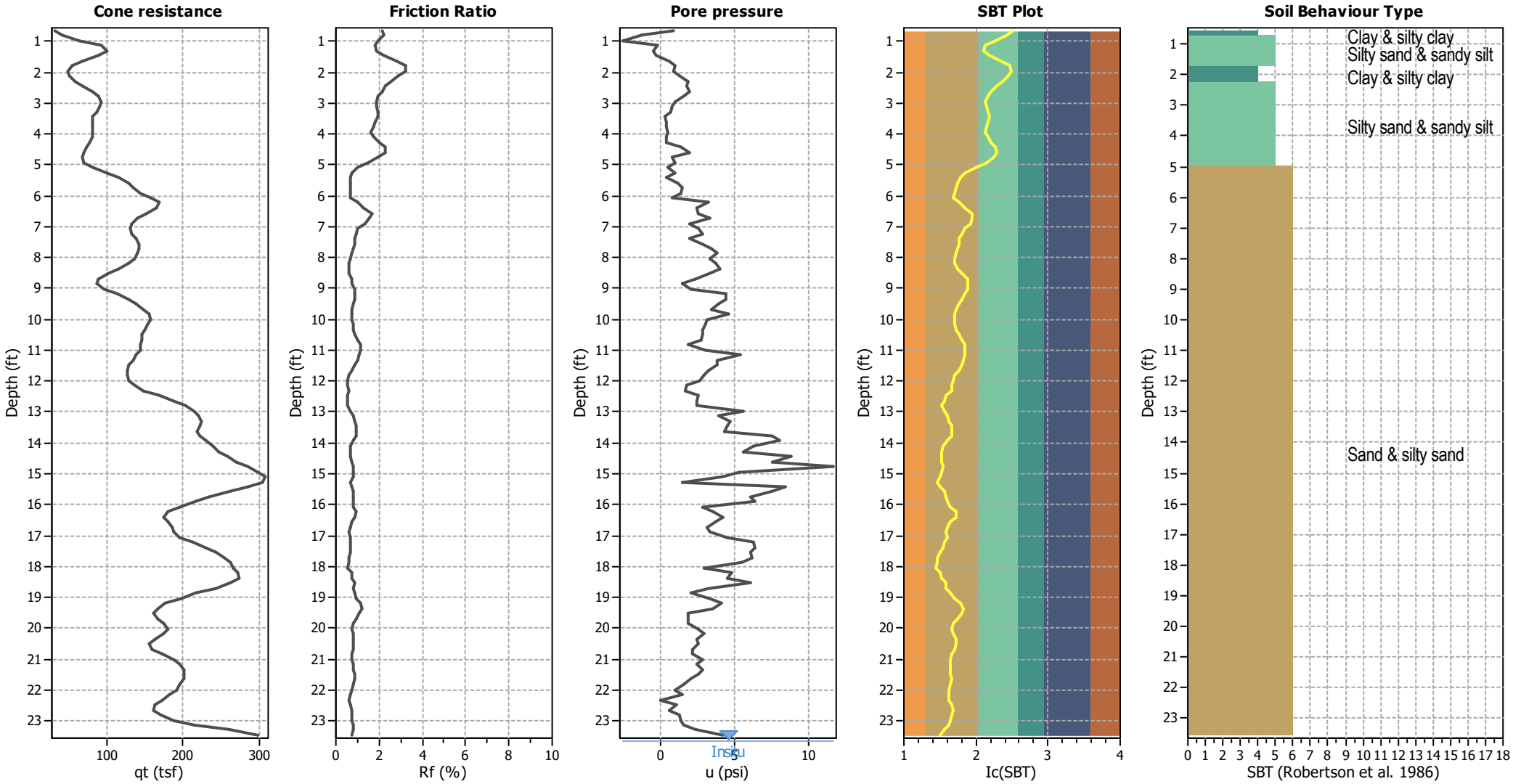






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



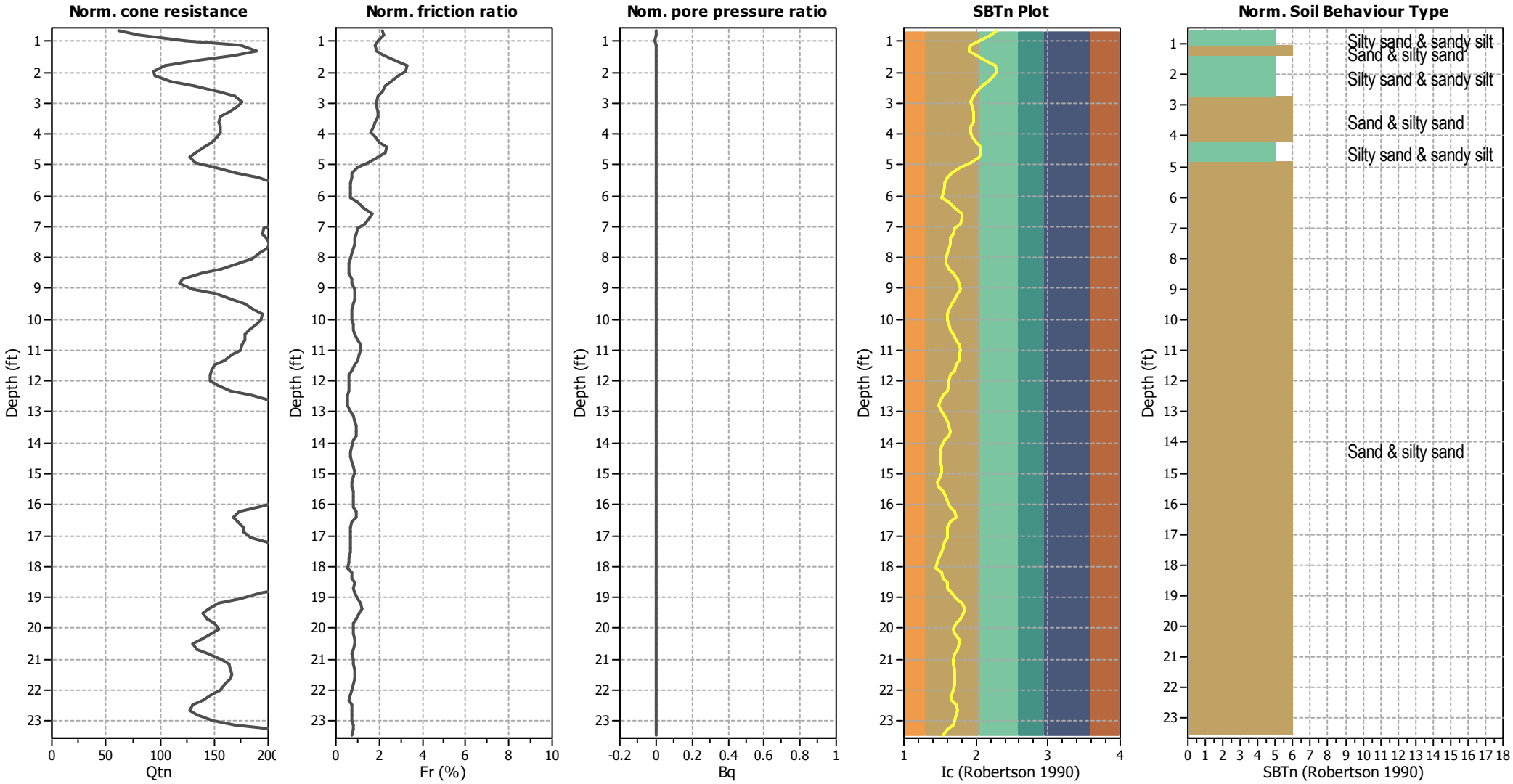
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



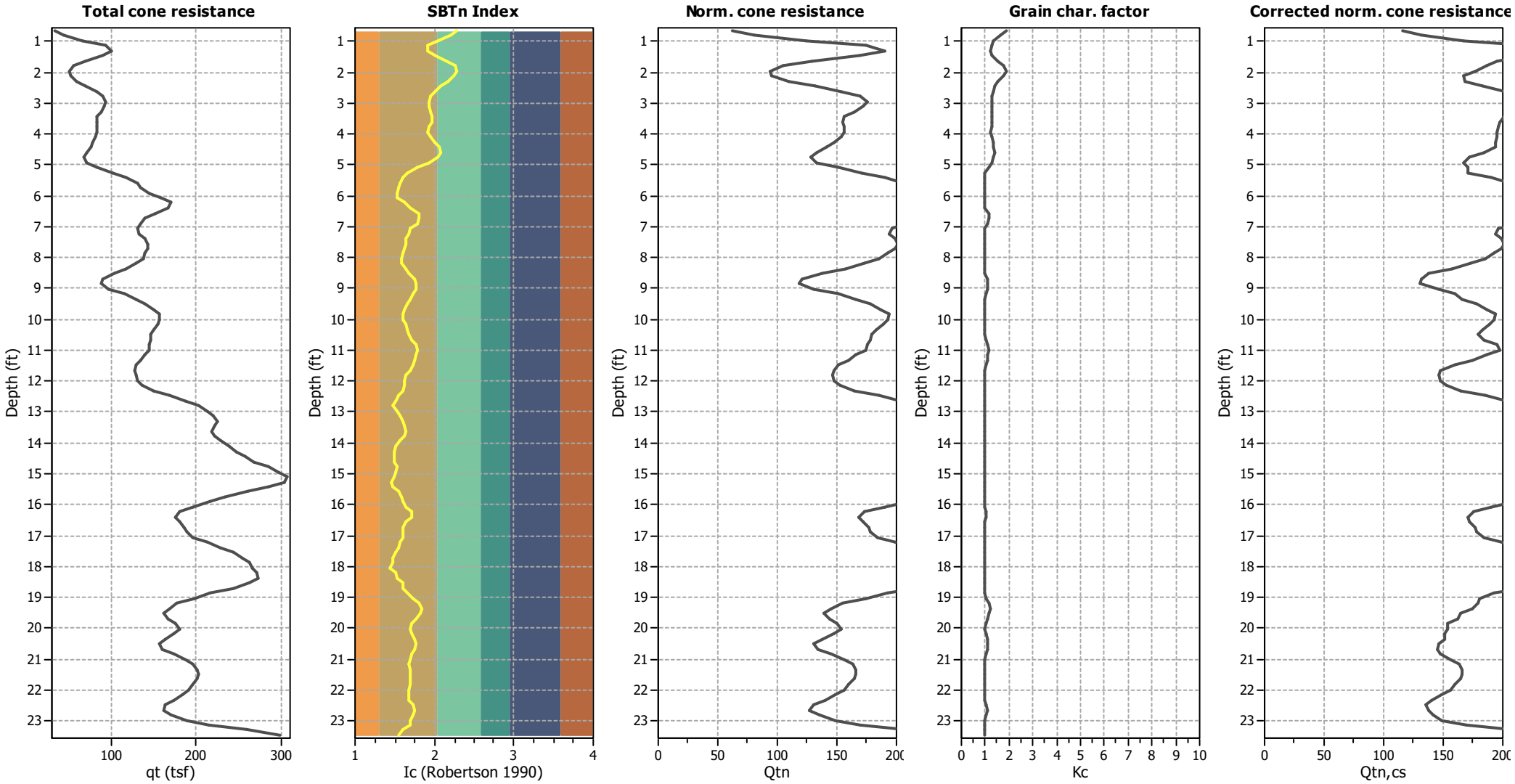
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

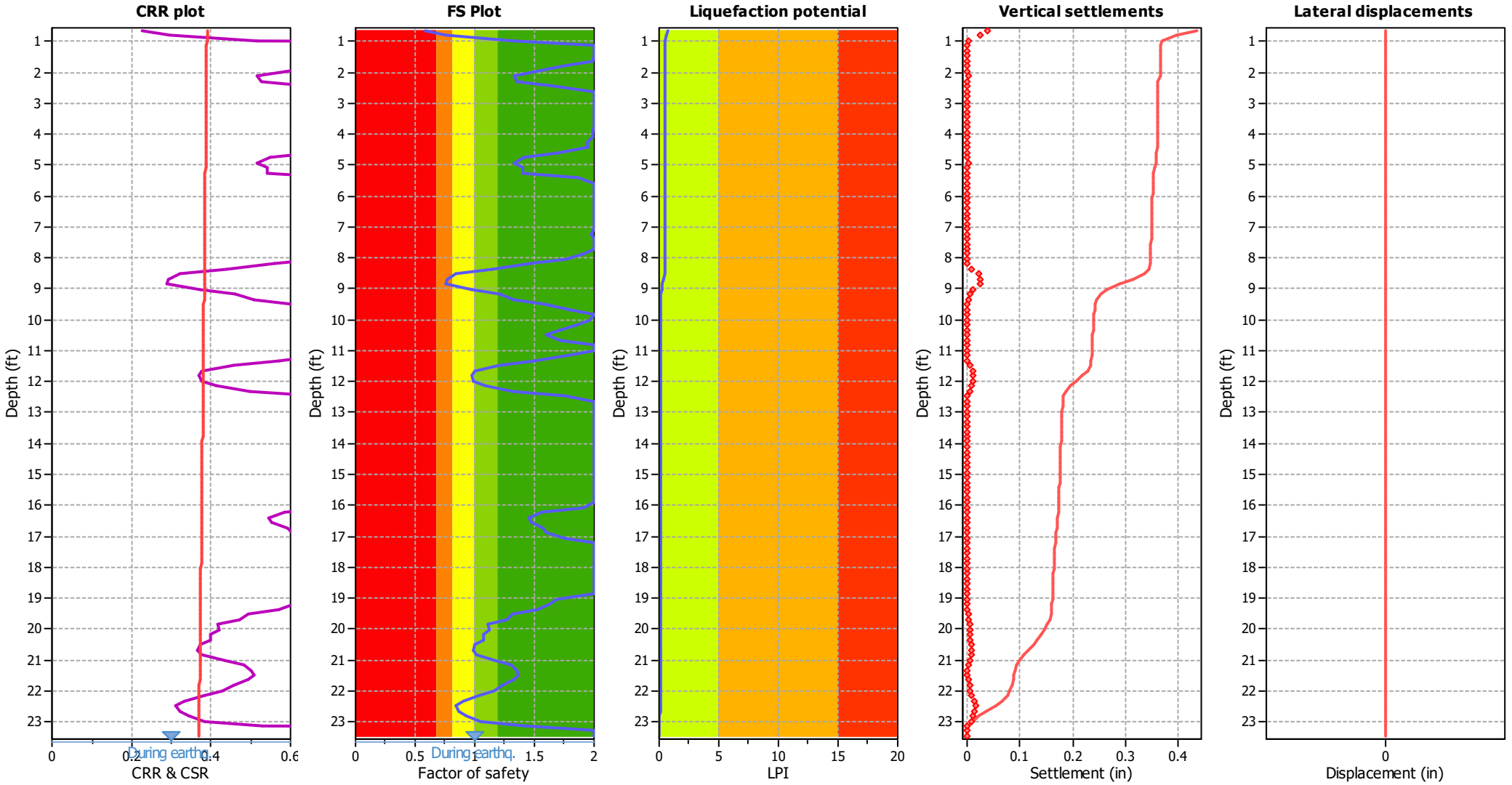
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

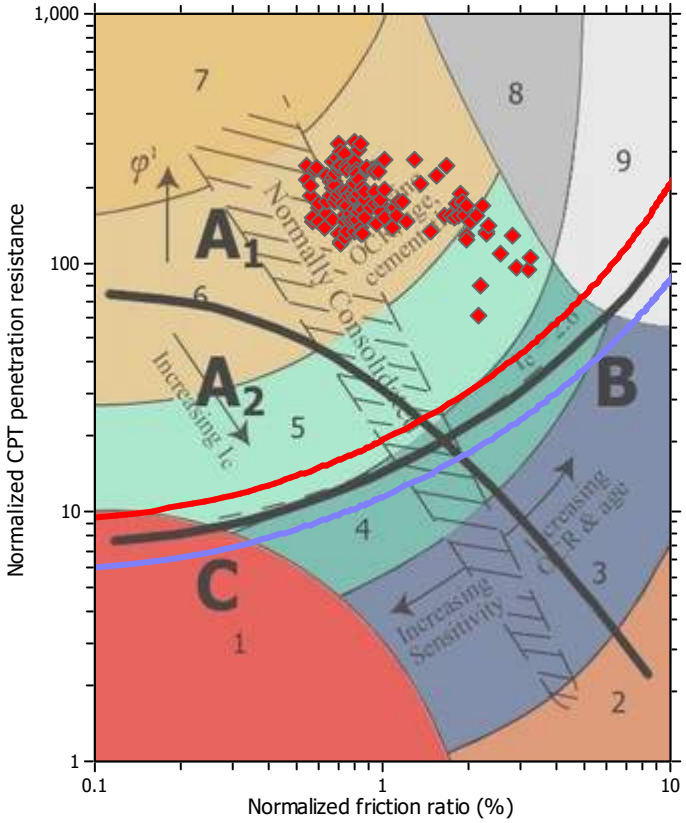
F.S. color scheme

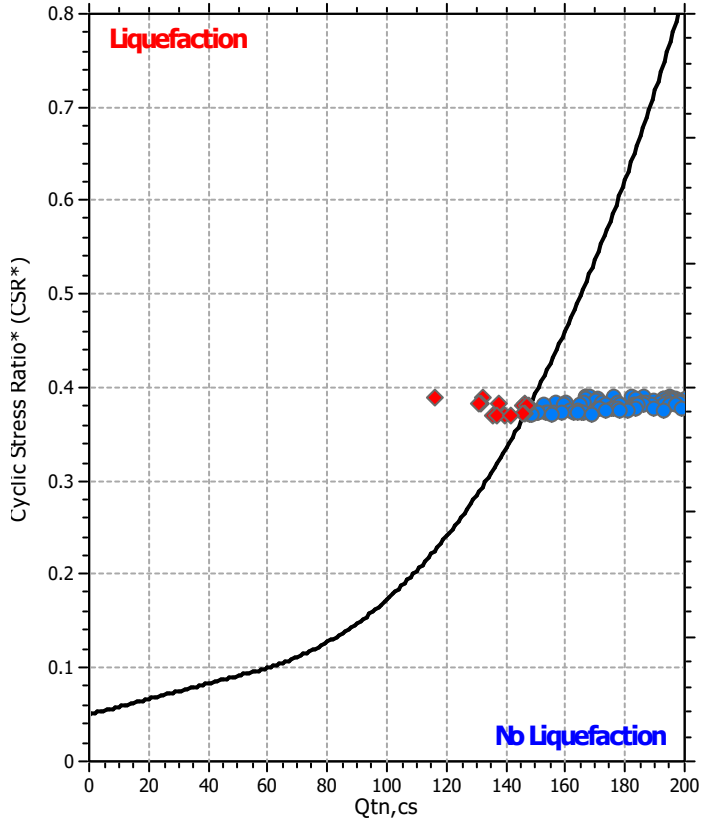
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

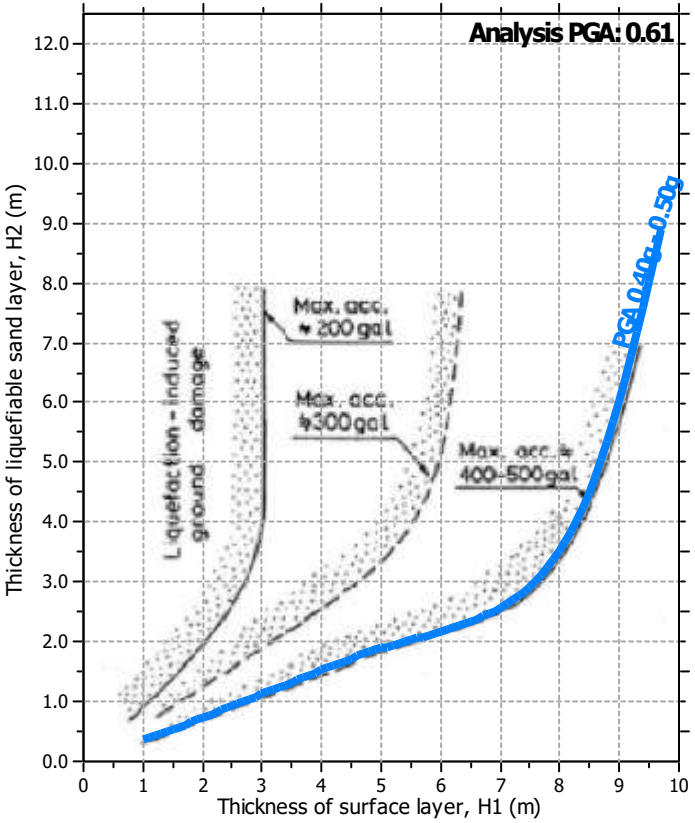
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



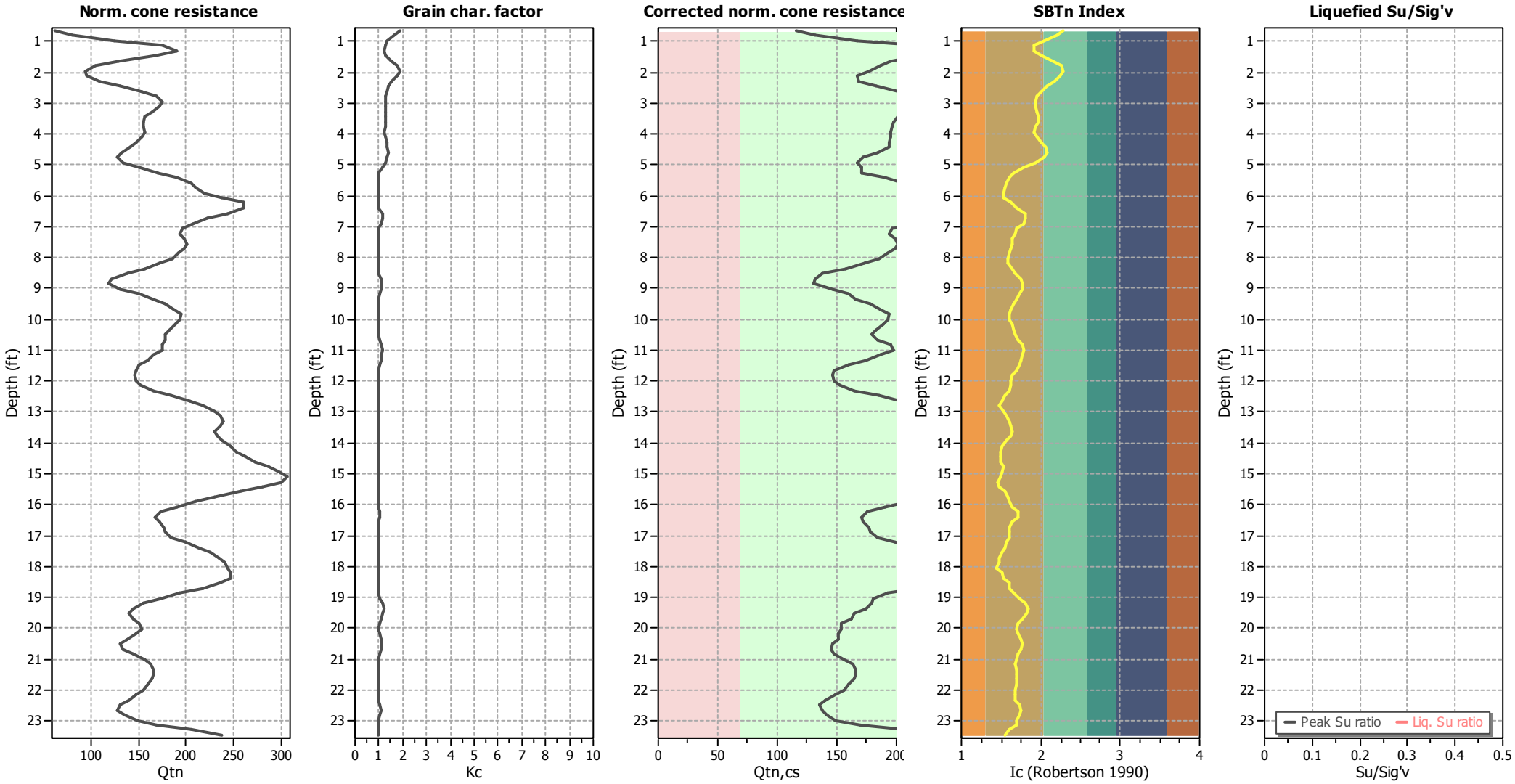




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

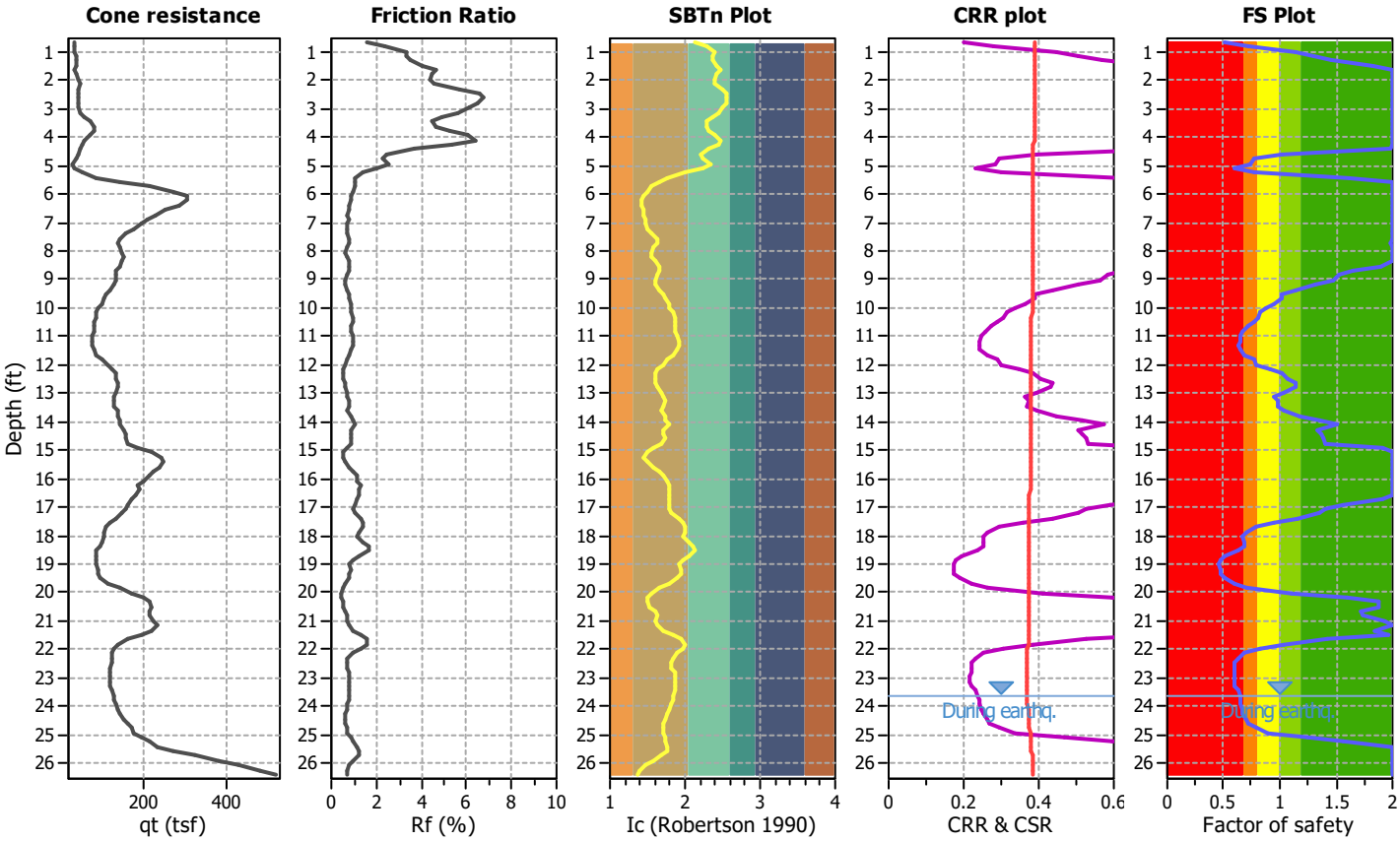
LIQUEFACTION ANALYSIS REPORT

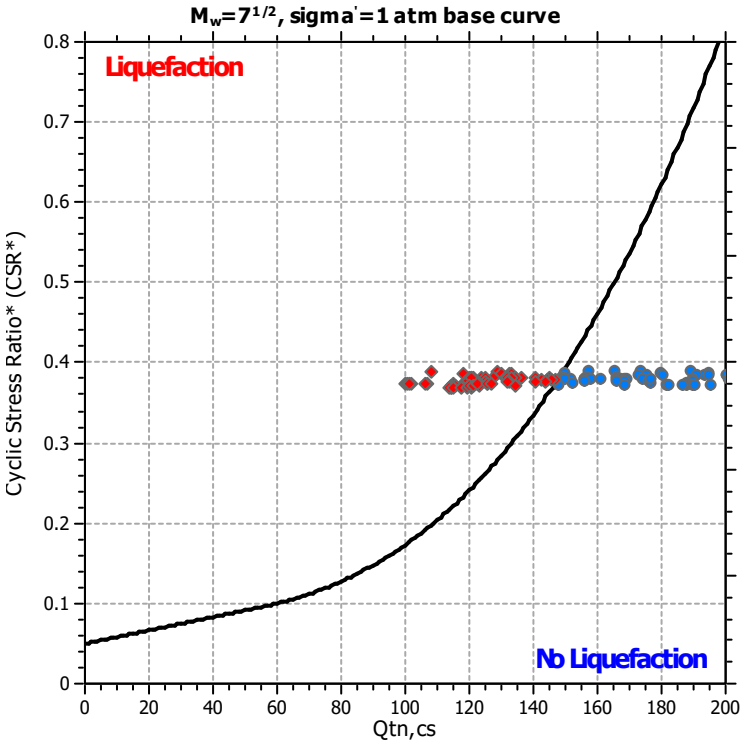
Project title : **Location :**

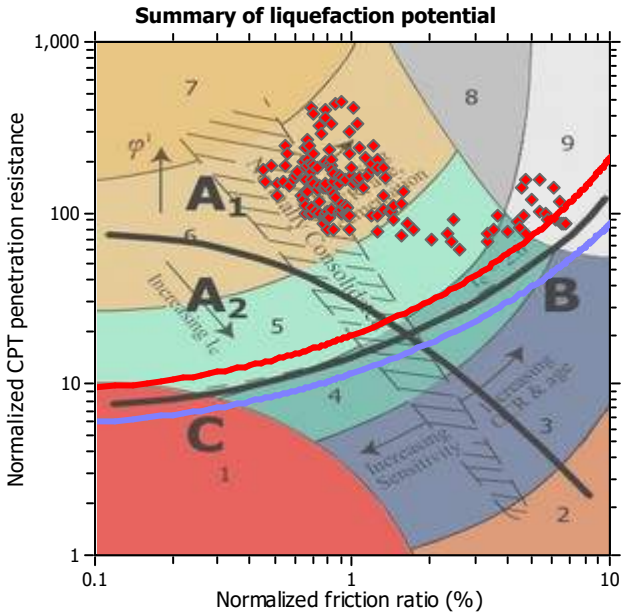
CPT file : CPT-04 - Basic

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	23.67 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	23.67 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.45	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	No		

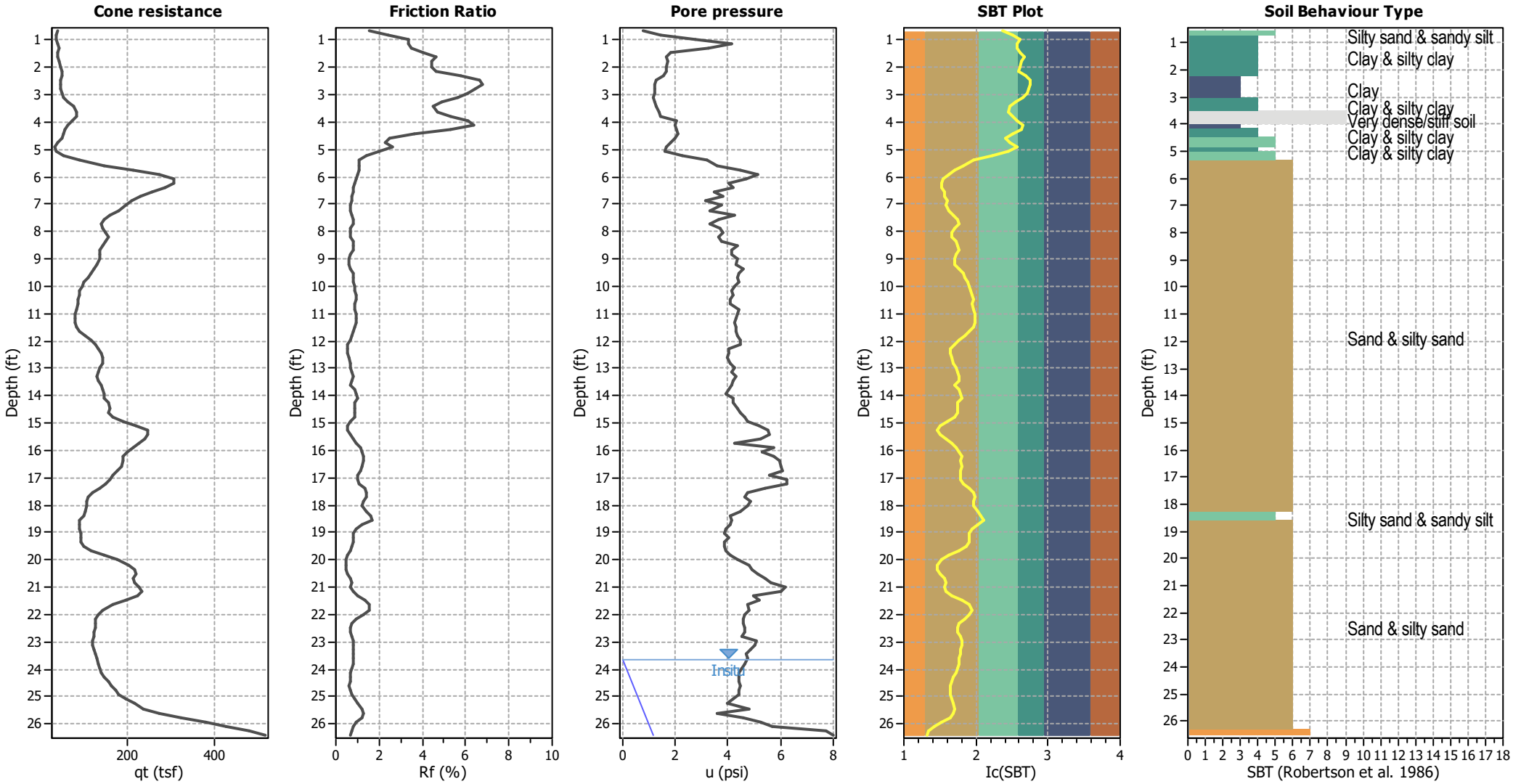






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



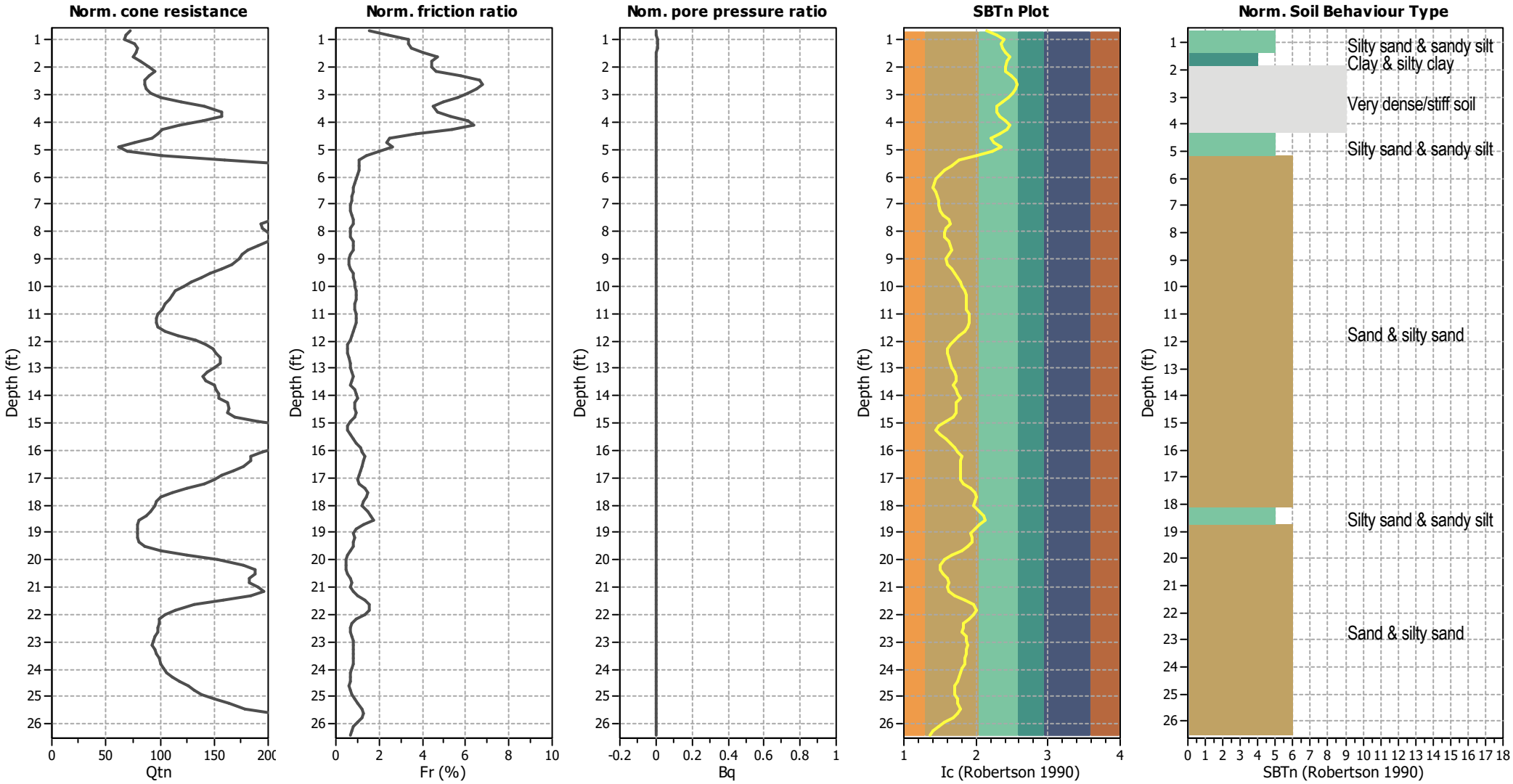
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



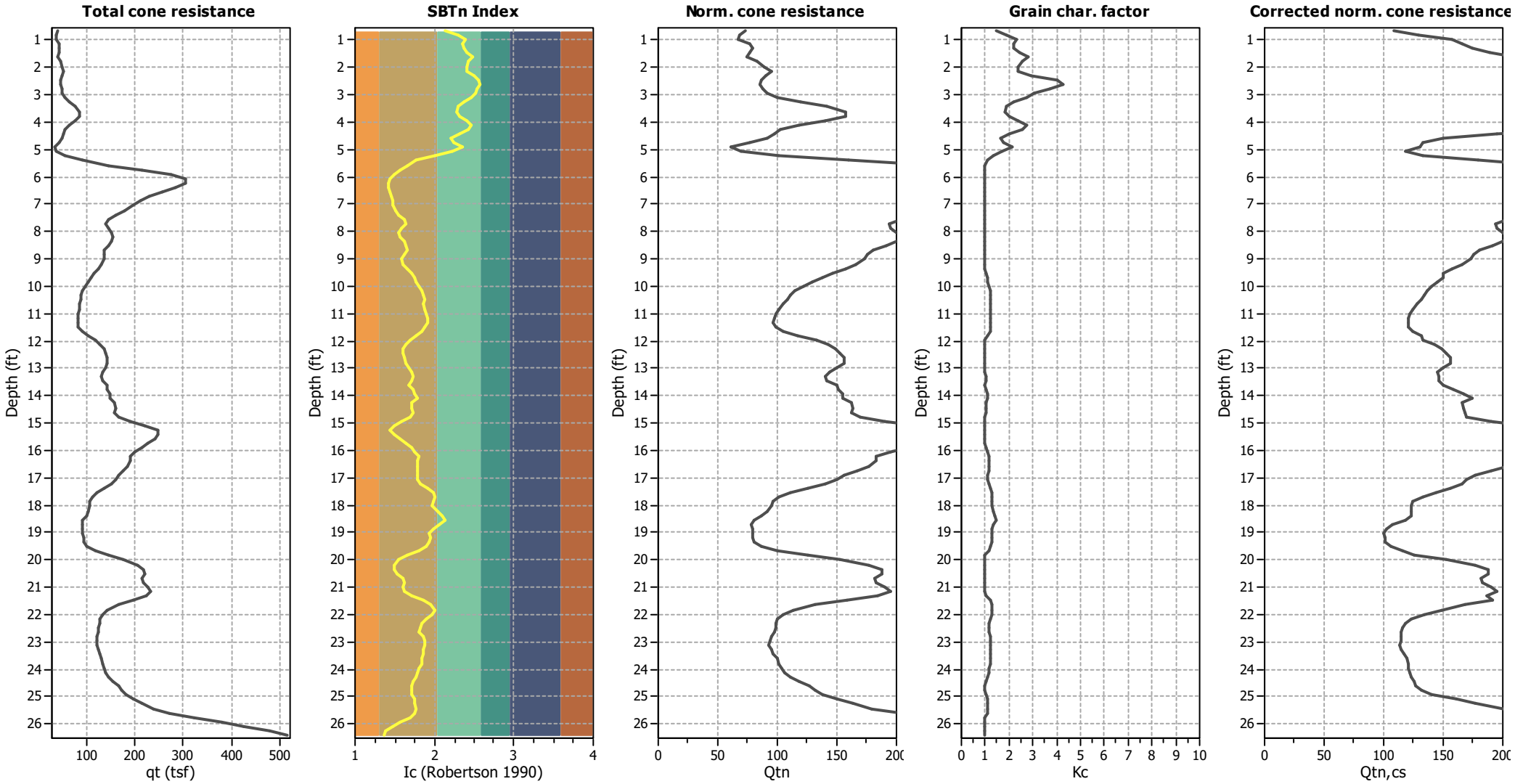
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

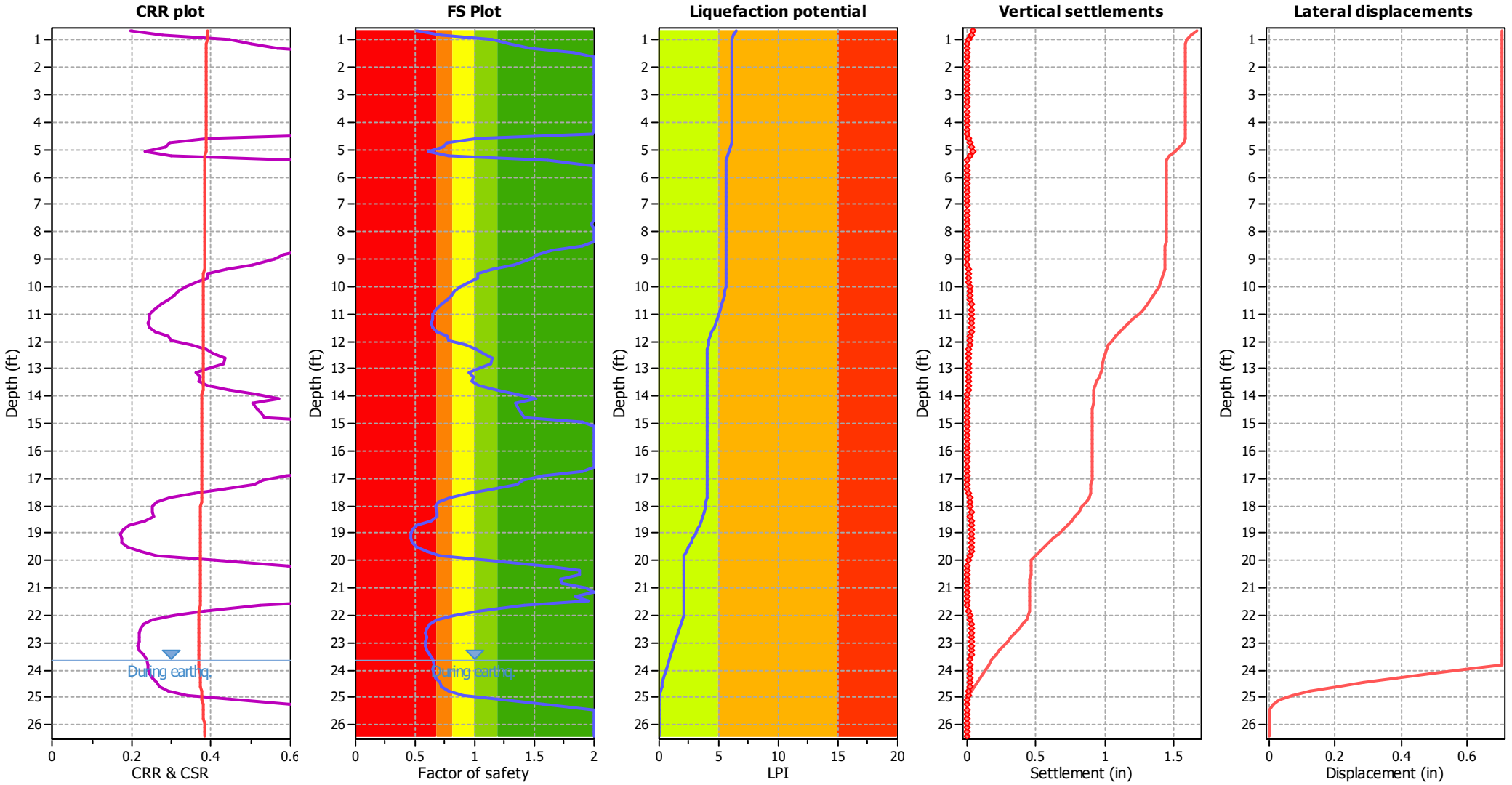
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

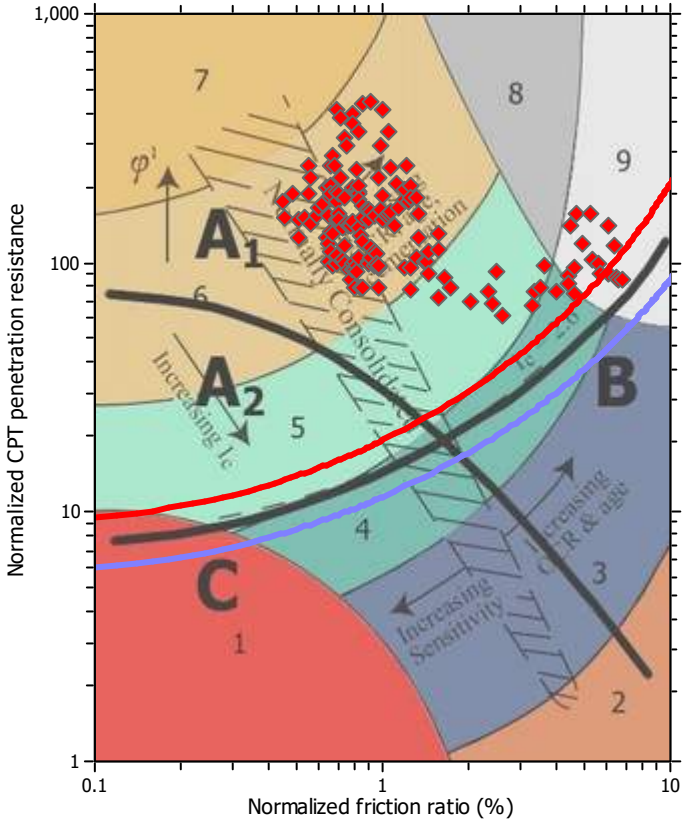
F.S. color scheme

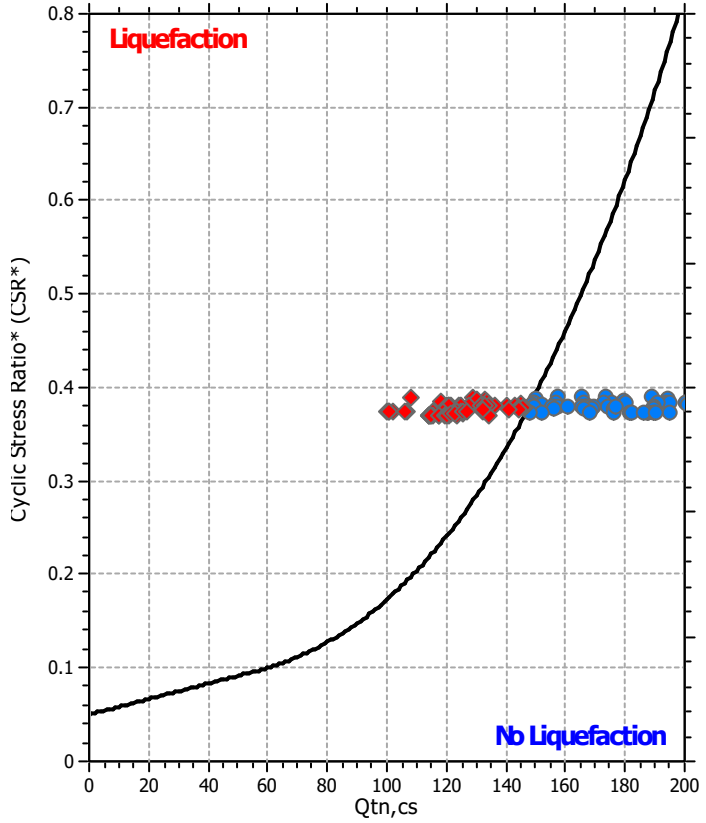
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

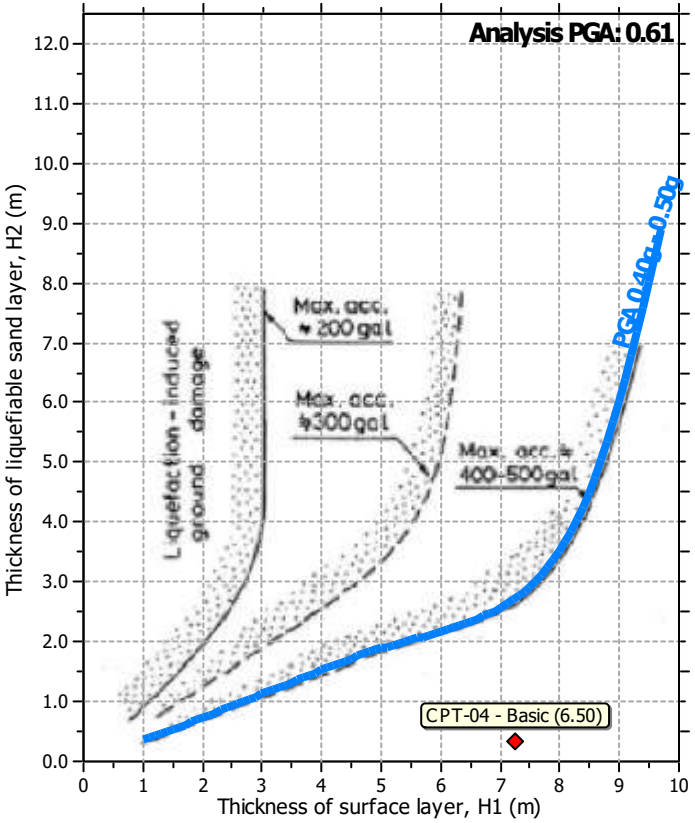
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



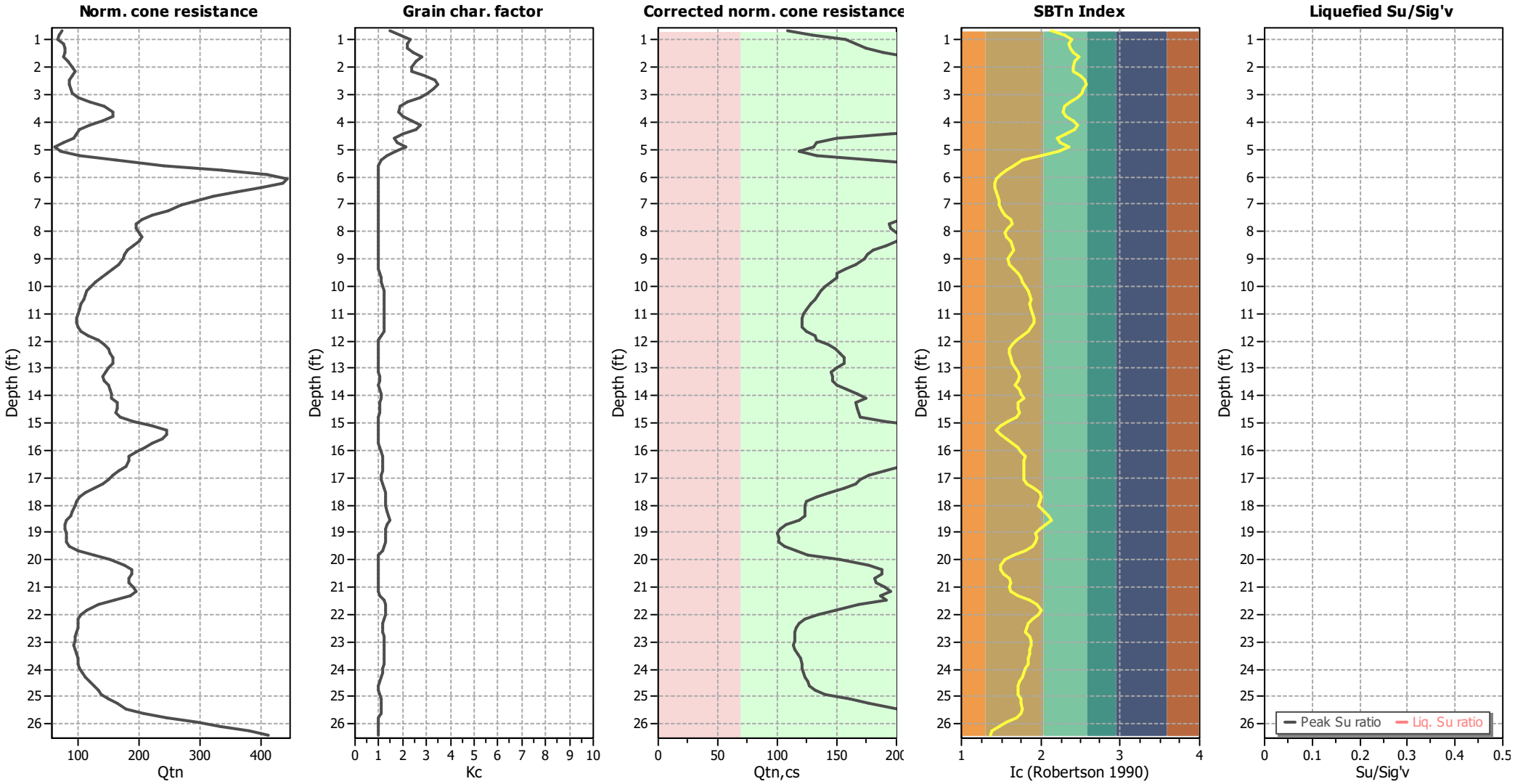




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

APPENDIX E

Percolation Test Data

Project: **New Bradley Branch Library Feasibility Study** File No.: **305777-001**

PERCOLATION TEST RESULTS

PERCOLATION TEST: P-1

TEST HOLE DIAMETER: 3 inch

DATE DRILLED: 12/28/2022

TEST HOLE DEPTH: 7 feet

DATE PRE-SATURATED: 02/09/2023

DATE TESTED: 02/10/2023

RISER HEIGHT: 9 inches

TECHNICIAN: AH

TEST DURATION: 2 hours

Reference of Measurement: Top of Riser

INTERVAL (Minutes)	READING (Feet)	INCREMENTAL FALL (Feet)	PERCOLATION RATE (Minutes / Inch)	PERCOLATION RATE (Inches / Hour)
Fill				
0	7.04	---	---	---
10	7.30	0.26	3.21	18.72
10	7.44	0.14	5.95	10.08
10	7.60	0.16	5.21	11.52
10	7.74	0.14	5.95	10.08
Refill				
0	7.25	---	---	---
10	7.42	0.17	4.90	12.24
10	7.54	0.12	6.94	8.64
10	7.66	0.12	6.94	8.64
10	7.74	0.08	10.42	5.76
Refill				
0	7.25	---	---	---
10	7.37	0.12	6.94	8.64
10	7.47	0.10	8.33	7.20
10	7.57	0.10	8.33	7.20
10	7.67	0.10	8.33	7.20

Project: **New Bradley Branch Library Feasibility Study**

File No.: **305777-001**

PERCOLATION TEST RESULTS

PERCOLATION TEST: P-2

TEST HOLE DIAMETER: 3 inch

DATE DRILLED: 12/28/2022

TEST HOLE DEPTH: 5 feet

DATE PRE-SATURATED: 02/09/2023

DATE TESTED: 02/10/2023

RISER HEIGHT: 6 inches

TECHNICIAN: AH

TEST DURATION: 0 hours

Reference of Measurement: Top of Riser

INTERVAL (Minutes)	READING (Feet)	INCREMENTAL FALL (Feet)	PERCOLATION RATE (Minutes / Inch)	PERCOLATION RATE (Inches / Hour)
>6 inches of standing water after Pre-Saturation, No Test Taken				

Project: **New Bradley Branch Library Feasibility Study**

File No.: **305777-001**

PERCOLATION TEST RESULTS

PERCOLATION TEST: P-3

TEST HOLE DIAMETER: 3 inch

DATE DRILLED: 12/28/2022

TEST HOLE DEPTH: 7 feet

DATE PRE-SATURATED: 02/09/2023

DATE TESTED: 02/10/2023

RISER HEIGHT: 9 inches

TECHNICIAN: AH

TEST DURATION: 61 minutes

Reference of Measurement: Top of Riser

INTERVAL (Minutes)	READING (Feet)	INCREMENTAL FALL (Feet)	PERCOLATION RATE (Minutes / Inch)	PERCOLATION RATE (Inches / Hour)
Fill				
0	6.50	---	---	---
10	7.23	0.73	1.14	52.56
Refill				
0	6.61	---	---	---
1	6.75	0.14	0.60	100.80
1	6.87	0.12	0.69	86.40
1	6.95	0.08	1.04	57.60
1	7.03	0.08	1.04	57.60
1	7.11	0.08	1.04	57.60
1	7.23	0.12	0.69	86.40
Refill				
0	6.21	---	---	---
1	6.34	0.13	0.64	93.60
1	6.51	0.17	0.49	122.40
1	6.60	0.09	0.93	64.80
1	6.71	0.11	0.76	79.20
1	6.80	0.09	0.93	64.80
1	6.90	0.10	0.83	72.00
1	6.98	0.08	1.04	57.60
1	7.06	0.08	1.04	57.60
1	7.14	0.08	1.04	57.60
1	7.23	0.09	0.93	64.80

Project: **New Bradley Branch Library Feasibility Study** File No.: **305777-001**

PERCOLATION TEST RESULTS

PERCOLATION TEST: P-3

TEST HOLE DIAMETER: 3 inch

DATE DRILLED: 12/28/2022

TEST HOLE DEPTH: 7 feet

DATE PRE-SATURATED: 02/09/2023

DATE TESTED: 02/10/2023

RISER HEIGHT: 9 inches

TECHNICIAN: AH

TEST DURATION: 43 minutes

Reference of Measurement: Top of Riser

INTERVAL (Minutes)	READING (Feet)	INCREMENTAL FALL (Feet)	PERCOLATION RATE (Minutes / Inch)	PERCOLATION RATE (Inches / Hour)
Refill				
0	6.26	---	---	---
1	6.35	0.09	0.93	64.80
1	6.46	0.11	0.76	79.20
1	6.58	0.12	0.69	86.40
1	6.70	0.12	0.69	86.40
1	6.80	0.10	0.83	72.00
1	6.88	0.08	1.04	57.60
1	6.96	0.08	1.04	57.60
1	7.04	0.08	1.04	57.60
1	7.12	0.08	1.04	57.60
1	7.23	0.11	0.76	79.20
Refill				
0	6.42	---	---	---
1	6.56	0.14	0.60	100.80
1	6.68	0.12	0.69	86.40
1	6.78	0.10	0.83	72.00
1	6.86	0.08	1.04	57.60
1	6.94	0.08	1.04	57.60
1	7.02	0.08	1.04	57.60
1	7.11	0.09	0.93	64.80
1	7.23	0.12	0.69	86.40

Project: **New Bradley Branch Library Feasibility Study** File No.: **305777-001**

PERCOLATION TEST RESULTS

PERCOLATION TEST: P-3

TEST HOLE DIAMETER: 3 inch

DATE DRILLED: 12/28/2022

TEST HOLE DEPTH: 7 feet

DATE PRE-SATURATED: 02/09/2023

DATE TESTED: 02/10/2023

RISER HEIGHT: 9 inches

TECHNICIAN: AH

TEST DURATION: 43 minutes

Reference of Measurement: Top of Riser

INTERVAL (Minutes)	READING (Feet)	INCREMENTAL FALL (Feet)	PERCOLATION RATE (Minutes / Inch)	PERCOLATION RATE (Inches / Hour)
Refill				
0	6.40	---	---	---
1	6.53	0.13	0.64	93.60
1	6.67	0.14	0.60	100.80
1	6.78	0.11	0.76	79.20
1	6.86	0.08	1.04	57.60
1	6.92	0.06	1.39	43.20
1	7.00	0.08	1.04	57.60
1	7.07	0.07	1.19	50.40
1	7.15	0.08	1.04	57.60
1	7.23	0.08	1.04	57.60
Refill				
0	6.52	---	---	---
1	6.64	0.12	0.69	86.40
1	6.73	0.09	0.93	64.80
1	6.82	0.09	0.93	64.80
1	6.90	0.08	1.04	57.60
1	6.98	0.08	1.04	57.60
1	7.05	0.07	1.19	50.40
1	7.15	0.10	0.83	72.00
1	7.23	0.08	1.04	57.60

Project: **New Bradley Branch Library Feasibility Study**

File No.: **305777-001**

PERCOLATION TEST RESULTS

PERCOLATION TEST: P-4

TEST HOLE DIAMETER: 3 inch

DATE DRILLED: 12/28/2022

TEST HOLE DEPTH: 5 feet

DATE PRE-SATURATED: 02/09/2023

DATE TESTED: 02/10/2023

RISER HEIGHT: 7 inches

TECHNICIAN: AH

TEST DURATION: 2.5 hours

Reference of Measurement: Top of Riser

INTERVAL (Minutes)	READING (Feet)	INCREMENTAL FALL (Feet)	PERCOLATION RATE (Minutes / Inch)	PERCOLATION RATE (Inches / Hour)
Fill				
0	5.09	---	---	---
10	5.35	0.26	3.21	18.72
10	5.55	0.20	4.17	14.40
10	5.75	0.20	4.17	14.40
10	5.82	0.07	11.90	5.04
Refill				
0	5.32	---	---	---
10	5.52	0.20	4.17	14.40
10	5.66	0.14	5.95	10.08
10	5.82	0.16	5.21	11.52
Refill				
0	5.31	---	---	---
10	5.45	0.14	5.95	10.08
10	5.59	0.14	5.95	10.08
10	5.71	0.12	6.94	8.64
10	5.82	0.11	7.58	7.92
Refill				
0	5.28	---	---	---
10	5.42	0.14	5.95	10.08
10	5.58	0.16	5.21	11.52
10	5.72	0.14	5.95	10.08
10	5.82	0.10	8.33	7.20

APPENDIX B

EARTH SYSTEMS
1514 Moffett Street, Suite A | Salinas, CA 93905 | (831) 240-4624 | www.earthsystems.com

January 21, 2026 File No.: 305777-002

Ms. Nancy Ayala
Monterey County Public Works, Facilities, and Parks
1441 Schilling Place, South 2nd Floor
Salinas, CA 93901

PROJECT: NEW BRADLEY BRANCH LIBRARY
65607 DIXIE STREET
BRADLEY, CALIFORNIA

SUBJECT: Geotechnical Plan Review

REF.: Geotechnical Engineering and Geologic Hazards Evaluation Report, New Bradley Branch Library Feasibility, 65607 Dixie Street, APN 424-351-038, Bradley, California, by Earth Systems Pacific, dated March 10, 2023

Dear Ms. Ayala-Avila:

At your request, we reviewed the below listed plans to evaluate their substantial conformance with our geotechnical engineering recommendations for the proposed new library building. The Architectural Plans were prepared by Weston Miles Architects, Inc., last revised January 20, 2026; the Civil Plans were prepared by Brio Engineering Associates, Inc., last revised January 20, 2026; and the Structural Plans were prepared by AKH Structural Engineers, Inc., last revised January 20, 2026.

- Sheet A0.1, Title Sheet
- Sheet A1.2, Enlarged Site Plan
- Sheet A1.3, Site Details
- Sheet C-1, Legend and Notes
- Sheet C-2, Grading and Utility Plan
- Sheet C-3, Sections and Details
- Sheet S1.1, General Notes
- Sheet S2.1, Foundation Plan
- Sheet S4.1, Structural Foundation Details

Based on our review, it is our opinion that the architectural, civil, and structural plans have been prepared in general conformance with our geotechnical engineering recommendations for the project. The plans were reviewed specifically with respect to geotechnical considerations. It is our understanding that the new pervious pavement section and detail was designed by the Project Civil Engineer, as we did not provide recommendations for the design of the pervious pavement system. We make no representation as to the accuracy of the dimensions, calculations, or other aspects of the design.

We trust this letter provides the information requested at this time. If you have any questions or need any additional information, please contact our office.

Sincerely,

Earth Systems Pacific

Michelle Garcia, PG CEG
Senior Engineering Geologist

Tyler Brown, PE, C92495
Project Engineer



NEW BRADLEY LIBRARY & RESILIENCY CENTER

COUNTY OF MONTEREY & MONTEREY COUNTY FREE LIBRARIES

65650 BRADLEY ROAD, BRADLEY, CA 93426

SCOPE OF WORK

GENERAL PROJECT DESCRIPTION INCLUDES:

1. CONSTRUCTION OF NEW 2,500 SQ FT METAL BUILDING.
2. EXTENSION OF UTILITIES TO THE NEW SITE AND A NEW SEPTIC SYSTEM.
3. SITE WORK INCLUDING PARKING, UTILITIES AND UTILITY YARD.
4. NEW WHARF HYDRANT AND FIRE TANKS
5. NEW GENERATOR

ABBREVIATIONS

ABV	above
AFF	above finished floor
ACFL	access floor
AP	access panel
ACPL	acoustical plaster
ACT	acoustical tile
ACR	acrylic plastic
ADD	addendum
ADH	adhesive
ADJ	adjacent
AGG	aggregate
A/C	air conditioning
ALT	alternate
ALUM	aluminum
ADA	american disability assoc.
ANC	anchor, anchorage
AB	anchor bolt
ANOD	anodized
ARCH	architect (ural)
AD	area drain
AC	asphalt concrete
AT	asphalt tile
APN	assessor parcel map
AUTO	automatic
@	at
&	and
BA	bath
BP	building paper
BSMT	basement
BRG	bearing
BPL	bearing plate
BM	bench mark
BLW	below
BETW	between
BIT	bituminous
BLK	block
BLKG	blocking
BD	board
BS	both sides
BW	both ways
BOT	bottom
BRK	brick
BRZ	bronze
BLDG	building
BUR	built-up roofing
CAB	cabinet
CAD	cadmium
CBC	california building code
CPT	carpet (ed)
CSMT	casement
CI	cast iron
CIPC	cast-in-place concrete
CST	cast stone
CB	catch basin
CK	caulk (ing)
CLG	ceiling
CHT	ceiling height
CJ	ceiling joist
CEM	cement
CL	chain link fence
CER	ceramic
CT	ceramic tile
CMT	ceramic mosaic (tile)
CHBD	chalkboard
CHAM	chamfer
CIR	circle
CIRC	circumference
CLR	clear (ance)
CO	clean out
CLS	closure
CHPS	collaborative for high performance schools
COL	column
COMB	combination
COMPT	compartment
COMPO	composition (composite)
COMP	compress (ed), (ion), (ible)
CONC	concrete
CMU	concrete masonry unit
CONST	construction
CONT	continue (ous)
CONTR	contract (or)
CJ	control joint
CPR	copper
CG	corner guard
CORR	corrugated
CTR	counter
CFL	counterflashing
CRS	course (s)
CRG	cross grain
CFT	cubic foot
CYD	cubic yard
℄	center line
CP	cement plaster
DPR	damper
DP	damp proofing
DEMO	demolish, demolition
DMT	demountable
DEP	depressed
DTL	detail
DIAG	diagonal
DIA	diameter
DIM	dimension
DPR	dispenser
DIV	division
DSA	division of the state architect
DR	door
DA	double acting
DH	double hung
DF	douglas fir
DBL PLT	double plate
D	drain
DRB	drainboard
DWR	drawer
DWG	drawing
EF	each face
ER	eave rafter
ELEC	electric (al)
EP	electrical panelboard
EWC	electric water cooler
EL	elevation
ELEV	elevator
EMB	embedment
EMER	emergency
EMT	electrical metallic tubing
ENC	enclose (ure)
EQ	equal
EQP	equipment
EST	estimate
EXCA	excavate
EXH	exhaust
<E>	existing
EXMP	expanded metal plate
EB	expansion bolt
EXP	exposed
EXT	exterior
EXS	extra strong
EA	each
EW	each way
FB	face brick
FOC	face of concrete
FOF	face of finish
FOM	face of masonry
FOS	face of stud
FF	factory finish
FN	fence
FBD	fiberboard
FRP	fiber reinforced plastic
FIN	finish (ed)
FFE	finished floor elevation
FFL	finished floor line
FA	fire alarm
FE	fire extinguisher
FEC	fire extinguisher cabinet
FPL	fireplace
FP	fireproof
FRC	fire-resistant coating
FLG	flashing
FLX	flexible
FLR	floor (ing)
FLCO	floor cleanout
FD	floor drain
FLUOR	fluorescent
FJT	flush joint
FTG	footing
FND	foundation
FR	frame (d), (ing)
FRA	fresh air
FS	full size
FBO	furnished by others
FUR	furred (ing)
FUT	future
GA	gage
GALV	galvanized
GI	galvanized iron
GP	galvanized pipe
GKT	gasket (ed)
GC	general contract (or)
GL	glass, glazing
GLB	glass block
GB	grab bar
GD	grade (ing)
GRN	granite
GVL	gravel
GT	grout
GPDW	gypsum drywall
GPL	gypsum lath
GPPL	gypsum plaster
GFCI	ground fault circuit interrupt
GYP	gypsum
H	high
HH	handhole
HBD	hardboard
HDW	hardware
HWD	hardwood
HJT	head joint
HDR	header
HTG	heating
HVAC	heating/ventilation/ air conditioning
HD	heavy duty
HT	height
HX	hexagonal
HES	high early-strength cement
HC	hollow core
HM	hollow metal
HK	hook (s)
HOR	horizontal
HB	hose bibb
INCL	include (d), (ing)
ID	inside diameter
INT	interior
INV	invert
IPS	iron pipe size
INCAN	incandescent
ISA	international sign association
JC	janitor's closet
JT	joint
JF	joint filler
J	joist
KPL	kickplate
KIT	kitchen
KD	knock down
LBL	label
LAB	laboratory
LB	lag bolt
LS	lag screw
LAM	laminate (d)
LAV	lavatory
LH	left hand
L	length
LT	light
LW	lightweight
LMS	limestone
LTL	lintel
LBS	pounds
LVR	louver
MB	machine bolt
MI	malleable iron
MH	manhole
MFR	manufacture (er)
MRB	marble
MAS	masonry
MO	masonry opening
MATL	material (s)
MAX	maximum
MECH	mechanical
MC	medicine cabinet
MTL	metal
MFD	metal floor decking
MRD	metal roof decking
MIN	minimum
MIR	mirror
MISC	miscellaneous
MOD	modular
MLD	molding, molding
MT	mount (ed), (ing)
MOV	movable
MULL	mullion
NL	nailable
NAT	natural
(N)	new
NRC	noise reduction coefficient
NOM	nominal
NIC	not in contract
NTS	not to scale
OBS	obscure
OC	on center (s)
OPG	opening
OPH	opposite hand
OD	outside diameter
OA	overall
OH	overhead
O/	over
PNT	paint (ed)
PNL	panel
PB	panic bar
PTD	paper towel dispenser
PTR	paper towel receptor
PAR	parallel
PK	parking
PBD	particle board
PTN	partition
POT	path of travel
PV	pave (d), (ing)
PVMT	pavement
PED	pedestal
PERF	perforate (d)
PERIM	perimeter
PA	planting area
PLAS	plaster
PLAM	plastic laminate
PLT	plate
PG	plate glass
PLWD	plywood
PVC	polyvinylchloride
PSF	pounds per square foot
PCC	precast concrete
PFN	prefinished
PRF	preformed
PFMG	pre-formed metal gutter
PTN	project tracking number
℄	property line, plate
QT	quarry tile
RAD	radius
RWL	rainwater leader
REF	reference
RFL	reflect (d), (ing)
REFR	refrigerator
REG	register
RCP	reinforced conc pipe
REM	remove
RES	resilient
RA	return air
RVS	reverse (side)
REV	revision (s), revised
RH	right hand
ROW	right-of-way
R	riser
RD	roof drain
RFH	roof hatch
RR	roof rafter
RM	room
RO	rough opening
RB	rubber base
RBT	rubber tile
SFGL	safety glass
SCCOE	santa clara county office of education
SCH	schedule
SCD	see civil drawings
SSD	see structural drawings
SMD	see mechanical drawings
SED	see electrical drawings
SEC	sections
SHTH	sheathing
SHT	sheet
SH	shelf, shelving
SIM	similar
SB	solid block
SC	solid core
SP	soundproof
SPC	spacer
SPK	speaker
SPEC	specification (s)
SQ	square
SST	stainless steel
STD	standard
STA	station
STO	storage
SD	storm drain
STR	structural
SCT	structural clay tile
SUS	suspended
SYM	symmetry (ical)
STC	sound transmission class
TKBD	tackboard
TKS	tackstrip
TEL	telephone
TV	television
TC	terra cotta
TZ	terrazzo
THK	thick (ness)
THR	threshold
TPTN	toilet partition
TPD	toilet paper dispenser
T&G	tongue and groove
TO	top of
TB	towel bar
TR	transom
T	tread
TYP	typical
UMC	uniform mechanical code
UBC	uniform building code
UPC	uniform plumbing code
UFC	uniform fire code
UR	urinal
UNO	unless noted otherwise
VCT	vinyl composition tile
VB	vapor barrier
VERT	vertical
VTR	vent through roof
WC	water closet
WCO	wall cleanout
WD	wood
WGL	wire glass
WH	water heater
WI	wrought iron
WIND	window
WP	waterproof
WR	water resistant
WSCT	wainscot (ing)
W/	with
W/O	without

SHEET LEGEND (70 PAGES TOTAL)

ARCHITECTURAL	A0.1	TITLE SHEET
CALGREEN	CB-1	CAL GREEN CHECKLIST
CIVIL	C-1	LEGEND & NOTES
	C-2	GRADING & UTILITY PLAN
	C-3	SECTIONS & DETAILS
	C-4	EROSIONS CONTROL PLAN
	C-4.1	EROSIONS CONTROL DETAILS & NOTES
ARCHITECTURAL	A1.0	EXISTING & DEMO SITE PLAN
	A1.1	OVERALL SITE PLAN
	A1.2	ENLARGED SITE PLAN
	A1.3	SITE DETAILS
	A1.4	CHAINLINK FENCE DETAILS
	A2.1	FLOOR PLAN
	A2.3	EGRESS PLAN
	A2.4	FINISH PLAN
	A2.5	REFLECTED CEILING PLAN
	A2.6	ROOF PLAN
	A3.1	EXTERIOR ELEVATIONS
	A3.2	RENDERINGS
	A4.1	BUILDING SECTIONS
	A4.2	BUILDING SECTIONS
	A5.1	ENLARGED FLOOR PLANS
	A5.2	INTERIOR ELEVATIONS
	A5.3	INTERIOR ELEVATIONS
	A6.1	DOOR & WINDOW SCHEDULE
	A6.2	DOOR & WINDOW DETAILS
	A7.1	WALL TYPES AND DETAILS
	A8.0	FRAMING PLAN
	A8.1	TYPICAL FRAMING DETAILS
	A8.2	TYPICAL FRAMING DETAILS
	A9.1	CEILING DETAILS
	A9.2	SIGNAGE DETAILS
	A9.3	CABINET DETAILS
	A9.4	MISC DETAILS
	A9.5	SHELVING ANCHORAGE
STRUCTURAL	S1.1	STRUCTURAL GENERAL NOTES & MATERIAL GRADES
	S2.1	STRUCTURAL FOUNDATION PLAN
	S4.1	STRUCTURAL FOUNDATION DETAILS
	S4.2	STRUCTURAL EQUIPMENT DETAILS
MECHANICAL	EMT2.1	ENVELOPE & MECHANICAL TITLE 24
	EMT2.2	ENVELOPE & MECHANICAL TITLE 24
	M0.00	MECHANICAL FRON SHEET
	M0.01	MECHANICAL SCHEDULES
	M1.01	VRS PIPING AND WIRING
	M1.02	MECHANICAL DETAILS
	M2.01	MECHANICAL FLOOR PLAN
PLUMBING	P0.1	P0.1 PLUMBING: GENERAL NOTES, LEGEND AND SCHEDULES
	P0.2	PLUMBING: SHEET SPECIFICATIONS
	P0.3	PLUMBING: DETAILS
	P2.0	PLUMBING: UNDERFLOOR PLAN
	P2.1	PLUMBING: FLOOR PLANS
	PT.24	PLUMBING: TITLE 24
ELECTRICAL	E0.1	SYMBOLS, ABBREVIATIONS, CODES, ETC
	E0.2	TITLE 24 - LIGHTING INDOOR
	E0.3	TITLE 24 - LIGHTING OUTDOOR
	E0.4	TITLE 24 - ELECTRICAL POWER DISTRIBUTION
	E1.1	SINGLE LINE DIAGRAM, DETAILS & SCHEDULE
	E2.1	ELECTRICAL SITE PLAN
	E4.1	POWER & SYSTEMS PLAN
	E4.2	POWER & SYSTEMS PLAN - ROOF
	E5.1	LIGHTING PLAN
	E6.1	ELECTRICAL DETAILS
	E6.2	ELECTRICAL DETAILS
	E6.3	ELECTRICAL DETAILS & LIGHT FIXTURE SCHED.
	E6.4	ELECTRICAL DETAILS
	E6.5	ELECTRICAL DETAILS
LANDSCAPE	L1.1	LANDSCAPE PLAN
	L2.1	IRRIGATION PLAN
	L3.1	LANDSCAPE DETAILS
OWTS	SW-1	OWTS DESIGN

SYMBOLS

DESCRIBES AN "AREA" OR "FIELD"

RM NAME / 101 — ROOM NAME / ROOM NUMBER

ELEVATION — Elevation Reference Number (1 / A3.1) — Sheet Number when shown

SECTION — Section Reference Number (1 / A4.1) — Sheet Number when shown

ROOM ELEVATION — Detail Reference Number (1 / A5.1) — Elevation Reference Number (2) — Sheet Number where shown (4)

TYPICAL DETAIL — Detail Reference Number (1 / A7.1) — Sheet Number where shown

PHOTO REFERENCE — Direction Indicator — Detail Reference Number (1 / A1.1) — Sheet Number where shown

TYPICAL COLUMN or SHEAR LINE — Column or Shear Line Designation (A) — Center Line of Column or Shear Wall

NORTH ARROW (TRUE NORTH / NORTH REF.)

A9.5 SHELVING ANCHORAGE (1)

BUILDING & SITE DATA

APN #:	424-351-069
PARCEL SIZE:	.52 ACRES
OCCUPANCY TYPE:	B
NUMBER OF STORIES:	1
TYPE OF CONSTRUCTION:	II-B
ACTUAL SQFT:	2,500
ZONING:	HIGH DENSITY RESIDENTIAL
SETBACKS:	
FRONT	20 FT
SIDE	5 FT
REAR	10 FT
BUILDING HEIGHT:	
MAXIMUM:	35 FT
ACTUAL:	20 FT
IMPERVIOUS COVERAGE:	4,930 SQFT
PERVIOUS COVERAGE:	5,567 SQFT
BUILDING SITE COVERAGE	
MAXIMUM:	60%
ACTUAL:	11%

CONTACTS

OWNER — COUNTY OF MONTEREY & MONTEREY COUNTY FREE LIBRARIES
1441 SCHILLING PLACE, SOUTH 2ND FLOOR
SALINAS, CA 93901-4527

ATTN: NANCY AYALA
PHONE: 1-831-755-4848
EMAIL: AyalaNP@countyofmonterey.gov

CIVIL SURVEYOR — BRIO ENGINEERING
4750 ALMADEN EXPY, SUITE 124-283
SAN JOSE, CA 95118-2052

ATTN: ANDREW DUONG
PHONE: 1-408-241-5494
EMAIL: NDREWD@BRIOENGINEERING.COM -

ARCHITECT — WESTON MILES ARCHITECTS, INC.
17500 DEPOT STREET, SUITE #126
MORGAN HILL, CA 95037

ATTN: LESLY MILES
PHONE: 1-408-515-9469
EMAIL: Lesley@wmarchitects.com

STRUCTURAL — AKH STRUCTURAL ENGINEERS, INC
275 TENNANT AVE SUITE 204
MORGAN HILL, CA 95037

ATTN: TIM HYDE
PHONE: 408-978-1970
EMAIL: hyde@akhse.com

MECHANICAL/ PLUMBING — H&M MECHANICAL GROUP
8517 EARHART RD, SUITE #230
OAKLAND, CA 94621

ATTN: GARY HENNINGS
PHONE: 1-510-569-2000
EMAIL: gary@hm-mechanical.com

ELECTRICAL — AURUM CONSULTING ENGINEERS
1798 TECHNOLOGY DR, SUITE #242
SAN JOSE, CA 95110

ATTN: NAJIB ANWARY
PHONE: 1-408-564-7925
EMAIL: najib@acemb.com

GEOTECHNICAL — EARTH SYSTEMS PACIFIC
1514 MOFFETT STREET, SUITE A
SALINA, CA 93905

ATTN: AJAY SINGH
PHONE: 1-831-240-4624

ONSITE WASTEWATER TREATMENT SYSTEMS — FOX ONSITE SOLUTIONS
1575 SHEFFIELD AVE
SAN JOSE, CA 95125

ATTN: RYAN FOX
PHONE: 1-831-531-7205
EMAIL: ryan@foxonsite.com

(1)

DEFERRED APPROVALS & ADD ALTERNATES

1. **BASE BID:** METAL BUILDING DESIGN & INSTALLATION. SEE SPEC SECTION 133419 – METAL BUILDING SYSTEMS AND CONSTRUCTION DRAWINGS FOR SCOPE REQUIREMENTS. THE DESIGN AND PROCUREMENT PROCESS FOR THE PRE-FAB BUILDING WILL HAVE AN IMPACT ON OVERALL CONSTRUCTION SCHEDULE. FABRICATION/PROCUREMENT SHOULD ALIGN WITH ANTICIPATED INSTALLATION SCHEDULE.
2. **BASE BID:** FIRE ALARM. SEE ELECTRICAL DRAWINGS FOR SCOPE REQUIREMENTS.
3. **ALTERNATE BID #1:** INCLUDES COST FOR A WELL WATER FILTRATION SYSTEM DESIGN AND INSTALLATION FOR THE SCHOOL AND COUNTY LIBRARY, AS DESCRIBED IN THE DRAWINGS.
4. **ALTERNATE BID #2:** INCLUDES COST FOR SOLAR PANEL DESIGN AND INSTALLATION, AS DESCRIBED IN THE DRAWINGS.
5. **ALTERNATE BID #3:** INCLUDES COST FOR A NET ZERO BATTERY BACKUP INCLUDING INTEGRATION WITH SOLAR PANEL SYSTEM DESIGN AND INSTALLATION, AS DESCRIBED IN THE DRAWINGS
6. **ALTERNATE BID #4:** INCLUDES COST TO REMOVE PETROMAT/ WATER PROOFING MEMBRANE IF FOUND UNDER EXISTING ASPHALT THAT IS TO BE REMOVED, AS DESCRIBED IN DRAWINGS.

CODE COMPLIANCE

ALL WORK & MATERIAL SHALL BE PERFORMED & INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE GOVERNING JURISDICTION. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CALIFORNIA CODES.

2022 CALIFORNIA ADMINISTRATIVE CODE, PART 1, TITLE 24 CCR

2022 CALIFORNIA BLDG CODE (CBC). PART 2, TITLE 24, CCR (2021 INTERNATIONAL BLDG CODE VOL. 1-2 AND 2022 CA AMENDMENTS)

2022 CALIFORNIA ELECTRICAL CODE (CEC). PART 3,TITLE 24 CCR (2020 NATIONAL ELECTRICAL CODE AND 2022 CA AMENDMENTS)

2022 CALIFORNIA MECHANICAL CODE (CMC). PART 4, TITLE 24 CCR (2021 UNIFORM MECHANICAL CODE AND 2022 CA AMENDMENTS)

2022 CALIFORNIA PLUMBING CODE (CPC). PART 5, TITLE 24 CCR (2021 UNIFORM PLUMBING CODE AND 2022 CA AMENDMENTS)

2022 CALIFORNIA ENERGY CODE (CEC). PART 6, TITLE 24 CCR

2022 CALIFORNIA FIRE CODE (CFC). PART 9, TITLE 24 CCR (2021 INTERNATIONAL FIRE CODE AND 2022 CA AMENDMENTS)

2022 CALIFORNIA GREEN BUILDING STANDARDS CODE. PART 11, TITLE 24 CCR

2022 CALIFORNIA REFERENCED STANDARDS. PART 12, TITLE 24 CCR.

TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHALL REGULATIONS

2010 AMERICANS W/DISABILITIES ACT (ADA) STANDARDS FOR ACCESSIBLE DESIGN

2022 NFPA 13, INSTALLATION OF AUTOMATIC SPRINKLER SYST. (CA AMENDED)

2019 NFPA 14, INSTALLATION OF STANDPIPE & HOLD SYSTEMS (CA AMENDED)

2021 NFPA 17, DRY CHEMICAL EXTINGUISHING SYSTEMS

2021 NFPA 17A, WET CHEMICAL EXTINGUISHING SYSTEMS

2019 NFPA 20, INSTALLATION OF STATIONARY PUMPS FOR FIRE PROTECTION

2013 NFPA 22, WATER TANKS FOR PRIVATE FIRE PROTECTION

2019 NFPA 24, INSTALLATION OF PRIVATE FIRE SERVICE MAINS & THEIR APPURTENANCES (CA EDITION)

2023 NFPA 25, INSPECTION, TESTING, MAINTENANCE OF WATER-BASED FIRE PROTECTION SYSTEMS (CA AMENDED)

2022 NFPA 72, NATIONAL FIRE ALARM CODE (CA AMENDED; SEE UL STD 1071 FOR "VISUAL DEVICES")

2019 NFPA 80, FIRE DOORS AND OTHER OPENING PROTECTIVES

2022 NFPA 110, EMERGENCY AND STANDBY POWER SYSTEMS

2021 NFPA 170, STANDARD FOR FIRE SAFETY & EMERGENCY SYMBOLS

2018 NFPA 2001 CLEAN AGENT FIRE EXTINGUISHING SYSTEMS

SFM 12-10-1, POWER OPERATED EXIT DOORS

SFM 12-10-2, SINGLE POINT LATCHING OR LOCKING DEVICES

SFM 12-10-3, EMERGENCY EXIT & PANIC HARDWARE

UL 38, MANUAL OPERATING SIGNAL BOXES (2008 EDITION)

UL 268, SMOKE DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS (2021 EDITION)

UL 268A, SMOKE DETECTORS DUCT APPLICATIONS (2008 EDITION)

UL 300, FIRE TESTING OF FIRE EXTINGUISHING SYST. FOR PROTECT- ION OF RESTAURANT COOKING AREAS (2005 EDITION)

UL 305, PANIC HARDWARE (2012 EDITION)

UL 464, AUDIBLE SIGNAL APPLICATIONS (2003 EDITION)

UL 521, HEAT DETECTORS FOR FIRE PREVENTING SIGNALING SYSTEM (1999 EDITION)

UL 864, CONTROL UNITS FOR FIRE PROTECTIVE SIGNALING SYSTEMS (2014 EDITION)

CCR TITLE 8, DIVISION 1, CHAPTER 4, SUBCHAPTER 6, ELEVATOR SAFETY ORDERS, COMMENCING WITH SECTION 3094.2.

ASME A17.1 - 2019 (W/A17.1A/CSA B44A-08 ADDENDA) SAFETY CODE FOR ELEVATORS AND ESCALATORS.

ASME A18.1 - 2021, SAFETY STANDARD FOR PLATFORM LIFTS AND STAIRWAY CHAIRLIFTS, COMMENCING WITH SECTION 2.

ICC 300-2017 STANDARD FOR BLEACHERS, FOLDING AND TELSCOPIC SEATING AND GRANDSTANDS

COMPLIANCE WITH CFC CHAPTER 33 "FIRE SAFTEY DURING CONSTRUCTION AND DEMOLITION" WILL BE ENFORCED.

EMERGENCY VEHICLE ACCESS ROADS AND ON SITE FIRE HYDRANTS SHALL BE IN SERVICE AND OPERABLE PRIOR TO LOADING THE SITE WITH COMBUSTABLE MATERIALS.

VICINITY MAP


PROJECT SITE
Bradley Rd
Monterey Rd
Bradley Rd
Bradley Rd
Bradley

ARCH D Size -24x36

2022 CALIFORNIA GREEN BUILDING STANDARDS CODE
NONRESIDENTIAL MANDATORY MEASURES, SHEET 3 (July 2024 Supplement)

Y = YES
N/A = NOT APPLICABLE
RESPON. PARTY = RESPONSIBLE PARTY (ie: ARCHITECT, ENGINEER, OWNER, CONTRACTOR, INSPECTOR ETC.)

Y	N/A	RESPON. PARTY
X	☐	Contractor

5.409.2 Whole building life cycle assessment. Projects shall conduct a cradle-to-grave whole building life cycle assessment performed in accordance with ISO 14040 and ISO 14044, excluding operating energy, and demonstrating a minimum 10-percent reduction in global warming potential (GWP) as compared to a reference baseline building of similar size, function, complexity, type of construction, material specification, and location that meets the requirements of the California Energy Code currently in effect. Software used to conduct the whole building life cycle assessment, including reference baseline building, shall have a data set compliant with ISO 14044, and ISO 21930 or EN 15804, and the software shall conform to ISO 21931 and/or EN 15978. The software tools and data sets shall be the same for evaluation of both the baseline building and the proposed building.

Notes:
1. Software for calculating whole building life cycle assessment is available for free at Athena Sustainable Materials Institute (https://calculatelca.com/software/impact-estimator/) and OneClick LCA-Planetary (www.oneclicklca.com/planetary). Paid versions include, but are not limited to, Sphera GaBi Solutions (gabi.sphera.com), SimaPro (simapro.com), One-Click LCA (www.oneclicklca.com) and Tally for Revit (apps.autodesk.com).

2. ASTM E2921-22 "Standard Practice for Minimum Criteria for Comparing Whole Building Life Cycle Assessments for Use with Building Codes, Standards, and Rating Systems" may be consulted for the assessment.

3. In addition to the required documentation specified in Section 5.409.2.3, Worksheet WS-9 may be required by the enforcing entity to demonstrate compliance with the requirements.

5.409.2.1 Building components. Building enclosure components included in the assessment shall be limited to glazing assemblies, insulation, and exterior finishes. Primary and secondary structural members included in the assessment shall be limited to footings and foundations, and structural columns, beams, walls, roofs, and floors.

5.409.2.2 Reference study period. The reference study period of the proposed building shall be equal to the reference baseline building and shall be 60 years.

5.409.2.3 Verification of compliance. A summary of the GWP analysis produced by the software and Worksheet WS-4 signed by the design professional of record shall be provided in the construction documents as documentation of compliance. A copy of the whole building life cycle assessment which includes the GWP analysis produced by the software, in addition to maintenance and training information, shall be included in the operation and maintenance manual and shall be provided to the owner at the close of construction. The enforcing agency may require inspection and inspection reports in accordance with Sections 702.2 and 703.1 during and at completion of construction to demonstrate substantial conformance. Inspection shall be performed by the design professional of record or third party acceptable to the enforcing agency.

X	☐	Contractor

5.409.3 Product GWP compliance—prescriptive path. Each product that is permanently installed and listed in Table 5.409.3 shall have a Type III environmental product declaration (EPD), either product-specific or factory-specific.

TABLE 5.409.3
PRODUCT GWP LIMITS

BUY CLEAN CALIFORNIA MATERIALS PRODUCT CATEGORY[1]	MAXIMUM ACCEPTABLE GWP VALUE (unfabricated) ($GWP_{allowed}$)	UNIT OF MEASUREMENT
Hot-rolled structural steel sections	1.77	MT CO_2e/MT
Hollow structural sections	3.00	MT CO_2e/MT
Steel plate	2.61	MT CO_2e/MT
Concrete reinforcing steel	1.56	MT CO_2e/MT
Flat glass	2.50	MT CO_2e/MT [4]
Light-density mineral wool board insulation	5.83	kg CO_2e/MT
Heavy-density mineral wool board insulation	14.28	kg CO_2e/MT
Concrete, Ready-Mixed[2], [3]		
CONCRETE PRODUCT CATEGORY	**MAXIMUM GWP ALLOWED VALUE ($GWP_{allowed}$)**	**UNIT OF MEASUREMENT**
up to 2499 psi	450	kg CO_2e/m^3
2500−3499 psi	489	kg CO_2e/m^3
3500−4499 psi	566	kg CO_2e/m^3
4500−5499 psi	661	kg CO_2e/m^3
5500−6499 psi	701	kg CO_2e/m^3
6500 psi and greater	799	kg CO_2e/m^3
Concrete, Lightweight Ready-Mixed[2]		
CONCRETE PRODUCT CATEGORY	**MAXIMUM GWP ALLOWED VALUE ($GWP_{allowed}$)**	**UNIT OF MEASUREMENT**
up to 2499 psi	875	kg CO_2e/m^3
2500−3499 psi	956	kg CO_2e/m^3
3500−4499 psi	1039	kg CO_2e/m^3

1. The GWP values of the products listed in Table 5.409.3 are based on 175 percent of Buy Clean California Act (BCCA) GWP values, except for concrete products which are not included in the BCCA.
2. For concrete, 175 percent of the National Ready Mixed Concrete Association (NRMCA) 2022 version 3 Pacific Southwest regional benchmark values are used for the GWP allowed, except for High Early Strength.
3. Concrete High Early Strength ready-mixed shall be calculated at 130 percent of the ready-mixed concrete GWP allowed values for each product category**.**
4. The GWP unit for flat glass has been adjusted to correct an error in the express terms. With the revised unit (MT CO2e/MT), reported GWP values will align with industry data as published in the CLF North American Material Baselines (2023).

5.409.3.1 Products shall not exceed the maximum GWP value specified in Table 5.409.3.

Exception: Concrete may be considered one product category to meet compliance with this section. A weighted average of the maximum GWP for all concrete mixes installed in the project shall be less than the weighted average maximum GWP allowed per Table 5.409.3 using Exception Equation 5.409.3.1. Calculations shall be performed with consistent units of measurement for the material quantity and the GWP value.

For the purposes of this exception, industry-wide EPDs are acceptable.

Exception EQUATION 5.409.3.1

$GWP_P < GWP_{allowed}$
where
$GWP_P = \Sigma\ (GWP_n)(v_n)$
and
$GWP_{allowed} = \Sigma\ (GWP_{allowed})(v_n)$
and
$_n$ = each concrete mix installed in the project
GWP_n = the GWP for concrete mix $_n$ per concrete mix EPD, in kg CO2e/m3
$GWP_{allowed}$ = the GWP potential allowed for concrete mix $_n$ per Table 5.409.3
v_n = the volume of concrete mix $_n$ installed in the project, in m3

Y	N/A	RESPON. PARTY

5.409.3.2 Verification of compliance. Calculations to demonstrate compliance, Type III EPDs for products required to comply, if included in the project, and Worksheet WS-5 signed by the design professional of record shall be provided on the construction documents. Updated EPDs for products used in construction shall be provided to the owner at the close of construction and to the enforcement entity upon request. The enforcing agency may require inspection and inspection reports in accordance with Sections 702.2 and 703.1 during and at completion of construction to demonstrate substantial conformance. Inspection shall be performed by the design professional of record or third party acceptable to the enforcing agency.

SECTION 5.410 BUILDING MAINTENANCE AND OPERATIONS

X	☐	Contractor

5.410.1 RECYCLING BY OCCUPANTS. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of non-hazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics, organic waste, and metals or meet a lawfully enacted local recycling ordinance, if more restrictive.

Exception: Rural jurisdictions that meet and apply for the exemption in Public Resources Code 42649.82 (a)(2)(A) et seq. shall also be exempt from the organic waste portion of this section.

5.410.1.1 Additions. All additions conducted within a 12-month period under single or multiple permits, resulting in an increase of 30% or more in floor area, shall provide recycling areas on site.

Exception: Additions within a tenant space resulting in less than a 30% increase in the tenant space floor area.

5.410.1.2 Sample ordinance. Space allocation for recycling areas shall comply with Chapter 18, Part 3, Division 30 of the *Public Resources Code*. Chapter 18 is known as the California Solid Waste Reuse and Recycling Access Act of 1991 (Act).

Note: A sample ordinance for use by local agencies may be found in Appendix A of the document at the CalRecycle's web site.

☐	X	

5.410.2 COMMISSIONING. [N] New buildings 10,000 square feet and over. For new buildings 10,000 square feet and over, building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the owner's or owner representative's project requirements. Commissioning shall be performed in accordance with this section by trained personnel with experience on projects of comparable size and complexity. For I-occupancies that are not regulated by OSHPD or for I-occupancies and L-occupancies that are not regulated y the California Energy Code Section 100.0 Scope, all requirements in Sections 5.410.2 through 5.410.2.6 shall apply.

Note: For energy-related systems under the scope (Section 100) of the California Energy Code, including heating, ventilation, air conditioning (HVAC) systems and controls, indoor lighting systems and controls, as well as water heating systems and controls, refer to California Energy Code Section 120.8 for commissioning requirements

Commissioning requirements shall include:

1. Owner's or Owner representative's project requirements.
2. Basis of design.
3. Commissioning measures shown in the construction documents.
4. Commissioning plan.
5. Functional performance testing.
6. Documentation and training.
7. Commissioning report.

Exceptions:

1. Unconditioned warehouses of any size.
2. Areas less than 10,000 square feet used for offices or other conditioned accessory spaces within unconditioned warehouses.
3. Tenant improvements less than 10,000 square feet as described in Section 303.1.1.
4. Open parking garages of any size, or open parking garage areas, of any size, within a structure.

Note: For the purposes of this section, unconditioned shall mean a building, area or room which does not provide heating and/or air conditioning.

Informational Notes:

1. . Functional performance testing for heating, ventilation, air conditioning systems and lighting controls must be performed in compliance with the *California Energy Code*.

5.410.2.1 Owner's or Owner Representative's Project Requirements (OPR). [N] The expectations and requirements of the building appropriate to its phase shall be documented before the design phase of the project begins. This documentation shall include the following:
1. Environmental and sustainability goals.
2. Building sustainable goals.
3. Indoor environmental quality requirements.
4. Project program, including facility functions and hours of operation, and need for after hours operation.
5. Equipment and systems expectations.
6. Building occupant and operation and maintenance (O&M) personnel expectations.

5.410.2.2 Basis of Design (BOD). [N] A written explanation of how the design of the building systems meets the OPR shall be completed at the design phase of the building project. The Basis of Design document shall cover the following systems:

1. Renewable energy systems.
2. Landscape irrigation systems.
3. Water reuse system.

5.410.2.3 Commissioning plan. [N] Prior to permit issuance a commissioning plan shall be completed to document how the project will be commissioned. The commissioning plan shall include the following:
1. General project information.
2. Commissioning goals.
3. Systems to be commissioned. Plans to test systems and components shall include:
   a. An explanation of the original design intent.
   b. Equipment and systems to be tested, including the extent of tests.
   c. Functions to be tested.
   d. Conditions under which the test shall be performed.
   e. Measurable criteria for acceptable performance.
4. Commissioning team information.
5. Commissioning process activities, schedules and responsibilities. Plans for the completion of commissioning shall be included.

5.410.2.4 Functional performance testing. [N] Functional performance tests shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the approved plans and specifications. Functional performance testing reports shall contain information addressing each of the building components tested, the testing methods utilized, and include any readings and adjustments made.

5.410.2.5 Documentation and training. [N] A Systems Manual and Systems Operations Training are required, including Occupational Safety and Health Act (OSHA) requirements in *California Code of Regulations* (CCR), Title 8, Section 5142, and other related regulations.

5.410.2.5.1 Systems manual. [N] Documentation of the operational aspects of the building shall be completed within the systems manual and delivered to the building owner or representative. The systems manual shall include the following:
1. Site information, including facility description, history and current requirements.
2. Site contact information.
3. Basic operations and maintenance, including general site operating procedures, basic troubleshooting, recommended maintenance requirements, site events log.
4. Major systems.
5. Site equipment inventory and maintenance notes.
6. A copy of verifications required by the enforcing agency or this code.
7. Other resources and documentation, if applicable.

5.410.2.5.2 Systems operations training. [N] A program for training of the appropriate maintenance staff for each equipment type and/or system shall be developed and documented in the commissioning report and shall include the following:
1. System/equipment overview (what it is, what it does and with what other systems and/or equipment it interfaces).
2. Review and demonstration of servicing/preventive maintenance.
3. Review of the information in the Systems Manual.
4. Review of the record drawings on the system/equipment.

5.410.2.6 Commissioning report. [N] A report of commissioning process activities undertaken through the design and construction phases of the building project shall be completed and provided to the owner or representative.

X	☐	Contractor

5.410.4 TESTING AND ADJUSTING. New buildings less than 10,000 square feet. Testing and adjusting of systems shall be required for new buildings less than 10,000 square feet or new systems to serve an addition or alteration subject to Section 303.1.

Y	N/A	RESPON. PARTY

5.410.4.2 (Reserved)

Note: For energy-related systems under the scope (Section 100) of the California Energy Code, including heating, ventilation, air conditioning (HVAC) systems and controls, indoor lighting system and controls, as well as water heating systems and controls, refer to California Energy Code Section 120.8 for commissioning requirements and Sections 120.5, 120.6, 130.4, and 140.9(b)3 for additional testing requirements of specific systems.

5.410.4.2 Systems. Develop a written plan of procedures for testing and adjusting systems. Systems to be included for testing and adjusting shall include at a minimum, as applicable to the project:

1. Renewable energy systems.
2. Landscape irrigation systems.
3. Water reuse systems.

5.410.4.3 Procedures. Perform testing and adjusting procedures in accordance with manufacturer's specifications and applicable standards on each system.

5.410.4.3.1 HVAC balancing. In addition to testing and adjusting, before a new space-conditioning system serving a building or space is operated for normal use, the system shall be balanced in accordance with the procedures defined by the Testing Adjusting and Balancing Bureau National Standards; the National Environmental Balancing Bureau Procedural Standards; Associated Air Balance Council National Standards or as approved by the enforcing agency.

5.410.4.4 Reporting. After completion of testing, adjusting and balancing, provide a final report of testing signed by the individual responsible for performing these services.

5.410.4.5 Operation and maintenance (O & M) manual. Provide the building owner or representative with detailed operating and maintenance instructions and copies of guaranties/warranties for each system. O & M instructions shall be consistent with OSHA requirements in CCR, Title 8, Section 5142, and other related regulations.

5.410.4.5.1 Inspections and reports. Include a copy of all inspection verifications and reports required by the enforcing agency.

DIVISION 5.5 ENVIRONMENTAL QUALITY

SECTION 5.501 GENERAL

5.501.1 SCOPE. The provisions of this chapter shall outline means of reducing the quantity of air contaminants that are odorous, irritating, and/or harmful to the comfort and well-being of a building's installers, occupants and neighbors.

SECTION 5.502 DEFINITIONS

5.502.1 DEFINITIONS. The following terms are defined in Chapter 2 *(and are included here for reference)*

ARTERIAL HIGHWAY. A general term denoting a highway primarily for through traffic usually on a continuous route.

A-WEIGHTED SOUND LEVEL (dBA). The sound pressure level in decibels as measured on a sound level meter using the internationally standardized A-weighting filter or as computed from sound spectral data to which A-weighting adjustments have been made.

1 BTU/HOUR. British thermal units per hour, also referred to as Btu. The amount of heat required to raise one pound of water one degree Fahrenheit per hour, a common measure of heat transfer rate. A ton of refrigeration is 12,000 Btu, the amount of heat required to melt a ton (2,000 pounds) of ice at 32[0] Fahrenheit.

COMMUNITY NOISE EQUIVALENT LEVEL (CNEL). A metric similar to the day-night average sound level (Ldn), except that a 5 decibel adjustment is added to the equivalent continuous sound exposure level for evening hours (7pm to 10pm) in addition to the 10 dB nighttime adjustment used in the Ldn.

COMPOSITE WOOD PRODUCTS. Composite wood products include hardwood plywood, particleboard and medium density fiberboard. "Composite wood products" does not include hardboard, structural plywood, structural panels, structural composite lumber, oriented strand board, glued laminated timber, timber, prefabricated wood I–joists or finger–jointed lumber, all as specified in California Code of Regulations (CCR), Title 17, Section 93120.1(a).

Note: See CCR, Title 17, Section 93120.1.

DAY-NIGHT AVERAGE SOUND LEVEL (Ldn). The A-weighted equivalent continuous sound exposure level for a 24-hour period with a 10 dB adjustment added to sound levels occurring during nighttime hours (10p.m. to 7 a.m.).

DECIBEL (db). A measure on a logarithmic scale of the magnitude of a particular quantity (such as sound pressure, sound power, sound intensity) with respect to a reference quantity.

ELECTRIC VEHICLE (EV). An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles, and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. Plug-in hybrid electric vehicles (PHEV) are considered electric vehicles. For purposes of the *California Electrical Code*, off-road, self-propelled electric vehicles, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats, and the like, are not included.

ELECTRIC VEHICLE CHARGING STATION(S) (EVCS). One or more spaces intended for charging electric vehicles.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE). The conductors, including the ungrounded, grounded, and equipment grounding conductors and the electric vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle.

ENERGY EQUIVALENT (NOISE) LEVEL (Leq). The level of a steady noise which would have the same energy as the fluctuating noise level integrated over the time of period of interest.

EXPRESSWAY. An arterial highway for through traffic which may have partial control of access, but which may or may not be divided or have grade separations at intersections.

FREEWAY. A divided arterial highway with full control of access and with grade separations at intersections.

GLOBAL WARMING POTENTIAL (GWP). The radiative forcing impact of one mass-based unit of a given greenhouse gas relative to an equivalent unit of carbon dioxide over a given period of time. Carbon dioxide is the reference compound with a GWP of one.

GLOBAL WARMING POTENTIAL VALUE (GWP VALUE). A 100-year GWP value published by the Intergovernmental Panel on Climate Change (IPCC) in either its Second Assessment Report (SAR) (IPCC, 1995); or its Fourth Assessment A-3 Report (AR4) (IPCC, 2007). The SAR GWP values are found in column "SAR (100-yr)" of Table 2.14.; the AR4 GWP values are found in column "100 yr" of Table 2.14.

HIGH-GWP REFRIGERANT. A compound used as a heat transfer fluid or gas that is: (a) a chlorofluorocarbon, a hdrochlorofluorocarbon, a hydrofluorocarbon, a perfluorocarbon, or any compound or blend of compounds, with a GWP value equal to or greater than 150, or (B) any ozone depleting substance as defined in Title 40 of the Code of Federal Regulations, Part 82, sec.82.3 (as amended March 10, 2009)**.**

LONG RADIUS ELBOW. Pipe fitting installed between two lengths of pipe or tubing to allow a change of direction, with a radius 1.5 times the pipe diameter.

LOW-GWP REFRIGERANT. A compound used as a heat transfer fluid or gas that: (A) has a GWP value less than 150, and (B) is not an ozone depleting substance as defined in Title 40 of the Code of Federal Regulations, Part 82, sec.82.3 (as amended March 10, 2009).

MERV. Filter minimum efficiency reporting value, based on ASHRAE 52.2–1999.

MAXIMUM INCREMENTAL REACTIVITY (MIR). The maximum change in weight of ozone formed by adding a compound to the "Base REactive Organic Gas (ROG) Mixture" per weight of compound added, expressed to hundredths of a gram (g O^3/g ROC).

PRODUCT-WEIGHTED MIR (PWMIR). The sum of all weighted-MIR for all ingredients in a product subject to this article. The PWMIR is the total product reactivity expressed to hundredths of a gram of ozone formed per gram of product (excluding container and packaging).

PSIG. Pounds per square inch, guage.

REACTIVE ORGANIC COMPOUND (ROC). Any compound that has the potential, once emitted, to contribute to ozone formation in the troposphere.

SCHRADER ACCESS VALVES. Access fittings with a valve core installed.

SHORT RADIUS ELBOW. Pipe fitting installed between two lengths of pipe or tubing to allow a change of direction, with a radius 1.0 times the pipe diameter.

SUPERMARKET. For the purposes of Section 5.508.2, a supermarket is any retail food facility with 8,000 square feet or more conditioned area, and that utilizes either refrigerated display cases, or walk-in coolers or freezers connected to remote compressor units or condensing units.

VOC. A volatile organic compound broadly defined as a chemical compound based on carbon chains or rings with vapor pressures greater than 0.1 millimeters of mercury at room temperature. These compounds typically contain hydrogen and may contain oxygen, nitrogen and other elements. See CCR Title 17, Section 94508(a).

Note: Where specific regulations are cited from different agencies such as SCAQMD, ARB, etc., the VOC definition included in that specific regulation is the one that prevails for the specific measure in question.

Y	N/A	RESPON. PARTY
	☐	
X	☐	Contractor
X	☐	Contractor
X	☐	Contractor

SECTION 5.503 FIREPLACES

5.503.1 FIREPLACES. Install only a direct-vent sealed-combustion gas or sealed wood-burning fireplace, or a sealed woodstove or pellet stove, and refer to residential requirements in the California Energy Code, Title 24, Part 6, Subchapter 7, Section 150. Woodstoves, pellet stoves and fireplaces shall comply with applicable local ordinances.

5.503.1.1 Woodstoves. Woodstoves and pellet stoves shall comply with U.S. EPA New Source Performance Standards (NSPS) emission limits as applicable, and shall have a permanent label indicating they are certified to meet the emission limits.

SECTION 5.504 POLLUTANT CONTROL

5.504.1 TEMPORARY VENTILATION. The permanent HVAC system shall only be used during construction if necessary to condition the building or areas of addition or alteration within the required temperature range for material and equipment installation. If the HVAC system is used during construction, use return air filters with a Minimum Efficiency Reporting Value (MERV) of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30% based on ASHRAE 52.1-1992 Replace all filters immediately prior to occupancy, or, if the building is occupied during alteration, at the conclusion of construction.

5.504.3 Covering of duct openings and protection of mechanical equipment during construction. At the time of rough installation and during storage on the construction site until final startup of the heating, cooling and ventilation equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the enforcing agency to reduce the amount of dust, water and debris which may enter the system.

5.504.4 FINISH MATERIAL POLLUTANT CONTROL. Finish materials shall comply with Sections 5.504.4.1 through 5.504.4.6.

5.504.4.1 Adhesives, sealants and caulks. Adhesives, sealants, and caulks used on the project shall meet the requirements of the following standards:
1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits, as shown in Tables 5.504.4.1 and 5.504.4.2. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene and trichloroethylene), except for aerosol products as specified in subsection 2, below.

2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of *California Code of Regulations*, Title 17, commencing with Section 94507.

TABLE 5.504.4.1 - ADHESIVE VOC LIMIT[1,2]

Less Water and Less Exempt Compounds in Grams per Liter

ARCHITECTURAL APPLICATIONS	CURRENT VOC LIMIT
INDOOR CARPET ADHESIVES	50
CARPET PAD ADHESIVES	50
OUTDOOR CARPET ADHESIVES	150
WOOD FLOORING ADHESIVES	100
RUBBER FLOOR ADHESIVES	60
SUBFLOOR ADHESIVES	50
CERAMIC TILE ADHESIVES	65
VCT & ASPHALT TILE ADHESIVES	50
DRYWALL & PANEL ADHESIVES	50
COVE BASE ADHESIVES	50
MULTIPURPOSE CONSTRUCTION ADHESIVES	70
STRUCTURAL GLAZING ADHESIVES	100
SINGLE-PLY ROOF MEMBRANE ADHESIVES	250
OTHER ADHESIVES NOT SPECIFICALLY LISTED	50
SPECIALTY APPLICATIONS	
PVC WELDING	510
CPVC WELDING	490
ABS WELDING	325
PLASTIC CEMENT WELDING	250
ADHESIVE PRIMER FOR PLASTIC	550
CONTACT ADHESIVE	80
SPECIAL PURPOSE CONTACT ADHESIVE	250
STRUCTURAL WOOD MEMBER ADHESIVE	140
TOP & TRIM ADHESIVE	250
SUBSTRATE SPECIFIC APPLICATIONS	
METAL TO METAL	30
PLASTIC FOAMS	50
POROUS MATERIAL (EXCEPT WOOD)	50
WOOD	30
FIBERGLASS	80

1. IF AN ADHESIVE IS USED TO BOND DISSIMILAR SUBSTRATES TOGETHER, THE ADHESIVE WITH THE HIGHEST VOC CONTENT SHALL BE ALLOWED.

2. FOR ADDITIONAL INFORMATION REGARDING METHODS TO MEASURE THE VOC CONTENT SPECIFIED IN THIS TABLE, SEE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 1168, www.arb.ca.gov/DRDB/SC/CURHTML/R1168.PDF

TABLE 5.504.4.2 - SEALANT VOC LIMIT

Less Water and Less Exempt Compounds in Grams per Liter

SEALANTS	CURRENT VOC LIMIT
ARCHITECTURAL	250
MARINE DECK	760
NONMEMBRANE ROOF	300
ROADWAY	250
SINGLE-PLY ROOF MEMBRANE	450
OTHER	420
SEALANT PRIMERS	
ARCHITECTURAL	
NONPOROUS	250
POROUS	775
MODIFIED BITUMINOUS	500
MARINE DECK	760
OTHER	750

NOTE: FOR ADDITIONAL INFORMATION REGARDING METHODS TO MEASURE THE VOC CONTENT SPECIFIED IN THESE TABLES, SEE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 1168.

DISCLAIMER: *THIS DOCUMENT IS PROVIDED AND INTENDED TO BE USED AS A MEANS TO INDICATE AREAS OF COMPLIANCE WITH THE CALIFORNIA GREEN BUILDING STANDARDS (CALGREEN) CODE. DUE TO THE VARIABLES BETWEEN BUILDING DEPARTMENT JURISDICTIONS, THIS CHECKLIST IS TO BE USED ON AN INDIVIDUAL PROJECT BASIS AND MAY BE MODIFIED BY THE END USER TO MEET THOSE INDIVIDUAL NEEDS. THE END USER ASSUMES ALL RESPONSIBILITY ASSOCIATED WITH THE USE OF THIS DOCUMENT, INCLUDING VERIFICATION WITH THE FULL CODE.*

GREEN BUILDING CHECKLIST

REVISIONS	BY

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460 WEST EDMUNDSON AVENUE, MORGAN HILL, CA 95037
(408) 202-8075 www.title24.com heather@builders-energy.net
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TITLE 24 HERS RATINGS GREEN POINT RATERS

ENERGY STAR PARTNERS HERS II CERTIFIED CEA CERTIFIED

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STAMP: 21x32 4x3

LEGEND

EXISTING	PROPOSED	DESCRIPTION
		PROPERTY LINE
		SETBACK LINE
	LOW LOW	LIMIT OF WORK
		CENTER LINE
		EXCEPTION
		EASEMENT LINE
		CONCRETE CURB
		CONCRETE CURB & GUTTER
		SAWCUT/CONFORM LINE
		HEADER BOARD
		TRAFFIC MARKINGS
		SIGN
FH	F.H.	ACCESSIBLE RAMP / FIRE HYDRANT
		EDGE OF PAVEMENT
		FENCE
18"SD	15"	STORM DRAIN & SIZE
	PP	PERFORATED PIPE
15"SS	SS 15"	SANITARY SEWER & SIZE
2"W	W 2"	DOMESTIC WATER LINE
T	T	TELEPHONE LINE
JT	JT	JOINT TRENCH (ELEC.,TEL.,GAS & CATV)
8"FS	FS 8"	FIRE SERVICE LINE & SIZE
E	E	ELECTRIC LINE
2"G	G 2"	GAS LINE & SIZE
C	C	COMMUNICATION LINE
		(E) UTILITY TO BE ABANDONED OR REMOVED IF IT IS WITHIN THE NEW BLDG. FOOTPRINT/FOOTING AREA.
		GRADE BREAK
115	115	CONTOUR LINE
CO	C.O.T.G.	CLEAN OUT TO GRADE
		CATCH BASIN
		AREA DRAIN
		DRAINAGE ARROW
BFP	BFP	BACK FLOW PREVENTOR
	P.I.V.	POST INDICATOR VALVE
	F.D.C.	FIRE DEPT. CONNECTION
S	SSMH	SANITARY SEWER MANHOLE
D	SDMH	STORM DRAIN MANHOLE
		WATER VALVE
		STREET LIGHT
		GUY WIRE
		JUNCTION POLE
TELE		TELEPHONE BOX
U		UNKNOWN UTILITY BOX
E	P	POWER (ELECTRICAL) BOX
WM	WM	WATER METER
W		WATER BOX
		VALLEY GUTTER
	50.85	SPOT ELEVATION
(101.13) 18"		TREE W/SIZE & DRIPLINE

UTILITY COORDINATION NOTES:

- FOR ALL NEW BLDG. P.O.C.'S SUCH AS DW, RWL AND SS (SHOWN ON THIS PLAN) SEE ARCH. PLANS FOR VERIFICATION OF EXACT INVERT, SIZE AND LOCATION PRIOR TO INSTALLATION.
- SEE ELECTRICAL, MECHANICAL, AND ARCH. PLANS FOR (E) POWER & GAS DEMOLITION & RELOCATION

COORDINATION NOTES:

- REFER TO ARCH PLANS FOR IRRIGATION RELOCATION/DEMOLITION.
- REFER TO LIGHTING PLANS FOR NEW/RELOCATED PARKING LOT LIGHTING.
- REFER TO ARCH PLANS FOR TREE PROTECTION/REMOVAL.

NOTES:

1. UNDERGROUND UTILITY LOCATIONS SHOWN HEREON WERE TAKEN FROM RECORD DATA. NO GUARANTEE IS MADE OR IMPLIED AS TO THE ACCURACY OF SUCH RECORD DATA. NO EXCAVATIONS WERE MADE TO CONFIRM LOCATIONS. CONTRACTORS SHALL CONTACT U.S.A. UNDERGROUND (1-800-227-2600) AND TO EXERCISE EXTREME CARE IN VERIFYING ALL LOCATIONS PRIOR TO COMMENCING EXCAVATIONS OR OTHER WORK WHICH MAY AFFECT THESE UTILITIES.
2. IRRIGATION LATERALS, PARKING LOT LIGHTING WIRING AND SIGNAL WIRING NOT SHOWN. VERIFY LOCATION BEFORE COMMENCING TRENCHING. REPLACE OR REPAIR IMMEDIATELY WHERE BROKEN TO PROVIDE UNINTERRUPTED SERVICE.
3. ALL FINISH GRADES SHOWN ARE TO TOP OF PAVEMENT NOT TOP OF CURB UNLESS NOTED OTHERWISE. TOP OF CURB ELEVATION IS 6" ABOVE TOP OF PAVEMENT UNLESS NOTED OTHERWISE.
4. GRADING CONFORM LINE AND MATCH POINTS [EXAMPLE:(39.05±(E)] TO EXISTING CONDITIONS ARE BASED ON ESTIMATED ELEVATIONS FROM AERIAL AND TOPOGRAPHIC SURVEYS. CONTRACTOR SHALL VERIFY ELEVATIONS AT CONFORM AND MATCH POINTS BEFORE GRADING TO ENSURE PROPER DRAINAGE AND SLOPES.
5. PRIOR TO CONNECTING TO EXISTING UTILITIES OR INSTALLING UPSTREAM UTILITIES, VERIFY LOCATION, FLOW DIRECTION, SIZE, INVERT OR DEPTH AT POINT OF CONNECTION.
6. UTILITY ABANDONMENT/REMOVAL: DISCONNECT AND CAP PIPES AND SERVICES TO REMAIN. REMOVE ALL PORTIONS OF ALL UTILITIES WITHIN NEW BUILDING FOOTPRINT AND DISPOSE OF OFF-SITE. OTHERWISE ABANDON IN PLACE U.N.O.
7. NOTIFY THE ENGINEER IMMEDIATELY OF ANY UTILITIES ENCOUNTERED THAT ARE NOT SHOWN ON THE DRAWINGS. PRESERVE AND REPAIR ANY UTILITIES THAT ARE DAMAGED AND THAT ARE TO REMAIN.
8. CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL CROSSINGS OF NEW UTILITIES WITH EACH OTHER, AND WITH EXISTING UTILITIES. VERIFY EXISTING PIPE LOCATION AND INVERT PRIOR TO INSTALLING NEW UTILITIES. NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES OR DEVIATIONS. INSTALL GRAVITY UTILITIES BEFORE WATER & DRY UTILITIES TO ENSURE NO CONFLICTS.
9. SAWCUT, REMOVE, & REPLACE EXISTING PAVEMENT, CURBS, SIDEWALKS, & LANDSCAPING TO MATCH (E) AS NECESSARY TO INSTALL NEW UTILITIES AS SHOWN. FOR REPLACING CONCRETE PAVEMENT, USE 18" LONG, #4 DOWELS @ 12" O.C. ON THE CENTER OF THE (N) CONCRETE SECTION AND EMBED A MINIMUM OF 6" INTO (E) CONCRETE WITH EPOXY. FOR LANDSCAPE AREAS, REFER TO ARCHITECTURAL/LANDSCAPE SPECIFICATIONS FOR TOP SOIL REQUIREMENTS.
10. ADJUST ALL (E) UTILITY VALVES, BOX, ETC. INCLUDING NOT SHOWN TO FINISHED GRADE (TYP.)
11. CONTRACTOR IS RESPONSIBLE FOR PRESERVING & PROTECTING ALL SURVEY CONTROL POINTS. A LICENSED LAND SURVEYOR SHALL REPAIR AND OR REPLACE ANY SURVEY CONTROL POINTS THAT ARE DISPLACED OR DAMAGED.
12. SUB-EXCAVATE ON THE ORDER OF 2 FEET BELOW THE PAD GRADE AT LEAST 5 FEET BEYOND THE PERIMETER OF THE BUILDING AND AT LEAST 2 FEET BEYOND THE EXTERIOR FLAT WORK, MIXING THE SOIL THOROUGHLY, AND UNIFORMLY MOISTURE CONDITIONING IT TO A MINIMUM 3 PERCENT ABOVE OPTIMUM MOISTURE CONTENT PER SECTION 11 EARTH SYSTEMS SOIL REPORT. 1
12. ALL GRADING, EXCAVATION, COMPACTION, AND EXPANSIVE SOIL REMEDIATION SHALL BE OBSERVED BY THE SOIL ENGINEER. CONTACT SOILS ENGINEER 48 HOURS PRIOR TO COMMENCING WORK.

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PROFESSIONAL ENGINEER Andrew Perez No. 89701 CIVIL STATE OF CALIFORNIA

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1 03/04/2026 ADDENDUM #1

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LEGEND & NOTES

NEW BRADLEY LIBRARY
SITE WORK

BRADLEY UNION SCHOOL DISTRICT
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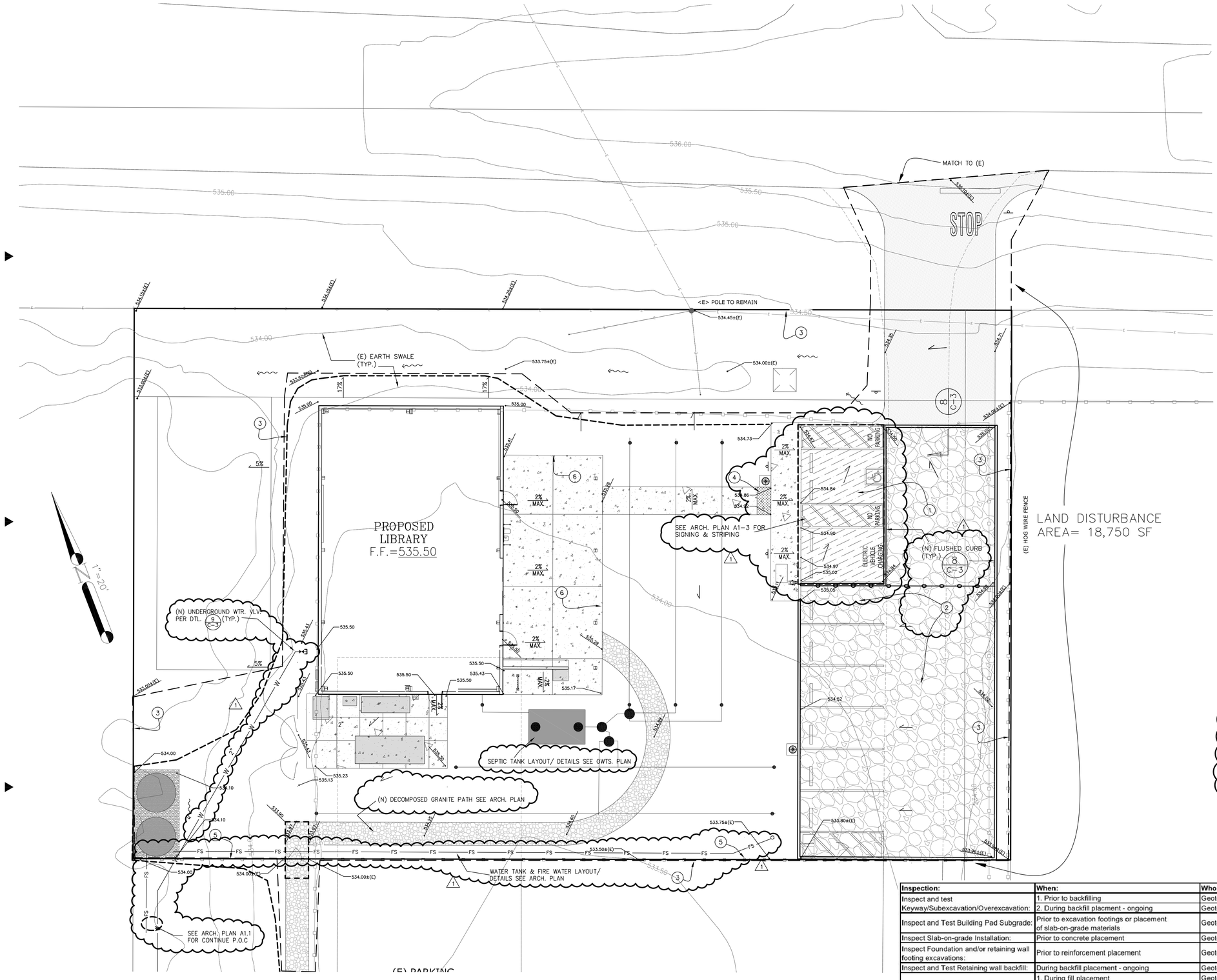
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C-1



GRADING KEYNOTES

1. 2% MAX. SLOPE IN ANY DIRECTION (TYP. ALL ACC. PARKING/DROP-OFF)
2. ADJUST ALL (E) UTILITY VALVES, BOX, ETC. INCLUDING NOT SHOWN TO FINISHED GRADE IN (N) PAVING AREA (TYP.)
3. CONFORM TO (E) GRADE (SEE NOTE 4 SHEET C-1 LEGEND & NOTES) 1
4. INSTALL 36" WIDE BAND OF DETECTABLE WARNING TRUNCATED DOMES PER MFR'S. SPECS. USE WAUSAU ADA-2 PAVER TRUNCATED DOMES (800.388.8728) MEETING CBC SECTION 11B-705. FINISH TO MATCH S/W.
5. (N) FENCE PER ARCH. PLANS (TYP.)
6. (N) THICKENED EDGE CONC. SIDEWALK @ ALL AREAS WHERE (N) CONC. MEETS LANDSCAPE PER DTL. 6 C-3 (TYP.)

EARTH WORK QUANTITIES

CUT: 386 CY
FILL: 974 CY
EXPORT: 0 CY
IMPORT: 606 CY

NOTE: EARTHWORK QUANTITIES SHOWN ARE APPROXIMATE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INDEPENDENTLY ESTIMATE QUANTITIES FOR HIS/HER OWN USE.

PAVING LEGEND

NEW PERVIOUS PAVEMENT SECTION, 6" PERVIOUS CONC. PER DTL. 8/C-3 (TYP.) 1

4" CONC. SECTION FOR NEW SIDEWALK AREAS. W/ #4 @ 18" O.C.E.W. OVER 8" CL. II A.B., EXPANSION JOINTS @ 24' O.C. AND SCORED @ 4' O.C. SEE DTL. 3/C-3
WHERE (N) CONC. MEETS LANDSCAPE, (N) THICKENED EDGE CONC. PER DTL. 2/C-3 (TYP.)
SEE DTL. 6/C-3 WHERE (N) CONC. MEETS BUILDING FACE (TYP.)
SEE DTL. 1/C-3 WHERE (N) CONC. MEETS (E) CONC. (TYP.)

6" CONCRETE PAVING SECTION FOR NEW PARKING AREAS. W/ #4 @ 18" O.C.E.W. OVER 8" CL. II A.B., EXPANSION JOINTS @ 24' O.C. AND SCORED @ 4' O.C. SEE DTL. 3/C-3
WHERE (N) CONC. MEETS LANDSCAPE, (N) THICKENED EDGE CONC. PER DTL. 2/C-3 (TYP.)
SEE DTL. 1/C-3 WHERE (N) CONC. MEETS (E) CONC. (TYP.)

NEW PAVING SECTION 3" AC OVER 10" CL. II A.B. SEE DTL. 1/C-3
WHERE (N) PVMT. MEETS LANDSCAPE, (N) HEADER BOARD PER DTL. 4/C-3 (TYP.)

Inspection:	When:	Who:	Inspection By:	Date of Inspection:
Inspect and test Keyway/Subexcavation/Overexcavation:	1. Prior to backfilling 2. During backfill placment - ongoing	Geotechnical Engineering Technician		
Inspect and Test Building Pad Subgrade:	Prior to excavation footings or placement of slab-on-grade materials	Geotechnical Engineering Technician		
Inspect Slab-on-grade Installation:	Prior to concrete placement	Geotechnical Engineering Technician		
Inspect Foundation and/or retaining wall footing excavations:	Prior to reinforcement placement	Geotechnical Engineering Technician		
Inspect and Test Retaining wall backfill:	During backfill placement - ongoing	Geotechnical Engineering Technician		
Inspect and Test Driveway Fill, Subgrade and Baserock Placement:	1. During fill placement 2. Subgrade, prior to backfill placement 3. Baserock prior to AC, Concrete, or Pavement	Geotechnical Engineering Technician		
Inspect and Test Drainage Installation:	1. After pipe placement, prior to backfill placement 2. During backfill placment - ongoing	Geotechnical Engineering Technician		
Inspect site stripping and clearing:	After clearing complete	Geotechnical Engineering Technician		
Inspect utility trench compaction:	After utility trench backfill	Geotechnical Engineering Technician		

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GRADING & UTILITY PLAN

NEW BRADLEY LIBRARY SITE WORK
BRADLEY UNION SCHOOL DISTRICT
COUNTY OF MONTEREY

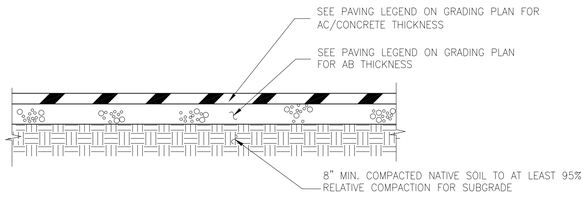
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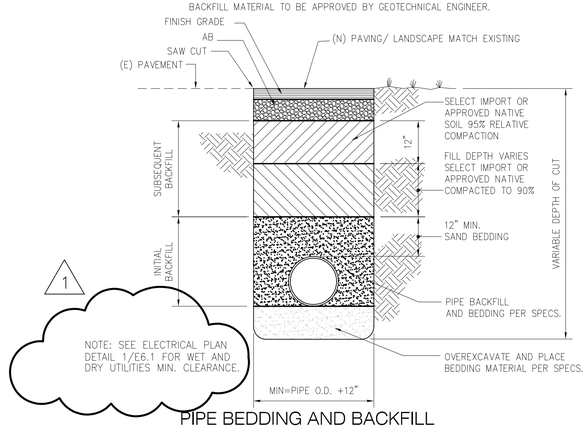
C-2



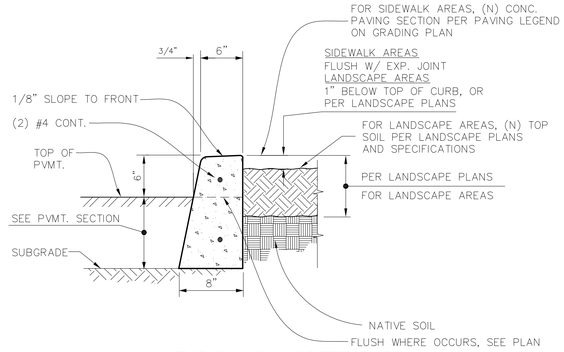
1 / C-3 TYP. PVMT. SECTION N.T.S.

*SELECT IMPORT SPECIFICATIONS	
SIEVE SIZE	PERCENTAGE PASSING
NO. 4	50–100
NO. 200	0–5

*NOTE:
BACKFILL MATERIAL TO BE APPROVED BY GEOTECHNICAL ENGINEER.



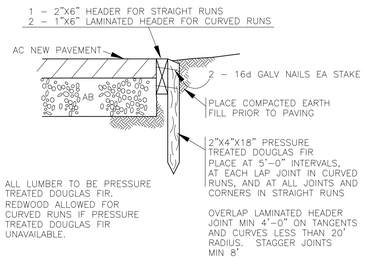
2 / C-3 PIPE BEDDING AND BACKFILL DETAIL N.T.S.



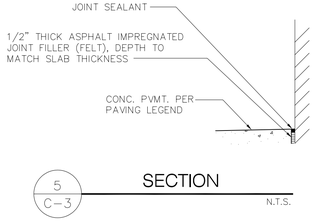
3 / C-3 TYPICAL CONCRETE CURB DETAIL N.T.S.

NOTE:

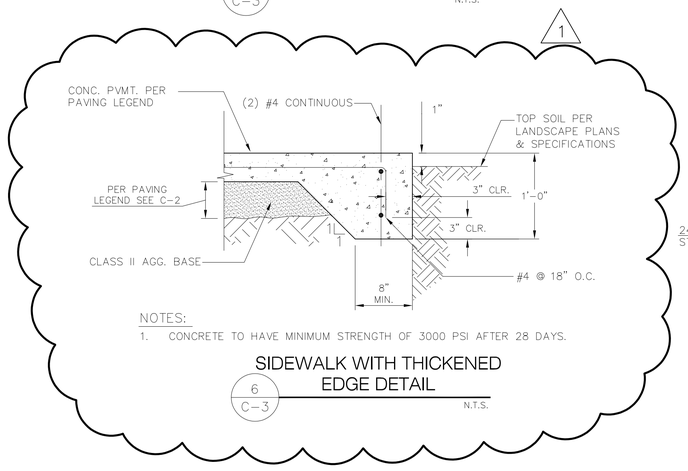
1. THE TOP EDGE SHALL BE ROUNDED OFF WITH A 1" RADIUS ON THE STREET SIDE AND A 1/2" RADIUS ON THE PROPERTY SIDE.
2. CONCRETE SHALL BE 3000 PSI, 2" TO 4" SLUMP.
3. EXPANSION JOINTS
   A. TO BE PROVIDED:
      1.) AT EACH POINT OF TANGENCY OF THE CURB.
      2.) AT EACH COLD JOINT.
      3.) AT EACH SIDE OF INLET STRUCTURES.
      4.) AT EACH END OF DRIVEWAYS.
   B. MATERIAL TO BE PRE-MOLDED, ASPHALTIC IMPREGNATED, NON-EXTRUDED, WITH A THICKNESS OF 1/4 INCH.
4. CONSTRUCTION JOINTS
   A. SPACING TO BE NOT MORE THAN 15 FEET.
   B. THE DEPTH OF THE JOINT SHALL BE AT LEAST 1/2 INCH.



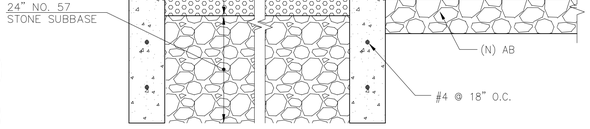
4 / C-3 HEADER BOARD DETAIL N.T.S.



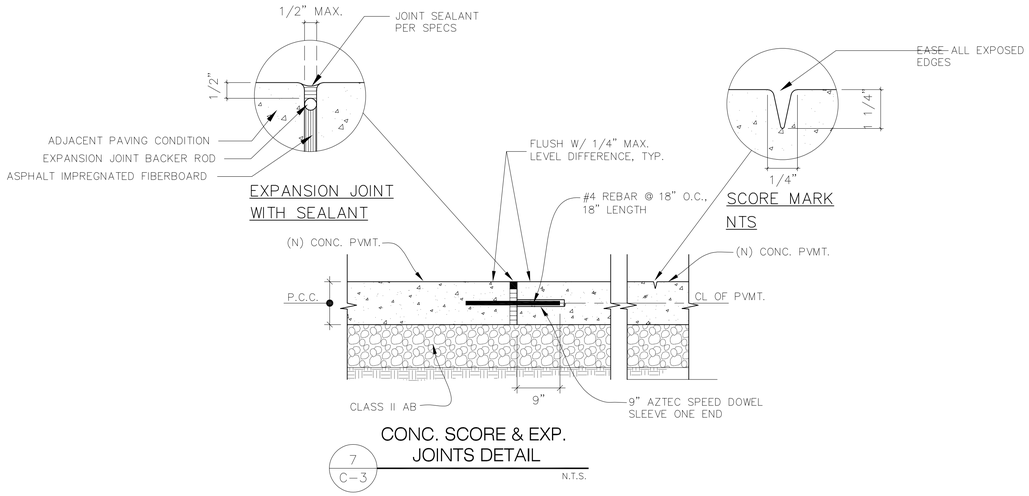
5 / C-3 SECTION N.T.S.



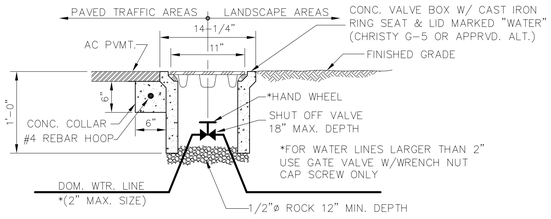
6 / C-3 SIDEWALK WITH THICKENED EDGE DETAIL N.T.S.



8 / C-3 PERVIOUS CONCRETE DETAIL N.T.S.



7 / C-3 CONC. SCORE & EXP. JOINTS DETAIL N.T.S.



9 / C-3 VALVE BOX INSTALLATION DETAIL N.T.S.

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SECTIONS & DETAILS

NEW BRADLEY LIBRARY SITE WORK
BRADLEY UNION SCHOOL DISTRICT
COUNTY OF MONTEREY

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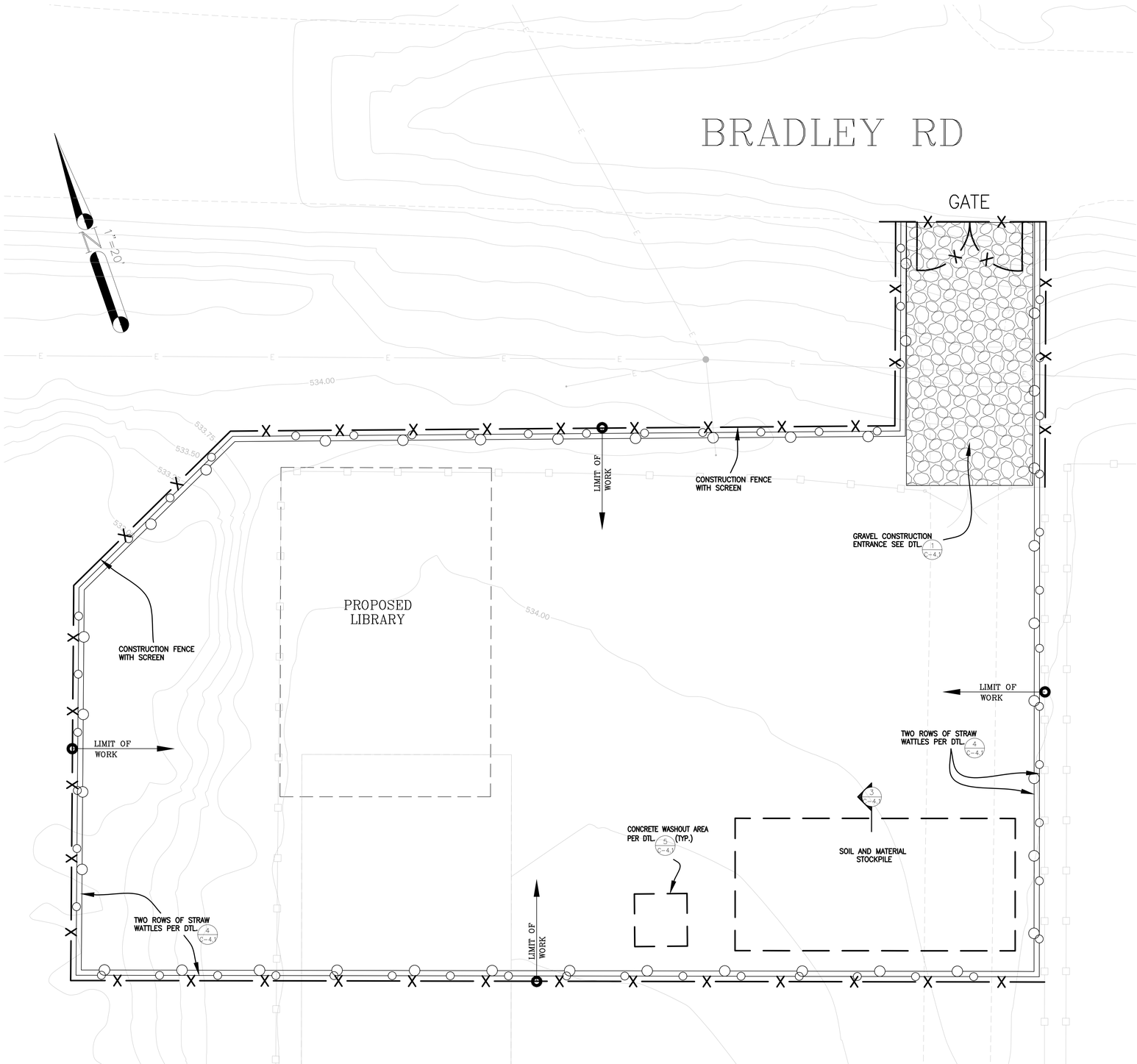
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C-3

LEGEND

- PROPERTY LINE
- STREET CENTERLINE
- EASEMENT LINE
- CONCRETE CURB
- CURB & GUTTER
- EDGE OF PAVEMENT
- FENCE
- SD — STORM DRAIN
- SS — SANITARY SEWER
- W — WATER LINE
- TV — CABLE TELEVISION
- T — TELEPHONE
- JT — JOINT TRENCH (ELEC.,TEL.,GAS & CATV)
- FS — FIRE SERVICE
- E — ELECTRIC LINE
- G — GAS LINE
- OH — OVERHEAD POWER
- C — COMMUNICATION
- 115 — CONTOUR LINE
- ELECTRICAL BOX
- CO — CLEAN OUT TO GRADE
- PB — PULL BOX
- GAS VALVE
- SD — STORM DRAIN MANHOLE
- S — SANITARY SEWER MANHOLE
- DI — AREA DRAIN
- CATCH BASIN
- HOSE BIB
- IRR — IRRIGATION BOX
- WATER BOX
- WM — WATER METER
- FH — FIRE HYDRANT
- LIGHT POLE
- WATER VALVE



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EROSION CONTROL PLAN

NEW BRADLEY LIBRARY SITE WORK

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EROSION CONTROL GENERAL NOTES:

1. PERFORM BEST MANAGEMENT PRACTICES FOR EROSION CONTROL.
2. A STAND–BY CREW FOR EMERGENCY WORK SHALL BE AVAILABLE AT ALL TIMES DURING THE RAINY SEASON (OCTOBER 15 TO APRIL 15). NECESSARY MATERIAL SHALL BE AVAILABLE ON SITE AND STOCKPILED AT CONVENIENT LOCATIONS TO INSURE THE RAPID CONSTRUCTION OF EMERGENCY DEVICES.
3. EROSION CONTROL DEVICES SHOWN ON THIS PLAN MAY BE REMOVED OR MODIFIED AS DIRECTED BY THE AUTHORITY HAVING JURISDICTION IF THEY INTERFERE WITH GRADING OPERATIONS, OR IF THE GRADING OPERATION HAS PROGRESSED TO THE POINT WHERE THEY ARE NO LONGER REQUIRED.
4. EXCEPT AS OTHERWISE DIRECTED, ALL DEVICES SHOWN ON THE PLAN SHALL BE IN PLACE AT THE END OF EACH WORKING DAY.
5. ALL LOOSE SOIL AND DEBRIS WHICH MAY CREATE A POTENTIAL HAZARD TO OFFSITE PROPERTY SHALL BE REMOVED FROM THE SITE AS DIRECTED BY THE AUTHORITY HAVING JURISDICTION
6. ALL SILT AND DEBRIS SHALL BE REMOVED FROM ALL DEVICES WITHIN 24 HOURS AFTER EACH RAINSTORM OR AS DIRECTED BY THE AUTHORITY HAVING JURISDICTION
7. A GUARD SHALL BE POSTED ON THE SITE WHENEVER THE DEPTH OF WATER IN ANY DEVICE EXCEEDS TWO FEET. THE DEVICE SHALL BE DRAINED OR PUMPED DRY WITHIN 24 HOURS AFTER EACH RAINSTORM.
8. THE PLACEMENT OF ADDITIONAL DEVICES TO REDUCE EROSION DAMAGE WITHIN THE SITE IS LEFT TO THE DISCRETION OF THE SITE CONTRACTOR.
9. GRAVEL BAGS SHALL BE STOCKPILED IN PARKWAY READY TO BE PLACED IN POSITION WHEN RAIN IS FORECAST OR WHEN DIRECTED.
10. ALL ON–SITE DRAIN INLETS MUST BE LABELED "NO DUMPING – DRAINS TO BAY" USING THERMOPLASTIC PAINT OR OTHER APPROVED METHODS.
11. EXACT LOCATION OF ENTRANCES, FENCING ETC. IS SUBJECT TO ADJUSTMENT BY THE CONTRACTOR AS THEY EXECUTE INTERIM CONDITIONS ON THE PROJECT. COORDINATE ACCESS POINTS AND PERIMETER WITH MONTEREY COUNTY LIBRARY AND CM.

DUST CONTROL GENERAL NOTES:

1. CONTRACTORS SHALL MEET WITH MONTEREY COUNTY LIBRARY AND CM TO DISCUSS EXCAVATION PROCEDURE PRIOR TO START OF WORK.
2. DUST CONTROL MITIGATION NOTES:
   - A) WASH OFF TRUCKS BEFORE LEAVING THE SITE.
   - B) ROADWAYS TO BE PERIODICALLY SWEPT AND KEPT CLEAN.
   - C) PROVIDE SOIL BINDER (HYDROSEEDING) AFTER GRADING.
   - D) TRUCK LOADS TO BE TARPED BEFORE LEAVING THE SITE.

PROVIDE EFFECTIVE SOIL COVER FOR INACTIVE AREAS, (AREAS OF CONSTRUCTION ACTIVITY THAT HAVE BEEN DISTURBED AND ARE NOT SCHEDULED TO BE RE–DISTURBED FOR AT LEAST 14 DAYS), FINISHED SLOPES, AND UTILITY BACKFILL (I.E. SOIL BINDER, HYDROSEEDING) FOR DUST CONTROL.

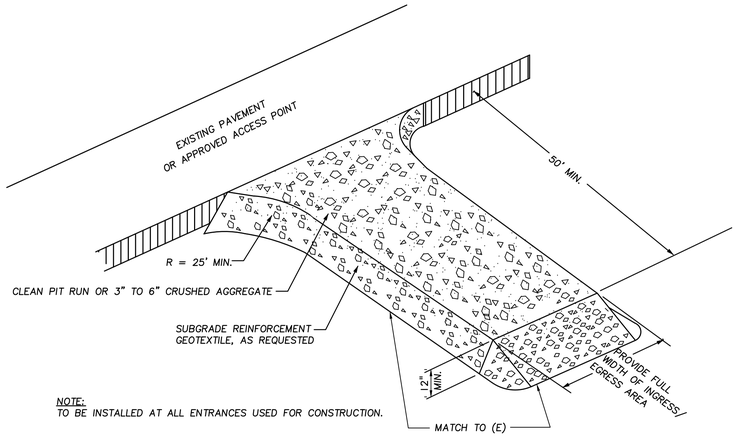
LEGEND

- INSTALL TEMPORARY GRAVEL BAGS W/ SILT SACK AND STRAW WATTLES AROUND STORM INLET, PER DETAIL 2/C-4.1
- GRAVEL CONSTRUCTION ENTRANCE PER DETAIL 1/C-4.1
- CONSTRUCTION FENCE WITH SCREEN
- STRAW WATTLES PER DETAIL 4/C-4.1

SURVEY NOTES:

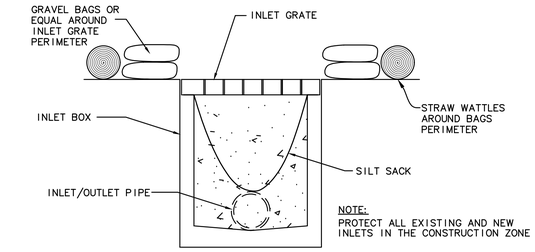
1. UNDERGROUND UTILITY LOCATIONS SHOWN HEREON WERE TAKEN FROM RECORD DATA. NO GUARANTEE IS MADE OR IMPLIED AS TO THE ACCURACY OF SUCH RECORD DATA. NO EXCAVATIONS WERE MADE TO CONFIRM LOCATIONS. CONTRACTORS ARE CAUTIONED TO CONTACT U.S.A. UNDERGROUND AND TO EXERCISE EXTREME CARE IN VERIFYING ALL LOCATIONS PRIOR TO COMMENCING EXCAVATIONS OR OTHER WORK WHICH MAY AFFECT THESE UTILITIES.
2. IRRIGATION LATERALS, PARKING LOT LIGHTING WIRING AND SIGNAL WIRING NOT SHOWN. VERIFY LOCATION BEFORE COMMENCING TO TRENCH. REPLACE OR REPAIR IMMEDIATELY WHERE BROKEN TO PROVIDE UNINTERRUPTED SERVICE.

APN: 424–351–069–000



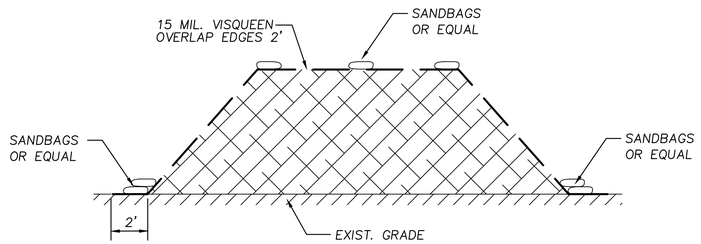
GRAVEL DRIVEWAY

1/C-4.1 DETAIL N.T.S.



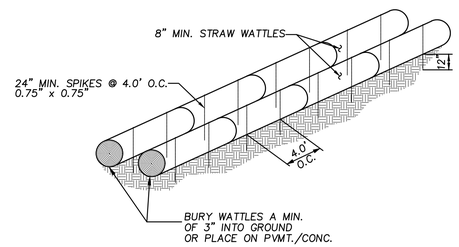
INLET PROTECTION

2/C-4.1 DETAIL N.T.S.



SOIL STOCK PILE

3/C-4.1 DETAIL N.T.S.



STRAW WATTLES

4/C-4.1 DETAIL N.T.S.

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San Jose, CA 95118-2052
Tel. (408) 241-5494

REGISTERED PROFESSIONAL ENGINEER — Andrew Ramey — No. 89808 — CIVIL — STATE OF CALIFORNIA

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EROSION CONTROL DETAILS & NOTES

NEW BRADLEY LIBRARY SITE WORK

COUNTY OF MONTEREY & MONTEREY COUNTY FREE LIBRARIES
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C–4.1



EXISTING & DEMO SITE PLAN
SCALE: 1" = 30'



4



3



2

GENERAL NOTES

1. CONTRACTOR SHALL VERIFY LOCATION OF ALL <E> ABOVE GROUND UTILITIES AND PROVIDE FOR THEIR TEMPORARY DISCONNECTION, PROTECTION, REMOVAL AND/ OR STORAGE AS MAY BE REQUIRED DURING CONSTRUCTION. CONTRACTOR SHALL COORDINATE WITH THE COUNTY/DISTRICT TO DETERMINE WHETHER TEMPORARY SERVICES ARE NECESSARY.
2. ALL SPOILS, DEBRIS, AND INCIDENTAL ITEMS SHALL BE HAULED OFF SITE BY CONTRACTOR AND BE DISPOSED OF IN A LAWFUL MANNER AS IT ACCUMULATES.
3. CONTRACTOR SHALL TAKE CARE NOT TO DAMAGE IN ANY WAY, ANY EXISTING ELEMENTS NOT DESIGNATED FOR REMOVAL. SUCH DAMAGE IS THE RESPONSIBILITY OF THE CONTRACTOR AT NO ADDITIONAL COST TO THE COUNTY/DISTRICT.
4. COORDINATE SHUT-OFF OF ALL UTILITIES PRIOR TO ANY DEMOLITION.
5. CONTRACTOR IS TO PROTECT AND KEEP <E> TREES.
6. THE <E> BUILDINGS ARE TO REMAIN IN USE DURING CONSTRUCTION.
7. THE SITE MUST BE CLEANED AT THE END OF EACH BUSINESS DAY.
8. CONTRACTOR TO MAINTAIN A SAFE, SECURE SITE.
9. THIS DRAWING IS TO OUR BEST KNOWLEDGE AND REFLECTS THE <E> SITE CONDITIONS. CONTRACTOR RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS
10. COORDINATE DEMO WITH OTHER DRAWINGS HEREIN THIS SET
11. ADDITIONAL DEMO BENEATH ASPHALT TO MEET REQUIREMENTS OF NEW PAVING AND SUB BASE MATERIALS. SEE DETAILS ON SHEET C-2 & C-3

1

DEMOLITION KEY NOTES

##

01 NOT USED

1

KEY NOTES

##

01 <E> TREE TO REMAIN PROCTECT DURING DEMOLITION AND CONSTRUCTION

SYMBOL LEGEND

PROPERTY LINE

ITEMS TO BE DEMOLISHED

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LICENSED ARCHITECT CASEY L. A. WESTON C-31... STATE OF CALIFORNIA

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EXISTING & DEMO SITE PLAN

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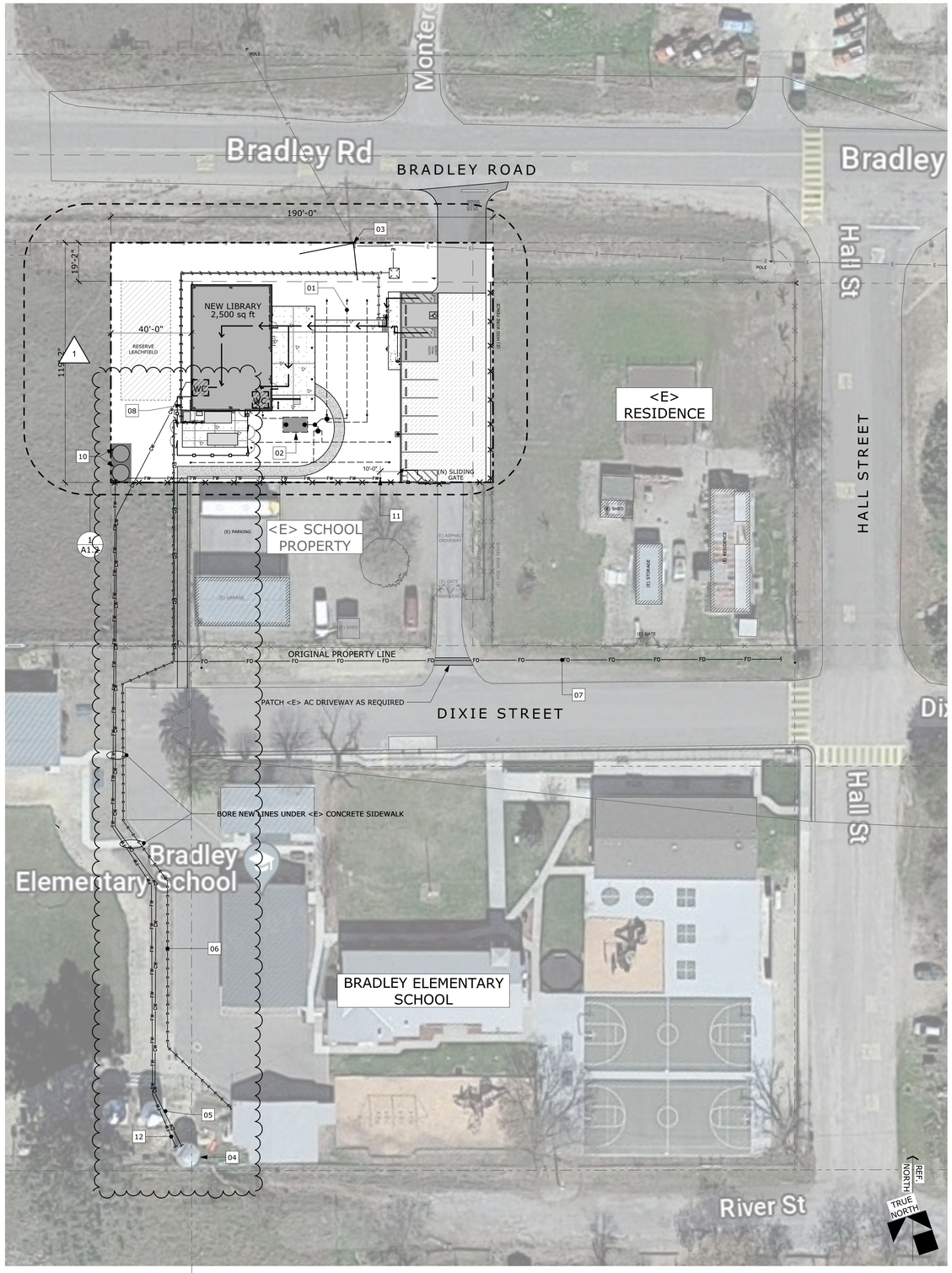
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A1.0



OVERALL SITE PLAN
SCALE: 1" = 30'

1

PARKING RATIO

* NUMBER OF PARKING SPACES PROVIDED PER CBC TABLE 11B-208.2.4	
STANDARD STALLS	6 PROVIDED
ACCESSIBLE STALLS (1-25*) 1 REQUIRED -1 VAN ACCESSIBLE	1 PROVIDED
ELECTRICAL VEHICLE CHARGING STALL (0-9*) 0 REQUIRED -1 VAN ACCESSIBLE EV	1 PROVIDED
TOTAL PARKING PROVIDED	**8 PROVIDED**

KEY NOTES

##

01 LEACH LINES, SEE OWTS DRAWINGS

02 SEPTIC TANK, SEE OWTS DRAWINGS

03 <E> 3-PHASE PG&E SERVICE POLE WITH OVERHEAD SERVICE CABLES TO BE UNDERGROUNDED FROM POLE. PROJECT REQUIRES NEW SERVICE APPLICATION TO PG&E.

04 <E> STATE MONITORED SCHOOL WELL HOLDING TANK - SHARED USE VIA GRANT DEED

05 (N) WATER LINE POINT OF CONNECTION TO SCHOOL WELL - SCD

06 (N) ELECTRICAL LINE GENERATOR TIE-IN TO EXISTING WELL PUMP - SED

07 (N) TELECOM FIBER LINE - SED

08 UTLITY YARD SED

09 NOT USED

10 2 (N) 5,000 GALLON FIRE TANKS ON 6" COMPACTED CLASS 2 BASE ROCK

11 (N) WHARF HYDRANT PER COUNTY STANDARD (LISTED BELOW ON THIS SHEET) CONNECTED TO (N) FIRE TANKS SEE KEYNOTE 10

12 2" FIRE LINE FROM <E> FIRE TANK TO THE TWO (N) FIRE TANKS SEE KEYNOTE 10

SYMBOL LEGEND

- PROPERTY LINE
- (N) BLDG
- <E> OVERHEAD ELECTRICAL LINES
- (N) UNDERGROUND ELECTRICAL LINES
- FO (N) FIBER OPTICS LINE
- CW (N) WATER LINE
- FW (N) FIRE WATER LINE
- (N) POROUS PAVING, SCD
- (N) SITE CONCRETE, SCD
- (N) ASPHALT PAVING, SCD
- (N) DECOMPOSED GRANITE PATH, SEE DETAIL 15/A1.3
- WC BATHROOMS LOCATED WITHIN BLDG
- ACCESSIBLE PATH OF TRAVEL

WHARF HYDRANT DETAIL & SPECIFICATIONS

MONTEREY COUNTY REGIONAL FIRE DISTRICT
PREVENTION DIVISION

FIRE HYDRANT SPECIFICATIONS

All Hydrants:

- 0.9 Coefficient
- Brass construction
- Wet barrel
- Hydrant shut-off valve clearance shall be a minimum of 15 feet from hydrant.
- Minimum 18" vertical clearance from center of lowest outlet to finish grade.
- Minimum 36" horizontal clearance from outside of widest outlet (including landscaping).
- If soil retention is an issue, retaining walls shall be added.
- Hydrants shall be pre-flushed prior to fire department flushing, flow testing & acceptance.

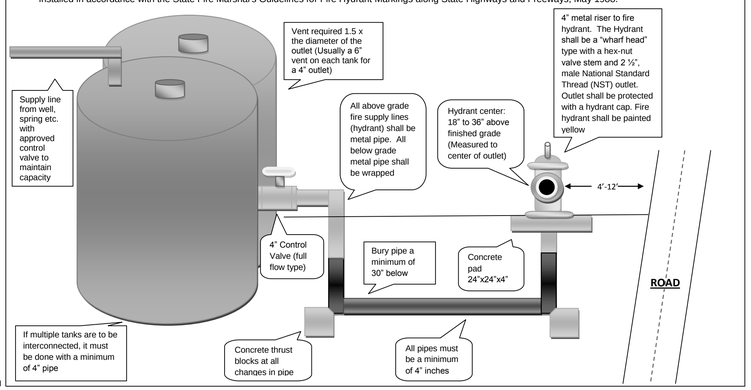
Commercial Hydrants:

- Two 2-1/2" outlets
- One 4-1/2" outlet

Monterey County Single parcel fire protection Water Supply

For development of structures totaling less than three thousand (3,000) square feet on a single parcel, the minimum fire protection water supply shall be four thousand nine hundred (4,900) gallons. For development of structures totaling three thousand (3,000) square feet or more on a single parcel, the minimum fire protection water supply shall be nine thousand eight hundred (9,800) gallons. For development of structures totaling more than ten thousand (10,000) square feet on a single parcel, the reviewing authority may require additional fire protection water supply.

A fire hydrant or fire valve is required. The hydrant or fire valve shall be eighteen (18) inches above grade, eight feet from flammable vegetation, no closer than four feet nor further than twelve (12) feet from a roadway, and in a location where fire apparatus using it will not block the roadway. The hydrant serving any building shall be not less than fifty (50) feet and not more than one thousand (1,000) feet by road from the building it is to serve. Minimum hydrant standards shall include a brass head and valve with at least one 2 1/2 inch National Hose outlet supplied by a minimum four inch main and riser. More restrictive hydrant requirements may be applied by the Reviewing Authority. Each hydrant/valve shall be identified with a reflectorized blue marker, with minimum dimensions of three inches, located on the driveway address sign, non-combustible post or fire hydrant riser. If used, the post shall be within three feet of the hydrant/valve, with the blue marker not less than three feet or greater than five feet above the ground, visible from the driveway. On paved roads or driveways, reflectorized blue markers shall be permitted to be installed in accordance with the State Fire Marshal's Guidelines for Fire Hydrant Markings along State Highways and Freeways, May 1988.



GENERAL NOTES

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE FOLLOWING:
   - A. APPLICABLE SECTIONS OF THE STATE OF CALIFORNIA'S DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, LATEST EDITION, HEREINAFTER CALLED "CALTRANS";
   - B. CALIFORNIA PLUMBING CODE AND CALIFORNIA BUILDING CODE PROVISIONS;
   - C. AWWA STANDARD SPECIFICATIONS;
   - D. CITY/COUNTY DESIGN STANDARDS WHERE APPLICABLE;
   - E. STANDARDS OF THE UNITED STATES DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OFFICE OF STANDARDS AND RULES OF THE STATE DIVISION OF INDUSTRIAL SAFETY;
   - F. THESE PLANS AND DETAILS SHOWN HEREON. WHERE CONFLICTS EXIST BETWEEN ANY OF THE ABOVE LISTED SPECIFICATIONS THE MOST STRINGENT SPECIFICATION SHALL PREVAIL.
2. CONTRACTOR SHALL VERIFY LOCATION OF ALL <E> ABOVE GROUND UTILITIES AND PROVIDE FOR THEIR TEMPORARY DISCONNECTION, PROTECTION, REMOVAL AND/ OR STORAGE AS MAY BE REQUIRED DURING CONSTRUCTION. CONTRACTOR SHALL COORDINATE WITH THE COUNTY/DISTRICT TO DETERMINE WHETHER TEMPORARY SERVICES ARE NECESSARY.
3. ALL SPOILS, DEBRIS, AND INCIDENTAL ITEMS SHALL BE HAULED OFF SITE BY CONTRACTOR AND BE DISPOSED OF IN A LAWFUL MANNER AS IT ACCUMULATES.
4. CONTRACTOR SHALL TAKE CARE NOT TO DAMAGE IN ANY WAY, ANY EXISTING ELEMENTS NOT DESIGNATED FOR REMOVAL. SUCH DAMAGE IS THE RESPONSIBILITY OF THE CONTRACTOR AT NO ADDITIONAL COST TO THE COUNTY/DISTRICT.
5. COORDINATE SHUT-OFF OF ALL UTILITIES PRIOR TO ANY DEMOLITION.
6. CONTRACTOR IS TO PROTECT AND KEEP <E> TREES NOT MARKED FOR RELOCATION OR REMOVAL.
7. THE SITE MUST BE CLEANED AT THE END OF EACH BUSINESS DAY.
8. CONTRACTOR TO MAINTAIN A SAFE, SECURE SITE.
9. THIS DRAWING IS TO OUR BEST KNOWLEDGE AND REFLECTS THE <E> SITE CONDITIONS.
10. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SECURE ALL PERMITS NECESSARY TO PERFORM THE WORK, INCLUDING BUT NOT LIMITED TO WORK IN THE PUBLIC RIGHT-OF-WAY, TREE REMOVAL, AND UTILITY MODIFICATIONS.
11. ALL KNOWN EXISTING UTILITY LINES ARE SHOWN FOR INFORMATION ONLY. CONTRACTOR SHALL EXERCISE ALL NECESSARY CAUTION TO AVOID DAMAGE TO ANY EXISTING UTILITY LINES OR FACILITIES TO REMAIN IN PLACE. WHETHER OR NOT SUCH LINES OR FACILITIES ARE SHOWN ON THESE PLANS, AND SHALL BEAR FULL RESPONSIBILITY FOR ANY DAMAGE THERETO. CONTRACTOR IS ADVISED TO CONTACT UNDERGROUND SERVICE ALERT (USA) AT (800) 642-2444 OR A PRIVATE UNDERGROUND LOCATER SERVICE (AT CONTRACTOR'S EXPENSE) AND THE AFFECTED UTILITY COMPANY FOR MARKING UNDERGROUND LINES PRIOR TO BEGINNING WORK.
12. TO REDUCE CONSTRUCTION DUST THESE CONTROL MEASURES SHALL BE REQUIRED DURING DEMOLITION/CONSTRUCTION
    - WATER ALL ACTIVE CONSTRUCTION AREAS AT LEAST TWICE DAILY
    - COVER ALL TRUCKS HAULING SOIL, SAND, OR LOOSE MATERIALS OR REQUIRE ALL TRUCKS TO MAINTAIN AT LEAST TWO FEET OF FREEBOARD.
    - SWEEP STREET DAILY (WITH WATER SWEEPERS) IF VISIBLE SOIL MATERIAL IS CARRIED INTO ADJACENT PUBLIC STREETS.
    - ENCLOSE, COVER, WATER TWICE DAILY OR APPLY NON-TOXIC SOIL BINDERS TO EXPOSED STOCKPILES (DIRT, SAND, ETC.)
13. ANY SITE WORK TO BE PERFORMED ON THE ADJACENT SCHOOL PROPERTY TO BE SCHEDULE AT A TIME WHEN SCHOOL IS NOT IS SESSION. CONTRACTOR TO PREPARE THE CONSTRUCTION SCHEDULE TO ACCOMODATE THIS

1

ACCESSIBILITY NOTES

1. PEDESTRIAN PATH OF TRAVEL (P.O.T.) INDICATED AS A BARRIER FREE, COMMON, ACCESS ROUTE WITHOUT ANY ABRUPT VERTICAL CHANGES EXCEEDING 1/2" BEVELED AT 1:2 MAXIMUM SLOPE, EXCEPT THAT LEVEL CHANGES DO NOT EXCEED 1/4" VERTICAL. THE PATH'S SURFACE SHALL BE AT LEAST 48" WIDE, SLIP RESISTANT, STABLE, FIRM AND SMOOTH. PASSING SPACES (CBC 11B-403.5.3) SHALL BE AT LEAST 60" X 60" ARE LOCATED NOT MORE THAN 200' APART. PARTS OF POT W/CONTINUOUS GRADIENTS SHALL HAVE 60" LEVEL AREAS (CBC 11B-403.7) NOT MORE THAN 400' APART. THE CROSS SLOPE SHALL OT EXCEED 2% AND THE SLOPES IN THE DIRECTION OF TRAVEL THAT EXCEED 5% SHALL BE CONSTRUCTED AS ACCESSIBLE RAMPS. THE P.O.T. SHALL BE FREE OF OVERHEAD OBSTRUCTIONS UP TO 80" MINIMUM (CBC 11B-307.4). OBJECTS PROJECTING FROM WALLS W/LEADING EDGES BETWEEN 27" AND 80" A.F.F.SHALL NOT PROTRUDE MORE THAN 4" FROM THE WALL (CBC 11B-307). THE P.O.T.SHALL COMPLY W/CBC 11B-403.
2. ARCHITECT AND CONTRACTOR TO VERIFY THAT ALL BARRIERS IN THE PATH OF TRAVEL HAVE BEEN REMOVED PER SECTION 11B-403.
3. ACCESSIBLE PATH OF TRAVEL SHALL BE SLIP RESISTANT.
4. ACCESSIBLE GROUND FLOOR ENTRY/ EXITS SHALL COMPLY WITH: CBC 11B-404.2.4.
   - 24" STRIKE SIDE CLEARANCE AT EXTERIOR PULL SIDE OF DOORS
   - 60" MIN LEVEL AREA (2% MAX SLOPE) PERPENDICULAR TO DOOR @ EXTERIOR & INTERIOR
   - LEVEL LANDING AREA CONNECTED TO ACCESSIBLE ROUTE THROUGHOUT SITE.
5. ALL GATES IN POT SHALL BE EQUIPPED W/PANIC HARDWARE.
6. ALL EXTERIOR DOORS SHALL COMPLY WITH DETAIL 4/A6.2

1

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OVERALL SITE PLAN

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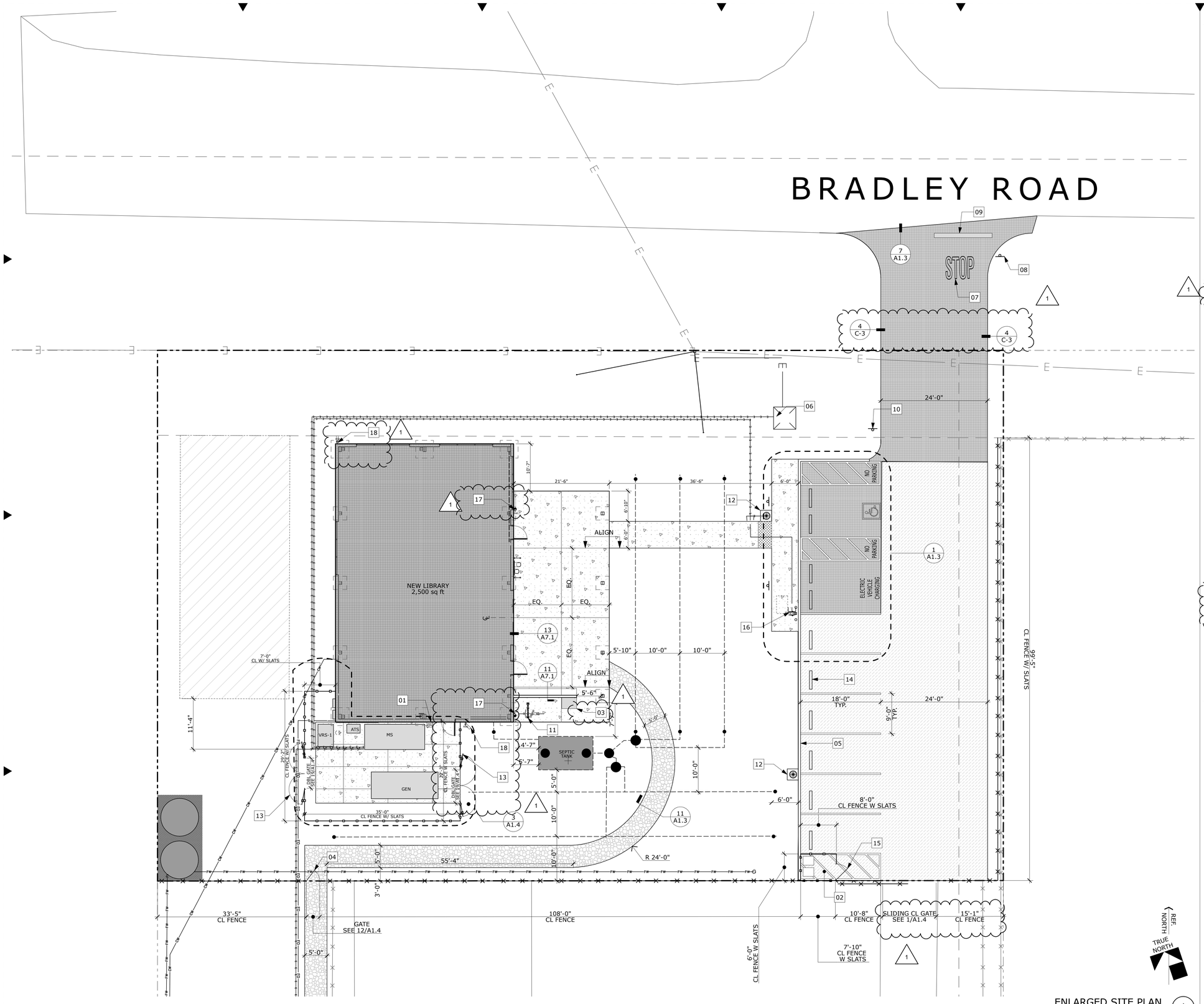
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A1.1



ENLARGED SITE PLAN
SCALE: 1" = 10'

1

GENERAL NOTES

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KEY NOTES

##	
01	20-B:C FIRE EXTINGUISHER WITH SURFACE MOUNT OUTDOOR CABINET MODEL #H-7269 BY ULINE
02	TRASH/RECYCLING BIN CHAIN LINK ENCLOSURE WITH PRIVACY SLATS
03	BOOK DROP OFF WITH CART & BRAILLE TAGS READING "BOOK DROP OFF" BY KINGSLEY MODEL #K-S50SS W/ 1 30-9650
04	SINGLE SWING CHAINLINK MAINTENANCE GATE SEE 12/A1.4
05	CURB, SCD
06	(N) PG&E TRANSFORMER, SED
07	PAINT "STOP" IN WHITE LETTERS PER CALTRANS STANDARDS
08	STOP SIGN, SEE DETAIL 21/A1.3
09	12" WIDE PAINTED YELLOW STRIPE
10	TOW AWAY SIGN, SEE DETAIL 13A/A1.3
11	5 CAPACITY BIKE RACK, SEE SPEC SECTION 129313 AND DETAIL 2/A1.3
12	PARKING LIGHT FIXTURE SED
13	(2) 36" WIDE DBL SWING CHAINLINK MAINTENANCE GATE SEE 19/A1.4
14	WHEEL STOP SEE DETAIL 3/A1.3
15	36" WIDE SINGLE SWING CHAINLINK MAINTENANCE GATE WITH PRIVACY SLATS SEE 12/A1.4
16	EV CHARGER WITH BOLLARDS SED & SPECS
17	RAIN WATER LEADER TO CHRISTY BOX SEE DETAIL 20/A1.3.
18	RAIN WATER LEADER TO SPLASH BLOCK

SYMBOL LEGEND

- PROPERTY LINE
- <E> OVERHEAD ELECTRICAL LINES
- (N) UNDERGROUND ELECTRICAL LINES
- (N) WATER LINE
- (N) FIBER OPTICS LINE
- (N) FIRE WATER LINE SEE A1.1
- <E> CHAIN LINK FENCE
- (N) CHAINLINK FENCE/GATE SEE A1.4
- (N) CHAINLINK FENCE WITH PRIVACY SLATS/GATE SEE A1.4
- (N) POROUS PAVING, SCD
- (N) SITE CONCRETE, SCD, SSD & DETAILS 12 & 16/A1.3
- (N) ASPHALT PAVING, SCD
- (N) DECOMPOSED GRANITE PATH, SEE DETAIL 15 & 11/A1.3

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ENLARGED SITE PLAN

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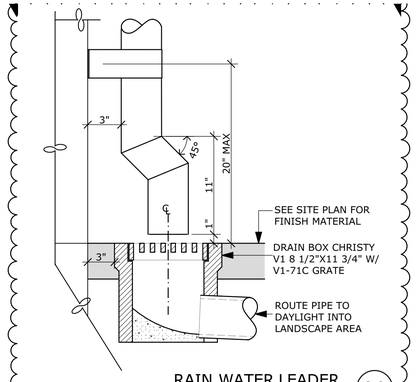
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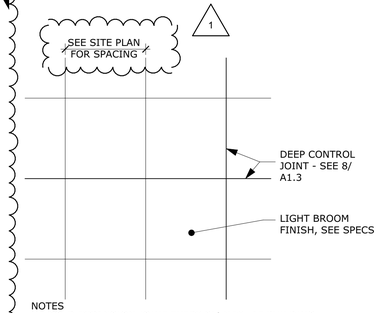
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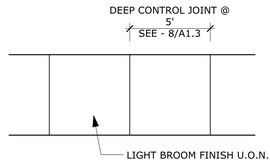
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RAIN WATER LEADER 20
SCALE: 1 1/2"= 1'-0"



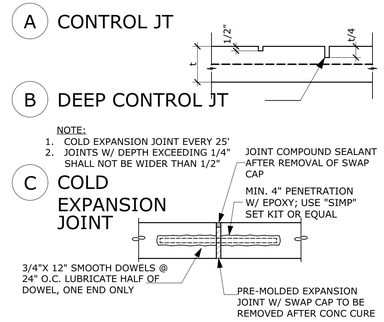
NOTES
1. COLD EXPANSION JOINT EVERY 25' MAX, AT BUILDING, LANDINGS AND INTERSECTIONS.

TYP. PAVING DETAIL 16
SCALE: 3/8" = 1'-0"



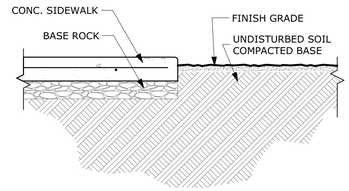
NOTES:
1. COLD EXPANSION JOINT EVERY 25', AT BUILDING, LANDINGS AND INTERSECTIONS.

TYP. SIDEWALK PATTERN 12
SCALE: 3/8" = 1'-0"

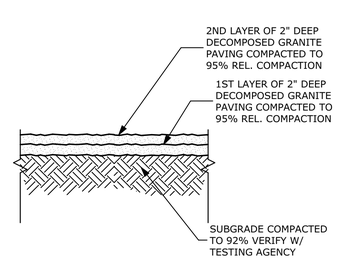


NOTE:
1. COLD EXPANSION JOINT EVERY 25'
2. JOINTS W/ DEPTH EXCEEDING 1/4" SHALL NOT BE WIDER THAN 1/2"

TYP. SLAB JOINT 8
SCALE: 1 1/2"= 1'-0"

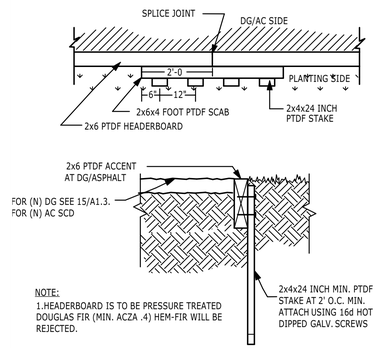


CONCRETE PATIO EDGE 4
SCALE: 1" = 1'-0"



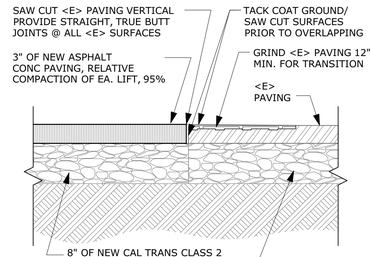
NOTE:
1. FIRST LAYER OF DECOMPOSED GRANITE SHALL BE COMPACTED PRIOR TO INSTALLATION OF SECOND LAYER
2. TECHNISOIL TO BE INCORPORATED INTO 1ST & 2ND LAYER OF DECOMPOSED GRANITE PRIOR TO DG INSTALLATION PER TECHNISOIL RECOMMENDATIONS
3. SEE 11/A1.3 FOR EDGE CONDITION

DG INSTALLATION 15
SCALE: 1 1/2"= 1'-0"

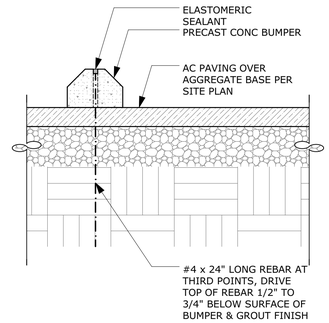


NOTE:
1.HEADERBOARD IS TO BE PRESSURE TREATED DOUGLAS FIR (MIN. ACZA .4) HEM-FIR WILL BE REJECTED.

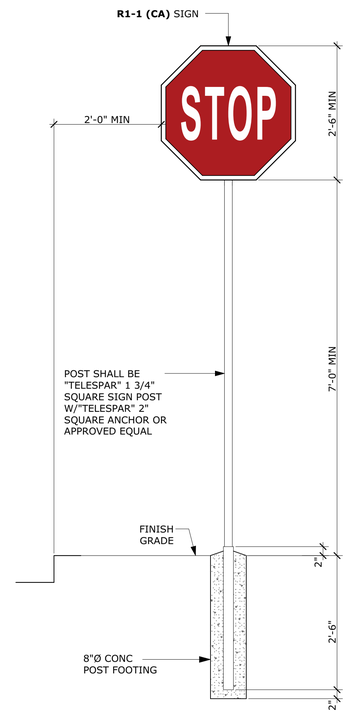
EDGE OF DG & AC 11
SCALE: 1 1/2"= 1'-0"



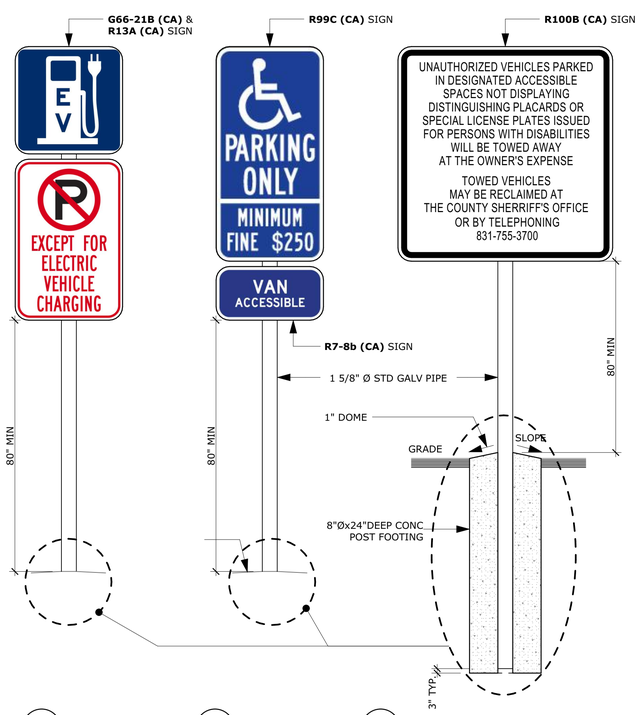
(N) A.C. TO <E> A.C. TRANSITION 7
SCALE: 1 1/2"= 1'-0"



WHEEL STOP 3
SCALE: 1 1/2"= 1'-0"



STOP SIGN 21
SCALE: 3/4" = 1'-0"

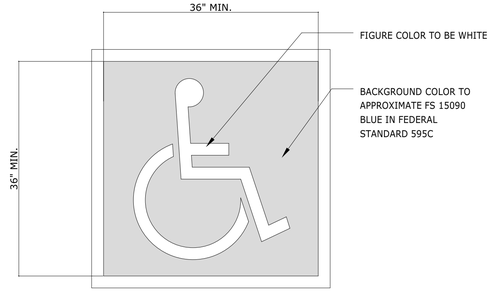


C EV SIGN AT FRONT OF STALL

B VAN ACCESSIBLE SIGN FRONT OF STALL

A TOW SIGN AT EACH ENTRANCE TO PARKING AREAS - CONTRACTOR TO VERIFY INFORMATION IS CORRECTLY SHOWN

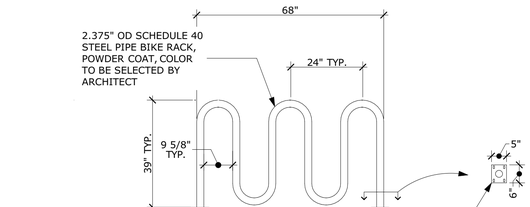
PARKING SIGNS 13
SCALE: 1 1/2"= 1'-0"



NOTE:

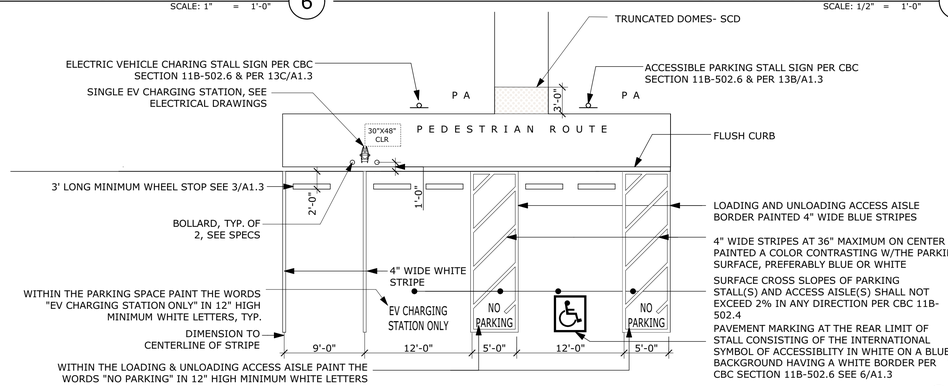
MARKINGS THAT EXCEED THE MINIMUM DIMENSIONS SHALL SCALE THE FIGURE PROPORTIONALLY WITH THE BACKGROUND.

ISA PARKING GRAPHIC 6
SCALE: 1" = 1'-0"



NOTES:
EXPANSION ANCHORS SHALL BE S.S. HILTI KWIK BOLT TZ-2, (ICC ESR-4266) & INSTALLATION TORQUE SHALL BE 30 FT-LBS. WHICH SHALL BE OBTAINED WITHIN 1/2 TURN OF NUT AFTER FIRM CONTACT WITH WASHER.

SURFACE MOUNT BIKE RACK 2
SCALE: 1/2" = 1'-0"



1

PARKING DETAILS 1
SCALE: 1/8" = 1'-0"

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SITE DETAILS

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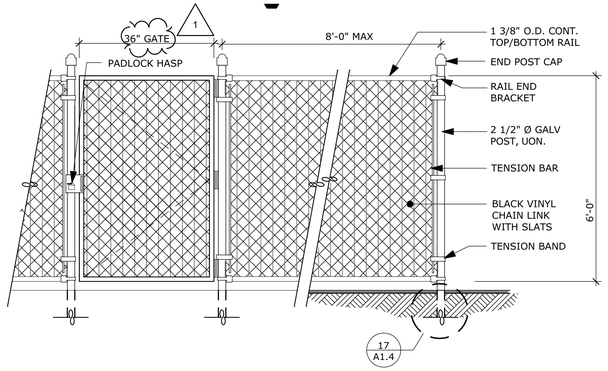
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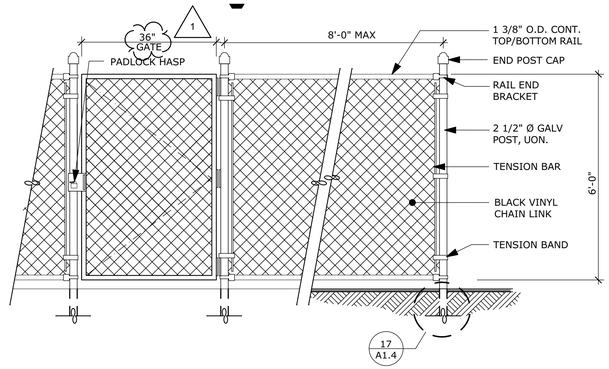
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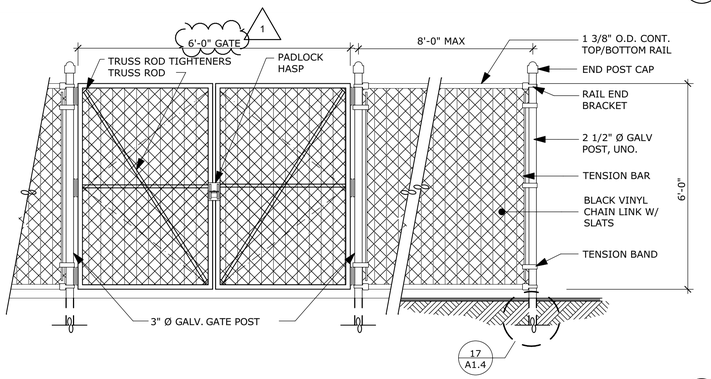
A1.3



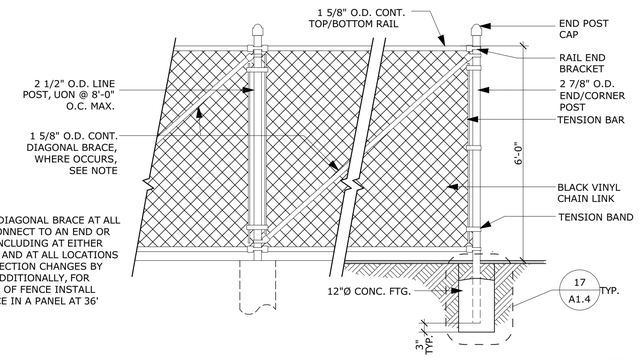
SNGL CHAINLINK GATE WITH PADLOCK & SLATS (20)
SCALE: 1/2" = 1'-0"



SNGL CHAINLINK GATE WITH PADLOCK (12)
SCALE: 1/2" = 1'-0"

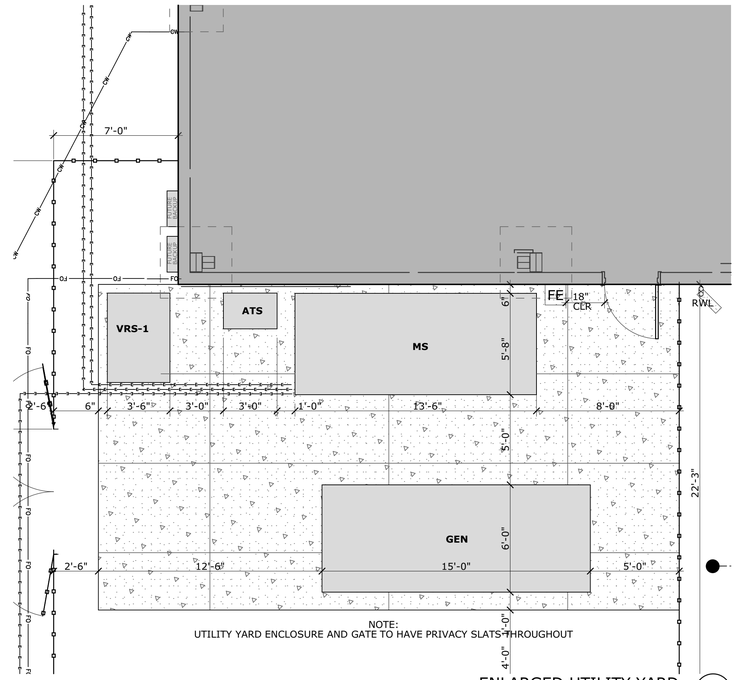


DBL CHAINLINK GATE WITH PADLOCK & SLATS (19)
SCALE: 1/2" = 1'-0"



NOTE: INSTALL DIAGONAL BRACE AT ALL PANELS THAT CONNECT TO AN END OR CORNER POST INCLUDING AT EITHER SIDE OF A GATE AND AT ALL LOCATIONS WHERE THE DIRECTION CHANGES BY 30° OR MORE. ADDITIONALLY, FOR STRAIGHT RUNS OF FENCE INSTALL DIAGONAL BRACE IN A PANEL AT 36' INTERVALS.

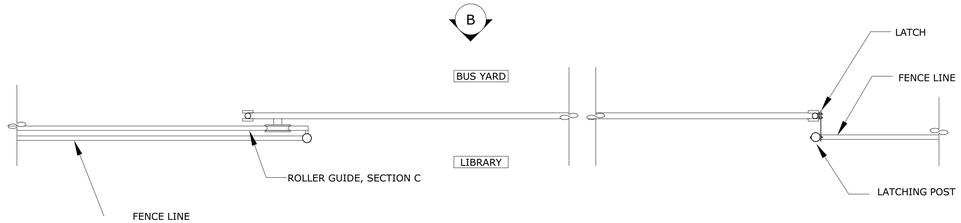
CHAINLINK
SCALE: 1/2" = 1'-0"
11



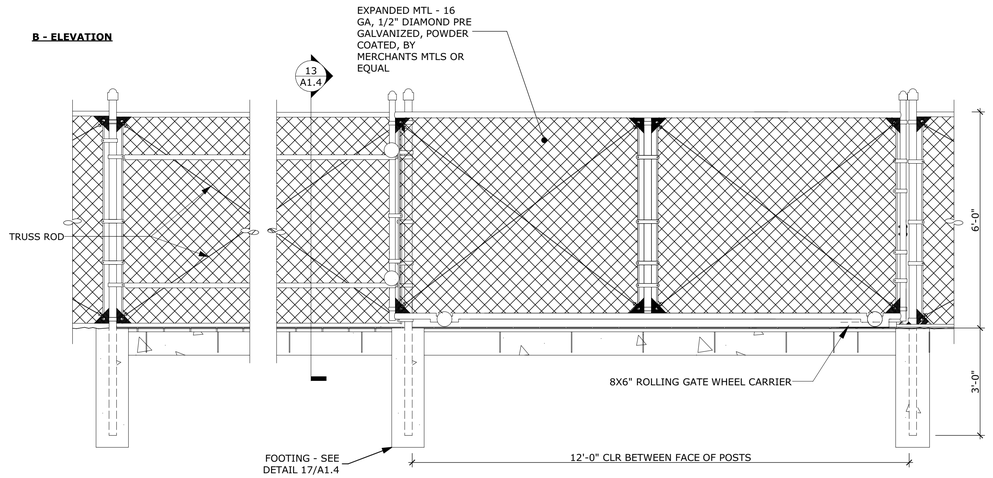
NOTE:
UTILITY YARD ENCLOSURE AND GATE TO HAVE PRIVACY SLATS THROUGHOUT

ENLARGED UTILITY YARD
SCALE: 1/4" = 1'-0"
3

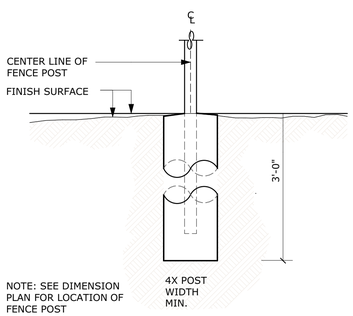
A - PLAN



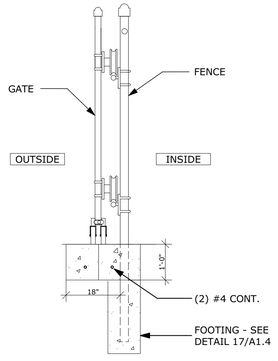
B - ELEVATION



CHAINLINK - SLIDING GATE
SCALE: 1/2" = 1'-0"
1



FENCE POST FOOTING
SCALE: 1" = 1'-0"
17



CHAINLINK - SLIDING GATE
SCALE: 1/2" = 1'-0"
13

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CHAINLINK FENCE DETAILS

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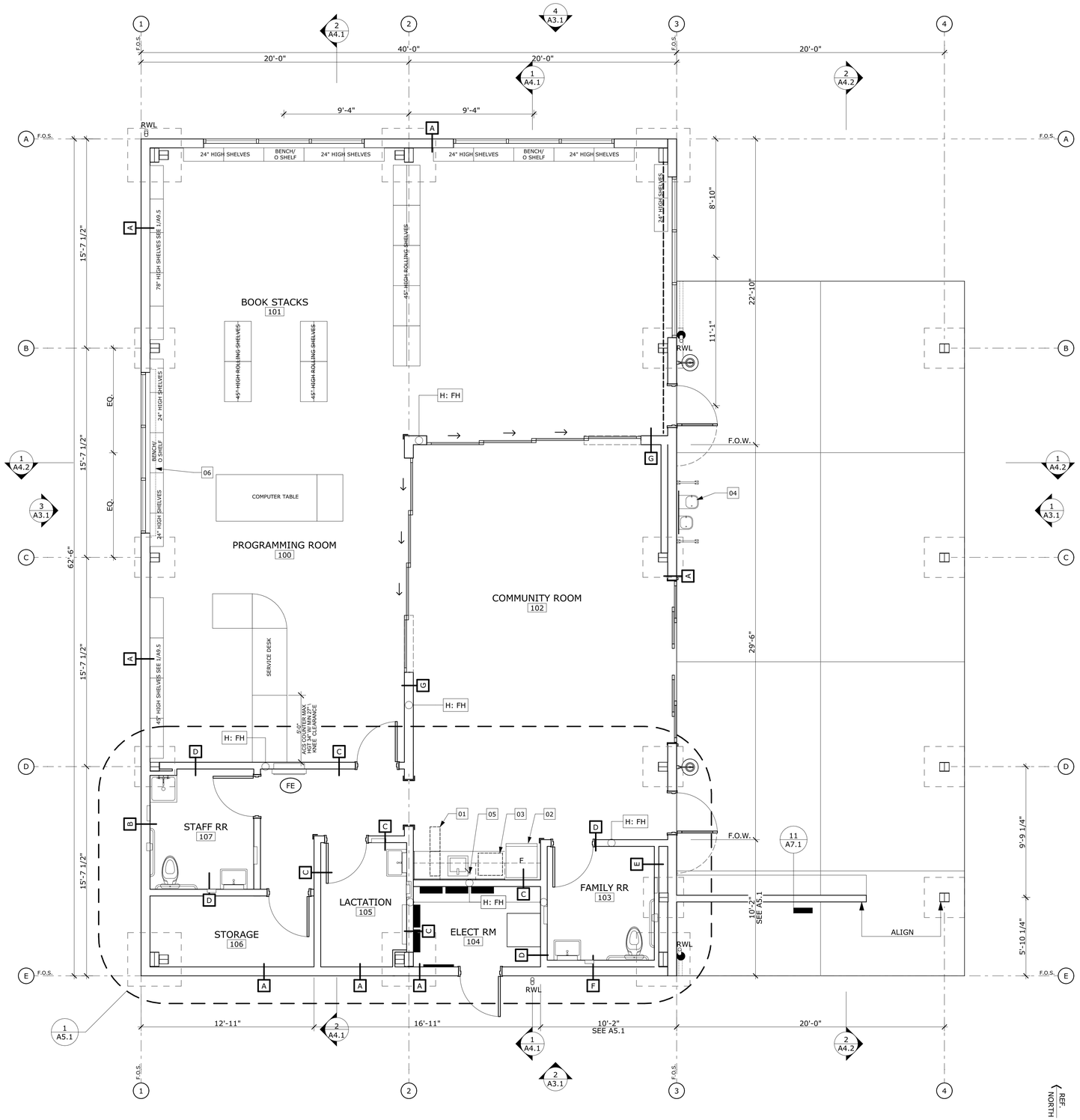
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A1.4



FLOOR PLAN
SCALE: 1/4" = 1'-0"

GENERAL NOTES

1. RWL = RAIN WATER LEADER, SEE DETAIL PER BUILDING MANUFACTURER STANDARD

KEY NOTES

##

01	PULL OUT WASTE CONTAINER W/ SOFT CLOSE, SEE SPEC SECTION 102813
02	FRIDGE, SEE SPECS
03	MICROWAVE, SEE SPECS
04	DRINKING FOUNTAIN AND WATER BOTTLE FILLING STATION, SEE SPECS AND 15/A9.4
05	COUNTERTOP MOUNTED LIQUID SOUP DISPENSER, SEE SPECS
06	MANUAL ROLLING WINDOW SHADE SEE SPEC SECTION 122413

SYMBOL LEGEND

- WALL TYPES, SEE SHEET A7.1
- FE — FIRE EXTINGUISHER - FOR FIRE EXTINGUISHER CABINET SEE DETAIL 6/A9.4 AND SPEC

ALL PORTIONS OF THE BUILDING SHALL BE WITHIN 75 FEET OF A FIRE EXTINGUISHER. THE MINIMUM SIZE OF THE EXTINGUISHER SHALL BE 2-A:10-BC.

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FLOOR PLAN

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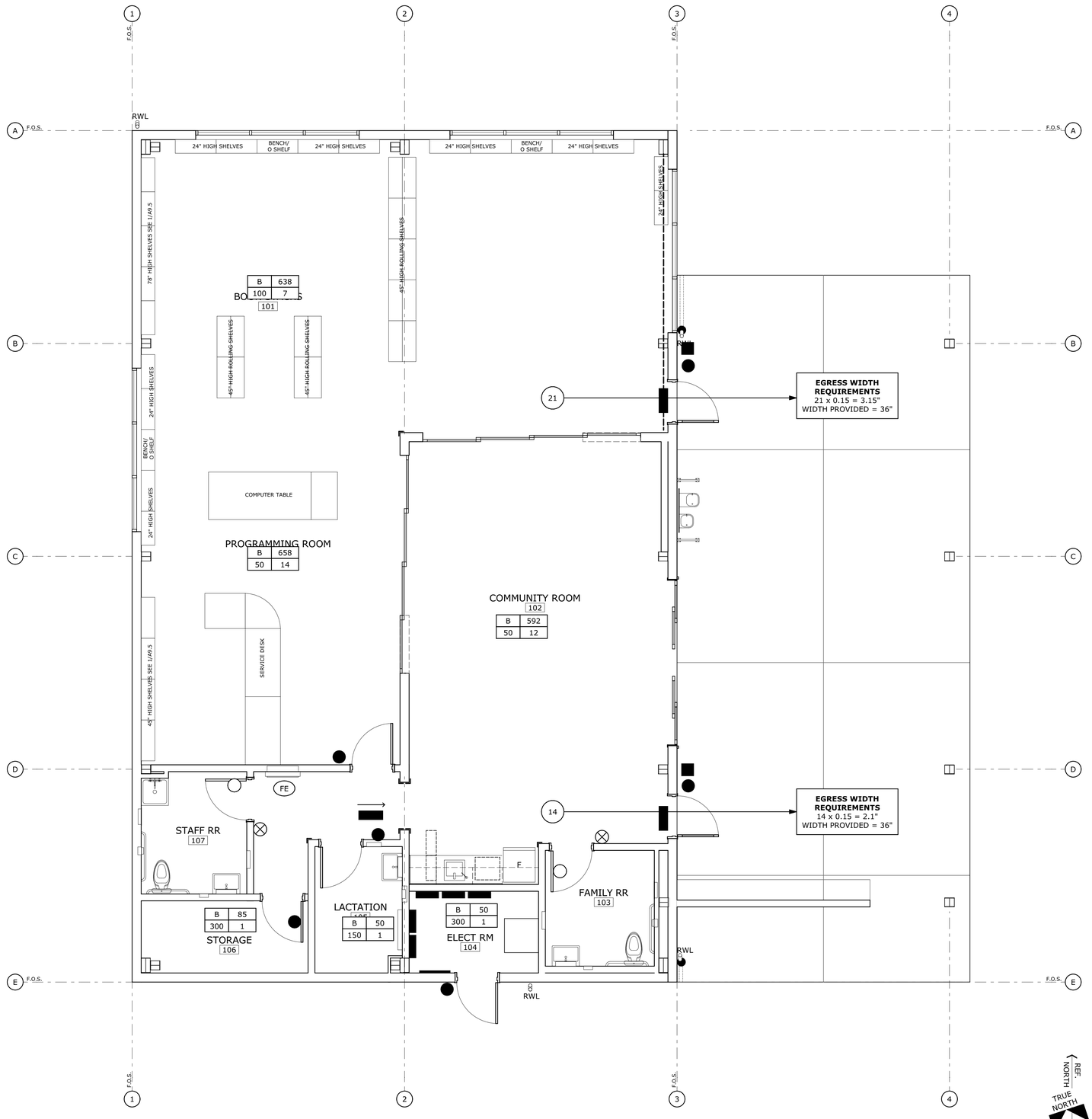
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A2.1



EGRESS PLAN
SCALE: 1/4" = 1'-0"
1

GENERAL NOTES

1. INSTALL FIRE WALL BARRIER SIGN PER CBC SECTION 703.6 LOCATED IN ACCESSIBLE CONCEALED FLOOR, FLOOR-CEILING OR ATTIC SPACES. SIGN TO BE REPEATED AT INTERVALS NOT EXCEEDING 30 FEET MEASURED HORIZONTALLY ALONG THE WALL. INCLUDE LETTERING NOT LESS THAN 0.5 INCH IN HEIGHT, INCORPORATING THIS WORDING: "FIRE BARRIER-PROTECT ALL OPENINGS."

KEY NOTES

##

01 NONE

SIGNAGE LEGEND

- ● DOOR SIGNAGE - SEE DETAIL 5B/A9.2 &
- ○ TOILET DOOR SIGNAGE - SEE DETAIL 3B/A9.2
- ⊗ TOILET WALL SIGNAGE - SEE DETAIL 3A/A9.2
- ▲ EXIT SIGN - SEE DETAIL 5A/A9.2
- ILLUMINATED EXIT SIGN WITH DIRECTIONAL ARROW WHEN NECESSARY -SEE ELECTRICAL DRAWINGS
- ■ ISA ENTRANCE SIGN - SEE DETAIL 5C/A9.2

SYMBOL LEGEND

- (FE) FIRE EXTINGUISHER - FOR FIRE EXTINGUISHER CABINET SEE DETAIL 6/A9.4 AND SPEC

  ALL PORTIONS OF THE BUILDING SHALL BE WITHIN 75 FEET OF A FIRE EXTINGUISHER. THE MINIMUM SIZE OF THE EXTINGUISHER SHALL BE 2-A:10-BC.
- (#) ROOM OCCUPANCY LOAD
- (##) COMBINED OCCUPANCY LOAD FROM ADJOINING ROOMS
- PH DOORS W/PANIC HARDWARE
- OCCUPANCY TYPE / ROOM SQUARE FEET / OCCUPANCY LOAD / OCCUPANCY FACTOR

PER SECTION 302.1, EXCEPTION 2.2, IF THE "B" OCCUPANCY SQ. FOOTAGE IS GREATER THAN 25% OF THE TOTAL SQ. FOOTAGE, THEN A 1-HR SEPARATION WALL IS REQUIRED BETWEEN THE TWO OCCUPANCIES.

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EGRESS PLAN

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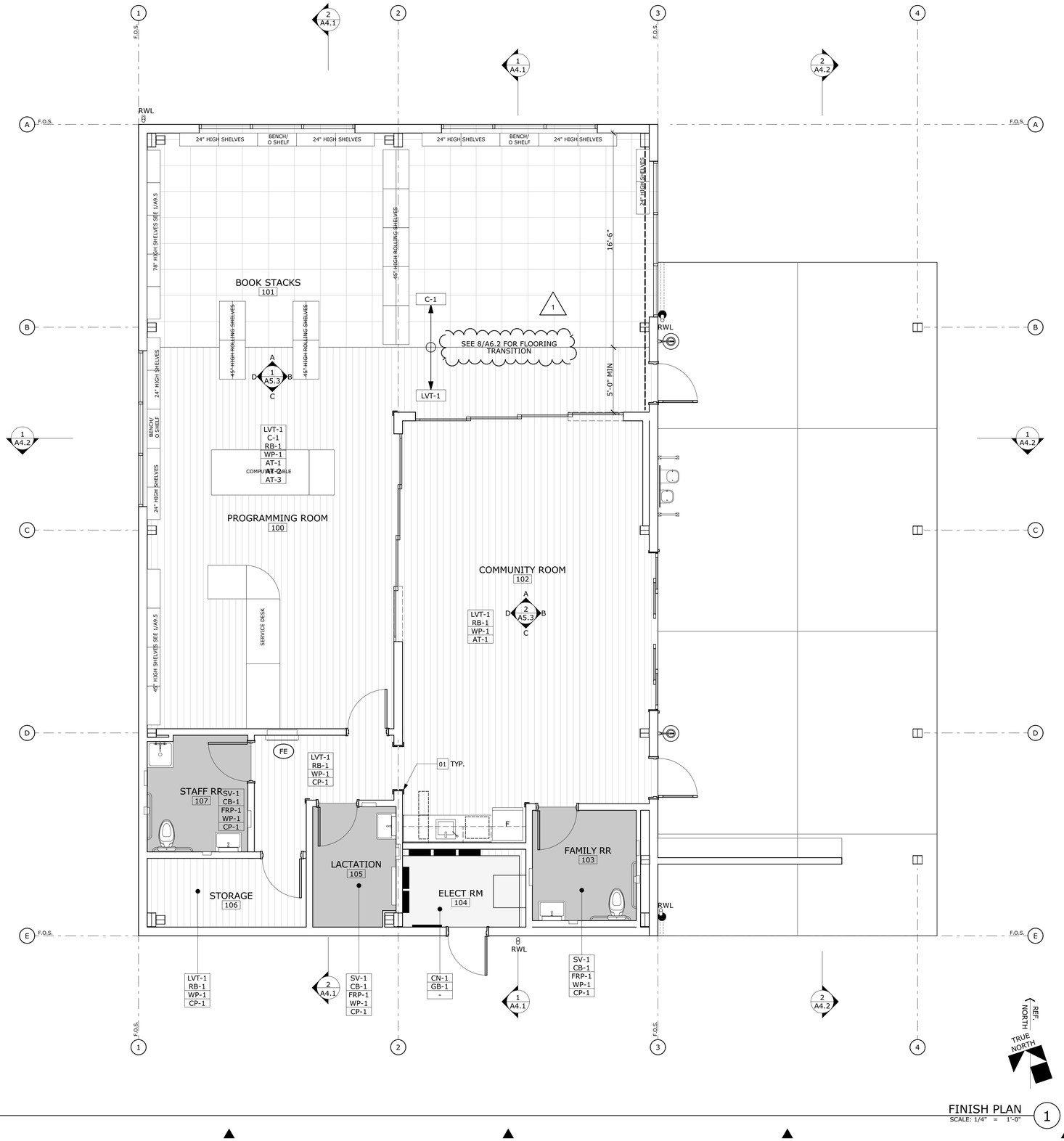
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A2.3



FINISH PLAN
SCALE: 1/4" = 1'-0"

1

ROOM FINISHES SCHEDULE

FLOOR

CONC
CN-1 SEALED CONC, SEE SPECS

LVT LUXURY VINYL TILE
LVT-1 SEE SPECS

CARPET TILE
C-1 SEE SPECS

SHEET VINYL
SV-1 SEE SPECS

BASE

RUBBER BASE
RB-1 SEE SPECS

SHEET VINYL COVED BASE
CB-1 SEE SPECS

WALLS

PAINT
WP-1 SEE SPECS
WP-2 SEE SPECS

FRP - SEE INTERIOR ELEVATIONS ON A5.1 & A5.2
FRP-1 SEE SPECS

CEILING

PAINT
CP-1 SEE SPECS

ACOUSTICAL TILES
AT-1 2x4, SEE SPECS
AT-2 SUSPENDED ACOUSTIC CLOUD, SEE SPECS
AT-3 SUSPENDED ACOUSTIC CLOUD, SEE SPECS

GENERAL NOTES

1. SEE INTERIOR ELEVATIONS ON A5.2 & A5.3 FOR MORE INFORMATION ABOUT FINISHES
2. SEE DETAIL 4/A6.2 FOR TRANSITION OF DISSIMILAR FLOOR
3. PAINTS AND COATINGS SHALL COMPLY WITH TABLE 5.504.4.3 VOC LIMITS OF 2016 CGB STANDADS CODE. AEROLSOL PAINTS AND COATING SHALL MEET THE PWMIR LIMITS FOR ROC IN SECTION 94522(A)(3), 94522(C)(2) AND (D)(2) OF CALIFORNIA CODE OF REGULATIONS, TITLE 17, COMMENCING WITH SECTION 94520. VERIFICATION OF COMPLIANCE WITH THIS SECTION SHALL BE PROVIDED AT THE REQUEST OF THE ENFORCING AGENCY. DOCUMENTATION MAY INCLUDE, BUT NOT LIMITED TO: 1. MANUFACTURER'S PRODUCT SPECIFICATION, 2. FIELD VERIFICATION OF ON-SITE PRODUCT CONTAINERS
4. CARPET SHALL MEET REQUIREMENTS AS LISTED IN 5.504.4, 5.504.4.4.1 AND 5.504.4.4.2 OF CGB STANDARDS CODE
5. COMPOSITE WOOD PRODUCTS SHALL MEET REQUIREMENTS OF 5.504.4.5 OF THE CGB STANDARDS CODE
6. RESILIENT FLOORING SYSTEMS SHALL MEET REQUIREMENTS OF 5.504.4.4.6 OF THE CGB STANDARDS CODE
7. ADHESIVES, SEALANTS, AND CAULKS SHALL MEET REQUIREMENTS OF 5.504.4.1 OF THE CGB STANDARDS CODE
8. CORNER GUARD TYP AT ALL PAINTED WALL'S EXPOSED CORNERS SEE SPECS

KEY NOTES

##	
01	CORNER GUARDS, TYP.

SYMBOL LEGEND

- # — FLOOR FINISH
- # — BASE FINISH
- # — WALL FINISH
- # — CEILING FINISH

LVT-1, SEE SPECS

C-1, SEE SPECS

SV-1, SEE SPECS

CN-1, SEE SPECS

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FINISH PLAN

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A2.4



REFLECTED CEILING PLAN
SCALE: 1/4" = 1'-0"

1

GENERAL NOTES

KEY NOTES

##

01 NONE

SYMBOL LEGEND

- H: #'-#" — CEILING HEIGHT
- H: #'-#" — SLOPED CEILING HEIGHT AT LOW/HIGH POINT
- GYP. BD. CEILING, 8'-0" U.O.N.
- T-BAR CEILING, SEE PLAN FOR HEIGHT, FOR T-BAR ATTACHMENT SEE DETAIL 4/A9.1
- EXPOSED METAL ROOF
- SUSPENDED ACOUSTIC CLOUD AT-2 ANGLE VARIES 10-30 DEGREES FIELD VERIFY EXACT ANGLES SEE 19 & 11/A9.1
- SUSPENDED ACOUSTIC CLOUD AT-3 ANGLE VARIES 10-30 DEGREES FIELD VERIFY EXACT ANGLES SEE 19 & 11/A9.1
- SLIP JOINT, SEE DETAIL 2/A9.1
- AIR DIFFUSER - SMD
- AIR RETURN - SMD
- GRID MOUNT LIGHT FIXTURE - SED
- SURFACE MOUNT 2X4 LIGHT FIXTURE - SED
- EXTERIOR WALL SCONCE - SED
- SURFACE MOUNT OUTDOOR LIGHT FIXTURE - SED

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REFLECTED CEILING PLAN

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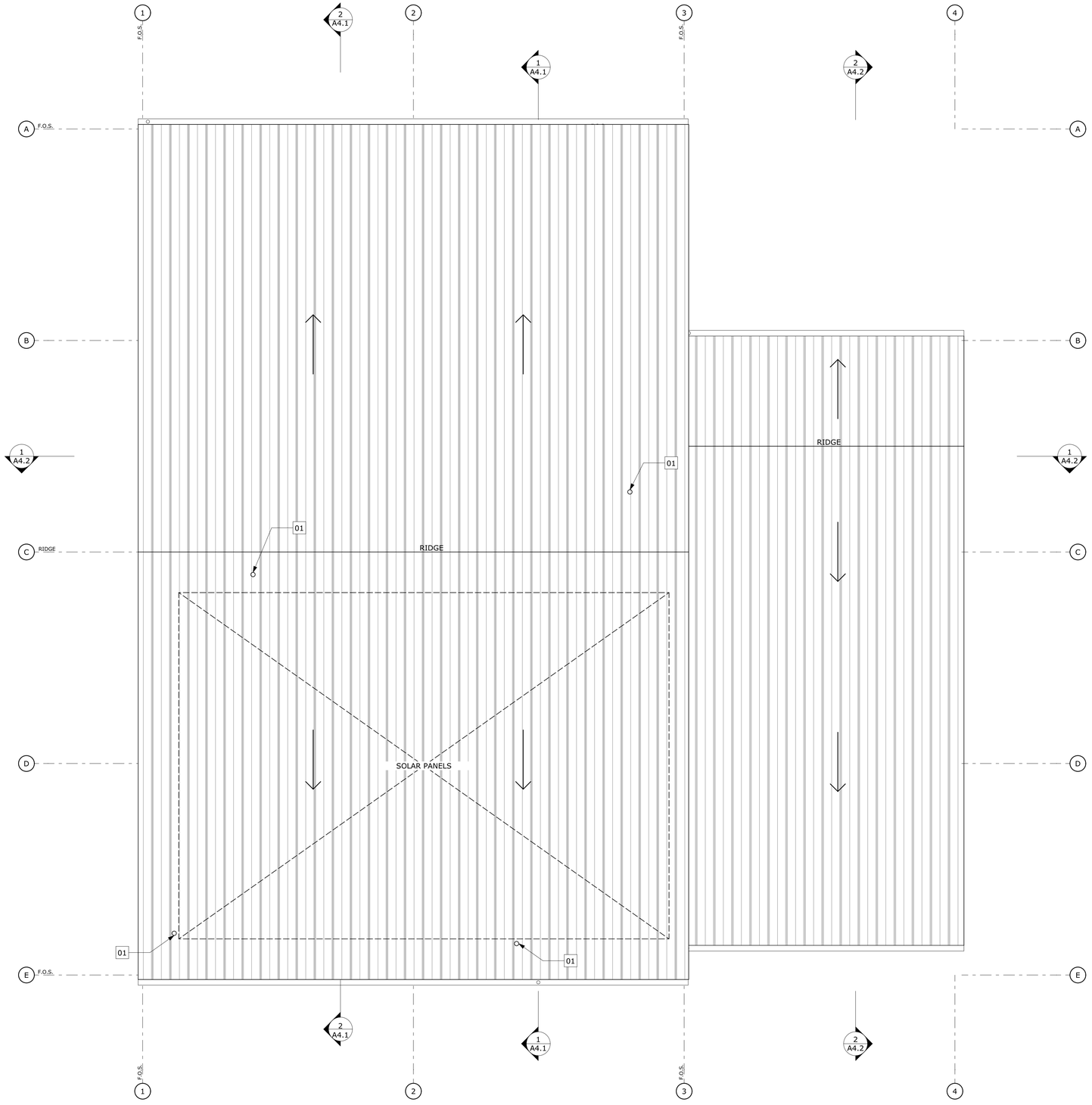
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A2.5



ROOF PLAN
SCALE: 1/4" = 1'-0"
1

GENERAL NOTES

1. ROOF CLASSIFICATION A PER CBC TABLE 15-A & SECTION 1504
2. SMD FOR MORE INFORMATION
3. CONTRACTOR TO PROVIDE APPROPRIATE ROOF ACCESS & TIE OFFS FOR FUTURE SOLOAR PANEL INSTALLATION

1

KEY NOTES

##

01 SEE MECH/PLUMBING PLANS & 10/A9.4

1

SYMBOL LEGEND

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ROOF PLAN

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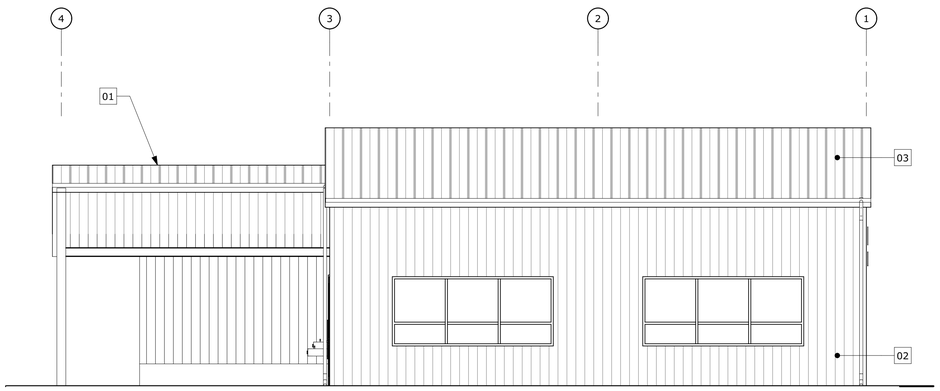
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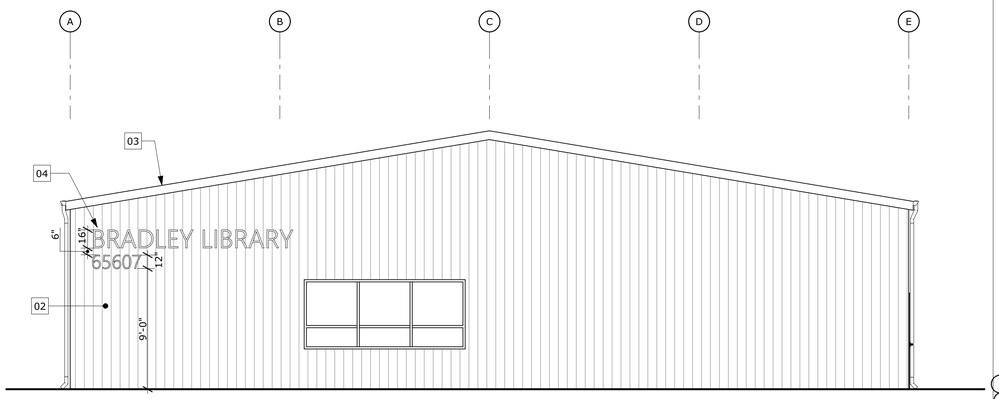
JOB NO: 23014

A2.6



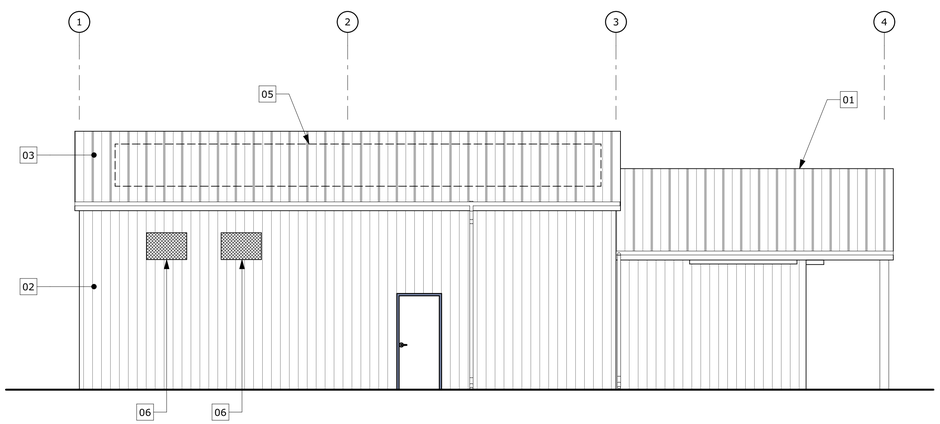
NORTH ELEVATION
SCALE: 3/16" = 1'-0"

4



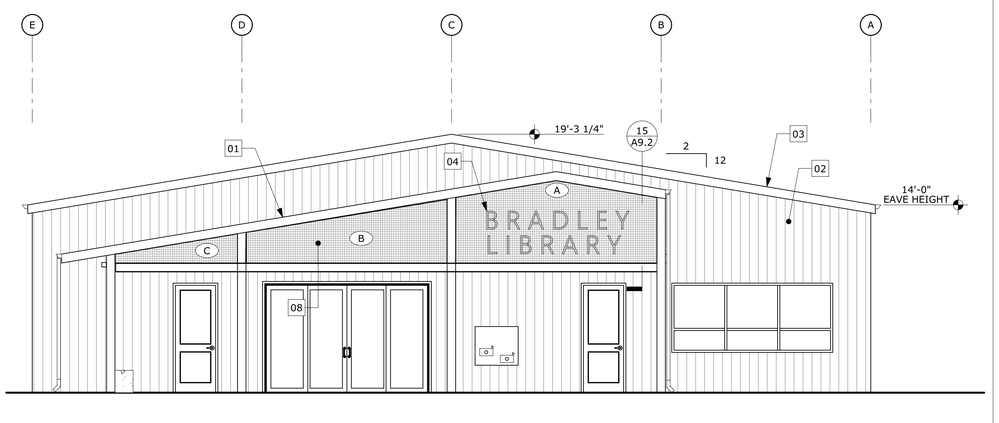
WEST ELEVATION
SCALE: 3/16" = 1'-0"

3



SOUTH ELEVATION
SCALE: 3/16" = 1'-0"

2



EAST ELEVATION
SCALE: 3/16" = 1'-0"

1

GENERAL NOTES

1. EXTERIOR MATERIAL SELECTIONS TO BE OF STANDARD AS PROVIDED BY THE METAL BUILDING MANUFACTURER.

1

KEY NOTES

##

- 01 ENTRY CANOPY TO BE PART OF BUILDING MANUFACTURER'S SUBMITTAL PACKAGE FOR COUNTY APPROVAL.CONTRACTOR TO COORDINATE/PROVIDE ALL FOOTING REQUIREMENTS
- 02 METAL SIDING, (PROVIDE COLOR OPTIONS TO ARCHITECT) SEE SPECS
- 03 INSULATED METAL ROOF PANELS, SEE SPECS
- 04 1/2" THICK METAL SIGN LETTERS W/ OPTIMA FONT & 3/4" STAND OFF ON EXTERIOR WALL , SEE SPEC (BLDG MANUFACTURER TO PROVID FRAMED WALL SUPPORTS FOR EXTERIOR MOUNTED SIGNAGE)
- 05 SOLAR PANELS (DEFFERRED SUBMITTAL)
- 06 MECHANICAL INTAKE, SMD
- 07 METAL SIGN LETTERS ON PERFORATED METAL PANELS SEE SPECS & DETAIL 15/A9.2
- 08 PERFORATED METAL PANELS SEE DETAIL 15/A9.2

PANEL ESTIMATED WEIGHTS

A

ELEMENT / PANEL WEIGHTS USED IN CALCS:

ELEMENT / PANEL	TOTAL WEIGHT (LBS)	AREA (SF)	LB / SF
PANEL A	188.4	83	2.27
PANEL B	118	52	2.27
PANEL C	29.5	13	2.27

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EXTERIOR ELEVATIONS

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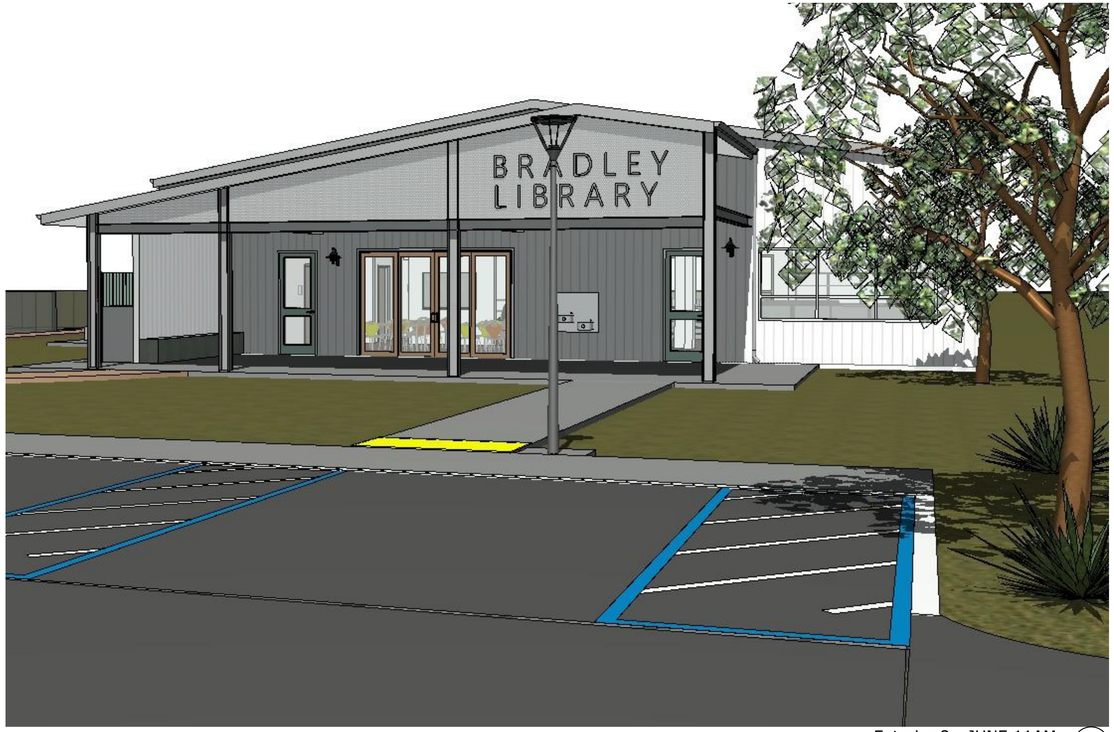
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A3.1



Exterior 2 - JUNE 11AM
SCALE: 1/8" = 1'-0"
1



Exterior 3 - JUNE 11AM
SCALE: 1/8" = 1'-0"
1



Exterior 1 - JUNE 11AM
SCALE: 1/8" = 1'-0"
1

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RENDERINGS

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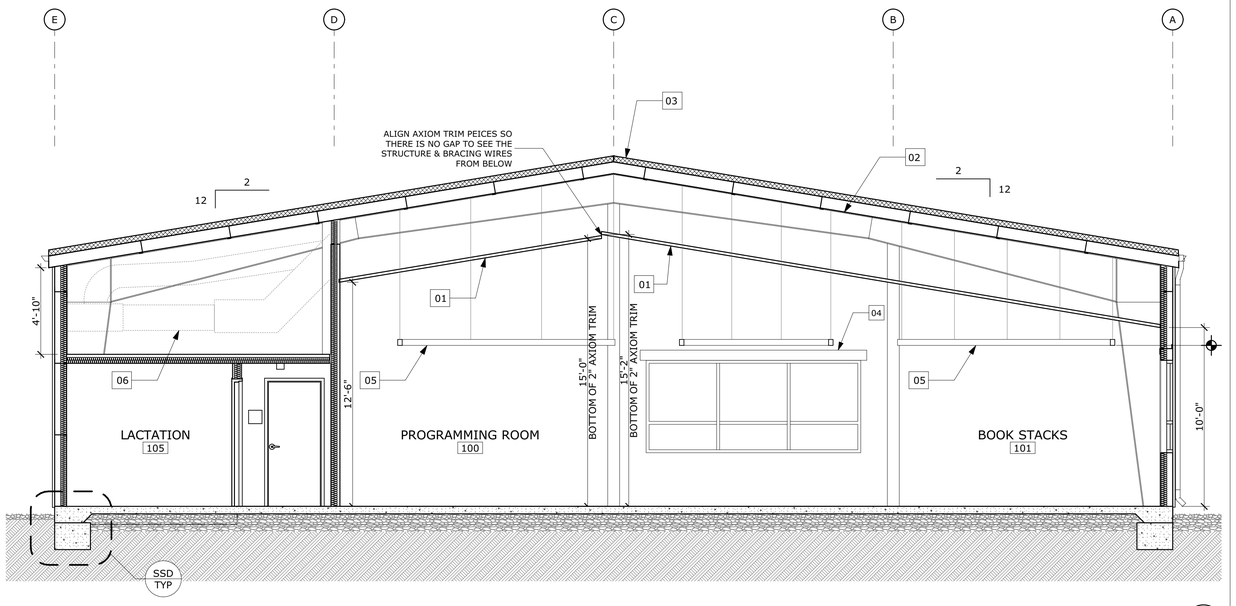
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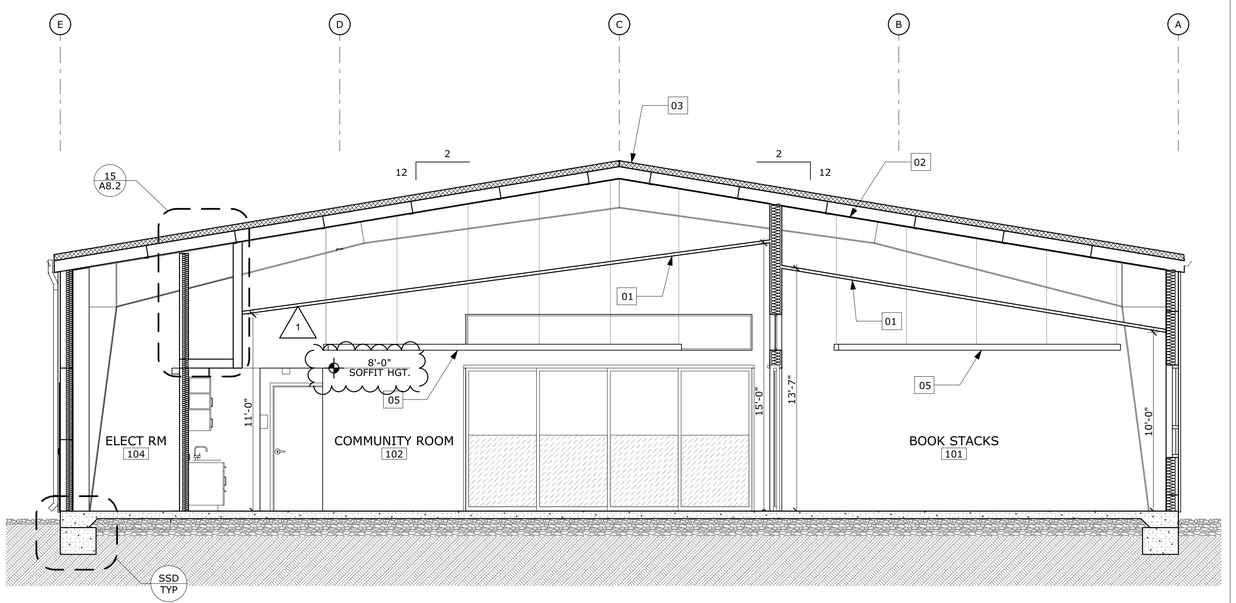
JOB NO: 23014

A3.2



SECTION
SCALE: 1/4" = 1'-0"

2



SECTION
SCALE: 1/4" = 1'-0"

1

KEY NOTES

##

01	SLOPED T-BAR CEILING SEE A2.5 & SPECS
02	RIGID FRAME PER MANUFACTURER
03	INSULATED ROOF PANELS PER MANUFACTURER
04	MANUAL ROLLING WINDOW SHADE SEE SPEC SECTION 122413
05	LIGHT FIXTURE SED & A2.5
06	MECHANICAL UNIT SMD

GENERAL NOTES

1. IN CONCEALED SPACES OF STUD WALLS PROVIDE 2X SOLID FIRE BLOCKING AT CEILING LEVELS, FLOOR LEVELS AND AT 10 FOOT INTERVALS BOTH HORIZONTAL & VERTICAL. ALL FIRE BLOCKING SHALL BE IN ACCORDANCE WITH CBC SECTION 717

2. SEE A2.5 FOR ACOUSTICAL CLOUDS NOT SHOWN

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BUILDING SECTIONS

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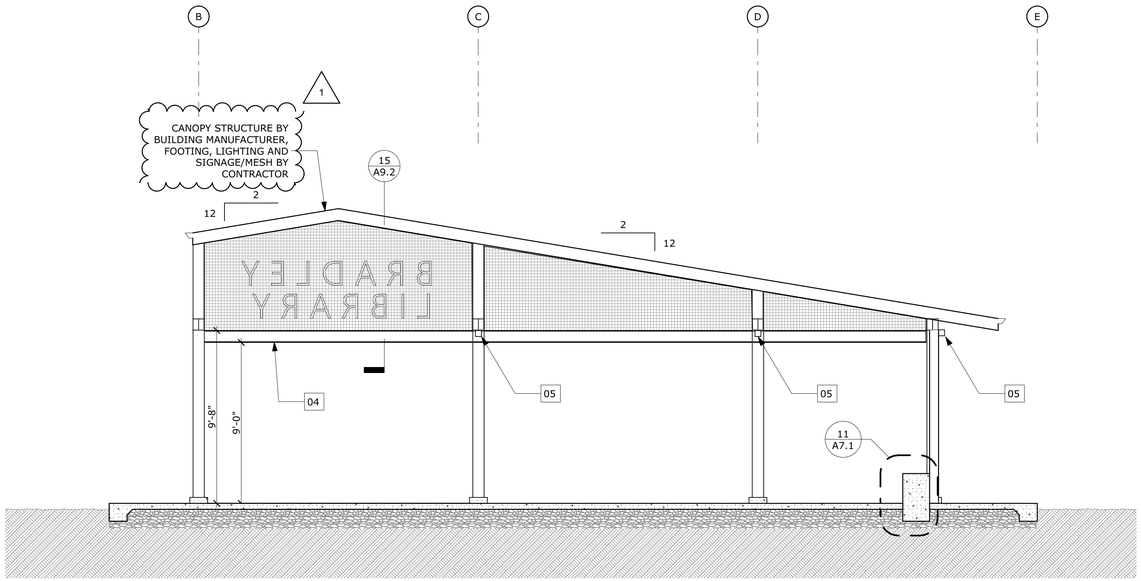
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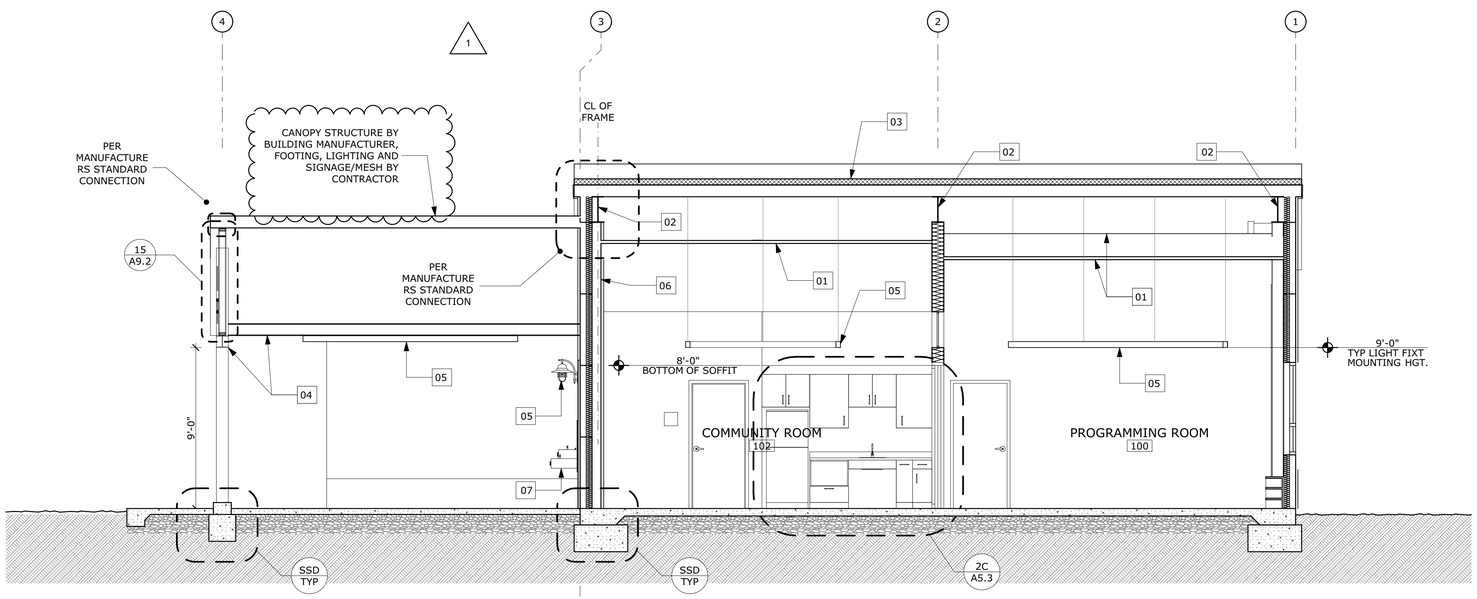
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A4.1



SECTION
SCALE: 1/4" = 1'-0" 2



SECTION
SCALE: 1/4" = 1'-0" 1

GENERAL NOTES

1. IN CONCEALED SPACES OF STUD WALLS PROVIDE 2X SOLID FIRE BLOCKING AT CEILING LEVELS, FLOOR LEVELS AND AT 10 FOOT INTERVALS BOTH HORIZONTAL & VERTICAL. ALL FIRE BLOCKING SHALL BE IN ACCORDANCE WITH CBC SECTION 717
2. SEE A2.5 FOR ACOUSTICAL CLOUDS NOT SHOWN IN SECTIONS

KEY NOTES

01	SLOPED T-BAR CEILING SEE A2.5 & SPECS
02	RIGID FRAME PER MANUFACTURER
03	INSULATED ROOF PANELS PER MANUFACTURER
04	I-BEAM PER MANUFACTURER
05	LIGHT FIXTURE SED & A2.5
06	FURRED WALL TO BOTTOM OF RIGID BEAM
07	DRINKING FOUNTAIN SEE DETAIL 15/A9.4

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A4.2

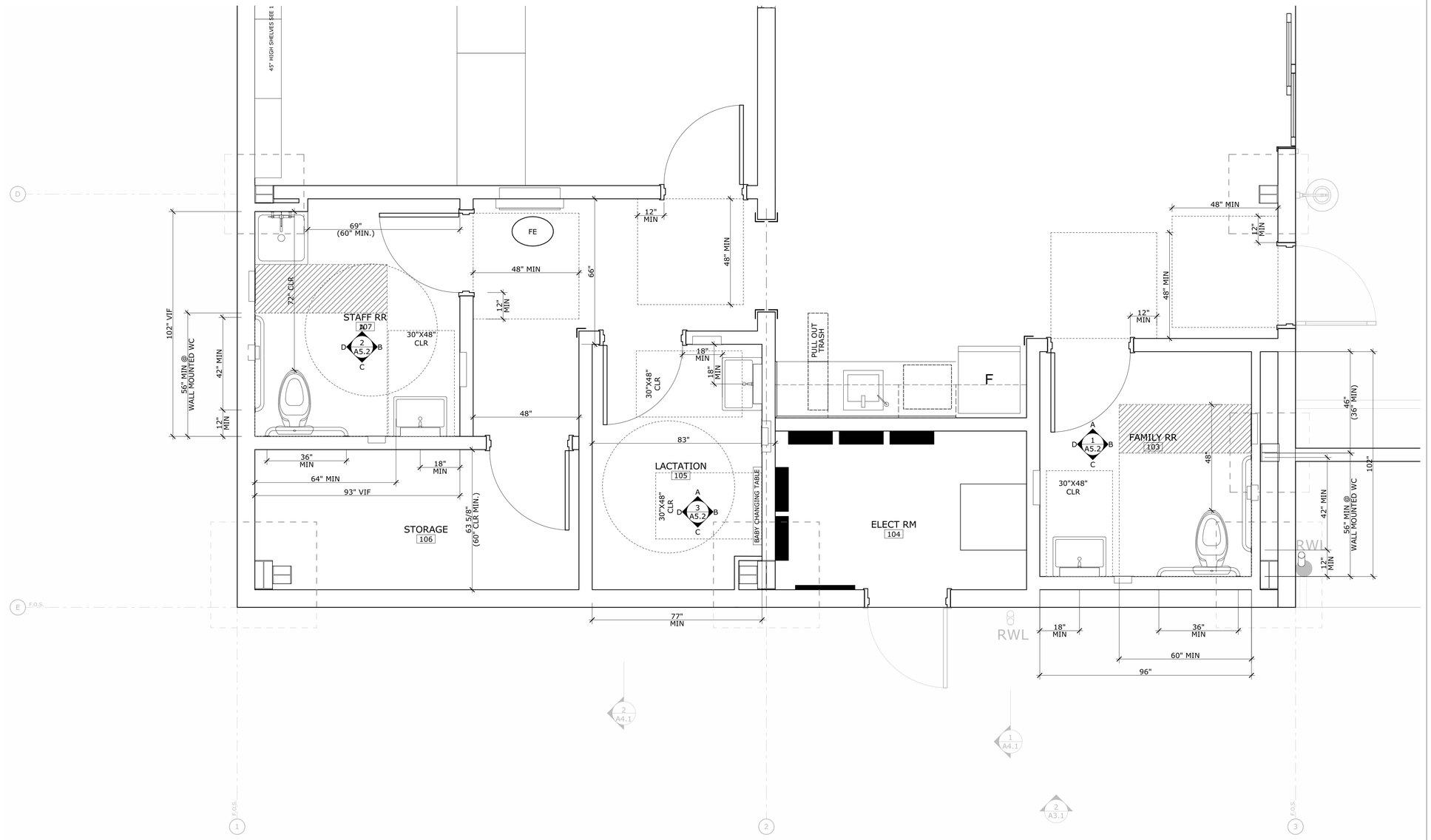
GENERAL NOTES

1. HOP - HIGHEST OPERABLE PART
2. RS - REFLECTIVE SURFACE

KEY NOTES

##

01 NONE



ENLARGED FLOOR PLANS
SCALE: 1/2" = 1'-0"

1

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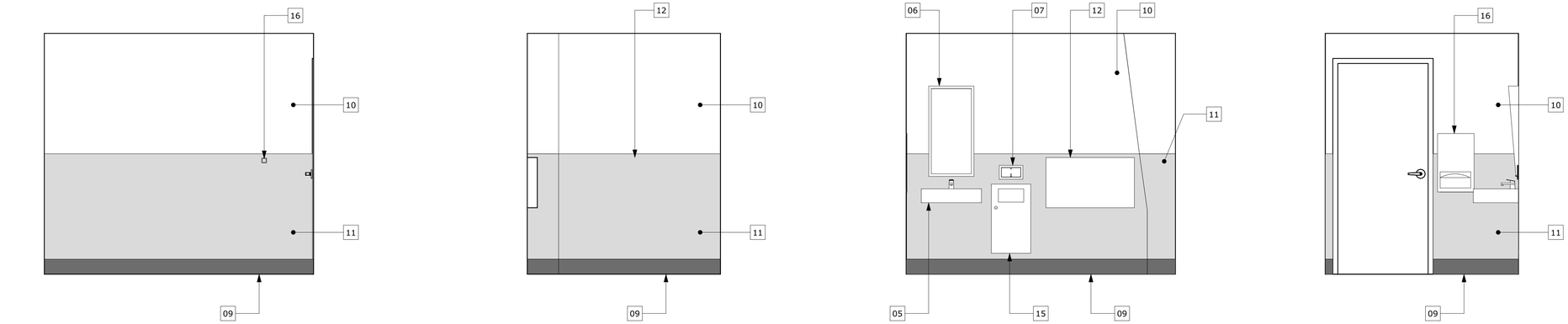
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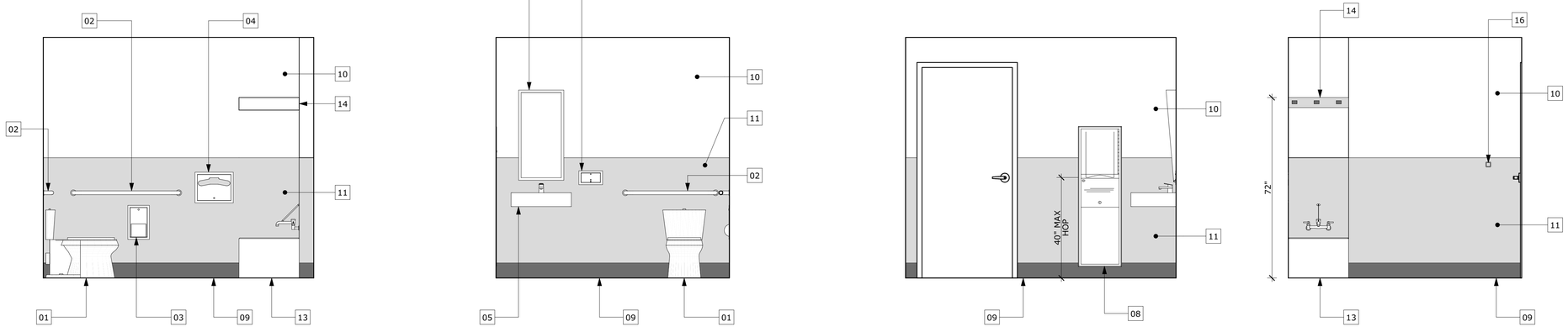
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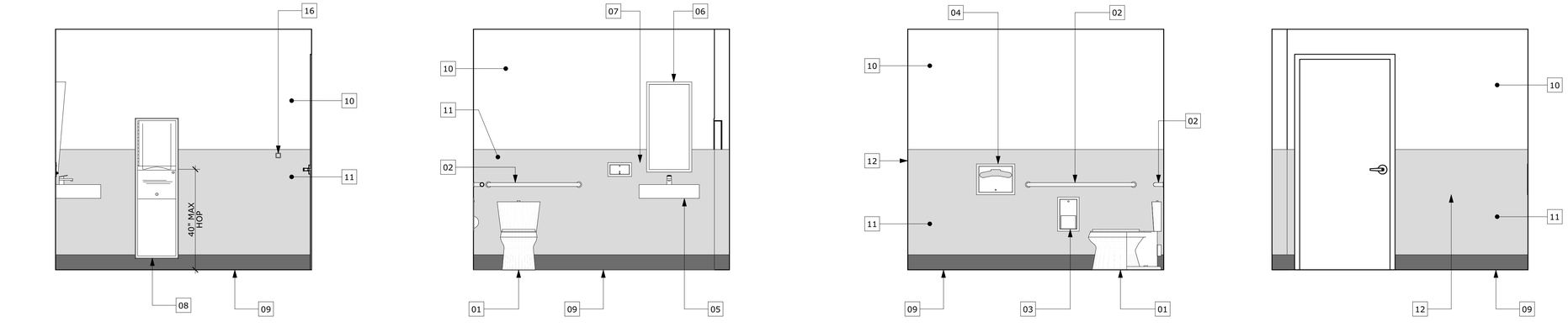
A5.1



STAFF RESTROOM 107 (3)
SCALE: 1/2" = 1'-0"



STAFF RESTROOM 107 (2)
SCALE: 1/2" = 1'-0"



FAMILY RESTROOM 103 (1)
SCALE: 1/2" = 1'-0"

GENERAL NOTES

1. HOP - HIGHEST OPERABLE PART
2. RS - REFLECTIVE SURFACE
3. CONTRACTOR TO CUT FRP AROUND RECESSED/SEMI RECESSED RESTROOM ACCESSORIES. SURFACE MOUNTED ACCESSORIES TO BE MOUNTED OVER FRP

1

KEY NOTES

##

01	TOILET, SEE 4/A9.4 & PLUMBING DWGS
02	GRAB BAR, SEE SPECS AND DETAIL 4/A9.4
03	TOILET PAPER DISPENSER, SEE SPECS AND DETAIL 4/A9.4
04	SEAT COVER DISPENSER, SEE SPECS AND DETAIL 4/A9.4
05	LAVATORY SINK, SEE 3/A9.4 & PLUMBING DWGS
06	MIRROR, SEE 3/A9.4 & SPECS
07	SOAP DISPENSER, SEE 3/A9.4 & SPECS
08	RECESSED WASTE & PAPER TOWEL DISPENSER, SEE 3/A9.4 & SPECS
09	COVED BASE SEE DET 5/A9.4
10	WALL FINISH - PAINTED - SEE FINISH PLAN ON A2.4
11	FRP UP TO 4' AFF, SEE FINISH PLAN ON A2.4
12	BABY CHANGING STATION, SEE DET 7/A9.4
13	24"X24" MOP SINK AND FAUCET - SPD
14	MOP SHELF, SEE SPECS
15	RECESSED WATSE RECPETACLE WITH DISPOSAL DOOR, SEE 3/A9.4 & SPECS
16	COAT HOOK 48" MAX AFF & SPECS
17	SANITARY NAPKIN DIPOSAL SEE

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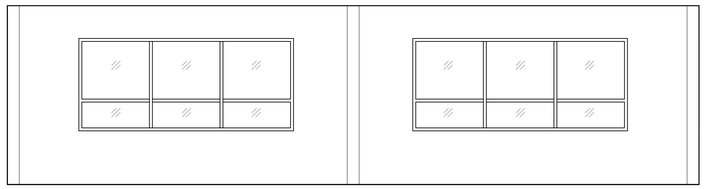
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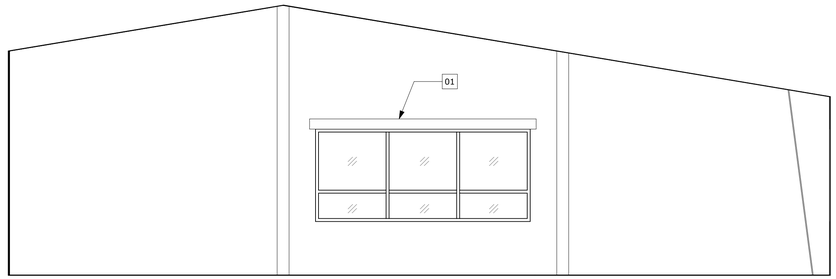
A5.2



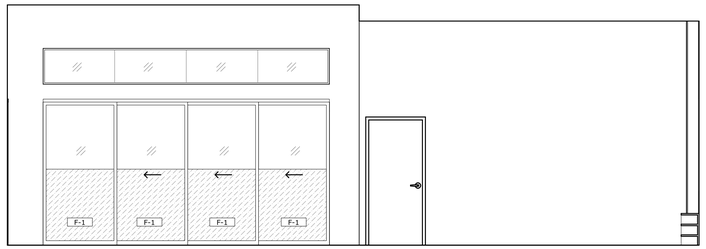
A



B



D



C

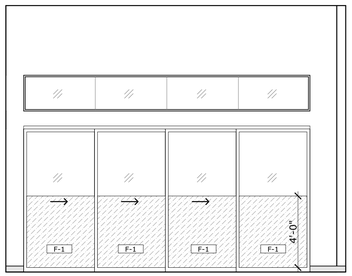
PROGRAMMING ROOM

SCALE: 1/4" = 1'-0"

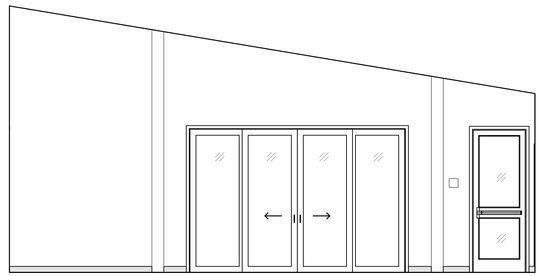
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D

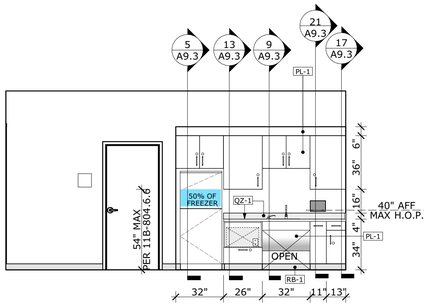
C



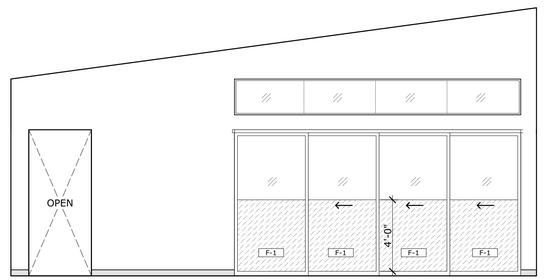
A



B



C



D

COMMUNITY ROOM

SCALE: 1/4" = 1'-0"

2

GENERAL NOTES

1. SEE RCP FOR ACOUSTICAL CLOUDS AND LIGHT FIXTURES NOT SHOWN

KEY NOTES

##

01 MANUAL ROLLING WINDOW SHADE SEE SPEC SECTION 122413

SYMBOLS LEGEND

F-1 WINDOW FILM SEE SPECS SECTION 088700

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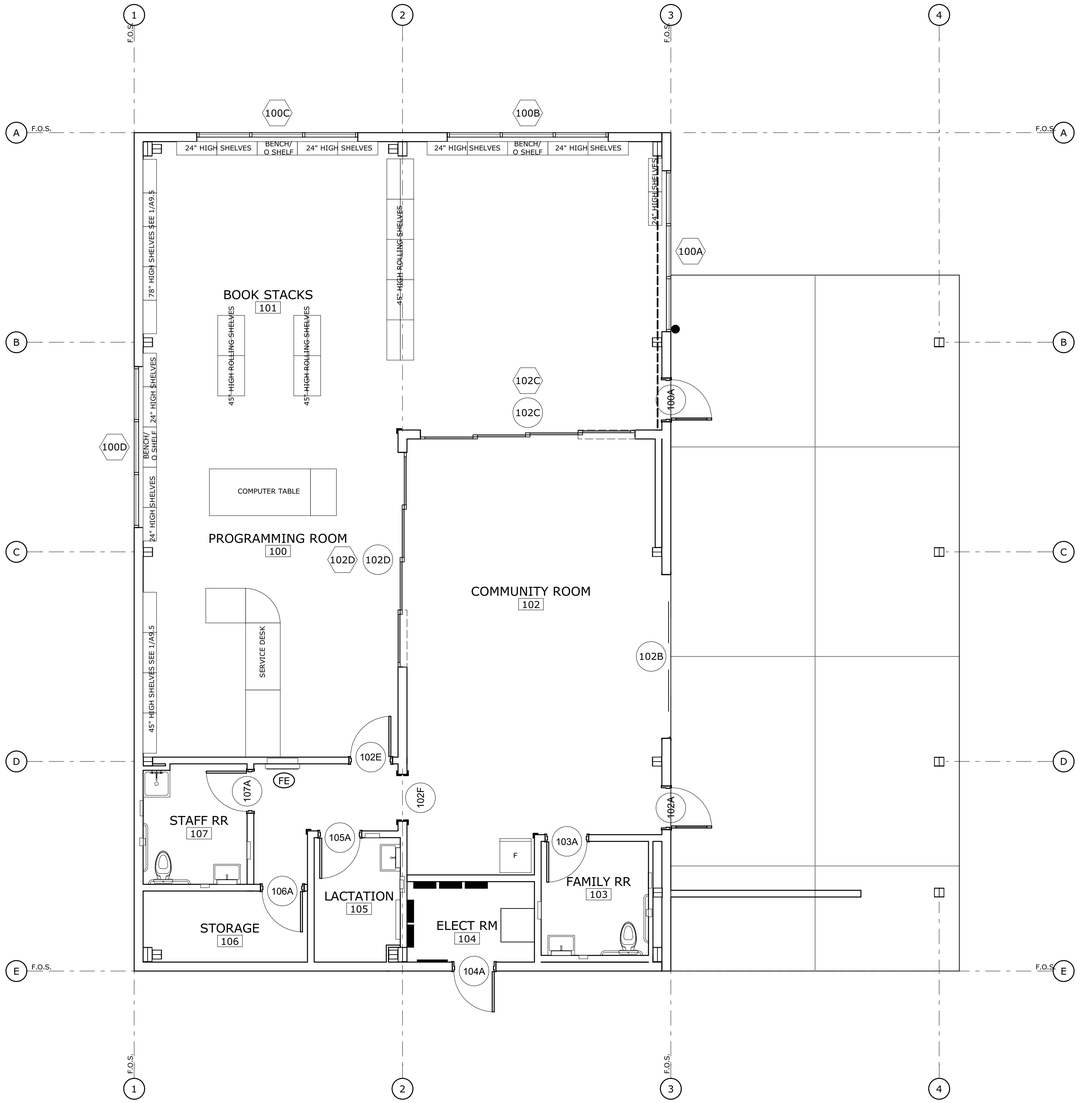
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A5.3

DOOR & WINDOW TAGS FLOOR PLAN



GENERAL NOTES

1. DOOR OPENING EFFORTS - NOT TO EXCEED 5 LBS AT EXTERIOR & INTERIOR. 15 LBS FORCE REQUIRED TO ACHIEVE POSITIVE LATCHING FOR FIRE DOORS.
2. ALL DOORS ARE EQUIPPED WITH HAND-ACTIVED HARDWARE, INCLUDING ALL DEAD BOLTS, ARE TO BE MOUNTED BETWEEN 30" & 44" ABOVE THE FINISH FLOOR.
3. ALL DOORS, FINISH, AND LEVER HARDWARE, SEE SPECS
4. ALL DOOR HEADER HEIGHTS = 8'-0" U.N.O.. SEE DOOR SCHEDULE FOR APPROPRIATE HEIGHT.
5. VERIFY DOOR ROUGH OPENING SIZE IN FIELD
6. FOR EXACT THROAT DIMENSIONS OF DOOR FRAMES, AND ADDITIONAL INFORMATION, REFER TO STRUCTURAL SHEAR WALL PLAN, ARCHITECTRUAL FINISH SCHEDULE AND DETAILS.
7. GLASS IN DOORS SHALL BE TEMPERED. SEE SPECIFICATIONS.
8. FOR SIGNAGE REQUIREMENTS SEE EGRESS PLAN ON 1/A2.3
9. ALL GLAZING WITHIN 18" OF FINISHED FLOOR SHALL BE TEMPERED

SPECIFIC DOOR REMARKS

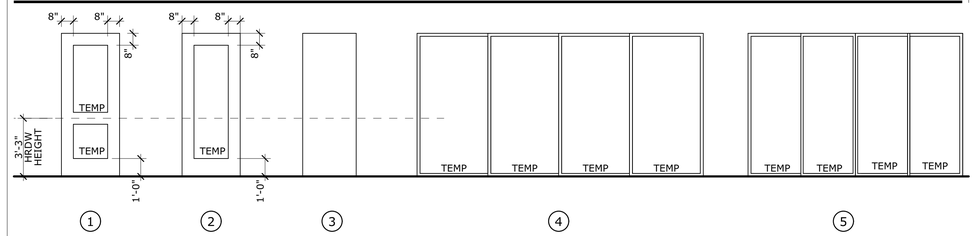
1. EXIT DOORS SHALL BE OPENED FROM THE INSIDE WITHOUT THE USE OF A KEY OR ANY SPECIAL KNOWLEDGE OR EFFORT. MANUALLY OPERATED EDGE - OR SURFACE MOUNTED FLUSH BOLTS AND SURFACE BOLTS SHALL NOT BE USED ON EXIT DOORS. ALL EXIT DOORS SHALL BE PROVIDED WITH PANIC HARDWARE PER SECTION 1007.2.5, AND KICK PLATE AT PUSH SIDE.
2. SEE DOOR DETAIL REFERENCE A
3. SEE DOOR DETAIL REFERENCE B
4. SEE DOOR DETAIL REFERENCE C
5. SEE DOOR DETAIL REFERENCE D

DOOR SCHEDULE

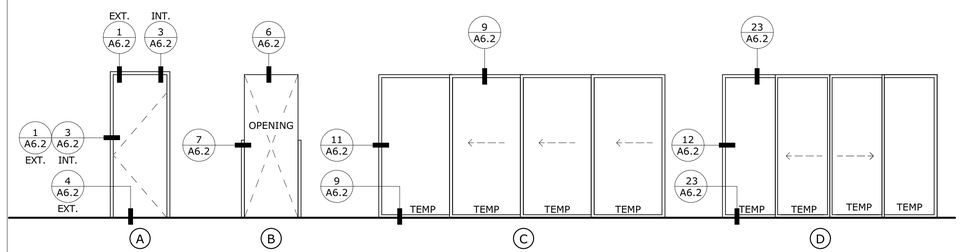
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ID	TYPE	SIZE WXH	DOOR MATERIAL	DOOR FINISH	FRAME MATERIAL	FRAME FINISH	HARDWAR...	SPECIFIC REMARKS
100A	1	3'-0"×8'-0"	METAL	PAINT	HM	PAINT	A	1, 2
102A	1	3'-0"×8'-0"	METAL	PAINT	HM	PAINT	A	1, 2
102B	5	12'-0"×8'-0"	ALUM	CLEAR	ALUM	CLEAR	F	5
102C	4	16'-0"×8'-0"	ALUM	CLEAR	ALUM	CLEAR	F	4
102D	4	16'-0"×8'-0"	ALUM	CLEAR	ALUM	CLEAR	F	4
102E	2	3'-0"×7'-0"	WOOD	CLEAR	HM	PAINT	D	2
102F	OPENING	3'-6"×8'-0"	---	---	---	---	---	3
103A	3	3'-0"×7'-0"	WOOD	CLEAR	HM	PAINT	E	2
104A	3	3'-0"×7'-0"	METAL	PAINT	HM	PAINT	B	2
105A	3	3'-0"×7'-0"	WOOD	CLEAR	HM	PAINT	E	2
106A	3	3'-0"×7'-0"	WOOD	CLEAR	HM	PAINT	C	2
107A	3	3'-0"×7'-0"	WOOD	CLEAR	HM	PAINT	E	2

DOOR TYPES



DOOR DETAIL REFERENCE

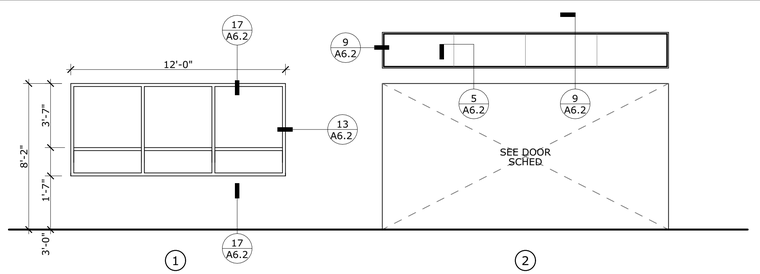


WINDOW SCHEDULE

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ID	TYPE	MATERIAL	FINISH	GLAZING	SPECIFIC REMARKS
100A	1	ALUM	CLEAR ANODIZED	CLEAR	
100B	1	ALUM	CLEAR ANODIZED	CLEAR	
100C	1	ALUM	CLEAR ANODIZED	CLEAR	
100D	1	ALUM	CLEAR ANODIZED	CLEAR	
102C	2	ALUM	CLEAR ANODIZED	CLEAR	
102D	2	ALUM	CLEAR ANODIZED	CLEAR	

WINDOW TYPES



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DOOR & WINDOW SCHEDULE

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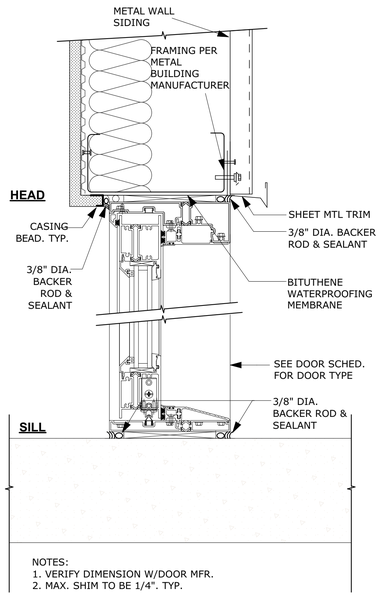
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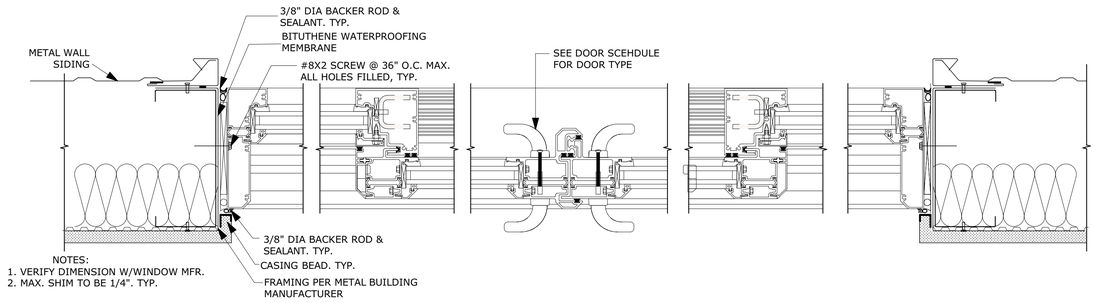
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JOB NO: 23014

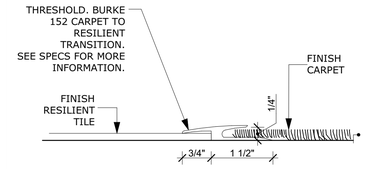
A6.1



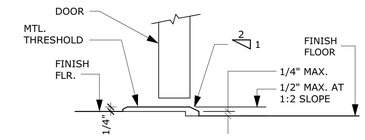
DOUBLE SLIDING DOOR JAMB 23
SCALE: 3" = 1'-0"



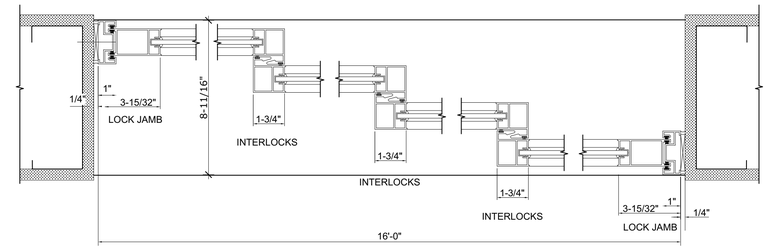
DOUBLE SLIDING DOOR JAMB 12
SCALE: 3" = 1'-0"



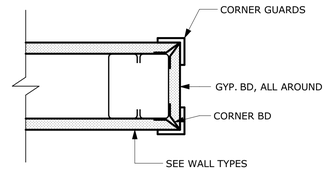
INT THRESHOLD RES. TILE TO CARPET 8
SCALE: 6" = 1'-0"



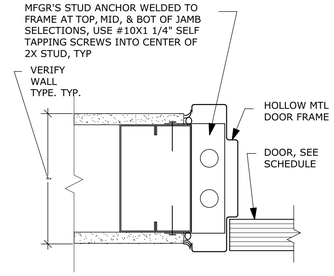
THRESHOLD 4
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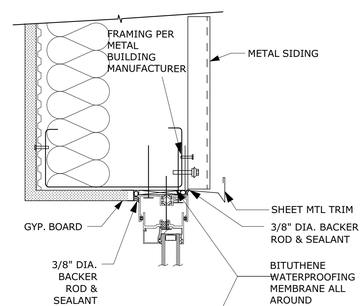
STACKING DOOR JAMB 11
SCALE: 3" = 1'-0"



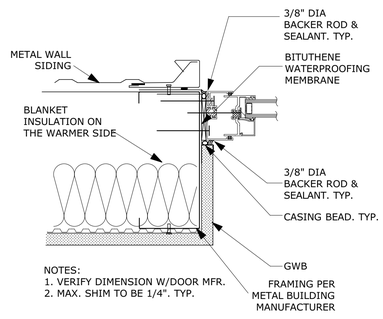
FINISHED OPENING JAMB 7
SCALE: 3" = 1'-0"



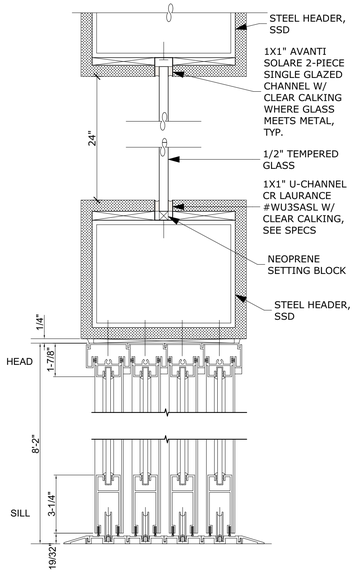
INT HM DOOR HEAD/JAMB 3
SCALE: 3" = 1'-0"



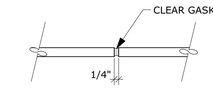
EXT ALUM WINDOW 17
SCALE: 3" = 1'-0"



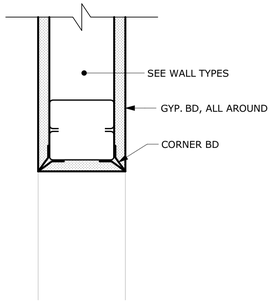
STOREFRONT ALUM WINDOW JAM 13
SCALE: 3" = 1'-0"



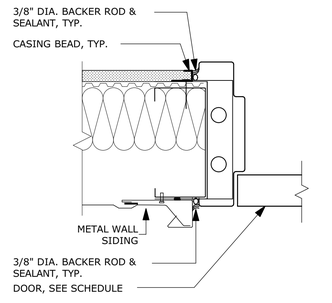
STACKING DOOR HEAD/SILL 9
SCALE: 3" = 1'-0"



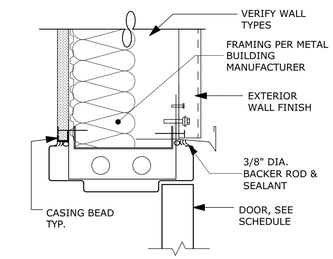
INT. GLAZING DTL 5
SCALE: 3" = 1'-0"



FINISHED OPENING HEAD 6
SCALE: 3" = 1'-0"



EXT HM DOOR JAMB 2
SCALE: 3" = 1'-0"



EXT HM DOOR HEAD 1
SCALE: 3" = 1'-0"

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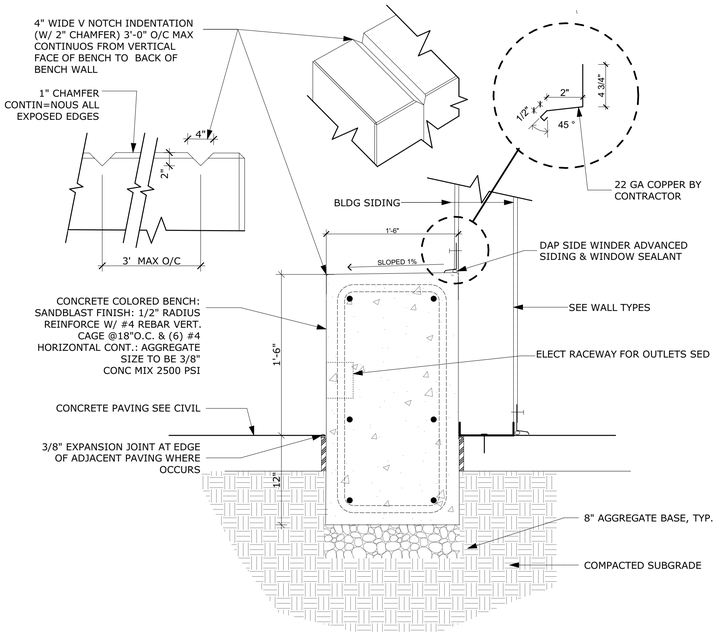
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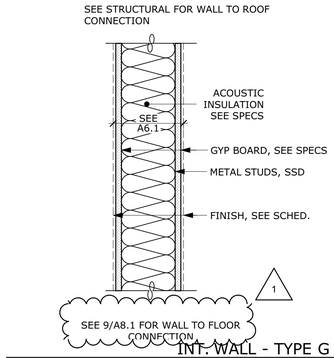
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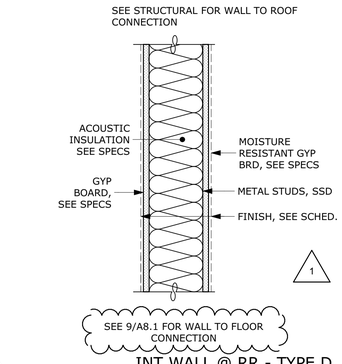
A6.2



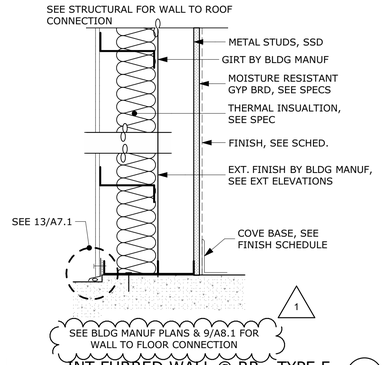
CONC BENCH @ WALL W/ OUTLETS 11
SCALE: 1 1/2"= 1'-0"



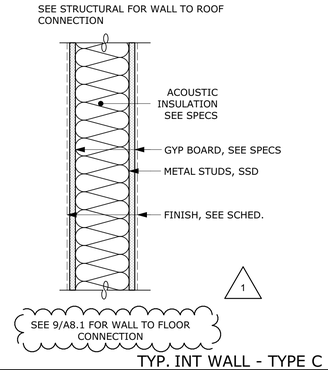
INT. WALL - TYPE G G
SCALE: 1 1/2"= 1'-0"



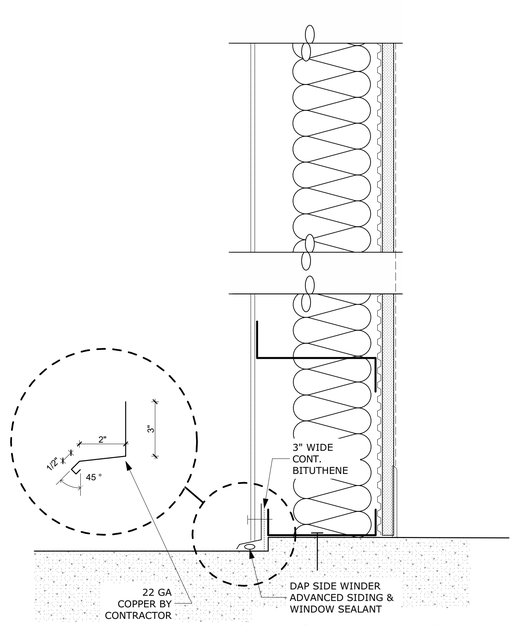
INT WALL @ RR - TYPE D D
SCALE: 1 1/2"= 1'-0"



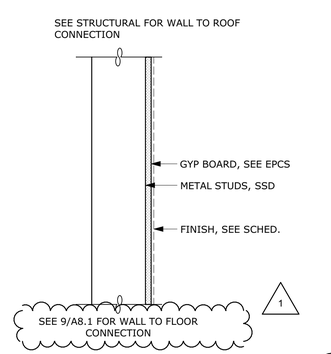
INT FURRED WALL @ RR - TYPE F F
SCALE: 1 1/2"= 1'-0"



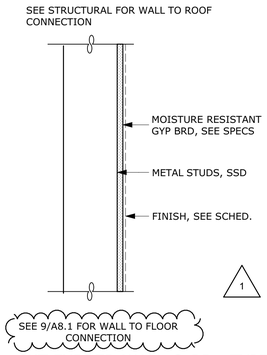
TYP. INT WALL - TYPE C C
SCALE: 1 1/2"= 1'-0"



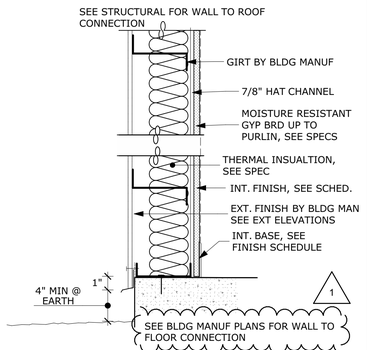
WALL TO FOUNDATION 13
SCALE: 3" = 1'-0"



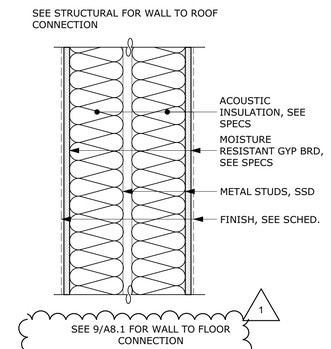
INT. FULL HEIGHT WALL - TYPE H H
SCALE: 1 1/2"= 1'-0"



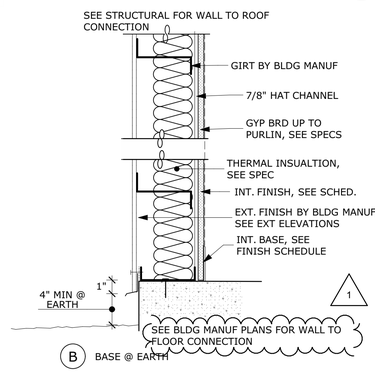
INT FURRED WALL @ RR - TYPE E E
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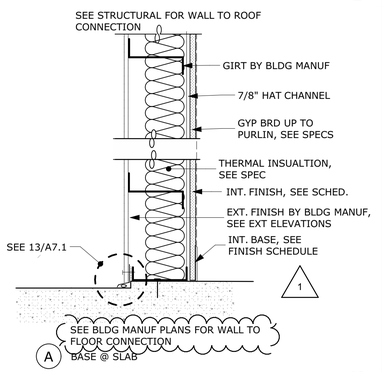


EXT WALL @ RR - TYPE B B
SCALE: 1 1/2"= 1'-0"



CHASE INT. WALL @ RR - TYPE G G
SCALE: 1 1/2"= 1'-0"





EXT WALL - TYPE A A
SCALE: 1 1/2"= 1'-0"

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WALL TYPES AND DETAILS

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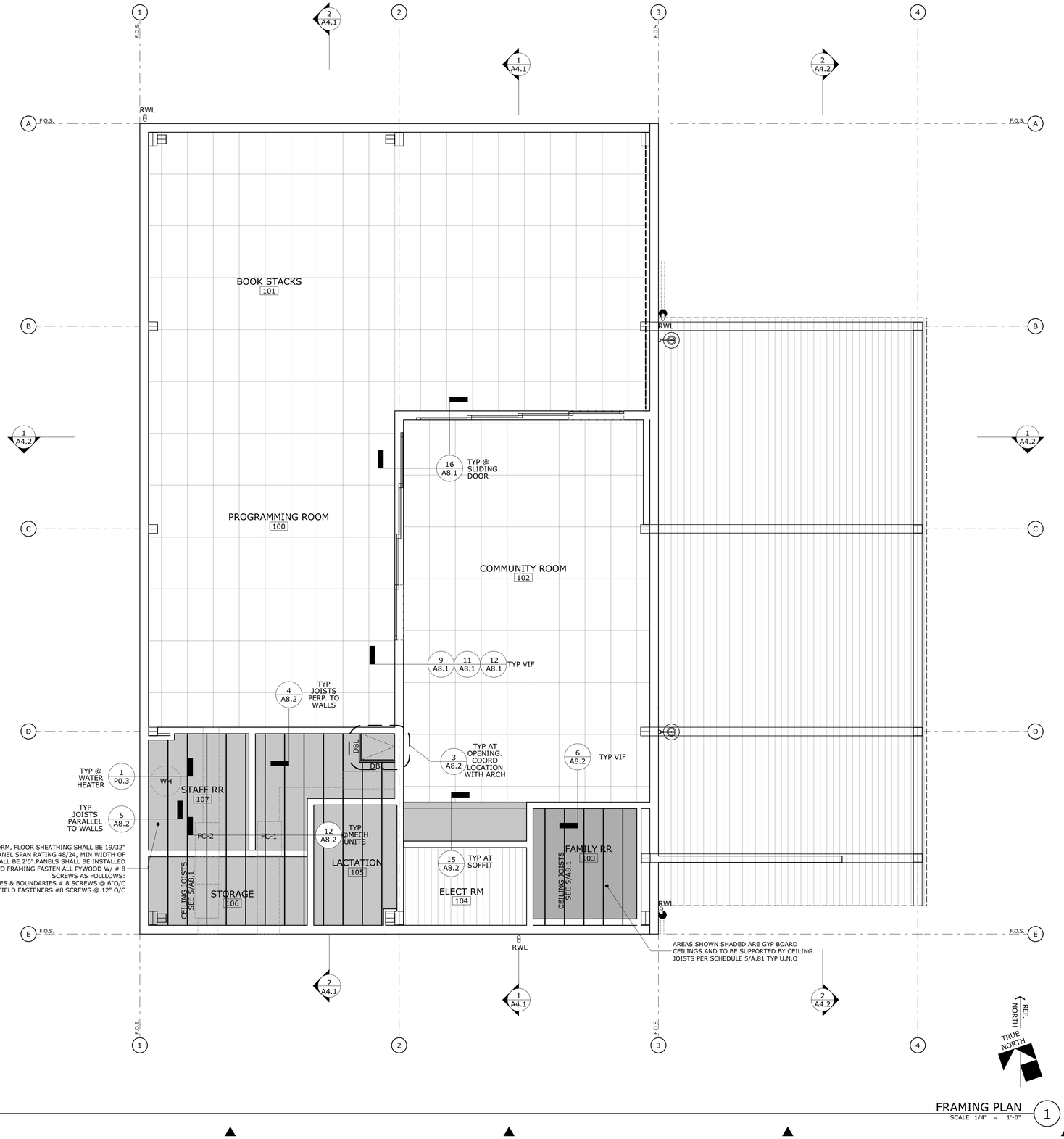
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JOB NO: 23014

A7.1



FRAMING PLAN
SCALE: 1/4" = 1'-0" 1

LIGHT GAUGE STEEL NOTES

1. COLD FORMED STEEL USED FOR STUDS, TRACK, BLOCKING, GUSSETS, BRACE STRAPS, ETC., SHALL MEET THE REQUIREMENTS OF THE STEEL STUD MANUFACTURER'S ASSOCIATION (SSMA) ES EVALUATION REPORT NO. 3064P DATED FEBRUARY 2018. SEE DETAILS SHEETS FOR SIZES AND THICKNESS REQUIREMENTS.
2. COLD FORM STEEL STUD FRAMING SHALL BE ASTM A653 SS, AND A MINIMUM OF 33KSI FOR 43 MIL AND LIGHTER STEEL, 50KSI MINIMUM YIELD STRENGTH FOR 54 MIL AND HEAVIER STEEL. ALL EXTERIOR MEMBERS SHALL BE GALVANIZED G60 MIN.
3. INSTALL COLD-FORMED FRAMING IN ACCORDANCE WITH ASTM C1007 AND AISI S200 "NORTH AMERICAN STANDARD FOR COLD-FORMED STEEL FRAMING - GENERAL PROVISIONS". COLD-FORMED STEEL FRAMING MAY BE SHOP OR FIELD FABRICATED FOR INSTALLATION, OR IT MAY BE FIELD ASSEMBLED.
4. SCREW, BOLT, OR WELD WALL PANELS AT HORIZONTAL AND VERTICAL JUNCTURES TO PRODUCE FLUSH, EVEN, TRUE-TO-LINE JOINTS WITH MAXIMUM VARIATION IN PLANE AND TRUE POSITION BETWEEN FABRICATED PANELS NOT EXCEEDING 1/8 INCH.
5. INSTALL COLD-FORMED STEEL FRAMING AND ACCESSORIES PLUMB, SQUARE, AND TRUE TO LINE, AND WITH CONNECTIONS SECURELY FASTENED.

   a. CUT FRAMING MEMBERS BY SAWING OR SHEARING; DO NOT TORCH CUT.

   b. FASTEN COLD-FORMED STEEL FRAMING MEMBERS BY WELDING, SCREW FASTENING, CLINCH FASTENING, OR RIVETING. WIRE TYING OF FRAMING MEMBERS IS NOT PERMITTED.

   c. COMPLY WITH AWS D1.3/D1.3M REQUIREMENTS AND PROCEDURES FOR WELDING, APPEARANCE AND QUALITY OF WELDS, AND METHODS USED IN CORRECTING WELDING WORK.
6. LOCATE MECHANICAL FASTENERS AND INSTALL ACCORDING TO DRAWINGS, AND COMPLYING WITH REQUIREMENTS FOR SPACING, EDGE DISTANCES, AND SCREW PENETRATION.
7. INSTALL TEMPORARY BRACING AND SUPPORTS TO SECURE FRAMING AND SUPPORT LOADS COMPARABLE IN INTENSITY TO THOSE FOR WHICH STRUCTURE WAS DESIGNED. MAINTAIN BRACES AND SUPPORTS IN PLACE, UNDISTURBED, UNTIL ENTIRE INTEGRATED SUPPORTING STRUCTURE HAS BEEN COMPLETED AND PERMANENT CONNECTIONS TO FRAMING ARE SECURED.
8. ALL STEEL SHEET SHALL MEET ASTM A 1003/A 1003M, STRUCTURAL GRADE, TYPE H, METALLIC COATED, OF GRADE ST50H (U.O.S.) AND COATING WEIGHT OF G60 (U.O.S.).
9. ALL FRAMING MEMBERS SHALL BEAR A STAMP OR LABEL INDICATING THE MANUFACTURER'S NAME OR LOGO, THE CONFORMING EVALUATION SERVICE REPORT NUMBER, THE MATERIAL THICKNESS, AND THE YIELD STRENGTH.
10. WALL STUDS REQUIRE LATERAL BRIDGE IF SHEATHING IS NOT CONTINUOUS ON BOTH SIDES OF STUDS. SEE DETAILS FOR BRIDGING DETAILS.
11. ALL MECHANICAL FASTENERS SHALL MEET ASTM C 1513, CORROSION-RESISTANT-COATED,SELF-DRILLING, SELF-TAPPING, STEEL DRILL SCREWS WITH HEAD TYPE: LOW-PROFILE HEAD BENEATH SHEATHING AND HEX WASHER HEAD ELSEWHERE.
12. SET STUDS PLUMB, EXCEPT AS NEEDED FOR DIAGONAL BRACING OR REQUIRED FOR NON-PLUMB WALLS OR WARPED SURFACES AND SIMILAR CONFIGURATIONS.
13. ALIGN STUDS VERTICALLY WHERE FLOOR FRAMING INTERRUPTS WALL-FRAMING CONTINUITY.WHERE STUDS CANNOT BE ALIGNED, CONTINUOUSLY REINFORCE TRACK TO TRANSFER LOADS.
14. ALIGN FLOOR AND ROOF FRAMING OVER STUDS. WHERE FRAMING CANNOT BE ALIGNED, CONTINUOUSLY REINFORCE TRACK TO TRANSFER LOADS.
15. ANCHOR STUDS ABUTTING STRUCTURAL COLUMNS OR WALLS, INCLUDING MASONRY WALLS, TO SUPPORTING STRUCTURE AS INDICATED.

GENERAL FRAMING NOTES

1. INSTALL COLD-FORMED FRAMING IN ACCORDANCE WITH ASTM C1007 AND AISI S200 "NORTH AMERICAN STANDARD FOR COLD-FORMED STEEL FRAMING - GENERAL PROVISIONS". COLD-FORMED STEEL FRAMING MAY BE SHOP OR FIELD FABRICATED FOR INSTALLATION, OR IT MAY BE FIELD ASSEMBLED.
2. SCREW, BOLT, OR WELD WALL PANELS AT HORIZONTAL AND VERTICAL JUNCTURES TO PRODUCE FLUSH, EVEN, TRUE-TO-LINE JOINTS WITH MAXIMUM VARIATION IN PLANE AND TRUE POSITION BETWEEN FABRICATED PANELS NOT EXCEEDING 1/8 INCH.
3. INSTALL COLD-FORMED STEEL FRAMING AND ACCESSORIES PLUMB, SQUARE, AND TRUE TO LINE, AND WITH CONNECTIONS SECURELY FASTENED.
4. CUT FRAMING MEMBERS BY SAWING OR SHEARING; DO NOT TORCH CUT.
5. FASTEN COLD-FORMED STEEL FRAMING MEMBERS BY WELDING, SCREW FASTENING, CLINCH FASTENING, OR RIVETING. WIRE TYING OF FRAMING MEMBERS IS NOT PERMITTED.
6. COMPLY WITH AWS D1.3/D1.3M REQUIREMENTS AND PROCEDURES FOR WELDING, APPEARANCE AND QUALITY OF WELDS, AND METHODS USED IN CORRECTING WELDING WORK.
7. LOCATE MECHANICAL FASTENERS AND INSTALL ACCORDING TO DRAWINGS, AND COMPLYING WITH REQUIREMENTS FOR SPACING, EDGE DISTANCES, AND SCREW PENETRATION.
8. INSTALL TEMPORARY BRACING AND SUPPORTS TO SECURE FRAMING AND SUPPORT LOADS COMPARABLE IN INTENSITY TO THOSE FOR WHICH STRUCTURE WAS DESIGNED. MAINTAIN BRACES AND SUPPORTS IN PLACE, UNDISTURBED, UNTIL ENTIRE INTEGRATED SUPPORTING STRUCTURE HAS BEEN COMPLETED AND PERMANENT CONNECTIONS TO FRAMING ARE SECURED.
9. ALL COLD FORMED FRAMING MEMBERS SHALL BE FABRICATED PER ASTM C955
10. ALL STEEL SHEET SHALL MEET ASTM A 1003/A 1003M, STRUCTURAL GRADE, TYPE H, METALLIC COATED, OF GRADE ST50H (U.O.S.) AND COATING WEIGHT OF G60 (U.O.S.).
11. ALL MECHANICAL FASTENERS SHALL MEET ASTM C 1513, CORROSION-RESISTANT-COATED, SELF-DRILLING, SELF-TAPPING, STEEL DRILL SCREWS WITH HEAD TYPE: LOW-PROFILE HEAD BENEATH SHEATHING AND HEX WASHER HEAD ELSEWHERE.
12. SET STUDS PLUMB, EXCEPT AS NEEDED FOR DIAGONAL BRACING OR REQUIRED FOR NON-PLUMB WALLS OR WARPED SURFACES AND SIMILAR CONFIGURATIONS.

KEY NOTES

##

1 NONE

SYMBOL LEGEND

GYP. BD. CEILING, 8'-0" U.O.N.

T-BAR CEILING, SEE PLAN FOR HEIGHT, FOR T-BAR ATTACHMENT SEE DETAIL 4/A9.1

EXPOSED METAL ROOF

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JOSEPH L. PEA
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FRAMING PLAN

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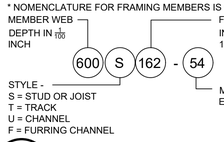
JOB NO: 23014

A8.0

PARTITION WALL SCHEDULE (P.W.S.)

WALL HEIGHT	STUDS *	SPACING	BOTTOM AND TOP TRACK *	BOTTOM TRACK ** FASTENERS	TOP SLIP TRACK FASTENERS
< 14'	350S162-33	16"o.c.	350T150-43	0.138"Ø P.A.F. @ 32"o.c.	(2) #12-14 @ 48"o.c.
14'-18'	400S162-33	16"o.c.	400T150-43	0.138"Ø P.A.F. @ 32"o.c.	(2) #12-14 @ 48"o.c.
18'-24'	600S162-43	16"o.c.	600T150-43	0.138"Ø P.A.F. @ 32"o.c.	(2) #12-14 @ 48"o.c.

* NOMENCLATURE FOR FRAMING MEMBERS IS AS FOLLOWS:

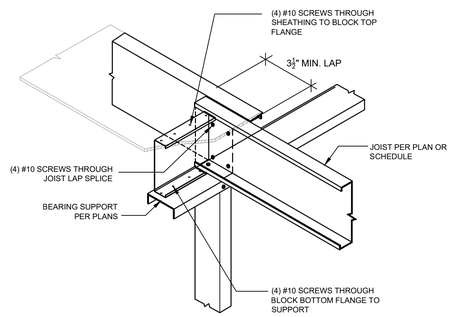


** AT SHEAR WALL SHOWN ON PLAN, BOTTOM TRACK FASTENERS: ON SHEAR WALL SCHEDULE SUPERSEDE THOSE SHOWN HERE

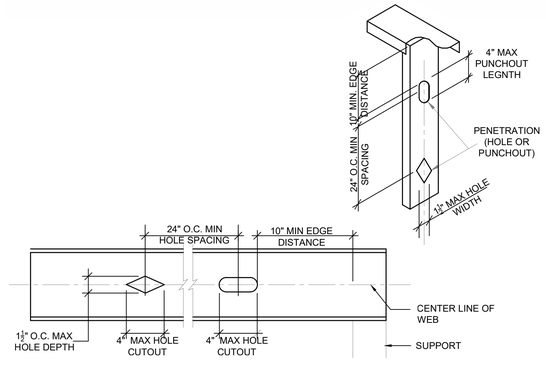
1 INTERIOR NON BEARING PARTITION SCHEDULE

CEILING JOIST SCHEDULE

JOIST SPAN	STUDS *	SPACING	BOTTOM AND TOP TRACK *	JOIST ATTACHMENT
<8'	350S162-33	16"o.c.	350T150-43	2-#8
14'-18'	400S162-33	16"o.c.	400T150-43	3-#8
18'-24'	600S162-43	16"o.c.	600T150-43	4-#8

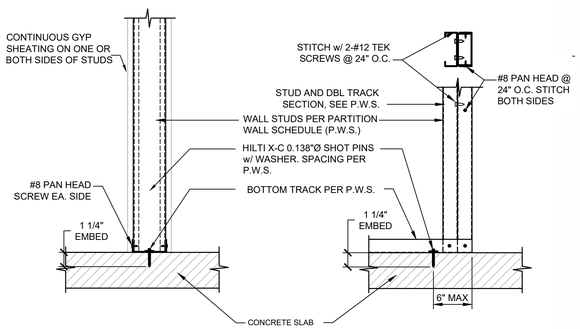


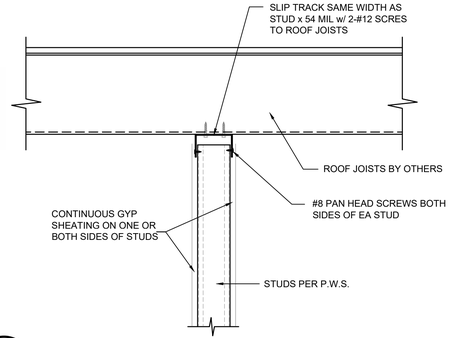
6 JOIST LAP SPLICE AT SUPPORT

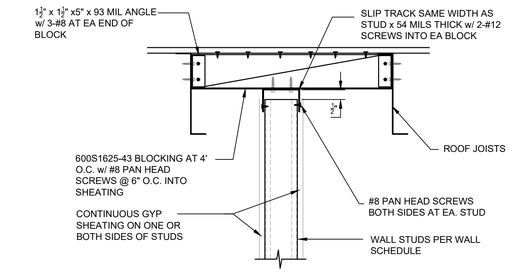


7 ALLOWABLE HOLES IN CFS MEMBERS

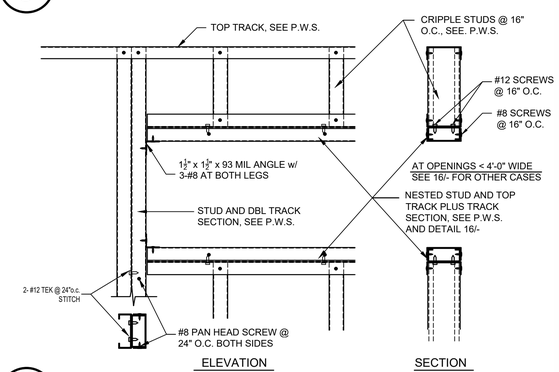
5 LIGHT GAUGE JOIST SCHEDULE



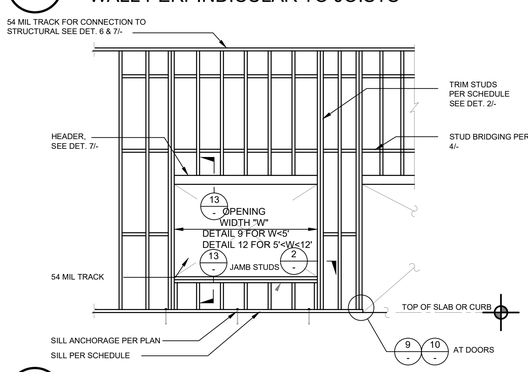




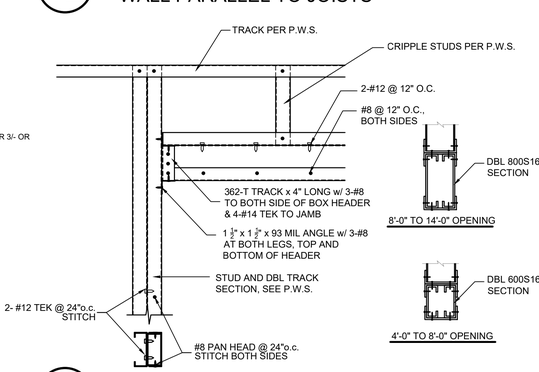
9 INTERIOR NON BEARING PARTITION BASE



13 JAMB AND HEADER DETAILS



11 TYPICAL FULL HEIGHT PARTITION WALL PERPINDICULAR TO JOISTS



15 PARTITION WALL TOP TRACK PARALLEL TO JOISTS

12 TYPICAL FULL HEIGHT PARTITION WALL PARALLEL TO JOISTS

16 BUILT UP BOX HEADER

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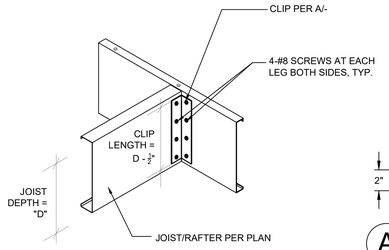
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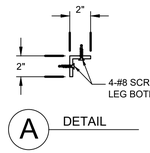
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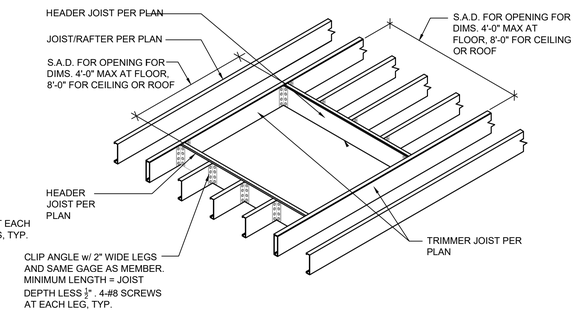
A8.1



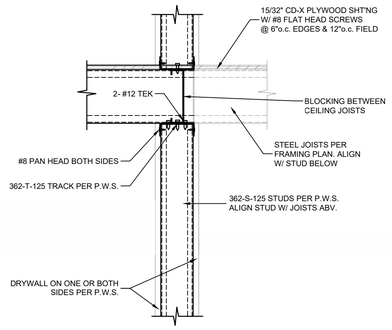


A DETAIL

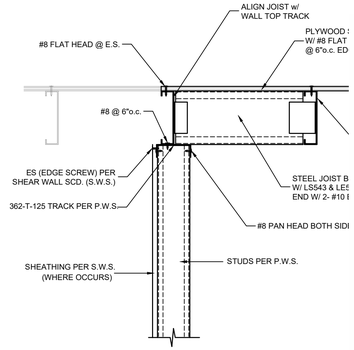
2 JOIST TO JOIST CONNECTION



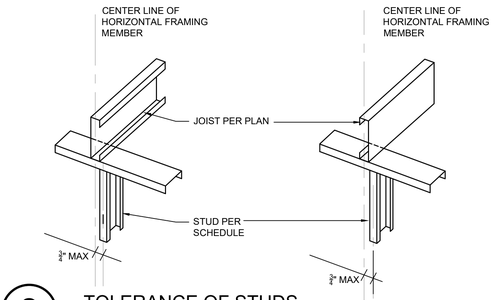
3 FRAMING AT OPENING



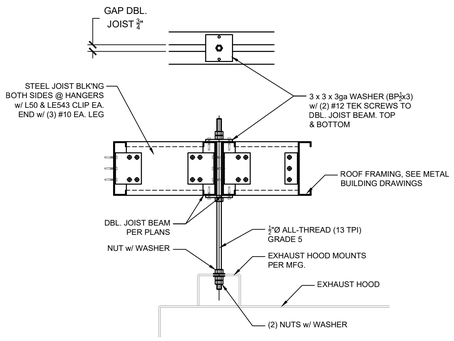
4 INTERIOR BEARING PARTITION WALL



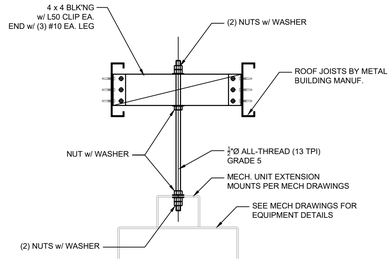
5 INTERIOR BEARING WALL



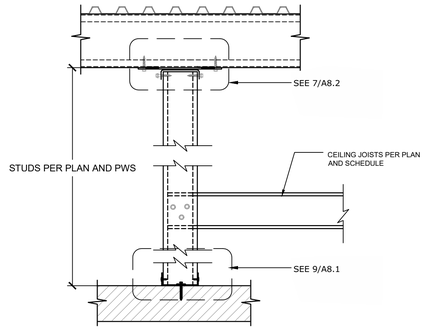
8 TOLERANCE OF STUDS



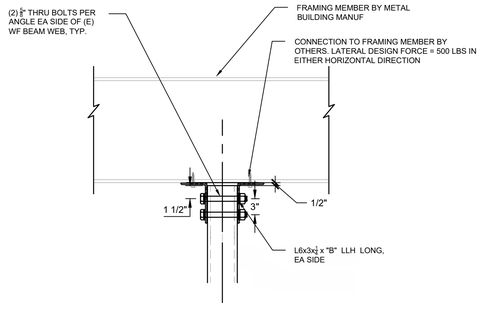
12 EXHAUST HOOD HANGER



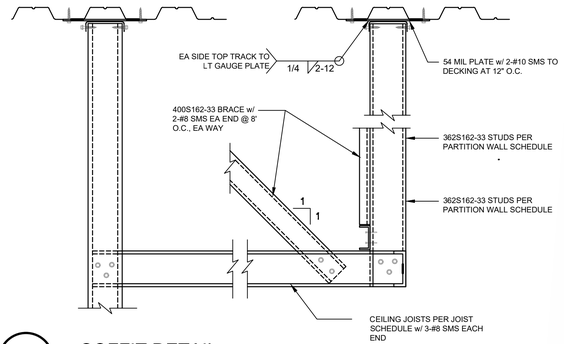
13 LIGHT DUTY HANGER - 100 LBS MAX



6 CEILING JOIST @ PARTITION WALL



7 CEILING JOIST @ PARTITION WALL



15 SOFFIT DETAIL

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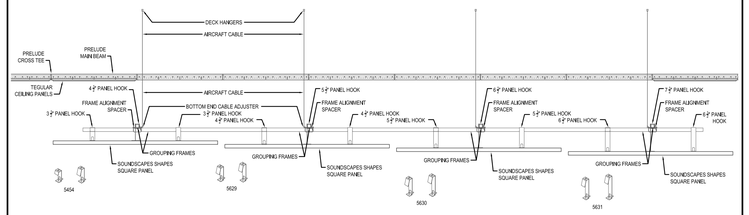
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A8.2



GENERAL NOTES FOR CAPZ, INFUSIONS AND SOUNDSCAPE CEILING SYSTEMS:

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- CONSULT YOUR LOCAL BUILDING CODE FOR ADDITIONAL REQUIREMENTS OUTSIDE OF THE ARMSTRONG INSTALLATION INSTRUCTIONS. THIS INCLUDES BUT IS NOT LIMITED TO BRACING OF TRANSITIONS, AND ADDITIONAL SEISMIC REQUIREMENTS.
- FIELD VERIFY ALL CONDITIONS AND DIMENSIONS.

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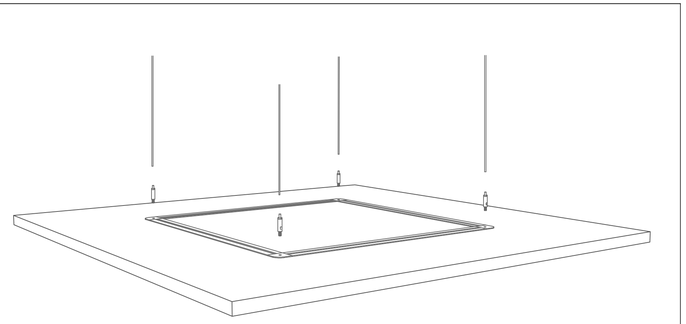
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PROJECT NAME:	SOUNDSCAPES SHAPES HANGING KIT APPLICATIONS		
DWG. NO. DETAIL	PATH:	REV: .	DATE: .
DATE: 6/30/11	SCALE: 1:20	DESC.: . . .	
DRAWN BY: MSS	CHK BY:		

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ACOUSTICAL CLOUD HANGING KIT APPLICATIONS
SCALE: 1" = 1'-0" 19



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- **FIELD VERIFY ALL CONDITIONS AND DIMENSIONS.**

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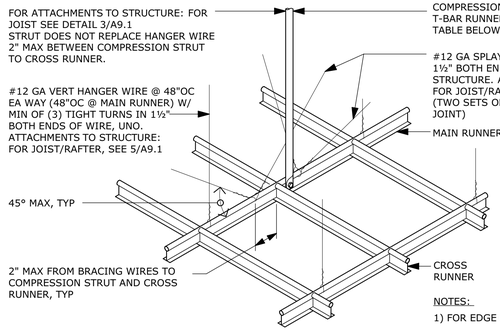
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PROJECT NAME:	SOUNDSCAPES INDIVIDUAL SUSPENDED CLOUD		
DWG. NO. ISO		REV:	DATE:
DATE: 12/02/08	SCALE: 1/2"=1'-0"	DESC.:	
DRAWN BY: CAD	CHK BY:		

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ACOUSTICAL CLOUD INSTALLATION
SCALE: 1" = 1'-0" 11



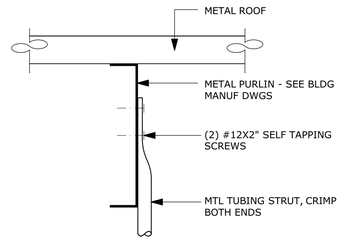
COMPRESSION STRUT SIZE TABLE

SIZE	WALL THK	MAX. LENGTH
1/2" EMT	.042	5'-10"
3/4" EMT	.049	7'-8"
1" EMT	.059	9'-9"
1' 1/4" EMT	.065	11'-6"

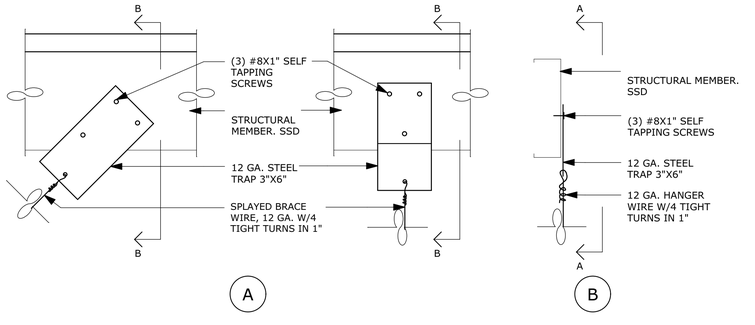
NOTES:

1) FOR EDGE CONDITIONS SEE 2 & 1/A9.1

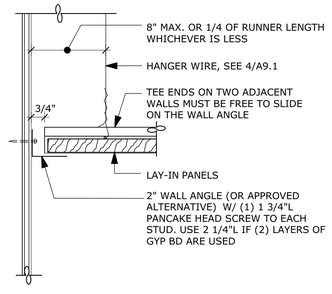
T-BAR ATTACHMENT
SCALE: 1" = 1'-0" 4



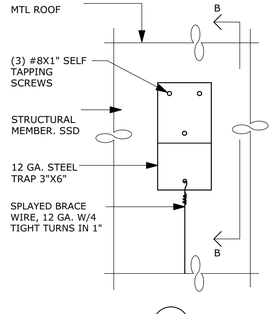
T-BAR STRUT ANCHOR
SCALE: 3" = 1'-0" 3

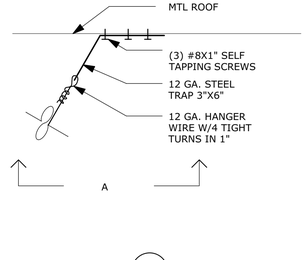


A B



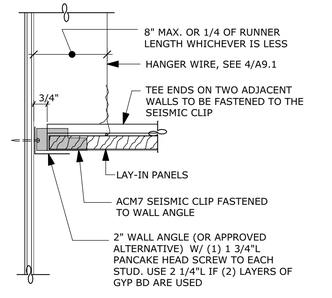
T-BAR @ WALL - SLIP JOINT
SCALE: 3" = 1'-0" 2





A B

T-BAR WIRE CONNECTION
SCALE: 3" = 1'-0" 5



T-BAR @ WALL - FIXED LEDGER
SCALE: 3" = 1'-0" 1

GENERAL NOTES FOR AXIOM AND FORMATION CEILING SYSTEMS:

- INSTALL PER ASTM C636 AND PRODUCT INSTALLATION INSTRUCTIONS
- CONSULT YOUR LOCAL BUILDING CODE FOR ADDITIONAL REQUIREMENTS OUTSIDE OF THE ARMSTRONG INSTALLATION INSTRUCTIONS. THIS INCLUDES BUT IS NOT LIMITED TO BRACING OF TRANSITIONS, AND ADDITIONAL SEISMIC REQUIREMENTS.
- CANTILEVER CALCULATIONS TO BE SUPPLIED BY PROJECT ENGINEER.
- FIELD VERIFY ALL CONDITIONS AND DIMENSIONS.

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DATE: 10/28/09	SCALE: .	DESC.: . . .	
DRAWN BY: MSS	CHK BY:		

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AXIOM TRIM PERSCEPTIVE REFERENCE DETAIL
SCALE: 1" = 1'-0" 17

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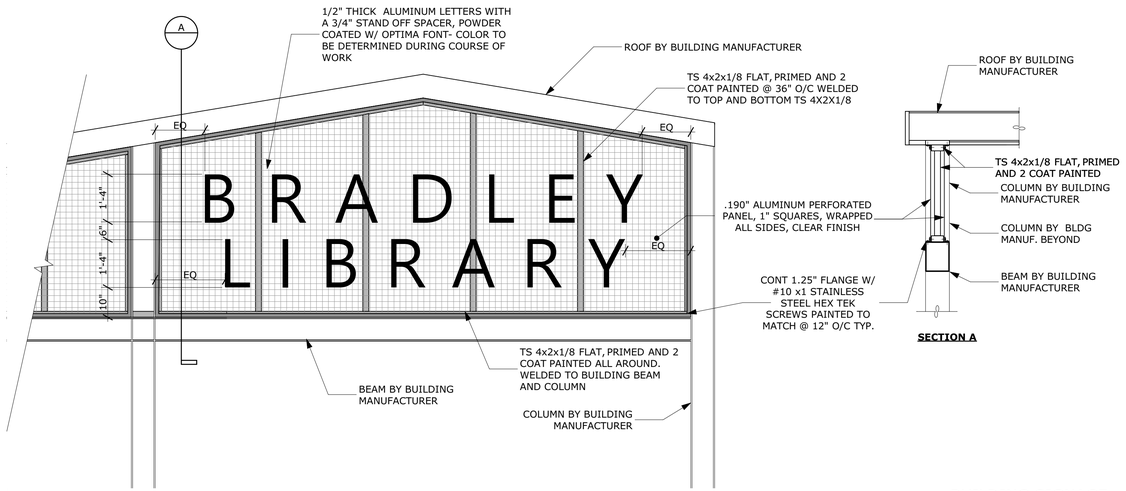
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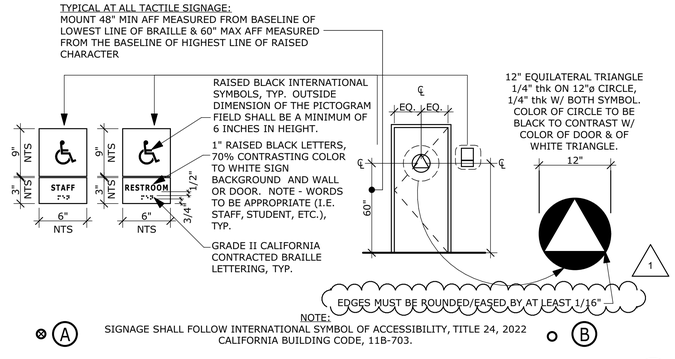
A9.1



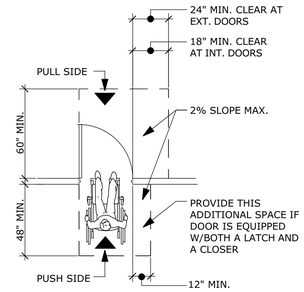
BUILDING SIGNAGE
SCALE: 1/2" = 1'-0" 15

NOTE:
1. PROVIDE DOOR IDENTIFICATION SIGNAGE ON WALL ADJACENT TO THE LATCH SIDE OF THE DOOR W/BRAILLE 11B-703.3, PROPORTIONS 11B-703.2.4, CONTRAST (NON-RAISED CHARACTERS) 11B-703.5.1, RAISED CHARACTERS 11B-703.2 AND PICTOGRAMS 11B-703.6
2. INSTALLATION HEIGHT AND LOCATION PER 11B703.4, SEE DETAIL 2/A9.2, U.N.O. WHERE THERE IS NO WALL SPACE ON THE LATCH SIDE INCLUDING DOUBLE LEAF DOORS, SIGNS SHALL BE PLACED ON THE NEAREST ADJACENT WALL, PREFERABLY ON THE RIGHT.
3. RAISED CHARACTERS - SHALL COMPLY WITH 11B-703.2 AND SHALL BE DUPLICATED IN BRAILLE COMPLYING WITH 11B-703.3. CHARACTER HEIGHT 5/8" MIN TO 2' MAX. RAISED 1/32" ABOVE BACKGROUND, UPPERCASE, SANS SERIF. CHARACTERS CANNOT BE ITALIC, OBLIQUE, SCRIPT, HIGHLY DECORATIVE, OR OTHER UNUSUAL FORMS.
4. BRAILLE SPECIFICATION PER 11B-703.3:
TO BE CALIFORNIA CONTRACTED GRADE 2 BRAILLE SHALL BE USED WHERE BRAILLE SYMBOLS ARE SPECIFICALLY REQUIRED IN OTHER PORTION OF THESE STANDARDS. DOTS SHALL BE 1/10 IN (2.5mm) ON CENTER IN SAME CELL, W/ 3/10 IN. (7.6mm) SPACE BETWEEN CORRESPONDING DOTS IN ADJACENT CELL. DOTS SHALL BE RAISED A 0.025" (0.6mm) TO 0.037" (0.9mm) ABOVE THE BACKGROUND. DOMES SHALL BE DOMED OR ROUNDED.
5. ALL SIGNS TO BE 1/4" THK. ACRYLIC PLASTIC.
6. ANCHOR SIGN TO WALL W/EXPOSED TAMPER RESISTANT SCREWS.
7. ALL CHARACTERS AND BACKGROUNDS OF ALL SIGNS SHALL HAVE A NON-GLARE FINISH.
8. CHARACTERS ON ALL SIGNS SHALL CONTRAST 70% W/THEIR BACKGROUND.
9. SIGNS TO HAVE COLOR WHICH CONTRASTS W/SURFACE TO WHICH THEY ARE MOUNTED.
10. NAME OF ROOM SHALL ALWAYS BE BELOW ROOM NUMBER, BRAILLE ALWAYS BELOW THE ROOM NAME.
11. FOR SIGNAGE MOUNTING HEIGHTS SEE DETAIL 2/A9.2
12. ROOM IDENTIFICATION TEXT TO BE APPROVED BY OWNER PRIOR TO MAKING OF SIGNS.

SIGNAGE NOTES
SCALE: 1 1/2"= 1'-0" 4

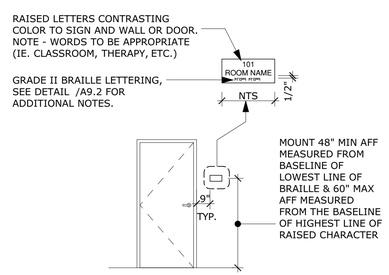


SIGNAGE AT TOILETS
SCALE: 1/4" = 1'-0" 3



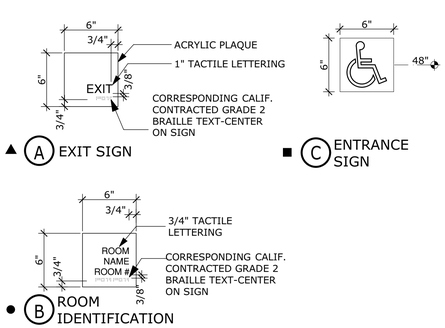
FRONT APPROACH

CLEARANCE AT DOORS
SCALE: 1/4" = 1'-0" 6

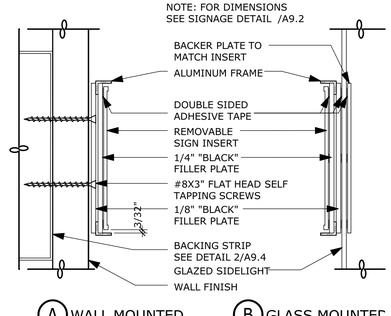


NOTE:
SIGNAGE SHALL FOLLOW INTERNATIONAL SYMBOL OF ACCESSIBILITY, TITLE 24, 2016 CALIFORNIA BUILDING CODE, 11B-703

GENERAL DOOR SIGNAGE
SCALE: 1/4" = 1'-0" 2



GENERAL SIGNAGE
SCALE: 1 1/2"= 1'-0" 5



GENERAL SIGNAGE FRAME
SCALE: 6" = 1'-0" 1

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SIGNAGE DETAILS

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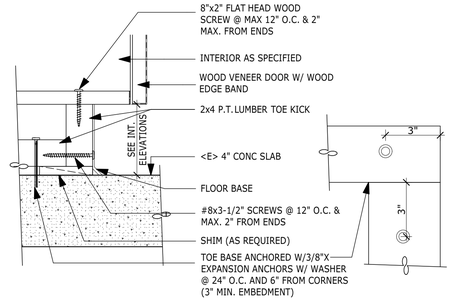
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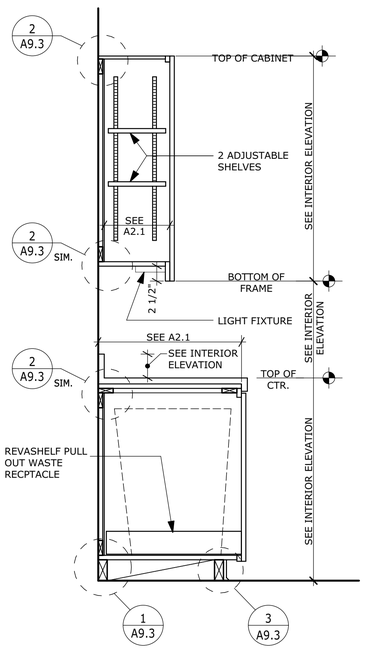
A9.2

GENERAL NOTES

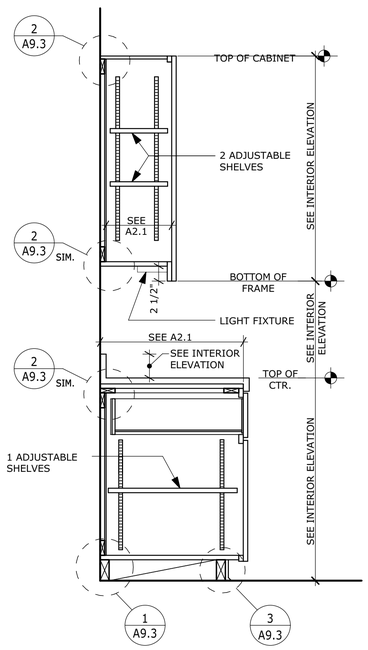
1. ALL CABINETS TO BE PLASTIC LAMINATE WITH 4" TOE KICK. SUBMIT COLORS TO ARCHITECT FOR SELECTION.
2. ALL COUNTERTOP TO BE PLASTIC LAMINATE WITH A 4" BACKSPLASH. SUBMIT COLORS TO ARCHITECT FOR SELECTION.
4. ALL CABINETRY WILL BE EQUIPPED WITH LOCKS



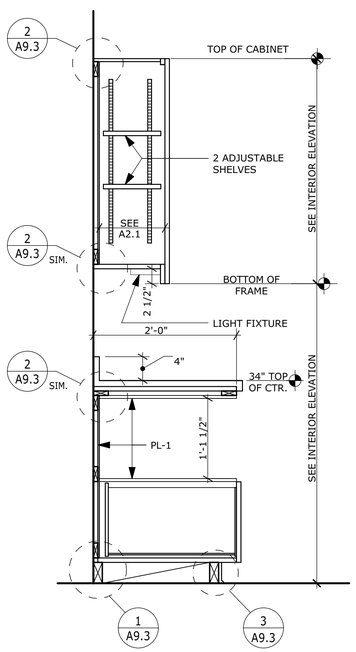
CABINET FLOOR ANCHOR 3
SCALE: 3" = 1'-0"



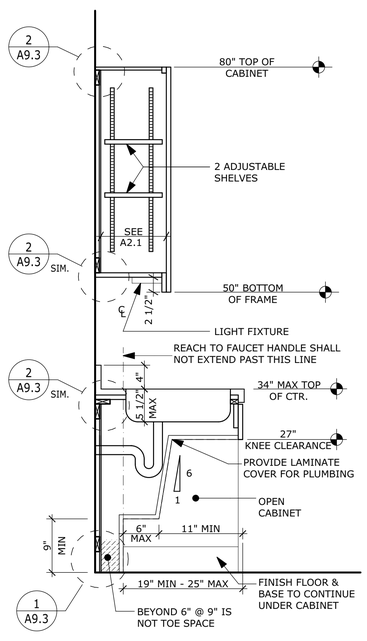
TYP.WALL & BASE CABINET REVASHELF 21
SCALE: 1" = 1'-0"



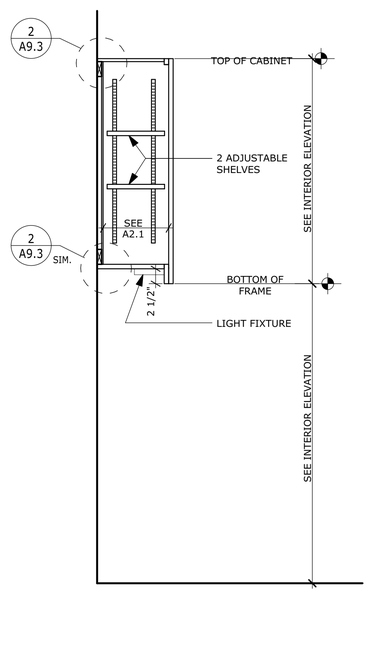
TYP.WALL & BASE CABINET W/DRAWER 17
SCALE: 1" = 1'-0"



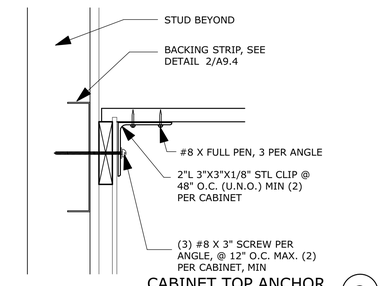
WALL & BASE CAB. WITH MICROWAVE 13
SCALE: 1" = 1'-0"



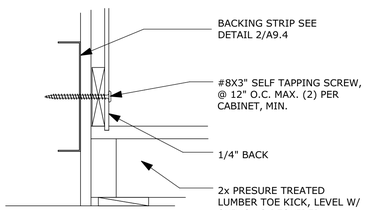
ACCESSIBLE OPEN SINK - ADULT 9
SCALE: 1" = 1'-0"



TYP. WALL CABINET 5
SCALE: 1" = 1'-0"



CABINET TOP ANCHOR 2
SCALE: 3" = 1'-0"



CABINET WALL ANCHOR 1
SCALE: 3" = 1'-0"

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CABINET DETAILS

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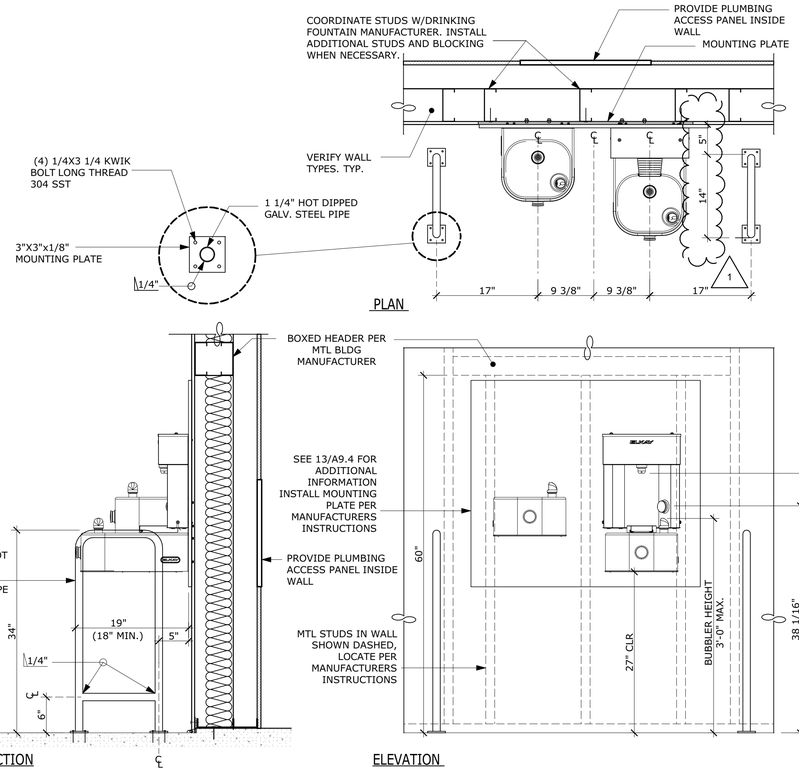
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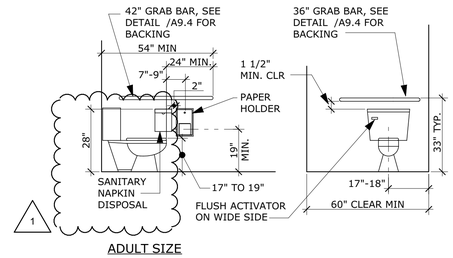
DATE: 10/22/2025

JOB NO: 23014

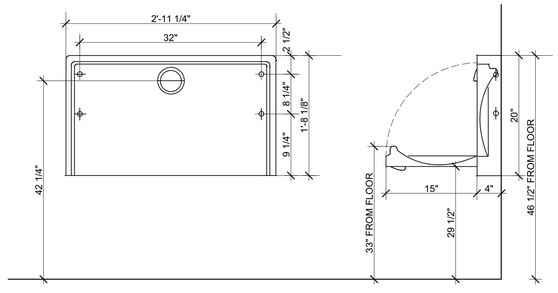
A9.3



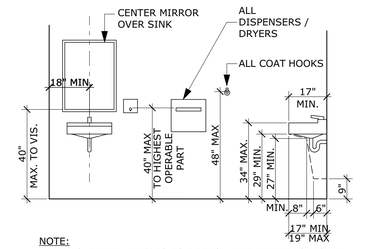
HI-LOW DRINKING FOUNTAIN
SCALE: 1" = 1'-0" — 15



ADULT ACC. TOILET REQ.
SCALE: 3/8" = 1'-0" — 4

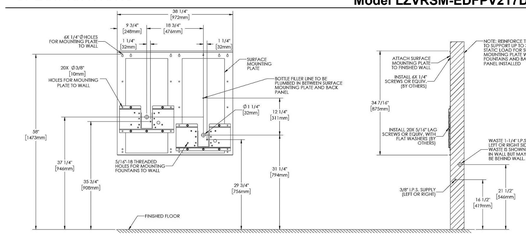


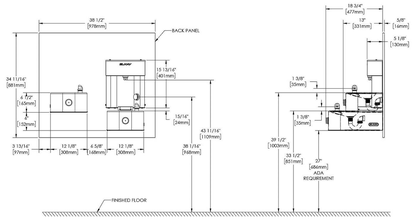
BABY CHANGING STATION
SCALE: 1" = 1'-0" — 7

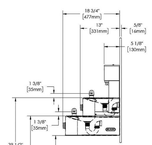


NOTE:
WATER SUPPLY AND PIPES TO BE INSULATED AND PROTECTED PER 11B-606.5

ADULT ACC. FIXTURE REQ.
SCALE: 3/8" = 1'-0" — 3







ELKAY SPECIFICATIONS

ezH2O® VR Mechanical Bottle Filling Station w/Integral Soft Sides® Ftn+Mounting Plate Filtered Non-Refrig. Stainless
Model LZVRSM-EDFPV217D1LK

PRODUCT SPECIFICATIONS

ezH2O® VR Mechanical Bottle Filling Station w/Integral Soft Sides® Ftn+Mounting Plate Filtered Non-Refrig. Stainless. Features shall include Ambient Water, Vandal Resistant, Mechanically Activated, Includes Back Plate, Laminar Flow, New Offering. Furnished with Vandal Resistant bubbler. Mechanical Bottle Filler Button with Mechanical Front Bubbler Button activation. Product shall be Wall Mount (Inwall Frame/Plate), for Indoor + Outdoor applications, serving 2 station(s).

Special Features:	Ambient Water, Vandal Resistant, Mechanically Activated, Includes Back Plate, Laminar Flow, New Offering
Finish:	Stainless Steel
Power:	No Electrical Required
Bubbler Style:	Vandal Resistant
Activation by:	Mechanical Bottle Filler Button with Mechanical Front Bubbler Button
Mounting Type:	Wall Mount (Inwall Frame/Plate)
Chilling Capacity:	Non-refrigerated
Dimensions (L x W x H):	38-1/2" x 19-3/8" x 34-5/8"
Approx. Shipping Weight:	118 lbs.
Installation Location:	Indoor + Outdoor
No. of Stations Served:	2

**When used in non-temperature controlled environments, unit(s) must be adequately winterized and/or protected from extreme heat to prevent damage where climates dictate.

Special Note: When used in non-temperature-controlled environments, unit(s) must be adequately winterized and/or protected from extreme heat to prevent damage where climates dictate. The filters are certified for water temperatures up to 100°F.

- Mechanically-Activated unit continues to supply water in event of service disruptions.
- Standard Filter Included: Filter is tested and certified to NSF/ANSI 42, 53, 372 and 401 for the reduction of lead, microplastics, Class 1 particulate, cysts, and chlorine taste and odor. 3,000 gallon capacity or 1 year after installation.
- Laminar flow provides clean fill with minimal splash.



Included with Product: Bottle Filler (VRCSM214C), Fountain Only (EDFPV217LSM), Wall Plate (WSMP20)

Ships in one box.

A Century of Tradition and Quality.
For more than 100 years, Elkay has been making innovative products and providing exceptional customer care. We take pride in offering plumbing products that make life easier, inspire change and leave the world a better place.

PRODUCT COMPLIANCE

ADA & ICC A117.1
ASME A112.19.3/CSA B45.4
NSF/ANSI 42, 53, 61 (Qs1), 372 (lead free), & 401

Complies with ADA & ICC A117.1 accessibility requirements when installed according to the requirements outlined in these standards. Installation may require additional components and/or construction features to be fully compliant. Consult the local Authority Having Jurisdiction if necessary.

Installation Instructions (PDF) - 2000001657
Installation Instructions (PDF) - 97696C

Water Systems are warranted for 12 months from date of installation. **Warranty pertains to drinking water applications only. Non-drinking water applications are not covered under warranty.**
Warranty (PDF)

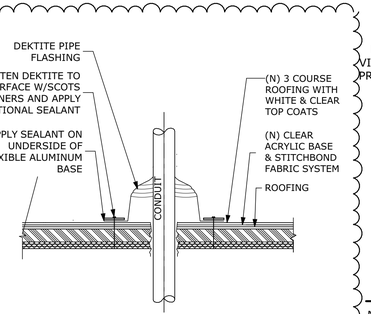
PART:_____QTY:_____
PROJECT:_____
CONTACT:_____
DATE:_____
NOTES:_____
APPROVAL:_____

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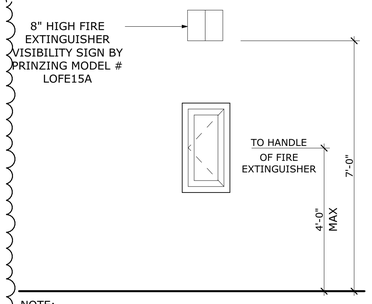
HI-LOW OUTDOOR DRINKING FOUNTAIN & BOTTLE FILLER
SCALE: 1:1.06 — 13

ELKAY SPECIFICATIONS
ezH2O® VR Mechanical Bottle Filling Station w/Integral Soft Sides® Ftn+Mounting Plate Filtered Non-Refrig. Stainless
Model LZVRSM-EDFPV217D1LK

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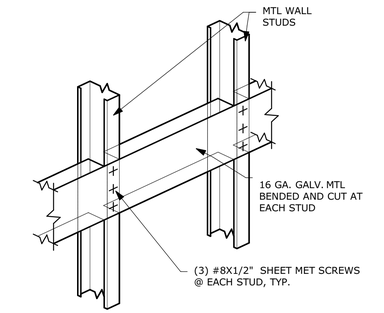


ROOF PENETRATION
SCALE: 1" = 1'-0" — 10

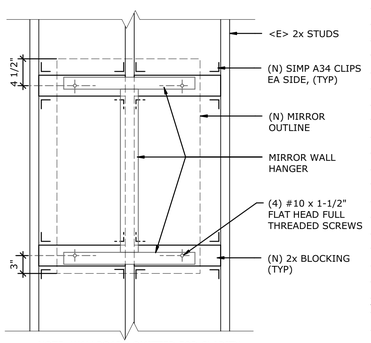


NOTE:
1. HANDLE TO BE U-SHAPED WIRE PULL OR SIMILAR.
2. CABINET OR EXINGUISHER NOT TO PROTRUDE HORIZONTALLY INTO CIRULATION PATH MORE THAN 4"

EXTINGUISHER CABINET
SCALE: 1/2" = 1'-0" — 6

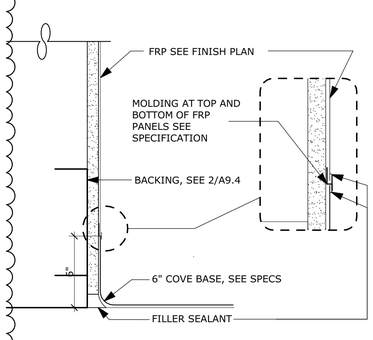


BACKING STRIP METAL
SCALE: 1 1/2"= 1'-0" — 2

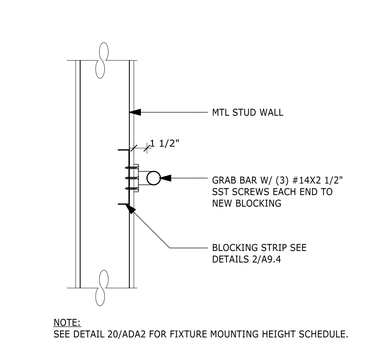


NOTE: WALLBOARD OMITTED FOR CLARITY
SEE SPECIFICATIONS FOR MANUF.

MIRROR MOUNTING
SCALE: 1" = 1'-0" — 9



FRP WALL TO FLOOR
SCALE: 3" = 1'-0" — 5



NOTE:
SEE DETAIL 20/ADA2 FOR FIXTURE MOUNTING HEIGHT SCHEDULE.

BACKING @ GRAB BARS
SCALE: 1 1/2"= 1'-0" — 1

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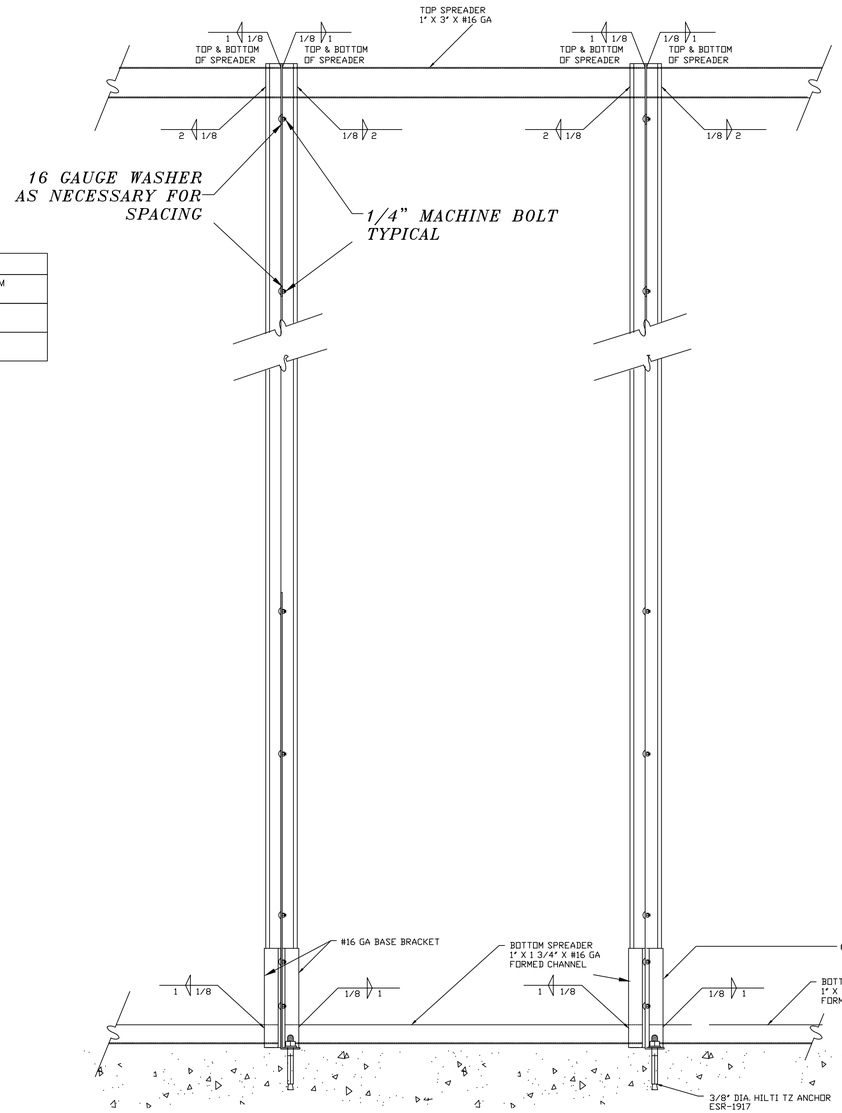
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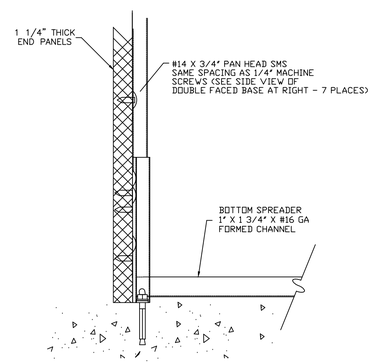
A9.4

MATERIALS:

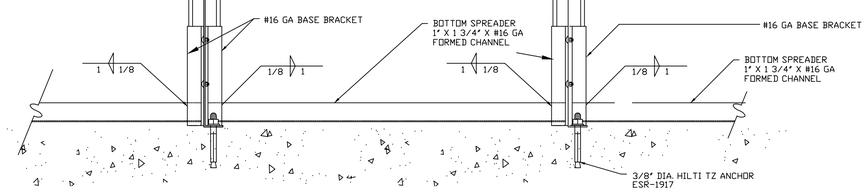
COMPONENT(S)	MATERIAL
SHELVES, UPRIGHTS, STRUTS, GUSSETS & BASE BRACKETS	ASTM A446, Fy = 36 KSI MINIMUM PER AISI SECTION III-19/20
1/4" MACHINE SCREWS	ASTM A307
WASHERS	USS OR SAE

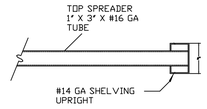


FRONT VIEW OF CANTILEVER BASE
(MOUNTED ON CONCRETE FLOOR)

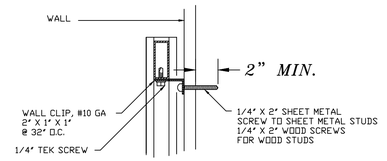


FRONT VIEW OF CANTILEVER BASE
(AT END PANEL)

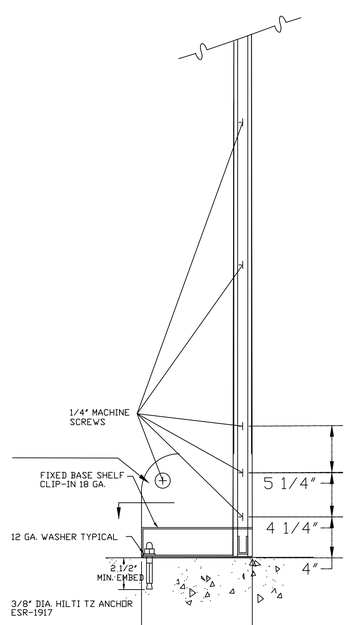




TOP VIEW OF CANTILEVER UPRIGHT
@ 36" O.C. MAX



TOP OF CANTILEVER UPRIGHT AT WALL
TYPICAL CONNECTION AT 32" O/C



SIDE VIEW OF CANTILEVER BASE
(MOUNTED ON CONCRETE FLOOR)

COMMUNITY ROOM
SCALE: 1" = 1'-0" (1)

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• Architecture • Landscape •

REGISTERED ARCHITECT
JOSEPH L. P.
RENEW 8-31-27
STATE OF CALIFORNIA

NOT VALID WITHOUT SIGNATURE

REVISIONS
1 03/04/2026 ADDENDUM #1
2
3

SHELVING ANCHORAGE

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DATE: 10/22/2025

JOB NO: 23014

A9.5

GENERAL

1. ALL CONSTRUCTION SHALL COMPLY WITH THE PROVISIONS OF THE 2022 CALIFORNIA BUILDING CODE ((CBC), TITLE 24, PART 2, VOLUMES 1–2 (2021 INTERNATIONAL BUILDING CODE (IBC) WITH 2022 CALIFORNIA AMENDMENTS).

2. ALL DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND STRUCTURAL ENGINEER FOR DIRECTION PRIOR TO PROCEEDING.

3. DETAILS OF CONSTRUCTION ARE TYPICAL, UNLESS NOTED OTHERWISE, AND SHALL APPLY AT ALL LOCATIONS OF SIMILAR CONSTRUCTION. TYPICAL DETAILS ARE NOT CUT AT EVERY APPLICABLE LOCATION ON THE PLANS.

4. DO NOT SCALE DRAWINGS FOR DIMENSIONAL INFORMATION.

5. SHORING, TEMPORARY BRACING AND OTHER METHODS AND MEANS OF CONSTRUCTION IS THE RESPONSIBILITY OF THE CONTRACTOR, AND IS NOT INCLUDED IN THE SCOPE OF THE STRUCTURAL DRAWINGS.

6. THE FOLLOWING NOTES ARE FOR GENERAL MATERIAL GRADES AND PROCEDURES. SEE SPECIFICATIONS AND REMAINDER OF DRAWINGS FOR COMPLETE REQUIREMENTS. ITEMS NOTED IN PLANS, SECTIONS AND DETAILS TAKE PRECEDENCE OVER GENERAL NOTES.

7. LOADS:
   - A) LIVE:
     ROOF: PER METAL BUILDING DESIGNER
   - B) WIND:
     EXPOSURE C, 95 MPH BASIC WIND SPEED
     DIRECTIONAL PROCEDURE
   - C) SEISMIC:
     BUILDING RISK CATEGORY II
     EQUIVALENT LATERAL FORCE PROCEDURE (ASCE 7–16 SEC. 12.8)
     LATITUDE: 38.8634, LONGITUDE: –120.8054
     SEISMIC DESIGN CATEGORY (SDC) D
     SITE CLASS D
     S_S=1.281, S_{D1}=0.452; F_a=1.00, F_v=1.50;
     S_{MS}=1.501, S_{M1}=1.460; S_{DS}=1.000, S_{D1}=0.973
     IMPORTANCE FACTOR: I_e=1.00
     R= PER BUILDING DESIGNER
     a_p=2.5, R_p=6.0 FOR MECHANICAL & PLUMBING EQUIPMENT
     C_S=0.480 (STRENGTH), 0.343 (ALLOWABLE STRESS) (SUSPENDED/ROOF–MOUNTED UNIT)
     C_S=0.300 (STRENGTH), 0.214 (ALLOWABLE STRESS) (GRADE–MOUNTED UNIT)
     C_V=0.200 (STRENGTH), 0.143 (ALLOWABLE STRESS).
   - D) LOAD COMBINATIONS FOR DESIGN:
     CONCRETE: PER ASCE 7 SECTION 2.3 FOR STRENGTH DESIGN.
     FOUNDATIONS: PER CBC SECTION 1605.2 FOR ALLOWABLE STRESS DESIGN.
     ALL OTHERS: PER ASCE 7 SECTION 2.4 FOR ALLOWABLE STRESS DESIGN.

STRUCTURAL ABBREVIATIONS

A.B.	ANCHOR BOLT	I.D.	INSIDE DIAMETER
ADJ	ADJACENT	IN	INCH
APPROX	APPROXIMATE	INT	INTERIOR
ARCH	ARCHITECTURAL		
		LAM	LAMINATE
BLDG	BUILDING	LBS	POUNDS
BLK	BLOCK		
BLKG	BLOCKING	KSI	KIPS PER SQ. IN.
BM	BEAM		
B.N.	BOUNDARY NAILING	MAX	MAXIMUM
BOT	BOTTOM	M.B.	MACHINE BOLT
BP	BASEPLATE	MECH	MECHANICAL
BRG	BEARING	MFR	MANUFACTURER
B.S.	BOTH SIDES	MIN	MINIMUM
		MISC	MISCELLANEOUS
C TO C	CENTER TO CENTER	<N>	NEW
C.B.	CARRIAGE BOLT	N.S.	NEAR SIDE
CJ	CONTROL JOINT OR CONSTRUCTION JOINT	N.I.C.	NOT IN CONTRACT
C.I.	CAST IRON	NO.	NUMBER
CL	CENTERLINE	NTS	NOT TO SCALE
CLG	CEILING		
CMU	CONCRETE MASONRY UNIT	O.C.	ON CENTER
COL	COLUMN	O.D.	OUTSIDE DIAMETER
CONC	CONCRETE	OPP	OPPOSITE
CONT	CONTINUOUS		
C.P.	COMPLETE PENETRATION	PERP	PERPENDICULAR
CTRD	CENTERED	PL	STEEL PLATE
CTSK	COUNTERSINK	P.P.	PARTIAL PENETRATION
		PLYWD	PLYWOOD
<D>	DEMO	PSF	POUNDS PER SQ. FT.
DBL	DOUBLE	PSI	POUNDS PER SQ. IN.
DIA OR ø	DIAMETER		
DIAG	DIAGONAL	RAD	RADIUS
DO	DITTO	REINF	REINFORCING
DWG	DRAWING	REQD	REQUIRED
		REV	REVISION
EA	EACH	R.O.	ROUGH OPENING
E.F.	EACH FACE	RWD	REDWOOD
ELEC	ELECTRICAL		
ELEV	ELEVATION	S.A.D	SEE ARCH'L DRAWINGS
E.N.	EDGE NAILING	S.M.D.	SEE MECH'L DRAWINGS
EQ	EQUAL	S.L.D.	SEE LANDSCAPE DRAWINGS
E.W.	EACH WAY	S.F.	SQUARE FEET
EXIST OR <E>	EXISTING	SIM	SIMILAR
EXTER	EXTERIOR	SPEC	SPECIFICATION
		SQ	SQUARE
<F>	FUTURE	STD	STANDARD
F.D.	FLOOR DRAIN	STGRD	STAGGERED
FHWS	FLAT HEAD WOOD SCREW	STIFF	STIFFENER
FIN	FINISH	SYM	SYMMETRICAL
F.O.B.	FACE OF BLOCK		
F.O.C.	FACE OF CONCRETE	T&G	TONGUE & GROOVE
F.O.F.	FACE OF FINISH	THRD	THREADED
F.O.S.	FACE OF STUD	T.O.C.	TOP OF CONCRETE
F.P.	FULL PENETRATION	T.O.F.	TOP OF FRAMING
F.S.	FAR SIDE	T.O.S.	TOP OF STEEL
FT	FOOT OR FEET	TS	TUBE STEEL
FTG	FOOTING	TYP	TYPICAL
GA	GAGE	U.N.O.	UNLESS NOTED OTHERWISE
GALV	GALVANIZED		
G.I.	GALVANIZED IRON	VERT	VERTICAL
GLB	GLUE–LAMINATED BEAM		
GYP.BD.	GYPSUM BOARD	W/	WITH
		W/O	WITHOUT
HDR	HEADER	WT	WEIGHT OR STEEL WT SECTION
HORIZ	HORIZONTAL		
HR	HOUR	WWF	WELDED WIRE FABRIC
H.S.	HIGH STRENGTH		
H.S.B.	HIGH STRENGTH BOLT		
HSS	HOLLOW STEEL SECTION		

GEOTECHNICAL & FOUNDATIONS

1. GEOTECHNICAL CRITERIA USED FOR FOUNDATION DESIGN:
   A) GEOTECHNICAL REPORT BY EARTH SYSTEMS PACIFIC, INC., SALINAS, CA. REPORT NO. 305777–001, DATED 03–10–23.
   GEOTECHNICAL REPORT SHALL BE CONSIDERED PART OF CONSTRUCTION DOCUMENTS. ALL RECOMMENDATIONS DESCRIBED THEREIN SHALL BE IMPLEMENTED IN PROJECT'S CONSTRUCTION, INCLUDING GRADING, STRIPPING OF EXISTING MATERIAL, LOCATION, TYPE AND INSTALLATION OF FILL MATERIAL, AND COMPACTION.
   - B) CONTINUOUS & SPREAD FOOTINGS:
     MINIMUM EMBEDMENT BELOW LOWEST ADJACENT FINISHED GRADE: 24"
   - C) ALLOWABLE SOIL PRESSURES USED FOR FOUNDATION DESIGN:
     DEAD LOAD ONLY: 2000 PSF
     DEAD PLUS LIVE LOAD: 2500 PSF
     TOTAL LOAD W/ SEISMIC OR WIND: 3000 PSF
     ALLOWABLE FRICTION COEFFICIENT: 0.30
     ALLOWABLE PASSIVE PRESSURE: 250 PCF
   - D) ENGINEERED FILL AND COMPACTION: PER GEOTECHNICAL REPORT RECOMMENDATIONS.

CONCRETE

1. ALL CONCRETE WORK SHALL CONFORM TO CHAPTER 19 OF THE 2022 CALIFORNIA BUILDING CODE (CBC) AND 2019 ACI STANDARD 318 AND ASTM C94, SPECIFICATION FOR READY–MIX CONCRETE. CEMENT SHALL BE PORTLAND CEMENT TYPE II AND SHALL COMPLY WITH ASTM C150. CALCIUM CHLORIDE SHALL NOT BE USED. COARSE AND FINE AGGREGATE SHALL COMPLY WITH ASTM C33. CONCRETE MIX DESIGNS FOR ALL STRUCTURAL CONCRETE SHALL BE SUBMITTED TO AND APPROVED BY TESTING AGENCY PRIOR TO ORDERING CONCRETE; ALL MIX DESIGNS SHALL INCLUDE A BREAK–HISTORY NOT MORE THAN TWO YEARS OLD, WITH RESULTS FROM NOT LESS THAN TEN (10) USES/SAMPLES.

2. ALL STRUCTURAL CONCRETE MIXES SHALL HAVE MIN. FIVE (5) SACKS CEMENT PER CU. YARD AND WATER–TO–CEMENT RATIO OF 0.45 TO 0.60, AND HAVE DENSITY OF 150 PCF, USING NORMAL–WEIGHT, HARD ROCK AGGREGATE, U.N.O. CONCRETE MIX PROPERTIES SHALL BE AS FOLLOWS:
   - A) SLABS–ON–GRADE:
     28–DAY COMP. STRENGTH: 3,000 PSI
     LARGE AGGREGATE SIZE: 1/2" – 1"
     MAX. SLUMP: 5"
     EXPOSURE CLASS: C1, SO (ACI 318 TABLE 19.3.1.1)
   - B) FOOTINGS & GRADE BEAMS:
     28–DAY COMP. STRENGTH: 3,000 PSI
     LARGE AGGREGATE SIZE: 1" – 1–1/2"
     MAX. SLUMP: 4"
     EXPOSURE CLASS: C1, SO (ACI 318 TABLE 19.3.1.1)
   - C) NON–STRUCTURAL CONCRETE WALKS ON GRADE:
     28–DAY COMP. STRENGTH: 2,500 PSI
     LARGE AGGREGATE SIZE: 3/8" – 3/4"
     MAX. SLUMP: 5"

3. IF HIGHER CONCRETE COMPRESSION STRENGTHS ARE SPECIFIED IN OTHER DRAWINGS WITHIN THE OVERALL PROJECT SCOPE, CONCRETE COMPRESSION STRENGTHS SHALL COMPLY WITH THOSE HIGHER VALUES.

4. STEEL REINFORCING BARS SHALL CONFORM TO ASTM A615, GR. 60 U.N.O. ALTERNATIVELY, ø4 AND SMALLER BARS MAY CONFORM TO ASTM A615, GR. 40. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A1064.

5. GROUT SHALL BE NON–SHRINK GROUT U.N.O. CONFORMING TO ASTM C1107. GROUT SHALL HAVE A 7–DAY COMPRESSIVE STRENGTH 5,000 PSI MIN. GROUT SHALL BE MASTER BUILDERS "MASTERFLOW 928", SIKA SIKAGROUT 212, OR APPROVED EQUAL. FOLLOW MANUFACTURER'S SURFACE PREPARATION RECOMMENDATIONS.

6. BONDING AGENT SHALL BE MASTER BUILDERS "MASTERemaco ADH 326", SIKA ARMATEC 110 EPOCEM, OR APPROVED EQUAL, AND SHALL BE APPLIED PER MANUFACTURER'S RECOMMENDATIONS.

7. CURING COMPOUND SHALL BE APPROVED BY ENGINEER, AND APPLIED PER MANUFACTURER'S RECOMMENDATIONS.

8. CONSTRUCTION JOINTS SHALL BE ROUGHENED TO FULL 1/4" AMPLITUDE (ICRI CSP 9) WITH BUSH HAMMER OR OTHER APPROVED METHOD. SURFACES SHALL BE CLEANED OF DUST AND DEBRIS IMMEDIATELY PRIOR TO PLACEMENT OF NEWER CONCRETE.

9. REINFORCING STEEL SHALL BE CONTINUOUS WHERE POSSIBLE. SPLICE WITH CONTACT LAP–SPLICES OR NON–CONTACT SPLICES. STAGGER ALL SPLICES. STAGGER ALL SPLICES. SPLICE LENGTHS SHALL BE 57 BAR–DIAMETERS MINIMUM. WELDED WIRE FABRIC SHALL BE LAPPED TWO (2) FULL SQUARES, BUT NOT LESS THAN 12".

10. EXTEND HORIZONTAL BARS IN FOUNDATIONS AND WALLS INTO INTERSECTING FOUNDATIONS AND WALLS WITH BEND AND 30 BAR DIAMETER EXTENSION, BUT NOT LESS THAN 24" EXTENSION.

11. WELDING OF REINFORCING SHALL NOT BE ALLOWED.

12. SEE STRUCTURAL STEEL NOTES FOR ANCHOR BOLTS CAST IN CONCRETE.

13. ANCHOR BOLT PROJECTION SHALL BE ADEQUATE FOR FULL ENGAGEMENT OF PLATES, WASHERS, NUTS, ETC. AND SHALL BE VERIFIED BY CONTRACTOR PRIOR TO PLACEMENT OF CONCRETE OR GROUT. ANCHOR BOLTS SHALL BE FIRMLY SECURED TO FORMS TO PREVENT THEIR MOVEMENT DURING CONCRETE PLACEMENT. WET–SETTING OF ANCHOR BOLTS IS NOT ALLOWED.

14. MAINTAIN THE FOLLOWING MINIMUM CONCRETE COVER FOR REBAR:
    WHERE CONC. IS PLACED AGAINST EARTH = 3"
    WHERE CONCRETE IS FORMED AND EXPOSED TO EARTH OR WEATHER = 2"
    WHERE CONCRETE IS NOT EXPOSED TO EARTH OR WEATHER = 1–1/2"
    SLABS ON GRADE = 1/2"

15. WHERE SIDES OF FOUNDATIONS (FOOTINGS, GRADE BEAMS OR WALLS) ARE CAST AGAINST EARTH WITHOUT FORMS, FOUNDATION SHALL BE WIDENED 1" AT EACH SUCH SURFACE.

16. EXCAVATION FOR FOOTINGS BELOW DEPTHS SHOWN ON DRAWINGS SHALL BE BACKFILLED WITH CONCRETE.

17. NOTIFY ENGINEER AT LEAST 48 HOURS BEFORE ANY CONCRETE IS TO BE PLACED OR FORMS CLOSED TO ALLOW FOR HIS INSPECTION OF EXCAVATIONS AND REINFORCING PLACEMENT. SEE ALSO SPECIAL INSPECTION REQUIREMENTS.

18. CONTRACTOR SHALL, PRIOR TO EXCAVATION, VERIFY FOOTING CONDITIONS AND FINISH GRADE/PAVING ELEVATIONS AT PERIMETER OF BUILDING. VERIFY THAT FOOTINGS HAVE SPECIFIED MINIMUM DEPTH BELOW ADJACENT GRADE AND THAT FOOTINGS DO NOT "DAYLIGHT" OR OTHERWISE INTERFERE WITH INTENDED EXTERIOR CONDITIONS. NOTIFY ENGINEER IF SUCH INTERFERENCE EXISTS PRIOR TO EXCAVATION.

19. IF LOADING OF CONCRETE ELEMENTS PRIOR TO 28–DAY AGE IS ANTICIPATED, CONTRACTOR SHALL NOTIFY ENGINEER PRIOR TO SUBMITTAL OF CONCRETE MIX DESIGNS IN ORDER TO ALLOW SPECIFYING OF PROVISIONS FOR SUCH. PROVISIONS MAY INCLUDE COMPRESSION TEST CYLINDERS BE FIELD–CURED IN CONDITIONS MATCHING SUBJECT CONCRETE ELEMENTS, PLUS USE OF CEMENT TYPES AND/OR ADMIXTURES IN MIX DESIGNS TO PROVIDE THE REQUIRED COMPRESSIVE STRENGTHS AT ANTICIPATED AGES LESS THAN 28 DAYS. LOADING OF CONCRETE ELEMENTS BEFORE CURING FOR 28 DAYS WILL NOT BE APPROVED WITHOUT THESE PROVISIONS BEING SPECIFIED, AND MET BY CONTRACTOR.

STRUCTURAL STEEL

1. ALL STEEL AND MISC. IRON SHALL BE FABRICATED AND ERECTED IN CONFORMANCE WITH AISC 360 SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS.

2. STEEL MATERIAL SHALL BE AS FOLLOWS:
   PLATES, CHANNELS & ANGLES: ASTM A36 UNLESS NOTED OTHERWISE
   MACHINE BOLTS (M.B.): ASTM A307 GRADE A, A563 FOR NUTS, F844 FOR WASHERS
   ANCHOR BOLTS/RODS (A.B.) IN FRAME COLUMN BASE PLATES: ASTM F1554 GRADE 105 (105 KSI YIELD STRENGTH)
   OTHER ANCHOR BOLTS/RODS (A.B.): ASTM F1554 GRADE 36, A307 GRADE C, OR A36
   WELDING ELECTRODES: E70XX

3. UNLESS NOTED OTHERWISE, ANCHOR BOLTS, MACHINE BOLTS AND THREADED ANCHOR RODS THROUGH STEEL AND EMBEDDED IN CONCRETE SHALL CONFORM TO ASTM F1554, A307 OR A36. ANCHOR BOLTS/RODS SHALL HAVE A STANDARD BOLT HEAD OR TIGHTENED DOUBLE NUTS. THREADED RODS SHALL HAVE TIGHTENED DOUBLE NUTS AT END. ANCHOR BOLT PROJECTION SHALL BE ADEQUATE FOR FULL ENGAGEMENT OF PLATES, WASHERS, NUTS, ETC. AND SHALL BE VERIFIED BY CONTRACTOR PRIOR TO PLACEMENT OF CONCRETE OR GROUT.

4. ALL WELDING ON STRUCTURAL STEEL SHALL CONFORM WITH AWS D1.1 CODE AND SHALL BE PRE–QUALIFIED WELDS CONFORMING TO AWS D1.1. UNLESS SPECIFICALLY INDICATED AS FIELD WELDING, ALL WELDS MAY BE PERFORMED IN SHOP OR FIELD.

5. ALL COMPLETE AND FULL PENETRATION GROOVE WELDS (DESIGNATED BY "C.P." OR "F.P.") SHALL USE BACK–UP PLATES UNLESS NOTED OTHERWISE. ALL PARTIAL–PENETRATION WELDS (DESIGNATED BY "P.P.") SHALL HAVE LARGEST EFFECTIVE THROAT ALLOWED BY AWS. GROOVE WELDS NOT NOTED WITH "C.P.", "F.P." OR "P.P" SHALL BE COMPLETE PENETRATION WELDS.

6. WELDING PROCEDURE SPECIFICATIONS SHALL BE SUBMITTED TO THE ARCHITECT AND THE TEST AND INSPECTION AGENCY'S WELDING INSPECTOR FOR REVIEW AND APPROVAL PRIOR TO START OF FABRICATION.

7. MINIMUM SPACING OF ALL BOLTS, 7/8"ø AND SMALLER IN STEEL SHALL BE 3" o.c. AND THE MINIMUM EDGE DISTANCE FROM CENTERLINE OF HOLE TO EDGE OF PLATE OR MEMBER SHALL BE 1–1/2", UNLESS NOTED OTHERWISE ON DRAWINGS. WHERE BOLTS ARE INSTALLED THROUGH FLANGES OF "W" OR SIMILAR SHAPES, THE BOLT GAGE SHALL BE AS RECOMMENDED BY AISC.

8. HOLES FOR BOLTS IN STEEL SHALL BE 1/16" MAXIMUM LARGER IN DIAMETER THAN BOLTS. HOLES FOR ANCHOR BOLTS SHALL NOT BE MORE THAN 5/16" LARGER FOR A.B.'S UP TO 1"ø AND NOT MORE THAN 1/2" LARGER FOR A.B.'S OVER 1"ø. ALL HOLES SHALL BE DRILLED OR PUNCHED. BURNING OF HOLES IS NOT ALLOWED, WHETHER IN FIELD OR SHOP.

9. BEVELED WASHERS SHALL BE USED WHEN THE SURFACE AGAINST WHICH BOLT HEAD OR NUT BEARS IS SLOPED MORE THAN 1:20. BEVELED WASHERS SHALL BE SQUARE OR RECTANGULAR.

10. WASHERS THAT COVER ENTIRE SLOT SHALL BE USED OVER SMALL SLOTTED HOLES. PLATE WASHERS THAT COVER ENTIRE SLOT SHALL BE USED OVER LONG–SLOTTED HOLES.

11. ALL STRUCTURAL STEEL IN EXTERIOR SPACES OR EXPOSED TO VIEW IN INTERIOR SPACES SHALL BE PAINTED WITH TWO (2) COATS OF ALKYD RED OXIDE PRIMER, COMPLYING WITH SSPC–PAINT 25 OR U.S. FEDERAL SPEC TT–P–645, WITH MIN. DRY THICKNESS OF 2 MILS. SEE ARCHITECTURAL SPECS FOR FINISH PAINTING. STRUCTURAL STEEL IN ENCLOSED SPACES AND NOT EXPOSED TO WEATHER NEED NOT BE PAINTED OR PRIMED UNLESS NOTED OTHERWISE. STEEL TO BE EMBEDDED IN CONCRETE SHALL NOT BE PAINTED.

12. ALL NON–PAINTED STEEL FASTENERS EXPOSED TO WEATHER OR IN UNENCLOSED SPACES SHALL BE HOT–DIPPED GALVANIZED, UNLESS NOTED OTHERWISE. GALVANIZED BOLTS AND NUTS SHALL BE PROVIDED BY SAME MANUFACTURER.

13. ALL STRUCTURAL STEEL SPECIFIED ON DRAWINGS TO BE GALVANIZED SHALL BE HOT–DIPPED ZINC GALVANIZED WITH MIN. 1.8 OZ./SQ. FT. ON ALL SURFACES. GALVANIZING SHALL BE TOUCHED UP AT FIELD–WELDED CONNECTIONS, FIELD–DRILLED HOLES, OR FIELD–CUT EDGES WITH A HIGH–ZINC DUST–CONTENT PAINT.

STEEL CHANNEL STRUTS & SYSTEMS

1. ALL CHANNEL STRUTS, ASSOCIATED FIXTURES, BRACKETS AND FASTENERS SHALL BE AS MANUFACTURED BY UNISTRUT CORPORATION, OR APPROVED EQUIVALENT.

2. CHANNEL STRUTS SHALL BE P1000 OR P1001; 12 GA. X 1–5/8" SQ. PRE–GALVANIZED CHANNELS. WHERE STRUTS ARE TO BE PRE–DRILLED, USE 'HS' PRE–DRILLED STRUTS (9/16"ø ROUND HOLES @ 1–7/8"o.c. USE OF STRUTS WITH SLOTTED HOLES IS NOT ALLOWED).

3. ALL BOLTS, NUTS & WASHERS THROUGH STRUTS SHALL BE 1/2"ø ASTM A576, GR. 1015, ELECTRO GALVANIZED PER ASTM B633, AS MFRD. BY UNISTRUT. NUTS FOR BOLTS THROUGH OPEN SIDE OF CHANNEL SHALL BE P1010 NUTS. ALL NUTS SHALL BE TORQUED TO 50 – 65 FT–LBS. NON–UNISTRUT BOLTS & NUTS SHALL BE ASTM A307, H.D. GALVANIZED. ALL BOLTS, NUTS & WASHERS EXPOSED TO WEATHER SHALL BE HOT–DIPPED GALVANIZED.

4. ALL FIXTURES & BRACKETS SHALL BE INSTALLED WITH ALL HOLES FILLED w/ 1/2"ø FASTENERS UNLESS NOTED OTHERWISE. DRILL 9/16"ø HOLES IN CLOSED SIDES OF CHANNELS WHERE NECESSARY, AT CENTERLINE OF STRUT.

POST–INSTALLED ANCHORS & DOWELS

A. GENERAL – APPLICABLE TO ALL ANCHORS AND DOWELS:

1. ANCHORS SHALL BE INSTALLED ONLY WHERE SPECIFIED ON DRAWINGS, PER MANUFACTURER'S INSTRUCTIONS, USING MANUFACTURER'S EQUIPMENT, WHERE APPLICABLE. INSTALLER SHALL HAVE ON SITE A COPY OF MANUFACTURER'S INSTALLATION INSTRUCTIONS AND ICC–ES OR IAPMO–UES REPORT.

2. ANCHORS SHALL BE INSTALLED ONLY INTO CURED CONCRETE OR MASONRY GROUT THAT HAS ATTAINED THE MIN. DESIGN COMPRESSIVE STRENGTH AT MIN. 28 DAY AGE. IF INSTALLATION OF ANCHORS INTO CONCRETE OR MASONRY ELEMENTS PRIOR TO 28–DAY AGE IS ANTICIPATED, CONTRACTOR SHALL NOTIFY ENGINEER PRIOR TO INSTALLATION IN ORDER TO ALLOW SPECIFYING PROVISIONS FOR SUCH. PROVISIONS MAY INCLUDE COMPRESSION TEST CYLINDERS BE FIELD–CURED IN CONDITIONS MATCHING SUBJECT CONCRETE OR MASONRY ELEMENTS, PLUS USE OF CEMENT TYPES AND/OR ADMIXTURES IN MIX DESIGNS TO PROVIDE THE REQUIRED COMPRESSIVE STRENGTHS AT ANTICIPATED AGES LESS THAN 28 DAYS. INSTALLATION OF ANCHORS INTO CONCRETE OR MASONRY GROUT BEFORE CURING FOR 28 DAYS WILL NOT BE APPROVED WITHOUT THESE PROVISIONS BEING SPECIFIED, AND MET BY CONTRACTOR.

3. WHERE POST–INSTALLED ANCHORS ARE USED TO MITIGATE OMITTED OR MISPLACED CAST–IN–PLACE ANCHORS, ADDED SPECIAL INSPECTION AND TESTING COSTS ASSOCIATED WITH THE POST–INSTALLED ANCHORS WILL BE PAID FOR BY THE OWNER, HOWEVER, SUCH COSTS WILL BE BACK–CHARGED TO THE CONTRACTOR.

4. PRIOR TO DRILLING HOLES FOR ANY POST–INSTALLED ANCHORS INTO NEW OR EXISTING CONCRETE OR MASONRY, ALL REINFORCING BARS IN AREA OF NEW ANCHORAGE HOLES SHALL BE LOCATED WITH PACHOMETER OR OTHER SUITABLE DEVICE AND CLEARLY MARKED IN THE FIELD. NEW ANCHORS SHALL BE INSTALLED NOT LESS THAN 1" CLEAR FROM REINFORCING. WHERE REINFORCING BARS CANNOT BE LOCATED, CARE SHALL BE TAKEN WHILE DRILLING HOLES SO THAT REINFORCING BARS ARE NOT CUT OR DAMAGED AND HOLES SHALL BE REPAIRED & RELOCATED AS REQUIRED. USE OF DRILLS WITH GROUND FAULT INTERRUPTERS (GFI) IS RECOMMENDED.

5. PROVIDE TESTING AND INSPECTIONS OF ANCHOR INSTALLATIONS PER TESTING AND SPECIAL INSPECTION NOTES, THIS SHEET.

6. ANCHORS OTHER THAN THOSE SPECIFIED BELOW MAY BE USED ONLY WHEN CURRENT ICC–ES OR IAPMO–UES REPORT FOR SUCH IS SUBMITTED FOR REVIEW AND APPROVAL IN WRITING. ANCHORS SHALL NOT BE INSTALLED UNTIL ANCHORS ARE APPROVED BY STRUCTURAL ENGINEER, AND TEST LOADS ARE DETERMINED AND ISSUED.

7. ANCHORS IN CONTACT WITH PRESERVATIVE–TREATED AND FIRE–RETARDANT–TREATED WOOD SHALL BE OF HOT–DIPPED ZINC COATED GALVANIZED STEEL OR STAINLESS STEEL. ANCHORS EXPOSED TO WEATHER OR REQUIRED TO BE CORROSION RESISTANT SHALL BE OF HOT–DIPPED ZINC–COATED GALVANIZED STEEL OR STAINLESS STEEL.

B. EXPANSION ANCHORS:

1. EXPANSION ANCHORS SHALL BE WEDGE TYPE ANCHORS ONLY AND SHALL HAVE ICC–ES OR IAPMO–UES APPROVAL, INCLUDING APPROVAL FOR RESISTANCE TO SEISMIC AND WIND LOADS, PASSING ICC–ES CRITERIA AC193 (CONCRETE). USE ONE OF THE FOLLOWING ICC–ES OR IAPMO–UES APPROVED SYSTEMS:
   CONCRETE:
   a) HILTI KWIK BOLT TZ2 (ESR–4266). (TYP. ANCHOR SPECIFIED U.N.O.)
   b) SIMPSON STRONG–BOLT 2 ANCHORS (ESR–3037),
   c) DEWALT/POWERS POWER–STUD+ SD2, SD4 & SD6 ANCHORS (ESR–2502).
   NOTE: OTHER EXPANSION ANCHORS MAY BE USED ONLY WHEN ICC–ES OR IAPMO–UES REPORT FOR SUCH IS SUBMITTED TO AND APPROVED BY ENGINEER AND TEST LOADS ARE DETERMINED AND ISSUED.

2. EXPANSION ANCHORS SHALL HAVE EMBEDMENT NOT LESS THAN EIGHT (8) ANCHOR DIAMETERS, OR AS OTHERWISE SPECIFIED IN DETAILS. TORQUE ANCHORS DURING INSTALLATION TO THE RECOMMENDED INSTALLATION TORQUE VALUES SPECIFIED IN MANUFACTURER'S ICC–ES OR IAPMO–UES REPORT.

D. CHEMICAL ADHESIVE ANCHORS AND DOWELS:

1. ALL THREADED RODS AND REBAR DOWELS INSTALLED IN HARDENED CONCRETE OR MASONRY GROUT WITH "ADHESIVE" SHALL BE A TWO–PART NOZZLE–MIXED ICC–ES OR IAPMO–UES APPROVED CHEMICAL ADHESIVE SYSTEM, PASSING ICC–ES CRITERIA AC308 (CONCRETE) & AC58 (MASONRY). USE ONE OF THE FOLLOWING ICC–ES OR IAPMO–UES APPROVED SYSTEMS:
   CONCRETE:
   a) HILTI "HIT–RE 500–V3" ADHESIVE ANCHOR SYSTEM (ESR–3814). (SPECIFIED U.N.O.)
   b) SIMPSON "SET–3G" ADHESIVE ANCHOR SYSTEM (ESR–4057).
   c) DEWALT/POWERS "PURE110+" ADHESIVE ANCHOR SYSTEM (ESR–3298),
   d) ITW RED HEAD "OBritish" ADHESIVE ANCHOR SYSTEM (ESR–4046).
   NOTE: OTHER CHEMICAL ADHESIVE ANCHOR SYSTEMS MAY BE USED ONLY WHEN ICC–ES OR IAPMO–UES REPORT FOR SUCH IS SUBMITTED TO AND APPROVED BY ENGINEER AND TEST LOADS ARE DETERMINED AND ISSUED.

2. ANCHORS SHALL BE INSTALLED ONLY INTO CURED CONCRETE OR MASONRY GROUT OF MIN. 21 DAY AGE. IF INSTALLATION OF ANCHORS INTO CONCRETE OR MASONRY ELEMENTS PRIOR TO 21–DAY AGE IS ANTICIPATED, CONTRACTOR SHALL NOTIFY ENGINEER PRIOR TO INSTALLATION FOR DIRECTION.

3. INSTALLATION OF CHEMICAL ADHESIVE ANCHORS IN OVERHEAD APPLICATIONS AND HORIZONTAL OR OVERHEAD APPLICATIONS WITH SUSTAINED (CONTINUOUS) TENSION LOADS SHALL BE INSTALLED BY AN ACI/CSRI CERTIFIED ADHESIVE ANCHOR INSTALLER.

4. BARS/RODS SHALL HAVE EMBEDMENT IN ADHESIVE NOT LESS THAN TEN (10) NOMINAL BAR/ROD DIAMETERS IN CONCRETE AND NINE (9) NOMINAL BAR/ROD DIAMETERS IN MASONRY, OR AS OTHERWISE SPECIFIED IN DETAILS.

5. INSTALLATION TORQUE FOR ALL ANCHORS SHALL BE REDUCED ACCORDING TO MANUFACTURER'S RECOMMENDATION DUE TO THE VICINITY OF ANCHOR TO EDGE OF CONCRETE.

6. THE BOND STRESSES AS SPECIFIED IN ICC–ES OR IAPMO–UES REPORT SHALL BE BASED ON LONG TERM ELEVATED TEMPERATURES OF NOT LESS THAN 110 DEGREES F.

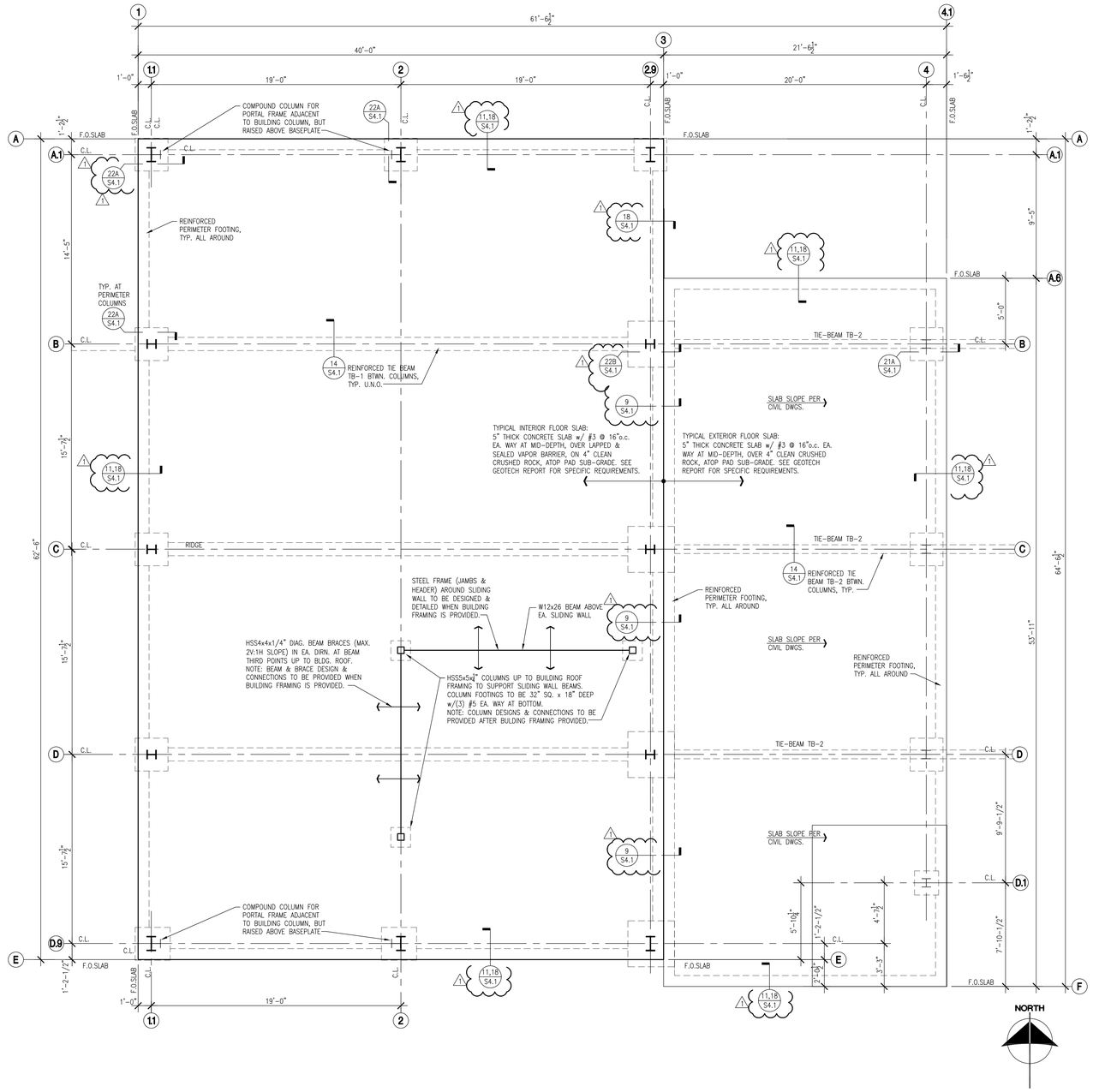
TESTING AND SPECIAL INSPECTIONS

1. GENERAL
   - A) ALL TESTS AND SPECIAL INSPECTIONS SHALL CONFORM TO APPLICABLE REQUIREMENTS OF 2022 CALIFORNIA BUILDING CODE (CBC) CHAPTER 17.
   - B) TEST AND INSPECTION LAB SHALL BE EMPLOYED AND PAID FOR BY THE OWNER. COSTS OF RE–TESTING MAY BE BACK–CHARGED TO THE CONTRACTOR.
   - C) COPIES OF ALL TEST/INSPECTION REPORTS SHALL BE SUBMITTED TO ARCHITECT AND STRUCTURAL ENGINEER.

2. FOUNDATIONS (DRILLED PIERS, FOOTINGS, GRADE BEAMS), WALLS AND SLABS–ON–GRADE:
   - A) NOTIFY ENGINEER 48 HOURS BEFORE CONCRETE IS TO BE PLACED OR FORMS CLOSED TO ALLOW FOR INSPECTION OF EXCAVATIONS AND REINFORCING PLACEMENT.
   - B) SPECIAL INSPECTION IS REQUIRED PER CBC SECTION 1705.3.
   - C) THE TESTING LAB SHALL PERFORM THE FOLLOWING:
     - REVIEW ALL CONCRETE MIX DESIGNS. ALL DESIGNS SHALL BE SUBMITTED TO AND APPROVED BY TESTING AGENCY PRIOR TO ORDERING CONCRETE.
     - FOR EACH CONCRETE MIX PLACED, AGENCY SHALL CAST (4) TEST CYLINDERS IN ACCORDANCE WITH ASTM C31 FOR EACH 50 CUBIC YARDS OR 2000 SQUARE FEET, OR FRACTION THEREOF, OF CONCRETE PLACED EACH DAY, AND TRANSPORT CYLINDERS TO LAB. TEST CYLINDERS IN ACCORDANCE WITH ASTM C39. TEST (1) CYLINDER AT 7 DAYS AND (2) CYLINDERS AT 28 DAYS. HOLD LAST TEST CYLINDER FOR 60 DAYS.
     - INSPECT FINAL PLACEMENT OF ALL REINFORCING AS INDICATED ON DETAILS PRIOR TO CONCRETE PLACEMENT.
     - PROVIDE CONTINUOUS INSPECTION OF CONCRETE PLACEMENT.
   - D) SEE ITEM 6 BELOW FOR INSPECTIONS BY GEOTECHNICAL ENGINEER.

3. POST–INSTALLED ANCHORS IN CONCRETE AND CONCRETE MASONRY:
   - A) GENERAL – APPLICABLE TO ALL ANCHORS AND DOWELS:
     1) ALL EXPANSION ANCHOR, SCREW ANCHOR AND ADHESIVE ANCHOR SYSTEMS USED SHALL HAVE ICC–ES OR IAPMO–UES APPROVAL.
     2) PERIODIC SPECIAL INSPECTION IS REQUIRED FOR ALL ANCHORS.
   - B) EXPANSION ANCHORS IN CONCRETE:
     1) PULL–TEST OR TORQUE–TEST 100% OF ANCHORS EXCEPT AS NOTED; PULL–TEST OR TORQUE–TEST 10% OF SOLE PLATE ANCHOR BOLTS AND 50% OR ALTERNATE ANCHORS FOR EQUIPMENT ANCHORAGE AND IN NON–STRUCTURAL APPLICATIONS.
     2) PULL–TEST LOAD VALUES SPECIFIED BELOW ARE BASED ON (1–1/4) TIMES THE MAXIMUM DESIGN TENSION STRENGTHS AS PROVIDED IN THE ICC–ES REPORT FOR HILTI KWIK–BOLT TZ2 (ESR–4266) IN CONCRETE.
     3) PULL–TEST ANCHORS IN TENSION WITH CALIBRATED HYDRAULIC RAM TO VALUES SPECIFIED BELOW.

ANCHOR DIAMETER	NOMINAL EMBEDMENT (CONC.)	CONC. TENSION TEST LOAD (LBS.)
7/8"	2½"	1905
1"	3¼"	4050
1¼"	4½"	5525
1⅜"	4½"	5525



1. CONTRACTOR SHALL CONFIRM ALL DIMENSIONS AND COLUMN LOCATIONS WITH ARCHITECTURAL DRAWINGS AND PRE-ENGINEERED BUILDING DRAWINGS.

2. TOP OF LEVEL SLAB ELEVATION IS AT DATUM (0'-0") U.N.O. TOP OF FOOTINGS ARE AT (-1'-0") U.N.O.

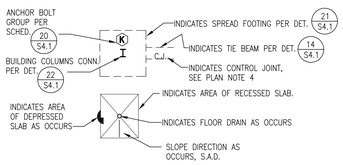
3. SEE FLOOR PLAN FOR SLAB INFORMATION. SET BOTTOM LAYER OF REBAR 3" CLR. FROM BOTTOM OF SLAB, TYPICAL THROUGHOUT.

4. CJ INDICATES SLAB CONTROL JOINT PER 6 S4.1

5. CONTRACTOR SHALL CONFIRM LOCATIONS OF DEPRESSED AND SLOPED FLOOR AREAS, AND FLOOR DRAINS/SINKS WITH ARCHITECTURAL.

6. WHERE SLABS ARE RECESSED OR SLOPED, MAINTAIN SPECIFIED THICKNESSES OF SLAB AND GRAVEL; SLOPE AND/OR LOWER HEIGHT OF PAD GRADE TO ACCOMMODATE CONSTANT TOTAL SLAB AND GRAVEL DEPTH.

7. LATERAL BUILDING ANALYSIS (WIND & SEISMIC) WILL BE PROVIDED WITH BUILDING FRAMING DESIGN, INCLUDING DETERMINATION OF ALL COLUMN REACTIONS, AFTER WHICH CALCULATIONS TO CONFIRM FOUNDATION AND ANCHOR BOLT DESIGNS PROVIDED ON SHEET S4.1 WILL BE PROVIDED.



FOUNDATION & SLAB PLAN NOTES & LEGEND

A FOUNDATION PLAN

SCALE: 1/4" = 1' 0"

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REVISIONS
1 ADDENDUM #1 03/04/26
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STRUCTURAL GENERAL NOTES & MATERIAL GRADES

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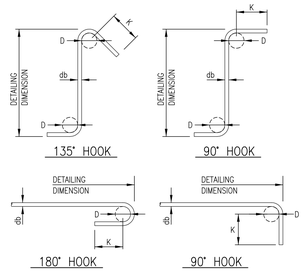
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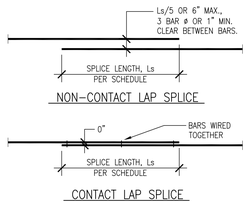
S2.1



STANDARD HOOKS			
BAR SIZE	"D" IN	180° HOOKS "K"	90° HOOKS "K"
#3	2-1/4"	2-1/2"	4-1/2"
#4	3"	2-1/2"	6"
#5	3-3/4"	2-1/2"	7-1/2"
#6	4-1/2"	3"	9"
#7	5-1/4"	3-1/2"	10-1/2"
#8	6"	4"	12"

STIRRUP AND TIE HOOKS				
BAR SIZE	"D" IN	180° HOOKS "K"	135° HOOKS "K"	90° HOOKS "K"
#3	1-1/2"	2-1/2"	3"	3"
#4	2"	2-1/2"	3"	3"
#5	2-1/2"	2-1/2"	3-3/4"	3-3/4"
#6	4-1/2"	3"	4-1/2"	9"

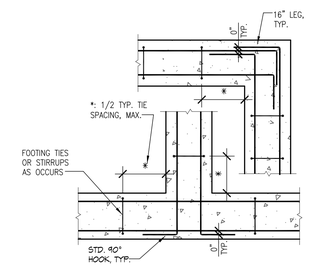
1 TYP. REBAR HOOKS AND TIES — NO SCALE



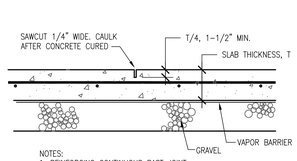
REBAR LAP SPLICE LENGTHS (Ls)			
BAR SIZE	HARD ROCK (REG. WT.) CONCRETE: CLASS B SPLICE TYP., U.N.O.	HARD ROCK (REG. WT.) CONCRETE: TOP BARS (SEE NOTE 1)	GROUTED MASONRY (CMU)
#3	22"	28"	27"
#4	29"	37"	36"
#5	36"	47"	45"
#6	43"	56"	54"
#7	63"	81"	63"
#8	72"	93"	72"
#9	81"	105"	–
#10	90"	116"	–
#11	98"	128"	–

NOTES:
1. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12" OF FRESH CONCRETE CAST BELOW BARS, IN SAME POUR AS BARS (AS IN DEEP BEAM OR FOOTING POURS, ETC.).
2. STAGGER LAPS IN SUCCESIVE PARALLEL BARS IN SLABS AND WALLS A DISTANCE EQUAL TO THE REQUIRED LAP SPLICE LENGTH, BUT NOT LESS THAN 24" (ALONG LENGTH OF BARS).
3. ALL LAP SPLICES SHALL BE CONTACT OR NON-CONTACT TYPE, AS SHOWN.
4. INCREASE SCHEDULED LAP LENGTHS BY 33% WHEN IN LIGHT WEIGHT CONCRETE.

3 TYP. REBAR SPLICES — NO SCALE



5 TYP. CONC. FOOTING INTERSECTIONS — NO SCALE

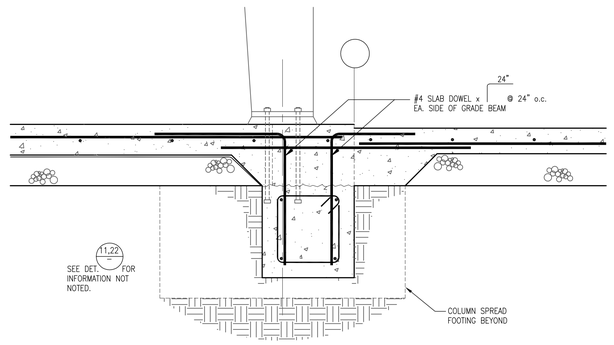


NOTES:
1. REINFORCING CONTINUOUS PAST JOINT
2. PRE-CUT WITH POINTED TROWEL
3. SAWCUT AS SOON AS RAVELLING DOES NOT OCCUR AND EQUIPMENT CAN BE SUPPORTED WITHOUT DENTING SLAB.
4. CONTRACTOR SHALL SUBMIT PLAN SHOWING PROPOSED JOINT LOCATIONS/LAYOUT TO ARCHITECT PRIOR TO PLACING FORMS.

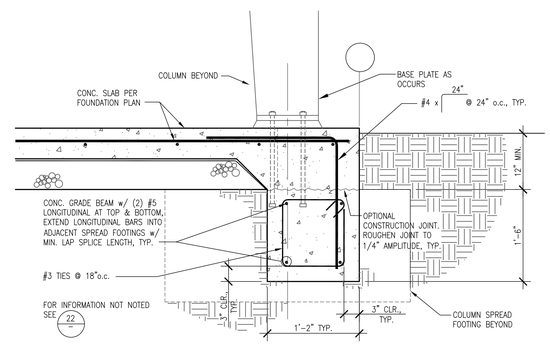
6 TYP. SLAB CONTROL JOINTS — NO SCALE

7 . — 1"=1'-0"

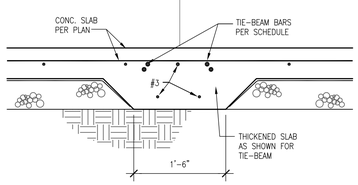
8 . — 1"=1'-0"



9 REINFORCED PERIMETER BEAM — 1"=1'-0"



11 REINFORCED PERIMETER BEAM — 1"=1'-0"

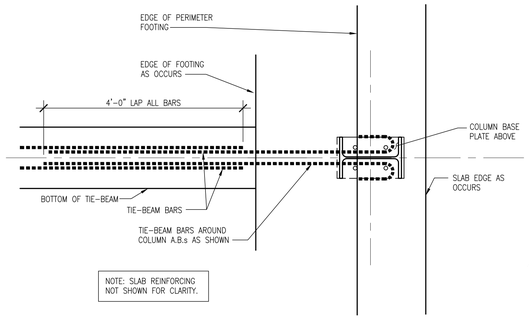


TIE-BEAM SCHEDULE		
MARK	A.B.s	COMMENTS
TB-1	(4) #5	.
TH-2	(2) #5	.

NOTE: TIE-BEAM REINFG. TO BE CONFIRMED WHEN THRUST REACTIONS FROM BUILDING COLUMNS ARE PROVIDED.

13 . — 1"=1'-0"

14 INTERIOR TIE BEAM — 1"=1'-0"



16 TIE-BEAM INTERSECTION w/ FOOTING — 1"=1'-0"

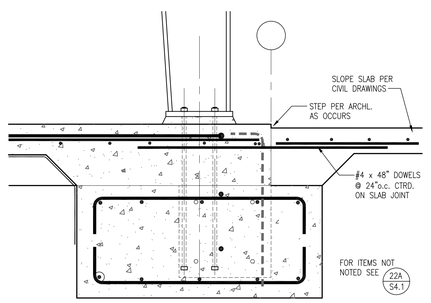
18 REINFORCED PERIMETER BEAM — 1"=1'-0"

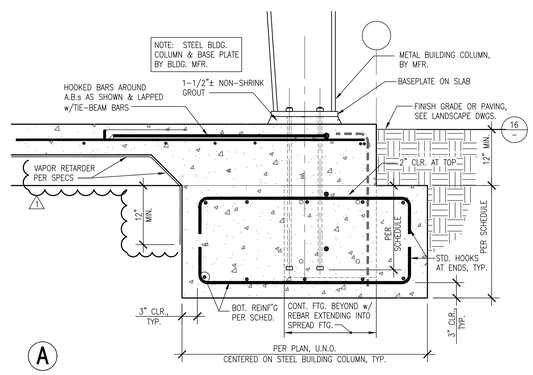
A.B. GROUP SCHEDULE			
MARK	A.B.s	EMBED.	COMMENTS
A	(4) 3/4"ø	18"	.
B **	(4) 1"ø	18"	.

**: FRAME COLUMN ANCHOR BOLTS SHALL BE ASTM A1554, GRADE 105.
NOTE: DESIGN OF A.B.s TO BE PROVIDED WHEN BUILDING COLUMN REACTIONS ARE PROVIDED.

FOOTING SCHEDULE				
LOCATION	PLAN SIZE	DEPTH	BOTTOM BARS	TOP BARS
A.1@2.9	2'-0" SQ.	24"	(3) #5 E.W.	(3) #5 E.W.
A.1,D.9@1.1		32"	(4) #5 E.W.	(4) #5 E.W.
A.1,D.9@2				
B,C,D,D.1@4	2'-4" SQ.	24"	(4) #5 E.W.	(3) #5 E.W.
D.9@2,2.9	2'-6" SQ.			
A.1@2				
B,C,D@1.1	2'-8" SQ.			
B,C,D@2.9	3'-0" SQ.		(5) #5 E.W.	(3) #5 E.W.

TYPICAL SPREAD FOOTING CALCULATION:
LOCATION: GRID 1.1 @ GRID C:
TRIB AREA = 20' x 15.5' = 310 S.F.
ROOF DL < 12 PSF, LL = 16 PSF
R = 8.70 K, @ 2.5 KSF, REQD. FOOTING A = 4.0 S.F.,
USE MIN. 2.5' SQ., A = 6.2 S.F.
USE 33% MORE REINFG. THAN REQD. FOR FLEXURE;
USE (4) #5 BOT., (3) #5 TOP.
NOTE: CALCULATIONS TO BE CONFIRMED, INCLUDING FOR UPLIFT, WHEN BUILDING COLUMN REACTIONS ARE PROVIDED.





19 . — 1"=1'-0"

20 A.B. SCHEDULE

21 FOOTING SCHEDULE

22 TYP. BUILDING COLUMN DETAILS AT PERIMETER — 1"=1'-0"

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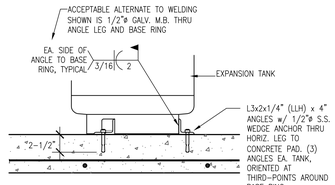
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S4.1

1 · 1"=1'-0"

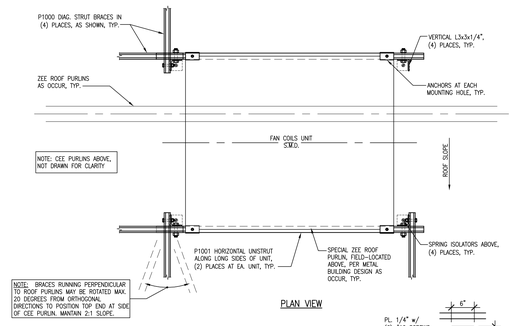
2 · 1"=1'-0"



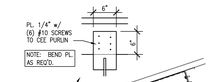
3 · 1-1/2"=1'-0"

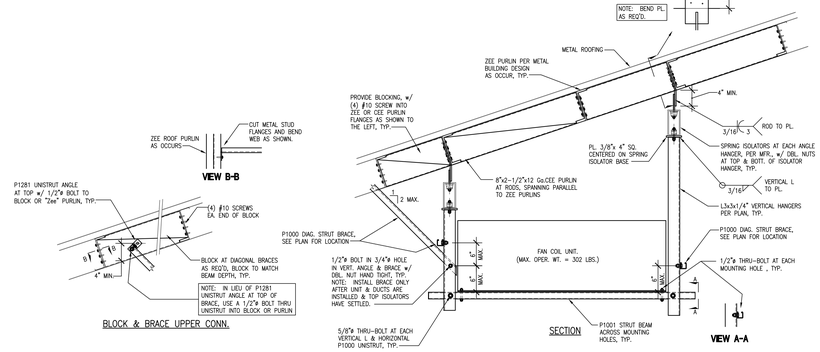
EXPANSION TANK ANCHORAGE

ET-1



PLAN VIEW





10 · 1"=1'-0"

FAN COIL SUPPORT & BRACE

FC-1 & FC-2

7 · 1"=1'-0"

8 · 1"=1'-0"

9 · 1"=1'-0"

13 · 1"=1'-0"

14 · 1"=1'-0"

15 · 1"=1'-0"

16 · 1"=1'-0"

17 · 1"=1'-0"

18 · 1"=1'-0"

19 · 1"=1'-0"

20 · 1"=1'-0"

21 · 1"=1'-0"

22 · 1"=1'-0"

23 · 1"=1'-0"

24 · 1"=1'-0"

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S4.2

MECHANICAL NOTES & SPECIFICATIONS

1. THESE DRAWINGS & NOTES SHALL BE READ IN CONJUNCTION WITH & BE CONSIDERED TO BE PART OF A SEPARATE & COMPLETE MECHANICAL SPECIFICATION.

2. ENTIRE INSTALLATION SHALL CONFORM TO THE REQUIREMENTS OF ALL APPLICABLE CODES AND REGULATIONS, INCLUDING:

   2.1. 2022 CALIFORNIA BUILDING CODE (CBC) - CCR TITLE 24 PART 2
   2.2. 2022 CALIFORNIA ELECTRICAL CODE (CEC) - CCR TITLE 24 PART 3
   2.3. 2022 CALIFORNIA MECHANICAL CODE (CMC) - CCR TITLE 24 PART 4
   2.4. 2022 CALIFORNIA PLUMBING CODE (CPC) - CCR TITLE 24 PART 5
   2.5. 2022 CALIFORNIA FIRE CODE (CFC) - CCR TITLE 24 PART 9
   2.6. 2022 CALIFORNIA GREEN BUILDING (CGB) STANDARD
   2.7. 2022 CALIFORNIA BUILDING ENERGY EFFICIENCY STANDARDS (BEES)

3. CONTRACTOR SHALL OBTAIN & PAY FOR ALL REQUIRED FEES, PERMITS & INSPECTIONS.

4. COORDINATE ENTIRE INSTALLATION OF THE HVAC SYSTEM(S) WITH THE WORK OF ALL OTHER TRADES PRIOR TO ANY FABRICATION OR INSTALLATION. PROVIDE ALL FITTINGS, OFFSETS, AND TRANSITIONS FOR A COMPLETE AND WORKABLE INSTALLATION. COORDINATE ITEMS TO BE PROVIDED BY OTHER TRADES WHERE MENTIONED IN THE CONTRACT DOCUMENTS PRIOR TO BID - NO EXCEPTIONS. PROVIDE A COMPLETE WORKING SYSTEM PER CONTRACT DOCUMENTS.

5. COORDINATE ALL WORK WITH THE ARCHITECTURAL, STRUCTURAL DRAWINGS AND DRAWINGS OF OTHER TRADES. INSTALL ALL WORK TO CLEAR ARCHITECTURAL WORK, STRUCTURAL MEMBERS AND WORK OF OTHER TRADES. NO ITEM SUCH AS PIPE, DUCT, ETC. SHALL BE IN CONTACT WITH ANY EQUIPMENT. ANY ERRORS, OMISSIONS, DISCREPANCIES, DEFICIENCIES, OR CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE GENERAL CONTRACTOR, THE ARCHITECT AND THE ENGINEER PRIOR TO PROCEEDING WITH ANY AFFECTED WORK.

6. COORDINATE THE LOCATION OF ALL ROOF OPENINGS & THE LOCATION OF ALL ROOF MOUNTED EQUIPMENT WITH THE STRUCTURAL & ARCHITECTURAL PLANS PRIOR TO ANY FABRICATION & INSTALLATION.

7. PLATFORMS, CURBS, AND FLASHING FOR MECHANICAL EQUIPMENT IS INDICATED ON THE STRUCTURAL AND ARCHITECTURAL PLANS, UNLESS NOTED OTHERWISE. WHERE THERE IS A CONFLICT WITH THE MECHANICAL PLANS, NOTIFY THE ARCHITECT AND ENGINEER PRIOR TO FABRICATION AND INSTALLATION.

8. COORDINATE THE LOCATIONS OF ALL CEILING DIFFUSERS, REGISTERS, AND GRILLES WITH THE ARCHITECTURAL REFLECTED CEILING PLAN, ELECTRICAL LIGHTING LAYOUT AND ARCHITECTURAL ROOM ELEVATIONS. THE ARCHITECT AND ENGINEER SHALL BE IMMEDIATELY NOTIFIED OF ANY CONFLICTS PRIOR TO FABRICATION AND INSTALLATION.

9. EQUIPMENT, DUCTS, PIPING, & OTHER DEVICES & MATERIALS INSTALLED OUTSIDE OF THE BUILDING OR OTHERWISE EXPOSED TO THE WEATHER SHALL BE COMPLETELY WEATHER PROOFED & PAINTED TO MATCH. COORDINATE WITH ARCHITECT PRIOR TO PAINTING.

10. VERIFY ALL CLEARANCES & AVAILABLE SPACE FOR DUCTWORK PRIOR TO ORDERING AND/OR FABRICATION.

11. DIMENSIONS SHOWN ON THESE PLANS ARE APPROXIMATE AND MUST BE CONFIRMED ON SITE AND/OR PER ARCHITECTURAL DRAWINGS. ANY SCALE NOTATIONS ARE TO BE VERIFIED PRIOR TO ANY TAKE-OFF.

12. PRIOR TO OCCUPANCY THE ENTIRE HVAC SYSTEMS SHALL BE BALANCED FOR AIR IN ACCORDANCE AND PROCEDURES WITH (AABC) ASSOCIATED AIR BALANCE COUNCIL STANDARDS, (NEBB) NATIONAL ENVIRONMENTAL BALANCING BUREAU , OR (TABB) TESTING ADJUSTING AND BALANCING BUREAU. SYSTEMS SHALL BE BALANCED AS INDICATED ON PLANS INCLUDING OUTSIDE AIR VENTILATION. FINAL BALANCING SHALL BE WITHIN 10% FOR SUPPLY, RETURN AND OUTSIDE AIR QUANTITIES INDICATED. WHERE THERE IS A CONFLICT IN PLANS, NOTIFY THE ENGINEER PRIOR TO BALANCING OF SYSTEM. IF NOT DONE SO THE ENTIRE SYSTEM MUST BE RE-BALANCED DUE TO CONFLICTS ON CONTRACT DOCUMENTS. PROVIDE A COPY OF THE AIR BALANCE REPORT TO THE ENGINEER FOR REVIEW. PROVIDE PROCEDURES AND REPORTING PER CAL GREEN CODES SECTION 5.410.4.3, SECTION 5.410.4.3.1 AND SECTION 5.410.4.4.

13. CONTROLS CONTRACTOR & AIR BALANCE CONTRACTOR TO COORDINATE WORK & PERFORM NECESSARY TASKS TO OBTAIN AIR FLOW QUANTITIES FOR SYSTEMS SHOWN HEREIN.

14. ADHESIVES, SEALANTS AND CAULKING SHALL BE COMPLIANT WITH LOW VOC OR OTHER TOXIC COMPOUND LIMITS SET BY (NR)5.504.4.

15. EQUIPMENT, ACCESSORIES AND RELATED PIPING SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS. PROVIDE ALL FITTINGS, TRANSITIONS, DAMPERS, VALVES, AND OTHER DEVICES REQUIRED FOR A COMPLETE WORKABLE INSTALLATION.

16. MAINTENANCE LABEL SHALL BE AFFIXED TO ALL MECHANICAL EQUIPMENT AND A MAINTENANCE MANUAL SHALL BE PROVIDED FOR THE OWNER'S USE. LABEL SHALL IDENTIFY THE UNIT DESIGNATION PER PLANS AND THE SPACE IT SERVES.

   16.1. EQUIPMENT: 4-1/2"X1-1/2" ENGRAVED PLASTIC-LAMINATED SIGN WITH 1/2" WHITE LETTERS ON BLACK BACKGROUND.
   16.2. VALVES: 1-1/2" DIAMETER BRASS DISC STAMPED WITH 3/8" HIGH LETTERS IDENTIFYING TYPE OF SERVICE AND VALVE NUMBER.
   16.3. PIPING: SELF-STICKING PIPE MARKERS CONSISTING OF PIPE SERVICE WORDING AND ARROW INDICATING DIRECTION OF FLOW ON ANSI COLOR BACKGROUND. MAXIMUM SPACING OF 50 FEET APART. SECURE MARKER WITH 2-1/4" WIDE SELF-STICKING CLEAR TAPE AROUND PERIPHERY OF MARKER.

17. PROVIDE MANUAL VOLUME DAMPERS AND BACKDRAFT DAMPERS FOR OUTSIDE AIR INTAKES ON ALL AIR HANDLING EQUIPMENT AND EXHAUST FANS SERVING CONDITIONED SPACES.

18. OUTSIDE AIR INTAKES SHALL MEET AS A MINIMUM CODE REQUIRED CLEARANCES FROM EXHAUST AND PLUMBING VENT OUTLETS.

19. ALL HVAC EQUIPMENT SERVING NORMALLY OCCUPIED SPACES HAVING OVER 10' OF DUCT SHALL HAVE MINIMUM MERV13 FILTERS UNLESS OTHERWISE NOTED. DOES NOT INCLUDE EXHAUST SYSTEMS.

20. AIR FILTERS SHALL BE STATE FIRE MARSHALL APPROVED & LISTED, PREFORMED FILTERS HAVING COMBUSTIBLE FRAMING SHALL BE TESTED AS A COMPLETE ASSEMBLY. INSTALLED FILTERS SHALL BE CLEARLY LABELED BY THE MANUFACTURER INDICATING THE MERV RATING & THE FILTER SPECIFICATION SHALL BE INCLUDED IN THE OPERATION & MAINTENANCE MANUAL. AIR FILTERS SHALL BE ACCESSIBLE FOR CLEANING OR REPLACEMENT.

21. EQUIPMENT WITH MOVING PARTS, FIXED OR FLEXIBLY MOUNTED, SHALL BE PROVIDED WITH FLEXIBLE DUCT & PIPE CONNECTIONS & SHALL BE BRACED OR ANCHORED.

22. HVAC EQUIPMENT SHALL BE CERTIFIED BY THE CALIFORNIA ENERGY COMMISSION TO COMPLY WITH THE LATEST EFFICIENCY STANDARDS.

23. AIR HANDLING EQUIPMENT SERVING CONDITIONED SPACES SHALL PROVIDE CONTINUOUS OUTSIDE AIR TO SPACES IN OCCUPIED MODE WHEN OCCUPIED TESTING AND ADJUSTING OF SYSTEMS SHALL BE REQUIRED. OTHERWISE DEVICES AND CONTROLS SHALL BE PROVIDED TO FACILITATE A ZERO OUTDOOR VENTILATION RATE WHEN THERE IS NO ZONE(S) OCCUPIED PER 2022 BEES TABLE 120.1-A. TO PROVIDE THE MINIMUM RATE OF OUTDOOR AIR REQUIRED BY THE STATE ENERGY REGULATIONS. MINIMUM RATES SHALL BE PER SCHEDULE OR PLANS OF MINIMUM, MINIMUM OF MINIMUM, OR MAXIMUM OF MINIMUM.

24. CONTRACTOR TO SUBMIT ALL EQUIPMENT, DUCTWORK, AIR DISTRIBUTION DEVICES & OTHER ACCESSORIES TO THE ENGINEER FOR APPROVAL PRIOR TO ANY ORDERING OF SUCH ITEMS.

25. ORDER AIR CONDITIONING EQUIPMENT WITH THE THRU-BASE CONTROL CONNECTIONS. VERIFY ALL CONNECTION LOCATIONS W/ UNIT MANUFACTURER & COORDINATE WITH OTHER TRADES AS NECESSARY.

26. DUCTWORK, PIPING, CONDUIT, ETC. PENETRATING FIRE RATED CONSTRUCTION SHALL HAVE APPROVED FIRE STOPPING.

27. CONTROL AND POWER WIRING DIAGRAMS ARE DIAGRAMMATIC ONLY. REFER TO ELECTRICAL DRAWING FOR PROPER POWER WIRING DIAGRAM. SUBMIT CONTROL DRAWINGS FOR APPROVAL. IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN CONTROL DRAWINGS FROM UNIT MANUFACTURERS FOR PROPER WIRING AND OPERATION TO COMPLY WITH CONTROL SEQUENCE.

28. WHERE THE CONTROLS CONTRACTOR IS RETAINED BY THE OWNER THEY SHALL BE RESPONSIBLE TO FURNISH AND INSTALL ALL DEVICES, WIRING, AND TERMINATIONS REQUIRED FOR A COMPLETE AND FUNCTIONAL INSTALLATION. COORDINATE ALL WORK AND REQUIREMENTS WITH OTHER TRADES INCLUDING THE GENERAL, MECHANICAL, AND ELECTRICAL CONTRACTORS PRIOR TO BID. FOLLOW ALL SUBMITTAL REQUIREMENTS PER DRAWINGS AND SPECIFICATIONS.

29. LINE VOLTAGE WIRING SHALL BE INSTALLED IN CONDUIT. ALL LINE VOLTAGE CONDUIT AND WIRING, INCLUDING FINAL CONNECTIONS, SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR AS INDICATED ON THE ELECTRICAL DRAWINGS OR SPECIFIED IN THE ELECTRICAL SECTION OF THE SPECIFICATIONS. ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS OF GOVERNING BODIES HAVING JURISDICTION THEREOF.

30. LOW VOLTAGE CONDUIT & WIRING AS APPLICABLE, INCLUDING FINAL CONNECTIONS, SHALL BE FURNISHED & INSTALLED BY THE MECHANICAL CONTRACTOR AS INDICATED ON THE MECHANICAL DRAWINGS OR SPECIFIED IN THE MECHANICAL SECTION OF THE SPECIFICATIONS.

31. LOW VOLTAGE WIRING SHALL BE IN CONDUIT. PLENUM RATED WIRING INSTALLED IN CEILING SPACE, WHEN APPROVED BY SCHOOL DISTRICT, IS ACCEPTABLE.

32. CONTROL WIRING INSTALLED IN EXISTING BUILDINGS WHERE WIRING CANNOT BE FED DOWN THROUGH EXISTING WALLS SHALL BE INSTALLED IN WIREMOLD (PVC).

33. CONTROL WIRING CONDUIT BETWEEN BUILDINGS SHALL FURNISHED AND INSTALLED PER DIVISION 26 OF SPECIFICATIONS BY ELECTRICAL CONTRACTOR.

34. ELECTRICAL CONTRACTOR TO PROVIDE REQUIRED RELAY ACCESSORIES FOR CONNECTION OF 120V/1Ø VENTILATION EQUIPMENT TO 277V/1Ø LIGHTING AS APPLICABLE.

35. WHERE HVAC CONTROL WIRING IS REQUIRED BETWEEN BUILDINGS, PROVIDE UNDERGROUND CONDUIT WITH PULL STRING(S) FURNISHED & INSTALLED BY ELECTRICAL CONTRACTOR FOR THE ENERGY MANAGEMENT SYSTEM WIRING TERMINATIONS ONLY. FURNISH & INSTALL CONDUIT & WIRING TERMINATIONS FOR BETWEEN BUILDINGS.

36. THERMOSTATS SHALL HAVE LOCKABLE COVERS (WHERE INDICATED ON PLANS) & SHALL BE OF THE ELECTRONIC, PROGRAMMABLE, AUTOMATIC CHANGEOVER TYPE TO SEQUENCE HEATING OR COOLING. SET POINT RANGE SHALL BE 10F° BETWEEN FULL HEATING & COOLING. THEY SHALL HAVE CAPABILITY OF TERMINATING ALL HEATING AT A TEMPERATURE NO MORE THAN 70°F, & COOLING AT A TEMPERATURE NOT LESS 78°F. ADJUSTABLE TEMPERATURE DIFFERENTIAL SHALL BE 1½F°. CONTROL LIMITS SHALL BE FROM 55°F TO 85°F. MOUNT TOP OF BOX AT NO MORE THAN 42 INCHES ABOVE FLOOR TO MEET LOCAL ADA REQUIREMENT. IN ADDITION, THERMOSTAT(S) SHALL HAVE THE CAPABILITY TO CONNECT & RESPOND TO AN OCCUPANT CONTROLLED DEMAND RESPONSE SIGNAL OR PRICE SIGNAL FOR RESETTING OF ROOM SETPOINTS.

37. THERMOSTATS THAT ARE PART OF AN ENERGY MANAGEMENT SYSTEM SHALL FOLLOW CONTROL SPECIFICATIONS AND DRAWING REQUIREMENTS.

38. RELOCATE (E)THERMOSTAT THAT DO NOT MEET THE ADA HEIGHT REQUIREMENTS DUE TO OBSTRUCTIONS, NOTIFY THE ENGINEER & ARCHITECT BEFORE PROCEEDING.

39. LINE VOLTAGE THERMOSTATS SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

40. AT THE TIME OF ROUGH INSPECTION & DURING STORAGE ON THE CONSTRUCTION SITE & UNTIL FINAL STARTUP OF THE HEATING, COOLING & VENTILATING EQUIPMENT, ALL DUCT & OTHER RELATED AIR DISTRIBUTION COMPONENTS, OPENINGS SHALL BE COVERED WITH TAPE, PLASTIC, SHEET METAL OR OTHER METHODS TO REDUCE THE AMOUNT OF DEBRIS WHICH MAY COLLECT IN THE SYSTEM. PROVIDE POLLUTANT CONTROL PER CAL GREEN 2022 CODES SECTION 5.504.1-4 FOR TEMPORARY VENTILATION, COVERING OF DUCT OPENINGS & PROTECTION OF MECHANICAL EQUIPMENT DURING CONSTRUCTION, & USE OF LOW VOC SEALANTS.

41. LIMIT USE OF PERMANENT HVAC SYSTEMS DURING CONSTRUCTION TO CONDITIONING NECESSARY FOR MATERIAL & EQUIPMENT INSTALLATION. IF PERMANENT HVAC IS USED DURING CONSTRUCTION, INSTALL MERV-8 FILTERS ON RETURNS, & REPLACE ALL FILTERS IMMEDIATELY PRIOR TO OCCUPANCY, OR, IF THE BUILDING IS OCCUPIED DURING ALTERATION, AT THE CONCLUSION OF CONSTRUCTION.

42. ALL SUPPLY, RETURN AND EXHAUST DUCT JOINTS SHALL BE SEALED PER CMC CHAPTER 6 REQUIREMENTS. SEAL CLASS A.

43. DUCTWORK CONSTRUCTION SHALL MEET THE FOLLOWING SYSTEM PRESSURE REQUIREMENTS: 2 INCH WATER COLUMN

44. DUCTWORK CONSTRUCTION SHALL BE INSTALLED & SEALED TO MEET THE REQUIREMENTS OF CMC SECS 601.0, 602.0, 603.0, 605.0; & ANSI, SMACNA HVAC DUCT CONSTRUCTION STANDARDS METAL & FLEXIBLE. DUCTWORK & ACCESSORIES WILL BE INSTALLED IN ACCORDANCE WITH NFPA 90A, NFPA 90B, ASHRAE HANDBOOK, & SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL & FLEXIBLE, UL 181 CERTIFIED & THE CMC & THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS AS APPLICABLE. MOUNTING & SUPPORTING OF EQUIPMENT, DUCTS, ACCESSORIES, & APPURTENANCES SHALL BE PROVIDED, INCLUDING STRUCTURAL SUPPORTS, HANGERS, STANDS, CLAMPS & BRACKETS. RECTANGULAR DUCTWORK SHALL BE SHEET METAL CONSTRUCTED OR SPIRAL ROUND.

45. WHERE OPENINGS HAVE BEEN MADE IN WALLS, FLOORS, OR CEILINGS FOR THE PASSAGE OF DUCTWORK OR PIPES, SUCH OPENINGS SHALL BE CLOSED AND PROTECTED BY THE INSTALLATION OF APPROVED METAL COLLARS SECURELY FASTENED TO THE ADJOINING STRUCTURE, ALL IN ACCORDANCE WITH CMC 316.11.

46. FLEXIBLE AIR DUCT SHALL NOT EXCEED FIVE FEET IN LENGTH TO RESPECTIVE DIFFUSERS, GRILLES, OR OTHER AIR DEVICES. FLEX DUCT SHALL NOT BE USED IN LIEU OF RIGID ELBOWS OR FITTINGS PER CMC SEC. 603.4.1. FLEXIBLE DUCT MAY BE USED AS AN ELBOW AT A TERMINAL DEVICE USING 'FLEX RIGHT' FOR SIZES 4" TO 16".

47. PROVIDE SEISMIC RESTRAINTS TO ALL DUCTWORK, PIPE, AND EQUIPMENT SUPPORTS IN ACCORDANCE WITH THE OSHPD (HCAI) PRE-APPROVED OPM# FOR SEISMIC RESTRAINT OF MECHANICAL SYSTEMS. SUSPENDED EQUIPMENT SHALL BE PROVIDED WITH SEISMIC ANCHORAGE AND ISOLATION SUPPORTS.

48. WHERE ANCHORAGE DETAILS ARE NOT SHOWN ON THE DRAWINGS THE FIELD INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER.

49. RECTANGULAR DUCT TURNS IN SUPPLY, RETURN, AND EXHAUST DUCTS SHALL HAVE TURNING VANES UNLESS OTHERWISE NOTED, OR SHALL HAVE A INNER RADIUS TURN OF NO LESS THAN THE WIDTH OF THE DUCT.

50. DUCTWORK HANDLING CONDITIONED AIR SHALL BE INSULATED OR LINED TO MEET CMC 605. INTERIOR DUCTWORK SHALL BE INSULATED WITH A NON-FIBROUS MATERIAL, R=4.2. ALL INSULATION SHALL HAVE A FLAME SPREAD OF NOT MORE THAN 25 AND A SMOKE DENSITY NOT EXCEEDING 50. ALL DUCT INSULATION SHALL COMPLY WITH 2022 BEES SECTION 120.4(A).

51. MANUAL VOLUME DAMPERS SHALL BE PROVIDED IN ALL DUCT BRANCHES TO INDIVIDUAL DIFFUSERS, GRILLES, AND REGISTERS, AS WELL AS OUTSIDE AIR INTAKE DUCTS. DAMPERS SHALL BE LOCATED AT THE BRANCH DUCT LOCATIONS. COORDINATE LOCATIONS OF DAMPERS WITH THE AIR BALANCING CONTRACTOR PRIOR TO BID, SO AS TO ENSURE ACCESSIBILITY AFTER INSTALLATION. IN LOCATIONS WHERE THESE DAMPERS ARE INACCESSIBLE, CABLE OPERATED ADJUSTMENT CONTROLS SHALL BE PROVIDED AT NO ADDITIONAL COST. OPPOSED BLADE DAMPERS SHALL NOT BE PERMITTED UNLESS OTHERWISE NOTED.

52. FOR INACCESSIBLE AREAS PROVIDE ACCESS PANELS FOR ALL DAMPERS, EQUIPMENT, SMOKE DETECTORS, & CONTROL DEVICES. THESE PANELS SHALL MATCH THE RATING OF THE WALL AND/OR CEILING THAT THEY ARE LOCATED IN. MINIMUM ACCESS PANEL SIZES SHALL BE 12"x12" FOR HAND ACCESS & 30"x30" MINIMUM FOR BODY ACCESS. WHERE A LARGER ACCESS PANEL IS REQUIRED DUE TO INSTALLATION CONSTRAINTS OR EQUIPMENT SIZE, DO SO AT NO ADDITIONAL COST & SHALL OBTAIN PRIOR APPROVAL FROM THE ARCHITECT, ENGINEER & DSA.

53. REMOVE ALL LEFT OVER DUCTWORK SCRAPS, ETC. (IF ANY) AND LEAVE PREMISES CLEAN AND FREE OF ANY TRASH OR DEBRIS DUE TO THEIR WORK.

54. INSULATED PIPES SHALL CONFORM TO 2022 BEES STANDARDS SECTION 120.3, TABLE 120.3-A. EXPOSED TO VIEW PIPING SHALL BE INSTALLED AND ENCLOSED AS FOLLOWS:
   54.1. EXPOSED TO WEATHER: PER ABOVE IF APPLICABLE, OR COVERED WITH E-FLEX GUARD AS MANUFACTURED BY AIREX MFGR INC. PROVIDING UV WEATHER PROTECTION AND VAPOR RETARDER. FOR COMBINED PIPE AND INSULATION THAT EXCEEDS 3.19", SUCH PIPING AND INSULATION SHALL BE PROTECTED BY PLASTIC PIPE INSULATION JACKETING WITH MANUFACTURERS FITTINGS.
   54.2. SLEEVE-SEAL SYSTEMS: FILL ANNULAR SPACE BETWEEN PIPING AND SLEEVE: EPDM RUBBER OR NPR AND CLAMPED WITH STAINLESS STEEL BAND.

55. CLAMPS USED ON INSULATED PIPES: INSULATION SHALL NOT BE CUT TO ACCOMMODATE PIPE CLAMPS. CLAMPS SHALL EXTEND OVER THE CIRCUMFERENCE OF THE INSULATION. AT ANCHORS THE INSULATION UNDER THE CLAMP SHALL BE OF A RIGID MATERIAL TO PREVENT CRUSHING OF INSULATION.

56. MECHANICAL, LIGHTING CONTROL, ENVELOPE AND PROCESS EQUIPMENT REQUIRING ACCEPTANCE TESTING SHALL BE PROVIDED BY CERTIFIED TECHNICIANS. SEE SHEET MECHANICAL TITLE 24 SHEETS FOR MECHANICAL ACCEPTANCE TESTING REQUIREMENT.

MECHANICAL SYMBOLS & ABBREVIATIONS

SYMBOL	ABBREVIATION	DESCRIPTION
	AFF	ABOVE FINISHED FLOOR
	AL	ACOUSTICALLY LINED
	AIR: EA	EXHAUST AIR
	AIR: OA	OUTSIDE AIR
	AIR: RA	RETURN AIR
	AIR: SA	SUPPLY AIR
	AUX	AUXILIARY
	BOD	BOTTOM OF DUCT
	BTUH	BRITISH THERMAL UNITS PER HOUR
		CONTROLLER
	CFM	CUBIC FEET PER MINUTE
○—	BDD	DAMPER: BACKDRAFT
—▯—	MVD	DAMPER: MANUAL VOLUME
Ø	DIA	DIAMETER
	DN	DOWN
	DS	DISCONNECT SWITCH
	EER	ENERGY EFFICIENCY RATIO
	FLEX DUCT	▯▯▯▯▯
	HP	HORSEPOWER
	kBTUH	BRITISH THERMAL UNITS IN THOUSANDS
	LBS	POUNDS
	LVR	LOUVER
	MAX	MAXIMUM
	MIN	MINIMUM
	MCA	MINIMUM CIRCUIT AMPACITY
	MOP	MAXIMUM OVERCURRENT PROTECTION
	NCC	NET COOLING CAPACITY
	NFA	NET FREE AREA
	NHC	NET HEATING CAPACITY
	NTCC	NOMINAL TOTAL COOLING CAPACITY
	NTHC	NOMINAL TOTAL HEATING CAPACITY
	REF	REFERENCE
	RL	REFRIGERANT LIQUID
	RS	REFRIGERANT SUCTION
	ϕ	PHASE
	SEER	SEASONAL EER
	SAD	SEE ARCHITECTURAL DRAWING
	SED	SEE ELECTRICAL DRAWING
	SPD	SEE PLUMBING DRAWING
	SSD	SEE STRUCTURAL DRAWING
⊂T⊃		SENSOR: TEMPERATURE / THERMOSTAT @42" AFF
	TCC	TOTAL COOLING CAPACITY
	THC	TOTAL HEATING CAPACITY
	TYP	TYPICAL
	UON	UNLESS OTHERWISE NOTED
	WT	WEIGHT
	24x12	RECTANGULAR DUCT - INCHES
	12"	ROUND DUCT - INCHES
— — — —		WIRING AND CONDUIT BY ELECTRICAL CONTRACTOR.
———		CONDUIT, WIRING AND FINAL CONNECTION BY MECHANICAL OR CONTROL CONTRACTOR.
Ⓔ		FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR.
Ⓜ		FURNISHED AND INSTALLED BY MECHANICAL OR CONTROL CONTRACTOR
ⓂⒺ		FURNISHED BY MECHANICAL/CONTROL CONTRACTOR, INSTALLED BY ELECTRICAL CONTRACTOR

SHEET INDEX

M0.0 MECHANICAL FRONT SHEET
M0.01 MECHANICAL SCHEDULES
M1.01 VRS PIPING AND WIRING
M1.02 MECHANICAL DETAILS
M2.01 MECHANICAL FLOOR PLAN
EMT24.1 ENVELOPE & MECHANICAL TITLE 24
EMT24.2 ENVELOPE & MECHANICAL TITLE 24

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REGISTERED PROFESSIONAL ENGINEER — MARK C. HAYS — No. M20245 — 3/9/2026 — Signed — MECHANICAL — STATE OF CALIFORNIA

REVISIONS

1	03/04/2026	ADDENDUM #1
2		
3		

MECHANICAL FRONT SHEET

NEW BRADLEY LIBRARY & RESILIENCY CENTER

COUNTY OF MONTEREY & MONTEREY COUNTY FREE LIBRARIES
65607 DIXIE ST, BRADLEY, CA 93426

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DATE: 10/23/2025

JOB NO: 23014

M0.00

VARIABLE REFRIGERANT SYSTEM (HEAT RECOVERY) (OUTDOOR UNIT)

EQUIP ID	DAIKIN MODEL NO	TCC (BTUH @ ARI)	HOLDING REFRIGERANT CHARGE - LBS (R-410A)	IEER	TOTAL HEATING CAPACITY @ ARI (BTUH)	COP	ELECT V/ϕ	MCA	MOP	OPER WEIGHT (LBS)
VRS-1	REYQ96AATJB	96,000	25.8	30	108,000	4.3	208/3	34.1	35	710

BRANCH SELECTOR BOX (BS)

EQUIP ID	DAIKIN MODEL NO	NO OF BRANCHES	ELECT V/ϕ	MCA	MOP	CONDENSATE DRAIN LINE SIZE	OPER WEIGHT (LBS)	OVERALL DIMENSIONS (Height x Width x Depth) IN x IN x IN
BS-1	BS4Q54TAVJ	4	208/1	0.6	15	NONE	73	9-1/2 x 23-3/8 x 23-3/4

VARIABLE REFRIGERANT SYSTEM FAN COIL (INDOOR UNIT)

EQUIP ID	AREA SERVED	DAIKIN MODEL NO	REFRIG	CFM @ .75" ESP	NOMINAL TCC (BTUH @ ARI)	NOMINAL HEATING CAPACITY @ ARI (BTUH)	MCA	MOP	ELECT V/ϕ	CONDENSATE DRAIN LINE SIZE (IN)	OPER WEIGHT (LBS)
FC-1	COMMUNITY RM 101	FXTQ42PA	R410A	1,300	42,000	46,000	6.5	15	208/1	3/4	150
FC-2	PROGRAMMING RM 100	FXTQ48PA	R410A	1,400	48,000	54,000	6.5	15	208/1	3/4	150

ACCESSORIES:
ALL CEILING CASSETTES FURNISHED WITH STANDARD DECORATION PANEL, SENSOR KIT (BRYQ60AAW), NAVIGATION REMOTE CONTROLLER (BRC1E73)
ALL NON CEILING CASSETTES FURNISH WITH MADOKA REMOTE CONTROL (BRC1H71W)

FAN SCHEDULE

EQUIP ID	AREA SERVED	GREENHECK MODEL	CFM	ESP (IN H_20)	ELECTRICAL		OPW (LBS)	NOTES
					V/ϕ	WATTS		
EF-1	STAFF RR 107	SP-LP0511	80	0.25	120/1	12	19	FAN ACTIVATED/DEACTIVATED BY LIGHTS
EF-2	FAMILY RR 103	SP-LP0511	80	0.25	120/1	12	19	FAN ACTIVATED/DEACTIVATED BY LIGHTS

ACCESSORIES:
WALL CAP

AIR DISTRIBUTION

ITEM	MFR	MODEL NO	TYPE	MAX SP DROP (INWC)	MAX NC LEVEL	BORDER MATERIAL	CEILING TYPE	NECK SIZE INCHES	OVERALL DIMENSIONS IN x IN	OPER WT (LB)
CSD	TITUS	OMNI	CEILING SUPPLY DIFFUSER	0.1	30	STEEL	T-BAR	SEE PLANS	24x24	15
CR	TITUS	PAR	CEILING RETURN, 24x24	0.1	30	STEEL	T-BAR	SEE PLANS	24x24	15
CRG	TITUS	530	CEILING RETURN	0.1	30	STEEL	HARD LID	SEE PLANS	SEE PLANS	15

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No. M20245
3/9/2026
Signed
MECHANICAL
STATE OF CALIFORNIA

REVISIONS
1 03/04/2026 ADDENDUM #1
2
3

MECHANICAL SCHEDULES

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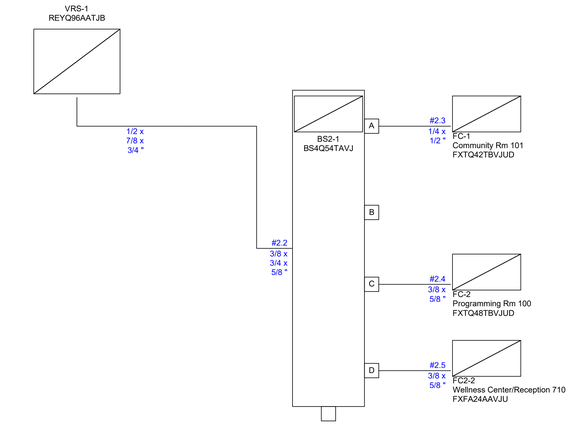
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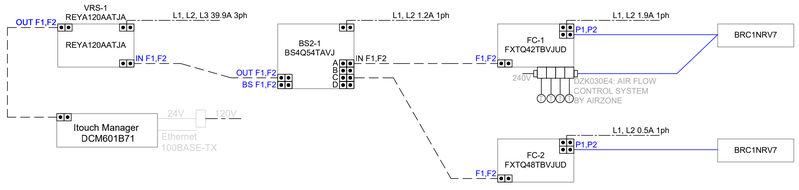
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JOB NO: 23014

M0.01



VRS PIPING DIAGRAM 1



VRS WIRING DIAGRAM 2

SEQUENCE OF OPERATION

iTOUCH MANGER

iTOUCH MANAGER SHALL BE CONNECTED TO THE INTERNET FOR REMOTE CONTROL, PROGRAMMING ETC BY THE USER.

GENERAL

A. THE iTOUCH MANGER SHALL INITIATE THE SYSTEM ENGAGING THE VRS UNIT TO START BRINGING THE BUILDING TO A STABLE INDOOR TEMPERATURE AND ALSO OPEN THE OUTDOOR DAMPERS FOR A ONE HOUR PURGE FOR A ONE HOUR PRIOR TO NORMAL OCCUPANCY.
B. THE LOCAL THERMOSTATS SHALL INITIATE A HEATING OR COOLING DEMAND WHENEVER THE THE ROOM DEVIATES FROM SETPOINT.
C. FANS SHALL RUN CONTINUOUSLY DURING OCCUPIED HOURS.

SETPOINTS:
HEATING: 70°F
COOLING: 74°F

VRS REQUIREMENTS AND NOTES

CONTRACTOR'S QUALIFICATIONS

THE INSTALLING MECHANICAL CONTRACTOR SHALL SHOW HAVING SUCCESSFULLY INSTALLED A MINIMUM OF TWO DAIKIN SYSTEM PROJECTS WITHIN THE LAST 5 YEARS. PROVIDE FOR APPROVAL, PRIOR TO CONSTRUCTION.A WRITTEN STATEMENT INDICATING THE PROJECT NAMES, DATES COMPLETED, OWNER'S NAME AND CONTACT INFORMATION.

INSTALLER QUALIFICATIONS

INSTALLERS FOR THE DAIKIN SYSTEM SHALL HAVE AT LEAST ONE PERSON FACTORY TRAINED AND CERTIFIED FOR INSTALLATION AND SERVICE OF THE DAIKIN SYSTEM BY DAIKIN. THIS PERSON SHALL AT ALL TIMES SUPERVISE THE INSTALLATION OF ALL OTHER INSTALLERS AND ASSURE ALL WORK IS DONE IN ACCORDANCE WITH DAIKIN REQUIREMENTS. ALL OTHER INSTALLERS SHALL BE TRAINED AND CERTIFIED IN HVAC INSTALLATION (INCLUDING BUT NOT LIMITED TO REFRIGERANT PIPING AND CONTROLS) BY A NATIONAL OR REGIONALLY RECOGNIZED ORGANIZATION. PROVIDE FOR APPROVAL, PRIOR TO CONSTRUCTION, COPIES OF INSTALLERS CERTIFICATES OR OTHER PROOF OF QUALIFICATIONS.

PIPING

REFRIGERANT PIPING (REFER TO SPECIFICATION 23 23 00 FOR ADDITIONAL INFORMATION)

A. SEAMLESS COPPER TUBING, ASTM B280, TYPE L - ACR, CLEAN, DRY NITROGEN CHARGED AND CAPPED FROM FACTORY.
B. AT FAN COILS TO HEAT RECOVERY BRANCH CONTROLLERS: SOFT COIL COPPER PIPE WITH PRE-INSULATED WITH 3/4" THICK INSULATION ON BOTH VAPOR AND LIQUID LINES.
C. FROM BRANCH CONTROLLERS TO OUTDOOR UNITS: HARD DRAWN COPPER PIPE WITH FIELD APPLIED 1-1/2" THICK INSULATION ON HIGH PRESSURE VAPOR LINES, AND 3/4" THICK ON LOW PRESSURE VAPOR AND LIQUID LINES. AT OUTDOOR PIPING PROVIDE PVC JACKETING OVER INSULATION, INSTALLED BY CONTRACTOR WHO SPECIALIZES IN INSTALLING INSULATION PRODUCT. USE ONLY LONG RADIUS ELBOWS ON THE SUCTION LINE PIPES.

REFRIGERANT PIPING INSTALLATION (REFER TO SPECIFICATION 23 23 00 FOR ADDITIONAL INFORMATION)

A. INSTALL ALL PIPING IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS AND THE REQUIREMENTS OF THIS SPECIFICATION.
B. INSTALL PIPING AS SHORT AND DIRECT AS POSSIBLE, WITH MINIMUM NUMBER OF JOINTS, ELBOWS AND FITTINGS. PIPING SHALL BE INSTALLED IN A WORKMANSHIP MANNER AND PARALLEL WITH THE BUILDING LINES UNLESS NOTED OTHERWISE.
C. PITCH ALL LINES BACK TOWARDS THE OUTDOOR UNIT UNLESS REQUIRED OTHERWISE BY THE MANUFACTURER.
D. LABEL EACH LINE SET TO BRANCH CONTROLLER WITH SEATON PRINTED LABELS WITH 1/2" LETTERING OR EQUAL. HAND WRITTEN LABELS WILL NOT BE ACCEPTABLE.
E. COPPER TO COPPER JOINTS SHALL BE BRAZED WITH COPPER-PHOSPHOROUS BRAZING ALLOY CONTAINING MINIMUM OF 15% SILVER, AND DURING ALL BRAZING AN INERT GAS (SUCH AS DRY NITROGEN OR ARGON) SHALL BE CONTINUOUSLY PASSED THROUGH THE SYSTEM AT A FLOW RATE SUFFICIENT TO MAINTAIN AN OXYGEN FREE ENVIRONMENT TO PREVENT THE FORMATION OF COPPER OXIDE SCALE INSIDE THE PIPING.
F. STRICTLY FOLLOW MANUFACTURE'S INSTRUCTIONS FOR PRESSURE TESTING, EVACUATION AND CHARGING OF THE SYSTEM, PRESSURIZE THE SYSTEM WITH 600 PSI OF NITROGEN, AND VERIFY IT MAINTAINS THE PRESSURE FOR 24 HOURS BEFORE PROCEEDING WITH EVACUATION. WITH A THERMISTOR VACUUM GAUGE INSTALLED, TRIPLE EVACUATE THE SYSTEM TO 350 MICRONS FOR 2 HOUR. KEEP A LOG OF THE TIME AND DATE OF THE TESTING FOR THE COMMISSIONING REPORT.
G. KEEP TRACK OF THE REFRIGERANT LINE LENGTHS. VERIFY THE TOTAL LINE LENGTHS ARE LESS THAN THE SCHEDULED LINE LENGTHS. NOTIFY THE ENGINEER IF THE LINE LENGTHS ARE EXCEEDED FOR VERIFICATION BEFORE PROCEEDING. CAREFULLY CALCULATE THE REFRIGERANT CHARGE PER THE MANUFACTURER'S INSTRUCTIONS. KEEP WRITTEN LOG OF THE ADDED REFRIGERANT CHARGE (WITH DOCUMENTATION IN DAIKIN SERVICE MANUAL).
H. FLARE TUBING AT FITTINGS SHALL BE CAREFULLY DONE PER DAIKIN SERVICE MANUAL. CAREFULLY CHECK EACH FLARE TO MEET DAIKIN SPECIFICATION, ALSO USE REFRIGERANT OIL ON THE FLARING TOOL TO PREVENT FLARE SPLITTING.

PIPE INSULATION (REFER TO SPECIFICATION SECTION 23 07 19)

ARMACELL AP ARMAFLEX EXPANDED CLOSE CELL FLEXIBLE ELASTOMERIC INSULATION WITH 0.27 BTU-IN/HR FT^2 °F THERMAL CONDUCTIVITY OR APPROVED EQUAL.

PIPING SUPPORTS (REFER TO SPECIFICATION SECTION 23 0 00 & DETAILS HEREIN)

UNISTRUT, SUPERSTRUT OR APPROVED EQUAL. FRAMING CHANNELS, RELATED HANGER PARTS, RODS, BOLTS AND NUTS ARE TO BE "GOLDGALV" ELECTRO PLATED ZINC.

FLARE CONNECTIONS

PROVIDE SOLID FORGED BRASS FLARE FITTINGS BY PARKER OR MUELLER BRASS.

CONTROLS

CONTROL WIRING

A. BETWEEN THE CONTROLLER (THERMOSTAT) AND FAN COIL SHALL BE 18 GAUGE STRANDED, UNSHIELDED 2 CONDUCTOR PLENUM RATED CABLE.
B. TRANSMISSION CABLE S (COMMUNICATION, M-NET) - 16 GAUGE, STRANDED, SHIELDED 2 CONDUCTOR PLENUM RATED CABLE.

CONTROL WIRING INSTALLATION

A. WIRING INSTALLED IN CEILING/ATTIC, FLOORS OR WALLS SHALL BE NEATLY STAPLED TO FRAMING AND WITH BUILDING LINES. DO NOT STRING CABLES ACROSS ATTIC OR CRAWL SPACES WHERE THEY CAN BE DAMAGED. KEEP WRITTEN LOG OF WIRE LENGTHS TO VERIFY LENGTHS DO NOT EXCEED MANUFACTURER'S REQUIREMENTS.
B. WIRING NOT CONCEALED IN WALL, FLOORS OR CEILING/ATTICS SHALL BE INSTALLED IN EMT CONDUIT. INSTALL FLEXIBLE CONDUIT TO UNITS ARE ON ISOLATORS.
C. TAG ALL CABLES WITH ROOM OR EQUIVALENT INFORMATION FOR USE IN TROUBLESHOOTING.

PC AND WEB MONITORING

PROVIDE CENTRAL CONTROL THROUGH iTOUCH MANGER SOFTWARE CONNECTED TO OWNER'S LOCAL AREA NETWORK. SET UP SOFTWARE TO EMAIL BUILDING OPERATIONS WITH PROBLEMS (SUCH AS IF THE AIR FILTER NEEDS CHANGING, OR POWER LOSS TO EQUIPMENT, ETC.)

START-UP AND COMMISSIONING

A. CONTRACTOR SHALL PERFORM START-UP AND COMMISSIONING PER MANUFACTURER'S REQUIREMENTS.
B. MANUFACTURER'S SERVICE REP SHALL BE PRESENT AT FIRST START-UP FOR ASSISTANCE AND TO VERIFY INSTALLATION. ALSO REP SHALL BE AVAILABLE FOR TWO (2) ADDITIONAL SITE VISITS THEREAFTER.
C. CONTRACTOR SHALL OWN AND USE THE DAIKIN START-UP AND TROUBLESHOOTING PROCEDURES FOR DOCUMENTATION.
D. CONTRACTOR SHALL KEEP A LOG BOOK (AN ORGANIZED 3-RING BINDER) WITH ALL DOCUMENTS RELATED TO THE INSTALLATION, START-UP AND COMMISSIONING. THE LOG BOOK SHALL BE LEFT ON THE JOBSITE AND BECOME THE PROPERTY OF THE OWNER. THE LOG BOOK SHALL CONTAIN THE DAIKIN COMMISSIONING REPORT AND THE FOLLOWING AT A MINIMUM:
   - INSTALLATION DATA, SYSTEM AND INSTALLATION STATUS.
   - EVACUATION DETAILS AND METHOD STATEMENT.
   - PRESSURE TEST METHOD STATEMENT.
   - OUTDOOR UNIT OPERATION STATUS.
   - THE INSTALLED REFRIGERANT LINE LENGTHS.
   - HEIGHT DIFFERENCES BETWEEN UNITS.
   - THE INSTALLED COMMUNICATION CABLING LENGTHS.
E. SUBMIT REPORT TO COMMISSIONING AGENT FOR REVIEW UPON COMPLETION.

IDENTIFICATION OF EQUIPMENT

SEE SPECIFICATION SECTION 23 05 53.

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CONSULTANT JOB NO:
23049.00

REGISTERED PROFESSIONAL ENGINEER — MARK L. HAYES — No. M20245 — 3/9/2026 — Signed — MECHANICAL — STATE OF CALIFORNIA

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1	03/04/2026	ADDENDUM #1
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3		

VRS PIPING AND WIRING

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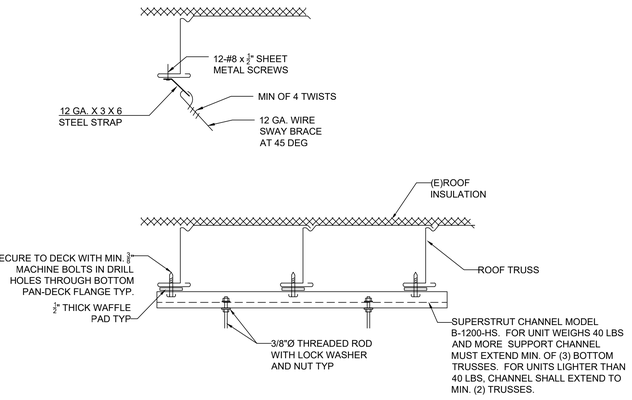
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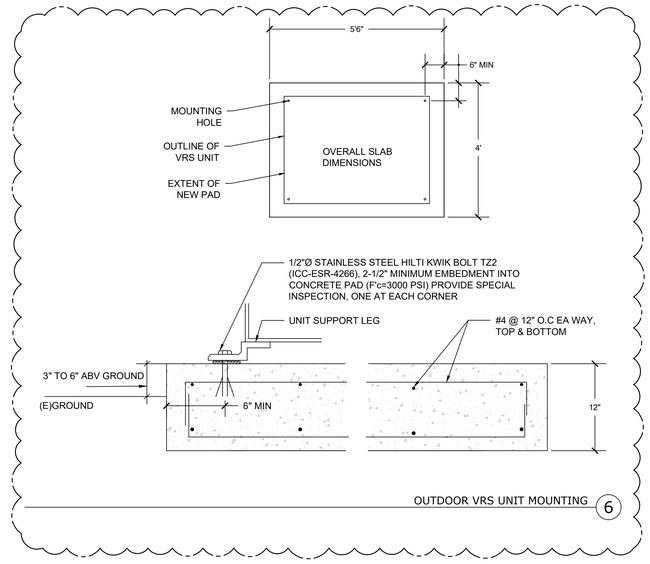
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UPPER ATTACHMENT TO ROOF TRUSS SYSTEM 5



OUTDOOR VRS UNIT MOUNTING 6

NOTES:

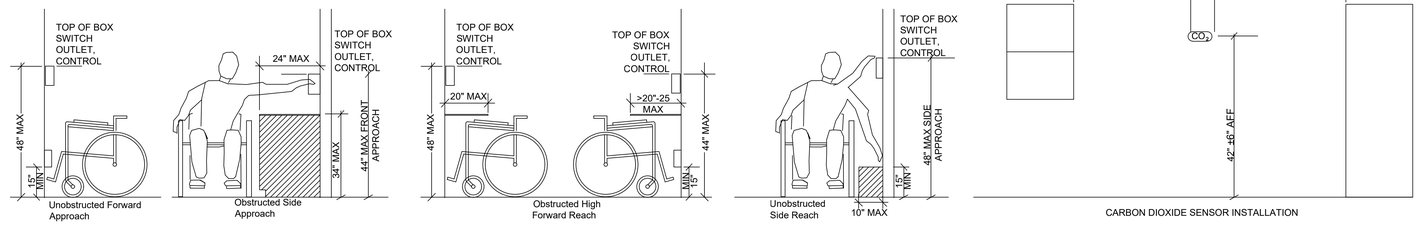
ELECTRICAL RECEPTACLE OUTLETS ON BRANCH CIRCUITS OF 30 AMPERES OR LESS AND COMMUNICATION SYSTEM RECEPTACLES SHALL BE LOCATED NO MORE THAN 48 INCHES MEASURED FROM THE TOP OF THE RECEPTACLE OUTLET BOX NOR LESS THAN 15 INCHES MEASURED FROM THE BOTTOM OF THE RECEPTACLE OUTLET BOX TO THE LEVEL OF THE FINISHED FLOOR OR WORKING PLATFORM. (2022 CBC §11B-308.1.1 & §11B-308.1.2).

CONTROL CONDUIT & WIRING:

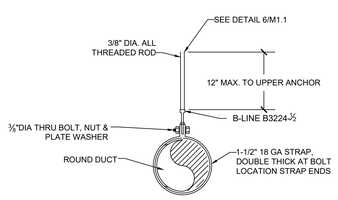
ALL CONTROL WIRING EXPOSED TO VIEW SHALL BE INSTALLED IN EMT AS PROVIDED AND INSTALLED BY THE CONTROLS CONTRACTOR. REFER TO ELECTRICAL DIVISION 26.

LEGEND

(E)------ FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR
(F)—— FIELD INSTALLED WIRING BY MECHANICAL CONTRACTOR



CONTROL DEVICE MOUNTING 5



NOTES:

INSTALLATION SHALL COMPLY W/ LATEST SMACNA STANDARDS. SUBMIT SHOP DRAWINGS FOR MOUNTING TO ENGINEER. ALL ALTERNATE INSTALLATIONS SHALL BE APPROVED BY ENGINEER AND DSA.

ONLY DUCTS WITH CROSS SECTIONAL AREAS OF 6 SQFT AND LARGER SHALL BE SEISMICALLY SWAY BRACED.

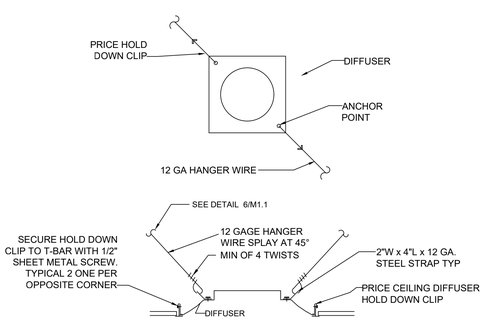
TRANSVERSE AND LONGITUDINAL BRACING SHALL BE SPACED AT MAXIMUM OF 50' INTERVALS

EXCEPTION: NO BRACING IS REQUIRED IF THE DUCT IS SUSPENDED BY HANGER 12" OR LESS IN LENGTH, AS MEASURED FROM THE TOP OF THE DUCT TO THE BOTTOM OF THE SUPPORT ATTACHMENT

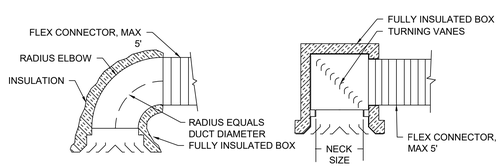
NOTE:
12 GA. SWAY BRACING IS NOT REQUIRED WHEN SUPPORT IS LESS THAN 12" IN LENGTH

ROUND DUCT SUPPORT SPACING @ 12'-0" O.C. MAXIMUM 6'-0" FROM ENDS.
RECTANGULAR DUCT SUPPORT SPACING @ 10'-0" O.C. MAXIMUM 6'-0" FROM ENDS

DUCT SUPPORT 4



CEILING DIFFUSER INSTALLATION 3

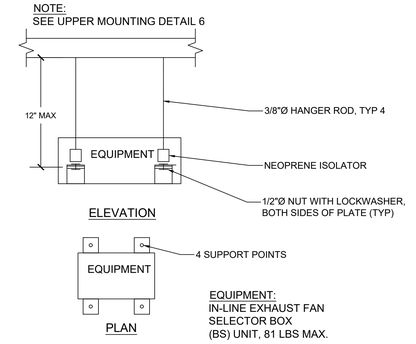


ALTERNATE WHERE SPACE PERMITS

CEILING DIFFUSER SHOWN, CEILING REGISTER SIMILAR

NOTES:
T-BAR INSTALLATION: USE 12 GA WIRE FOR REGISTERS AND GRILLES UP TO 24"x24".

CEILING DIFFUSER CONNECTION 2



ABOVE CEILING EQUIPMENT MOUNTING 1

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REGISTERED PROFESSIONAL ENGINEER JEREMY C. PAGE No. M20245 3/9/2026 Signed MECHANICAL STATE OF CALIFORNIA

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MECHANICAL DETAILS

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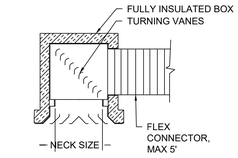
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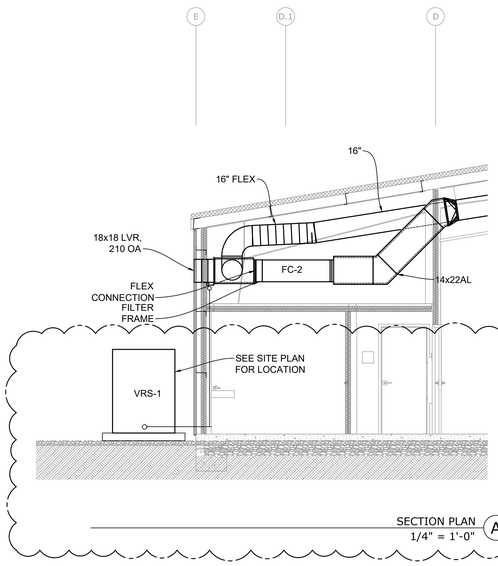
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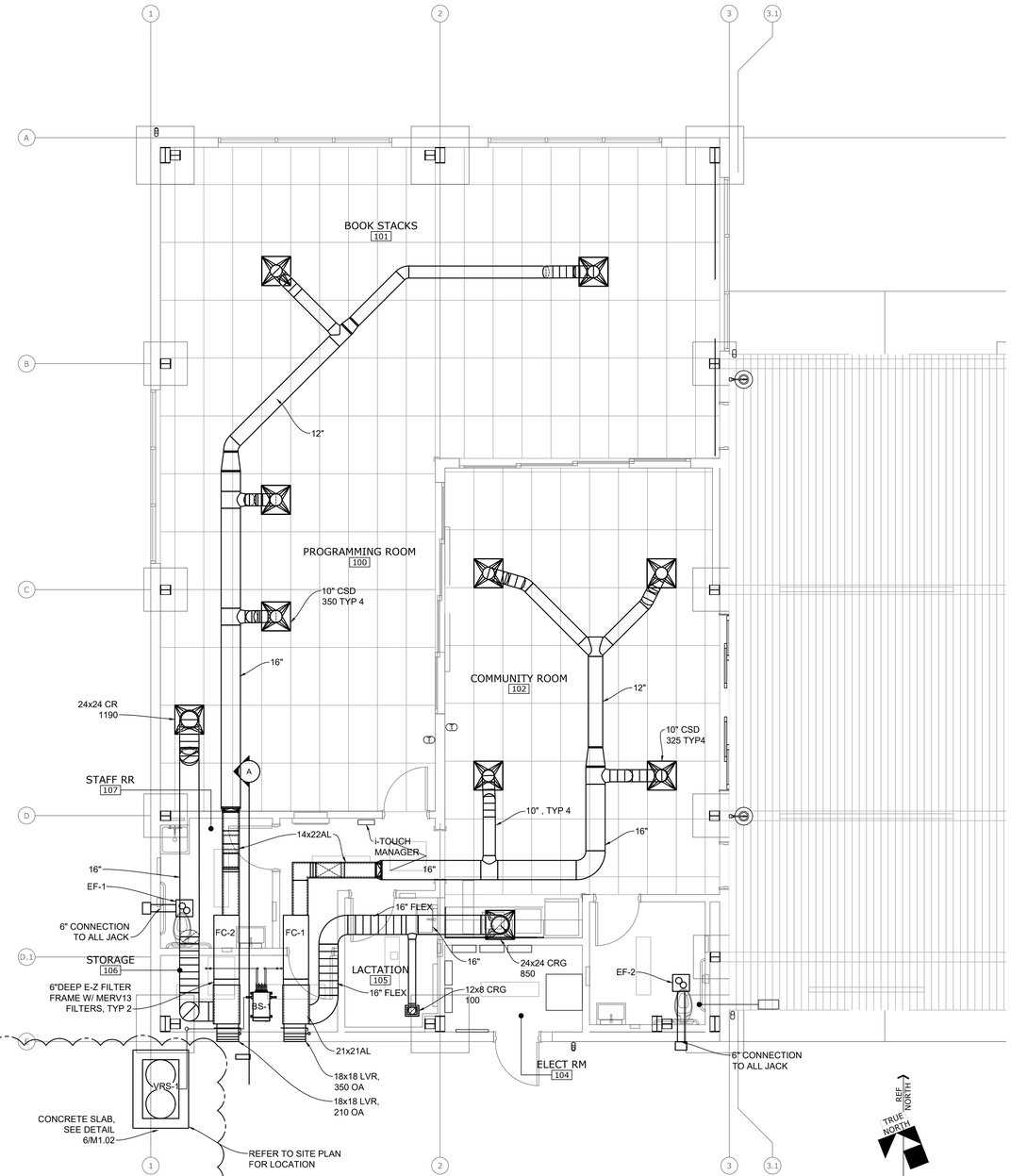


CEILING DIFFUSER SHOWN,
CEILING REGISTER SIMILAR

CEILING DIFFUSER CONNECTION C
NO SCALE



SECTION PLAN A
1/4" = 1'-0"



MECHANICAL FLOOR PLAN 1
1/4" = 1'-0"

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MECHANICAL FLOOR PLAN

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CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 1 of 16)

Project Name: Bradley Library & Resiliency Center **Date Prepared:** 2025-10-15

A. General Information

1	Project Name	Bradley Library & Resiliency Center			
2	Run Title	Title 24 Analysis			
3	Project Location	65607 Dixie St			
4	City	Bradley	5	Standards Version	Compliance 2022
6	Zip code	93426	7	Compliance Software (version)	EnergyPro 9.4
8	Climate Zone	4	9	Building Orientation (deg)	0
10	Building Type(s)	• Nonresidential	11	Weather File	PASO-ROBLES_STYP20.epw
12	Project Scope	• New envelope and mechanical	13	Number of Dwelling Units	0
14	Total Conditioned Floor Area in Scope (ft²)	2499	15	Total # of hotel/motel rooms	0
16	Total Unconditioned Floor Area (ft²)	0	17	Fuel Type	Natural gas
18	Nonresidential Conditioned Floor Area	2499	19	Total # of Stories (Habitable Above Grade)	1
20	Residential Conditioned Floor Area	0			

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 2 of 16)

B. PROJECT SUMMARY

Table B shows which building components are included in the performance calculation. If indicated as not included, the project must show compliance prescriptively if within the permit application.

Building Components Complying via Performance					Building Components Complying Prescriptively	
Envelope (See Table G)	Nonres	Performance	Solar Thermal Water Heating (See Table I3)	☐ Performance	The following building components are ONLY eligible for prescriptive compliance and should be documented on the NRCC form listed if within the scope of the permit application (i.e. compliance will not be shown on the NRCC-PRF-E).	
	MultiFam	Not Included		☒ Not Included		
Mechanical (See Table H)	Nonres	Performance	Covered Process: Commercial Kitchens (see Table J)	☐ Performance	Indoor Lighting (Unconditioned) 140.6 & 170.2(e)	NRCC-LTI-E is required
	MultiFam	Not Included		☒ Not Included	Outdoor Lighting 140.7 & 170.2(e)	NRCC-LTO-E is required
Domestic Hot Water (See Table I)	Nonres	Performance	Covered Process: Laboratory Exhaust (see Table J)	☐ Performance	Sign Lighting 140.8 & 170.2(e)	NRCC-LTS-E is required
	MultiFam	Not Included		☒ Not Included	**Building Components Complying with Mandatory Measures**	
Lighting (Indoor Conditioned, see Table K)	Nonres	Not Included	Photovoltaics (see Table F)	☐ Performance	Electrical power systems, commissioning, solar ready, elevator and escalator requirements are mandatory and should be documented on the NRCC form listed if applicable (i.e. compliance will not be shown on the NRCC-PRF-E.)	
	MultiFam	Not Included		☒ Not Included	Electrical Power Distribution 110.11	NRCC-ELC-E is required
			Battery (see Table F)	☐ Performance	Commissioning 120.8	NRCC-CXR-E is required
				☒ Not Included	Solar and Battery 110.10	NRCC-SAB-E is required

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 3 of 16)

C1. COMPLIANCE SUMMARY

COMPLIES[3]	Time Dependent Valuation (TDV)		Source Energy Use
	Efficiency[1] (kBtu/ft² - yr)	Total[2] (kBtu/ft² - yr)	Total[2] (kBtu/ft² - yr)
Standard Design	239.02	239.02	22.29
Proposed Design	183.31	183.31	16.34
Compliance Margins	**55.71**	**55.71**	**5.95**
	Pass	**Pass**	**Pass**

[1] Efficiency measures include improvements like a better building envelope and more efficient equipment
[2] Compliance Totals include efficiency, photovoltaics and batteries
[3] New Construction, Complete Addition Scope: Building complies when all efficiency and total compliance margins are greater than or equal to zero and unmet load hour limits are not exceeded
Existing, Addition and Alteration Scope: Building complies when efficiency compliance margin is greater than or equal to zero and unmet load hour limits are not exceeded

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 4 of 16)

C2. TDV ENERGY COMPLIANCE RESULTS FOR PERFORMANCE COMPONENTS (Annual TDV Energy Use, kBtu/ft² - yr)

COMPLIES[2]			
Energy Component	**Standard Design (TDV)**	**Proposed Design (TDV)**	**Compliance Margin (TDV)[1]**
Space Heating	26.45	29.51	-3.06
Space Cooling	57.22	27.38	29.84
Indoor Fans	98.23	70.21	28.02
Heat Rejection	0	0	0
Pumps & Misc.	0	0	0
Domestic Hot Water	16.33	15.42	0.91
Indoor Lighting	40.79	40.79	0
Flexibility	---	---	---
EFFICIENCY COMPLIANCE TOTAL	**239.02**	**183.31**	**55.71 (23.3%)**
Photovoltaics	---	---	---
Batteries	---	---	---
TOTAL COMPLIANCE	**239.02**	**183.31**	**55.71 (23.3%)**

[1] Notes: This number in parenthesis following the Compliance Margin in column 4, represents the Percent Better than Standard.

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 5 of 16)

C3. TDV ENERGY RESULTS FOR NON-REGULATED COMPONENTS[1]

Non-Regulated Energy Component	Standard Design (TDV)	Proposed Design (TDV)	Compliance Margin (TDV)[1]
Receptacle	77.35	77.35	---
Process	---	---	---
Other Ltg	---	---	---
Process Motors	---	---	---
TOTAL (TOTAL COMPLIANCE + NON-REGULATED COMPONENTS)	**316.37**	**260.66**	**55.71 (17.6%)**

[1] Notes: This table is not used for Energy Code Compliance.

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 6 of 16)

C4. SOURCE ENERGY COMPLIANCE RESULTS FOR PERFORMANCE COMPONENTS (Annual SOURCE Energy Use, kBtu/ft² /yr)

COMPLIES[2]			
Energy Component	**Standard Design (SOURCE)**	**Proposed Design (SOURCE)**	**Compliance Margin (SOURCE)[1]**
Space Heating	3.84	4.31	-0.47
Space Cooling	1.84	0.98	0.86
Indoor Fans	9.24	6.58	2.66
Heat Rejection	0	0	0
Pumps & Misc.	0	0	0
Domestic Hot Water	4.22	1.32	2.9
Indoor Lighting	3.15	3.15	0
Flexibility	---	---	---
EFFICIENCY COMPLIANCE TOTAL	**22.29**	**16.34**	**5.95 (26.7%)**
Photovoltaics	---	---	---
Batteries	---	---	---
TOTAL COMPLIANCE	**22.29**	**16.34**	**5.95 (26.7%)**

[1] Notes: This number in parenthesis following the Compliance Margin in column 4, represents the Percent Better than Standard.

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 7 of 16)

C5. SOURCE ENERGY RESULTS FOR NON-REGULATED COMPONENTS[1]

Non-Regulated Energy Component	Standard Design (SOURCE)	Proposed Design (SOURCE)	Compliance Margin (SOURCE)[1]
Receptacle	5.59	5.59	---
Process	---	---	---
Other Ltg	---	---	---
Process Motors	---	---	---
TOTAL (TOTAL COMPLIANCE + NON-REGULATED COMPONENTS)	**27.88**	**21.93**	**5.95 (21.3%)**

[1] Notes: This table is not used for Energy Code Compliance.

C6. 'ABOVE CODE' QUALIFICATIONS

☐ This project is pursuing CalGreen Tier 1 ☐ This project is pursuing CalGreen Tier 2

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 8 of 16)

C7. ENERGY USE SUMMARY

Energy Component	Standard Design Site (MWh)	Proposed Design Site (MWh)	Margin (MWh)	Standard Design Site (MBtu)	Proposed Design Site (MBtu)	Margin (MBtu)
Space Heating	2.1	2.3	-0.2	---	---	---
Space Cooling	3.2	1.7	1.5	---	---	---
Indoor Fans	8.6	6.2	2.4	---	---	---
Heat Rejection	---	---	---	---	---	---
Pumps & Misc.	---	---	---	---	---	---
Domestic Hot Water	0.6	1.5	-0.9	9.7	---	---
Indoor Lighting	4.1	4.1	0	---	---	---
Flexibility	---	---	---	---	---	---
EFFICIENCY TOTAL	**18.6**	**15.8**	**2.8**	**9.7**	**0**	**9.7**
Photovoltaics	---	---	---	---	---	---
Batteries	---	---	---	---	---	---
ENERGY USE SUBTOTAL	**18.6**	**15.8**	**2.8**	**9.7**	**0**	**9.7**
Receptacle	7.9	7.9	0	---	---	---
Process	---	---	---	---	---	---
Other Ltg	---	---	---	---	---	---
Process Motors	---	---	---	---	---	---
ENERGY USE TOTAL	**26.5**	**23.7**	**2.8**	**9.7**	**0**	**9.7**

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 9 of 16)

C8. ENERGY USE INTENSITY (EUI)

	Standard Design (kBtu/ft² / yr)	Proposed Design (kBtu/ft² / yr)	Margin (kBtu/ft² / yr)	Margin Percentage
GROSS EUI[1]	40.06	32.36	7.7	19.22
NET EUI[1]	40.06	32.36	7.7	19.22

[1] Notes: Gross EUI is Energy Use Total (not including PVJ/Total Building Area. Net EUI is Energy Use Total (including PV)/Total Building Area.

D1. EXCEPTIONAL CONDITIONS

• The aged solar reflectance and aged thermal emittance must be listed in the Cool Roof Rating Council database of certified products. For projects where initial reflectance is used, the initial reflectance must be listed, and the aged reflectance is calculated by the software program and used in the compliance model.
• The project uses the Simplified Geometry Performance Modeling Approach which is not capable of modeling daylighting controls and assumes the prescriptive Secondary Daylit Control requirements are met. PRESCRIPTIVE COMPLIANCE documentation (form NRCC-LTI-02-E) for the requirements of section 140.6(d) Automatic Daylighting Controls in Secondary Daylit Zones is required.
• PV/Battery Building Type has been modified from software defaults for one or more spaces. Review project's PV/Battery Building Type(s) with documentation author. Refer to Energy Code section 140.10 for Nonresidential or 170.2(g) for more information.

G1. ENVELOPE GENERAL INFORMATION (conditioned spaces only)

01	02	03	04
Opaque Surfaces & Orientation	**Total Gross Surface Area (ft²)**	**Total Fenestration Area (ft²)**	**Window to Wall Ratio (%)**
North-Facing[1]	561	216	38.5
East-Facing[2]	770.25	180	23.37
South-Facing[3]	360	0	0
West-Facing[4]	438	24	5.48

Notes
[1]North-Facing is oriented to within 45 degrees of true north, including 4500'00" east of north (NE), but excluding 4500'00" west of north (NW),
[2]East-Facing is oriented to within 45 degrees of true east, including 4500'00" south of east (SE), but excluding 4500'00" north of east (NE),
[3]South-Facing is oriented to within 45 degrees of true south, including 4500'00" west of south (SW), but excluding 4500'00" east of south (SE),
[4]West-Facing is oriented to within 45 degrees of true west, including 4500'00" north of west (NW), but excluding 4500'00" south of west (SW),

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MECHANICAL GROUP INC.
1330 Broadway Ste. 114
Oakland, CA 94612
Tel: 510-569-2000

CONSULTANT JOB NO: 23049.00

REGISTERED PROFESSIONAL ENGINEER JOHN L. REED No. M20045 3/9/2026 Signed MECHANICAL STATE OF CALIFORNIA

REVISIONS
1 03/04/2026 ADDENDUM #1
2
3

ENVELOPE & MECHANICAL TITLE 24

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Written dimensions on these drawings shall have precedence over scaled dimensions. Contractors shall verify and be responsible for all dimensions and conditions on the job and this office shall be notified of any variations from the dimensions and conditions shown by these drawings. Shop details shall be submitted to this office for approval before proceeding with fabrication.

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EMT24.1

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 10 of 16)

G1. ENVELOPE GENERAL INFORMATION (conditioned spaces only)

01	02	03	04
Opaque Surfaces & Orientation	Total Gross Surface Area (ft²)	Total Fenestration Area (ft²)	Window to Wall Ratio (%)
Total	**2129.25**	**420**	**19.73**
Roof	2477	0	0

Notes
[1]*North-Facing is oriented to within 45 degrees of true north, including 4500'00" east of north (NE), but excluding 4500'00" west of north (NW),*
[2]*East-Facing is oriented to within 45 degrees of true east, including 4500'00" south of east (SE), but excluding 4500'00" north of east (NE),*
[3]*South-Facing is oriented to within 45 degrees of true south, including 4500'00" west of south (SW), but excluding 4500'00" east of south (SE),*
[4]*West-Facing is oriented to within 45 degrees of true west, including 4500'00" north of west (NW), but excluding 4500'00" south of west (SW),*

G2A. ROOFING PRODUCT SUMMARY (NONRESIDENTIAL)

01	02	03	04	05	06
Assembly Name	Roof Pitch	Roof Rise (x in 12)	Aged Solar Reflectance	Thermal Emittance	SRI
R-45 Roof15	LowAndSteepSlope	N/A	0.8	0.75	N/A

G4. NONRESIDENTIAL AIR BARRIER

01	02
Building Story Name	Air Barrier
Com-Floor 1	No air barrier

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 11 of 16)

G5. OPAQUE SURFACE ASSEMBLY SUMMARY

01	02	03	04	05	06		07	08	09	10
Surface Name	Construction Type	Area (ft²)	Framing Type	Cavity R-Value	Continuous R-Value		Units	Value	Description of Assembly Layers	Status[1]
					Interior	Exterior				
R-10 + 13 Mtl Eng Wall8	Exterior Wall	2,129.25	N/A	23	N/A	N/A	U-factor	0.061	Metal Siding - 1/16 in. Composite-1	N
Slab On Grade13	Underground Floor	2,499	N/A	0	N/A	N/A	F-factor	0.73	Slab Type =Unheated slab on grade Insulation Orientation =None Insulation R-Value =none	N
R-45 Roof15	Roof	2,477	N/A	49	N/A	N/A	U-factor	0.0388	Metal Standing Seam - 1/16 in. Composite-2 Composite-3	N

[1] *Status: N - New, A - Altered, E - Existing*

G6A. OPAQUE DOOR SUMMARY (NONRESIDENTIAL)

01	02	03	04
Assembly Name	Area (ft²)	Overall U-factor	Status[1]
Insulated Door11	81	0.2	N

[1] *Status: N - New, A - Altered, E - Existing*

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 12 of 16)

G7A. FENESTRATION ASSEMBLY SUMMARY (NONRESIDENTIAL)

01	02	03	04	05	06	07	08	09
Fenestration Assembly Name	Fenestration Type/ Product Type / Frame Type	Certification Method[1]	Assembly Method	Area (ft²)	Overall U-factor	Overall SHGC	Overall VT	Status[2]
Residential Cooling	Vertical fenestration Fixed window N/A	NFRC	Manufactured	420	0.3	0.23	0.5	N

[1] *Notes: Newly installed fenestration shall have a certified NFRC Label Certificate or use the CEC default tables found in Table 110.6-A and Table 110.6-B. Center of Glass (COG) values are for the glass-only, determined by the manufacturer, and are shown for ease of verification. Site-built fenestration values are calculated per Nonresidential Appendix NA6 and are used in the analysis.*
[2] *Status: N - New, A - Altered, E - Existing*

H1. DRY SYSTEM EQUIPMENT (FURNACES, AIR HANDLING UNITS, HEAT PUMPS, VRF, ECONOMIZERS ETC.)

01	02	03	04	05	06	07	08	09	10	11	12
Equipment Name	Equipment Type	Qty	Heating				Cooling			Economizer Type (if present)	Status[1]
			Total Heating Output (kBtu/h)	Supp Heat Output (kBtu/h)	Efficiency Unit	Efficiency	Total Cooling Output (kBtu/h)	Efficiency Unit	Efficiency		
VRV-1	Variable Refrigerant Flow	1	108	N/A	COP	4.82	96	EER IEER	17.2 17.2	N/A	N

[1] *Status: N - New, A - Altered, E - Existing*

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 13 of 16)

H3. NONRESIDENTIAL / COMMON USE AREA FAN SYSTEMS SUMMARY

01	02	03	04	05	06	07	08	09	10	11	12	13
Name or Item Tag	Qty	Design OA CFM	Supply Fan				Return / Relief Fan					Status[1]
			CFM	Power	Power Units	Control	Fan Type	CFM	Power	Power Units	Control	
2-FC-1-VRF	1	348	1,400	0.64	BHP	Constant Vol	N/A	N/A	N/A	N/A	N/A	N
3-FC-2-VRF	1	208.05	1,600	0.64	BHP	Constant Vol	N/A	N/A	N/A	N/A	N/A	N

[1] *Status: N - New, A - Altered, E - Existing*

H8. SYSTEM SPECIAL FEATURES

01	02	03	04
System Name	Equipment Type	Interlocks per 140.4(n)[1]	Other Special Features and Controls
VRV-1	Variable Refrigerant Flow	N/A	Heat Recovery
WH1 - SHW	Service Hot Water	N/A	Fixed Temperature Control

Notes: This table includes controls related to the performance path only. For projects using the prescriptive path, mandatory and prescriptive controls requirements are documented on the NRCC-MCH-E.

[1] *Yes = interlocks are provided, No = interlocks are not provided, NA means no operable openings.*

H9. NONRESIDENTIAL / COMMON USE AREA & HOTEL/MOTEL VENTILATION

01	02	03	04	05	06	07
Zone Name	Mechanical Ventilation				Conditioned Area (sf)	DCV or Occupant Sensor Controls, or Both
	Ventilation Function	# of People	Supply OA CFM	Exhaust CFM		
1-FC-1	Education - Multiuse assembly	17.4	348	0	696	N/A
2-FC-2	Assembly - Libraries (reading rooms and stack areas)	6.93	208.05	0	1387	N/A
3-Uncondtined	NA	0	0	0	416	N/A

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 14 of 16)

H11. ZONAL SYSTEM AND TERMINAL UNIT SUMMARY

01	02	03	04	05	06	07	08	09	10	11	12
System ID	System Type	Qty	Rated Capacity (kBtuh)		Airflow (cfm)			Fan			VSD
			Heating	Cooling	Design	Min.	Min. Ratio	Power	Power Units	Cycles	
2-FC-1-VRF	Variable Refrigerant Flow	1	47	42	1,400	N/A	N/A	0.64	BHP	Continuous	☐
3-FC-2-VRF	Variable Refrigerant Flow	1	54	48	1,600	N/A	N/A	0.64	BHP	Continuous	☐

I1. WATER HEATER EQUIPMENT SUMMARY

01	02	03	04	05	06	07	08	09	10	11	12	13	14
Name	Heater Element Type	Tank Type	Qty	Tank Vol (gal)	Rated Input	Rated Input Unit	Efficiency	Efficiency Unit	Tank Insulation R-value Int/Ext	Standby Loss Fraction	1st Hr. Rating or Flow Rate (gal)	Heat Pump Type	Tank Location or Ambient Condition
40 Gallon Electric2	Electricity	Storage	1	40	3	kW	0.93	UEF	N/A	N/A	80	N/A	N/A

L. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections made by Documentation Author indicate which Certificates of Installation must be submitted for the features to be recognized for compliance. These documents must be retained and provided to the building inspector during construction and can be found online

Building Component	Form/Title
Envelope	NRCI-ENV-E - Envelope (for all buildings)
Mechanical	NRCI-MCH-E - For all buildings with Mechanical Systems
Plumbing	NRCI-PLB-E - For all buildings with Plumbing Systems

M. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Selections made by Documentation Author indicate which Certificates of Acceptance must be submitted for the features to be recognized for compliance. These documents must be provided to the building inspector during construction and must be completed through an Acceptance Test Technician Certification Provider (ATTCP).

Building Component	Form/Title & System Name(s)
Envelope	NRCA-ENV-02-F - NRFC label verification for fenestration

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 15 of 16)

N. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

Selections made by Documentation Author indicate which Certificates of Verification must be submitted for the features to be recognized for compliance. These documents must be retained and provided to the building inspector during construction and can be found online

There are no Certificates of Verification applicable to this project

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD NRCC-PRF-E

Nonresidential Performance Compliance Method (Page 16 of 16)

Documentation Author's Declaration Statement

1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Gary Hennings	Documentation Author Signature:
Company: H & M Mechanical Group	Signature Date:
Address: 8105 Edgewater Dr #114	CEA/HERS Certification Identification (if applicable): M20245
City/State/Zip: Oakland, CA 94621	Phone: 510.569.2000

Responsible Person's Declaration statement

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I understand that a registered copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections, and I will take the necessary steps to accomplish this requirement.
6. I understand that a registered copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy, and I will take the necessary steps to accomplish these requirements.

Responsible Designer Name:	Responsible Designer Signature:	
Company: Weston Miles Architects		
Address: 17500 Depot Street, Suite #200	Date Signed:	
City/State/Zip: Morgan Hill, CA 95037	License #:	
Phone: 1.408.779.6686	Title:	Scope:
Responsible Designer Name: Gary Hennings	Responsible Designer Signature:	
Company: H&M Mechanical Group		
Address: 8517 Earhart RD, Suite 230	Date Signed: 10/15/2025	
City/State/Zip: Oakland, CA 94621	License #: M202045	
Phone: 510.569.2000	Title: Mech Engr	Scope: Mech & Plmbg Design

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CONSULTANT JOB NO:
23049.00

LICENSED PROFESSIONAL ENGINEER
GARY L. HENNINGS
No. M20245
3/9/2026
Signed
MECHANICAL
STATE OF CALIFORNIA

REVISIONS
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ENVELOPE & MECHANICAL TITLE 24

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JOB NO: 23014

EMT24.2

GENERAL NOTES

1. BEFORE COMMENCEMENT OF WORK, THE CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS, ELEVATIONS AND CHARACTERISTICS OF ALL UTILITIES AND PIPING, AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT OF ANY DISCREPANCIES.
2. EXACT LOCATIONS AND MOUNTING HEIGHTS OF PLUMBING FIXTURES SHALL BE OBTAINED FROM THE ARCHITECTURAL DRAWINGS.
3. SEE ARCHITECTURAL DRAWINGS FOR ADA FIXTURE LOCATIONS AND MOUNTING HEIGHTS. (INSULATE ALL EXPOSED HOT AND COLD WATER AND DRAIN PIPING BELOW ADA LAVATORIES AND SINKS AND OFFSET P-TRAP AGAINST WALL. ALSO, ALL FLUSH VALVES SHALL BE TO WIDE SIDE OF STALL.)
4. TRAPS FOR ALL LAVATORIES AND SINKS SHALL TRAP STRAIGHT BACK TO WALL WITH ALL REQUIRED OFFSETS HAPPENING WITHIN THE WALL.
5. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS WITH UTILITY COMPANIES FOR SERVICE IN THE NAME OF THE OWNER AND SHALL PAY ALL MATERIAL AND LABOR COSTS INCIDENTAL TO AN OPERABLE UTILITY SERVICE AS REQUIRED BY THE DESIGNATED GOVERNING AUTHORITIES OF THE CITY.
6. ALL PLUMBING WORK SHALL BE INSTALLED SO AS TO AVOID INTERFERENCE WITH ELECTRICAL AND MECHANICAL EQUIPMENT AND STRUCTURAL FRAMING.
7. THE CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL CEILING ACCESS PANELS WITH THE ARCHITECTURAL REFLECTED CEILING PLANS AND THE ELEC. LIGHTING LAYOUT.
8. THE PLUMBING CONTRACTOR SHALL PROVIDE THE WATER, SEWER AND STORM DRAIN SYSTEMS TO A POINT OF CONNECTION SHOWN ON FLOOR PLANS AND SHALL MEET THE INVERT ELEVATION AS FIELD VERIFIED WHILE MAINTAINING REQUIRED PIPE GRADE.
9. ANY ALTERATIONS TO A STRUCTURAL MEMBER, SUCH AS CUTTING, BORING, BRAZING, DRILLING, WELDING, ETC. SHALL HAVE PRIOR WRITTEN APPROVAL OF ARCHITECT AND STRUCTURAL ENGINEER.
10. ALL CLEANOUTS SHALL BE INSTALLED WHERE READILY ACCESSIBLE. THE CONTRACTOR SHALL COORDINATE ALL CLEANOUT LOCATIONS WITH EQUIPMENT, CABINETS, ETC., AND THE ARCHITECT PRIOR TO ANY INSTALLATION.
11. CONTRACTOR TO PROVIDE WATER HAMMER ARRESTORS AS MANUFACTURED BY JAY R. SMITH. WATER HAMMER ARRESTORS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS ON ALL DOMESTIC WATER BRANCH LINES SERVING FIXTURES.
12. ALL PLUMBING FIXTURE VENTS TO TERMINATE A MIN. OF 12 INCHES FROM ANY VERTICAL SURFACE AND 10 FEET FROM ANY OUTSIDE AIR INTAKES.
13. ALL VALVES, UNIONS, ETC. TO BE SAME SIZE AS PIPE UNLESS OTHERWISE INDICATED ON DRAWINGS.
14. CONTRACTOR SHALL COORDINATE LAYOUT OF ALL BELOW GRADE PIPING AND COMPONENTS WITH GENERAL CONTRACTOR PRIOR TO BID TO DETERMINE EXTENT OF REQUIRED SAW CUTTING, EXCAVATION, AND SUBSEQUENT REPAIR/RESTORATION OF ALL AFFECTED HARDSCAPE AND SOFTSCAPE SURFACES. ALL SUCH ITEMS SHALL BE INCLUDED IN BID.
15. BEFORE FABRICATION OR INSTALLATION THE CONTRACTOR SHALL VERIFY EXACT LOCATIONS OF ALL MECHANICAL EQUIPMENT AND EQUIPMENT PROVIDED UNDER ANOTHER SECTION OF SPECIFICATIONS. EXACT ROUGH-IN LOCATIONS AND REQUIREMENTS SHALL BE COORDINATED IN FIELD.
16. ALL POINTS OF CONNECTION SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR PRIOR TO BID.
17. ALL WASTE AND VENT PIPING SHALL SLOPE AT 2% UNLESS OTHERWISE INDICATED.
18. ALL VALVES, WATER HAMMER ARRESTORS OR OTHER EQUIPMENT SHOWN IN WALLS OR ABOVE NON-ACCESSIBLE CEILINGS SHALL BE INSTALLED BEHIND AN ACCESS PANEL.
19. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH AND BE CONSIDERED TO BE A PART OF SEPARATE AND COMPLETE MECHANICAL SPECIFICATIONS.
20. CONNECTION BETWEEN INCOMPATIBLE MATERIALS ABOVE GRADE AND INSIDE BUILDING SHALL BE MADE WITH TWO (2) DIELECTRIC UNIONS SEPARATED BY A SIX INCH (6") SECTION OF RED BRASS PIPE.
21. ALL EXTERIOR GAS COCKS, WATER SHUT OFF VALVES AND/OR SEWER CLEANOUTS BELOW GROUND SHALL BE INSTALLED IN YARD BOXES WITH THE COVERS CONSPICUOUSLY MARKED "GAS", "WATER", AND "SEWER" RESPECTIVELY.
22. THE CONTRACTOR SHALL VERIFY THE EXACT ELEVATIONS AND LOCATION OF EXISTING DRAINAGE SYSTEM PIPING PRIOR TO CONNECTION OF ANY PIPING.
23. ALL HORIZONTAL PIPING LINES EXTENDED AND CONNECTED TO EQUIPMENT SHALL BE RUN AT THE HIGHEST POSSIBLE ELEVATIONS AND NOT LESS THAN 6" ABOVE THE FLOOR TO PROVIDE CLEARANCE FOR CLEANING. AT WALL OR COLUMN LOCATIONS, PIPING ROUGH-IN SHALL BE STUBBED IN WALLS WHENEVER POSSIBLE.
24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PATCHING AND REPAIRING ALL AREAS WHICH ARE DAMAGED BY HIS OPERATIONS. IN ADDITION, THE CONTRACTOR SHALL RESTORE TO THEIR ORIGINAL CONDITION ALL EXISTING TO REMAIN STRUCTURE AND NEW CONSTRUCTION DAMAGED BY HIS OPERATIONS.
25. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PATCHING AND REPAIRING ALL PAVED AREAS WHICH ARE EXCAVATED AND/OR DAMAGED BY HIS OPERATIONS. IN ADDITION, THE CONTRACTOR SHALL RESTORE TO THEIR ORIGINAL CONDITION ALL PLANTED AREAS DAMAGED BY HIS OPERATIONS.
26. ALL PATCHING AND REPAIRING OF CONCRETE PAVING AND/OR WALKS SHALL BE UNDER ANOTHER SECTION OF THE SPECIFICATIONS.
27. ALL EXISTING PIPING DAMAGED DURING EXCAVATION SHALL BE REPAIRED WITH MATERIALS TO MATCH EXISTING BY THE CONTRACTOR AT NO COST TO THE OWNER.
28. ALL CUTTING OF EXISTING PAVING, WALKS AND/OR FLOORS SHALL BE BY MACHINE SAW CUTTING. HOLES FOR PIPES IN CONCRETE WALLS OR FLOORS SHALL BE DONE BY CORE DRILLING EQUIPMENT.
29. ALL PIPING, EXCEPT PIPING OF NONFERROUS MATERIAL, INSTALLED WITHIN THE GROUND SHALL BE PROTECTED AGAINST CORROSION BY A PROTECTIVE COVERING SUITABLE FOR THE PURPOSE AND SUBJECT TO THE APPROVAL OF THE BUILDING OFFICIAL. ANY PIPING SUBJECT TO UNDUE CORROSIVE ACTION SHALL BE PROTECTED IN A MATTER SUITABLE FOR THE PURPOSE AND SUBJECT TO THE APPROVAL OF THE BUILDING OFFICIAL.
30. ALL PENETRATIONS AND OPENINGS IN PARTY WALLS AND ROOF/FLOOR/CEILING ASSEMBLIES DUE TO PLUMBING WORK SHALL BE SEALED LINED, INSULATED OR OTHERWISE TREATED TO MAINTAIN THE REQUIRED FIRE AND SOUND RATING.

PLUMBING LEGEND

SYMBOL	ABBREVIATION	DESCRIPTION
—— —— ——	W	SANITARY WASTE/SEWER PIPING
—— GW ——	GW	GREASE WASTE PIPING
——SD——	SD	STORM DRAIN PIPING
——OFD——	OFD	OVERFLOW DRAIN PIPING
– – – – – –	V	WASTE/SANITARY VENT PIPING
—— GV ——	GV	GREASE VENT PIPING
		DEMO FIXTURE/PIPING
—— —— ——	(E)W	EXISTING SANITARY SEWER PIPING
– – – – – –	(E)V	EXISTING SANITARY VENT PIPING
—— — ——	CW	DOMESTIC COLD WATER PIPING
—— – – ——	HW	DOMESTIC HOT WATER PIPING
—— – – – ——	HWR	DOMESTIC HOT WATER RETURN PIPING
—— – ——	(E)CW	EXISTING COLD WATER PIPING
—— – – ——	(E)HW	EXISTING HOT WATER PIPING
—— – – – ——	(E)HWR	EXISTING HOT WATER RETURN PIPING
——G——	G	NATURAL GAS PIPING
——MPG——	MPG	MEDIUM PRESSURE NATURAL GAS PIPING
——G——	(E)G	EXISTING NATURAL GAS PIPING
——MPG——	(E)MPG	EXISTING MEDIUM PRESSURE NATURAL GAS PIPING
——CD——	CD	CONDENSATE DRAIN PIPING
C		PIPE GOING DOWN
O		PIPE GOING UP
⊃		TEE
FCO	FCO	FLOOR CLEANOUT/CLEANOUT TO GRADE
OC		P-TRAP
	POC	POINT OF CONNECTION
	WCO	WALL CLEANOUT
		PIPE CAP
	HB	HOSE BIBB
	SOV	SHUT-OFF VALVE
	SOVAP	SHUT-OFF VALVE BEHIND ACCESS PANEL
	SOVYB	SHUT-OFF VALVE IN YARD BOX
		PLUG VALVE
	BV	BALANCING VALVE/CIRCUIT SETTER
		GAS COCK VALVE
		PRESSURE REDUCING VALVE
		CHECK VALVE
	FD	FLOOR DRAIN
	FS	FLOOR SINK
XX-X		EQUIPMENT OR FIXTURE
	CONT.	CONTINUED/CONTINUATION
	DFM	DISTANCE FROM METER
	FR.	FROM
	BEL.	BELOW
	DN.	DOWN
	VTR	VENT THROUGH ROOF
	AP	ACCESS DOOR
	NIC	NOT IN CONTRACT
	REF.	REFERENCE
	S.A.D.	SEE ARCHITECTURAL DRAWINGS
	S.M.D.	SEE MECHANICAL DRAWINGS
	S.C.D.	SEE CIVIL DRAWINGS
	S.S.D.	SEE STRUCTURAL DRAWINGS
	SF	SQUARE FEET

LIST OF APPLICABLE CODES

LIST OF CODES AND STANDARDS MODEL CODE EDITIONS EFFECTIVE JANUARY 1, 2023
2022 CA BUILDING CODE TITLE 24 PART 2 VOLUME #1 AND #2
2022 CA ELECTRICAL CODE TITLE 24 PART 3
2022 CA MECHANICAL CODE TITLE 24 PART 4
2022 CA PLUMBING CODE TITLE 24 PART 5
2022 CA FIRE CODE TITLE 24 PART 9
2022 CA BUILDING STANDARDS TITLE 24 PART 9

PLUMBING FIXTURE SCHEDULE

FIXTURE	MARK	ROUGH IN CONNECTIONS HW	CW	WASTE	VENT	DESCRIPTION
WATER CLOSET	WC-1	--	1"	4"	2"	AMERICAN STANDARD CADET PRO 215AA.104US FLOOR MOUNTED WATER CLOSET, ELONGATED BOWL, VITREOUS CHINA, CADET FLUSHING SYSTEM, HIGH EFFICIENCY 1.28 GPF. TOILET SEAT: BEMIS 1955CT OPEN FRONT LESS COVER, ELONGATED, HEAVY DUTY, INJECTION MOLDED SOLID PLASTIC.
LAVATORY	L-1	1/2"	1/2"	2"	2"	AMERICAN STANDARD LUCERNE 0356.421 WALL MOUNTED 20.50" X 18.25" LAVATORY, VITREOUS CHINA WITH SINGLE HOLE, WITH FRONT OVERFLOW. FAUCET: SLOAN EAF-250-BAT-ISM-CP-0.5 GPM-AER-IQ-FCT BATTERY POWERED, INTEGRATED SIDE MIXER, POLISHED CHROME FINISH, 0.5 GPM AERATED SPRAY, INFRARED SENSOR, DECK MOUNTED. STRAINER AMERICAN STANDARD 2411.015 BRASS CONSTRUCTION, 1-1/4" CONNECTION WITH OVERFLOW. ANGLE STOPS/P-TRAP/PIPE WRAP: SEE SHEET SPECIFICATIONS.
LAVATORY	L-2	1/2"	1/2"	2"	2"	AMERICAN STANDARD LUCERNE 0355.012 WALL MOUNTED 20.50" X 18.25" LAVATORY, VITREOUS CHINA WITH 4" CENTERS, WITH FRONT OVERFLOW. FAUCET: AMERICAN STANDARD 6114.116.002 CAST BRASS CENTERSET, METAL HANDLE, PRESSURE COMPENSATING, ,MULTI-LAMINAR, 0.5 GPM, DECK MOUNTED. STRAINER AMERICAN STANDARD 2411.015 BRASS CONSTRUCTION, 1-1/4" CONNECTION WITH OVERFLOW. ANGLE STOPS/P-TRAP/PIPE WRAP: SEE SHEET SPECIFICATIONS.
SINK	S-1	1/2"	1/2"	2"	2"	ELKAY LUSTERTONE LRAD2219MR2 22" X 19" X 5 1/2"COUNTER MOUNTED, 18 GAUGE, TYPE 304 STAINLESS STEEL, SELF RIMMING. FAUCET: 434-ABCP HOT AND COLD WATER, SINGLE LEVER, DECK MOUNTED, SINGLE HOLE, PULL DOWN SPRAY, CHROME PLATED, TUBULAR BRASS SPOUT, 1.5 GPM. SOAP DISPENSER: ELKAY LK320CR CHROME PLATED BRASS, CHROME FINISH. ANGLE STOPS/STRAINER/P-TRAP/PIPE WRAP: SEE SHEET SPECIFICATIONS.
DRINKING FOUNTAIN	DF-1	--	1/2"	2"	2"	ELKAY EZVRSM-EDFPVM217D1LK BI-LEVEL DRINKING FOUNTAIN WITH BOTTLE FILLER, STAINLESS STEEL, VANDAL RESISTANT BUBBLERS, LAMINAR FLOW, MECHANICALLY ACTIVATED, NON-FILTERED, NON-REFRIGERATED, 118 LBS.
MOP SINK	MS-1	3/4"	3/4"	3"	2"	FIAT PRODUCTS TSB100 24" X 24" X 12" MOP SINK, PRECAST TERRAZZO MADE OF BLACK AND WHITE MARBLE CHIPS IN GRAY PORTLAND CEMENT. FAUCET: AMERICAN STANDARD 8350.243 WALL MOUNTED, CAST BRASS BODY, METAL LEVER HANDLES WITH HOT AND COLD INDICATORS, VANDAL-RESISTANT SCREWS, VACUUM BREAKER, SPOUT WITH BUCKET HOOK AND THREADED HOSE. STRAINER: 1453BB STAINLESS STEEL STRAINER.
EXPANSION TANK	ET-1	--	3/4"	--	--	BELL & GOSSETT PTA-5 10" DIA X 14" HT., STEEL SHELL, POLYPRPROLYENE LINER, 3.2 GAL ACCPTANCE VOL., 2.3 LBS. SHIP WT.
FLOOR SINK	FS-1	--	1/2"	2"	2"	ZURN #Z1901 FLOOR SINK DEEP CAST IRON BODY AND SQUARE SLOTTED LIGHT DUTY GRATE, WITH WHITE ACID RESISTANT PORCELAIN ENAMEL INTERIOR AND TOP, COMPLETE WITH WHITE ABS ANTI-SPLASH INTERIOR BOTTOM DOME STRAINER.

NOTES
1. ITEM DESCRIPTIONS INCLUDED IN THIS SCHEDULE ARE INTENDED TO DESCRIBE GENERAL FIXTURE CONFIGURATIONS, AND DO NOT INCLUDE ALL REQUIREMENTS. REFER TO SHEET SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. REFER TO ARCHITECTURAL DRAWINGS FOR MOUNTING HEIGHTS AND REQUIRED CLEARANCES OF ALL FIXTURES.
3. ALL FIXTURES, TRIM, AND VALVING SHALL COMPLY WITH CALIFORNIA'S LEAD FREE PLUMBING LAW, HEALTH AND SAFETY CODE AND CA ASSEMBLY BILL 1953.

ELECTRIC WATER HEATER SCHEDULE

ITEM	MANUFACTURER	MODEL NO.	SERVICE	STORAGE (GAL.)	VOLT	PHASE	KW	RECOVERY @ 90F (GAL.)	INLET TEMP (F)	OUTLET TEMP (F)	OPERATING WEIGHT (LBS)
EWH-1	AO SMITH	DEL-40	DOMESTIC WATER	40	208	1	3	14	60	120	459

CIRCULATION PUMP SCHEDULE

ITEM	LOCATION	MANUFACTURER	MODEL NO	SERVICE	TYPE	ACCESSORIES	CAPACITY GPM	CAPACITY HEAD	MOTOR HP	MOTOR VOLTAGE	MOTOR PHASE	MOTOR AMPS
CP-1	GWH-1	BELL AND GOSSETT	NBF-25	HOT WATER RETURN	WET ROTOR	*	1	1	1/8	115	1	1.1

* = PROVIDE B&G AUTOMATIC TIMER KIT (TC-1 115 VAC, 60 HZ, 1 PH), AQUASTAT (AQS-1/2, AQS-3/4 115 VAC, 60 HZ, 1 PH)

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CONSULTANT JOB NO: 23049.00

REGISTERED PROFESSIONAL ENGINEER GARY L. WESTON No. M20245 3/9/2026 Signed MECHANICAL STATE OF CALIFORNIA

REVISIONS
1 03/04/2026 ADDENDUM #1
2
3

PLUMBING: GENERAL NOTES, LEGEND AND SCHEDULES

NEW BRADLEY LIBRARY & RESILIENCY CENTER

COUNTY OF MONTEREY & MONTEREY COUNTY FREE LIBRARIES
65607 DIXIE ST, BRADLEY, CA 93426

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DATE: 10/23/2025

JOB NO: 23014

P0.1

PLUMBING SPECIFICATIONS

1.0 GENERAL

DESCRIPTION OF WORK: FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND PAY ALL FEES REQUIRED TO COMPLETE ALL PLUMBING WORK SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN, INCLUDING:

SANITARY SEWER SYSTEMS
DOMESTIC HOT AND COLD WATER SYSTEM
CONDENSATE PIPES
INSULATION
EXCAVATION, TRENCHING, AND BACKFILLING FOR WORK UNDER THIS SECTION
MISCELLANEOUS STEELWORK (FLOOR SLEEVES, SLOTS, INSERTS, PLATES, SUPPORTS, HANGERS, ETC.)

INCORPORATED DOCUMENTS: PUBLISHED SPECIFICATIONS, STANDARDS, TESTS OR RECOMMENDED METHODS OF TRADE, INDUSTRY OR GOVERNMENTAL ORGANIZATIONS APPLY TO WORK OF THIS SECTION.

REQUIREMENTS OF REGULATORY AGENCIES AND STANDARDS

PERMITS: OBTAIN AND PAY FOR ALL FEES, PERMITS AND INSPECTIONS. DELIVER ALL CERTIFICATES OF INSPECTION TO ARCHITECT.

LEGAL REQUIREMENTS AND STANDARDS: COMPLY WITH APPLICABLE SECTIONS OF STATE AND LOCAL CODES, LAWS, ORDINANCES, RULES AND REGULATIONS OF AUTHORITIES HAVING JURISDICTION. SUCH REQUIREMENTS SHALL BE THE MINIMUM ACCEPTABLE REQUIREMENTS FOR THE WORK. THE DRAWINGS AND SPECIFICATIONS TAKE PRECEDENCE WHEN THEY CALL FOR MATERIALS OR CONSTRUCTION OF BETTER QUALITY OR LARGER SIZE THAN REQUIRED BY CODES, LAWS, RULES, AND REGULATIONS.

SERVICE CONNECTIONS: ARRANGE AND PAY ALL COSTS FOR UTILITIES REQUIRED TO COMPLETE ALL WORK OF THIS DIVISION. CONNECTION TO ALL UTILITY OR ON-SITE SERVICES, PAYMENT OF SERVICE CHARGES, AND PROVISION FOR INSTALLATION OF TEMPORARY UTILITIES SHALL BE INCLUDED.

LIABILITY OF SUBSTITUTIONS:

PERFORMANCE OF SUBSTITUTIONS MUST BE EQUAL TO THE ITEM SPECIFIED. SHOULD THE SUBSTITUTED ITEM FAIL TO PERFORM ACCORDING TO THE SPECIFICATIONS, REPLACE WITH THE ORIGINALLY SPECIFIED ITEM. NO REQUEST FOR EXTRA COMPENSATION SHALL BE GRANTED.

THE CONTRACTOR IS RESPONSIBLE FOR THE COST OF ANY CHANGES RESULTING FROM APPROVED SUBSTITUTIONS.

2.0 PRODUCTS

BEYOND MATERIAL AND EQUIPMENT SPECIFIED, ALSO PROVIDE INCIDENTAL MATERIALS REQUIRED TO EFFECT COMPLETE INSTALLATION. SUCH INCIDENTAL MATERIALS INCLUDE SOLDER, TAPES, CAULKING, MASTIC, GASKETS, AND SIMILAR ITEMS.

SEALS: FILL ALL CRACKS AND OPEN SPACE BETWEEN FIXTURES AND WALL OR FLOOR WITH NON-ELASTOMERIC SEALER.

FINISH ON EXPOSED PIPES, TRAP, FITTINGS, VALVES, STOPS, ESCUTCHEONS, AND ACCESSORIES SHALL BE CHROME-PLATED BRASS. EXPOSED SHALL INCLUDE ITEMS LOCATED UNDER OPEN COUNTERS AND INSIDE CABINETS WITH DOORS.

BACKING: FOR WALL HUNG LAVATORIES USE JAY R SMITH 0723 CONCEALED ARMS AND PROVIDE 1/4" X 6" WIDE STEEL FLAT PLATE ATTACHED TO BACKING PLATE, DRILLED AND TAPPED TO MATCH FIXTURE HANGER. ATTACH WITH (4) 3/8" X 1 1/4" STEEL BOLTS AND NUTS.

ACCESS DOORS/PANELS

PROVIDE ACCESS DOORS/PANELS WHERE REQUIRED BY AUTHORITIES HAVING JURISDICTION AND BY THE DRAWINGS AND SPECIFICATIONS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING LOCATIONS: ALL CONCEALED VALVES, WATER HAMMER ARRESTORS, UNIONS, ETC. FURNISH FIRE-RATED DOORS WHEN LOCATED IN RATED CONSTRUCTION.

ACCEPTABLE MANUFACTURERS: KARP OR EQUAL.

12" X 12" MIN. FOR WALLS; 24" X 24" FOR CEILINGS.

CLEANOUTS

INSTALL CLEANOUTS AS REQUIRED BY THE CALIFORNIA PLUMBING CODE AND WHERE INDICATED ON DRAWINGS. WALL CLEANOUTS SHALL BE LOCATED 18" ABOVE FINISHED FLOOR.

SIZE CLEANOUT TO MATCH PIPE BEING SERVED, EXCEPT FOR PIPES 4" AND LARGER, CLEANOUTS SHALL BE 4" IN SIZE.

CONDENSATE PIPING

TYPE "M" COPPER TUBING, HARD DRAWN WITH WROUGHT COPPER SWEAT TYPE FITTINGS AND 95-5 LEAD FREE SOLDER. PROVIDE INLINE NEUTRALIZER AT HIGH EFFICIENCY CONDENSING EQUIPMENT. INSULATE WITH 1/2" ARMAFLEX.

DOMESTIC HOT AND COLD WATER PIPING SYSTEM

UNDERGROUND: TYPE "K" COPPER TUBING, HARD TEMPER, COLD DRAWN. COAT PIPE WITH 22 PRIMER ADHESIVE THEN WRAP WITH 10 MIL TAPE AND COAT TAPE WITH 22 PRIMER ADHESIVE. NO EXCEPTIONS.

BELOW FLOOR: TYPE "K" COPPER TUBING, SOFT ANNEALED. NO FITTINGS ALLOWED BELOW SLAB.

ABOVE GROUND: TYPE "L" COPPER TUBING, HARD TEMPER, COLD DRAWN.

DRAINS

PROVIDE COATED CAST IRON BODY, EXCEPT AS NOTED, WITH INTEGRAL DOUBLE DRAINAGE FLANGE, WEEP HOLES AND INSID3E CAULKED BOTTOM OR NO-HUB OUTLET. ACCEPTABLE MANUFACTURERS INCLUDE JAY R. SMITH AND ZURN.

PROVIDE CAST IRON P-TRAP AT ALL FLOOR DRAINS, FLOOR SINKS AND TRENCH DRAINS.

ALL FLOOR DRAINS SHALL HAVE TRAP PRIMERS.

ALL DRAINS AND FLOOR CLEANOUTS SHALL BE FURNISHED WITH "SLAB+GARD" PROTECTION DEVICE.

FITTINGS, SOLDER & UNIONS

FITTINGS: WROUGHT COPPER OR CAST BRASS SOLDER SWEAT TYPE.

SEALS: USE 95-5 LEAD-FREE SOLDER FOR COPPER PIPING.

UNIONS: SHALL BE INSTALLED AT THE INLET AND OUTLET OF ALL APPARATUS AND EQUIPMENT, AT ALL VALVES, AND ELSEWHERE AS REQUIRED TO FACILITATE REMOVAL OF VALVES AND EQUIPMENT.

DIELECTRIC UNIONS: CONNECTION BETWEEN INCOMPATIBLE MATERIALS, SUCH AS DISSIMILAR METALS, ABOVE GRADE AND INSIDE BUILDING SHALL BE MADE WITH TWO (2) DIELECTRIC UNIONS SEPARATED BY A TWELVE INCH (12") SECTION OF RED BRASS PIPE. DIELECTRIC UNION ISOLATOR FOR CONNECTION PIPING OR NON-COMPATIBLE MATERIALS SHALL BE OF STANDARD COMMERCIAL DESIGN WITH THREADED CONNECTIONS.

INSULATION

INSULATE ALL P-TRAP AND HOT AND COLD WATER ANGLE VALVE ASSEMBLIES ON FIXTURES WHERE TRAP AND SUPPLY PIPING IS EXPOSED OR ACCESSIBLE. INSULATION SHALL BE FULLY MOLDED, WHITE IN COLOR, "PROWRAP" SEAMLESS PREWRAPPED INSULATION KIT AS MANUFACTURED BY MCGUIRE.

VALVES AND IRREGULAR PIPELINE ACCESSORIES SHALL BE INSULATED WITH OVERSIZED SECTIONS OF PIPE INSULATION.

INSERT SECTIONS SHALL BE INSTALLED ON ALL INSULATED PIPING. LOCATE CENTRALLY UNDER EACH HANGER WHERE THE INSULATION RESTS ON THE HANGER. INSERTS SHALL BE AS RECOMMENDED BY MANUFACTURER.

PENETRATION OF ROOF, WALL AND FLOOR

ALL PIPE PENETRATIONS SHALL BE SEALED WITH A PRODUCT THAT WILL SEAL AGAINST THE SPREAD OF FLAME, SMOKE, GASES AND WATER, FOR A RATING EQUIVALENT TO (OR GREATER THAN) THAT OF THE WALL/FLOOR BEING PENETRATED.

ESCUTCHEONS: PROVIDE 1" WIDE CHROME OR NICKEL PLATED PLATES ON ALL PIPES EXPOSED TO VIEW, PASSING THROUGH FLOORS, WALLS, PARTITIONS, ETC. SIZE ESCUTCHEONS TO FIT PIPE AND PIPE COVERING AND TO GIVE A FINISHED APPEARANCE. ESCUTCHEONS SHALL BE HELD IN PLACE BY SET SCREW. PROVIDE PLATES ON PIPES EXTENDING THROUGH SLEEVES.

PIPE ISOLATION

ALL PIPING WHICH IS NOT ISOLATED FROM CONTACT WITH THE BUILDING BY ITS INSULATION SHALL BE INSTALLED WITH A MANUFACTURED TYPE ISOLATOR. ACCEPTABLE MANUFACTURERS: SEMCO, TRISOLATOR, OR EQUAL.

PROVIDE PIPE AND SOUND ISOLATION FOR ALL PIPING THROUGH WALLS. ACCEPTABLE MANUFACTURERS: ACOUSTOPLUMB BY LSP PRODUCTS, HOLDRITE SILENCER BY HUBBARD ENTERPRISES, OR EQUAL.

PIPE SUPPORTS

FOR PIPING 1/2", 3/4" AND 1", FURNISH AND INSTALL THE ACOUSTOPLUMB SYSTEM AS MANUFACTURED BY LSP SPECIALTY PRODUCTS COMPANY.

NO METALLIC PIPES SHALL HAVE METAL-TO-METAL CONTACT WITH HANGERS, CLAMPS, BRACKETS OR ANY OTHER PIPE SUPPORT, OR BE OTHERWISE IN DIRECT CONTACT WITH ANY PART OF THE BUILDING.

WIRE FOR HANGING OR STRAPPING PIPES NOT PERMITTED. SUPPORT EACH RUN OF PIPE INDEPENDENTLY FROM ALL OTHER PIPING.

PLUMBING FIXTURES

FIXTURES SHALL HAVE STOPS OR VALVES. SUPPLY RISERS MAY NOT BE CORRUGATED TUBING.

WATER CONNECTIONS: MUST HAVE RIGID METAL TO METAL CONNECTION. SLIP JOINTS UTILIZING NON-METALLIC WASHERS ARE NOT PERMITTED.

PRESSURE GAUGES

WEKSLER, OR EQUAL, DRAWN STEEL OR BRASS CASE, GLASS LENS, 4½" DIAL, 1% ACCURACY, ANSI B40.1 GRADE 2A, PHOSPHOR BRONZE, BOURDON TUBE, BRASS BOTTOM CONNECTION; WITH WHITE COATED ALUMINUM SCALE WITH PERMANENTLY ETCHED MARKINGS, BLACK GRADUATIONS AND NUMERALS, 270° ARC SCALE; WITH DIAL RANGE APPROXIMATELY TWICE THE WORKING PRESSURE. PROVIDE PRESSURE GAUGE COCKS BETWEEN PRESSURE GAUGES AND GAUGE TEES ON PIPING SYSTEM.

SANITARY SEWER SYSTEM

UNDERGROUND: SERVICE WEIGHT CAST IRON, HUBLESS, WITH HEAVY STAINLESS BANDS AND NEOPRENE GASKET AS MANUFACTURED BY MISSION.

ABOVE GROUND:
2 1/2" AND SMALLER: SERVICE WEIGHT CAST IRON HUBLESS WITH STAINLESS STEEL BANDS, SCHEDULE 40 GALVANIZED STEEL PIPE, CAST IRON SCREWED DRAINAGE FITTINGS OR COPPER PIPE WITH DWV FITTINGS AND 95-5 SOLDERED JOINTS.
3" AND LARGER: SERVICE WEIGHT CAST IRON HUBLESS WITH STAINLESS STEEL BANDS OR COPPER PIPE WITH DWV FITTINGS AND 95-5 SOLDERED JOINTS.

HUBLESS/NO-HUB COUPLINGS: HUBLESS CAST IRON COUPLINGS SHALL COMPLY WITH ALL REQUIREMENTS OF FACTORY MUTUAL 1680 CLASS I, 15 PSI WORKING PRESSURE. COUPLINGS SHALL BE CONSTRUCTED OF TYPE 304 STAINLESS STEEL WITH 305 STAINLESS STEEL WORM DRIVE SCREWS. THE GASKET MATERIAL SHALL MEET THE PHYSICAL REQUIREMENTS OF ASTM C564. 4-BAND COUPLINGS TO BE TIGHTENED TO 80 IN-LB TORQUE AND 2 BAND TO 125 IN-LB TORQUE. COUPLINGS SHALL BE MANUFACTURED BY HUSKY OR CLAMP-ALL.

TRAPS

LAVATORIES AND SINK P-TRAPS SHALL BE COMMERCIAL GRADE, CHROME-PLATED CAST BRASS BODY WITH CLEANOUT, WITH 17-GAUGE BRASS ADJUSTABLE WALL BEND, CAST BRASS NIPPLE, 17-GAUGE TUBE, AND CAST BRASS SLIP NUTS. PROVIDE OFFSET STRAINER, AS MANUFACTURED BY MCGUIRE, AT ALL ACCESSIBLE LAVATORIES AND SINKS AND WHERE PLUMBING TRIM IS EXPOSED.

VALVES: DOMESTIC WATER

PROVIDE VALVES WITH FEATURES INDICATED AND WHERE NOT OTHERWISE INDICATED, PROVIDE PROPER VALVE FEATURES AS OUTLINED IN THIS SPECIFICATION. COMPLY WITH ANSI B31.1.

SIZE VALVES TO MATCH UPSTREAM PIPE, UNLESS OTHERWISE INDICATED.

BALL VALVES: MSS SP-110; RATED FOR 600 WOG PRESSURE; FULL PORT. TWO OR THREE PIECE BRONZE BODY CONSTRUCTION, TEFLON SEAT AND SEALS, LOCKING TYPE HANDLE.
VALVES 2" AND SMALLER: NIBCO T/S-685-80-LF, WATTS SERIES LFB6080/LFB6081 OR EQUAL.

BUTTERFLY VALVES: MSS SP-67; RATED AT 200 PSI, BODY CONFORMING TO ASTM A 126, CLASS B. PROVIDE FULL LUG STYLE VALVES WITH FIELD REPLACEABLE EPDM PHENOLIC BACKED SLEEVE, ALUMINUM BRONZE DISC, STAINLESS STEEL STEM, AND EPDM O-RING STEM SEALS. PROVIDE LEVER OPERATORS WITH LOCKS.
VALVES 2-/2" AND LARGER: NIBCO LD-2000, WATTS MODEL BF03-121-45/BF03-121-4G OR EQUAL.

WATER HAMMER ARRESTORS

CONTRACTOR SHALL MAKE EVERY EFFORT TO ALLEVIATE HYDRAULIC SHOCK (WATER HAMMER).

PROVIDE WATER HAMMER ARRESTORS IN WATER LINES TO EQUIPMENT OR FIXTURES HAVING QUICK CLOSING VALVES, FLUSH VALVES, SENSOR OPERATED METERING FAUCETS, MECHANICAL METERING FAUCETS, FOOT PEDAL VALVES, KNEE OPERATED VALVES AND ANY EQUIPMENT THAT MIGHT PRODUCE WATER HAMMER.

LOCATE AND SIZE PER PLUMBING AND DRAINAGE INSTITUTE MANUAL WH-201.

PROVIDE ACCESS PANEL FOR MAINTENANCE AND REPLACEMENT WHEN CONCEALED.

PROVIDE 6" BRASS NIPPLE AT CONNECTIONS TO COPPER LINES.

3.0 EXECUTION

JOB CONDITIONS: REPAIR OR REPLACE, AS DIRECTED BY ARCHITECT, MATERIALS AND PARTS OF PREMISES WHICH BECOME DAMAGED BECAUSE OF INSTALLATION OF WORK OF THIS DIVISION. REMOVE REPLACED PARTS FROM PREMISES.

PROVIDE CARPENTRY, CUTTING, PATCHING, AND CORE DRILLING REQUIRED FOR INSTALLATION OF MATERIAL AND EQUIPMENT SPECIFIED IN THIS DIVISION. DO NOT CUT, CORE OR DRILL STRUCTURAL MEMBERS WITHOUT CONSENT OF STRUCTURAL ENGINEER.

GENERAL PIPING INSTALLATION

CONCEAL ALL PIPING WITHIN FINISHED SPACES, UNLESS OTHERWISE NOTED. INSTALL ALL EXPOSED PIPING PARALLEL TO, OR AT RIGHT ANGLES WITH, BUILDING WALLS AND INSTALL TIGHT TO WALLS OR CEILINGS, UNLESS OTHERWISE NOTED.

VERIFY ALL INVERTS IN PITCHED LINES BEFORE STARTING WORK.

ROUGH-IN WORK: PROCEED AS RAPIDLY AS THE CONSTRUCTION WILL PERMIT. WORK SHALL BE COMPLETED, TESTED AND APPROVED BEFORE BEING ENCLOSED.

THOROUGHLY CLEAN PIPING BEFORE INSTALLATION. CAP ALL PIPE OPENINGS TO EXCLUDE DIRT UNTIL FIXTURES ARE INSTALLED AND FINAL CONNECTIONS MADE.

REAM PIPE ENDS TO REMOVE BURRS, CAREFULLY INSPECT EACH LENGTH OF PIPE, AND REMOVE ALL OBSTRUCTIONS PRIOR TO FABRICATION.

PITCH: INSTALL HORIZONTAL SANITARY AND DRAIN PIPING AT A UNIFORM GRADE OF ONE-QUARTER INCH PER FOOT UNLESS OTHERWISE NOTED.

EQUIPMENT BY OTHERS: FOR ROUGH-INS AND FINAL CONNECTIONS TO FIXTURES AND EQUIPMENT FURNISHED UNDER OTHER SECTIONS, ASCERTAIN EXACT SIZES, SERVICES AND LOCATIONS BEFORE STARTING WORK. VERIFY ACCURACY OF WORK SHOWN BEFORE STARTING WORK. CONTRACTOR RESPONSIBLE FOR PROVIDING PROPER INSTALLATION.

COORDINATE THE INSTALLATION OF ACCESS PANELS WITH THE ITEM BEING SERVED. VALVES AND EQUIPMENT LOCATED IN CEILING SPACES SHALL BE ACCESSIBLE AND LOCATED NO MORE THAN 2'-0" ABOVE THE ACCESS PANEL AND WITHIN ARM'S REACH, WHERE POSSIBLE.

POWDER ACTUATED FASTENERS WILL NOT BE ALLOWED. EMBEDS, BEAM CLAMPS, OR DRILLED FASTENERS WILL BE REQUIRED UNLESS OTHERWISE NOTED. SEISMIC BRACING SHALL BE REQUIRED FOR ALL PIPING, SEE SMACNA "SEISMIC RESTRAINT MANUAL: GUIDELINES FOR MECHANICAL SYSTEMS".

PROPERLY SUPPORT ALL MATERIALS, EQUIPMENT AND APPARATUS. ALL HANGERS AND SUPPORTS SHALL HAVE MINIMUM SAFETY FACTOR OF FIVE (5), BASED ON ULTIMATE TENSILE OR COMPRESSIVE STRENGTH, AS APPLICABLE, OF MATERIAL USED. PROVIDE BRACING TO PREVENT LATERAL MOTION OF SUSPEND MATERIALS.

ALL PIPING ON ROOF SHALL BE ANCHORED TO 4"X4" REDWOOD BLOCKING WITH PIPE STRAPS. BLOCKING SHALL BE SET IN MASTIC AT 6'-0" ON CENTER.

PROVIDE PIPE ISOLATION FOR ALL PIPING THROUGH WALLS AND FLOORS. NO PIPING SHALL HAVE DIRECT CONTACT WITH WALLS, CEILINGS, FLOORS, PIPE SUPPORTS, OR HANGERS.

ROOF OPENING

FLASH EACH PIPE EXTENDING THROUGH ROOF WITH PROPERLY SIZED LEAD FLASHING ASSEMBLY. MAKE WATERTIGHT.

TESTING AND ADJUSTING

TEST ALL SYSTEMS IN ACCORDANCE WITH THE GOVERNING PLUMBING CODE AND LOCAL BUILDING DEPARTMENT REQUIREMENTS.

PROVIDE ALL EQUIPMENT REQUIRED FOR TESTING, INCLUDING FITTINGS FOR ADDITIONAL OPERATING.

AFTER THE INSPECTION HAS BEEN APPROVED, OR PORTIONS THEREOF, CERTIFY IN WRITING THE TIME, DATE, NAME, AND TITLE OF THE PERSON REVIEWING THE TEST. INCLUDE THE DESCRIPTION OF WHAT PORTION OF THE SYSTEM HAS BEEN APPROVED.

A COMPLETE RECORD SHALL BE MAINTAINED OF ALL TESTING THAT HAS BEEN APPROVED, AND SHALL BE MADE AVAILABLE AT THE JOB SITE.

UPON COMPLETION OF THE WORK, ALL RECORDS AND CERTIFICATIONS APPROVING TESTING REQUIREMENTS SHALL BE SUBMITTED TO THE ARCHITECT BEFORE FINAL PAYMENT IS MADE.

DEFECTIVE WORK OR MATERIAL SHALL BE REPLACED OR REPAIRED, AS NECESSARY, AND THE INSPECTION AND TEST REPEATED. REPAIRS SHALL BE MADE WITH NEW MATERIALS. NO CAULKING OF SCREWED JOINTS OR HOLES WILL BE ACCEPTABLE.

DISINFECTION OF WATER SYSTEMS

DISINFECT WATER SYSTEMS AS RECOMMENDED BY THE PUBLIC HEALTH DEPARTMENT AND ALL AUTHORITIES HAVING JURISDICTION.

IDENTIFICATION

IDENTIFY ALL PIPING WITH BRADY PERMA-CODE, SETON, OR APPROVED EQUAL, SELF STICKING PIPE MARKERS CONSISTING OF PIPE CONTENT WORDING AND ARROW INDICATING DIRECTION OF FLOW, PER ANSI STANDARD A13.1.

ARROW AND WORDING ARE TWO SEPARATE MARKERS WHICH SHALL BE PLACED IMMEDIATELY ADJACENT TO EACH OTHER.

MARKERS SHALL BE LOCATED 20 FT. APART MAXIMUM ON HORIZONTAL RUNS. THEY SHALL OCCUR WHERE A PIPE ENTERS AND EXITS A CONCEALED SPACE; AT EVERY BRANCH AND RISER TAKEOFF; WITHIN 1 FT. OF EACH VALVE & CONTROL DEVICE; AT EVERY CHANGE IN DIRECTIONAL FLOW; NEAR MAJOR EQUIPMENT ITEMS & OTHER POINTS OF ORIGINATION & TERMINATION.

IDENTIFY ALL CAPPED PIPING AND VALVES WITH 1-1/2" DIAMETER BRASS DISC STAMPED WITH 3/8" HIGH LETTERS SHOWING TYPE OF SERVICE AND VALVE NUMBER. TAGS SHALL BE ATTACHED WITH BRASS CHAIN.

EXCAVATION, TRENCHING AND BACKFILLING

SAFETY REQUIREMENTS: DO ALL SHORING AND PUMPING NECESSARY TO PROTECT EXCAVATION AND SAFETY OF WORKMEN. COMPLY WITH ALL SAFETY REQUIREMENTS OF ALL APPLICABLE AUTHORITIES. PROTECT EXCAVATIONS WITH BARRICADES AS REQUIRED BY APPLICABLE SAFETY REGULATION.

EXCAVATION: PERFORM TRENCHING, SHORING, AND BACKFILLING REQUIRED FOR PROPER LAYING OF PIPES. CUT BOTTOM OF TRENCHES TO GRADE OF PIPE. EXCAVATE BELL HOLES. PROVIDE BEARING FOR ENTIRE LENGTH OF LOWER THIRD OF PIPE. EXCAVATE ROCK AND PEA GRAVEL, WELL TAMPED. CUT TRENCHES AT LEAST 12" WIDER THAN GREATER DIAMETER OF PIPE. PROVIDE CLASS II DRAINAGE ROCK UNDER IRRIGATION PIPING UNDER BUILDING SLABS.

BACKFILLING: PLACE AND COMPACT AS SPECIFIED UNDER DIVISION 2. COVER NO WORK UNTIL INSTALLATION HAS BEEN APPROVED BY THE ARCHITECT. PROVIDE 36" MINIMUM COVER FOR CAST IRON AND STEEL PIPE OUTSIDE BUILDING. REMOVE SURPLUS MATERIAL AS DIRECTED.

COMPLETION

BEFORE FINAL REVIEW:
THE WORK HEREUNDER WILL NOT BE REVIEWED FOR FINAL ACCEPTANCE UNTIL OPERATING AND MAINTENANCE DATA, MANUFACTURER'S LITERATURE, VALVE DIRECTORIES, PIPING IDENTIFICATION CODE DIRECTORY AND NAME PLATES SPECIFIED HEREIN HAVE BEEN APPROVED AND PROPERLY POSTED IN THE BUILDING AND FINAL CLEANING HAS BEEN COMPLETED.

DEMONSTRATION OF OPERATIONS:
WHEN THE INSTALLATION IS COMPLETE AND ADJUSTMENTS SPECIFIED HEREIN HAVE BEEN MADE, OPERATE THE SYSTEMS FOR A PERIOD OF ONE WEEK, DURING WHICH TIME DEMONSTRATE TO THE ARCHITECT THAT SYSTEMS ARE COMPLETED AND OPERATING IN CONFORMANCE WITH THESE SPECIFICATIONS.

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LICENSED ARCHITECT
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1609 Franklin Street Ste. No. 118
Oakland, CA 94621
Tel: 510-569-2000

CONSULTANT JOB NO:
23049.00

REGISTERED PROFESSIONAL ENGINEER
GARY L. HENNIG
No. M20245
3/9/2026
Signed
MECHANICAL
STATE OF CALIFORNIA

REVISIONS

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PLUMBING: SHEET SPECIFICATIONS

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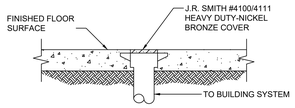
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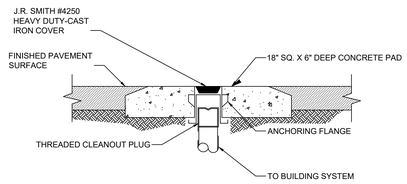
DATE: 10/23/2025

JOB NO: 23014

P0.2

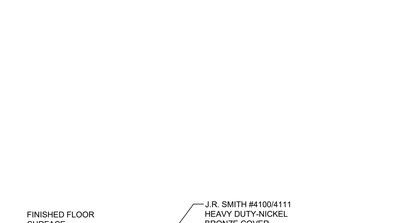


FLOOR CLEANOUT



GRADE CLEANOUT

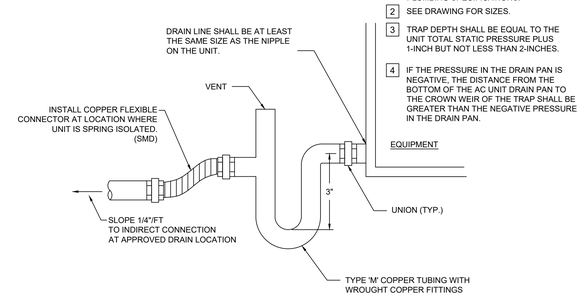
FLOOR/GRADE CLEANOUT DETAIL 5
N.T.S



CONDENSATE DRAIN CONNECTION TO TAILPIECE DETAIL 4
N.T.S

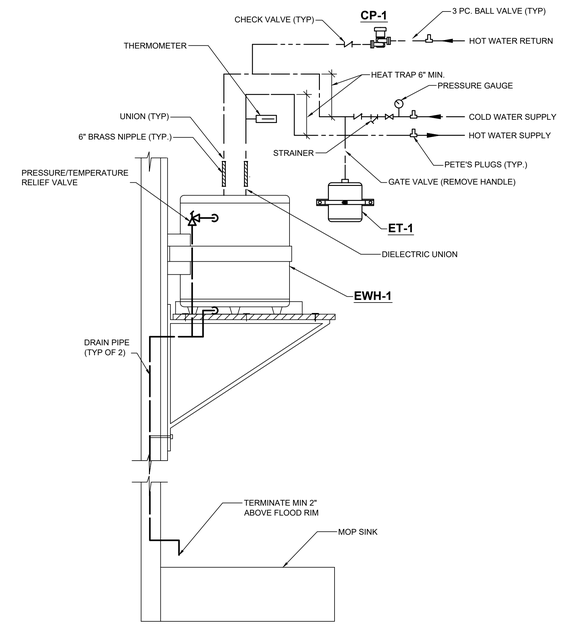
NOTES:

1. ALL CONDENSATE DRAIN LINES INSIDE BUILDING SHALL BE INSULATED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 15400, PLUMBING SPECIFICATIONS.
2. SEE DRAWING FOR SIZES.
3. TRAP DEPTH SHALL BE EQUAL TO THE UNIT TOTAL STATIC PRESSURE PLUS 1-INCH BUT NOT LESS THAN 2-INCHES.
4. IF THE PRESSURE IN THE DRAIN PAN IS NEGATIVE, THE DISTANCE FROM THE BOTTOM OF THE AC UNIT DRAIN PAN TO THE CROWN WEIR OF THE TRAP SHALL BE GREATER THAN THE NEGATIVE PRESSURE IN THE DRAIN PAN.

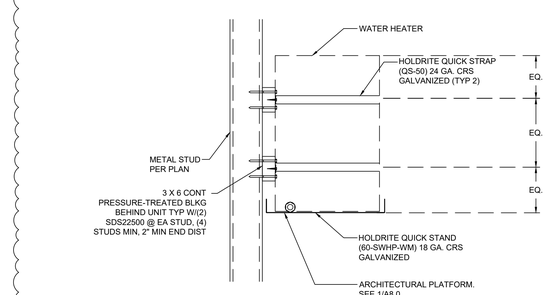


*DO NOT PROVIDE ON EQUIPMENT THAT IS INTERNALLY TRAPPED. CONTRACTOR TO COORDINATE.

CONDENSATE DRAIN CONNECTION TO EQUIPMENT DETAIL 3
N.T.S



WATER HEATER PIPING DIAGRAM 2
N.T.S



PLATFORM SUPPORT @ METAL STUD WALL

WATER HEATER MOUNTING DETAIL 1
N.T.S

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CONSULTANT JOB NO:
23049.00

REGISTERED PROFESSIONAL ENGINEER — GARY L. HENNIG — No. M20245 — 3/9/2026 — Signed — MECHANICAL — STATE OF CALIFORNIA

REVISIONS

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PLUMBING: DETAILS

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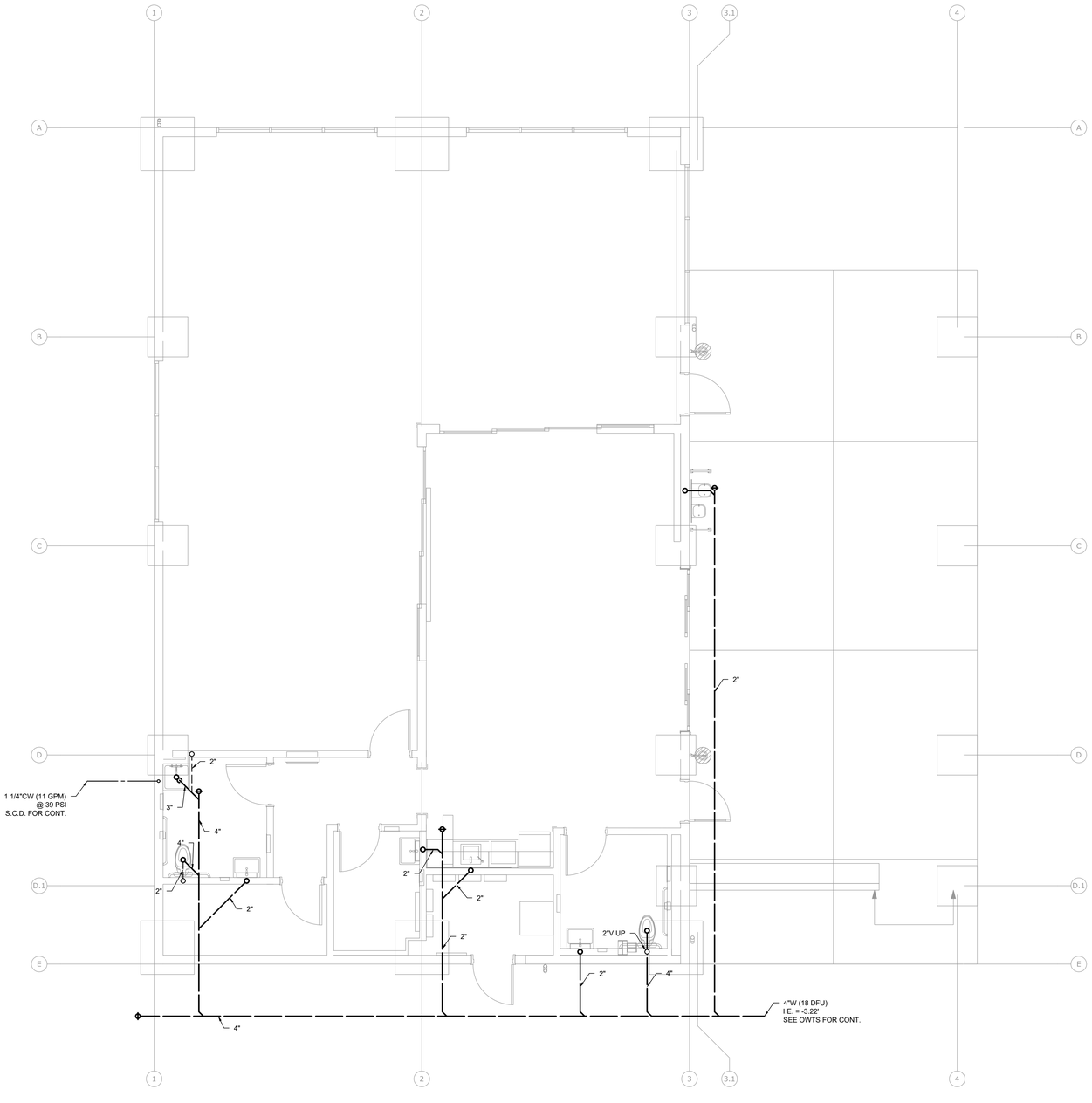
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P0.3



PLUMBING: FLOOR PLAN (1)
1/4" = 1'-0"

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REVISIONS
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3

PLUMBING: UNDERFLOOR PLAN

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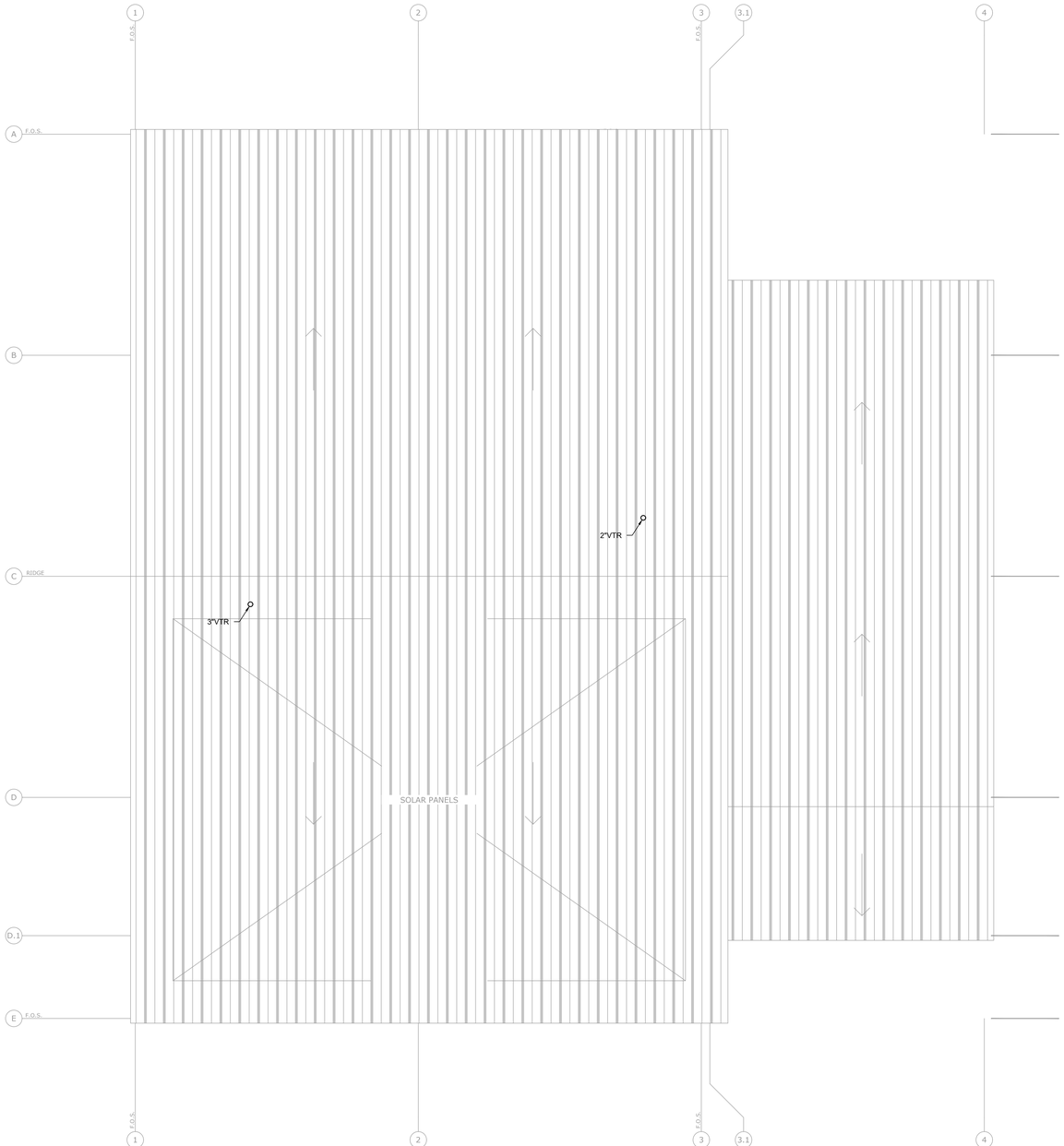
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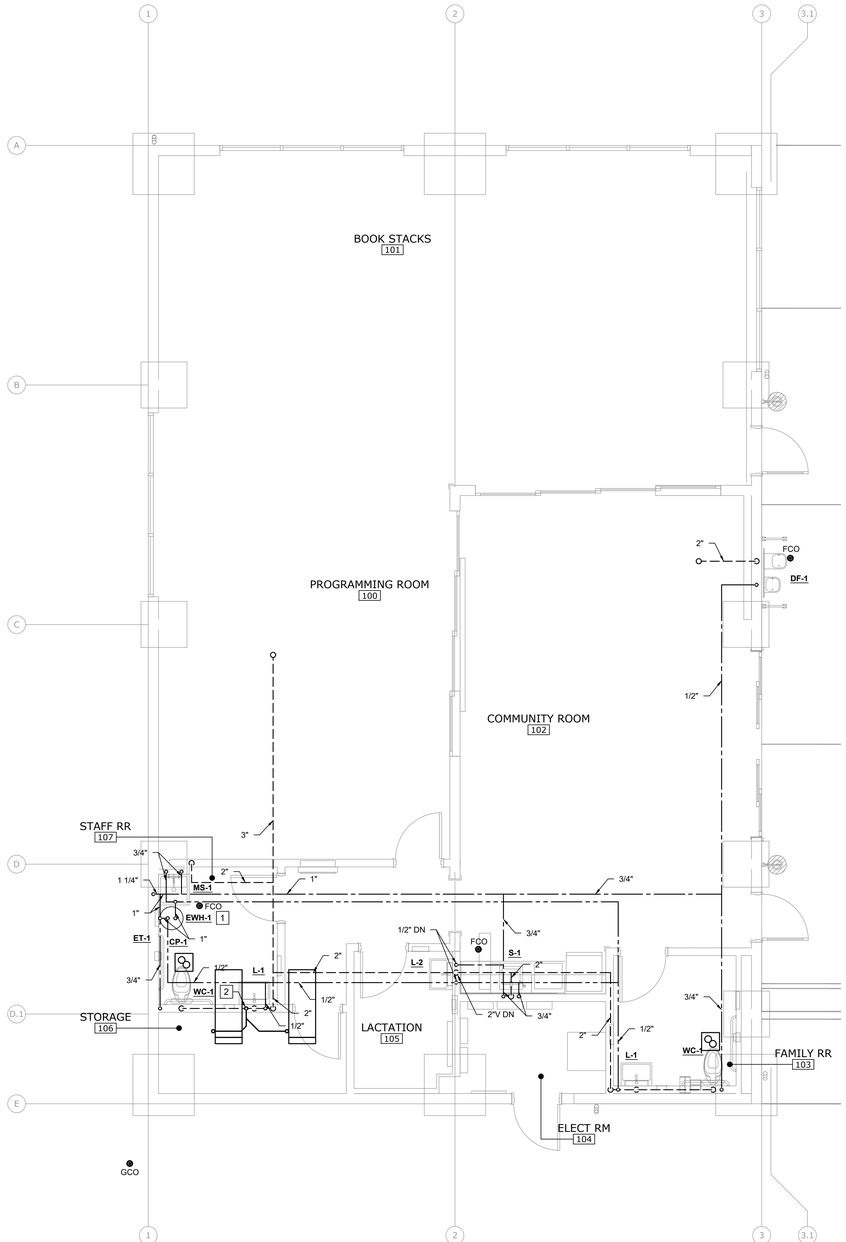
P2.0

SHEET NOTES:

1. MOUNT **EWH-1** ABOVE CEILING TO WALL AND SPILL DRAIN LINES TO **MS-1** BELOW.
2. 3/4"CD TO TAILPIECE OF SINK. SEE DETAIL 4/P0.3.



PLUMBING: ROOF PLAN (2)
1/4" = 1'-0"



PLUMBING: FLOOR PLAN (1)
1/4" = 1'-0"

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PLUMBING: FLOOR PLANS

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JOB NO: 23014

P2.1

STATE OF CALIFORNIA
Domestic Water Heating System
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE **NRCC-PLB-E**

This document is used to demonstrate compliance for nonresidential occupancies with requirements in 110.1, 110.3, 120.3, and 140.5, and with requirements in 141.0 for additions and alterations, for domestic water heating scopes using the prescriptive path. For high-rise residential and hotel/motel occupancies compliance is demonstrated with requirements in 110.1, 110.3, 160.4 and 170.2(d), and with requirements 180.1 for additions and 180.2 for alterations.

Project Name:	Bradley Library & Resiliency Center	**Report Page:**	**(Page 1 of 6)**
Project Address:	65607 Dixie St	**Date Prepared:**	10/15/2025

A. GENERAL INFORMATION

01	Project Location (city)	Bradley	02	Climate Zone	4
03	Occupancy Types Within Project (select all that apply):				

● Classroom ● All Other Occupancies

B. PROJECT SCOPE

This table includes domestic water heating systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive paths outlined in 140./170.2(d) and 141.0(a)/ 180.1, or 141.0(b)2N / 180.2 for additions or alterations. Solar water heating systems are documented on the NRCC-SAB compliance document. Combined hydronic water heating systems are documented on the NRCC-MCH compliance document.

01	02	03		
My project consists of (check all that apply):	System Type[1,2]	System Components		
☒ New system (DHW system being installed for the first time)	Individual System (serving nonresidential spaces)	☒ Equipment	☒ Distribution	☒ Controls
☐ System Alteration (equipment, distribution or controls)		☐ Equipment	☐ Distribution	☐ Controls

[1] *FOOTNOTES: Point of use water heaters, or other non-central systems used to serve nonresidential spaces, are considered individual systems.*
[2] *Dwelling units refers to hotel/motel guest rooms and units in a multifamily residential occupancy.*
[3] *DHW systems serving 2 or more dwelling units are considered "Central Systems" for multifamily occupancies*

C. COMPLIANCE RESULTS

Table C will indicate if the project data input into the compliance document is compliant with water heating requirements. If this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D. or the table indicated as not compliant for guidance.

01	02	03	04
Domestic Hot Water Equipment	Distribution Systems	Controls	**Compliance Results**
Table F	Table G	Table H	
Yes	Yes	Yes	COMPLIES

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. DOMESTIC HOT WATER EQUIPMENT

This table is used to demonstrate compliance with mandatory equipment requirements in 110.1 and 110.3. Compliance with prescriptive requirements in 140.5(c) / 170.2(d) must also be demonstrated and with 141.0 / 180.1/ 180.2 for addition and alteration scopes.

Equipment Schedule: Water Heating Efficiency and Standby Loss

03	04			05		06		
System Name	40 Gallon Electric	Exception to 140.5(c)/ 170.2(d)3		☐	Gas Service Water Heating System >= 1MMBtu/h[1]	Capacity-weighted Average Efficiency %		
07	08	09	10	11	12	13	14	15
Name or Item Tag	Equipment Type	Volume (gal)	Rated Input Capacity (Btu/h)	Max GPM/ First Hour Rating (FHR)	Rated Efficiency	Minimum Efficiency Required	Efficiency Unit	Designed Standby Loss	Maximum Standby Loss
40 Gallon Electric	Consumer Rated Electric Storage	40	10,236	FHR >=75	0.93	0.93	UEF		

[1] *FOOTNOTE: In systems >= 1MMBtu/h with multiple units, gas water heaters with input capacity > 100,000 Btu/h may meet 90% Et requirements via an input capacity-weighted average.*

Water Heating Equipment All Occupancies

	Yes	No	Not Applicable	Requirement
18	☐	☐	☒	Unfired storage tank insulation shall have Internal + External >=R-16 OR External >=R-3.5. Label required per 110.3(c)3
19	☐	☐	☒	New state buildings 60% of energy for service water heating from site solar energy or recovered energy per 110.3(c)5
20	☐	☐	☒	Isolation valves for instantaneous water heater with input rating >6.8 kBTUH or 2 kW has been specified per 110.3(c)6
21	☐	☐	☒	School buildings < 25,000 ft^2 and < 4 stories must install a heat pump water heating system per 140.5(a)1. Water heating systems serving an individual bathroom space may be an instantaneous electric water heater.

G. DOMESTIC HOT WATER DISTRIBUTION SYSTEM

This table is used to demonstrate compliance for nonresidential occupancies with distribution requirements in 120.3 and 140.5. For multifamily and hotel/motel occupancies, compliance is demonstrated with requirements 110.3(c), 160.4, 170.2(d).

Mandatory Pipe Insulation All Occupancies

13	☐	For systems serving dwelling units, pipe insulation must meet the minimum insulation requirements in Table 160.4-A (see blow) except: • Piping that penetrates framing members shall not be required to have pipe insulation for the distance of the framing penetration. Piping that penetrates metal framing shall use grommets, plugs, wrapping or other insulating material to assure that no contact is made with the metal framing. Insulation shall abut securely against all framing members • Piping installed in interior or exterior walls shall not be required to have pipe insulation if all of the requirements are met for compliance with Quality Insulation Installation (QII) as specified in the Reference Residential Appendix RA3.5. • Piping surrounded with a minimum of 1 inch of wall insulation, 2 inches of crawlspace insulation, or 4 inches of attic insulation, shall not be required to have pipe insulation.
14	☒	For systems serving nonresidential spaces, pipe insulation for the following applications is specified to comply with Table 120.3-A (see below) per 120.3: • Recirculating system piping, including supply and return piping of the water heater • The first 8 ft of hot and cold outlet piping, including between storage tank and heat trap, for a nonrecirculating storage system • Pipes that are externally heated
15	☒	Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather shall be installed with a cover suitable for outdoor service per 120.3(b) / 160.4(f). Pipe insulation buried below grade must be installed in a water proof and non-crushable casing or sleeve.

TABLE 120.3-A / 160.4-A PIPE INSULATION THICKNESS

Fluid Temperature Range (°F)	Conductivity Range (Btu-in per hour per ft^2 per °F)	Insulation Mean Rating Temp (°F)	Nominal Pipe Diameter (in)			
			< 1	1 to < 1.5	1.5 to < 4	1.5 to < 4 Multifamily & Hotel/Motel
			Minimum Insulation Required			
105-140	0.22 - 0.28	100	1.0 in or R-7.7	1.5 in or R-12.5	1.5 in or R-11	2.0 in or R-16

H. DOMESTIC HOT WATER CONTROLS

This table is used to demonstrate compliance with control requirements in 110.3 for all occupancies. For multifamily residential and hotel/motel occupancies, compliance is also demonstrated with requirements in 160.4(e) / 170.2(d).

	Yes	No	Not Applicable	Requirement
01	☒	☐	☐	Construction documents require manufacturer certification that service water-heating systems are equipped with automatic temperature controls capable of adjusting temperature settings per 110.3(a).
02	☐	☐	☒	Systems with capacity > 167,000 BTUH equipped with outlet temperature controls per 110.3(c)1 unless covered by California Plumbing Code 613.0.
03	☐	☐	☒	Controls for circulating pumps or electrical heat trace systems are capable of automatically turning off the system per §110.3(c)2 unless systems serves healthcare facility.
04	☐	☐	☒	For recirculation systems serving multiple dwelling units, design includes automatic pump controls per 170.2(d) or 180.1(b)3 for additions.
05	☐	☐	☒	For recirculation systems serving individual dwelling units, design includes manual on/off controls as specified in Reference Appendix RA4.4.9 per 170.2(d).
06	☐	☐	☒	Combustion air positive shut-off shall be provided per 160.4(3).on all newly installed commercial boilers as follows: • Boilers with input capacity >= 2.5 MMBtu/h, in which the boiler is designed to operate with a nonpositive vent static pressure • Boilers where one stack serves two or more boilers with a total combined input capacity per stack of 2.5 MMBtu/h.
07	☐	☐	☒	Boiler combustion air fans with motor >= 10 hp shall meet one of the following • The fan motor shall be driven by a variable speed drive OR • The fan motor shall include controls that limit the fan motor demand to <=30% of the total design wattage at 50% of the design air volume.
08	☐	☐	☒	Newly installed boilers with an input capacity [d:gte/] 5MMBtu/h and a steady state full-load combustion efficiency < 90% shall maintain excess (stack-gas) oxygen concentrations <= 5% by volume on a dry basis over firing rates of 20-100%. Combustion air volume shall be controlled with respect to firing rate or flue gas oxygen concentration. Use of a common gas and combustion air control linkage or jack shaft is prohibited.

I. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in this document. If any selection have been changed by permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online

Form/Title
NRCI-PLB-E - Must be submitted for all buildings

J. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

There are no forms required for this project.

K. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

There are no forms required for this project.

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Gary Hennings	Documentation Author Signature: Gary Hennings
Company: H & M Mechanical Group	Signature Date: 2025-10-15
Address: 8105 Edgewater Dr #114	CEA/ HERS Certification Identification (if applicable): M20245
City/State/Zip: Oakland CA 94621	Phone: 510.569.2000

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: Gary Hennings	Responsible Designer Signature: Gary Hennings
Company: H&M Mechanical Group	Date Signed: 2025-10-15
Address: 8517 Earhart RD, Suite 230	License: M202045
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REVISIONS
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PLUMBING: TITLE 24

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Written dimensions on these drawings shall have precedence over scaled dimensions. Contractors shall verify and be responsible for all dimensions and conditions on the job and this office shall be notified of any variations from the dimensions and conditions shown by these drawings. Shop drawings must be submitted to this office for approval before proceeding with fabrication.

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DATE: 10/23/2025
JOB NO: 23014

PT.24

GENERAL CONSTRUCTION NOTES

1. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE CODES AND REGULATIONS. MATERIALS AND EQUIPMENT SHALL BE U.L. LISTED AND LABELED FOR THE APPLICATION.
2. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, LICENSES AND INSPECTION FEES REQUIRED BY THIS CONTRACT WORK.
3. CONTRACTOR SHALL VISIT THE PROJECT SITE PRIOR TO BIDDING AND ALLOW FOR ALL FIELD CONDITIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ELECTRICAL WORK NOTED AND CALLED OUT ON ALL CONTRACT DOCUMENTS. THE CONTRACTOR SHALL OBTAIN INFORMATION AND BE FAMILIAR WITH ALL OTHER TRADES WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION BETWEEN OTHER TRADES ON PROJECT.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF PERSONS AND PROPERTY AND SHALL PROVIDE INSURANCE COVERAGE AS NECESSARY FOR LIABILITY AND PERSONAL, PROPERTY DAMAGE, TO FULLY PROTECT THE OWNER, ARCHITECT AND ENGINEER FROM ANY AND ALL CLAIMS RESULTING FROM THIS WORK.
5. CONTRACTOR SHALL MAINTAIN RECORD DRAWINGS AT THE PROJECT SITE INDICATING ALL MODIFICATIONS TO ELECTRICAL SYSTEMS. THE CONTRACTOR SHALL AT THE CONCLUSION OF THE PROJECT PROVIDE ACCURATE "AS-BUILT" DRAWINGS ACCEPTABLE TO THE ARCHITECT.
6. ALL MATERIALS PROVIDED TO THE PROJECT SHALL BE NEW. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE AND INSTALL ALL INCIDENTAL MATERIALS REQUIRED FOR A COMPLETE INSTALLATION.
7. CONTRACTOR SHALL PROVIDE TO THE ARCHITECT A CONSTRUCTION SCHEDULE OF ELECTRICAL WORK. THE CONSTRUCTION SCHEDULE SHALL IDENTIFY ALL SIGNIFICANT MILESTONES WITH COMPLETION DATES.
8. CONTRACTOR SHALL PROVIDE ALL REQUIRED "CUTTING, PATCHING, EXCAVATION, BACKFILL AND REPAIRS" NECESSARY TO RESTORE DAMAGED SURFACES TO EQUAL OR BETTER THAN ORIGINAL CONDITIONS EXISTING AT START OF WORK.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR PAINTING ALL EXPOSED CONDUITS AND ELECTRICAL EQUIPMENT. REFER TO ARCHITECTS PAINTING SECTION FOR REQUIREMENTS.
10. ALL ELECTRICAL EQUIPMENT INSTALLED OUTDOORS SHALL BE WEATHERPROOF. EXTERIOR CONDUITS RUN INTO BUILDINGS SHALL BE INSTALLED WITH FLASHING, CAULKED AND SEALED. CONDUITS FOR EXTERIOR ELECTRICAL DEVICES SHALL BE RUN INSIDE BUILDING UNLESS OTHERWISE NOTED ON DRAWINGS.
11. ALL CONDUITS UNLESS OTHERWISE NOTED ON DRAWINGS SHALL HAVE AS A MINIMUM: TWO (2) #12s WITH ONE (1) #12 GROUND. "TICK" MARKS SHOWN ON CIRCUITRY ARE FOR ROUGH ESTIMATING ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WIRES AND WIRE SIZES REQUIRED BY LATEST CODE.
12. ALL BRANCH CIRCUITS SHALL HAVE INDIVIDUAL NEUTRALS. SHARED NEUTRALS ON MULTIWIRE CIRCUITS IS NOT ALLOWED.
13. ALL 120/277V LIGHT SWITCHES AND WALL OCCUPANT SENSORS SHALL HAVE A NEUTRAL INSTALLED TO THE DEVICE BOX EXCEPT WHERE A CONDUIT OR SURFACE RACEWAY SYSTEM IS INSTALLED.
14. COORDINATE ALL CONDUIT RUNS, ELECTRICAL EQUIPMENT AND PANELS WITH ALL OTHER WORK TO AVOID CONFLICTS.
15. SEE ARCHITECTURAL DOCUMENTS FOR EXACT PLACEMENT OF LIGHTING FIXTURES AND DEVICES. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF CEILING TYPES FROM ARCHITECTURAL DOCUMENTS AND PROVIDE AND INSTALL ALL REQUIRED FIXTURE MOUNTING HARDWARE. PROVIDE AND INSTALL U.L. LISTED FIRE STOP ENCLOSURES FOR ALL RECESSED FIXTURES IN FIRE RATED CEILINGS.
16. FROM ALL NEW FLUSH MOUNT PANELS; THE CONTRACTOR SHALL STUB UP INTO ACCESSIBLE CEILING SPACE A MINIMUM OF FOUR (4) 3/4" CONDUITS FOR FUTURE USE.
17. CONTRACTOR SHALL, PRIOR TO BID, FIELD VERIFY ALL REQUIREMENTS FOR MODIFYING THE EXISTING CLOCK, DATA, AND INTERCOM SYSTEMS TO ACCOMMODATE ADDITIONS NOTED. THE CONTRACTOR SHALL PROVIDE ALL MATERIALS NEEDED TO MAKE A FULLY OPERATIONAL SYSTEM AT THE CONCLUSION OF PROJECT WORK.
18. CONTRACTOR SHALL PROVIDE IN EVERY NEW EMPTY CONDUIT A DRAW STRING FOR USE IN FUTURE CONSTRUCTION.
19. ALL CONDUIT SHALL BE CONCEALED WHERE POSSIBLE. CUT AND PATCH EXISTING WALLS WHERE NECESSARY. WHERE IT IS NECESSARY TO CUT OR BORE EXISTING STRUCTURAL WALLS FOR NEW ELECTRICAL WORK OBTAIN PERMISSION FROM THE ARCHITECT PRIOR TO STARTING WORK. REUSE EXISTING CONDUIT WHERE POSSIBLE.
20. WHERE IT IS NOT POSSIBLE TO REUSE EXISTING CONDUIT OR RUN NEW CONCEALED CONDUIT USE NON-METALLIC SURFACE RACEWAY AND BOXES. ROUTING OF ALL NON-METALLIC RACEWAYS SHALL BE APPROVED BY THE ARCHITECT OR OWNER'S REPRESENTATIVE PRIOR TO ROUGH-IN.
21. EXTENSION RINGS OR RESET BOXES TO BE FLUSH WITH NEW WALL THICKNESS.
22. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE TO EXISTING UNDERGROUND SYSTEMS (GAS, WATER, TELEPHONE, ELECTRICAL, SEWER, ETC.). THE CONTRACTOR SHALL REPAIR & PAY ALL EXPENSES FOR DAMAGE TO EXISTING UNDERGROUND SYSTEMS AS A RESULT OF NEW WORK. REPAIR TO DAMAGED UNDERGROUND SYSTEMS SHALL BE TO THE OWNERS SATISFACTION WITHOUT EXTRA EXPENSE TO THE OWNER.
23. EXISTING WIRING SHOWN HAS BEEN TAKEN FROM OLD PLANS AND IS ASSUMED TO BE CORRECT. ELECTRICAL CONTRACTOR SHALL FIELD VERIFY ACTUAL CONDITIONS AND MAKE ADJUSTMENTS TO SUIT ACTUAL CONDITIONS AND TO MEET THE INTENT OF THE CONTRACT DOCUMENTS.
24. WHERE NON-METALLIC SHEATHED CONDUCTORS ARE FOUND, THE CONTRACTOR SHALL REMOVE TO FULLEST EXTENT PER THE GENERAL DEMOLITION NOTES AND REPLACE WITH CONDUIT. METAL CLAD CABLE WILL BE PERMITTED ON A CASE-BY-CASE BASIS ONLY BY WRITTEN APPROVAL FROM THE ARCHITECT.
25. ALL INSTALLATION OF EXPOSED SURFACE MOUNTED RACEWAY IN PUBLIC AREAS SHALL BE REVIEWED BY ARCHITECT BEFORE ROUGH-IN. CONTRACTOR IS TO DETERMINE THE ACCESSIBILITY OF ATTIC, FURRED SPACE, HOLLOW MULLIONS, ETC. IN EACH AREA AND REVIEW WITH ARCHITECT. IF SYSTEM CAN BE ROUTED CONCEALED EITHER BY FISHING OR ACCESSIBILITY, CONTRACTOR IS TO DO SO. IF INACCESSIBILITY IS DETERMINED, CONTRACTOR SHALL INSTALL SURFACE MOUNTED RACEWAY IN THE MOST AESTHETICALLY PLEASING MEANS AS DETERMINED BY THE ARCHITECT. NO ALLOWANCE FOR ADDITIONAL COMPENSATION DUE TO ROUTING AS DIRECTED BY THE ARCHITECT WILL BE MADE.
26. CONTRACTOR SHALL COORDINATE WITH PG&E, AT&T & PAY ALL CHARGES FOR TEMPORARY CONSTRUCTION POWER & TELEPHONE.
27. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANIES AND OBTAIN UTILITY COMPANY CONSTRUCTION DOCUMENTS. UTILITY COMPANY CHARGES SHALL BE PAID BY OWNER.

ELECTRICAL SYMBOLS & ABBREVIATIONS

SYMBOLS & ABBREVIATIONS SHOWN ARE FOR GENERAL USE. DISREGARD THOSE WHICH DO NOT APPEAR ON THE PLANS.

- FLUORESCENT OR LED LUMINAIRE - SEE SCHEDULE
- EMERGENCY OR NIGHT LIGHT
- STRIP FLUORESCENT OR LED LUMINAIRE - SEE SCHEDULE
- LUMINAIRE - RECESSED - SEE SCHEDULE
- RECESSED WALL WASHER
- LUMINAIRE - SURFACE MOUNTED - SEE SCHEDULE
- LUMINAIRE - POLE OR POST MOUNTED - SEE SCHEDULE
- LUMINAIRE - WALL MOUNTED SEE SCHEDULE
- BOLLARD OR PATH LIGHT - SEE SCHEDULE
- EXIT LIGHT - DIRECTIONAL ARROWS AS INDICATED - SEE SCHEDULE
- TRACK LIGHTING - SEE SCHEDULE
- EMERGENCY LIGHT
- DIGITAL DUAL TECHNOLOGY OCC. SENSOR
- LIGHTING CONTROL OCCUPANCY SENSOR CORNER MOUNTED
- DRC — DIMMER ROOM CONTROLLER
- PC — PLUG LOAD CONTROLLER
- RC — ROOM LIGHTING CONTROLLER
- LCP — LIGHTING CONTROL PANEL
- INV — LIGHTING EMERGENCY INVERTER
- DL — DIGITAL DAYLIGHT SENSOR
- $ — SINGLE POLE SWITCH ★★
- $a — SINGLE POLE SWITCH, ★★ a = CIRCUIT CONTROLLED
- $3 — THREE WAY SWITCH★★
- $4 — FOUR WAY SWITCH★★
- $M — MANUAL MOTOR STARTER
- $K — KEY OPERATED SWITCH★★
- $ — LIGHTING DIMMER★★
- $ — DIGITAL ON/OFF SWITCH ★★
- $D — DIGITAL DIMMER SWITCH ★★
- $DM# — DIGITAL MULTI SCENE LIGHTING SWITCH ★★
- $S — DIGITAL DUAL TECHNOLOGY WALL OCC. SENSOR ★★
- $ — WALL OCCUPANCY SENSOR ★★
- $2 — DOUBLE SWITCHED WALL OCCUPANCY SENSOR ★★
- $ — DIMMING DUAL TECHNOLOGY WALL SWITCH OCCUPANCY SENSOR ★★
- $2 — 2-BUTTON DIMMING DUAL TECHNOLOGY WALL SWITCH OCCUPANCY SENSOR ★★

- SECURITY DOOR CONTACTS
- MD — SECURITY MOTION DETECTOR
- SC — CCTV CAMERA
- KP — SECURITY SYSTEM KEYPAD
- DOOR BELL PUSHBUTTON
- CH — DOOR CHIME WITH LED
- RECEPTACLE - DUPLEX ★
- DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER - FIELD VERIFY HEIGHT
- GFCI CONVENIENCE RECEPTACLE - DUPLEX★
- GFCI CONVENIENCE DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER - FIELD VERIFY HEIGHT
- RECEPTACLE DOUBLE DUPLEX★
- HALF SWITCHED DUPLEX RECEPTACLE ★
- SINGLE RECEPTACLE★
- DUPLEX RECEPTACLE - CEILING MOUNTED
- HC — LETTER INDICATES DUPLEX HALF CONTROLLED RECEPTACLE ★
- C — LETTER INDICATES DUPLEX FULLY CONTROLLED RECEPTACLE ★
- FLOOR MOUNTED DUPLEX RECEPTACLE
- FLOOR MOUNTED BOX
- POWER OUTLET - SEE PLANS FOR NEMA TYPE★
- POWER POLE
- WALL TELEPHONE OUTLET ★★
- [#] — VOICE/DATA WALL OUTLET ★
- [#] — VOICE/DATA OUTLET MOUNTED ABOVE COUNTER - FIELD VERIFY HEIGHT
- [#] — SURFACE MOUNTED VOICE/DATA WALL OUTLET ★
- [#] — SURFACE MOUNTED VOICE/DATA OUTLET MOUNTED ABOVE COUNTER - FIELD VERIFY HEIGHT
- WIRELESS ACCESS POINT (WAP) - CEILING MOUNTED
- WIRELESS ACCESS POINT (WAP) - WALL MOUNTED - FIELD VERIFY HEIGHT
- [#] — VOICE/DATA OUTLET - FLOOR MOUNTED
- TV OUTLET ★
- [#] — VOICE/DATA OUTLET - CEILING MOUNTED
- S — INTERIOR SPEAKERS CEILING MOUNTED
- HS — INTERIOR SPEAKERS WALL MOUNTED
- HC — CLOCK +8'-0" AFF U.O.N. VERIFY BEFORE INSTALLATION

- PANELBOARD - FLUSH MOUNTED
- EQUIPMENT PANEL - FLUSH MOUNTED
- PANELBOARD - SURFACE MOUNTED
- EQUIPMENT PANEL - SURFACE MOUNTED
- M — METER W/ CURRENT TRANSFORMER
- J/J — JUNCTION BOX - CEILING OR WALL MOUNTED, SIZE PER CODE, TAPE AND TAG WIRES
- SPD — SURGE PROTECTIVE DEVICE
- MOTOR CONNECTION
- NON-FUSED DISCONNECT SWITCH
- FUSED DISCONNECT SWITCH; FUSED WITH DUAL-ELEMENT FUSES SIZED PER EQUIPMENT MFGR'S NAMEPLATE DATA
- COMBINATION STARTER/FUSED DISCONNECT SWITCH; FUSED DISCONNECT SWITCH ELEMENT FUSES SIZED PER EQUIPMENT MFGRS NAMEPLATE DATA
- MAGNETIC STARTER - NEMA SIZE INDICATED NEMA 3R ENCLOSURE UNLESS OTHERWISE SPECIFIED
- CIRCUIT BREAKER
- GROUND ROD WITH GROUNDWELL BOX
- GROUND ELECTRODE
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- TRANSFORMER - SEE SINGLE LINE FOR SIZE
- PULLBOX
- ERMS
- FLEX CONDUIT WITH CONNECTION
- CONDUIT - UP
- CONDUIT - DOWN
- E — CONDUIT EMERGENCY SYSTEM
- LV — LOW VOLTAGE WIRING
- SURFACE METAL OR NON-METALLIC RACEWAY
- CONDUIT - CONCEALED IN WALLS OR CEILING
- CONDUIT - EXISTING
- CONDUIT - BELOW SLAB OR UNDERGROUND: 3/4"MIN.
- CAPPED OR STUB-OUT CONDUIT
- CONDUIT CONTINUATION
- #10 — CONDUIT - HOME RUN TO PANEL, TERMINAL CABINET, ETC. RUNS MARKED WITH CROSSHATCHES INDICATE NUMBER OF #12 AWG WIRES WHEN MORE THAN TWO. SIZE CONDUIT ACCORDING TO SPECIFICATIONS AND APPLICABLE CODE. CROSS HATCHES WITH NUMBER ADJACENT INDICATES WIRE SIZE OTHER THAN #12 AWG.
- 2 — SHEET NOTE REFERENCE SYMBOL; SEE ASSOCIATED NOTE ON SAME SHEET
- 3 — SCHEDULE SYMBOL; SEE ASSOCIATED NOTE ON SAME SHEET

- X — DETAIL NOTE REFERENCE SYMBOL SEE ASSOCIATED NOTE ON SAME DETAIL
- X / XXX — DETAIL NUMBER / DETAIL OR SECTION REFERENCE / SHEET NUMBER
- FXXX — FEEDER DESIGNATION: SEE ASSOCIATED NOTE ON SAME DETAIL
- X / X — INDICATES QUANTITY OF TELEPHONE OUTLETS / INDICATES QUANTITY OF DATA OUTLETS

ABBREVIATIONS

A	AMPERE	GND, G	GROUND	OFCI	OWNER FURNACED CONTRACTOR INSTALLED
AFF	ABOVE FINISHED FLOOR	GRS	GALVANIZED RIGID STEEL	PA	PUBLIC ADDRESS
ALUM/AL	ALUMINUM	HT	HEIGHT	PB	PULL BOX
ARCH	ARCHITECT	IC	INTERCOM	PF	POWER FACTOR
AWG	AMERICAN WIRE GAUGE	IDF	INTERMEDIATE DISTRIBUTION FRAME	PH	PHASE
BKR	BREAKER		INCANDESCENT	PIR	PASSIVE INFRARED
C	CONDUIT	INCAND	INVERTER	PNL	PANEL
CATV	CABLE TV	INV	LIGHTING EMERGENCY	PV	PHOTOVOLTAIC
CB	CIRCUIT BREAKER	JB	JUNCTION BOX	PVC	POLYVINYL CHLORIDE
CCTV	CLOSED CIRCUIT TV	KV	KILOVOLT	PWR	POWER
CKT	CIRCUIT	KVA	KILOVOLT AMPERES	(R)	RELOCATE
CL	CENTER LINE	KW	KILOWATT	(RP)	REMOVABLE POLE
CLG	CEILING	LCP	LIGHTING CONTROL PANEL	RECPT'S	RECEPTACLES
C.O.	CONDUIT ONLY	LTG	LIGHTING	REQD	REQUIRED
CTR	CENTER	LV	LOW VOLTAGE	REQMT'S	REQUIREMENT(S)
D	DIMMER	KCM	THOUSAND CIRCULAR MILS	SHT	SHEET
DIM	DIMENSION	M.B.	MAIN CIRCUIT BREAKER	SLD	SINGLE LINE DIAGRAM
DIST	DISTRIBUTION	MCA	MINIMUM CIRCUIT AMPS	STC	SYSTEMS TERMINATION
(E)	EXISTING	MDF	MAIN DISTRIBUTION FRAME		CABINET
EC	ELECTRICAL CONTRACTOR	MECH	MECHANICAL	SW	SWITCH
(EL)	EVENING LIGHT	MH	METAL HALIDE	SWBD	SWITCHBOARD
EM	EMERGENCY	MLO	MAIN LUGS ONLY	TTB	TELEPHONE TERMINAL BACKBOARD
EMT	ELECTRICAL METALLIC TUBING	MPOE	MAIN POINT OF ENTRANCE	TYP	TYPICAL
ERMS	ENERGY REDUCTION MAINTENANCE SWITCH	MTD	MOUNTED	UON	UNLESS OTHERWISE NOTED
EQUIP	EQUIPMENT	MTG	MOUNTING	UG	UNDERGROUND
EV	ELECTRICAL VEHICLE	MOCP	MAXIMUM OVER CURRENT PROTECTION	V	VOLT
FA	FIRE ALARM	(N)	NEW	VD	VOLTAGE DROP
FACP	FIRE ALARM CONTROL PANEL	NIC	NOT IN CONTRACT	W	WATT
FC	FOOT CANDLE	NIEC	NOT IN ELECTRICAL CONTRACT	W/	WITH
FIN	FINISH	(NL)	NIGHT LIGHT	WP	WEATHERPROOF
FL	FLOOR	NO.	NUMBER	XFMR	TRANSFORMER
FLA	FULL LOAD AMPS	NOM	NOMINAL		
FLUOR	FLUORESCENT	NTS	NOT TO SCALE		
(F)	FUTURE	OAH	OVERALL HEIGHT		
GC	GENERAL CONTRACTOR	OC	ON CENTER		
GFCI	GROUND FAULT	OH	OVERHEAD		
GFI	INTERRUPTING				

FIRE ALARM

NOTE: SEE FIRE ALARM DRAWINGS FOR QUANTITIES AND MOUNTING HEIGHTS.

- P — MANUAL PULL STATION
- STROBE ONLY
- HORN ONLY
- M — MINI HORN
- HORN/STROBE
- CHIME/STROBE
- HEAT DETECTOR
- SMOKE DETECTOR
- CO — CARBON MONOXIDE ALARM
- 2 — DUCT SMOKE DETECTOR
- TAMPER SWITCH
- FLOW SWITCH
- POST INDICATING VALVE
- FIRE SMOKE DAMPER
- BELL (GONG)
- FCP — FIRE ALARM CONTROL PANEL
- DH — DOOR HOLDER
- APS — AUXILIARY POWER SUPPLY
- FSA — FIRE SYSTEM ANNUNCIATOR
- FTR — FIRE ALARM TRANSPONDER OR TRANSMITTER
- ESR — ELEVATOR STATUS/RECALL
- FAC — FIRE ALARM COMMUNICATOR
- ANN — REMOTE ANNUNCIATORS
- EOL — END OF LINE

★ +15" A.F.F. TO BOTTOM OF BOX, U.O.N.
★★ +48" A.F.F. TO TOP OF BOX, U.O.N.
[#] NUMBER IN BRACKETS DENOTES NUMBER OF CABLE DROPS WHEN MORE THAN (2).

GENERAL DEMOLITION NOTES

A. CONTRACTOR SHALL FIELD VERIFY EXTENT OF ELECTRICAL DEMOLITION AND QUANTITIES OF ELECTRICAL TO BE REMOVED AS DICTATED BY THE REQUIREMENTS OF THE PROJECT.

B. REMOVAL SHALL INCLUDE WIRING, RACEWAY, BOXES, SWITCHES, LIGHT FIXTURES, ETC. AS INDICATED ON THE PLANS AND AS REQUIRED BY THESE DEMOLITION NOTES.

C. RACEWAYS ASSOCIATED WITH ELECTRICAL BEING DEMOLISHED WHICH ARE CONCEALED IN EXISTING REMAINING WALLS MAY BE ABANDONED IN PLACE. REMOVE WIRING FROM CONDUIT.

D. RACEWAYS ASSOCIATED WITH ELECTRICAL BEING DEMOLISHED WHICH ARE EXPOSED SHALL BE REMOVED.

E. WHERE REMOVAL OF EQUIPMENT OR WIRING IS INDICATED, IT SHALL INCLUDE ALL ASSOCIATED WIRING BACK TO LAST ACTIVE REMAINING OUTLET, DEVICE, FIXTURE OR PANEL.

F. ELECTRICAL CONTRACTOR SHALL INSURE THAT ALL REMAINING ACTIVE CIRCUITS, DEVICES, OUTLETS, LIGHT FIXTURES, ETC. HAVE NOT BEEN DISCONNECTED OR MADE INOPERATIVE DURING DEMOLITION. ELECTRICAL CONTRACTOR SHALL RESTORE ALL INTERRUPTED OR DISCONNECTED CIRCUITS TO OPERATION.

G. ELECTRICAL CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL REMOVED ELECTRICAL EQUIPMENT AND MATERIAL.

H. NO REMOVED EQUIPMENT OR MATERIAL SHALL BE REUSED AS PART OF NEW WORK, U.O.N.

I. EXISTING REMAINING CONCEALED RACEWAYS MAY BE REUSED FOR NEW WORK PROVIDED THEY MEET ALL REQUIREMENTS OF THE SPECIFICATION FOR NEW WORK.

J. EXISTING FLUSH OUTLETS MAY BE REUSED FOR NEW WORK PROVIDED THEY MEET ALL REQUIREMENTS OF THE SPECIFICATION FOR NEW WORK, MEET THE REQUIREMENTS OF THE CURRENT C.E.C. FOR VOLUME AND COINCIDE WITH LOCATION SHOWN FOR THE NEW WORK.

K. FLUSH OUTLET BOXES IN EXISTING WALLS TO REMAIN MAY BE ABANDONED IN PLACE. REMOVE DEVICES AND WIRING, PLUG OPENING AND PROVIDE AND INSTALL A BLANK DEVICE PLATE.

L. EXISTING WIRING SHOWN HAS BEEN TAKEN FROM OLD PLANS AND IS ASSUMED TO BE CORRECT. ELECTRICAL CONTRACTOR SHALL FIELD VERIFY ACTUAL CONDITIONS AND MAKE ADJUSTMENTS TO SUIT ACTUAL CONDITIONS AND TO MEET THE INTENT OF THE CONTRACT DOCUMENTS.

M. WHERE TELEPHONE, COMPUTER DATA, FIBER OPTICS, FIRE ALARM OR OTHER COMMUNICATIONS OUTLETS OR WIRING IS TO BE DEMOLISHED IT SHALL BE REMOVED BACK TO THE NEXT TERMINAL POINT. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH OWNER OR HIS REPRESENTATIVE TO HAVE EQUIPMENT AND WIRING DESIGNATED FOR REMOVAL OR PRESERVATION PRIOR TO REMOVAL OF OUTLET BOXES, CONDUIT OR WIRING BY ELECTRICAL CONTRACTOR.

N. COORDINATE WITH OWNER PRIOR TO START OF DEMOLITION TO MINIMIZE POWER INTERRUPTIONS, WORK MAY HAVE TO OCCUR DURING NON-REGULAR BUSINESS HOURS. COORDINATE IN WRITING WITH OWNER ONE WEEK PRIOR TO PLANNED POWER INTERRUPTIONS.

APPLICABLE CODES & STANDARDS

CODES:

1. 2025 CALIFORNIA ADMINISTRATIVE CODE C.A.C., PART 1, TITLE 24, C.C.R.
2. 2022 CALIFORNIA BUILDING CODE (CBC) C.C.R., TITLE 24. VOL. 1 & 2 BASED ON THE 2021 INTERNATIONAL BUILDING CODE (IBC) WITH CALIFORNIA AMENDMENTS.
3. 2022 CALIFORNIA ELECTRICAL CODE (CEC) C.C.R., TITLE 24, PART 3 BASED ON THE 2020 NATIONAL ELECTRICAL CODE (NEC) WITH CALIFORNIA AMENDMENTS.
4. 2022 CALIFORNIA MECHANICAL CODE (CMC) C.C.R., TITLE 24, PART 4 BASED ON THE 2021 UNIFORM MECHANICAL CODE (UMC) WITH CALIFORNIA AMENDMENTS.
5. 2022 CALIFORNIA PLUMBING CODE (CPC) C.C.R., TITLE 24, PART 5 BASED ON THE 2021 UNIFORM PLUMBING CODE (UPC) WITH CALIFORNIA AMENDMENTS.
6. 2022 CALIFORNIA ENERGY CODE C.C.R., TITLE 24, PART 6.
7. 2022 CALIFORNIA FIRE CODE (CFC) C.C.R., TITLE 24, PART 9 BASED ON THE 2021 INTERNATIONAL FIRE CODE (IFC) WITH CALIFORNIA AMENDMENTS.
8. 2022 CALIFORNIA GREEN BUILDING STANDARDS CODE C.C.R., TITLE 24, PART 11.
9. 2022 CALIFORNIA REFERENCED STANDARDS CODE C.C.R., TITLE 24, PART 12.
10. TITLE 19 C.C.R., PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS.
11. NATIONAL FIRE ALARM CODE (NFPA 72) 2022.
12. CITY OF BRADLEY ORDINANCES, CODES, AND REGULATIONS.

STANDARDS:

1. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
2. ELECTRONICS INDUSTRIES ASSOCIATION (EIA)
3. INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE)
4. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
5. NATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)
6. UNDERWRITER LABORATORIES (UL)
7. CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH ACT STANDARDS (CAL/OSHA)

SHEET INDEX

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E6.4	ELECTRICAL DETAILS.
E6.5	ELECTRICAL DETAILS.

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CONSULTANT:

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JOB NO: 23014

E0.1

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STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-LTI-E
This document is used to demonstrate compliance with requirements in 110.9, 110.12(c), 130.0, 130.1, 140.6 and 141.0(b)2 for indoor lighting scopes using the prescriptive path for nonresidential and hotel/motel occupancies. It is also used to document compliance with requirements in 160.5, 170.2(e) and 180.2(b)4 for indoor lighting scopes using the prescriptive path for multifamily occupancies. Multifamily includes dormitory and senior living facilities.			
Project Name: New Bradley Library & Resiliency Center		**Report Page:**	**(Page 1 of 8)**
Project Address: 65607 Dixie Street, Bradley CA 93426		**Date Prepared:**	2025-10-21T23:30:53-04:00

A. GENERAL INFORMATION

01	Project Location (city)	04	Total Conditioned Floor Area (ft²)	2,365
02	Climate Zone	05	Total Unconditioned Floor Area (ft²)	0
03	Occupancy Types Within Project (select all that apply):	06	# of Stories (Habitable Above Grade)	1
● Library				

B. PROJECT SCOPE

This table includes any lighting systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.6 / 170.2(e) or 141.0(b)2 / 180.2(b)4 for alterations.

Scope of Work		Conditioned Spaces		Unconditioned Spaces	
01		02	03	04	05
My Project Consists of (check all that apply):		Calculation Method	Area (ft²)	Calculation Method	Area (ft²)
☒	New Lighting System	Area Category Method	2365	N/A	0
☐	New Lighting System - Parking Garage	N/A	0	N/A	0
Total Area of Work (ft²)		2365			

C. COMPLIANCE RESULTS

If any cell on this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D. for guidance.

Lighting in conditioned and unconditioned spaces must not be combined for compliance per 140.6(h)1 /170.2(e)	Allowed Lighting Power per 140.6(a) /170.2(e) (Watts)						Adjusted Lighting Power per 140.6(a) /170.2(e) (Watts)				Compliance Results
	01	02	03	04		05	06	07		08	09
	Complete Building 140.6(c)1	Area Category 140.6(c)2 /170.2(e)4	Area Category Additional 140.6(c)2(5) / 170.2(e)4Av (+)	Tailored 140.6(c)3 /170.2(e)4B (+)	=	**Total Allowed** (Watts)	≥	Total Designed (Watts)	Adjustments PAF Lighting Control Credits 140.6(a)2 /170.2(e)1B (-)	=	**Total Adjusted** (Watts) *Includes Adjustments	**05 must be >= 08 140.6 /170.2(e)**
	(See Table I)	(See Table I)	(See Table J)	(See Table K)				(See Table F)	(See Table P)		
Conditioned		1,793.2			=	1,793.2	≥	1,770.8		=	1770.8	COMPLIES
Unconditioned					=		≥			=		
Controls Compliance (See Table H for Details)												COMPLIES
Rated Power Reduction Compliance (See Table Q for Details)												

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. INDOOR LIGHTING FIXTURE SCHEDULE

This table includes all planned permanent and portable lighting other than dwelling unit/ hotel/ motel room lighting. Multifamily dwelling unit and hotel/motel room lighting is documented in Table T. If using Table T to document lighting in multifamily common use areas providing shared provisions for living, eating, cooking or sanitation, those luminaires are not included here.

Designed Wattage: Conditioned Spaces

01	02	03	04	05	06	07	08	09	10	
Name or Item Tag	Complete Luminaire Description	Modular (Track) Fixture	Small Aperture & Color Change [1]	Watts per luminaire[2]	How is Wattage determined	Total Number of Luminaires	Excluded per 140.6(a)3 / 170.2(e)2C	Design Watts	Field Inspector	
									Pass	Fail
A [33']	33' Length Suspended LED Fixture	No	NA	240.9	Mfr. Spec	1	No	240.9	☐	☐
A [40']	40' Length Suspended LED Fixture	No	NA	292	Mfr. Spec	2	No	584	☐	☐
A [41']	41' Length Suspended LED Fixture	No	NA	299.3	Mfr. Spec	1	No	299.3	☐	☐
A [48']	48' Length Suspended LED Fixture	No	NA	350.4	Mfr. Spec	1	No	350.4	☐	☐
BE	4' Length Surface LED EM	No	NA	37.2	Mfr. Spec	1	No	37.2	☐	☐
C1E	4' Length Surface LED EM	No	NA	31	Mfr. Spec	1	No	31	☐	☐
C2	4' Length Surface LED	No	NA	57	Mfr. Spec	1	No	57	☐	☐
C2E	4' Length Surface LED EM	No	NA	57	Mfr. Spec	3	No	171	☐	☐
Total Designed Watts: CONDITIONED SPACES								1,770.8		

[1]FOOTNOTE: Design Watts for small aperture and color changing luminaires which qualify per 140.6(a)4B /170.2(e)2D is adjusted to be 75% /80% of their rated wattage. Table F automatically makes this adjustment, the permit applicant should enter full rated wattage in column 05.

[2]Authority Having Jurisdiction may ask for Luminaire cut sheets to confirm wattage used for compliance per 130.0(c) /160.5(b). Wattage used must be the maximum rated for the luminaire, not the lamp.

G. MODULAR LIGHTING SYSTEMS

This section does not apply to this project.

H. INDOOR LIGHTING CONTROLS (Not including PAFs)

This table includes lighting controls for conditioned and unconditioned spaces.

Building Level Controls

01	02	03	
		Field Inspector	
		Pass	Fail
Mandatory Demand Response 110.12(c)	Shut-off controls 130.1(c) / 160.5(b)4C	☐	☐
NA < 4,000W subject to multilevel	See Area/Space Level Controls		

Area Level Controls

04	05	06	07	08	09	10	11	12	
Area Description	Complete Building or Area Category Primary Function Area	Manual Area Controls 130.1(a) /160.5(b)4A	Multi-Level Controls 130.1(b) /160.5(b)4B	Shut-Off Controls 130.1(c) /160.5(b)4C	Primary/Sky lit Daylighting 130.1(d) /160.5(b)4D	Secondary Daylighting 130.1(d) /160.5(b)4D	Interlocked Systems 140.6(a)1/1/ 70.2(e)2A	Field Inspector	
								Pass	Fail
Programming Room 101	Conference, Multipurpose and Meeting Area	Readily Accessible	Dimmer	Partial On 130.1(c)/ 160.5(b)4C	Included	Included	No	☐	☐
Book Stacks 101	Library - Stacks	Readily Accessible	Dimmer	Partial On 130.1(c)/ 160.5(b)4C	Included	Included	No	☐	☐
Community Room 102	Conference, Multipurpose and Meeting Area	Readily Accessible	Dimmer	Partial On 130.1(c)/ 160.5(b)4C	Included	Included	No	☐	☐
Family RR 103	Restroom	Readily Accessible	NA: Restrooms	Occupancy Sensor	NA: Not daylit zone	NA: Not daylit zone	No	☐	☐
Electrical Room 104	Electrical, Mechanical, or Telephone Room	Readily Accessible	NA: Enclosed area <100SF	NA: Elec. equip. rm	NA: Not daylit zone	NA: Not daylit zone	No	☐	☐
Lactation 105	All Other Space Types	Readily Accessible	Dimmer	Partial On 130.1(c)/ 160.5(b)4C	NA: Not daylit zone	NA: Not daylit zone	No	☐	☐
Storage 106	All Other Space Types	Readily Accessible	NA: Enclosed area <100SF	Occupancy Sensor	NA: Not daylit zone	NA: Not daylit zone	No	☐	☐
Staff RR 107	Restroom	Readily Accessible	NA: Restrooms	Occupancy Sensor	NA: Not daylit zone	NA: Not daylit zone	No	☐	☐

H. INDOOR LIGHTING CONTROLS (Not including PAFs)

	13
	Plan Sheet Showing Daylit Zones:
	E5.1

I. LIGHTING POWER ALLOWANCE: COMPLETE BUILDING OR AREA CATEGORY METHODS

Each area complying using the Complete Building or Area Category Methods per 140.6(b) are included in this table. Column 06 indicates if additional lighting power allowances per 140.6(c) or adjustments per 140.6(a) are being used .

Conditioned Spaces

01	02	03	04	05	06	
Area Description	Complete Building or Area Category Primary Function Area	Allowed Density (W/ft²)	Area (ft²)	Allowed Wattage (Watts)	Additional Allowance / Adjustment	
					Area Category	PAF
Programming Room 101	Conference, Multipurpose and Meeting Area	0.75	470	352.5	No	No
Book Stacks 101	Library - Stacks	1	831	831	No	No
Community Room 102	Conference, Multipurpose and Meeting Area	0.75	588	441	No	No
Family RR 103	Restroom	0.65	72	46.8	No	No
Electrical Room 104	Electrical, Mechanical, or Telephone Room	0.4	54	21.6	No	No
Lactation 105	All Other Space Types	0.4	56	22.4	No	No
Storage 106	All Other Space Types	0.4	81	32.4	No	No
Staff RR 107	Restroom	0.65	70	45.5	No	No
	TOTALS:		2,222	1,793.2	See Tables I, or P for detail	

J. ADDITIONAL ALLOWANCE: AREA CATEGORY METHOD QUALIFYING LIGHTING SYSTEM

This section does not apply to this project.

K. TAILORED METHOD GENERAL LIGHTING POWER ALLOWANCE

This section does not apply to this project.

L. ADDITIONAL LIGHTING ALLOWANCE: TAILORED WALL DISPLAY

This section does not apply to this project.

M. ADDITIONAL LIGHTING ALLOWANCE: TAILORED FLOOR AND TASK LIGHTING

This section does not apply to this project.

N. ADDITIONAL LIGHTING ALLOWANCE: TAILORED DECORATIVE /SPECIAL EFFECTS

This section does not apply to this project.

O. ADDITIONAL LIGHTING ALLOWANCE: TAILORED VERY VALUABLE MERCHANDISE

This section does not apply to this project.

P. POWER ADJUSTMENT: LIGHTING CONTROL CREDIT (POWER ADJUSTMENT FACTOR (PAF))

This section does not apply to this project.

Q. RATED POWER REDUCTION COMPLIANCE FOR ONE-FOR-ONE ALTERATIONS

This section does not apply to this project.

R. 80% LIGHTING POWER FOR ALL ALTERATIONS - CONTROLS EXCEPTIONS

This section does not apply to this project.

S. DAYLIGHT DESIGN POWER ADJUSTMENT FACTOR (PAF)

This section does not apply to this project.

T. DWELLING UNIT LIGHTING

This section does not apply to this project.

U. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in this document. If any selections have been changed by permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online

Form/Title
NRCI-LTI-E - Must be submitted for all buildings

V. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Selections have been made based on information provided in this document. If any selections have been changed by the permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and any with "-A" in the form name must be completed through an Acceptance Test Technician Certification Provider (ATTCP). For more information visit: http://www.energy.ca.gov/title24/attcp/providers.html

Form/Title	Systems/Spaces To Be Field Verified
NRCA-LTI-02-A - Must be submitted for occupancy sensors and automatic time switch controls.	Family RR 103; Storage 106; Staff RR 107
NRCA-LTI-03-A - Must be submitted for automatic daylight controls.	Programming Room 101; Book Stacks 101; Community Room 102

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Najib Anwary	Documentation Author Signature:
Company: Aurum Consulting Engineers, San Jose	Signature Date: 10/21/2025
Address: 1798 Technology Drive Suite 242	EEA/ HERS Certification Identification (if applicable):
City/State/Zip: San Jose, CA 95110	Phone: (408) 564-7925

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: Najib Anwary	Responsible Designer Signature:
Company: Aurum Consulting Engineers, San Jose	Date Signed: 10/21/2025
Address: 1798 Technology Drive Suite 242	License: E21043
City/State/Zip: San Jose, CA 95110	Phone: (408) 564-7925

Indoor Lighting Mandatory Measures:

110.9 LIGHTING CONTROLS AND COMPONENTS
ALL LIGHTING CONTROL DEVICES AND SYSTEMS, AND ALL LIGHT SOURCES SHALL MEET THE APPLICABLE REQUIREMENTS OF 110.9.

NOTE: THE EXCEPTED SPACES DO NOT COUNT TOWARDS THE 10,000 FT2 THRESHOLD.

130.0 GENERAL LUMINAIRE REQUIREMENTS
ALL LUMINAIRES SHALL BE FACTORY-LABELLED PER 130.0(c).
ENERGY MANAGEMENT CONTROL SYSTEMS (EMCS) SHALL MEET REQUIREMENTS OF 130.0(e).

130.1(a) MANUAL AREA CONTROLS
EACH ROOM OR AREA WITH FLOOR-TO-CEILING WALLS IN THIS BUILDING SHALL HAVE LIGHTING CONTROLS THAT ALLOW LIGHTING TO BE MANUALLY TURNED ON AND OFF MANUAL CONTROLS SHALL:

1. BE READILY ACCESSIBLE
2. BE LOCATED IN THE SAME ENCLOSED AREA WITH THE LIGHTING IT CONTROLS.
3. PROVIDE SEPARATE CONTROL OF GENERAL, FLOOR, WALL, WINDOW CASE DISPLAY, ORNAMENTAL AND SPECIAL EFFECTS LIGHTING SO EACH TYPE CAN BE TURNED ON AND OFF SEPARATELY WITHOUT AFFECTING OTHER LIGHTING OR EQUIPMENT.

130.1(b) MULTILEVEL LIGHTING CONTROLS
GENERAL LIGHTING IN ALL ROOMS AND AREAS 100 FT2 OR GREATER AND WITH MORE THAN 0.5 WATTS PER FT2 OF LIGHTING LOAD SHALL HAVE MULTILEVEL CONTROLS THAT ALLOW LIGHT LEVELS TO BE ADJUSTED UP AND DOWN. CONTROLS SHALL PROVIDE NUMBER OF CONTROL STEPS AND UNIFORM ILLUMINANCE LIGHT LEVELS PER TABLE 130.1-A.

130.1(c): SHUTOFF CONTROLS
ALL INSTALLED INDOOR LIGHTING SHALL BE EQUIPPED WITH CONTROLS TO AUTOMATICALLY REDUCE LIGHTING POWER WHEN SPACE IS TYPICALLY UNOCCUPIED.

130.1(c)1: CONTROL REQUIREMENTS
ALL INSTALLED INDOOR LIGHTING SHALL HAVE ALL OF THE FOLLOWING:
A. CONTROL(S) CAPABLE OF AUTOMATICALLY SHUTTING OFF ALL LIGHTING IN THE SPACE WHEN TYPICALLY UNOCCUPIED (OCCUPANT SENSING CONTROL, AUTOMATIC TIME-SWITCH CONTROL, OR OTHER)
B. SEPARATE CONTROLS FOR LIGHTING ON EACH FLOOR (OTHER THAN STAIRWELLS)

C. SEPARATE CONTROLS FOR A SPACE ENCLOSED BY CEILING HEIGHT PARTITIONS NOT EXCEEDING 5,000 FT2

130.1(c)3,4 OVERRIDE FOR BUILDING LIGHTING SHUT-OFF
AREAS SERVED BY SHUT-OFF CONTROLS (OTHER THAN OCCUPANT SENSORS): SHALL:
130.1(c)3. INCLUDE MANUAL OVERRIDE CONTROL THAT COMPLIES WITH 130.1(a) AND ALLOWS LIGHTING TO REMAIN ON FOR UP TO 2 HOURS; AND
130.1(c)4. PROVIDE AUTOMATIC HOLIDAY "SHUTOFF".

130.1(c)6 PARTIAL OR FULL-OFF OCCUPANT SENSORS
PROVIDE PARTIAL OR FULL-OFF OCCUPANT SENSORS, IN ADDITION TO SHUTOFF CONTROLS PER 130.1(c)1 AND 130.1(c)2, IN THE FOLLOWING SPACES:
- AISLE WAYS AND OPEN AREAS IN WAREHOUSES
- LIBRARY BOOK STACK AISLES
- CORRIDORS AND STAIRWELLS
- OFFICES GREATER THAN 250 SQ. FT.

Indoor Lighting Mandatory Measures:

130.1(d) AUTOMATIC DAYLIGHTING CONTROLS
ALL GENERAL LIGHTING IN THE FOLLOWING ZONES SHALL HAVE CONTROLS THAT AUTOMATICALLY ADJUST THE INSTALLED LIGHTING POWER UP AND DOWN TO KEEP TOTAL LIGHT LEVEL STABLE AS INCOMING DAYLIGHT CHANGES:
- PRIMARY SIDELIT DAYLIT ZONES
- SECONDARY SIDELIT DAYLIT ZONES
- COMBINED PRIMARY AND SECONDARY SIDELIT DAYLIT ZONES IN PARKING GARAGES

ALL DAYLIT ZONES MUST BE SHOWN ON PLANS.

NOTE: PARKING AREAS ON THE ROOF OF A PARKING STRUCTURE ARE NOT SKYLIT DAYLIT AREAS.

IN ADDITION, AUTOMATIC DAYLIGHTING CONTROLS SHALL PROVIDE SEPARATE CONTROL FOR LUMINAIRES IN EACH TYPE OF DAYLIT ZONE. LUMINAIRES THAT FALL IN BOTH SKYLIT AND SIDELIT DAYLIT ZONE SHALL BE CONTROLLED AS PART OF THE SKYLIT ZONE.

130.1(d)3 THE AUTOMATIC DAYLIGHTING CONTROLS SHALL ACHIEVE ALL OF THE FOLLOWING:
A. ADJUST LIGHTING VIA CONTINUOUS DIMMING OR THE NUMBER OF CONTROL STEPS PROVIDED BY THE MULTILEVEL CONTROLS (FOR SPACES REQUIRED TO INSTALL MULTILEVEL CONTROLS UNDER SECTION 130.1(b)).

B. FOR EACH SPACE, ENSURE COMBINED ILLUMINANCE FROM CONTROLLED LIGHTING AND DAYLIGHT IS NOT LESS THAN ILLUMINANCE FROM CONTROLLED LIGHTING WHEN NO DAYLIGHT IS AVAILABLE.

C. ENSURE THAT THE GENERAL LIGHTING POWER IN A DAYLIT ZONE SHALL BE REDUCED BY AT LEAST 90% WHEN DAYLIGHT ILLUMINANCE IN THAT ZONE IS GREATER THAN 150% OF DESIGN ILLUMINANCE RECEIVED FROM THE GENERAL LIGHTING SYSTEM AT FULL POWER (NOT APPLICABLE TO PARKING GARAGES).

D. (FOR PARKING GARAGES ONLY) ENSURE THAT WHEN ILLUMINANCE LEVELS MEASURED AT THE FARTHEST EDGE OF THE SECONDARY SIDELIT ZONE AWAY FROM GLAZING OR OPENING ARE GREATER THAN 150% OF THE ILLUMINANCE PROVIDED BY THE CONTROLLED LIGHTING WHEN NO DAYLIGHT IS AVAILABLE, THE CONTROLLED LIGHTING POWER IN THE COMBINED PRIMARY AND SECONDARY SIDELIT DAYLIT ZONES SHALL BE REDUCED BY 100%.

130.1(d)4 WHEN PHOTOSENSORS ARE LOCATED WITHIN THE DAYLIT ZONE, AT LEAST ONE PHOTOSENSOR SHALL BE LOCATED SO THAT IT IS NOT READILY ACCESSIBLE TO UNAUTHORIZED PERSONNEL.

130.1(d)5 THE LOCATION WHERE CALIBRATION ADJUSTMENTS ARE MADE TO AUTOMATIC DAYLIGHTING CONTROLS SHALL BE READILY ACCESSIBLE TO AUTHORIZED PERSONNEL BUT MAY BE INSIDE A LOCKED CASE OR UNDER A COVER THAT REQUIRES A TOOL FOR ACCESS.

Indoor Lighting Mandatory Measures:

130.1(f) CONTROL INTERACTIONS
EACH LIGHTING CONTROL INSTALLED TO MEET 130.1 REQUIREMENTS SHALL INCORPORATE THE FUNCTIONS OF OTHER LIGHTING CONTROLS REQUIRED BY THIS SECTION.

1. FOR GENERAL LIGHTING, MANUAL AREA CONTROL SHALL PERMIT THE LEVEL OF LIGHT PROVIDED WHILE LIGHTING IS ON TO BE SET OR ADJUSTED BY CONTROLS SPECIFIED IN 130.1(b), (c), (d) and (e).

2. MANUAL AREA CONTROL SHALL PERMIT SHUTOFF CONTROL TO TURN THE LIGHTING DOWN OR OFF.

3. MULTILEVEL CONTROL SHALL PERMIT THE AUTOMATIC DAYLIGHTING CONTROL TO ADJUST ELECTRIC LIGHTING IN RESPONSE TO DAYLIGHT.

4. MULTILEVEL CONTROL SHALL PERMIT THE DEMAND RESPONSIVE (DR) CONTROL TO ADJUST LIGHTING DURING A DR EVENT THEN RETURN IT TO THE LEVEL SET BY THE CONTROL AFTER THE EVENT.

5 SHUTOFF CONTROL SHALL PERMIT THE MANUAL AREA CONTROL TO TURN THE LIGHTING ON.

6. AUTOMATIC DAYLIGHTING CONTROL SHALL PERMIT MULTILEVEL LIGHTING CONTROL TO ADJUST THE LIGHTING LEVEL.

7. FOR LIGHTING CONTROLLED BY MULTILEVEL LIGHTING CONTROLS AND OCCUPANT SENSING CONTROLS THAT PROVIDE AUTOMATIC-ON FUNCTION, CONTROLS SHALL PROVIDE A PARTIAL-ON FUNCTION THAT IS CAPABLE OF AUTOMATICALLY ACTIVATING BETWEEN 50-70% OF CONTROLLED LIGHTING POWER.

8. RESERVED

9. FOR SPACE CONDITIONING SYSTEM ZONES SERVING ONLY SPACES THAT ARE REQUIRED TO HAVE OCCUPANT SENSING CONTROLS SHALL BE CONTROLLED BY OCCUPANCY SENSING CONTROLS.

WESTON MILES
ARCHITECTS
17500 Depot Street, Suite #200
Morgan Hill, CA 95037
1 • 408 • 779 • 6686
• Architecture • Landscape •

LICENSED ARCHITECT JEFFREY L. RYAN 3-31-27 STATE OF CALIFORNIA

NOT VALID WITHOUT WET SIGNATURE

CONSULTANT:

REGISTERED PROFESSIONAL ENGINEER NAJIB ANWARY No. E21043 EXP:3/31/27 ELECTRICAL STATE OF CALIFORNIA

AURUM CONSULTING ENGINEERS MONTEREY BAY, INC.
Project No. 23-055.00
1798 Technology Dr. ● Suite 242 ● San Jose, CA 95110
T.831.646.3336 ● F.831.646.3336 ● www.acemb.com

These drawings are instruments of service and are the property of AURUM CONSULTING ENGINEERS MONTEREY BAY, INC. All designs and other information on the drawings are for use on the specified project and shall not be used otherwise without the expressed written permission of AURUM CONSULTING ENGINEERS MONTEREY BAY, INC.

REVISIONS
1
2
3

CALIFORNIA ENERGY COMPLIANCE TITLE 24 - LIGHTING INDOOR

NEW BRADLEY LIBRARY & RESILIENCY CENTER

COUNTY OF MONTEREY & MONTEREY COUNTY FREE LIBRARIES
65607 DIXIE ST, BRADLEY, CA 93426

These drawings are instruments of service and are the property of WESTON MILES ARCHITECTS, INC. All designs and other information on the drawings are for use on the specified project and shall not be used otherwise without the expressed written permission of WESTON MILES ARCHITECTS, INC.

Written dimensions on these drawings shall have precedence over scaled dimensions. Contractors shall verify and be responsible for all dimensions and conditions on the job and this office shall be notified of any variations from the dimensions and conditions shown by these drawings. Shop details shall be submitted to this office for approval before proceeding with fabrication.

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DATE: 10/22/2025

JOB NO: 23014

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STATE OF CALIFORNIA
Outdoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-CTO-E
Project Name: New Bradley Library & Resiliency Center	Report Page:	(Page 1 of 8)
Project Address: 65607 Dixie Street, Bradley CA 93426	Date Prepared:	2025-10-22T00:09:53-04:00

This document is used to demonstrate compliance with requirements in 110.9, 130.0, 130.2, 140.7, and 141.0(b)2I, for outdoor lighting scopes using the prescriptive path for nonresidential and hotel/motel occupancies. It is also used to document compliance with requirements in 160.5, 170.2(e)6, 180.1(a) and 180.2(b)4Bv for outdoor lighting scopes using the prescriptive path for multifamily and mixed-use occupancies. Multifamily includes dormitory and senior living facilities.

A. GENERAL INFORMATION

01	Project Location (city)	Bradley	04	Total Illuminated Hardscape Area (ft²)	16155
02	Climate Zone	4			

03 Outdoor Lighting Zone per Title 24 Part 1 10.114 or as designated by Authority Having Jurisdiction (AHJ):

☐ LZ-0: Very Low - Undeveloped Parkland ☐ LZ-2: Moderate - Urban Clusters ☐ LZ-4: High - Must be reviewed by CA Energy Commission for Approval
☒ LZ-1: Low - Rural Areas ☐ LZ-3: Moderately High - Urban Areas

05 Occupancy Types within Project

● Library

B. PROJECT SCOPE

This table includes outdoor lighting systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.7 / 170.2(e)6 or 141.0(b)2L / 180.2(b)4Bv for alterations.

My Project Consists of:

01	02
☒ New Lighting System	Must Comply with Allowances from 140.7 / 170.2(e)6
☐ Altered Lighting System	Is your alteration increasing the connected lighting load (Watts)? ○ Yes ○ No

03	04	05
% of Existing Luminaires Being Altered[1]	Sum Total of Luminaires Being Added or Altered	Calculation Method
☐ < 10% ☐ >= 10% and < 50% ☐ >= 50%		

Please proceed to Table F. Outdoor Lighting Fixture Schedule to define the project's luminaires.

[1] *FOOTNOTES: % of Existing Luminaires Being Altered = (Sum Total of Luminaires Being Added or Altered / Existing Luminaires within the Scope of the Permit Application) x 100.*

STATE OF CALIFORNIA
Outdoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-CTO-E
Project Name: New Bradley Library & Resiliency Center	Report Page:	(Page 2 of 8)
	Date Prepared:	2025-10-22T00:09:53-04:00

C. COMPLIANCE RESULTS

Results in this table are automatically calculated from data input and calculations in Tables F through N. Note: If any cell on this table says "COMPLIES with Exceptional Conditions" refer to Table D. Exceptional Conditions for guidance or see applicable Table referenced below.

Calculations of Total Allowed Lighting Power (Watts) 140.7 / 170.2(e)6 or 141.0(b)2L / 180.2(b)4Bv													Compliance Results		
01		02		03		04		05		06		07		08	09
General Hardscape Allowance 140.7(d)1 / 170.2(e)6 (See Table I)	+	Per Application 140.7(d)2 / 170.2(e)6 (See Table J)	+	Sales Frontage 140.7(d)2 (See Table K)	+	Ornamental 140.7(d)2 / 170.2(e)6 (See Table L)	+	Per Specific Area 140.7(d)2 / 170.2(e)6 (See Table M)	OR	Existing Power Allowance 141.0(b)2L / 180.2(b)4Bv (See Table N)	=	**Total Allowed** (Watts)	≥	**Total Actual** (Watts)	**07 must be >= 08**
582.46	+	18	+	---	+	---	+	---	OR	---	=	600.46	≥	290.4	COMPLIES
Shielding Compliance (See Table G for Details)															N/A
Controls Compliance (See Table H for Details)															COMPLIES

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

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CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance Report Version: 2022.0.000 Schema Version: rev 20220101 Compliance ID: 337776-1025-0008 Report Generated: 2025-10-21 21:09:56

STATE OF CALIFORNIA
Outdoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-CTO-E
Project Name: New Bradley Library & Resiliency Center	Report Page:	(Page 3 of 8)
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F. OUTDOOR LIGHTING FIXTURE SCHEDULE

For new or altered lighting systems demonstrating compliance with 140.7 / 170.2(e)6 all new luminaires being installed and any existing luminaires remaining or being moved within the spaces covered by the permit application are included in the Table below. For altered lighting systems using the Existing Power method per 141.0(b)2L only new luminaires being installed and replacement luminaires being installed as part of the project scope are included (ie, existing luminaires remaining or existing luminaires being moved are not included). Outdoor lighting attached to multifamily buildings and controlled from the inside of a dwelling unit are included in Table H. and are not included here. All other multifamily outdoor lighting is included here.

Designed Wattage:

01	02		03	04	05	06	07	08	09	10	
Name or Item Tag	Complete Luminaire Description		Watts per luminaire[1,2]	How is Wattage determined	Total Number Luminaires [3]	Luminaire Status[3]	Excluded per 140.7(a) / 170.2(e)6A	Design Watts	Cutoff Req.-> lumens 6,200 initial lumen output 130.2(b) /160.5(c).1 [4]	Field Inspector	
										Pass	Fail
XA	20" Post Top LED Fixture	☐ Linear	51	Mfr. Spec	2	New	☐	102	NA: < 6200 lumens	☐	☐
XBE	Sconce LED Fixture	☐ Linear	22	Mfr. Spec	2	New	☐	44	NA: < 6200 lumens	☐	☐
XC 8'	8' Surface Mounted LED Fixture	☐ Linear	28.8	Mfr. Spec	2	New	☐	57.6	NA: < 6200 lumens	☐	☐
XC 12'	12' Surface Mounted LED Fixture	☐ Linear	43.4	Mfr. Spec	2	New	☐	86.8	NA: < 6200 lumens	☐	☐
						Total Design Watts:		290.4			

* NOTES: Selections with a * require a note in the space below explaining how compliance is achieved.
EX: Luminaire is lighting a statue; EXCEPTION 2 to 130.2(b)

[1] *FOOTNOTES: Authority Having Jurisdiction may ask for Luminaire cut sheets to confirm wattage used for compliance per 130.0(c) / 160.5(b)*
[2] *For linear luminaires, wattage should be indicated as W/ft instead of Watts/luminaire. Total linear feet should be indicated in column 05 instead of number of luminaires.*
[3] *Select "New" for new luminaires in a new outdoor lighting project, or for added luminaires in an alteration. Select "Altered" for replacement luminaires in an alteration. Select "Existing to Remain" for existing luminaires within the project scope that are not being altered and are remaining. Select "Existing Reinstalled" for existing luminaires which are being removed and reinstalled as part of the project scope.*
[4] *Compliance with mandatory shielding requirements is required for luminaires with initial lumen output >= 6,200 unless exempted by 130.2(b)/ 160.5(c)*

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STATE OF CALIFORNIA
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CALIFORNIA ENERGY COMMISSION

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G. SHIELDING REQUIREMENTS (BUG)

This section does not apply to this project.

H. OUTDOOR LIGHTING CONTROLS

This table demonstrates compliance with controls requirements for all new or altered luminaires installed as part of the permit application. For alteration projects, luminaires which are existing to remain (ie untouched) and luminaires which are removed and reinstalled (wiring only) do not need to be included in this table even if they are within the spaces covered by the permit application.
Outdoor lighting for nonresidential buildings, parking garages and common service areas in multifamily buildings must be documented separately from outdoor lighting attached to multifamily buildings and controlled from the inside of a dwelling unit

Mandatory Controls for Nonresidential Occupancies, Parking Garages & Common Areas in Multifamily Buildings

01	02	03	04	05	
Area Description	Shut-Off 130.2(c)1 / 160.5(c)	Auto-Schedule 130.2(c)2 / 160.5(c)	Motion Sensor 130.2(c)3 / 160.5(c)	Field Inspector	
				Pass	Fail
Hardscape: "XA"	Astronomical Timer	Provided	Provided	☐	☐
Entrances: "XC 8'"	Astronomical Timer	Provided	NA: Each Luminaire <= 40 Watts	☐	☐
Entrances: "XC 12'"	Astronomical Timer	Provided	NA: Each Luminaire <= 40 Watts	☐	☐
Entrances: "XBE"	Astronomical Timer	Provided	NA: Each Luminaire <= 40 Watts	☐	☐

[1] *FOOTNOTE: Test has been abbreviated, please refer to Table 160.5-A to confirm compliance with the specific light source technologies listed.*
[2] *Authority having jurisdiction may ask for cutsheets or other documentation to confirm compliance of light source.*
[3] *Recessed luminaires marked for use in fire-rated installations, and recessed luminaires installed in non-insulated ceilings are excepted from ii and iii.*

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STATE OF CALIFORNIA
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Project Name: New Bradley Library & Resiliency Center	Report Page:	(Page 5 of 8)
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I. LIGHTING POWER ALLOWANCE (per 140.7 /170.2(e))

This table includes areas using allowance calculations per 140.7 /170.2(e). General Hardscape Allowance is per Table 140.7-A/Table 170.2-R while "Use it or lose it" Allowances are per Table 140.7-B /Table 170.2-S. Indicate which allowances are being used to expand sections for user input. Luminaires that qualify for one of the "Use it or lose it" allowances shall not qualify for another "Use it or lose it" allowance. Outdoor lighting attached to multifamily buildings and controlled from the inside of a dwelling unit are included in Table H. and are not included here. All other multifamily outdoor lighting is included here.

	01					
	"Use it or lose it" Allowance (select all that apply) (select all that apply)					
	☒ General Hardscape Allowance Table I (below)	☒ Per Application Table J	☐ Sales Frontage Table K	☐ Ornamental Table L	☐ Per Specific Area Table M	

Calculated General Hardscape Lighting Power Allowance per Table 140.7-A for Nonresidential & Hotel/Motel

02	03	04	05	06	07	08	09
	Area Wattage Allowance (AWA)			Linear Wattage Allowance (LWA)			
Area Description	Illuminated Area (ft²)	Allowed Density (W/ft²)	Area Allowance (Watts)	Perimeter Length (lf)	Allowed Density (W/lf)	Linear Allowance (Watts)	Total General AWA + LWA (Watts)
Entrance	938	0.016	15.01	132	0.13	17.16	32.17
Hardscape	20200	0.016	323.2	593	0.13	77.09	400.29
				Initial Wattage Allowance for Entire Site (Watts):			150
				Instances of Initial Wattage Allowance (LZ 0 only)[1]			
				Total General Hardscape Allowance (Watts):			582.46

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STATE OF CALIFORNIA
Outdoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-CTO-E
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J. LIGHTING ALLOWANCE: PER APPLICATION

This table includes areas using the wattage allowance per application from Table 140.7-B / Table 170.2-S.

01	02	03	04	05	06	07	08	09	10
		CALCULATED ALLOWANCE (Watts)			DESIGN WATTS				
Area Description	Application per Table 140.7-B [1]	# of Locations	Allowance per Location[2]	Extra Allowance (Watts)	Luminaire Name or Item Tag	Watts per Luminaire	# of Luminaires	Design Watts	Additional Allowance (Watts)
Entrances	Building Entrance/Exit	2	9	18	XC 8'	28.8	2	57.6	18
					XC 12'	43.4	2	86.8	
					Total Design Watts for this Area:			144.4	
					Total Allowance (Watts) All Areas:				18

[1] *FOOTNOTES: Primary entrance applications are only available for senior care facilities, healthcare facilities, police stations, hospitals, fire stations, and emergency vehicle facilities.*
[2] *The Allowance per Location for ATMs is 100W for the first ATM and 35W for each additional per Table 140.7-B /Table 170.2-S.*
[3] *For luminaires indicated in Table F as linear, wattage in column 07 is W/ft instead of Watts/luminaire. Total linear feet should be indicated in column 08 instead of number of luminaires.*

K. LIGHTING ALLOWANCE: SALES FRONTAGE

This section does not apply to this project.

L. LIGHTING ALLOWANCE: ORNAMENTAL

This section does not apply to this project.

M. LIGHTING ALLOWANCE: PER SPECIFIC AREA

This section does not apply to this project.

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CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance Report Version: 2022.0.000 Schema Version: rev 20220101 Compliance ID: 337776-1025-0008 Report Generated: 2025-10-21 21:09:56

STATE OF CALIFORNIA
Outdoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-CTO-E
Project Name: New Bradley Library & Resiliency Center	Report Page:	(Page 7 of 8)
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N. EXISTING CONDITIONS POWER ALLOWANCE (alterations only)

This section does not apply to this project.

O. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in this document. If any selection has been changed by permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online

Form/Title
NRCI-LTO-E - Must be submitted for all buildings

P. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Selections have been made based on information provided in this document. If any selection has been changed by permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and must be completed through an Acceptance Test Technician Certification Provider (ATTCP). For more information visit: http://www.energy.ca.gov/title24/attcp/providers.html

Form/Title	Systems/Spaces To Be Field Verified
NRCA-LTO-02-A - Must be submitted for all outdoor lighting controls except for alterations where controls are added to <= 20 luminaires.	Hardscape: "XA"; Entrances: "XC 8"; Entrances: "XC 12"; Entrances: "XBE"

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CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance Report Version: 2022.0.000 Schema Version: rev 20220101 Compliance ID: 337776-1025-0008 Report Generated: 2025-10-21 21:09:56

STATE OF CALIFORNIA
Outdoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-CTO-E
Project Name: New Bradley Library & Resiliency Center	Report Page:	(Page 8 of 8)
Project Address: 65607 Dixie Street, Bradley CA 93426	Date Prepared:	2025-10-22T00:09:53-04:00

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Najib Anwary	Documentation Author Signature:
Company: Aurum Consulting Engineers, San Jose	Signature Date: 10/21/2025
Address: 1798 Technology Drive Suite 242	EEA/ HERS Certification Identification (if applicable):
City/State/Zip: San Jose, CA 95110	Phone: (408) 564-7925

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable Inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: Najib Anwary	Responsible Designer Signature:
Company: Aurum Consulting Engineers, San Jose	Date Signed: 10/21/2025
Address: 1798 Technology Drive Suite 242	License:E21043
City/State/Zip: San Jose, CA 95110	Phone: (408) 564-7925

Outdoor Lighting Mandatory Measures:

110.9 OUTDOOR LIGHTING CONTROLS AND COMPONENTS
ALL LIGHTING CONTROL DEVICES AND SYSTEMS, AND ALL LIGHT SOURCES SHALL MEET THE APPLICABLE REQUIREMENTS OF 110.9.

130.0 GENERAL LUMINAIRE REQUIREMENTS
ALL LUMINAIRES SHALL BE FACTORY-LABELLED PER 130.0(c).
ENERGY MANAGEMENT CONTROL SYSTEMS (EMCS) SHALL MEET REQUIREMENTS OF 130.0(e).

130.2(c) CONTROLS FOR OUTDOOR LIGHTING
ALL OUTDOOR LIGHTING SHALL BE INDEPENDENTLY CONTROLLED FROM OTHER ELECTRICAL LOADS AND SHALL HAVE THE FOLLOWING FEATURES:

1. AUTOMATICALLY TURNS OFF OUTDOOR LIGHTING WHEN DAYLIGHT IS AVAILABLE

2. AUTOMATIC SCHEDULING CONTROLS
   A. AUTOMATIC SCHEDULING CONTROLS SHALL BE INSTALLED FOR ALL OUTDOOR LIGHTING.
   B. CAPABLE OF REDUCING LIGHTING POWER AT LEAST 50% AND NO MORE THAN 90% AND SEPARATELY CAPABLE OF TURNING LIGHTING OFF DURING UNOCCUPIED PERIODS
   C. THAT ALLOW SCHEDULING OF AT LEAST TWO NIGHTTIME PERIODS WITH INDEPENDENT LIGHTING LEVELS (MAY INCLUDE OVERRIDE FOR NO MORE THAN 2 HOURS)

3. MOTION SENSING CONTROLS
   A. SHALL BE INSTALLED FOR THE FOLLOWING AND MAY BE INSTALLED FOR OTHER OUTDOOR LIGHTING AND IN COMBINATION WITH OTHER OUTDOOR LIGHTING CONTROLS:
      (i) ORNAMENTAL HARDSCAPE, OUTDOOR DINING, OR OUTDOOR SALES FRONTAGE LIGHTING MOUNTED 24 FT ABOVE GRADE OR LOWER
      (ii)WALL MOUNTED LUMINAIRES INSTALLED FOR BUILDING FACADE, ORNAMENTAL HARDSCAPE, OUTDOOR DINING LIGHTING THAT HAVE A BILATERALLY SYMMETRIC DISTRIBUTION (AS DESCRIBED IN THE IES HANDBOOK) MOUNTED 24 FEET OR LESS ABOVE GRADE
   B. CAPABLE OF REDUCING LIGHTING POWER AT LEAST 50% AND NO MORE THAN 90% AND SEPARATELY CAPABLE OF TURNING LIGHTING OFF DURING UNOCCUPIED PERIODS
   C. CAPABLE OF DIMMING OR TURNING OFF LIGHTING NO LONGER THAN 15 MINUTES AFTER AREA IS VACATED AND TURNING LIGHTING ON WHEN AREA BECOMES OCCUPIED
   D. SINGLE SENSORS CAN CONTROL NO MORE THAN 1,500 WATTS OF LIGHTING POWER

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WESTON MILES
ARCHITECTS
17500 Depot Street, Suite #200
Morgan Hill, CA 95037
1 • 408 • 779 • 6686
• Architecture • Landscape •

LICENSED ARCHITECT JEFFREY L. RIGGI 3-31-27 STATE OF CALIFORNIA

NOT VALID WITHOUT WET SIGNATURE

CONSULTANT:

REGISTERED PROFESSIONAL ENGINEER NAJIB ANWARY No. E21043 EXP:3/31/27 ELECTRICAL STATE OF CALIFORNIA

AURUM CONSULTING ENGINEERS MONTEREY BAY, INC.
Project No. 23-055.00
1798 Technology Dr. ● Suite 242 ● San Jose, CA 95110
T.831.646.3336 ● F.831.646.3336 ● www.acemb.com

These drawings are instruments of service and are the property of AURUM CONSULTING ENGINEERS MONTEREY BAY, INC. All designs and other information in the drawings are for use on the specified project and shall not be used otherwise without the written permission of AURUM CONSULTING ENGINEERS MONTEREY BAY, INC.

REVISIONS
1
2
3

CALIFORNIA ENERGY COMPLIANCE TITLE 24 - LIGHTING OUTDOOR

NEW BRADLEY LIBRARY & RESILIENCY CENTER

COUNTY OF MONTEREY & MONTEREY COUNTY FREE LIBRARIES
65607 DIXIE ST, BRADLEY, CA 93426

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Written dimensions on these drawings shall have precedence over scaled dimensions. Contractors shall verify and be responsible for all dimensions and conditions on the job and this office shall be notified of any variations from the dimensions and conditions shown by these drawings. Shop details shall be submitted to this office for approval before proceeding with fabrication.

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DATE: 10/22/2025

JOB NO: 23014

E0.3

G:\Projects\2023\obs\23-055.00 Bradley Branch Library\Dwgs\01\23-055E0.3.dwg, 3/9/2026 2:35:36 PM

STATE OF CALIFORNIA
Electrical Power Distribution
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-ELC-E
This document is used to demonstrate compliance with mandatory requirements in 130.5, for electrical systems in newly constructed nonresidential and hotel/motel occupancies and 160.6 and 160.9 for electrical systems in newly constructed multifamily occupancies. Additions and alterations to electrical service systems in nonresidential and hotel/motel occupancies will also use this document to demonstrate compliance per 141.0(a) or 141.0(b)2P for alterations. For multifamily addition or alterations compliance will be documented per 180.1(a) or 180.2 (b4)bii		
Project Name: New Bradley Library & Resiliency Center	**Report Page:**	**(Page 1 of 5)**
Project Address: 65607 Dixie Street, Bradley CA 93426	**Date Prepared:**	2025-10-21T23:55:03-04:00

A. GENERAL INFORMATION

01	Project Location (city)	Bradley	02	Climate Zone	4
			03	Occupancy Types Within Project:	Library

B. PROJECT SCOPE

This table includes electrical systems that are within the scope of the permit application.

01	02	03	04	05	06	07
Electrical Service Designation/ Description	Scope of Work [1]	Rating[2] (kVA)	Utility Provided Metering System Exception to 130.5(a)/160.6(a)[3]	System subject to CA Elec Code Article 517 Exception to 130.5(a)and (b)	Demand Response Controls	Provides power to dwelling units/common living areas only in multifamily occupancy
MSB	New electrical service equipment and meter	144	☒	☐	Where required, demand response controls must be specified which are capable of receiving and automatically responding to at least one standards based messaging protocol which enables demand response after receiving a demand response signal. Sections 120.2/160.3, 130.1/160.5, and 130.3/160.5, and mechanical, indoor lighting, and sign lighting Certificate of Compliance documents will indicate when demand response controls are required.	☐

[1] FOOTNOTES: Adding only new feeders and branch circuits triggers Voltage Drop 130.5(c)/160.6(c), no other requirements from 130.5/160.6 are required.
[2] If common use areas in a multifamily are submetered, rating is for submeter size serving common use areas.
[3] Applicable if the utility company is providing a metering system that indicates instantaneous kW demand and kWh for a utility-defined period.

STATE OF CALIFORNIA
Electrical Power Distribution
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-ELC-E
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C. COMPLIANCE RESULTS

Results in this table are automatically calculated from data input and calculations in Tables F through J. Note: if any cell on this table says "COMPLIES with Exceptional Conditions" refer to Table D. Exceptional Conditions for guidance or see applicable Table referenced below.

01		02		03		04	05	06
Service Electrical Metering 130.5(a)/ 160.6(a) (See Table F)	AND	Separation for Monitoring 130.5(b)/ 160.6(b) (See Table G)	AND	Voltage Drop 130.5(c)/ 160.6(c) (See Table H)	AND	Controlled Receptacles 130.5(d)/ 160.6(d) (See Table I)	Electric Ready 160.9 (See Table J)	**Compliance Results**
	AND	Yes	AND	Yes	AND	Yes		COMPLIES with Exceptional Conditions

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

Table B indicates the project is exempt from 130.5(a) Service Electrical Metering requirements because the utility company has provided the project a metering system that indicates instantaneous kW demand and kWh for a utility-defined period.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

STATE OF CALIFORNIA
Electrical Power Distribution
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-ELC-E
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	Date Prepared:	2025-10-21T23:55:03-04:00

G. SEPARATION OF ELECTRICAL CIRCUITS FOR ENERGY MONITORING

This table includes entirely new or complete replacement electrical power distribution systems to demonstrate compliance with 130.5(b)/160.6(b). Any load types that are not included in the service do not need to be shown. For multifamily occupancies, submetered systems that provide power to dwelling units do not need to meet these separation requirements and therefore load types on those submetered systems also do not need to be shown.

01	02	03	04	05	
Load Type per Table 130.5-B [1]	Minimum Required Separation of Load per Table 130.5-B	Compliance Method[2]	Location of Requirements in Construction Documents	Field Inspector	
				Pass	Fail
MSB					
Other non-HVAC loads and appliances greater than or equal to 25kVA	All loads in aggregate	Method 3: Branch circuits serve load types individually & provisions for adding future branch curcuit monitoring	E1.1	☐	☐

** NOTES: If "Other*" is selected under Compliance Method above, please indicate how compliance has been achieved in the space provided below.*

[1] FOOTNOTES: For each separate load type, up to 10% of the connected load may be of any type.
[2] Method 1: Switchboards/ motor control centers/ panelboard loads disaggregated for each load type.
Method 2: Switchboards/ motor control centers/ panelboard supply other distribution equipment with loads disaggregated for each load type.
Method 3: Branch circuits serve load types individually and provisions for adding future branch circuit monitoring.
Method 4: Complete metering system measures and reports loads by type.
See Chapter 8 of the Nonresidential Compliance Manual for more detail on Compliance Methods.

H. VOLTAGE DROP

This table includes entirely new or complete replacement electrical power distribution systems, or alterations that add, modify or replace both feeders and branch circuits to demonstrate compliance with 130.5(c)/ 160.6(c). For alterations, only the altered circuits must demonstrate compliance per 141.0(b)2P/ 180.2(b)4Biic.

01	02			03	04	05	
Electrical Service Designation/Description	Combined Voltage Drop on Installed Feeder/Branch Circuit Conductors Compliance Method			Location of Voltage Drop Calculations[1]	Sheet Number for Voltage Drop Calculations in Construction Documents	Field Inspector	
						Pass	Fail
MSB	☒	Voltage drop less than 5%	☐	Permitted by CA Elec Code (Exception to 130.5(c))*	Contractor Responsible	☐	☐

STATE OF CALIFORNIA
Electrical Power Distribution
CALIFORNIA ENERGY COMMISSION

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H. VOLTAGE DROP

** NOTES: If "Permitted by CA Elec Code *" is selected under Compliance Method above, please indicate where the exception applies in the space provided below.*

[1] FOOTNOTES: Voltage drop calculations may be attached to the permit application outside the construction documents if allowed by the Authority Having Jurisdiction. Select "attached" if applicable. If calculations will be the responsibility of the installing contractor, select "Contractor Responsible".

I. CIRCUIT CONTROLS FOR 120-VOLT RECEPTACLES AND CONTROLLED RECEPTACLES

This table includes entirely new or complete replacement electrical power distribution systems to demonstrate compliance with 130.5(d)/ 160.6(d).. Both controlled and uncontrolled receptacles must be provided in office areas, lobbies, conference rooms, kitchen areas in office spaces, copy rooms and hotel/motel guest rooms.

01	02	03	04	05	06	07	
Room name or Description	Location/ Type of Controlled Receptacles[1]	Shut-Off Controls	Demand Responsive Controls	Permanent Durable Marking Will be Used	Location of Requirements in Construction Documents	Field Inspector	
						Pass	Fail
Programming Room 100	Split-wired receptacle	Occupancy Sensor	NA: Building does not require demand responsive lighting controls per 110.12(c)	☒	1/E4.1 & 6/E6.3	☐	☐

** NOTES: If "Other*" is selected under Shut-Off Controls above, please indicate how compliance has been achieved in the space provided below.*

[1] FOOTNOTES: Receptacles dedicated to refrigerators and water dispensers in kitchens, located a minimum of 6ft above the floor specifically for clocks, network copiers, fax machines, A/V and data equipment other than personal computers in copy rooms, circuits rated more than 20 Amps, or connected to a UPS that are intended to be in continuous use and are marked to differentiate them from other receptacles or circuits are excerpted from the requirements. .

K. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in this document. If any selection have been changed by permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online

Form/Title

NRCI-ELC-E - Must be submitted for all buildings

L. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

There are no NRCA forms required for this project.

STATE OF CALIFORNIA
Electrical Power Distribution
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-ELC-E
Project Name: New Bradley Library & Resiliency Center	**Project Address:** 65607 Dixie Street, Bradley CA 93426	**(Page 5 of 5)**
	Date Prepared:	2025-10-21T23:55:03-04:00

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Najib Anwary	Documentation Author Signature:
Company: Aurum Consulting Engineers, San Jose	Signature Date: 10/21/2025
Address: 1798 Technology Drive Suite 242	CEA/ HERS Certification Identification (if applicable):
City/State/Zip: San Jose, CA 95110	Phone: (408) 564-7925

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder gpvides to the building owner at occupancy.

Responsible Designer Name: Najib Anwary	Responsible Designer Signature:
Company: Aurum Consulting Engineers, San Jose	Date Signed: 10/21/2025
Address: 1798 Technology Drive Suite 242	License:E21043
City/State/Zip: San Jose, CA 95110	Phone: (408) 564-7925

Electrical Power Distribution Mandatory Measures:

110.12(a) DEMAND RESPONSIVE (DR) CONTROLS
ALL DEMAND RESPONSIVE CONTROLS SHALL:

1. BE EITHER A. CERTIFIED OPENADR 2.0a OR OPENADR 2.0b VIRTUAL END NODE (VEN); OR B. CERTIFIED BY THE MANUFACTURER AS BEING CAPABLE OF RESPONDING TO A DR SIGNAL FROM A CERTIFIED OPENADR 2.0b VEN AUTOMATICALLY IMPLEMENTING THE CONTROL FUNCTIONS REQUESTED BY THE VEN FOR THE EQUIPMENT IT CONTROLS.
2. BE CAPABLE OF COMMUNICATING USING ONE OR MORE OF THE FOLLOWING: WI-FI, ZIGBEE, BACNET, ETHERNET, OR HARD-WIRING.
3. CONTINUE TO PERFORM ALL OTHER CONTROL FUNCTIONS PROVIDED BY THE CONTROL WHEN COMMUNICATIONS ARE DISABLED OR UNAVAILABLE.
4. DR CONTROL THERMOSTATS SHALL COMPLY WITH REFERENCE JOINT APPENDIX 5 (JA5), TECHNICAL SPECIFICATIONS FOR OCCUPANT CONTROLLED SMART THERMOSTATS.

110.12(d) DEMAND RESPONSIVE ELECTRONIC MESSAGE CENTER CONTROL
CONTROLS FOR ELECTRONIC MESSAGE CENTERS GREATER THAN 15KW SHALL BE CAPABLE OF REDUCING THE LIGHTING POWER BY A MINIMUM OF 30% WHEN RECEIVING A DR SIGNAL.

130.5(b) SEPARATION OF CIRCUITS FOR ELECTRICAL ENERGY MONITORING
ELECTRICAL POWER DISTRIBUTION SYSTEMS SHALL BE DESIGNED SO THAT MEASUREMENT DEVICES CAN MONITOR ENERGY USE OF LOAD TYPES ACCORDING TO TABLE 130.5-B.

130.5(c) VOLTAGE DROP
THE MAXIMUM COMBINED VOLTAGE DROP ON BOTH INSTALLED FEEDER AND BRANCH CIRCUIT CONDUCTORS TO THE FARTHEST CONNECTED LOAD OR OUTLET SHALL NOT EXCEED 5%.

130.5(d) CIRCUIT CONTROLS FOR 120-VOLT RECEPTACLES AND CONTROLLED RECEPTACLES
BOTH CONTROLLED AND UNCONTROLLED 120-VOLT RECEPTACLES SHALL BE PROVIDED IN OFFICE AREAS, LOBBIES, CONFERENCE ROOMS, KITCHEN AREAS IN OFFICE SPACES, AND COPY ROOMS.
CONTROLLED RECEPTACLES SHALL:

- BE CAPABLE OF AUTOMATICALLY SHUTTING OFF WHEN THE SPACE IS UNOCCUPIED, EITHER AT RECEPTACLE OR CIRCUIT LEVEL. AUTOMATIC TIME SWITCH CONTROL SHALL INCORPORATE OVERRIDE CONTROL ALLOWING CONTROLLED RECEPTACLE TO REMAIN ON FOR NO MORE THAN 2 HOURS AND AN AUTOMATIC HOLIDAY SHUT-OFF TO TURN OFF ALL LOADS FOR AT LEAST 24 HOURS THEN RESUME NORMAL SCHEDULE. COUNTDOWN TIMER SWITCHES SHALL NOT BE USED FOR COMPLIANCE.
- EITHER A SPLITWIRE RECEPTACLE SHALL BE INSTALLED, OR AT LEAST ONE CONTROLLED RECEPTACLE SHALL BE INSTALLED WITHIN 6 FT OF EACH UNCONTROLLED RECEPTACLE. FOR MODULAR FURNITURE, INSTALL ONE CONTROLLED RECEPTACLE PER WORKSTATION.
- INCLUDE PERMANENT AND DURABLE MARKINGS TO DIFFERENTIATE THEM FROM UNCONTROLLED RECEPTACLES OR CIRCUITS.

NOTE: HARDWIRED POWER STRIP CONTROLLED BY AN OCCUPANT SENSING CONTROL MAY BE USED TO COMPLY WITH 130.5(d). PLUG-IN DEVICES MAY NOT BE USED FOR COMPLIANCE.

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CALIFORNIA ENERGY COMPLIANCE TITLE 24 - ELECTRICAL POWER DISTRIBUTION

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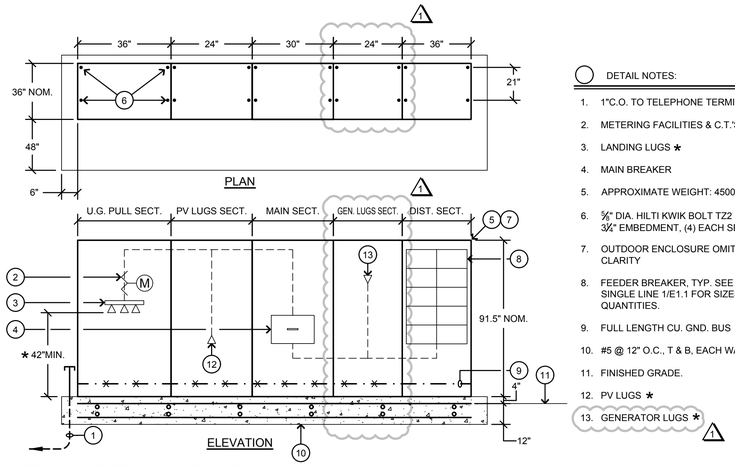
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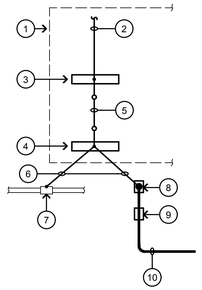
DETAIL NOTES:

1. 1"C.O. TO TELEPHONE TERMINAL BOARD ★
2. METERING FACILITIES & C.T.'S ★
3. LANDING LUGS ★
4. MAIN BREAKER
5. APPROXIMATE WEIGHT: 4500 LBS.
6. ⅝" DIA. HILTI KWIK BOLT TZ2 SS316 WITH 3½" EMBEDMENT, (4) EACH SECTION.
7. OUTDOOR ENCLOSURE OMITTED FOR CLARITY
8. FEEDER BREAKER, TYP. SEE ELECTRICAL SINGLE LINE 1/E1.1 FOR SIZES AND QUANTITIES.
9. FULL LENGTH CU. GND. BUS
10. #5 @ 12" O.C., T & B, EACH WAY.
11. FINISHED GRADE.
12. PV LUGS ★
13. GENERATOR LUGS ★

★ PER PG&E RULES, REGULATIONS & STANDARDS.

3 ELECTRICAL MAIN SWITCHBOARD 'MSB' ELEVATION DETAIL

NO SCALE



DETAIL NOTES:

1. MAIN ELECTRICAL SERVICE SWITCHBOARD.
2. INCOMING NEUTRAL.
3. SERVICE NEUTRAL LANDING LUG/NEUTRAL BUS.
4. GROUND BUS.
5. REMOVABLE MAIN SERVICE BONDING JUMPER FURNISHED WITH SWITCHBOARD CONNECTED BY CONTRACTOR.
6. 1" SCHEDULE 80 PVC WITH BARE COPPER GROUNDING ELECTRODE CONDUCTOR, SEE 1/E1.1 FOR REQUIREMENTS.
7. COLD WATER PIPE IN THE BUILDING WITHIN 5' OF ENTRANCE OF BUILDING THAT MEETS REQUIREMENTS OF CEC 250.52 (A)(1).
8. BOLTED-TYPE CONNECTION OR EXOTHERMIC WELD.
9. NON-METALLIC PROTECTIVE SLEEVE.
10. MIN. 20 LINEAR FEET OF #3/0 AWG BARE COPPER CONDUCTOR NO LESS THAN 2" FROM BOTTOM OF CONCRETE FOOTING IN DIRECT CONTACT WITH EARTH. IF NOT IN DIRECT CONTACT WITH EARTH INSTALL GROUND ROD PER CEC 250.52(5). INSTALL ROD IN GROUND WELL BOX.

GENERAL NOTE:
IF AVAILABLE ON THE PREMISES AT EACH BUILDING OR STRUCTURE SERVED EACH OF THE FOLLOWING SHALL BE BONDED TOGETHER TO FORM THE GROUNDING ELECTRODE SYSTEM (PER CEC 250-50):
a. METAL WATER PIPE
b. METAL FRAME OF BUILDING
c. GROUND RING
d. OTHER ELECTRODES PER CEC 250.50

2 ELECTRICAL SERVICE GROUND DETAIL

NO SCALE

PANELBOARD SCHEDULES

Voltage: 120/208V,3ø | Wire: 4W | Type: NEMA 3R | Mains: 400/3

MSB (1 2)

Bussing: 400A | Feed: BOTTOM | Mounting: FREE STANDING | A.I.C. 65,000

	Load	A	B	C	Bkr	Ck	abc	Ck	Bkr	A	B	C	Load
	PANEL LR	3060				1		2		12387			PANEL LM
	PANEL LR		2880		225/3	3		4	225/3		10673		PANEL LM
	PANEL LR			3600		5		6				8231	PANEL LM
3	EXISTING WELL PUMP	1154			15/2	7		8					SPARE
3	EXISTING WELL PUMP		1154			9		10	225/3				SPARE
3	EXISTING WELL PUMP			873	15/2	11		12					SPARE
3	EXISTING WELL PUMP	873				13		14					GENERATOR
	SPARE					15		16	400/3				GENERATOR
	SPARE				100/3	17		18					GENERATOR
	SPARE					19		20	-				SPACE ONLY
		5087	4034	4473						12387	10673	8231	

1 SUBMITTAL SHALL MATCH EXACT BREAKER LOCATIONS SHOWN.
2 LABEL PANEL FOR SHORT CIRCUIT AMPS AVAILABLE PER CEC 110-24.
3 PROVIDE WITH LOCK-ON DEVICE.

KVA Phase A	17.5
KVA Phase B	14.7
KVA Phase C	12.7

Total Connected Load KVA	44.9
Total Load Amperes	125

Voltage: 120/208V,3ø | Wire: 4W | Type: NEMA 1 | Mains: 225/3

PANEL LM (1 2)

Bussing: 225A | Feed: BOTTOM | Mounting: SURFACE | A.I.C. 48,000

	Load	A	B	C	Bkr	Ck	abc	Ck	Bkr	A	B	C	Load
	VRS-1	4103				1		2	15/1	12			EF-1
	VRS-1		4103		35/3	3		4	15/1		12		EF-2
	VRS-1			4103		5		6	15/1			456	CP-1
	FC-1	676				7		8	25/1	2000			EWH-1
	FC-1		676		15/2	9		10	20/1		900		FACP
	FC-2			676		11		12	20/1			900	RPS
	FC-2	676			15/2	13		14	20/1	900			LCP
	BS-1		62			15		16	20/1		900		LTG-OUTDOOR
	BS-1			62		17		18	20/1			1134	LTG-INDOOR
	EV CHARGER	3120			40/2	19		20	20/1	900			GENERATOR BATTERY CHARGER
	EV CHARGER		3120			21		22	20/1		900		GENERATOR BLOCK HEATER
	SPARE				40/2	23		24	20/1			900	CARD READERS
	SPARE					25		26	20/1				SPARE
	SPACE ONLY				-	27		28	20/1				SPARE
	SPACE ONLY				-	29		30	20/1				SPARE
	SPACE ONLY				-	31		32	20/1				SPARE
	SPACE ONLY				-	33		34	20/1				SPARE
	SPACE ONLY				-	35		36	20/1				SPARE
	SPACE ONLY				-	37		38	20/1				SPARE
	SPACE ONLY				-	39		40	20/1				SPARE
	SPACE ONLY				-	41		42	20/1				SPARE
		8575	7961	4841						3812	2712	3390	

1 SUBMITTAL SHALL MATCH EXACT BREAKER LOCATIONS SHOWN.
2 LABEL PANEL FOR SHORT CIRCUIT AMPS AVAILABLE PER CEC 110-24.

KVA Phase A	12.4
KVA Phase B	10.7
KVA Phase C	8.2

Total Connected Load KVA	31.3
Total Load Amperes	87

Voltage: 120/208V,3ø | Wire: 4W | Type: NEMA 1 | Mains: 225/3

PANEL LR (1 2)

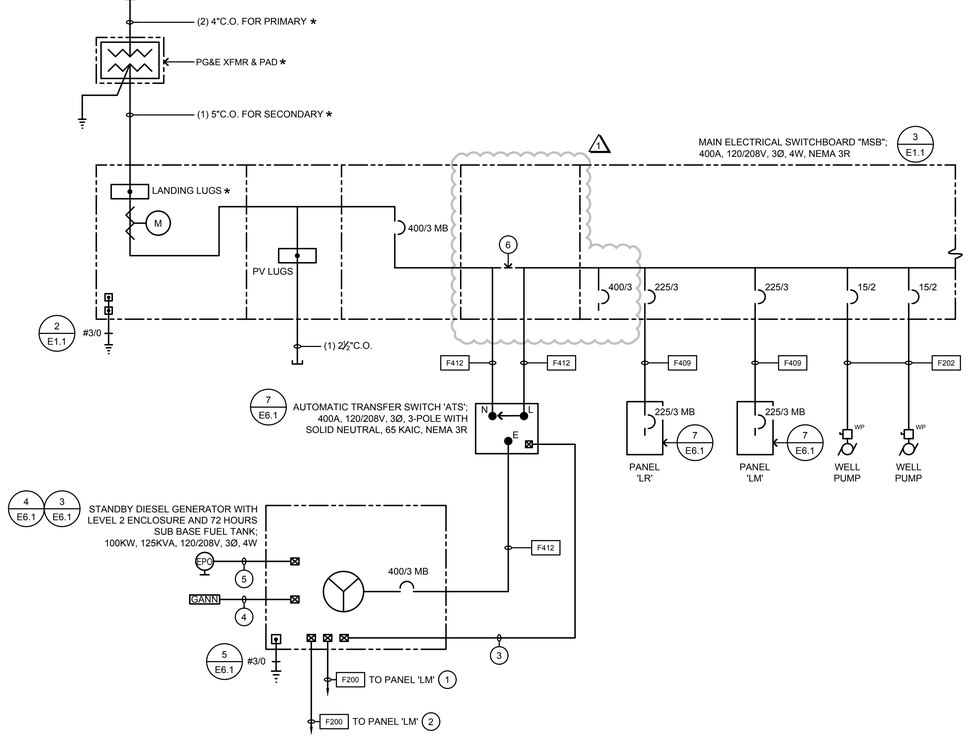
Bussing: 225A | Feed: BOTTOM | Mounting: SURFACE | A.I.C. 48,000

Load	A	B	C	Bkr	Ck	abc	Ck	Bkr	A	B	C	Load
RECEPTS-COMMUNITY RM 102	540			20/1	1		2	20/1	180			RECEPTS-FAMILY 103
RECEPTS-COMMUNITY RM 102		180		20/1	3		4	20/1		180		RECEPTS-LACTATION 105
RECEPTS-COMMUNITY RM 102			180	20/1	5		6	20/1			180	RECEPTS-STAFF RR 107
RECEPTS-COMMUNITY RM 102	180			20/1	7		8	20/1	540			RECEPTS-STORAGE 106
RECEPTS-COMMUNITY RM 102		180		20/1	9		10	20/1		180		RECEPTS-ELECTRICAL ROOM
RECEPTS-COMMUNITY RM 102			180	20/1	11		12	20/1			900	RECEPTS-IDF
SPARE				20/1	13		14	20/1	900			RECEPTS-TTB
SPARE				20/1	15		16	20/1		540		RECEPTS-OUTDOOR
RECEPTS-BOOK STACKS 101			540	20/1	17		18	20/1			360	RECEPTS-OUTDOOR BENCH
RECEPTS-BOOK STACKS 101	180			20/1	19		20	20/1				SPARE
RECEPTS-BOOK STACKS 101		360		20/1	21		22	20/1				SPARE
RECEPTS-BOOK STACKS 101			900	20/1	23		24	20/1				SPARE
RECEPTS-BOOK STACKS 101	180			20/1	25		26	20/1				SPARE
RECEPTS-PROGRAMMING RM 100		180		20/1	27		28	20/1				SPARE
RECEPTS-PROGRAMMING RM 100			180	20/1	29		30	20/1				SPARE
RECEPTS-PROGRAMMING RM 100	180			20/1	31		32	20/1				SPARE
RECEPTS-PROGRAMMING RM 100		180		20/1	33		34	20/1				SPARE
RECEPTS-PROGRAMMING RM 100			180	20/1	35		36	20/1				SPARE
RECEPTS-PROGRAMMING RM 100	180			20/1	37		38	20/1				SPARE
RECEPTS-PROGRAMMING RM 100		900		20/1	39		40	20/1				SPARE
SPARE				20/1	41		42	20/1				SPARE
	1440	1980	2160						1620	900	1440	

1 SUBMITTAL SHALL MATCH EXACT BREAKER LOCATIONS SHOWN.
2 LABEL PANEL FOR SHORT CIRCUIT AMPS AVAILABLE PER CEC 110-24.

KVA Phase A	3.1
KVA Phase B	2.9
KVA Phase C	3.6

Total Connected Load KVA	9.5
Total Load Amperes	27



★ PER PG&E RULES, REGULATIONS, AND STANDARDS

1 ELECTRICAL SINGLE LINE DIAGRAM

NO SCALE

FEEDER SCHEDULE		
DESIGNATION	AMPACITY	CONDUIT & CONDUCTORS SIZES
F200	20	3/4"C., 2 #12 & 1 #12 GND.
F202	50/60	1" C., 2 #6 & 1 #10 GND.
F409	225	2 1/2" C., 4 #4/0 & 1 #4 GND.
F413	400	4" C., 4 #500kcm & 1 #2 GND.

SINGLE LINE DIAGRAM LEGEND	
———	(NEW)
——— - - ———	(N) FLOOR/PAD MOUNTED EQUIPMENT

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ELECTRICAL SINGLE LINE DIAGRAM, DETAILS & PANELBOARD SCHEDULES

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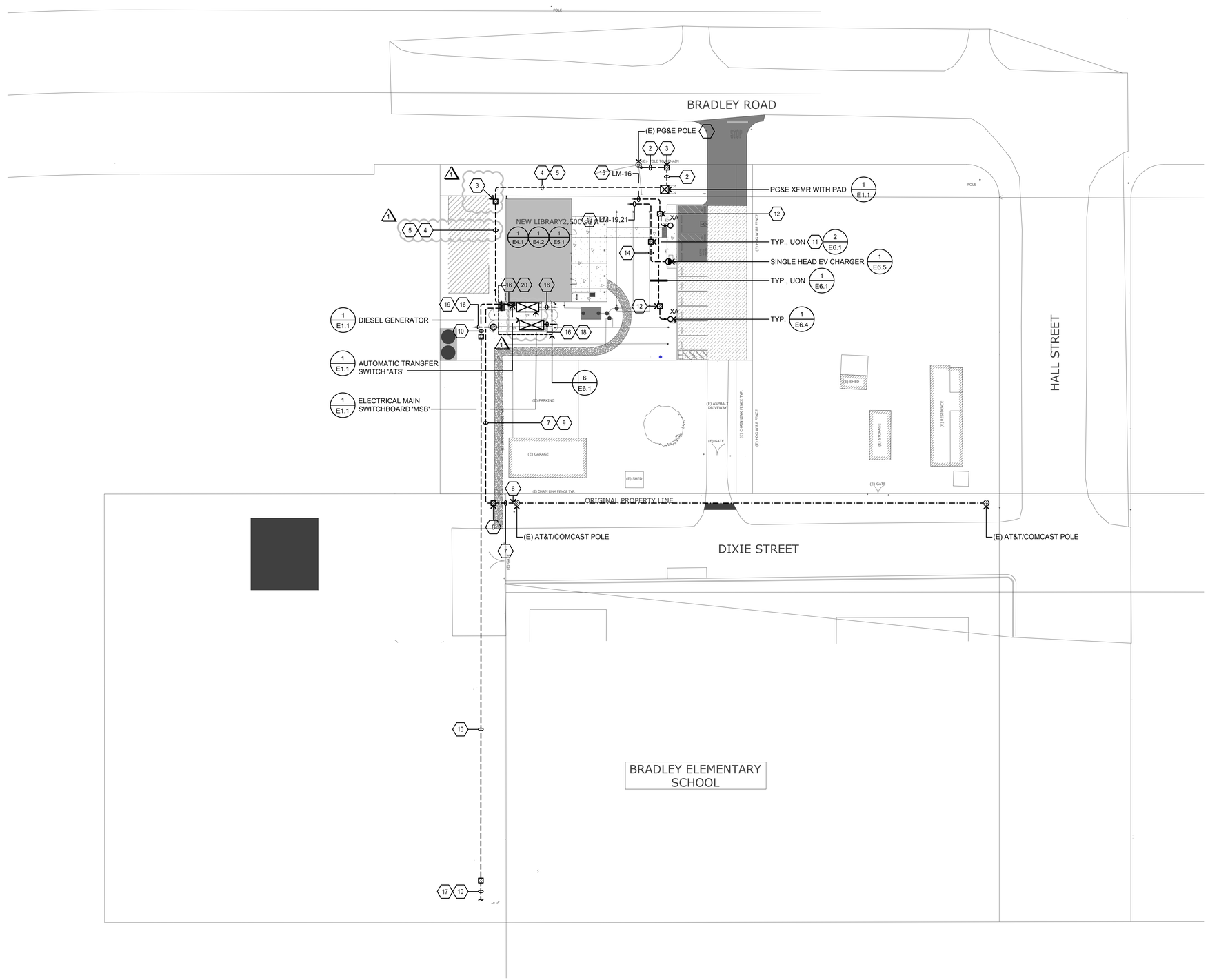
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1 ELECTRICAL SITE PLAN

SCALE: 1"=30'-0"

30' 0' 15' 30'

NORTH

SHEET NOTES

1. PROVIDE & INSTALL RISER PER PG&E RULES, REGULATIONS AND STANDARDS.
2. PROVIDE & INSTALL PRIMARY CONDUIT PER PG&E RULES, REGULATIONS AND STANDARDS.
3. PROVIDE & INSTALL VAULT PER PG&E RULES, REGULATION AND STANDARDS.
4. PROVIDE & INSTALL SECONDARY CONDUIT PER PG&E RULES, REGULATIONS AND STANDARDS.
5. STUB CONDUIT TO ELECTRICAL MAIN SWITCHBOARD 'MSB' PER PG&E RULES, REGULATIONS AND STANDARDS.
6. PROVIDE & INSTALL 4"C.O. RISER FOR TELECOM UTILITY PER TELECOM UTILITY RULES, REGULATIONS AND STANDARDS.
7. PROVIDE & INSTALL 4"C.O. FOR TELECOM UTILITY PER TELECOM UTILITY RULES, REGULATIONS AND STANDARDS.
8. PROVIDE & INSTALL TELECOM UTILITY VAULT PER TELECOM UTILITY RULES, REGULATION AND STANDARDS.
9. STUB CONDUIT BY TELEPHONE TERMINAL BOARD LOCATED IN ELECTRICAL ROOM PER UTILITY RULES, REGULATIONS AND STANDARDS.
10. PROVIDE & INSTALL FEEDERS FOR EXISTING WELL PUMPS PER ELECTRICAL SINGLE LINE DIAGRAM 1/E1.1.
11. PROVIDE & INSTALL IN-GRADE PULLBOX CHRISTY #N16 WITH LID LABELED 'ELECTRICAL'.
12. PROVIDE & INSTALL IN-GRADE PULLBOX CHRISTY #N16 WITH LID LABELED 'LIGHTING'.
13. 1½" C., 2 #4 & 1 #8 GND.
14. 1¼"C., 2 #8 & 1 #8 GND.
15. VIA LIGHTING CONTROL PANEL 'LCP'.
16. PROVIDE & INSTALL FEEDERS PER ELECTRICAL SINGLE LINE DIAGRAM 1/E1.1.
17. FIELD VERIFY EXACT LOCATION OF EXISTING WELL PUMPS. PROVIDE & INSTALL DISCONNECTS ADJACENT TO EXISTING MOTORS FOR WELL PUMPS AND TERMINATE TO EXISTING MOTORS FOR WELL PUMPS.
18. PROVIDE & INSTALL CABLING FOR GENERATOR ANNUNCIATOR PER ELECTRICAL SINGLE LINE DIAGRAM 1/E1.1.
19. PROVIDE & INSTALL CABLING FOR GENERATOR EMERGENCY POWER OFF PER ELECTRICAL SINGLE LINE DIAGRAM 1/E1.1.
20. PROVIDE & INSTALL CABLING FOR GENERATOR ENGINE START PER ELECTRICAL SINGLE LINE DIAGRAM 1/E1.1.

GENERAL NOTES:

A. CONTRACTOR SHALL LOCATE ALL (E) UNDERGROUND UTILITIES PRIOR TO TRENCHING AND TAKE CAUTION TO AVOID DAMAGE DURING TRENCHING. HAND TRENCH IF NECESSARY. CONTRACTOR SHALL MAKE ALL REPAIRS TO DAMAGED UTILITIES AT NO CHARGE TO OWNER.

B. ALL WIRING FOR SITE LIGHTING SHALL BE #10 AWG MINIMUM va ¾"C., U.O.N.

C. ALL UTILITIES (PG&E, AT&T AND COMCAST) ARE SHOWN IN SCHEMATIC FORM ONLY. CONTRACTOR SHALL VERIFY EXACT REQUIREMENTS WITH UTILITY COMPANY ENGINEERED DRAWINGS PRIOR TO START OF CONSTRUCTION AND PROVIDE FACILITIES ACCORDINGLY.

D. PER PG&E REQUIREMENTS, INSTALLERS OF PG&E SUBSTRUCTURES BOTH GAS AND ELECTRIC SHALL BE PG&E CERTIFIED.

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ELECTRICAL SITE PLAN

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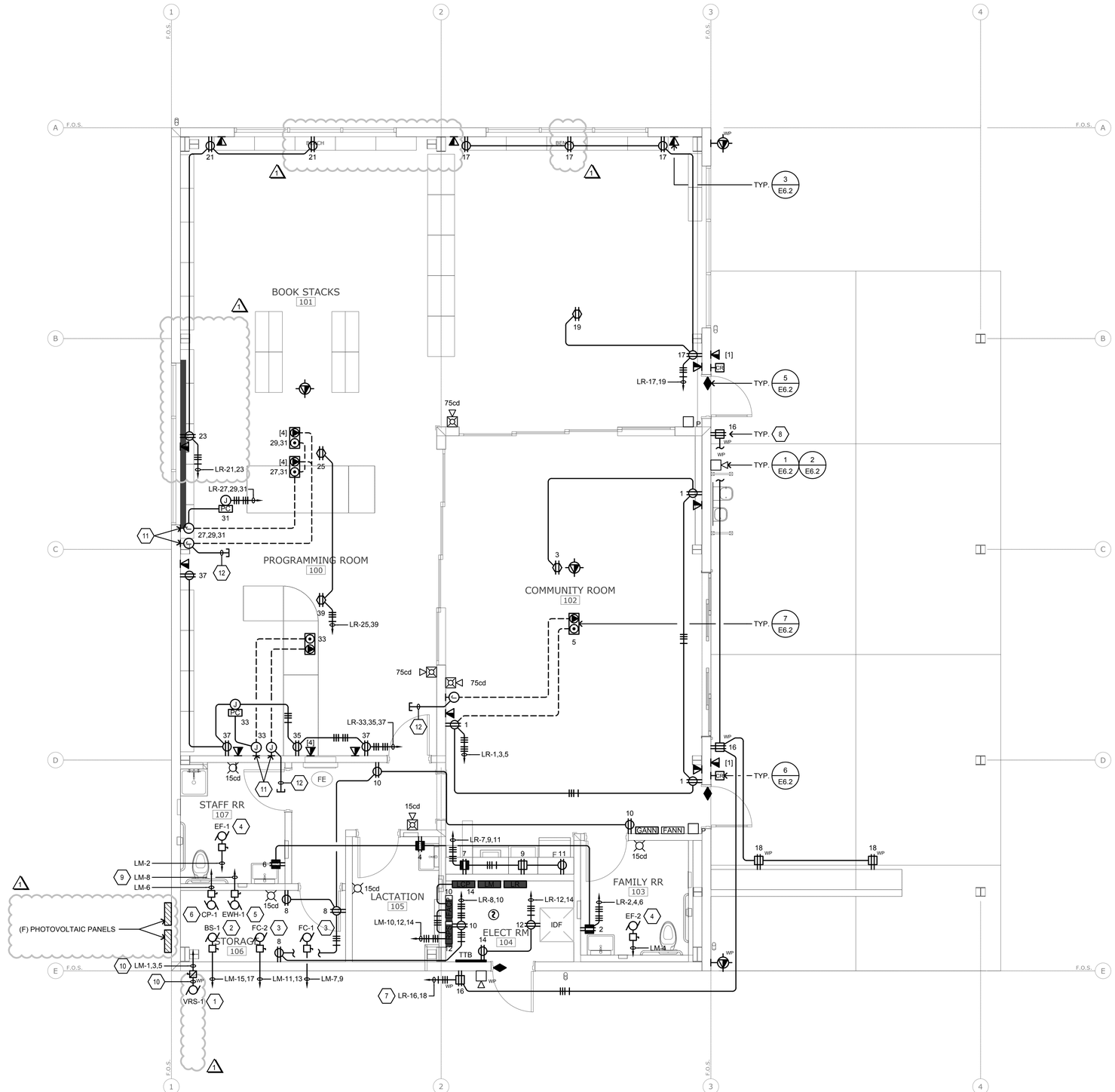
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1 POWER & SYSTEMS PLAN

SCALE: 1/4"=1'-0"

SHEET NOTES

1. VARIABLE REFRIGERANT SYSTEM; 34.1 MCA, 208V, 3Ø.
2. BRANCH SELECTOR BOX; 0.6 MCA, 120V.
3. VARIABLE REFRIGERANT SYSTEM FAN COIL; 6.5 MCA, 208V, 1Ø.
4. EXHAUST FAN; 12 WATTS, 120V.
5. ELECTRIC WATER HEATER; 2 KW, 120V.
6. CIRCULATION PUMP; 1/8 HP, 120V.
7. VIA LCP.
8. PROVIDE & INSTALL IN-USE EXTRA DUTY WEATHERPROOF COVER, TAYMAC OR EQUAL.
9. ½"C., 2 #8 & 1 #8 GND.
10. 1"C., 3 #6 & 1 #10 GND.
11. PROVIDE & INSTALL JUNCTION BOXES FOR POWER & TELE/DATA.
12. PROVIDE & INSTALL 1½"C.O. INTO ACCESSIBLE CEILING SPACE.

BRANCH CIRCUIT CONDUCTOR SIZING TABLE

CIRCUIT AMPACITY/VOLTAGE	CIRCUIT LENGTH	REQUIREMENT
20/120	56'-90'	½" C., 2 #10 & 1 #10 GND.
20/120	91'-140'	½" C., 2 #8 & 1 #8 GND.
20/277	131'-205'	½" C., 2 #10 & 1 #10 GND.
20/277	206'-330'	½" C., 2 #8 & 1 #8 GND.

NOTE:

A. CONTRACTOR SHALL SIZE BRANCH CIRCUIT CONDUCTORS PER THE TABLE ABOVE AS DETERMINED BY THE CIRCUIT CONDUCTOR LENGTH, U.O.N. CONTRACTOR SHALL SPLICE TO #12 AWG WITHIN TERMINATION BOX FOR DEVICE CONNECTION IF NECESSARY.

B. WHERE THE UNGROUNDED CONDUCTORS IS INCREASED IN SIZE, INCLUDING FOR VOLTAGE DROP, THE GROUNDED CONDUCTOR SHALL BE INCREASED IN SIZE PROPORTIONATELY PER CEC 250.122(B)

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CONSULTANT:

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POWER & SYSTEMS PLAN

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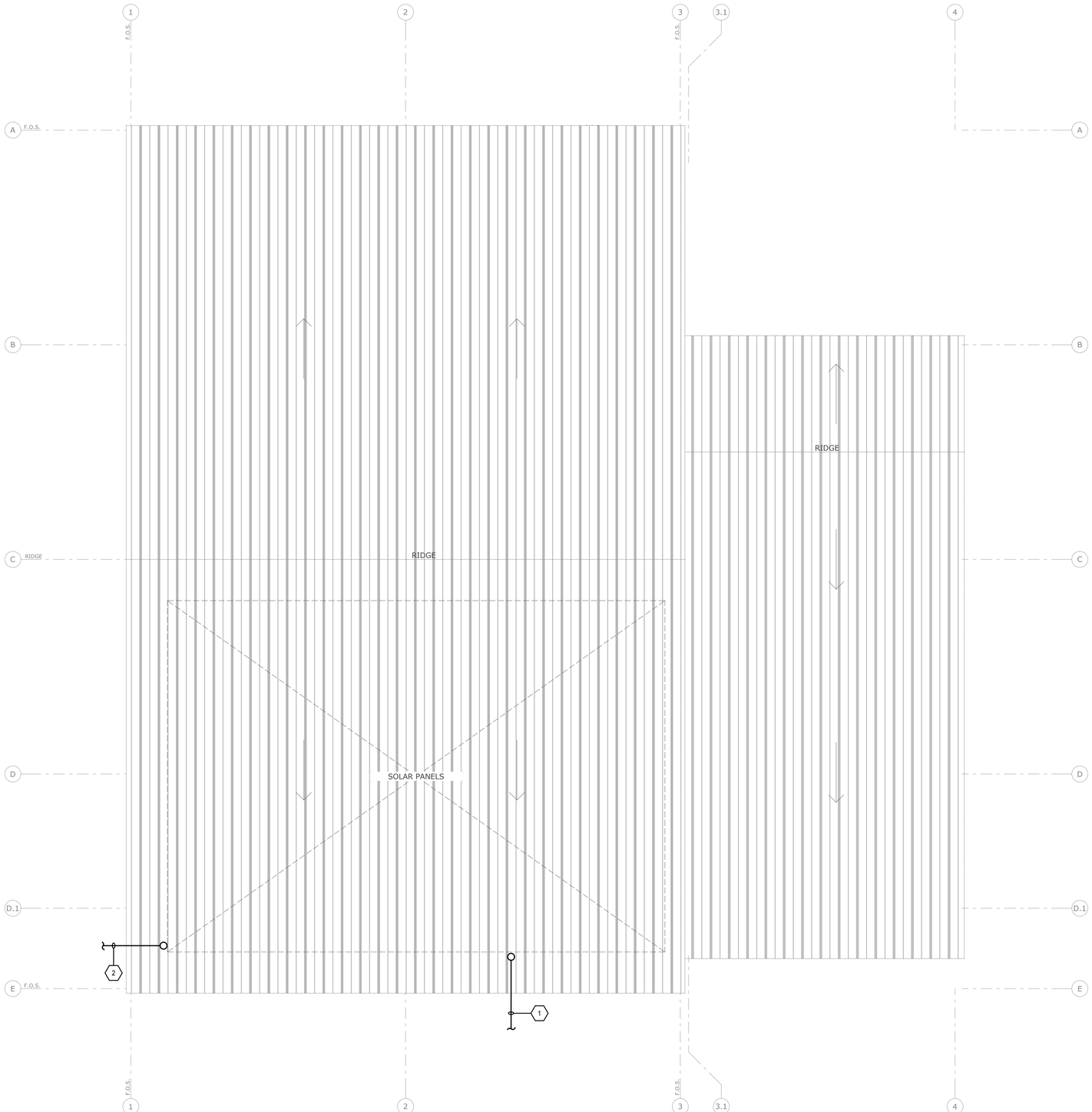
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SHEET NOTES

1. FOR PV SYSTEM, PROVIDE & INSTALL 2½"C.O. AND STUB INTO ELECTRICAL MAIN SWITCHBOARD 'MSB'. 1
2. FOR PV SYSTEM, PROVIDE & INSTALL 2½"C.O. AND STUB NEAR FUTURE PV PANELS. SEE 1/E4.1 FOR FUTURE PV PANELS LOCATIONS. 1

1 POWER & SYSTEMS PLAN - ROOF

SCALE: 1/4"=1'-0"

4' 0' 1' 2' 3' 4'

NORTH

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POWER & SYSTEMS PLAN - ROOF

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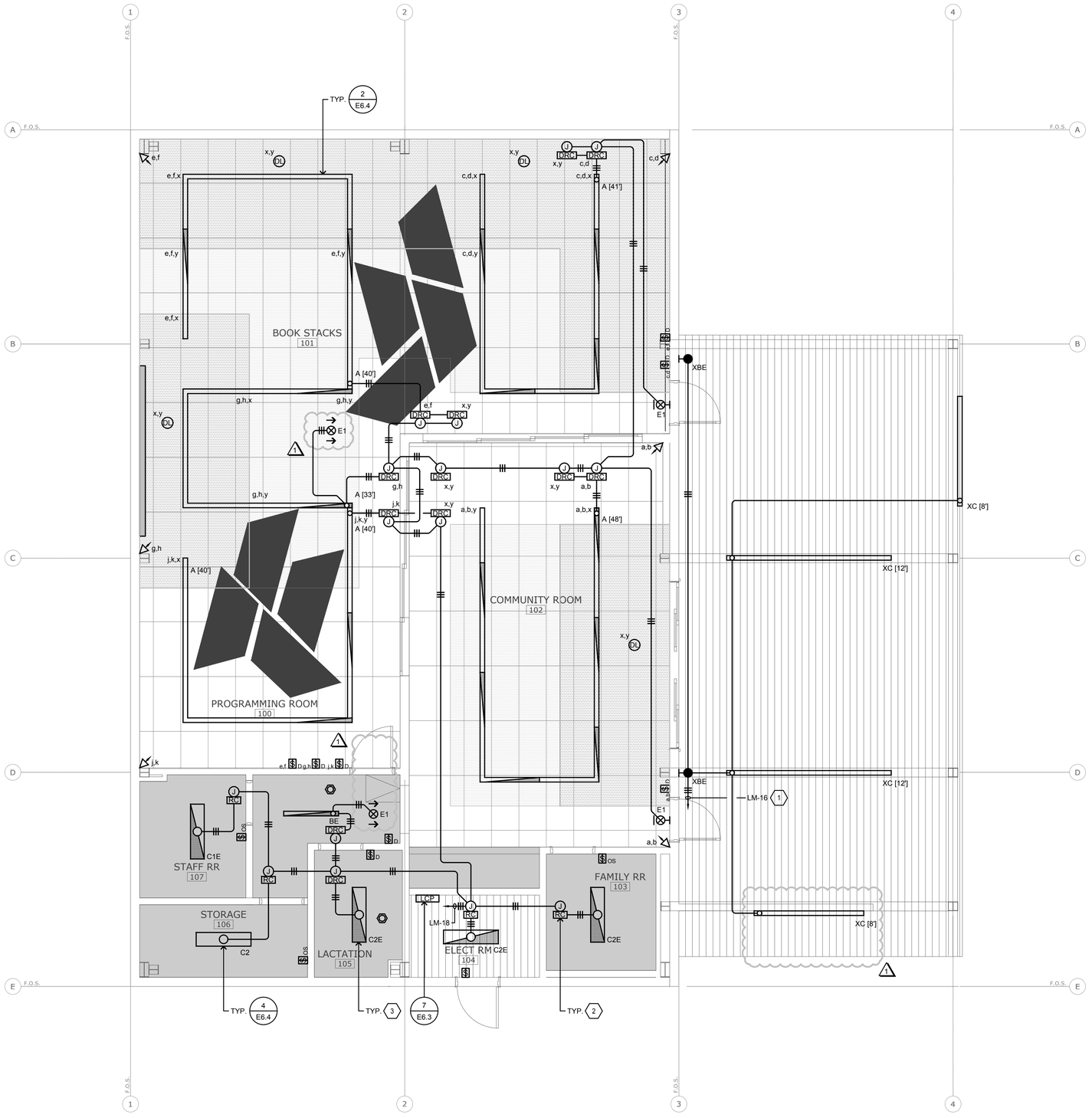
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JOB NO: 23014

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1 LIGHTING PLAN

SCALE: 1/4"=1'-0"

4' 0' 1' 2' 3' 4'

NORTH

SHEET NOTES

1. VIA LCP, SEE 7/E6.3.
2. INSTALL LIGHTING ROOM CONTROLLER IN ACCESSIBLE CEILING SPACE.
3. CONNECT LIGHT FIXTURE WITH EMERGENCY BATTERY BACK-UP TO LIGHTING BRANCH CIRCUIT UNSWITCHED HOT AND ALLOW FOR NORMAL SWITCHING DURING NORMAL OPERATION.

DAYLIT ZONES LEGEND

- PRIMARY DAYLIT ZONE
- SECONDARY DAYLIT ZONE

GENERAL NOTES:

A. FOR LIGHTING CONTROLS SEE E6.3.

B. FOR LIGHT FIXTURE SCHEDULE SEE E6.3.

C. FOR VACANCY/OCCUPANCY SENSORS FUNCTION SEE CALIFORNIA ENERGY COMPLIANCE FORM SECTION H INDOOR LIGHTING CONTROLS AND INDOOR LIGHTING MANDATORY MEASURES ON E0.2.

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LIGHTING PLAN

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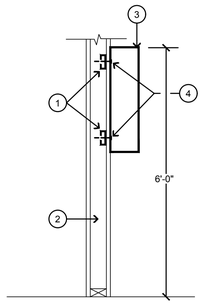
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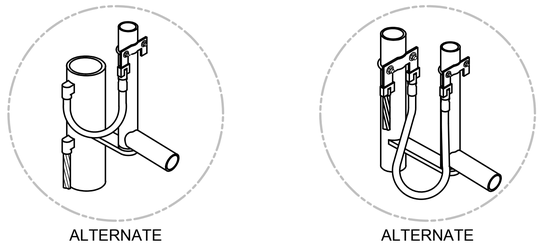


DETAIL NOTES:

1. 16 GA. "C" SHAPE BLOCKING BEHIND PANEL AT FASTENER LOCATIONS. BLOCK FLANGES AND FASTEN WEB OF 20 GA. BLOCK TO FLANGE OF TYPICAL STUDS - (2) #6 EA. END
2. METAL STUD WALL FRAMING
3. PANEL WEIGHT: 300 LBS MAX.
4. #14 SELF-TAPPING SCREWS INTO METAL BLK'G TYPICAL (4) PER PANEL AT CORNERS

7 SURFACE MOUNTED PANEL DETAIL

NO SCALE



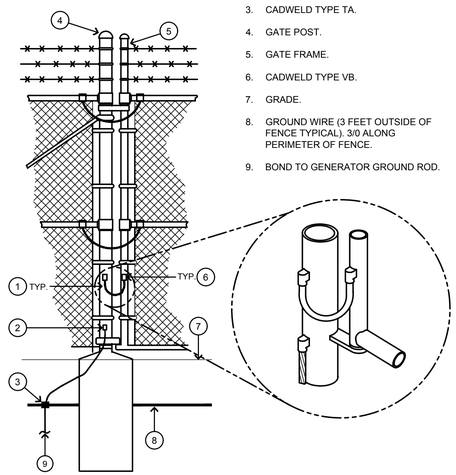
ALTERNATE

ALTERNATE

GENERAL NOTE:
TOP RAIL BONDING SHOWN; PROVIDE SIM. BONDS @ INTERMEDIATE & BOTTOM WHEN OCCUR.

DETAIL NOTES:

1. CADWELD FJ FLEX JUMPER (2/0 OR 4/0).
2. CADWELD TYPE VB.
3. CADWELD TYPE TA.
4. GATE POST.
5. GATE FRAME.
6. CADWELD TYPE VB.
7. GRADE.
8. GROUND WIRE (3 FEET OUTSIDE OF FENCE TYPICAL). 3/0 ALONG PERIMETER OF FENCE.
9. BOND TO GENERATOR GROUND ROD.



NOTES:

(A) METAL FENCES. WHERE METAL FENCES ARE LOCATED WITHIN 5M (16 FT.) OF THE EXPOSED ELECTRICAL CONDUCTORS OR EQUIPMENT, THE FENCE SHALL BE BONDED TO THE GROUNDING ELECTRODE SYSTEM WITH WIRE-TYPE BONDING JUMPERS AS FOLLOWS:

(1) BONDING JUMPERS SHALL BE INSTALLED AT EACH FENCE CORNER AND AT MAXIMUM 50M (160 FT) INTERVALS ALONG THE FENCE.

(2) WHERE BARE OVERHEAD CONDUCTORS CROSS THE FENCE, BONDING JUMPERS SHALL BE INSTALLED ON EACH SIDE OF THE CROSSING.

(3) GATES SHALL BE BONDED TO THE GATE SUPPORT POST, AND EACH GATE SUPPORT POST SHALL BE BONDED TO THE GROUNDING ELECTRODE SYSTEM.

(4) ANY GATE OR OTHER OPENING IN THE FENCE SHALL BE BONDED ACROSS THE OPENING BY A BURIED BONDING JUMPER.

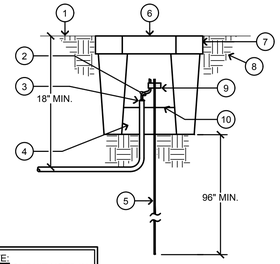
(5) THE GROUNDING GRID OR GROUNDING ELECTRODE SYSTEMS SHALL BE EXTENDED TO COVER THE SWING OF ALL GATES.

(6) THE BARBED WIRE STRANDS ABOVE THE FENCE SHALL BE BONDED TO THE GROUNDING ELECTRODE SYSTEM.

250.53 (F) GROUND RING. THE GROUND RING SHALL BE INSTALLED NOT LESS THAN 750MM (30 IN.) BELOW THE SURFACE OF THE EARTH.

6 GATE & GATE POST GROUNDING DETAIL

NO SCALE



GENERAL NOTE:
WHERE METAL CONDUIT USED IN LIEU OF PVC, PROVIDE GROUND BUSHINGS & BONDS PER CODE.

DETAIL NOTES:

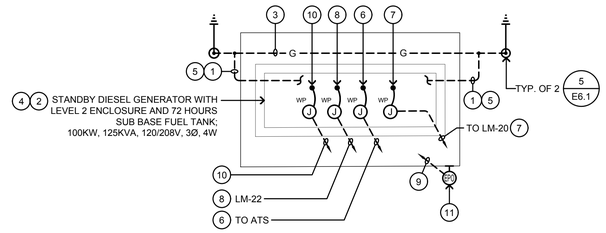
1. FINISHED GRADE.
2. GROUND CONDUCTOR.
3. SEAL CONDUIT WATERTIGHT.
4. GROUT BOTTOM MINIMUM 3".
5. 3/4" x 10'-0" COPPER CLAD GROUND ROD.
6. LID LABELED "GROUND ROD".
7. CHRISTY "F8" GROUND ROD BOX.
8. UNDISTURBED EARTH.
9. GROUND CLAMP.
10. COAT ALL INSIDE SURFACES WITH SEALANT.

5 GROUND ROD BOX DETAIL

NO SCALE

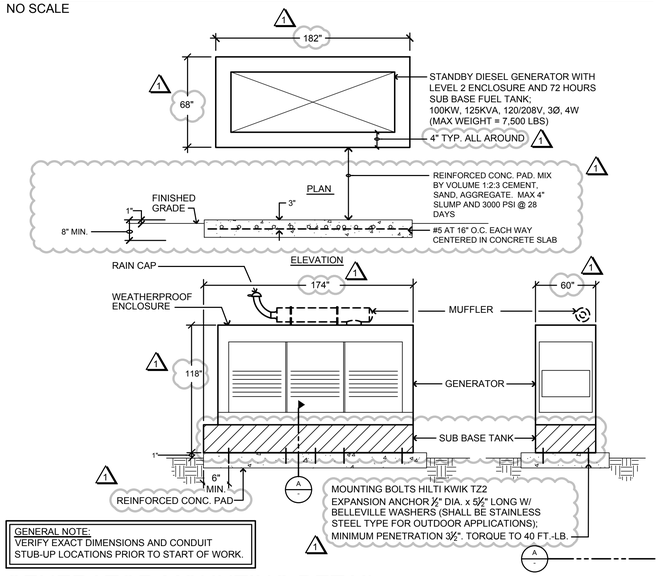
DETAIL NOTES:

1. GROUND FRAMING OF GENERATOR. DO NOT GROUND GENERATOR NEUTRAL.
2. BACK-UP POWER GENERATOR SHALL BE FURNISHED WITH FUEL ALARM (LOW LEVEL/LEAK DETECTION).
3. PROVIDE #3/0 AWG BARE COPPER GROUND CONDUCTOR BURIED 18" BELOW FINISHED GRADE MINIMUM. INSTALL GROUND GRID 2'-0" FROM THE EDGE OF THE GENERATOR PAD.
4. EMERGENCY GENERATOR SHALL BE PROVIDED WITH TYPE NEMA 3R AND SOUND ATTENUATED ENCLOSURE (70 dba @ 7 METERS).
5. PROVIDE #3/0 AWG BARE COPPER SERVICE GROUND CONDUCTOR AND CONNECT GENERATOR CASING TO THE GROUND GRID.
6. PROVIDE & INSTALL ½"C. WITH CABLING FOR ENGINE START PER MANUFACTURER INSTALLATION INSTRUCTIONS.
7. POWER CONNECTION TO THE BATTERY CHARGER; 10A, 120V.
8. POWER CONNECTION TO BLOCK HEATER, 15A, 120V.
9. PROVIDE & INSTALL ½"C. WITH CABLING PER MANUFACTURER INSTALLATION INSTRUCTIONS.
10. PROVIDE & INSTALL 1"C. WITH CABLING TO GENERATOR ANNUNCIATOR PER MANUFACTURER INSTALLATION INSTRUCTIONS.
11. PROVIDE & INSTALL REMOTE GENERATOR EMERGENCY POWER OFF BUTTON. INSTALL CABLING BETWEEN GENERATOR AND REMOTE GENERATOR EMERGENCY POWER OFF BUTTON PER MANUFACTURER INSTALLATION INSTRUCTIONS.



4 STAND-BY GENERATOR ELECTRICAL DETAIL

NO SCALE



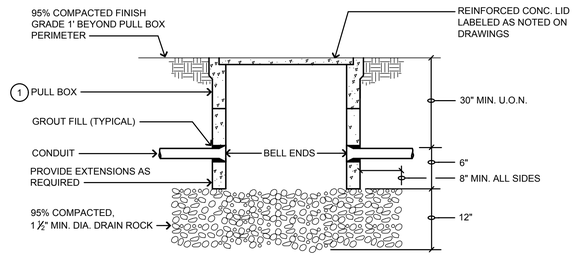
GENERAL NOTE:
VERIFY EXACT DIMENSIONS AND CONDUIT STUB-UP LOCATIONS PRIOR TO START OF WORK.

3 GENERATOR MOUNTING DETAIL

NO SCALE

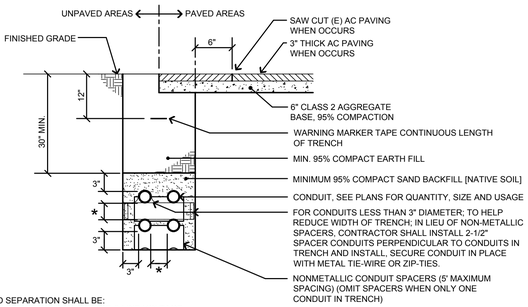
DETAIL NOTES:

1. SIZE(S) & MFGR. AS NOTED ON DRAWINGS.



2 TYPICAL PULLBOX DETAIL

NO SCALE



* = REQUIRED SEPARATION SHALL BE:
12" MINIMUM BETWEEN LOW VOLTAGE & LINE VOLTAGE CONDUITS LIKE SYSTEMS REQUIRE 3" SEPARATION

NOTES FOR CLEARANCES:

1. THE MINIMUM RECOMMENDED SEPARATIONS BETWEEN TELECOMMUNICATIONS CONDUIT SYSTEMS AND OUTSIDE SURFACES OF FOREIGN STRUCTURES VARY IN ACCORDANCE WITH REGIONAL STANDARDS, CODES, AND REGULATIONS:
   a. 6" MIN. WHEN CROSSING PIPES (E.G., GAS, WATER, OIL)
   b. 12" MIN. WHEN PARALLEL TO PIPES (E.G., GAS, WATER, OIL)
   c. 3" MIN. CONCRETE FOREIGN CONDUIT (POWER OR OTHER)
   d. 4" MIN. MASONRY (POWER OR OTHER)
   e. 12" MIN. OF WELL-TAMPED EARTH (POWER OR OTHER)
2. THE TOP OF CONDUIT SHOULD BE LOCATED AT A SUFFICIENT DEPTH (NORMALLY 24"-30") BELOW SURFACE GRADE SO BOTH LIVE OR DYNAMIC AND DEAD (STATIC) OR EARTH LOADS CAN BE SUSTAINED BY THE CONDUIT STRUCTURE.

NOTES:

1. SAW CUT, TRENCH & BACKFILL FOR NEW CONDUITS. PATCH WALKWAY TO MATCH (E) SURROUNDING SURFACES. CARE SHALL BE TAKEN TO PROTECT EXISTING TREES. RESEED OR RESOD (E) DISTURBED PLANTED AREAS TO ARCHITECT'S SATISFACTION.
2. BASE MATERIAL TO BE REPLACED TO THE DEPTH OF EXISTING BASE AND COMPACTED TO A MIN. 95% RELATIVE COMPACTION. A.C. MAY BE SUBSTITUTED FOR BASE MATERIAL. WHEN USED AS BACKFILL, CLASS 100-E-100 P.C.C. MAY BE SUBSTITUTED FOR BASE MATERIAL.

1 TYPICAL TRENCH SECTION DETAIL

NO SCALE

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ELECTRICAL DETAILS

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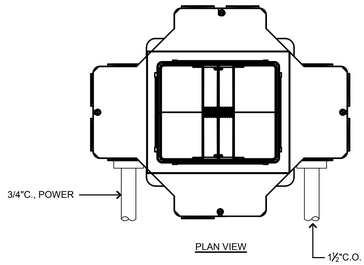
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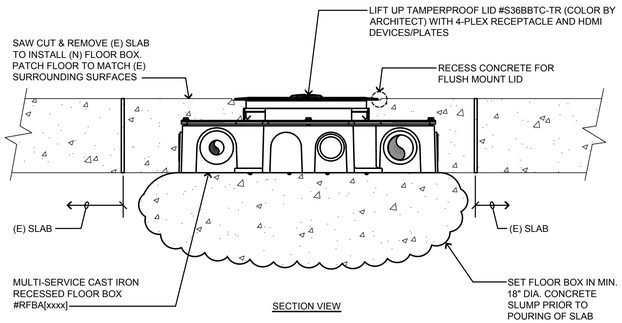
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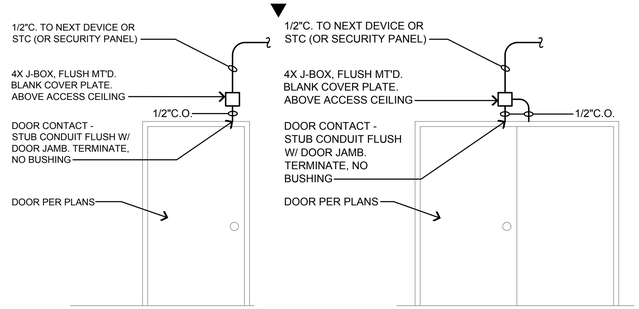


GENERAL NOTE:

ALL PART #'S SHOWN ARE WIREMOLD.

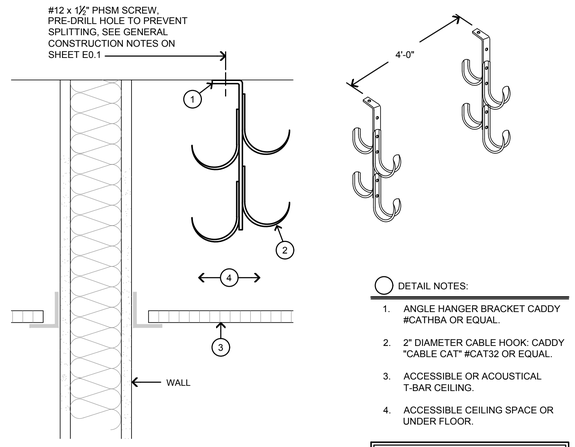
7 FLOOR OUTLET DETAIL

NO SCALE



5 DOOR CONTACT MOUNTING DETAIL

NO SCALE



DETAIL NOTES:

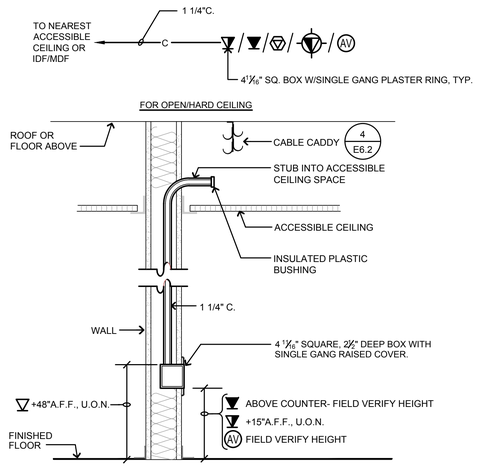
1. ANGLE HANGER BRACKET CADDY #CATHBA OR EQUAL.
2. 2" DIAMETER CABLE HOOK: CADDY "CABLE CAT" #CAT32 OR EQUAL.
3. ACCESSIBLE OR ACOUSTICAL T-BAR CEILING.
4. ACCESSIBLE CEILING SPACE OR UNDER FLOOR.

GENERAL NOTE:

NOT TO EXCEED 12" SAG IN CABLE.

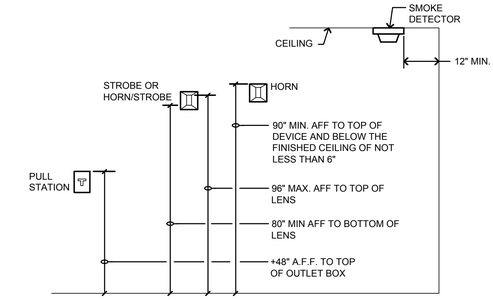
4 J-HOOK MOUNTING DETAIL

NO SCALE



3 TELE/DATA OUTLET DETAIL

NO SCALE



GENERAL NOTE:

WHERE LOW CEILING HEIGHTS DO NOT PERMIT WALL MOUNTING AT MIN 80", WALL MOUNTED VISUAL APPLIANCES SHALL BE MOUNTED WITHIN 6" OF THE CEILING.

2 FIRE ALARM DEVICE MOUNTING ELEVATION DETAIL

NO SCALE

SCOPE OF WORK:

NEW COMPLETE MANUAL ADDRESSABLE FIRE ALARM SYSTEM INCLUDING ALL REQUIRED EQUIPMENT, PANELS, RACEWAYS, CONDUCTORS, CONNECTIONS, PROGRAMMING, TESTING AND APPROVAL BY THE LOCAL AUTHORITY HAVING JURISDICTION.

SEQUENCE OF OPERATION OF THE FIRE ALARM SYSTEM.

A. ACTIVATION OF ANY INITIATING DEVICE SHALL CAUSE ALL SIGNALS IN BUILDING TO ACTIVATE AND SOUND AND SIMULTANEOUSLY CAUSE AN ALARM TO BE SENT TO THE REMOTE MONITORING AGENCY.

B. THE ADDRESS CORRESPONDING TO THE INITIATION DEVICE IN ALARM SHALL APPEAR ON FIRE ALARM CONTROL PANEL LCD SCREEN.

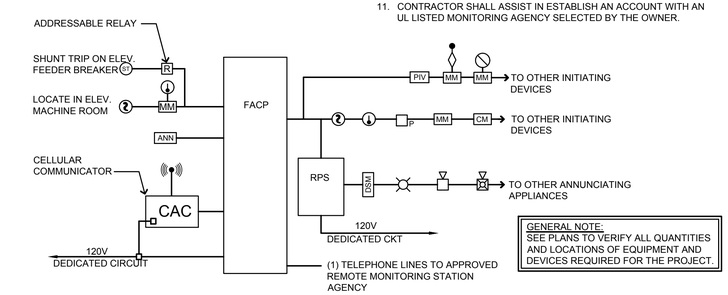
C. CLOSING THE FIRE ALARM SPRINKLER OS & Y VALVE SHALL INITIATE A TROUBLE INDICATION AT FIRE ALARM CONTROL PANEL AND MONITORING STATION.

D. SHOULD AN OPEN, GROUND OR SHORT OCCUR IN THE WIRING SYSTEM, FIRE ALARM CONTROL PANEL WILL DETECT MALFUNCTION AND INITIATE A TROUBLE ALARM INDICATOR AT PANEL AND MONITORING STATION.

E. ONCE THE SYSTEM IS BACK TO NORMAL. THE PANEL WILL RESOUND FOR PROPER RESETTING.

FIRE ALARM NOTES:

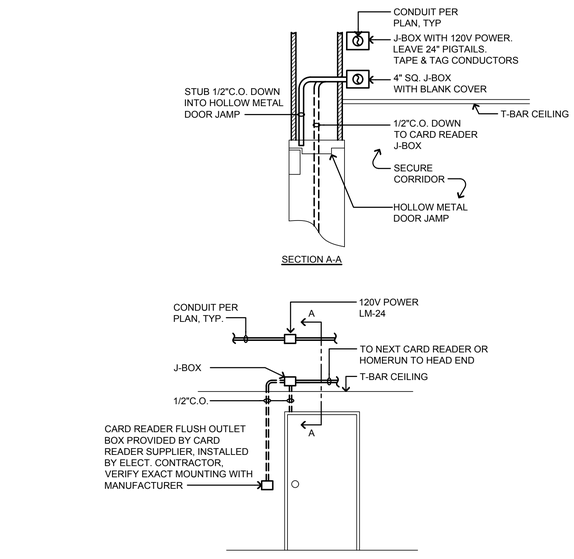
1. NEW ADDRESSABLE FIRE ALARM CONTROL PANEL WITH COMMUNICATOR, INITIATING AND ANNUNCIATING DEVICES, CHARGER & BATTERIES.
2. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MATERIALS, EQUIPMENT AND PROVIDE ALL LABOR REQUIRED AND NECESSARY TO COMPLETE THE WORK SHOWN ON THE DRAWINGS.
3. THE FIRE ALARM SYSTEM SHALL BE INSTALLED AS SPECIFIED IN ALL SECTIONS OF DIVISION 16 AND DIVISION 15, INCLUDING ALL OTHER WORK AND MISCELLANEOUS ITEMS NOT SPECIFICALLY MENTIONED BUT REASONABLY INFERRED FOR COMPLETE INSTALLATION.
4. ALL WIRE SHALL BE MINIMUM #12AWG FOR ANNUNCIATION CIRCUITS AND MINIMUM #16AWG TWISTED SHIELDED PAIR CABLE FOR INITIATING CIRCUITS. ALL WIRING SHALL BE ROUTED CONCEALED INSTALLED IN CONDUIT.
5. SUBMIT COMPLETE FIRE ALARM SYSTEM PLANS INCLUDING RISER DIAGRAMS, BATTERY CALCS, VOLT DROP CALCS, WIRING DIAGRAMS, ETC. TO LOCAL FIRE AUTHORITY REVIEW AND APPROVAL PRIOR TO START OF INSTALLATION.
6. FINAL CONNECTIONS OF DEVICES AND EQUIPMENT SHALL BE BY A FIRE ALARM CONTRACTOR WHO PERFORMS SUCH WORK ON A REGULAR BASIS.
7. FINAL TESTING SHALL BE WITNESSED BY THE LOCAL FIRE AGENCY.
8. PROVIDE MANUALS AND MINIMUM 2-HOURS OPERATING INSTRUCTION TO OWNER.
9. PROVIDE BATTERY BACKUP FOR 24 HOURS OF STANDBY & 5 MINUTES OF ALARM.
10. VERIFY COLOR (RED OR WHITE) OF NOTIFICATION APPLIANCES WITH ARCHITECT.
11. CONTRACTOR SHALL ASSIST IN ESTABLISH AN ACCOUNT WITH AN UL LISTED MONITORING AGENCY SELECTED BY THE OWNER.



GENERAL NOTE:
SEE PLANS TO VERIFY ALL QUANTITIES AND LOCATIONS OF EQUIPMENT AND DEVICES REQUIRED FOR THE PROJECT.

1 TYPICAL FIRE ALARM RISER DIAGRAM DETAIL

NO SCALE



6 CARD READER DETAIL

NO SCALE

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LICENSED ARCHITECT JEFFREY L. ROSE EXPIRES 9-30-27 STATE OF CALIFORNIA

NOT VALID WITHOUT WET SIGNATURE

CONSULTANT:

REGISTERED PROFESSIONAL ENGINEER MATTB ANKNEY No. E21043 09/30/2027 ELECTRICAL STATE OF CALIFORNIA

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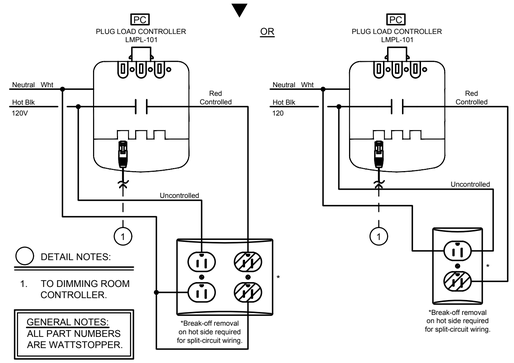
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LIGHT FIXTURE SCHEDULE

FIXTURE NOTES:

1. ALL LED LIGHT FIXTURE DRIVERS SHALL BE ELECTRONIC TYPE, 10% TOTAL HARMONIC DISTORTION MAXIMUM.
2. ALL LED LIGHT MODULES SHALL BE ENERGY SAVING 3500° K, 80 CRI MINIMUM, U.O.N. (SEE SPECIFICATIONS FOR MORE INFORMATION).
3. ALL LED DRIVERS (AND ASSOC. FIXTS.) SHALL HAVE MANUFACTURER'S CERTIFICATION OF COMPLIANCE WITH CALIFORNIA ENERGY COMMISSION STANDARDS AND REQUIREMENTS, WHERE SUCH ARE USED IN CONDITIONED SPACES.
4. EXIT SIGNS , EMERGENCY LIGHTS AND LIGHT FIXTURES WITH EMERGENCY BATTERY BACK-UP SHALL SUPPLY A MINIMUM DURATION OF 90 MINUTES OF POWER IN THE EVENT OF A POWER OUTAGE/FAILURE.
5. ALL RECESSED LIGHT FIXTURES SHALL BE U.L. APPROVED FOR ZERO CLEARANCE INSULATION COVER WHEN INSTALLED IN INSULATED CEILINGS.

TYPE	DESCRIPTION	LAMPS	MANUFACTURER
A	[#'] LENGTH 4" APERTURE HIGH PERFORMANCE LED FIXTURE, PENDANT, INDIRECT/DIRECT DISTRIBUTION, UPLIGHT OUTPUT STANDARD, DOWNLIGHT OUTPUT STANDARD, TOP GLOW, BOTTOM GLOW, DUAL CIRCUIT (INDEPENDENT CONTROL OF UP AND DOWN LIGHT DISTRIBUTION), 0-10V DIMMING DRIVER 120V. FINISH PER ARCHITECT. [#'] SEE LIGHTING PLAN FOR LENGTHS AND 4' EMERGENCY SECTIONS. SEE LIGHTING PLAN FOR 90-DEGREE MITERED LIT CORNERS.	7.3W/FT LED 428LM/FT UP 379LM/FT DN 90 CRI	FINELITE HP-4P SERIES .
BE	4' LENGTH 4" APERTURE HIGH PERFORMANCE LED FIXTURE WITH EMERGENCY BATTERY BACK-UP, SURFACE, DIRECT DISTRIBUTION, VERY HIGH OUTPUT, BOTTOM GLOW, 0-10V DIMMING DRIVER 120V. FINISH PER ARCHITECT.	9.3W/FT LED 926LM/FT 90 CRI .	FINELITE HP-4S SERIES .
C1	4' LENGTH SURFACE VANDAL RESISTANT LED FIXTURE, WHITE SHIELDING, 0-10V DIMMING DRIVER, 120V. FINISH PER ARCHITECT.	31W LED 3600 LUMENS . .	WILLIAMS AVX SERIES .
C2	SAME AS FIXTURE TYPE 'C1' EXCEPT LUMENS.	57W LED 6200 LUMENS .	WILLIAMS AVX SERIES .
C2E	SAME AS FIXTURE TYPE 'C1' EXCEPT WITH LUMENS AND EMERGENCY BATTERY BACK-UP OPTION.	57W LED 6200 LUMENS . .	WILLIAMS AVX SERIES .
E1	EXIT SIGN WITH BATTERY BACK-UP AND SELF-TEST DIAGNOSTIC, RED LETTERS 120V. SEE LIGHTING PLANS FOR ARROWS, FACES AND MOUNTING. FINISH PER ARCHITECT.	. LED . . .	DUAL LITE LES SERIES .
XA	20" DIA POST TOP LED FIXTURE, 1150mA, COMFORT TYPE 3 DISTRIBUTION, AUTOMATIC PROFILE DIMMING SECURITY 50%, MOTION SENSOR #2 LENS, 120V. 12' HIGH POLE. FINISH PER ARCHITECT.	51W LED . . .	PHILIPS GARDCO PPT SERIES POLE: PRA4-CB-12
XBE	SCONCE LED FIXTURE WITH EMERGENCY BATTERY BACK-UP, 16 LEDs, 400mA, TYPE 3 DISTRIBUTION, AUTOMATIC PROFILE DIMMING SECURITY 50%, MOTION SENSOR #2 LENS, 120V. FINISH PER ARCHITECT.	22W LED . . .	PHILIPS GARDCO LED WALL SCONCE 101L SERIES
XC	[#'] LENGTH 4" APERTURE HIGH PERFORMANCE LED FIXTURE, SURFACE, DIRECT DISTRIBUTION, DOWNLIGHT OUTPUT STANDARD, 0-10V DIMMING DRIVER,120V. FINISH PER ARCHITECT. [#'] SEE LIGHTING PLAN FOR LENGTHS.	3.6W/FT LED 354LM/FT .	FINELITE HP-4WL SERIES .



DETAIL NOTES:

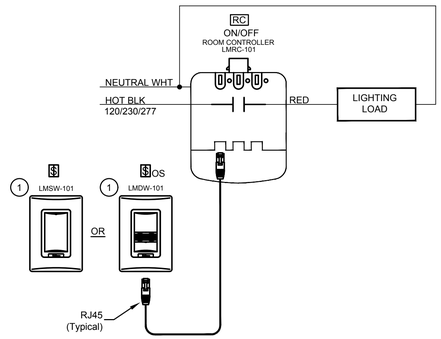
1. TO DIMMING ROOM CONTROLLER.

GENERAL NOTES:
ALL PART NUMBERS ARE WATTSTOPPER.

6 PLUG LOAD CONTROLS DETAIL

NO SCALE

LMRC-101
1-RELAY ON/OFF CONTROLLER
Provides one (1) controllable switch-leg



DETAIL NOTES:

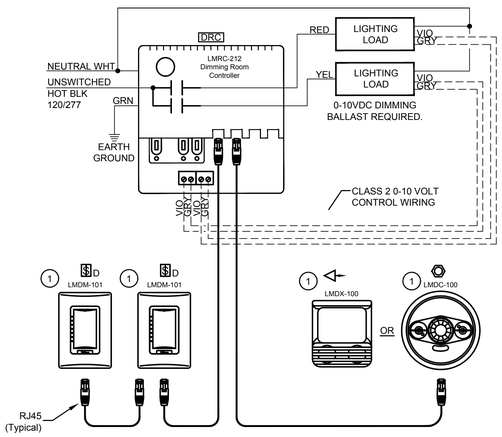
1. FOR DEVICE QUANTITY AND LOCATION; SEE LIGHTING FLOOR PLANS.

GENERAL NOTES:
A. ALL PART NUMBERS ARE WATTSTOPPER.
B. DISREGARD SYMBOLS/CONTROLS NOT SHOWN IN PLANS.

5 NON-DIMMING LIGHTING CONTROLS DETAIL

NO SCALE

LMRC-212
2--RELAY 0-10V DIMMING CONTROLLER
Provides two (2) controllable switch-legs
with two (2) channels of 0-10V dimming



DETAIL NOTES:

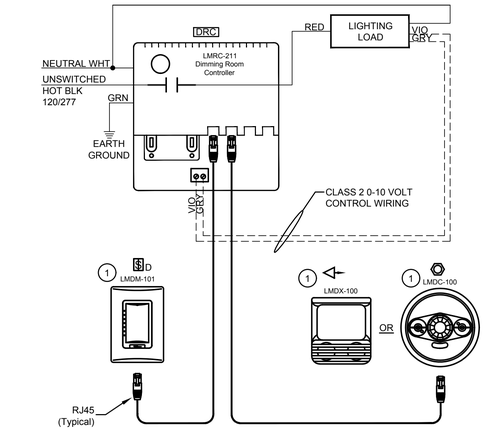
1. FOR DEVICE QUANTITY AND LOCATION; SEE LIGHTING FLOOR PLANS.
2. ONE ZONE DAY LIGHT PHOTOCELL; SEE PLANS FOR QUANTITIES & LOCATIONS. PROGRAM ZONE 1 (PRIMARY DAY LIT ZONE) AT 40FC.

GENERAL NOTES:
A. ALL PART NUMBERS ARE WATTSTOPPER.
B. DISREGARD SYMBOLS/CONTROLS NOT SHOWN IN PLANS.

3 2-ZONE DIMMING LIGHTING CONTROLS DETAIL

NO SCALE

LMRC-211
1-RELAY 0-10V DIMMING CONTROLLER
Provides one (1) controllable switch-leg
with one (1) channel of 0-10V dimming



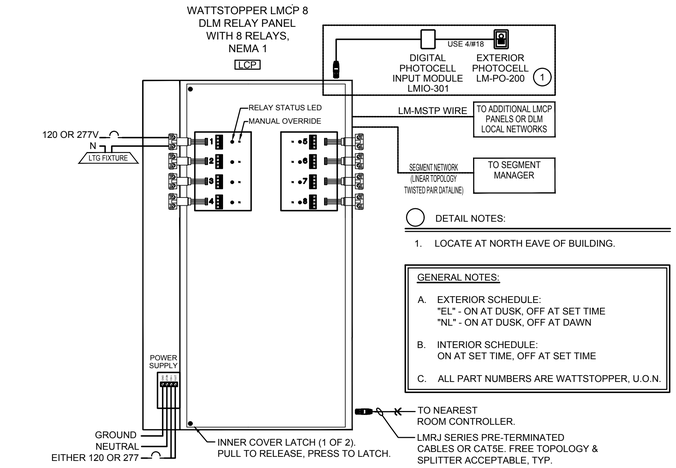
DETAIL NOTES:

1. FOR DEVICE QUANTITY AND LOCATION; SEE LIGHTING FLOOR PLANS.

GENERAL NOTES:
A. ALL PART NUMBERS ARE WATTSTOPPER.
B. DISREGARD SYMBOLS/CONTROLS NOT SHOWN IN PLANS.

2 1-ZONE DIMMING LIGHTING CONTROLS DETAIL

NO SCALE



DETAIL NOTES:

1. LOCATE AT NORTH EAVE OF BUILDING.

GENERAL NOTES:

A. EXTERIOR SCHEDULE:
"EL" - ON AT DUSK, OFF AT SET TIME
"NL" - ON AT DUSK, OFF AT DAWN

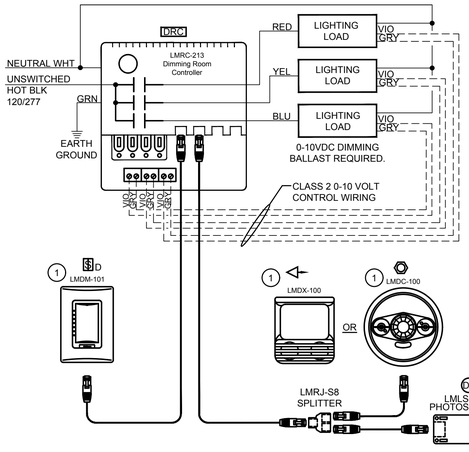
B. INTERIOR SCHEDULE:
ON AT SET TIME, OFF AT SET TIME

C. ALL PART NUMBERS ARE WATTSTOPPER, U.O.N.

7 LIGHTING CONTROL PANEL 'LCP' DETAIL

NO SCALE

LMRC-213
3-RELAY 0-10V DIMMING CONTROLLER
Provides three (3) controllable switch-legs
with three (3) channels of 0-10V dimming



DETAIL NOTES:

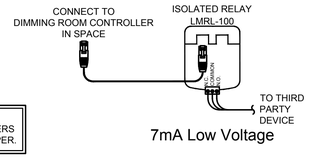
1. FOR DEVICE QUANTITY AND LOCATION; SEE LIGHTING FLOOR PLANS.
2. TWO ZONE DAY LIGHT PHOTOCELL; SEE PLANS FOR QUANTITIES & LOCATIONS. PROGRAM ZONE 1 (PRIMARY DAY LIT ZONE) AT 40FC AND ZONE 2 (SECONDARY DAY LIT ZONE) DIMMED TO 25% LESS THAN ZONE 1.

GENERAL NOTES:
A. ALL PART NUMBERS ARE WATTSTOPPER.
B. DISREGARD SYMBOLS/CONTROLS NOT SHOWN IN PLANS.

4 3-ZONE DIMMING LIGHTING CONTROLS DETAIL

NO SCALE

For fan control, HVAC or
Alarm interface.
24V 1A SPDT Relay
1 NO/NC output terminal



GENERAL NOTE:
ALL PART NUMBERS ARE WATTSTOPPER.

1 ISOLATED RELAY FOR HVAC INTERFACE DETAIL

NO SCALE

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LICENSED ARCHITECT JEFFREY L. MILES No. C-26784 REN: 8-31-27 STATE OF CALIFORNIA

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ELECTRICAL DETAILS & LIGHT FIXTURE SCHEDULE

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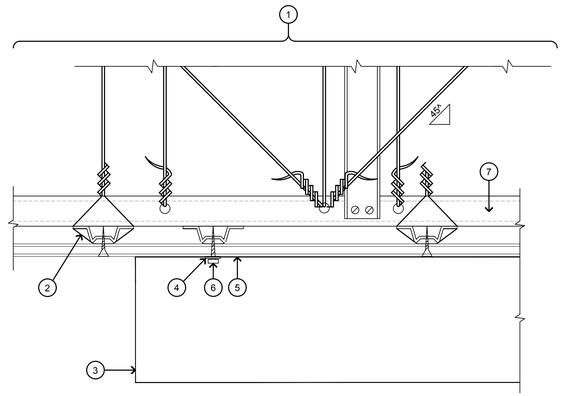
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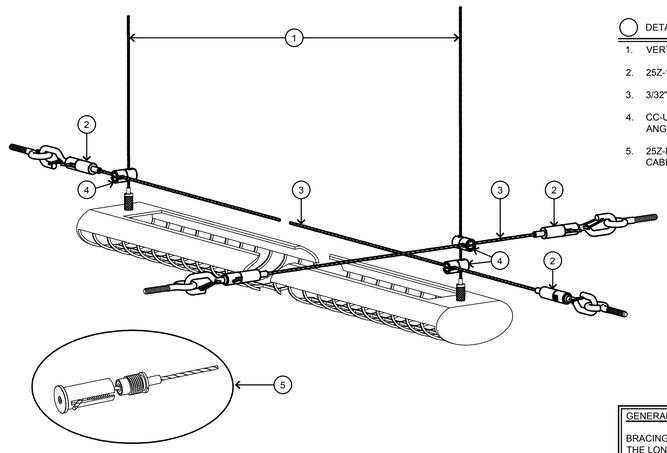


DETAIL NOTES:

1. SUPPORT WIRE TO STRUCTURE, SEE A9.1.
1. HAT CHANNELS (COORDINATE WITH GENERAL CONTRACTOR TO ADD CHANNELS AT LIGHT FIXTURE MOUNTING LOCATIONS).
2. FIXTURE.
3. FLAT WASHER.
4. ⅝" TYPE x GYP. BD.
5. #10 SELF-TAPPING SCREWS INTO HAT CHANNEL (4) PER FIXTURE.
6. 1½" GALV. COLD ROLLED CHANNEL.

4 SURFACE LIGHT FIXTURE MOUNTING DETAIL

NO SCALE



DETAIL NOTES:

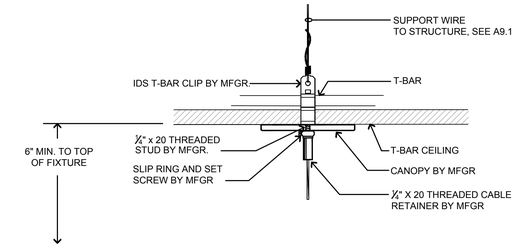
1. VERTICAL SUSPENSION CABLES.
2. 25Z-1420-GHA HOOK TO EYE-BOLT AT ANY ANGLE.
3. 3/32" LATERAL CABLE.
4. CC-UNICROSS LOCKS ANY TWO CABLES AT ANY ANGLE.
5. 25Z-M13-1420-SL OPTICAL FOR PERPENDICULAR CABLE/WALL INTERFACE.

GENERAL NOTE:

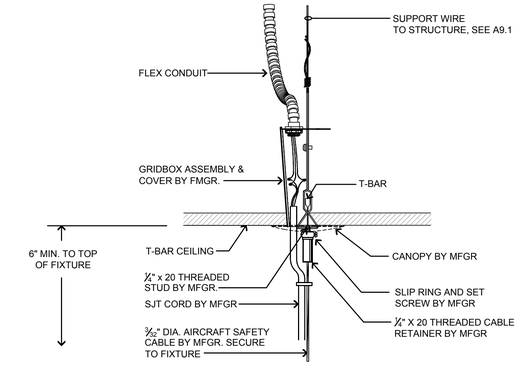
BRACING IS REQUIRED AT EACH END OF THE FIXTURE IN THE LONGITUDINAL DIRECTION; BRACING IS REQUIRED IN THE TRANSVERSE DIRECTION AT EACH PENDANT.

3 SUSPENDED LIGHT FIXTURE MOUNTING DETAIL

NO SCALE



NON - FEED POINT



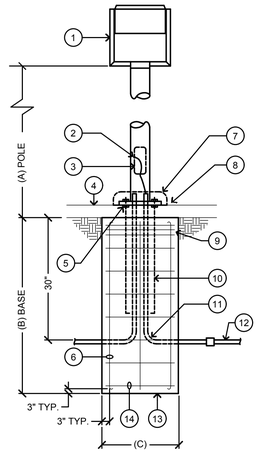
FEED POINT

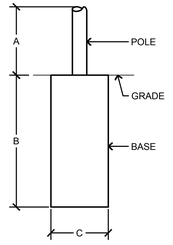
GENERAL NOTE:

LUMINAIRES ARE TO BE BRACED WITH SEISMIC CABLE WHERE THEY WILL COME IN CONTACT WITH EACH OTHER, OTHER OBSTRUCTIONS OR WALL WITHIN A 45 DEGREES ARC, SEE 3/E6.4 FOR SEISMIC BRACING REQUIREMENTS.

2 SUSPENDED LIGHT FIXTURE MOUNTING DETAIL

NO SCALE





A	B	C
POLE LENGTH	FOOTING DEPTH BELOW GRADE	✶ FOOTING DIAMETER
8'-0" TO 15'-0"	4'-0"	1'-6"

✶ MINIMUM DIAMETER. IN ALL CASES, DIAMETER OF BASE SHALL BE "C" DIMENSION OR BOLT CIRCLE DIA. +8" WHICHEVER IS GREATER.

DETAIL NOTES:

1. POST TOP MOUNTED FIXTURE
2. GROUND BOND LUG IN POLE
3. HANDHOLE WITH GASKET COVER
4. TOP OF PAVING/SIDEWALK, FINISHED GRADE.
5. LEVEL NUTS
6. 6 #4 VERTICAL BARS EQUALLY SPACED; HOOK ENDS
7. ANCHOR BOLTS AND BASE COVER
8. CONTRACTOR SHALL ENSURE THAT FINISH OF EXPOSED BASE IS SMOOTH WITH EVEN TEXTURE.
9. 3 #3 TIES IN UPPER 5" OF BASE
10. 4-¾-Ø x 17" STD HEADED ASTM A307 ANCHOR BOLTS ON 7" BOLT CIRCLE EMBEDED 12" MIN. INTO CONC.; QUANTITY & SIZE PER POLE MFGR. FURNISHED WITH POLE. ANCHOR BOLTS SHALL BE WITHIN VERTICAL REBAR CAGE.
11. PVC ELBOW AND RISER
12. BRANCH CIRCUIT PVC CONDUIT
13. 3000 P.S.I. AT 28 DAYS CONCRETE FOOTING
14. #3 HORIZONTAL TIES AT 9" O.C. LAP END

1 POST TOP FIXTURE MOUNTING DETAIL

NO SCALE

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LICENSED ARCHITECT
JEFFREY L. MILES
EXPIRES 8-31-27
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CONSULTANT:

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chargepoint+

CT4000 Level 2 Commercial Charging Station

Specifications and Ordering Information



CT4021

Ordering Information

The order codes below represent specific product configurations. Other product options are available. Please contact ChargePoint Sales for information and order codes.

Specify model number followed by the applicable code(s).
The order code sequence is: **Model-Options**. **Software**, **Services** and **Misc** are ordered as separate line items.

Hardware

Description		Order Code
Model	1830 mm (6 ft) Single Port Bollard Mount	CT4011-GW1
	1830 mm (6 ft) Dual Port Bollard Mount	CT4021-GW1
	1830 mm (6 ft) Single Port Wall Mount	CT4013-GW1
	1830 mm (6 ft) Dual Port Wall Mount	CT4023-GW1
	2440 mm (8 ft) Dual Port Bollard Mount	CT4025-GW1
	2440 mm (8 ft) Dual Port Wall Mount	CT4027-GW1
Included	Integral Modem – North America	-GW1
Misc	Power Management Kit Bollard Concrete Mounting Kit	CT4000-PMGMT
	Bollard Concrete Mounting Kit	CT4001-CCM

*Note: ALL CT4000 stations include Integral Modem -GW1.

Software & Services

Description	Order Code
ChargePoint Commercial Service Plan	CPCLD-COMMERCIAL-*n**
ChargePoint Enterprise Plan	CPCLD-ENTERPRISE-*n**
ChargePoint Assure	CT4000-ASSURE*n**
Station Activation and Configuration	CPSUPPORT-ACTIVE
ChargePoint Station Installation and Validation	CT4000-INSTALLVALID

Note: All CT4000 stations require a network service plan per port.

*Substitute *n* for desired years (1, 2, 3, 4 or 5 years)

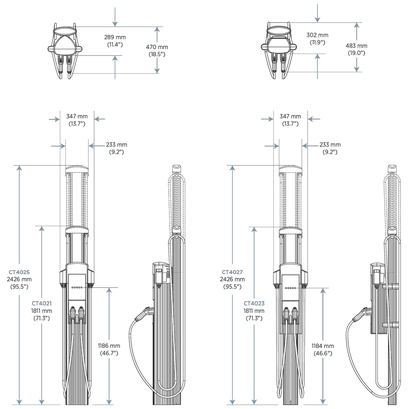
Order Code Examples

If ordering this…	…the order code is
1830 mm (6 ft) Dual Port Bollard Networked Station with Concrete Mounting Kit	CT4021-GW1 CT4001-CCM
ChargePoint Commercial Service Plan, 3 Year Subscription	CPCLD-COMMERCIAL-3
ChargePoint Station Installation and Validation	CT4000-INSTALLVALID
3 Years of Assure Coverage	CT4000-ASSURE3
1830 mm (6 ft) Single Port Wall Mount Networked Station	CT4013-GW1
ChargePoint Commercial Service Plan, 5 Year Subscription	CPCLD-COMMERCIAL-5
5 Years of Assure Coverage	CT4000-ASSURE5
Station Activation and Configuration	CPSUPPORT-ACTIVE

Architectural Drawings (Dimensions)

CT4021 1830 mm (6')
CT4025 2440 mm (8')
Bollard

CT4023 1830 mm (6')
CT4027 2440 mm (8')
Wall Mount



General Specifications

Electrical Input

Electrical Input	Single Port (AC Voltage 208 / 240V AC)			Dual Port (AC Voltage 208 / 240V AC)		
	Input Current	Input Power Connection	Required Service Panel Breaker	Input Current	Input Power Connection	Required Service Panel Breaker
Standard	30A	One 40A branch circuit	40A dual pole (non-GFCI type)	30A x 2	Two independent 40A branch circuits	40A dual pole (non-GFCI type) x 2
Standard Power Share	n/a	n/a	n/a	32A	One 40A branch circuit	40A dual pole (non-GFCI type)
Power Select 24A	24A	One 30A branch circuit	30A dual pole (non-GFCI type)	24A x 2	Two independent 30A branch circuits	30A dual pole (non-GFCI type) x 2
Power Select 24A Power Share	n/a	n/a	n/a	24A	One 30A branch circuit	30A dual pole (non-GFCI type)
Power Select 16A	16A	One 20A branch circuit	20A dual pole (non-GFCI type)	16A x 2	Two independent 20A branch circuits	20A dual pole (non-GFCI type)
Power Select 16A Power Share	n/a	n/a	n/a	16A	One 20A branch circuit	20A dual pole (non-GFCI type)
Service Panel GFCI	Do not provide external GFCI as it may conflict with internal GFCI (CCID)					
Wiring – Standard	3-wire (L1, L2, Earth)			5-wire (L1, L1, L2, L2, Earth)		
Wiring – Power Share	n/a			3-wire (L1, L2, Earth)		
Station Power	8 W typical (standby), 15 W maximum (operation)					

Electrical Output

Electrical Output	Single Port (AC Voltage 208 / 240V AC)	Dual Port (AC Voltage 208 / 240V AC)
Standard	7.2 kW (240V AC @ 30A)	7.2 kW (240V AC @ 30A) x 2
Standard Power Share	n/a	7.2 kW (240V AC @ 30A) x 1 or 3.8 kW (240V AC @ 16A) x 2

Power Select 24A	5.8 kW (240V AC @ 24A)	5.8 kW (240V AC @ 24A) x 2
Power Select 24A Power Share	n/a	5.8 kW (240V AC @ 24A) x 1 Or 2.9 kW (240V AC @ 12A) x 2
Power Select 16A	3.8 kW (240V AC @ 16A)	3.8 kW (240V AC @ 16A) x 2
Power Select 16A Power Share	n/a	3.8 kW (240V AC @ 16A) x 1 Or 1.9 kW (240V AC @ 8A) x 2

Functional Interfaces

	Single Port (AC Voltage 208 / 240V AC)	Dual Port (AC Voltage 208 / 240V AC)
Connector Types	SAE J1772™	SAE J1772™ x 2
Cable Length — 1.8 m (6 ft) Cable Management	5.5 m (18 ft)	5.5 m (18 ft) x 2
Cable Length — 2.4 m (8 ft) Cable Management	n/a	7 m (23 ft)
Overhead Cable Management System	Yes	
LCD Display	145 mm (5.7 in) full color, 640 x 480, 30 fps full motion video, active matrix, UV protected	
Card Reader	ISO 15693, ISO 14443, NFC	
Locking Holster	Yes	Yes x 2

Safety and Connectivity Features

Ground Fault Detection	20 mA CCID with auto retry
Open Safety Ground Detection	Continuously monitors presence of safety (green wire) ground connection
Plug-Out Detection	Power terminated per SAE J1772™ specifications
Power Measurement Accuracy	+/- 2% from 2% to full scale (30A)
Power Report/Store Interval	15 minute, aligned to hour. Vehicle to grid connected and responsive to TOU signals
Local Area Network	2.4 GHz WiFi (802.11 b/g/n)
Wide Area Network	LTE Category 4

Safety and Operational Ratings

Station Enclosure Rating	Type 3R per UL 50E
Safety and Compliance	UL and cUL listed; complies with UL 2594, UL 2231-1, UL 2231-2, and NEC Article 625
Station Surge Protection	6 kV @ 3,000A. In geographic areas subject to frequent thunder storms, supplemental surge protection at the service panel is recommended.
EMC Compliance	FCC Part 15 Class A
Operating Temperature	-40°C to 50°C (-40°F to 122°F)
Non-Operating Temperature	-40°C to 60°C (-40°F to 140°F)
Terminal Block Temperature Rating	105°C (221°F)
Operating Humidity	Up to 85% @ 50°C (122°F) non-condensing
Non-Operating Humidity	Up to 95% @ 50°C (122°F) non-condensing
Network	All stations include integral LTE modem and will be automatically configured to operate as gateway or non-gateway as needed

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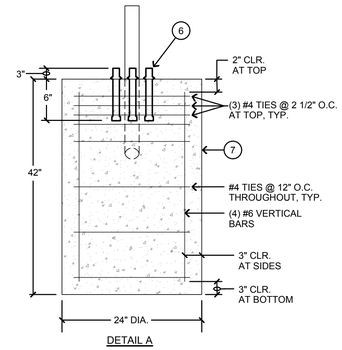
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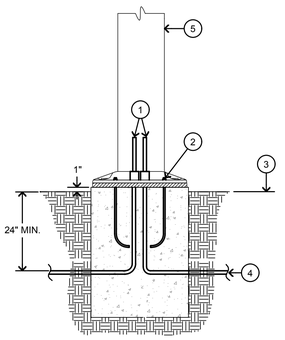
Email sales@chargepoint.com

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Listed by Underwriters Laboratories Inc.



DETAIL A



MOUNTING DETAIL

DETAIL NOTES:

1. EXTEND ELECTRICAL CONDUIT INTO ELECTRICAL VEHICLE CHARGER, PER MFGR.
2. ANCHOR BOLT QUANTITY & SIZE, PER ELECTRICAL VEHICLE CHARGER MFGR. SEE DETAIL A.
3. FINISHED GRADE
4. ELEC. CONDUIT, TYP.
5. PROVIDE & INSTALL ELECTRICAL VEHICLE CHARGING STATION.
6. (3) ¾" - 11 x 9" F1554 GRADE 55 HOT-DIPPED GALVANIZED THREADED BOLTS WITH GALVANIZED WASHERS AND ¾" HEAVY GALVANIZED HEX NUTS, 6" MIN. EMBED IN CONCRETE
7. ROUND DRILLED-PIER CONCRETE FOOTING, 3000 PSI CONCRETE STRENGTH.

1 ELECTRIC VEHICLE CHARGING STATION DETAIL

NO SCALE

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JEFFREY L. ROSS
RENEWAL 8-31-27
STATE OF CALIFORNIA

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CONSULTANT:

REGISTERED PROFESSIONAL ENGINEER
MATTB ANKNEY
No. E21043
EXP:8/31/27
ELECTRICAL
STATE OF CALIFORNIA

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Project No. 23-055.00
1798 Technology Dr. • Suite 242 • San Jose, CA 95110
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ELECTRICAL DETAILS

NEW BRADLEY LIBRARY & RESILIENCY CENTER

COUNTY OF MONTEREY & MONTEREY COUNTY FREE LIBRARIES
65607 DIXIE ST, BRADLEY, CA 93426

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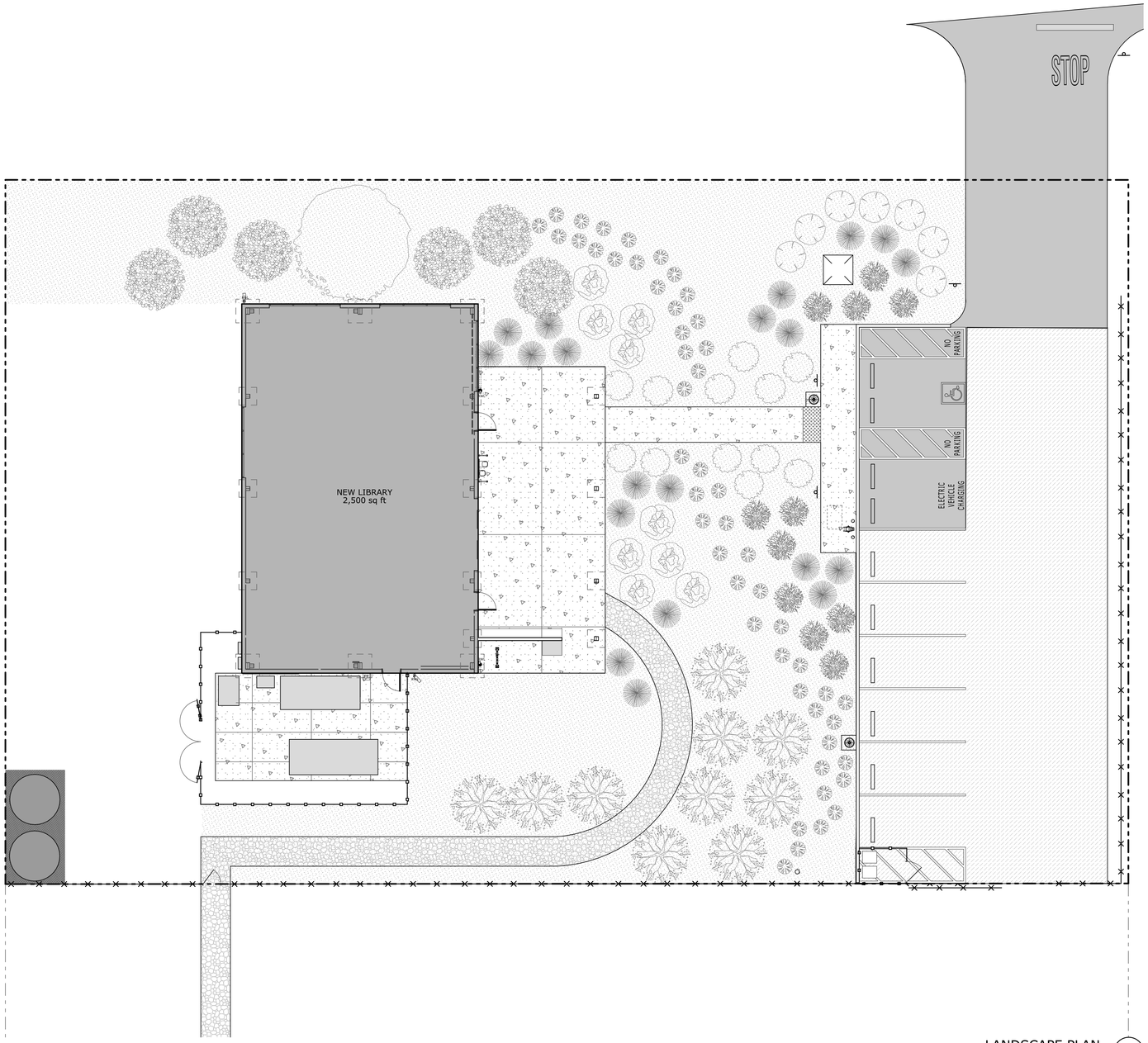
DATE: 10/22/2025

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E6.5

G:\Projects\2023\obs\23-055.00 Bradley Branch Library\Dwgs\01\23-05565.dwg, 3/9/2026 2:36:51 PM

BRADLEY R



LANDSCAPE PLAN
SCALE: 1" = 10'
1

GENERAL NOTES

1. ALL TREES TO REMAIN UNLESS OTHERWISE NOTED.
2. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL <E> UTILITIES PRIOR TO ANY EXCAVATION.
3. ALL SPOILS, DEBRIS, AND INCIDENTAL ITEMS TO BE REMOVED SHALL BE HAULED OFF SITE BY CONTRACTOR AND BE DISPOSED OF IN A LAWFUL MANNER AS IT ACCUMULATES.
4. CONTRACTOR SHALL TAKE CARE NOT TO DAMAGE IN ANY WAY, ANY <E>ELEMENTS NOT DESIGNATED FOR REMOVAL. SUCH DAMAGE IS THE RESPONSIBILITY OF THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
5. SHUT OFF ALL WATER, GAS & ELECTRIC WILL NEED TO BE COORDINATED W/<E>SITE OPERATIONS
6. THE <E> BUILDINGS ARE TO REMAIN IN USE DURING CONSTRUCTION.
7. THE SITE MUST BE CLEANED AT THE END OF EACH BUSINESS DAY.
8. CONTRACTOR TO MAINTAIN A SAFE, SECURE SITE.
9. THIS DRAWING REFLECTS THE <E> SITE CONDITIONS TO THE BEST OF OUR KNOWLEDGE
10. CONTRACTOR TO COORDINATE FINAL LOCATION/LAYOUT OF ALL PLANTS W/ARCHITECT ONSITE PRIOR TO PLANTING

PLANTING LEGEND

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	QTY	REMARKS
TREES					
	PARKINSONIA FLORIDA	BLUE PALO VERDE	24" BOX	1	SEE DETAIL 5/L3.1
SHRUBS					
	HETEROMELES ARBUTIFOLIUM	TOYAN	15 GAL	6	SEE DETAIL 1/L3.1
	SALVIA CLEVELANDII	POZO BLUE SAGE	5 GAL	10	SEE DETAIL 1/L3.1
	ZAUSCHNERIA CALIFORNICA	CALIFORNIA FUCHSIA	5 GAL	9	SEE DETAIL 1/L3.1
	LANTANA MORTIVIDENSIS	TRAILING LANTANA	1 GAL	12	SEE DETAIL 1/L3.1
	ERIOGONUM UMBELLATUM	SULPHURFLOWER BUCKWHEAT	1 GAL	11	SEE DETAIL 1/L3.1
	HELICTOTRICHON SEMPERVIRONS	BLUE OAT GRASS	1 GAL	20	SEE DETAIL 1/L3.1
	SALVIA SONOMENSIS	SANOMA SAGE	1 GAL	7	SEE DETAIL 1/L3.1
	CENCHRUS ALOPECUROIDES	CHINESE FOUNTAIN GRASS	1 GAL	50	SEE DETAIL 1/L3.1
	MULCH				1

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LANDSCAPE PLAN

NEW BRADLEY LIBRARY & RESILIENCY CENTER

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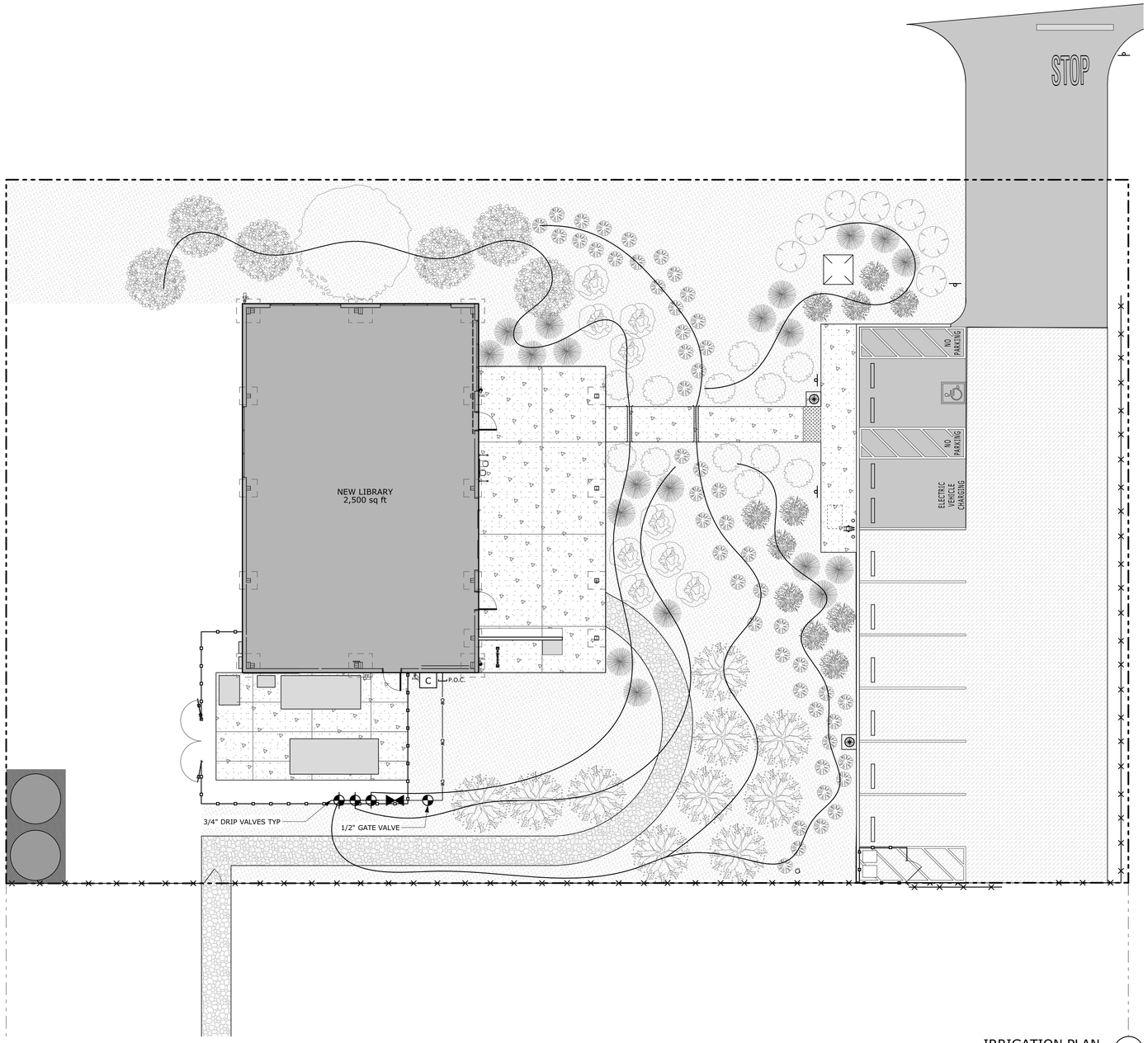
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JOB NO: 23014

L1.1

BRADLEY R



IRRIGATION PLAN
SCALE: 1" = 10'
1

GENERAL NOTES

1. SLEEVE TO BE TWICE THE SIZE OF THE PIPES
2. ALL IRRIGATION LINES UNDER PAVING TO BE INSTALLED WITHIN A SLEEVE. IRRIGATION LINES IN SAME PROXIMITY TO BE INSTALLED IN SAME SLEEVE
3. FOR CONTROLLER INSTALLATION, SEE DETAIL 4/L3.1
4. FOR REMOTE CONTROL VALVE INSTALLATION, SEE DETAIL 7/L3.1
5. FOR REDUCED PRESSURE BACKFLOW PREVENTOR SEE DETAIL12/ L3.1
6. FOR IRRIGATION LINE INSTALLATION, SEE DETAIL 2/L3.1

KEY NOTES

01 NONE

SYMBOL LEGEND

SYMBOL	DESCRIPTION	MAKE	MODEL	SIZE	NOTES
P.O.C.	POINT OF CONNECTION	-	-	-	-
	GATE VALVE				
	REMOTE CONTROL VALVE	HUNTER	PGV100G	-	4
	DRIP TUBING	PEPCO	P-QB	1/4"	6
	REDUCED PRESSURE BACKFLOW PREVENTOR	FEBCO	LF825Y	1 1/2"	5
	PVC SLEEVE	-	-	-	1, 6
C	8-STATION CONTROLLER	HUNTER	XC 800	-	3

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IRRIGATION PLAN

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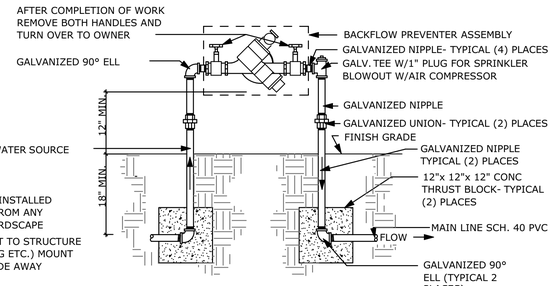
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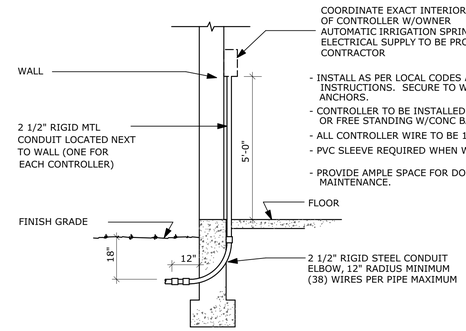
L2.1



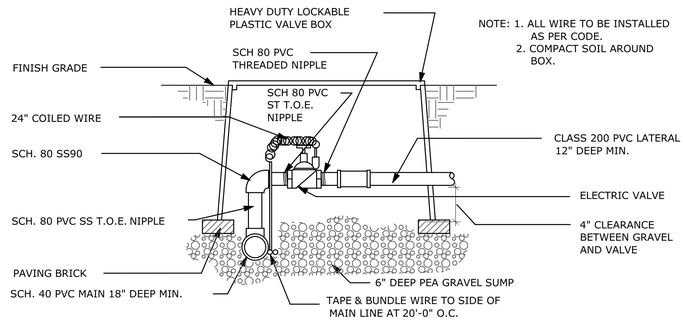
NOTE:

1. EQUIPMENT TO BE INSTALLED AT A MIN. OF 24" FROM ANY STRUCTURE OR HARDSCAPE
2. WHEN UNIT IS NEXT TO STRUCTURE (ie. WALL, BUILDING ETC.) MOUNT TEST COCKS ON SIDE AWAY FROM STRUCTURE.
3. PROVIDE OWNER W/COMPLETE WRITTEN INSTRUCTIONS ON HOW TO DRAIN ENTIRE BACKFLOW UNIT TO PREVENT FREEZING.

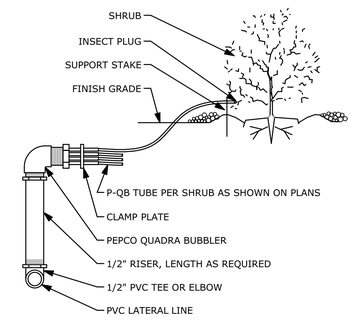
REDUCED PRESSURE BACKFLOW PREVENTER 12
SCALE: 1" = 1'-0"



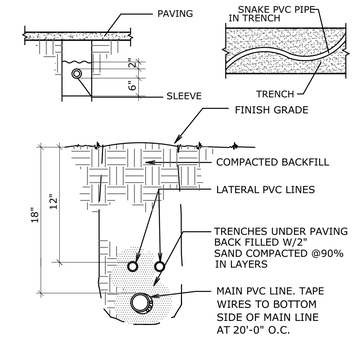
CONTROLLER 4
SCALE: 1" = 1'-0"



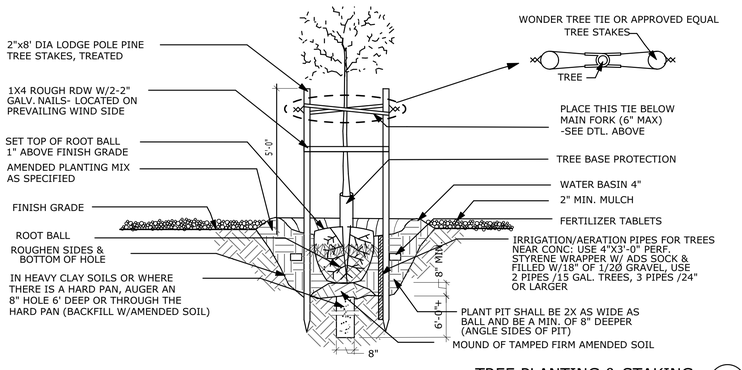
AUTOMATIC VALVE 7
SCALE: 1" = 1'-0"



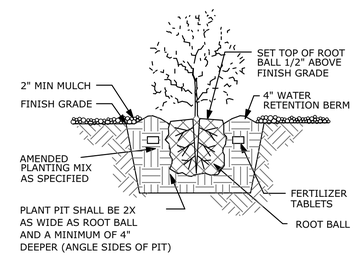
QUADRA BUBBLER 3
SCALE: 1" = 1'-0"



TRENCHING 2
SCALE: 1" = 1'-0"



TREE PLANTING & STAKING 5
SCALE: 1" = 1'-0"



SHRUB PLANTING 1
SCALE: 1" = 1'-0"

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LANDSCAPE DETAILS

NEW BRADLEY LIBRARY & RESILIENCY CENTER

COUNTY OF MONTEREY & MONTEREY COUNTY FREE LIBRARIES
65650 BRADLEY ROAD, BRADLEY, CA 93426

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DATE: 10/22/2025

JOB NO: 23014

L3.1

PROJECT DESCRIPTION:
Onsite Wastewater Treatment System (OWTS) new development of New Bradley Library & Resiliency Center for County of Monterey & Monterey County Free Libraries located at APN 424-351-038-000 65650 BRADLEY ROAD, Bradley, CA 93426.

PROPOSED USE:
The proposed public library project to accommodate up to 36 students. It is estimated to have intermittent use of limited days per week as described in the Use Letter from Hillary Theyer, County of Monterey Free Libraries Director. Based on fixture type, use pattern, and lack of kitchen facilities, the wastewater is considered low-strength commercial, similar to an office or assembly space. A total nitrogen concentration of 35 mg/L is assumed, consistent with USEPA and industry standards for similar uses.

SITE USE:
- Use type: Public library with restrooms and one classroom (no food prep)
- Occupancy: ~36 students, ~3 days/week
- Fixtures: group restrooms but no commercial kitchen or showers

NITROGEN LOADING CALCULATIONS:
The proposed project is a public library with a classroom that accommodates up to 36 students during intermittent weekly use (approximately 3 days per week). Based on fixture type, use pattern, and lack of kitchen facilities, the wastewater is considered low-strength commercial, similar to an office or assembly space. A total nitrogen concentration of 35 mg/L is assumed, consistent with USEPA and industry standards for similar uses.

Design flow is 540 gpd, resulting in: 540gpd×35mg/L=18.9g/day TN

The 0.616-acre parcel allows up to 24.65 g/day TN discharge (Monterey County limit of 40 g/acre/day). The proposed project is therefore compliant with nitrogen loading limits without the need for advanced treatment.

SITE VARIABLES:
1. Upper 3' Clay Cap (Fatty Clay)
2. Small lot size (0.6 acres)

DESIGN CALCULATIONS:
Design Flow: 36 students x 15 gpd (Elementary Students) = 540 GPD
Gallons Per Day: 540 gpd
Infiltrative Zone Average (w/o P2): 5.26 MPI
App Rate: 0.8 (more conservative app rate selected to compensate for failing test hole)
Calculations:
540 Gallons Total = 2000 gal septic tank minimum
540/0.8 = 675 SQFT Leachfield Minimum
675 SQFT/ 4SQFT/LF = 168.75 LF Required
*System to utilize diverter valve toe dual zones
*Septic Tank and Leachfield to be oversized to prevent against high influx

DESIGN CRITERIA:

Septic Tank:
2,500 Gallon Concrete Pinnacle
Septic Tank with Cast in 24" Riser Adapters
and Risers to Grade

Leach field:
1350 sqft Total
675 sqft per zone

Two zones @
4 ft per linear ft Credit
~171 linear ft each w/ diverter valve
Gravity Distribution
7 ft Total Depth
2 ft cover + 4.5 ft Drain Rock

SPECIFICATIONS:
1. NEW Tight Line + Clean Out: New 4" ABS gravity fed tight line and clean out w/ double sweep to be installed from structure to tank inlet with proper fall.
2. Install 2500 Gallon Concrete Septic Tank: Concrete septic tank to be installed and gravity fed from structure. Add risers to grade if is not within 6" of surface.
3. Septic Tank Outlet Filter: Septic tank to be fitted with filter on septic tank outlet T.
4. Diversion Valve: Install diversion valve (Bull Run or Zable flow divider) to serve TWO dispersal fields each with its own distribution box. Wet set in Concrete and level. Utilize concrete christy box to ensure access from the surface.
5. Distribution Box x2 Zones: Set distribution boxes level on concrete pad prior to each zone to gravity feed to leach lines equally.
6. Leach field (DUAL DISPERSAL): Install gravel leach field in configuration shown on plan. Leach field to be a total 7 ft total depth x 2 ft width x 4.5 ft flow x 2 ft of cover x 10 ft separation.
   6.1. INSTALLER NOTE- Clay Cap Cover Backfill: Ensure to keep "clay cap" top soil off to the side during installation and utilize as cover backfill. It is Imperative that clay cap be maintained and reinstalled to prevent against surface water intrusion. See trench cross-section.
7. Leach field Risers: Install leach field inspection risers on BOTH sides of the leach field 6" above grade with caps.
8. Tracer Wire: Add tracer wire over top of leach lines.

Installer Conditions and Responsibilities:
1. The installer is responsible for locating any property lines, underground utilities or piping. Any damage to these facilities is the responsibility of the installer.
2. Contractor and county responsible for as-built minor changes allowed by inspector. Any major changes to plan require approval by designer.
3. Area of leach field must not be subject to grading, compaction, filling, or deviation from natural conditions prior to installation.
4. Installation to ideally occur during dry soil conditions to increase the longevity of the system.
5. Roof and driveway runoff must be located 25 ft. away from leach field.
6. Erosion control measures shall be implemented during raining season installation as required

NITOGEN LOADING SUMMARY

NITROGEN LOADING SUMMARY
Project: 65650 BRADLEY ROAD, Bradley, CA 93426
APN: 424-351-038-000 | Parcel Size: 0.616 acres
Use: Public Library w/ Classroom (36 students, ~3 days/week)

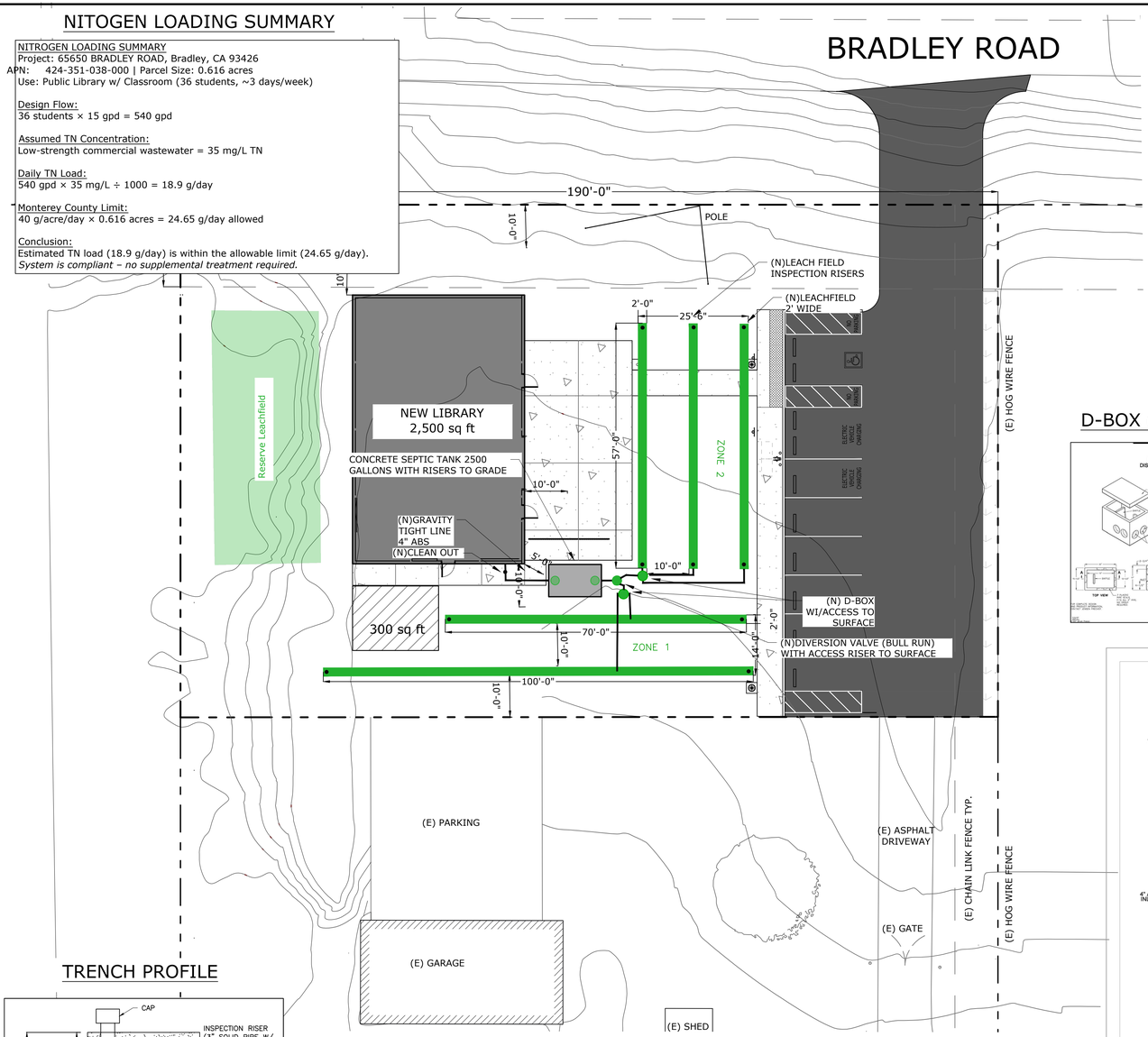
Design Flow:
36 students × 15 gpd = 540 gpd

Assumed TN Concentration:
Low-strength commercial wastewater = 35 mg/L TN

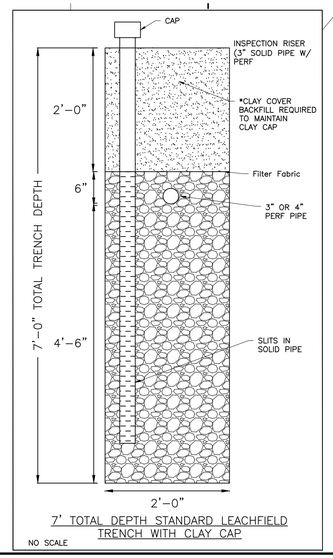
Daily TN Load:
540 gpd × 35 mg/L ÷ 1000 = 18.9 g/day

Monterey County Limit:
40 g/acre/day × 0.616 acres = 24.65 g/day allowed

Conclusion:
Estimated TN load (18.9 g/day) is within the allowable limit (24.65 g/day).
System is compliant – no supplemental treatment required.



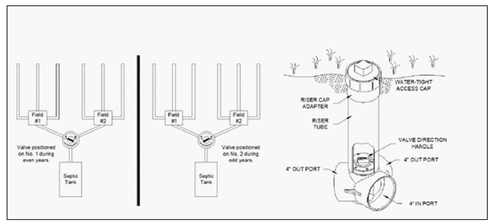
TRENCH PROFILE



SCHOOLS GALLONS PER DAY

Schools:	
Elementary students	15
Intermediate and High	20
W/ gym and showers add	5

BULL RUN ZONE DIVERSION VALVE



OWTS SOIL FEASIBILITY SUMMARY

PERCOLATION TEST SUMMARY
Site: 65650 BRADLEY ROAD, Bradley, CA
APN: 424-351-038-000
Date Tested: 2/10/2023
Firm: Earth Systems Pacific
Method: Falling Head
Pre-soak: Yes

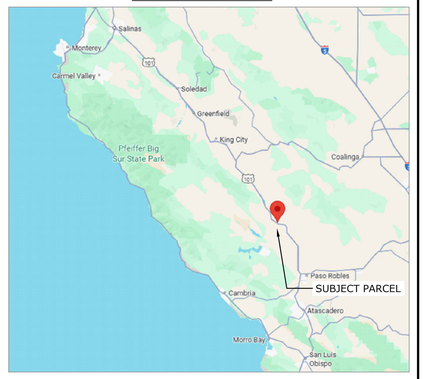
PERCOLATION RATES SUMMARY:
P-1 (7 ft deep): 8.33 min/in
P-2 (5 ft deep): >6" standing water after soak – test voided
P-3 (7 ft deep): 1.04 min/in (very rapid)
P-4 (5 ft deep): 6.5 min/in

Average = 5.26 min/in
(calculated as the simple mean of P-1, P-3, and P-4; P-2 excluded due to invalid test)

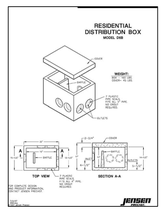
SOIL PROFILE SUMMARY:
(Based on Boring Logs B-1 and B-2, Figure 2 in Earth Systems Report)
0–2.5 ft: Sandy Lean Clay (CL), brown, moist, trace gravel
2.5–6.5 ft: Lean Clay to Sand w/ Gravel (CL to SW), light brown to yellowish brown, moist to wet
6.5–10+ ft: Poorly to Well-Graded Sand (SP/SW), loose to medium dense, fine to coarse grain, some gravel

NOTES:
- No groundwater encountered in percolation holes (≤7 ft)
- Monitoring well M-1 encountered groundwater at 28 ft

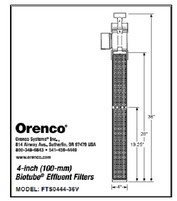
VICINITY MAP



D-BOX (TYP)



FILTER ON SEPTIC TANK OUTLET

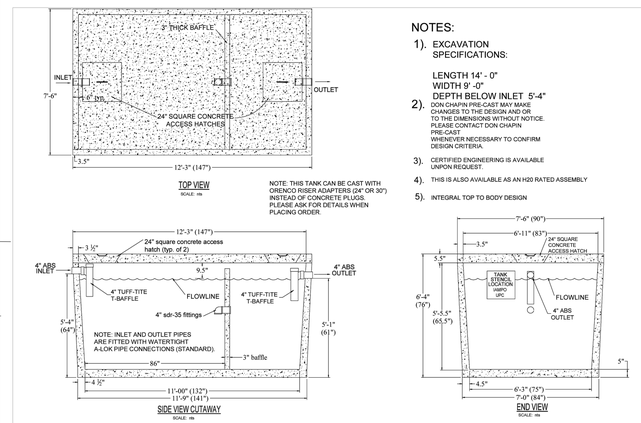


TANK ADAPTER



Cutaway view of Orenco® PRTA24-2, cast into concrete tank with 24-inch (600-mm) access riser attached

SEPTIC TANK



NOTES:
1). EXCAVATION SPECIFICATIONS:
LENGTH 14' - 0"
WIDTH 9' -0"
DEPTH BELOW INLET 5'-4"
2). DON CHAPIN PRE-CAST MAY MAKE CHANGES TO THE DESIGN AND OR TO THE DIMENSIONS WITHOUT NOTICE. PLEASE CONTACT DON CHAPIN PRE-CAST WHENEVER NECESSARY TO CONFIRM DESIGN CRITERIA.
3). CERTIFIED ENGINEERING IS AVAILABLE UNPON REQUEST.
4). THIS IS ALSO AVAILABLE AS AN H20 RATED ASSEMBLY
5). INTEGRAL TOP TO BODY DESIGN

NOTE: THIS TANK CAN BE CAST WITH ORENCO RISER ADAPTERS (24" OR 30") INSTEAD OF CONCRETE PLUGS. PLEASE ASK FOR DETAILS WHEN PLACING ORDER.

DON CHAPIN PRE-CAST
2735 BOLSA RD.
HOLLISTER, CA 95023
(831) 630-1042
(831) 630-5763

PRE-CAST CONCRETE SEAMLESS
SEPTIC TANK
CAPACITY 2500 GALLONS
MODEL IPS2500

3/13/09

Disclaimer
This plan set is only to be used for septic applications

FOX ONSITE SOLUTIONS
Ryan Fox R.E.H.S. #8605
1575 Sheffield Ave
San Jose, CA 95125
ryan@foxonsite.com
(831) 531-5533
foxonsitesolutions.com

APN:	424-351-069	Date:	7/22/25	Scale:	1"=15'
Project Location:	65650 BRADLEY ROAD, BRADLEY, CA				
Property Owner:	COUNTY OF MONTEREY				
Mailing Address:	65650 BRADLEY ROAD, BRADLEY, CA				
Owner Contact Info:	SHARON@WMARCHITECTS.COM				
Sheet Name:	SW - 1				
Revision:	-	Page:	-		

GEOTECHNICAL ENGINEERING AND GEOLOGIC HAZARDS EVALUATION NEW BRADLEY BRANCH LIBRARY FEASIBILITY 65607 DIXIE STREET, APN 424-351-038 BRADLEY, CALIFORNIA

March 10, 2023

Prepared for:

Monterey County Public Works, Facilities, and Parks
Ms. Nancy Ayala

Prepared by:

Earth Systems Pacific
1514 Moffett Street, Suite A
Salinas, CA 93905

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Earth Systems

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March 10, 2023 File No.: 305777-001

Ms. Nancy Ayala Avila
Monterey County Public Works, Facilities, and Parks
1441 Schilling Place, South 2nd Floor
Salinas, CA 93901

PROJECT: NEW BRADLEY BRANCH LIBRARY FEASIBILITY
65607 DIXIE STREET, APN 424-351-038
BRADLEY, CALIFORNIA

SUBJECT: Geotechnical Engineering and Geologic Hazards Evaluation Report

REF.: Proposal for a Geotechnical Engineering and Geologic Hazards Evaluation Report, New Bradley Branch Library Feasibility 65607 Dixie Street, APN 424-351-038, Bradley, California, by Earth Systems Pacific, dated November 16, 2022, *Revised November 29, 2022*.

Dear Ms. Ayala:

In accordance with your authorization, this geotechnical engineering and geologic hazards report has been prepared for use in development of plans and specifications for the feasibility of the New Bradley Branch Library to be constructed at 65607 Dixie Street, in Bradley, California. This report was prepared to comply with provisions of the California Building Code, 2022 Edition. The general site geologic/seismic characteristics are described herein, and potential geologic/seismic hazards have been identified and addressed. Preliminary geotechnical recommendations for site preparation and grading, foundations, slabs-on-grade and exterior flatwork, utility trenches, drainage and maintenance, and observation and testing are also presented herein.

We appreciate the opportunity to have provided services for this project and look forward to working with you in the future. If there are any questions concerning this report, please do not hesitate to contact the undersigned.

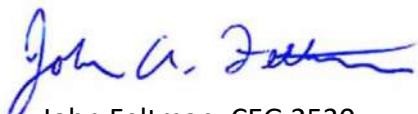
Sincerely,

Earth Systems Pacific



Ajay Singh, GE 3057
Geotechnical Engineer





John Feltman, CEG 2530
Engineering Geologist



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APPENDIX A

Cone Penetrometer (CPT) Data
Boring Logs (7)
Boring Log Legend

APPENDIX B

Geotechnical Laboratory Test Results
CERCO Analytical Corrosivity Test Results

APPENDIX C

Table of Site-Specific Ground Motion Spectra

APPENDIX D

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Percolation Test Data

1.0 INTRODUCTION AND SITE SETTING

The project site is located at 65607 Dixie Street, in Bradley, California. The property is bordered by vacant land on the west, Bradley Road on the north, a residential parcel on the east, and Dixie Street on the south. Bradley Elementary School is located across Dixie Street to the south. The Salinas River is located approximately 850 feet southwest of the site.

The property is owned by the Bradley School District and currently contains a modular building, water well and pump, and perimeter fencing with gates. The Site Plan prepared by Weston Miles Architect provided by County of Monterey Public Works, Facilities, & Parks via email on December 5, 2022, indicates a 2,800 square foot, single story library building with a 480 square foot covered patio area are planned in the western portion of the property. We anticipate loads will be typical of a light-frame building. Based on a review of the current site constraints, we anticipate the grading to be minor with cuts and fills on the order of 2 feet or less.

The site is essentially flat and lies at an elevation of about 534 feet above mean sea level (MSL). The parcel is approximately centered at 35.863535 degrees north latitude and -120.805166 degrees west longitude on the U.S. Geological Survey's Bradley 7.5-minute quadrangle. The site location is shown on a Vicinity Map (Figure 1).

2.0 SCOPE OF SERVICES

The scope of work for this report included a site reconnaissance by a geologist, exploration of subsurface conditions from a geotechnical engineering standpoint, laboratory testing of samples collected during the field investigation, geotechnical and geologic analyses of the data, and preparation of this report.

This report and preliminary geotechnical recommendations are intended to comply with the following: the considerations of Sections 1803A.1 through 1803A.7 and J104.3 of the 2022 California Building Code (CBC); California Geological Survey Note 48 (CGS 2019); IR Document A-4.13 (DSA 2013); and common geotechnical engineering and engineering geology practice in this area under similar conditions at this time. The tests were performed in general conformance with the standards noted, as modified by common geotechnical engineering practice in this area under similar conditions at this time.

Preliminary geotechnical recommendations for site preparation and grading, utility trenches, foundations, slabs-on-grade and exterior flatwork, drainage and maintenance, and geotechnical observation and testing are presented to guide the development of project plans and specifications. It is our intent that this report be used exclusively by the client in the preparation of plans and specifications.

This report does not address issues in the domain of contractors such as, but not limited to, site safety, loss of volume due to stripping of the site, shrinkage of soils during compaction, excavatability, dewatering, shoring, temporary slope angles, construction means and methods, etc. Analyses of the soil for mold potential, asbestos in building materials, lead, radioisotopes, hydrocarbons, or chemical properties other than geotechnical corrosivity are beyond the scope of this report. Evaluation of the site for suitability for drainage basins, if added, is beyond the scope of this report. Ancillary features such as temporary access roads, fences, flag and light poles, signage; and nonstructural fills are not within our scope and are also not addressed.

As there may be unresolved geotechnical or geologic issues with respect to this project, the geotechnical engineer and engineering geologist should be retained to provide consultation as the design progresses, to review project plans as they near completion, to assist in verifying that pertinent geotechnical issues have been addressed, and to aid in conformance with the intent of this report. In the event there are any changes in the nature, design, or location of improvements, or if any assumptions used in the preparation of this report prove to be incorrect, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed, and the conclusions of this report are verified or are modified in writing. The criteria presented in this report are considered preliminary until such time as any peer review or review by any jurisdiction has been completed, conditions are observed by the geotechnical engineer and/or engineering geologist in the field during construction, and the recommendations have been verified as appropriate or modified in writing.

3.0 FIELD INVESTIGATION

On December 8, 2022, four cone penetrometer tests (CPT) were performed on the site. The CPT soundings were performed by Middle Earth Geo Testing, Inc. (MEGT) using a 25-ton truck mounted CPT rig. Refusal conditions were encountered in each CPT at depths of 23 to 26 feet below ground surface (bgs). The CPTs we conducted in accordance with ASTM specifications. Copies of the CPT logs are included in Appendix A.

Subsequently, on December 28, 2022, two exploratory borings were drilled at the site using a truck-mounted B-53 drill rig equipped with a 6-inch outside diameter hollow-stem auger. Four additional borings were drilled to perform tests to measure infiltration rates at the site. Boring B-1 was drilled to a depth of 15 feet bgs. Boring B-2 was drilled to 34.5 feet bgs where refusal conditions were encountered. Percolation P-1, P-2, P-3, and P-4 were drilled to depths of 7 feet, 5 feet, 6.5 feet, and 5 feet bgs respectfully. The groundwater monitoring hole M-1 was drilled to a final depth of 30 feet bgs. The approximate locations of the CPT soundings and borings are shown on the Site Geologic and Exploration Location Map (Figure 2).

A CPT involves pushing a standardized size instrument of a conical shape into the ground at a specified constant rate. The cone used for this project had a tip area of 15 cm^2 and a friction sleeve area of 225 cm^2. The cone was pushed into ground at a constant rate of approximately 20-mm per second using the 25-ton truck as reaction weight. The cone was fitted with load cells, which continuously recorded the total force acting on the cone (Qc), sleeve friction (Fs), and pore pressure (u) readings. The data collected from the CPT was processed to interpret site stratigraphy and many other engineering properties of soil using published relationships. Generally, cohesive soils (clays) have high friction ratios (sleeve friction divided by cone bearing – Rf), low cone bearing, and generate large excess pore water pressures. Cohesionless soils (sands) have lower friction ratios, high cone bearing, and generate little in the way of excess pore water pressures.

Soil samples were obtained from the borings using an internally-lined barrel sampler (ASTM D 3550-17, with shoe similar to D 2937-17), Standard Penetration Tests - SPT (ASTM D 1586-18) were conducted at selected depths, and bulk soil samples were obtained from the auger cuttings.

Soils encountered in the borings were categorized and logged in general accordance with the Unified Soil Classification System and ASTM D 2488-17. Copies of the boring logs and a boring log legend are included in Appendix A. In reviewing the boring logs and legend, the reader should recognize that the legend is intended as a guideline only, and there are a number of conditions that may influence the soil characteristics as observed during drilling. These include, but are not limited to, the presence of cobbles, cementation, variations in soil moisture, presence of groundwater, and other factors.

4.0 LABORATORY ANALYSIS

A near-surface sample from Boring B-2 was tested for Atterberg Limits (ASTM D 4318-17) and particle size analysis (ASTM D 7928-16). Test results were used to aid in soil classification and to qualitatively estimate shrinkage/swelling potential. Nine samples were tested to measure moisture content and dry unit weight (ASTM D 2216-17 and D 2937-17). A bulk sample obtained from Boring B-1 soil cuttings from the near surface soils in the proposed pavement area was tested for R-value (ASTM D 2844-18) for use in the development of pavement design criteria. Please see Appendix B for the results of the laboratory tests.

A sample of the near surface soil from Boring B-2 was tested by CERCO Analytical to measure Redox Potential, pH, resistivity, chloride and sulfate concentrations. These parameters were used to evaluate corrosion potential of near surface soils at the site. A description of their test methods, results and a brief evaluation of the test results are contained in the Corrosivity Analysis in Appendix B.

5.0 GENERAL SUBSURFACE PROFILE

The results of Atterberg Limits test performed on the near surface soils within the proposed building area indicates Liquid Limit of 39 and Plasticity Index of 22. Based on the laboratory test results the near surface soil at the site was classified as Lean Clay with moderately high shrinkage/swelling potential.

Based on the results of subsurface exploration, the soil stratigraphy at the site is generally uniform, flat-lying, and laterally continuous at the location of the proposed building, as shown on Cross Sections A-A' and B-B' (Figure 4a and 4b). The upper 5 to 6 feet of the soil profile consists of medium stiff to stiff clay. Layers of loose to dense silty sands and sands were encountered below the clay. Increasing gravel content was encountered from a depth of 14 feet to the bottom of Boring B-2 at 34.5 feet where auger and sampler refusal was encountered. Boring B-1 located in an existing paved area encountered approximately three feet of fat clay below the pavement section which consisted of 2 inches of asphalt concrete over 3 inches of sand. Based on the field observations, this fat clay layer may be localized and possibly fill. Below the fat clay layer B-1 encountered similar materials as those found in B-2. The CPT's achieved maximum depths of 23 to 26.4 feet where refusal was encountered.

Based on the results of our subsurface exploration data, it is our opinion that the Site Class per Table 20.3-1 of ASCE 7 (per Section 1613A.3.2 of the 2019 CBC) is taken as Stiff Soil profile. The Stiff Soil profile is based on the results of unconfined compressive strength data.

Earth Systems issued a geotechnical engineering investigation for Bradley Elementary School, New Modular Classroom, 65600 Dixie Street, Bradley, California, dated May 7, 2014, which is located just south of the subject site and closer to Salinas River. As a part of our investigation in 2014, we drilled two soil borings. Boring B-1 was terminated at 16.5 feet bgs and boring B-2 was terminated at 29.5 feet bgs because refusal conditions were encountered in very dense sand and gravel very similar to what we encountered at the site as a part of the current investigation.

Kleinfelder also performed a geotechnical investigation at the Bradley Elementary School and presented the results of their investigation in a report issued on July 11, 2014. Similar soil conditions were encountered in the soil borings drilled by Kleinfelder.

6.0 GROUNDWATER

Subsurface water was encountered in exploratory boring B-2 at approximately 28 feet below ground surface. We reviewed the State Water Resources Control Board Geotracker website for nearby well data. Groundwater monitoring records for well BY-E1 installed at the closed Bradley Landfill, located 460 feet west of the site, shows groundwater levels ranged between 23.67 and 27.87 feet below ground surface between 1996 and 2010. We also reviewed the California Department of Water Resources website for nearby well data. Well Completion Report No. 757967, prepared for a domestic water supply well located approximately 430 feet northeast of the site, shows a groundwater depth of 31 feet below ground surface in 2003. Based on the above information, we consider the historical high groundwater level at the site to be 23.67 feet below ground surface.

7.0 GEOLOGY

Geologic Setting

The site is located in the seismically active central California Coast Ranges geomorphic province in the southern portion of the Salinas Valley. The Coast Ranges geomorphic province is characterized by northwest-trending mountain ranges resulting from tectonic uplift that has been interpreted to have been occurring since Pliocene-Pleistocene time (beginning

approximately 3 to 5 million years before present). The Salinas Valley was formed by related tectonic processes during Pleistocene time.

The predominant structural feature in the California Coast Ranges is the San Andreas fault zone, which is the structural boundary between two tectonic plates: the Pacific Plate west of the San Andreas fault zone and the North American Plate east of the fault zone. These two plates are moving past each other at approximately 5.1 cm/year at the mouth of the Gulf of California and 1 to 3 cm/year in the central and northern parts of California (Brown, 1990).

At the latitude of the site, the Salinas valley is bounded by the Santa Lucia Range on the west, and the Cholame Hills (a sub-range of the southern Diablo Range) to the east of the Site. The Salinas River is located approximately 850 feet southwest of the site and flows northwest toward its mouth at Monterey Bay, located approximately 80 miles northwest of the site. The northwest-trending Rinconada fault is located within the Santa Lucia Range approximately 6.6 miles southwest of the site. The northwest-trending San Andreas fault is located on the east side of the Cholame Hills approximately 16.7 miles northeast of the site.

Based on mapping by Dibblee and Minch (2006), the site is underlain by surficial sediments of Quaternary age (Qa) and described as “unindurated, undissected alluvial sediments” consisting of “alluvial clay and sand of valley areas”. These sediments are flanked on the east by older surficial sediments (younger lower terrace deposits; Qoa2), described as “dissected alluvial gravel and sand”. Alluvial gravel and sand of stream channels (Qg) are mapped within the modern Salinas River channel to the west of the site. Bedrock terrain on both sides of the Salinas River drainage is mapped as Paso Robles Formation (QTp), described as “alluvial conglomerate of pebbles, mostly of white siliceous shale from Monterey Formation in a matrix of sand and clay” (see Figure 3 Local Geologic Map). Site geologic conditions are shown on the Site Geologic and Boring Location Map (Figure 2), and Geologic Cross Sections (Figures 4a and 4b).

Faulting

The subject site is located within the seismically active Coast Ranges region. Several active and potentially active faults have been identified in this region. Until recently, faults were historically described by the California Geological Survey (CGS) as “active” and “potentially active”. As of 2018 (CGS, 2018), the CGS no longer uses the terms “Active” and “Potentially active” to describe

faults. Faults are now described as “Holocene-active” for faults having activity within the last 11,700 years; “Pre-Holocene” for faults which have not been active within the last 11,700 years (Pre-Holocene faults may still have potential for rupture but are not regulated by the Alquist-Priolo Act); and “Age-undetermined” is used for faults where timing of last rupture is unknown. However, within Alquist-Priolo Earthquake Fault Zones age undetermined faults are considered active unless data can be obtained to demonstrate otherwise.

There are no known faults that cross the site, and the site is not located in a State Earthquake (Alquist-Priolo) Fault Zone (Jennings and Bryant, 2010). The closest Holocene-active fault to the site is the San Andreas fault (Parkfield segment), located approximately 16.7 miles northeast (Figure 6). The closest fault to the site is the pre-Holocene Rinconada fault, located approximately 6.6 mile to the southwest of the site. The pre-Holocene Oceanic-West Huasna fault is located approximately 21.4 miles southwest of the site, and the Hosgri fault is located approximately 26.2 miles to the southwest. The locations of these and other faults of the San Andreas fault system relative to the site are shown on a Regional Faults and Earthquakes map (Figure 6). The earthquake locations are keyed to the Selected Earthquakes table (Figure 7). Table C-2 (Appendix C) includes a list of historical earthquakes in the vicinity of the subject site, including date, location, magnitude, and distance from the site.

A brief discussion of characteristics for nearby faults is provided below.

Rinconada Fault Zone

The Rinconada fault zone lacks obvious Holocene offset and therefore does not meet the State’s criteria for inclusion in an A-P zone; nonetheless, it is considered an active fault and is included as a seismic source in regional models. The Rinconada fault is a northwest trending high angle fault that forms the boundary between two dissimilar geologic terranes. Northeast of the Rinconada fault is the Salinian Block, composed of crystalline plutonic and metamorphic rock overlain by a thick sequence of marine sedimentary rocks. Southwest of the Rinconada fault is the Coastal Block, composed of Franciscan mélange overlain by marine sedimentary rocks (Dibblee 1976). The Rinconada fault is mapped as several anastomosing strands with the seismogenic plane modeled approximately 6.6 miles southwest of the site. The Rinconada fault is estimated to be capable of a magnitude 7.5 earthquake (Cao et al 2003).

San Andreas Fault

The San Andreas fault is considered the potential source of the largest regional earthquake. The San Andreas fault has a total length of approximately 675 miles and is divided into segments based on geometry and known historic behavior, with some segments capable of earthquakes up to magnitude 7.5 (Cao et. al. 2003). Simultaneous rupture of more than one segment could cause an earthquake of magnitude 8 or more (USGS, 2014). The Parkfield segment is located approximately 16.7 miles northeast of the site. The Cholame-Carrizo segment is located approximately 29.3 miles east of the site, is approximately 125 miles long and is in an A-P Zone (CDMG 1986a). This segment was part of the multi-segment magnitude 7.9 Fort Tejon earthquake in 1857 (USGS, 2022).

Oceanic-West Huasna Fault

The Oceanic-West Huasna fault zone separates the Santa Lucia and San Rafael Mountains from a series of distinct tectonic domains stretching from Cambria to the western Transverse Ranges (Lettis et al 2004). This fault system trends northwest-southeast for approximately 75 miles and is modeled about 21.4 miles southwest of the site. The Oceanic-West Huasna fault is considered capable of a magnitude 7.2 earthquake (BSSC 2014).

San Juan Fault

The San Juan fault zone is a roughly north-south trending right-lateral strike slip fault zone comprised of several segments with a combined length of about 60 miles. The San Juan fault is located approximately 24.7 miles southeast of the site and is reported to be capable of a magnitude 7.2 earthquake (USGS, 2014).

Hosgri-San Simeon Fault System

The Hosgri-San Simeon fault system lies approximately 26.2 miles to the southwest of the site. A northwest-trending strike-slip fault, the San Simeon fault extends from offshore of Ragged Point to just offshore of San Simeon Point, where it joins the northern end of the Hosgri fault. The Hosgri-San Simeon fault between San Simeon Point and Arroyo de la Cruz is included in A-P Zone (CDMG 1986b). This fault system ruptured in November 1927 producing the magnitude 7.1 Lompoc Earthquake, and in December 2003 producing the magnitude 6.6 San Simeon earthquake (USGS 2022).

La Panza Fault

The La Panza fault is a northwest-southeast trending reverse fault that dips to the northeast. The trace of this fault stretches for approximately 45 miles from northern Santa Barbara County to the southern Salinas Valley. The La Panza fault is approximately 29.6 miles southeast of the site and is considered to be capable of a magnitude 7.3 earthquake (USGS 2013).

Aerial Imagery

We reviewed images available on Google Earth dated between 1989 and 2021. The site appears to have been partly cultivated with orchards in the 1989 photograph. A few small structures and trailers are variably present in the photos, and orchards were gradually removed. School buildings across the street were present in the 1989 photograph. There are no obvious lineations that would suggest the presence of faulting that passes through or are on trend with the site. Additionally, there was no evidence of landslides on or adjacent to the site.

8.0 SEISMICITY

Earthquake History

The historic earthquakes in the site region were researched using the Northern California Earthquake Data Center Catalogs (NCEDC 2014, accessed 2022). The parameters used for the search consisted of earthquake Richter magnitudes ranging from 5.0 to 9.0 that occurred within a 65-mile radius from the site from 1910 to 2022.

The results of the search indicated that within the search parameters, 38 earthquakes have occurred. Some of the nearby earthquakes are shown on the Regional Fault and Earthquakes Map (Figure 6). The largest earthquake had a 6.7 magnitude and occurred in 1983 (Coalinga Earthquake) on a blind thrust fault. It was estimated to be located approximately 38 miles northeast of the site. The nearest large magnitude (5.2) earthquake occurred in 1955 and was located approximately 11.4 miles to the northwest near San Ardo.

Ground Motion Analyses

In accordance with CGS Note 48 (2022), 2022 CBC and ASCE 7-16 (2017, 2018, 2021), an assessment was made to determine the need for employing “Site-Specific Ground Motion Procedures” to calculate the ground motion parameters for the project. Based on our site evaluation, the subsurface characteristics are those of Seismic Site Class D (Stiff Soil) as defined

by ASCE 7-16 Table 20.3-1, Site Classification, based on Standard Penetration Tests (SPT) and cone penetrometer tests (CPT). The mapped S_1 ground motion value obtained from the Structural Engineers Association of California website (SEAOC, 2023) using the ASCE 7-16 (2017), for Site Class "D - Stiff Soil," was 0.452g, greater than 0.2; therefore, per Section 11.4.8 of ASCE 7-16, the project requires site-specific ground motion analyses unless certain procedures are used during the structural design that comply with the exceptions allowed. Because we have no information on the building's fundamental period, or if the structural engineer intends to use the calculations necessary to comply with an exception, we performed a site-specific ground motion analysis to develop the seismic design parameters in accordance with ASCE 7-16 Sections 11.4.8 and 21.2.

A risk-targeted maximum considered earthquake (MCE_R) modeling procedure was performed in accordance with ASCE 7-16, including a Probabilistic Seismic Hazard Analysis (PSHA) using ground motion data from the United States Geologic Survey (USGS, 2022) Unified Hazard Tool and a Deterministic Seismic Hazard Analysis (DSHA) using the Third California Earthquake Rupture Forecast (UCERF3) fault model (USGS 2013) and NGA-West2 ground motion prediction equations (PEER 2015). These analyses are based on knowledge of the regional tectonic setting, geology, and seismicity. These analyses were performed as described in ASCE 7-16 Section 21.2.1.1 (Method 1) to estimate the peak ground motion corresponding to the uniform hazards earthquake and MCE_R which has a 2% probability of being exceeded in 50 years.

Our DSHA analysis compared the ground response resulting from a magnitude 7.45 earthquake on the Rinconada fault and a multi-segment earthquake on the San Andreas fault involving the Parkfield, Cholame, Carrizo, Big Bend, North Mojave and South Mojave segments that is estimated to produce a magnitude 7.92 earthquake, emulating the M7.9 Fort Tejon earthquake of 1857. Our analysis indicate that the most severe site response would be anticipated from the Rinconada fault for periods less than and equal to 1 second. For periods greater than 1 second the probabilistic values govern. The fault parameters that we considered in our analysis are presented in Table C-1, Fault Parameters, in Appendix C, modified in accordance with the USGS Earthquake Scenario website (BSSC 2014). The primary seismic risks at the site are from earthquakes generated by the Rinconada and San Andreas faults. Although these listed faults are thought to potentially generate the most severe seismic shaking at the site any local fault could produce seismic shaking.

The 2022 CBC seismic design criteria are based on a Design Earthquake that produces ground motion $^2/_3$ of the lesser of an earthquake with 2 percent probability of occurrence in 50 years, or maximum 84th percentile of the mean deterministic MCE. The deterministic spectra calculated with NGA-West2 ground motion prediction equations are presented in Table C-3.

Seismic Design Category

Section 1613A.2.5 of the 2022 CBC states that *structures classified as Risk Category I, II or III that are located where the mapped spectral response acceleration parameter at 1-second period, S_1, is greater than or equal to 0.75 shall be assigned to Seismic Design Category E… Other structures shall be assigned to Design Category D*. The mapped S_1 for the site is 0.452, less than 0.75; therefore, the site should be assigned to the seismic design category D.

Seismic Design Parameters

This site may be subject to strong ground shaking due to potential fault movements along regional faults including the Rinconada fault, whose proximity and magnitude potential was considered during our site-specific analysis. Engineered design and earthquake-resistant construction increase safety and allow development of seismically active areas. The minimum seismic design should comply with the 2022 edition of the CBC and ASCE 7-16. The resulting seismic coefficients considering Seismic Site Class D are summarized in Table 1 below. The results of our site-specific ground motion analysis are presented in Table C-4.

TABLE 1: SITE SPECIFIC SEISMIC PARAMETERS
(2022 CBC/ASCE 7-16) (Method 1)

Seismic Design Category	D
Seismic Site Class	D
Mapped and Code Based Ground Motion	
Short Period Spectral Response, S_s	1.281 g
1 second mapped Spectral Response, S_1	0.452 g
Design Earthquake Ground Motion	
Short Period Spectral Response, S_{DS}	1.000 g
1 second Spectral Response, S_{D1}	0.973 g
Peak Ground Acceleration (PGA_M)	0.611 g
MCE Spectral Response Acceleration	
Short Period Spectral Response, S_{MS}	1.501 g
1 Second Period Spectral Response, S_{M1}	1.460 g
Site Amplification Factors	
Short Period Site Coefficient, F_a	1.00
1 Second Period Site Coefficient, F_v	2.50
Vertical Site Coefficient, C_v	1.36
Risk Coefficient (Short Period), C_{Rs}	0.977
Risk Coefficient (1 Second Period), C_{R1}	0.935

Acceleration values provided are estimates only. Vertical accelerations are typically ⅓ to ⅔ of the horizontal accelerations but can equal or exceed the horizontal accelerations depending upon the fault type, local site effects and amplification.

As an alternative, if the structural engineer uses the procedures stipulated in Section 11.4.8, Exception #1, of ASCE 7-16 Supplement 3, increasing the value of S_{M1} by 50-percent for all applications of S_{M1}, then the general procedure seismic parameters may be applicable. The structural engineer should make the determination if the exception applies. The ***unscaled*** seismic design parameters calculated in accordance with the general procedure are presented in Table C-5.

9.0 GEOLOGIC HAZARDS

Surface Ground Rupture

Surface ground rupture generally occurs at sites that are traversed by, or that lie very near, a causative fault. The site is not in a State Earthquake Fault Zone, and there are no mapped faults crossing or immediately adjacent to the site. Therefore, the potential for surface ground rupture to occur within the site is considered to be very low.

Liquefaction & Dry Sand Settlement

Soil liquefaction is a phenomenon where saturated granular soils undergo a substantial loss of strength due to increased pore water pressure resulting from cyclic stress applications induced by earthquakes or other vibrations. In this process, the soil acquires mobility sufficient to permit both vertical and horizontal movements, which may result in significant deformations. Soils most susceptible to liquefaction are loose, uniformly graded, fine-grained sands. In addition, recent literature indicates that fine grained soils may also be susceptible to liquefaction or cyclic strain softening. Examples of highly susceptible fine-grained soil include "non-plastic silts and clayey silts of low plasticity (PI<12) at high water content to liquid limit ratios (w_c/LL>0.85)." Examples of soils moderately susceptible to liquefaction include "clayey silts and silty clays of moderate plasticity (12<PI<18) at natural water content and Liquid Limits ratios (w_c/LL) greater than 0.80" (Bray and Sancio, 2006). It is generally acknowledged that liquefaction will not affect surface improvements if these deposits are located at a depth greater than 50 feet below the ground surface. In the deeper deposits, the greater overburden pressure is sufficient to prevent liquefaction effects from occurring.

Based on mapping by Dibblee and Minch (2006), the site is underlain by surficial sediments of Quaternary age (Qa) and described as "unindurated, undissected alluvial sediments" consisting of "alluvial clay and sand of valley areas". According to the Monterey County Geologic Hazard Zones web application accessed online, the site lies within an area of moderate liquefaction susceptibility (Figure 5). Due to the presence of potentially liquefiable soils, and using the historical high groundwater level, we performed engineering analysis to estimate seismic settlements at the site. Details of our analysis are presented below.

Analysis

In order to evaluate liquefaction potential and estimate seismic settlement at the site, ESP performed engineering analysis using the subsurface data collected from the CPTs performed at the site. The CPT data was analyzed with the aid of computer program CLiq V.3.3.1.14 by Geologismiki using various methods including Boulanger and Idriss, 2014; Moss et al, 2006, Idriss and Boulanger, 2008, Robertson, 2009, and Robertson (NCEER, 2001). The analyses used the following input parameters; depth to groundwater of 23.67 feet (historically high groundwater level), subsurface data from CPT-01 and -02, the mapped site modified peak ground acceleration (PGA_M) of 0.611 times gravity (g) calculated in accordance with CBC 18.03A.5.12 (general procedure); and moment magnitude 7.45 earthquake, consistent with the mean characteristic moment magnitude for the Rinconada fault.

The seismic settlement analysis was performed using data from the CPTs performed at the site which met refusal conditions at 25 feet (CPT-1), 23 feet (CPT-2), 24 feet (CPT-3), and 26 feet (CPT-4). Seismic settlement of approximately 1 inch (1.1 inches) was estimated in the planned building area. The results of our liquefaction analysis are presented in Appendix D. Comparing the estimated settlement values from CPT-01 and -02, the differential settlement was estimated to be less than a ½-inch. The estimated total and differential liquefaction-induced settlements, additionally discussed in the geotechnical Recommendations sections of this report, should be considered in the design of foundations and other improvements.

As noted above, soils encountered in the CPTs were primarily sand layers. Based on this finding, and the relatively low seismically induced settlement estimated for the site (1.1 inches), we judge that surface manifestation of liquefaction, such as sand boils, is unlikely at the site.

The estimated liquefaction settlement is slightly higher than what was estimated by Earth Systems Pacific and Kleinfelder in their 2014 reports, which were reviewed and approved by CGS.

Lateral Spreading

The nearest embankment appears to be the bank of the Salinas River. The top-of-bank is located approximately 275 feet to the southwest of the site. The bank appears to slope gently to the southwest toward the modern river channel over a distance of approximately 500 feet. As such, the potential for lateral displacement at the site is considered low.

Slope Stability and Seismically Induced Landsliding

The ground surface at the site is essentially flat. There was no evidence of potential instability on or adjacent to the site. Therefore, the potentials for slope instability and seismically induced landsliding to occur on-site are considered to be low.

Tsunami and Seiche Potential

Hazardous tsunamis along the California coastline can be caused by vertical displacement of submarine faults, or by submarine landslides. The site is approximately 26 miles from the Pacific Ocean within an intermontane valley. As such, the potential for the site to be affected by a tsunami event is considered nil.

A seiche is a single water wave that can be generated in a reservoir, lake or pond as the result of long-period surface waves normally generated by strong local earthquakes or larger earthquakes at farther distances. As there are no reservoirs, lakes or ponds in the vicinity of the site, the potential for a seiche to affect the project site is considered to be nil.

Flooding

According to Flood Insurance Rate, Map Number 06053C1925G dated April 2, 2009, published by the Federal Emergency Management Agency (FEMA), the project site lies within an Area of Minimal Flood Hazard Area (Zone X). See FEMA Flood Zone Map (Figure 8).

Naturally Occurring Asbestos

The site is underlain by alluvial deposits of the Salinas River drainage. Because there are no asbestos-bearing rock formations (serpentinite or ultramafic rock) on or mapped within 10 km (Churchill and Hill, 2000) of the site, the potential to encounter naturally occurring asbestos during construction is considered to be low.

Radon

Radon is a colorless, odorless gas present in soil and rock, which is derived from the decay of uranium. The occurrence of radon correlates with the presence of specific minerals, and its concentrations in soil or rock will vary depending on the mineralogy of the surrounding bedrock, temperature, barometric pressure, moisture and other factors.

Radon in the central coast areas of California is most commonly found in areas that are underlain by bedrock of the Rincon and Monterey Formations, or soils derived from these formations. The site is located on alluvium within the Salinas River drainage.

According to the California Geological Survey's Indoor Radon Potential Zones map for Monterey County (CGS Special Report 201, accessed online), the site is located within an area of low potential for indoor radon levels above 4 pCi/L, the lowest rating mapped. The California Department of Health Services recommends that action be taken to reduce indoor radon levels if it is 4 pCi/L or greater. It is our opinion that the potential for indoor radon levels exceeding 4 pCi/L at the site is low.

10.0 CONCLUSIONS

In our opinion, the site is suitable, from a geotechnical engineering and engineering geologic standpoint, for the proposed library building as described in the "Introduction and Site Setting" section of this report. The primary geologic hazard is the potential for strong seismic ground shaking and the related potential for earthquake-induced liquefaction settlement. The proposed building could experience up to 1.1-inches of settlement during a design-level seismic event. All other geologic hazards are considered to have low to nil potentials for occurrence. The new building should be designed based on the design criteria presented in Section 8.0 of this report.

The near surface soils within the building area are sandy lean clays. The results of Atterberg Limits testing (LL=39, PI=22) performed on a sample collected from Boring B2 indicates that the near surface soils have moderately high shrinkage/swelling potenital. Similar soils generally undergo pronounced volume changes with fluctuations in the moisture content – they expand with the increase in the moisture content and shrink with the loss of moisture. When the volume changes are restricted, they could exert significant uplift pressure on the overlying structures thus causing heaving of the floor slabs and lightly loaded structures.

The results of tests performed on the soil sample submitted to Cerco Analytical Laboratory indicate that based on resistivity results the near surface soil is corrosive; therefore, all buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel and iron should be protected against corrosion depending on the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride concentration was found to be insufficient to attack steel embedded in a concrete mortar coating and the sulfate ion concentration was found to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at this location. The redox potential is indicative of aerobic soil conditions. Please refer to the Corrosivity Analysis by CERCO Analytical in Appendix B for the complete analysis.

11.0 PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

The following recommendations are for improvements constructed as described in the "Introduction and Site Setting" section of this report. If locations, elevations, structural loads, etc., vary from those assumed, the recommendations contained herein may require modification. If any other improvements not previously described are incorporated into the project, the geotechnical engineer should be contacted to review the applicability of the recommendations included in this report and prepare additional recommendations, if needed.

Unless otherwise noted, the following definitions are used in the recommendations presented below. Where terms are not defined, definitions commonly used in the construction industry are intended.

- **Building Area:** The area within and extending a minimum of 3 feet beyond the perimeter of the foundations of the proposed structure. The building area also includes the footprint of any improvements which are rigidly connected to the structure, such as retaining walls, and that are expected to perform in a similar manner.

- **Flatwork Areas:** The areas within and extending a minimum of 1 foot beyond the limits of exterior pedestrian flatwork.

- **Subgrade:** The elevation of the surface upon which a sand cushion/nonexpansive imported material or aggregate base (AB) will be placed for flatwork.

- **Existing Grade:** Elevations of the site that existed as of the date of this report.

- **Finish Pad Grade:** The elevation in the building area where earthwork operations are typically considered to be complete. It does not include any sand or gravel that might be placed below slabs in association with vapor protection for the slabs.

- **Scarified:** Thoroughly plowed or ripped in two orthogonal directions to a depth of not less than 8 inches.

- **Moisture Conditioned:** Soil moisture content adjusted to optimum moisture content, or just above, prior to application of compactive effort.

- **Compacted/Recompacted:** Soils placed in level lifts not exceeding 8 inches in loose thickness and compacted to a minimum of 90 percent of maximum dry density, unless specified otherwise. The standard tests used to establish maximum dry density and field density should be ASTM D 1557-12 and ASTM D 6938-17, respectively, or other methods acceptable to the geotechnical engineer and jurisdiction.

Site Preparation

1. The site should be prepared for grading by removing the existing modular building, asphalt concrete, vegetation, large roots, debris, and other potentially deleterious materials from areas to receive improvements. The site preparation operations should be observed by the geotechnical engineer prior to continuing grading.

2. Existing utility lines that will not remain in service should be either removed or abandoned. The appropriate method of abandonment will depend upon the location, type, and depth of the utility. Recommendations for abandonment can be made as necessary.

3. Voids created by the removal of materials or utilities described above should be called to the attention of the geotechnical engineer prior to continuing grading.

Grading

1. The site grading plans were not available when this report was prepared. As the site is flat, it is our understanding that construction of the building pad will require cuts and fills of less than 1 foot. However, due to the presence of moderately high expansive site soils, we recommend the sub-excavation on the order of 2 feet below the pad grade, mixing it thoroughly, and uniformly moisture conditioning it to a minimum of 3 percent above optimum moisture content. This moisture content should be maintained until the compacted soil receives structural concrete. The sub-excavated areas should extend a minimum of 5 feet beyond the planned building foundation perimeters and 2 feet beyond the edges of exterior flatwork and other improvements to the structure.

2. The sub-excavation should be observed by the geotechnical engineer prior to continuing grading. If soft soils, buried objects, or other potentially adverse conditions are observed, additional sub-excavation or other remedial measures may be recommended.

3. Prior to placing new fill, the surfaces exposed by sub-excavation should be scarified to an approximate depth of 8 inches. The soil should then be moisture conditioned to a level slightly above optimum moisture content and recompacted to a minimum of 90 percent of maximum dry density.

4. Fill should be placed in lifts not exceeding 8 inches in loose thickness, moisture conditioned to a level above optimum moisture content, and compacted to a minimum of 90 percent of maximum dry density. Due to the presence of moderately high expansive soils, an approval from the Geotechnical Engineer will be required prior to using fill material generated by cutting at other locations at the site. Therefore, if needed, our field representative should be contacted so they could collect a representative sample of the fill material proposed to be used within the building pad area and bring it to the laboratory for Atterberg Limits testing. The laboratory testing process could take 5 working days, therefore the contractor should plan his schedule accordingly. Organics and rock, debris, and irreducible material larger than 4 inches in diameter should be removed from the soil to be compacted.

5. If fill is to be imported for general use at the site (other than nonexpansive imported material), the fill should be coarse grained with a plasticity index of 10 or less. Proposed imported soils should be evaluated by the geotechnical engineer before being transported to the site, and on an intermittent basis during placement and compaction on the site.

6. The building area contains soils with moderate shrinkage/swelling potential at shallow depths. It may be difficult to achieve stability if the grading operation is undertaken during wet season when the soils being compacted are excessively wet. In those cases, it may be necessary to dry the soil through scarification or mixing with dry soil in order to achieve stable conditions. Other options to achieve stable conditions may include replacement of wet soil with gravel or mixing quick lime plus in the top 12 to 18 inches of subgrade. A layers of filter fabric may be needed at the interface of the native soil the gravel layer. For cost estimation purposes, percentage of quick lime may be assumed to be 5 percent of the dry unit weight of soil which may be taken as 120 lbs/cubic foot. The thickness of the lime treated soil layer may be assumed to be 18 inches. Additional testing will be required to determine the actual required percentage of quick lime plus. Addition of quick lime plus will also help in reduction of soil moisture content, creating more stable and workable surface during wet weather conditions. Detailed stabilization recommendations may be provided, if requested, upon the examination of actual field conditions by the Geotechnical Engineer.

7. Cut and fill slopes should not be steeper than 2:1, measured horizontally to vertically.

Utility Trenches

1. A select, noncorrosive, granular, easily compacted material should be used as bedding and shading immediately around utility pipes. The site soils may be used for trench backfill above the select material. However, if obtaining compaction is difficult with the site soils, use of a more easily compacted sand may be desirable. The upper foot of backfill in landscaped and unimproved areas should consist of native material to reduce the potential for seepage of water into the backfill.

2. In areas to receive asphalt concrete pavement, the upper 8 inches of trench backfill should be compacted to a minimum 95 percent of maximum dry density. Trench backfill in other areas should be compacted to a minimum of 90 percent of maximum dry density. Jetting of utility trench backfill should not be allowed.

3. Where utility trenches extend under perimeter foundations, exterior flatwork, or pavement the trenches should be backfilled entirely with compacted native soil. The zone of native soil should extend to a minimum distance of 2 feet on both sides of the foundation, flatwork, or pavement edges. If utility pipes pass through sleeves cast into the perimeter foundations, the annulus between the pipes and sleeves should be sealed.

4. Long-term settlement of properly compacted imported granular backfill material should be assumed to be about 0.25 to 0.5 percent of the depth of the backfill. Where trenches are backfilled with site soils, the anticipated settlement would be about twice that of granular backfill. Improvements that are constructed over or near trenches should be designed to accommodate the potential for settlement.

5. The recommendations of this section are minimums only and may be superseded by the specifications of the architect/engineer based upon soil corrosivity or the requirements of pipe manufacturers, utility companies or the governing jurisdiction.

Foundations

1. The proposed building should be supported by conventional spread footings bearing in firm engineered fill or native soils. The foundation trenches should be a minimum of 24 inches below the lowest adjacent grade. All footings should be reinforced as directed by the architect/engineer. The footing excavations should be observed by the geotechnical engineer prior to placement of formwork or reinforcement.

2. In the event that soft soils or other potentially adverse conditions are observed in the excavations, deepening of the footings, compaction of the soil, or other remedial measures may be recommended. Soils exposed in footing excavations should be kept moist, and no desiccation cracks should be present prior to concrete placement.

3. The foundation seismic loading should be based on the parameters presented in the Seismic Design Parameters of this report. The foundation design should be based on the following parameters:

Allowable Bearing Capacity (dead loads)	2,000 psf
Allowable Bearing Capacity (dead + live loads)	2,500 psf
Allowable Bearing Capacity (DL+LL+ wind or seismic)	3,000 psf
Modulus of subgrade reaction (K_{30})	50 psi/inch
Estimated total static settlement	1 inch
Estimated differential static settlement, within 25 feet	0.5 inch
Total liquefaction and seismically-induced settlement	1.1 inches
Differential liquefaction and seismically-induced settlement	½-inch

4. Resistance to lateral loads should be calculated based on a passive equivalent fluid pressure of 250 pcf and a friction factor of 0.3. Passive and frictional resistance can be combined in the calculations without reductions. Passive pressure from the top 1-foot of the footing should be ignored unless the area adjacent to the footings is covered with concrete or asphalt concrete pavement.

Slabs-on-Grade and Exterior Flatwork

1. Slabs-on-grade should have a minimum thickness of 4 full inches and be reinforced as directed by the architect/engineer.

2. In areas where moisture transmitted from the subgrade would be undesirable, or where moisture sensitive materials will be stored directly on the slab, a capillary break system that consists of a vapor retarder and a 4-inch-thick, clean crushed rock layer should be placed above the pad subgrade to serve as a capillary break.

3. The vapor retarder should comply with ASTM Standard Specification E 1745-17 and the latest recommendations of ACI Committee 302. The vapor retarder should be installed in accordance with ASTM Standard Practice E 1643-18a. Care should be taken to properly lap and seal the vapor retarder, particularly around utilities, and to protect it from damage during construction.

4. If sand or other permeable material is to be placed over the vapor retarder, the material over the vapor retarder should be only lightly moistened and not saturated prior to casting the slab concrete. Recent studies, including those by ACI Committee 302, have concluded that excess water above the vapor retarder would increase the potential for moisture damage to floor coverings and could increase the potential for mold growth or other microbial contamination. The studies also concluded that it is preferable to eliminate the sand layer and place the slab concrete in direct contact with the vapor retarder, particularly during wet weather construction. However, placing the concrete directly on the vapor retarder would require special attention to using the proper vapor retarder, concrete mix design, and finishing and curing techniques.

5. Assuming that movement (i.e., ¼-inch or more) of exterior flatwork beyond the structure is acceptable, the flatwork should be designed to be independent of the building foundations. The flatwork should not be doweled to foundations, and a separator should be placed between the two. If differential movement of flatwork is considered undesirable, the flatwork should be designed and constructed in roughly the same manner as the structure slabs, and reinforced footings should be provided around the perimeter of the flatwork.

6. To reduce shrinkage cracks in concrete, the concrete aggregates should be of appropriate size and proportion, the water/cement ratio should be low, the concrete should be properly placed and finished, contraction joints should be installed, and the concrete should be properly cured. This is particularly applicable to slabs that will be cast directly upon a vapor retarder and those that will be protected from transmission of vapor by use of admixtures or surface sealers. Concrete materials, placement and curing specifications should be at the direction of the architect/engineer.

Pavement Sections for Parking Areas

1. For the design of asphalt pavements, a bulk sample with an R-Value of less than 5 was obtained for the soils anticipated at subgrade soil elevation. The asphalt concrete (AC) sections were designed in accordance with the Caltrans Highway Design Method for Traffic Indices (TIs) of 4 through 7. Determination of the appropriate TI for each area to be paved is the province of the architect/engineer. The calculated base and AC

thicknesses are for compacted material. Normal Caltrans construction tolerances should apply. The aggregate base should conform to Caltrans Class 2. Project Architect should select the appropriate pavement section for the track based on the anticipated traffic.

R-Value	Traffic Index	AC Thickness	Class 2 Base Thickness
5	4.0	2.5"	7.5"
5	4.5	2.5"	9.5"
5	5.0	3.0"	10"
5	5.5	3.0"	12"
5	6.0	3.5"	12.5"
5	6.5	4.0”	13.5”
5	7.0	4.0”	15.5”

Concrete (PCC) Pavements

1. Portland Cement Concrete (PCC) pavements in automobile parking areas should be at least 6 inches thick.

2. Reinforcing of the concrete is optional. The concrete should have a minimum modulus of rupture of 650 psi. Construction joints should be doweled. The concrete pavement sections should be underlain by a minimum 6 inches of compacted Class 2 aggregate base. A modulus of subgrade reaction of 50 pci may be assumed in the design of the concrete pavements.

General Conditions

1. The subgrade soil should be scarified 8 inches, moisture conditioned as necessary and be compacted to a minimum 92 percent of maximum dry density. Aggregate base should be compacted to at least 95 percent of maximum dry density.

2. The subgrade and base should be firm and unyielding when proof-rolled with heavy, rubber-tired equipment prior to paving. The subgrade soils should be periodically moistened as necessary prior to placement of the aggregate base to maintain the soil moisture content near optimum.

3. Pavement longevity will be enhanced if the surface grade drains away from the edges of the pavement. Finished AC surfaces should slope toward drainage facilities at 2 percent where practicable, but in no case should water be allowed to pond.

4. Cutoff walls below curbs and around landscape islands should be constructed to extend the life of both asphalt and concrete pavement by reducing irrigation water and runoff that seeps into the aggregate base. Where utilized, cutoff walls should extend through the aggregate base to penetrate a minimum of 3 inches into the subgrade soils.

Management of Site Drainage and Maintenance

1. Per Section 1804A.3 of the 2022 CBC, unpaved ground surfaces should be finish-graded to direct surface runoff away from foundations and other improvements at a minimum 5 percent grade for a minimum distance of 10 feet. The site should be similarly sloped to drain away from improvements during construction. If this is not practicable due to the terrain, property lines, or other site features, swales with improved surfaces or other drainage facilities should be provided to divert runoff from those areas.

2. All eaves of the building should be fitted with roof gutters. Runoff should discharge in a nonerosive manner away from foundations and other improvements in accordance with the requirements of the governing agencies. Erosion protection should be placed at all discharge points unless the discharge is to a pavement surface.

3. To reduce the potential for planter drainage gaining access to subslab or subfloor areas, raised planter boxes adjacent to foundations should be installed with drains and sealed sides and bottoms. Drains should also be provided for areas adjacent to the structure that would not otherwise freely drain.

4. The on-site soils are erodible; stabilization of soils disturbed during construction by vegetation or other means during and following construction, is essential to reduce erosion damage. Care should be taken to establish and maintain vegetation. The landscaping should be planned and installed to maintain the surface drainage recommended above. Surface drainage should also be maintained during construction.

5. Maintenance of drainage and other improvements is critical to the long-term stability of the site and the integrity of the structures. Vegetation and erosion matting (if utilized) should be maintained and repaired or augmented as needed. Irrigation systems should be adjusted and/or repaired so that soils around structures are maintained at a relatively uniform year-round moisture content, and are neither over-watered nor allowed to dry and desiccate.

6. To reduce the potential for disruption of drainage patterns and undermining of structures, pavement, etc., rodent activity should be aggressively controlled.

Required Observation and Testing

1. It must be recognized that the recommendations contained in this report are based on a limited subsurface investigation and rely on continuity of the subsurface conditions encountered.

2. It is assumed that the geotechnical engineer will be retained to provide consultation during the design phase, to interpret this report during construction, and to provide construction monitoring in the form of testing and observation.

3. Unless, otherwise stated, the terms "compacted" and "recompacted" refer to soils placed in level lifts not exceeding 8 inches in loose thickness and compacted to a minimum of 90 percent of maximum dry density. The standard tests used to define maximum dry density and field density should be ASTM D 1557-12 and ASTM D 6938-17, respectively, or other methods acceptable to the geotechnical engineer and jurisdiction.

4. “Moisture conditioning” refers to adjusting the soil moisture to at least optimum moisture prior to application of compactive effort.

5. At a minimum, the geotechnical engineer should be retained to provide:

    - Review of final plans and specifications
    - Professional observation during grading and foundation construction
    - Oversight of soils special inspection during grading

6. Special inspection of grading and foundation construction should be provided as per Section 1705A.6 and Table 1705A.6 of the 2019 CBC. The special inspector should be under the direction of the geotechnical engineer. In our opinion, the following operations should be subject to *continuous* soils special inspection:

    - Overexcavation to the recommended depths
    - Scarification and recompaction
    - Fill placement and compaction

7. In our opinion, periodic special inspection should suffice for the following items: subject to approval by the building official, the exemption under Section 1704A.2 may be utilized to allow *periodic* special inspection of soils. The following items should be inspected and/or tested by the special inspector:

    - Site preparation
    - Foundation excavations
    - Imported materials
    - Compaction of utility trench backfills
    - Compaction of pavement subgrade and aggregate base courses

8. A program of quality control should be developed prior to the beginning of the project. The contractor or project manager should determine any additional inspection items required by the architect/engineer or the governing jurisdiction.

9. The locations and frequencies of compaction tests should be as per the recommendations of the geotechnical engineer at the time of construction. The recommended test locations and frequencies may be subject to modification by the geotechnical engineer, based upon soil and moisture conditions encountered, size and type of equipment used by the contractor, the general trend of the results of compaction tests, or other factors.

10. A preconstruction site meeting among the owner, the geotechnical engineer, the soil special inspector, the architect/engineer, the governing jurisdiction, and contractors should be convened to discuss planned construction procedures and quality control requirements.

11. The geotechnical engineer should be notified at least 48 hours prior to beginning construction operations.

12.0 PERCOLATION TESTING

As a part of the scope of our services, Earth Systems measured soil percolation rates at the site for use in the design of the proposed septic leach field areas. Percolation tests were performed in the northern and central portions of the site.

On February 10, 2023, four percolation tests were performed. The test holes for percolation testing were drilled on December 28, 2022, using a 6-inch diameter auger. Holes used for percolation testing were drilled to nominal depths of five to seven feet. The test hole locations are shown on the attached Site Geologic and Boring Location Map (Figure 2).

The tests were conducted using the Percolation Testing Methodology, as detailed in the document Onsite Wastewater Treatment Systems (OWTS) prepared by Monterey County Health Department Environmental Health Bureau. Prior to performing the tests, percolation test borings were cased with perforated PVC pipe, and the annular spaces were backfilled with gravel. The borings were then pre-saturated with clear water and left overnight. The following day, one of the four test holes contained greater than 6 inches of standing water and per the methodology, the test was terminated at this location. The remaining three test holes (P-1, P-3, and P-4) were filled with water 6 inches above the gravel bottom, and the tests were conducted as a falling head test with measurements taken approximately every 30 minutes as the water level dropped. Copies of the percolation test results are attached in Appendix E.

The test results only indicate the percolation rates at the specific locations and under specific conditions. Sound engineering judgement should be exercised in extrapolating the test results for other conditions or locations. Please note that the test results incorporate both downward and horizontal fluxes of water. Therefore, the test results will need to be adjusted to estimate the downward infiltration rates for assessment of the septic percolation facilities. Technical design references vary in methods they present for using these types of test results. However, most references include reduction and/or correction factors for several parameters including, but not limited to, size of the percolation system relative to the test volume, number of tests

conducted, variability in the soil profile, anticipated biological buildup, anticipated long-term maintenance, and other factors. Assessment of the septic system should select the appropriate reduction and/or correction factors based on these considerations.

It is also pointed out that the measured rates were for undisturbed native soils, and that site grading, fill placement, and soil compaction can have significant effects on the actual percolation rates that will be experienced following construction.

13.0 CLOSURE

This report is valid for the conditions, as they exist at this time for the type of development described herein. Our intent was to perform the investigation in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this project under similar conditions at this time. No representation, warranty, or guarantee is either expressed or implied. This report is intended for the exclusive use by the client as discussed in the "Scope of Services" section. Application beyond the stated intent is strictly at the user's risk.

If changes with respect to project type or location become necessary, if items not addressed in this report are incorporated into plans, or if any of the assumptions used in the preparation of this report are not correct, this firm shall be notified for modifications to this report. The geotechnical engineer should be retained early in the design process for the structure to provide geotechnical guidance as the design progresses. Any items not specifically addressed in this report shall comply with the CBC and the requirements of the governing jurisdiction.

The preliminary recommendations of this report are based upon the geotechnical conditions encountered at the site and may be augmented by additional requirements of the architect/engineer, or by additional recommendations provided by the geotechnical engineer based on conditions exposed at the time of construction. If Earth Systems Pacific is not retained to provide construction observation and testing services, it shall not be responsible for the interpretation of the information by others or any consequences arising therefrom.

This document, the data, conclusions, and recommendations contained herein are the property of Earth Systems Pacific. This report shall be used in its entirety, with no individual sections reproduced or used out of context. Copies may be made only by Earth Systems Pacific, the client, and the client's authorized agents for use exclusively on the subject project. Any other use is subject to federal copyright laws and the written approval of Earth Systems Pacific.

Thank you for this opportunity to have been of service. If you have any questions, please feel free to contact this office at your convenience.

End of Text

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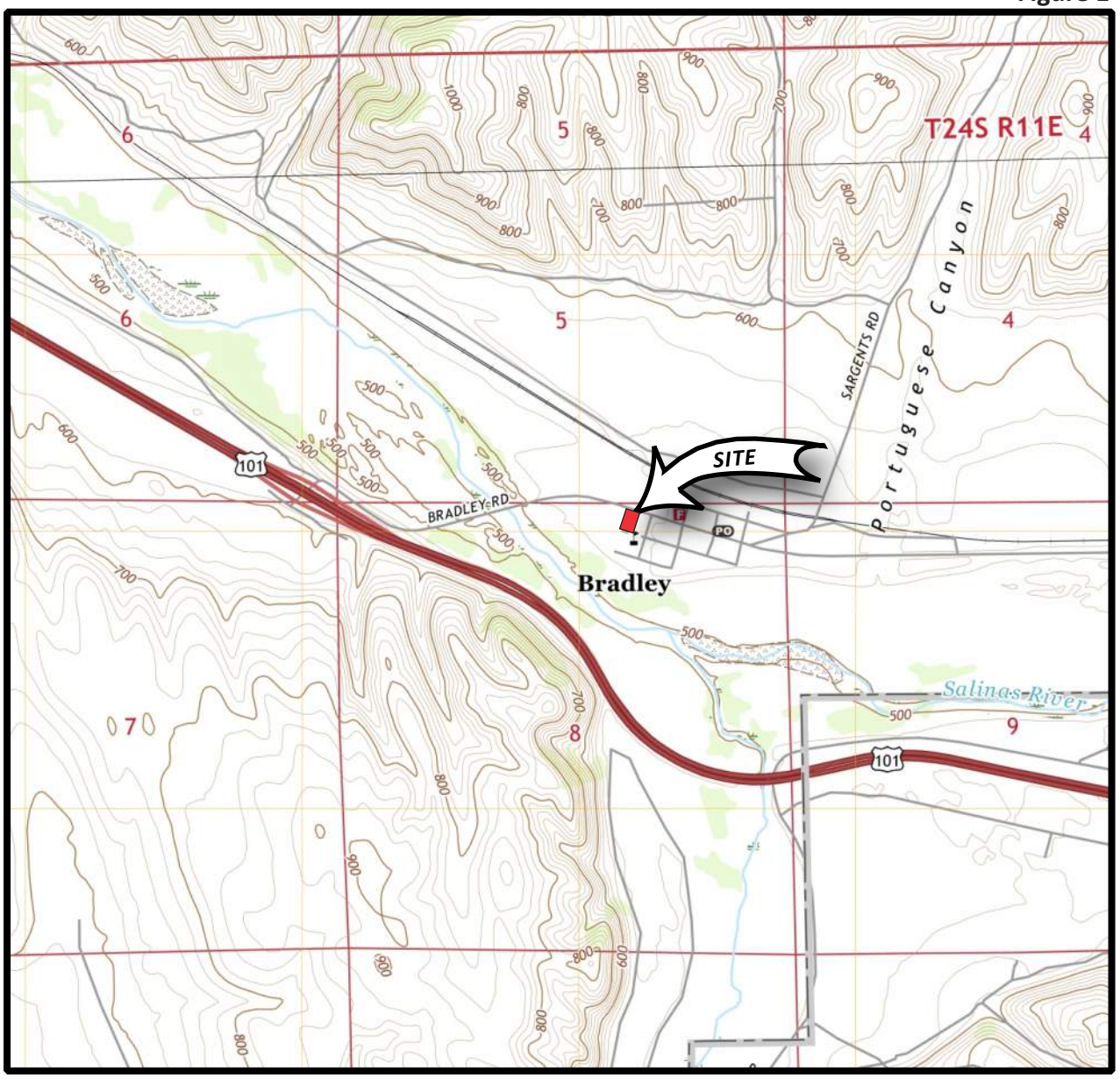
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FIGURES

Figure 1 - Vicinity Map
Figure 2 - Site Geologic and Boring Location Map
Figure 3 - Local Geologic Map
Figures 4 - Geologic Cross Section A-A’
Figure 5 – Geologic Hazard Zones
Figure 6 - Regional Faults and Earthquakes
Figure 7 - Selected Earthquakes
Figure 8 – Flood Zone Map

Figure 1



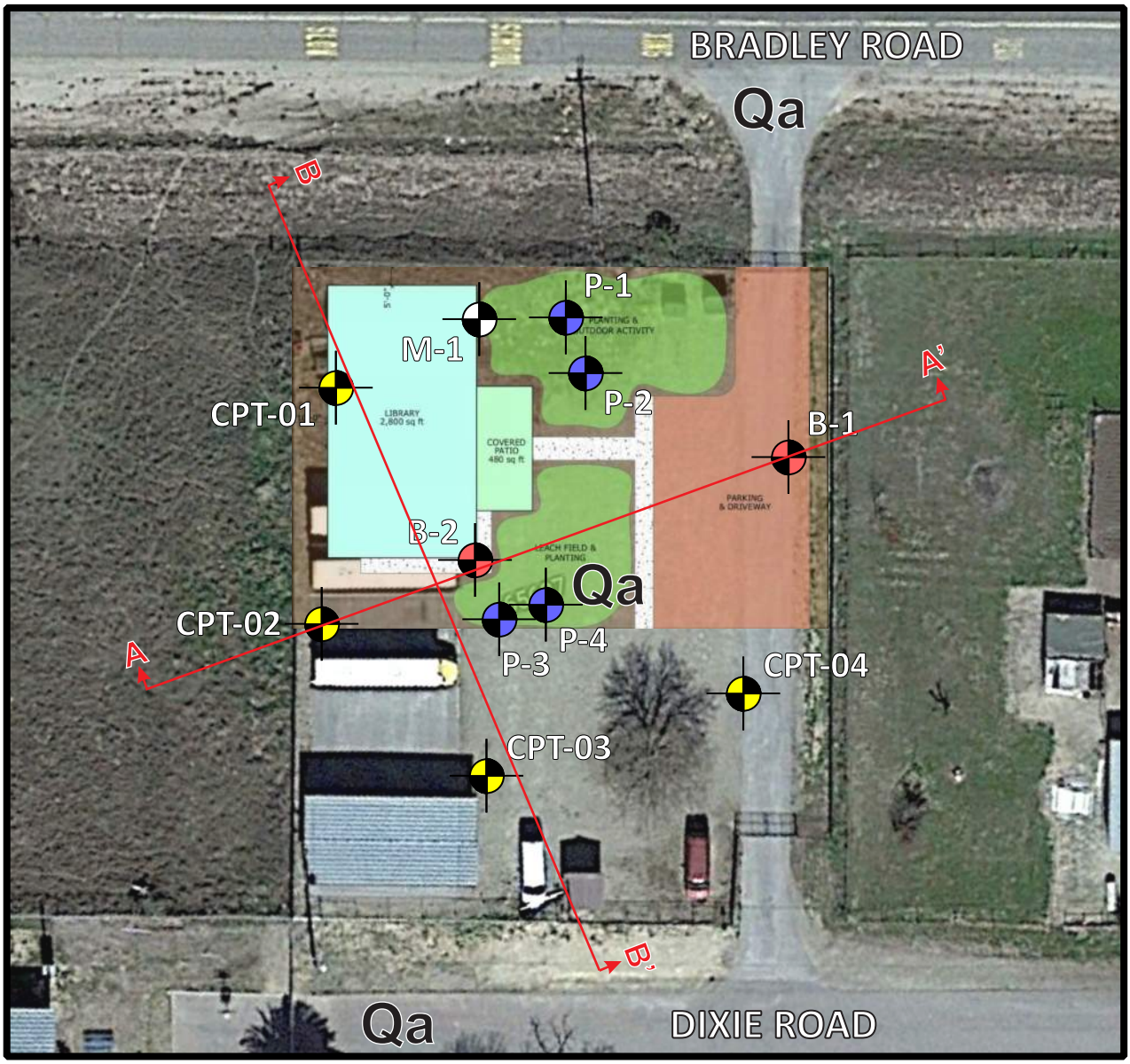
BASE: USGS. 2021. Bradley and Wunpost 7.5-minute Topographic Quadrangles

1000 0 1000

Approximate Scale in Feet

Earth Systems Pacific	New Bradley Branch Library Feasibility Study 65607 Dixie Street, APN 424-351-038 Bradley, California	SITE VICINITY MAP 305777-001

Figure 2



45 0 45 90

Approximate Scale in Feet

B-2 Approximate Boring Location

M-1 Approximate Groundwater Monitor Location

B B' Line of Geologic Cross Section

CPT-04 Approximate CPT Location

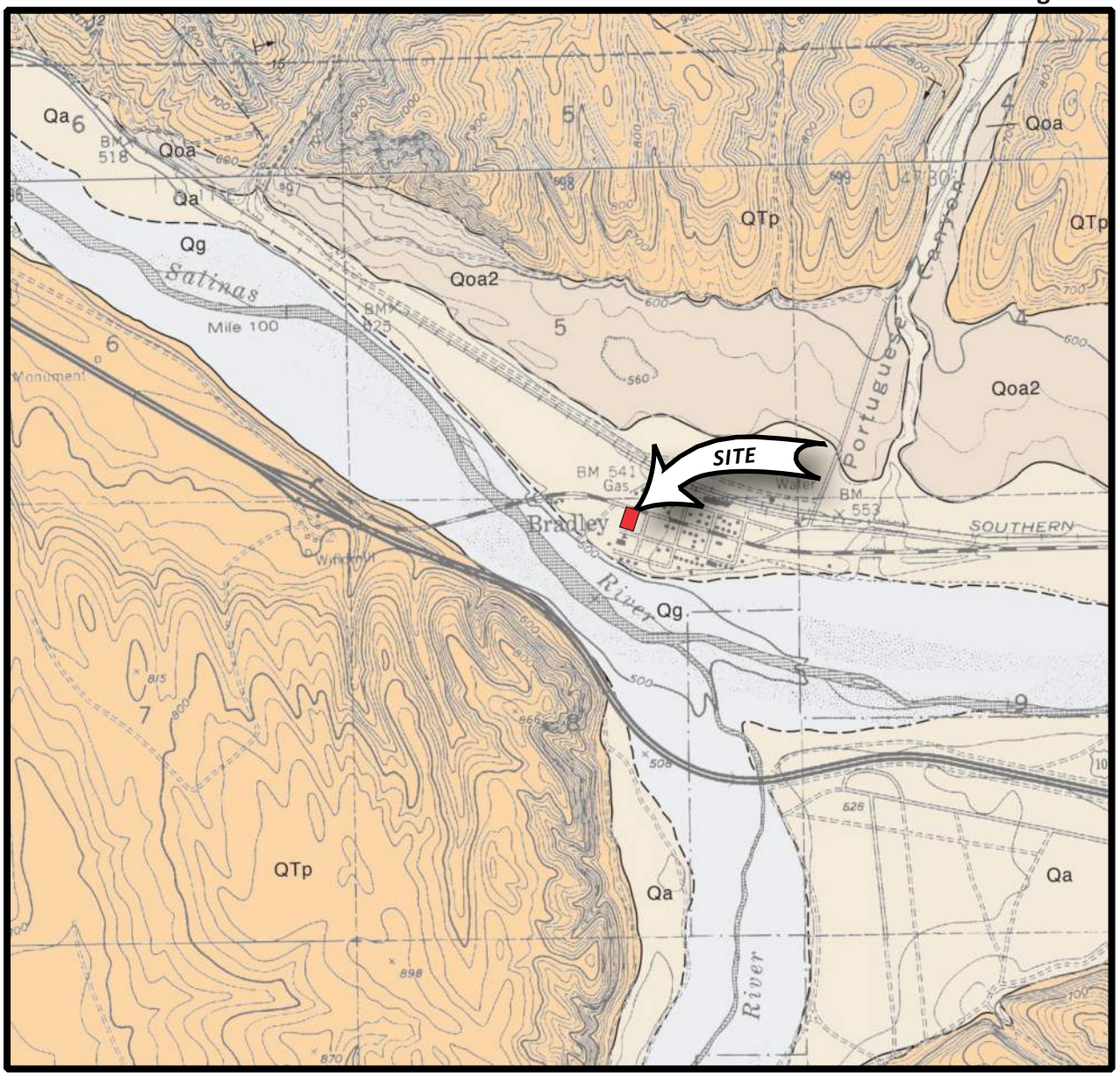
P-4 Approximate Percolation Location

Qa - Surficial Sediments

Base: Google Earth (2022)

Earth Systems Pacific	**New Bradley Branch Library Feasibility Study** **65607 Dixie Street, APN 424-351-038** **Bradley, California**	**Site Geologic and Boring Location Map** **File No.: 305777-001**

Figure 3



BASE: Dibblee, Thomas W, Jr. 2006. Geologic Maps of the Bradley and Wunpost 7.5-minute Topographic Quadrangles

Geologic contact, dashed where approximately located

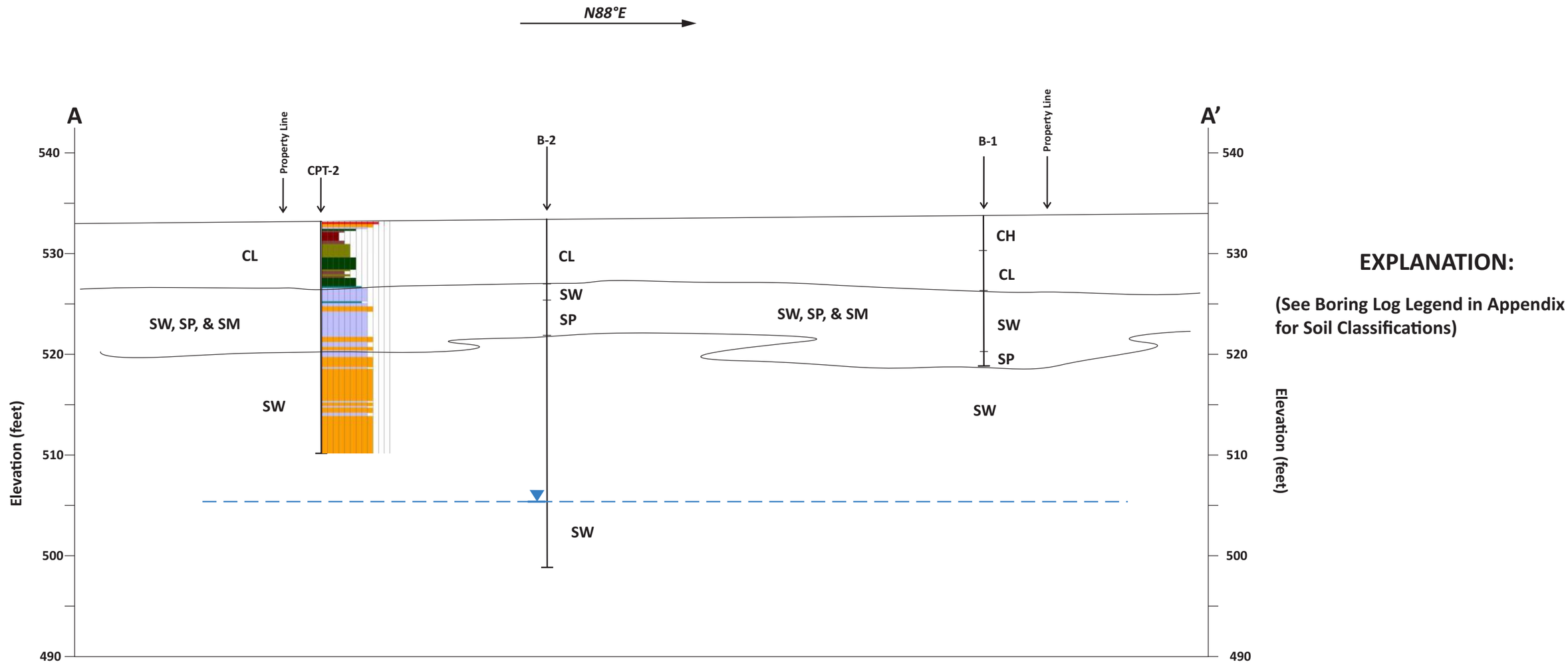
1000 0 1000

Approximate Scale in Feet

Relevant Geologic Units

Qa/Qg	Surficial Sediments (Holocene)
Qoa	Older Surficial Sediments, Alluvial Terraces (Pleistocene)
Qoa2	Younger, Lower Alluvial Terraces (Pleistocene)
Qoa1	Older, Higher Alluvial Terraces (Pleistocene)
QTp	Paso Robles formation (Pleistocene - Late Pliocene)

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EXPLANATION:

(See Boring Log Legend in Appendix A for Soil Classifications)

1 inch = 20 feet
2x Vertical Exaggeration

Groundwater Level

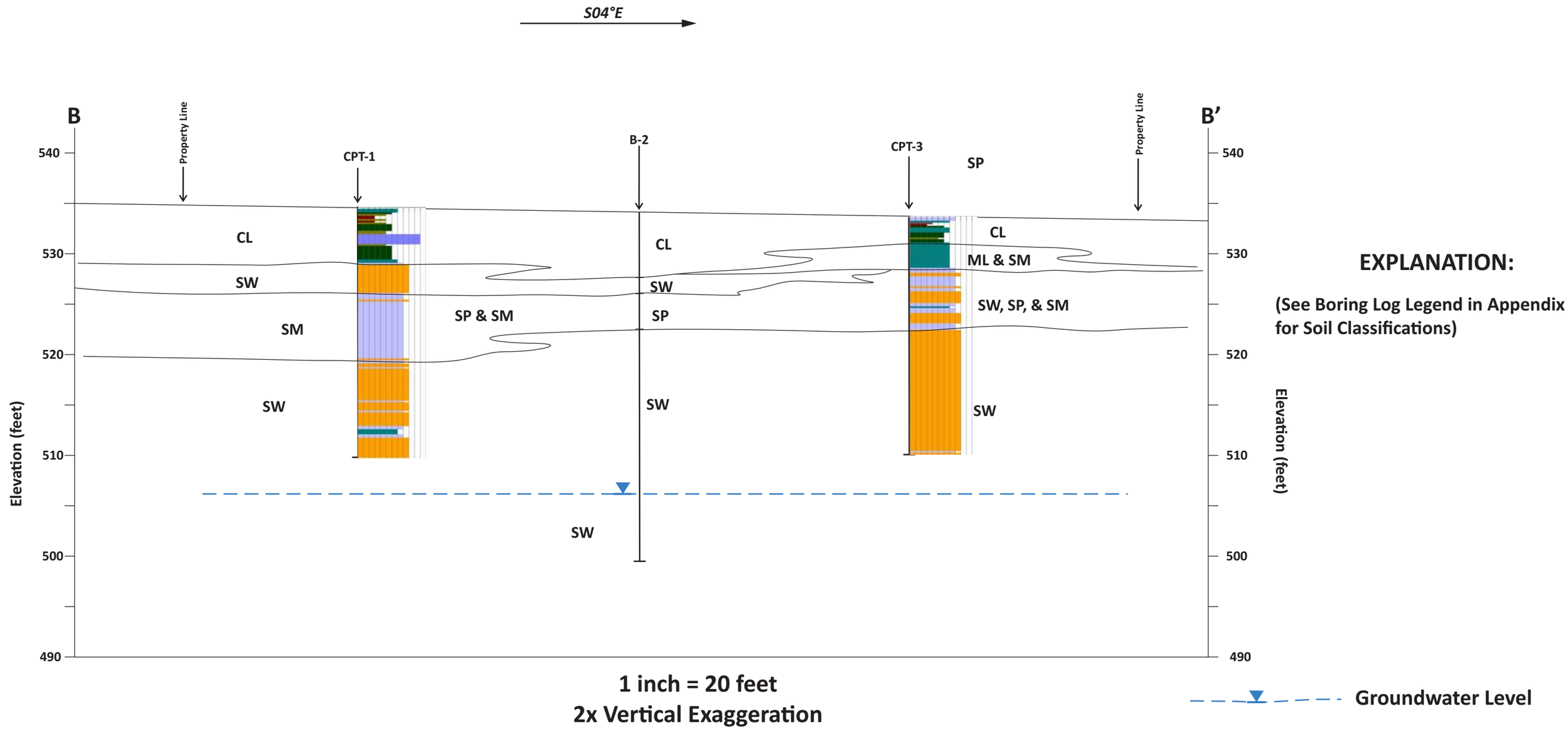
1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

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New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

GEOLOGIC CROSS-SECTION A-A'

305777-001

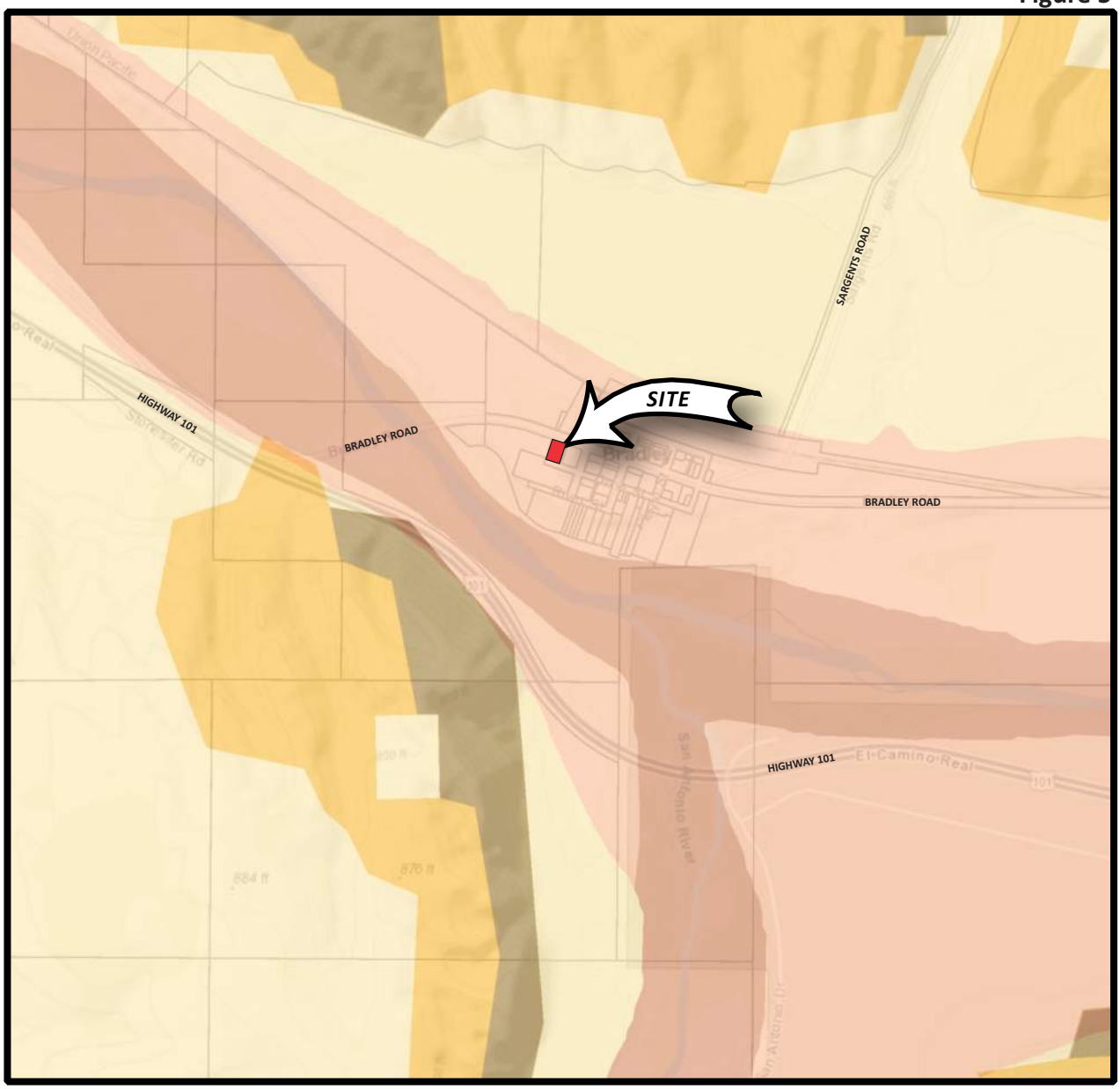


EXPLANATION:

(See Boring Log Legend in Appendix A for Soil Classifications)

Earth Systems Pacific	New Bradley Branch Library Feasibility Study 65607 Dixie Street, APN 424-351-038 Bradley, California	GEOLOGIC CROSS-SECTION B-B' 305777-001

Figure 5



County Geologic Hazard Zones

Liquefaction susceptibility

- High
- Moderate
- Low
- Variable

Landslide susceptibility

- High
- Moderate
- Low

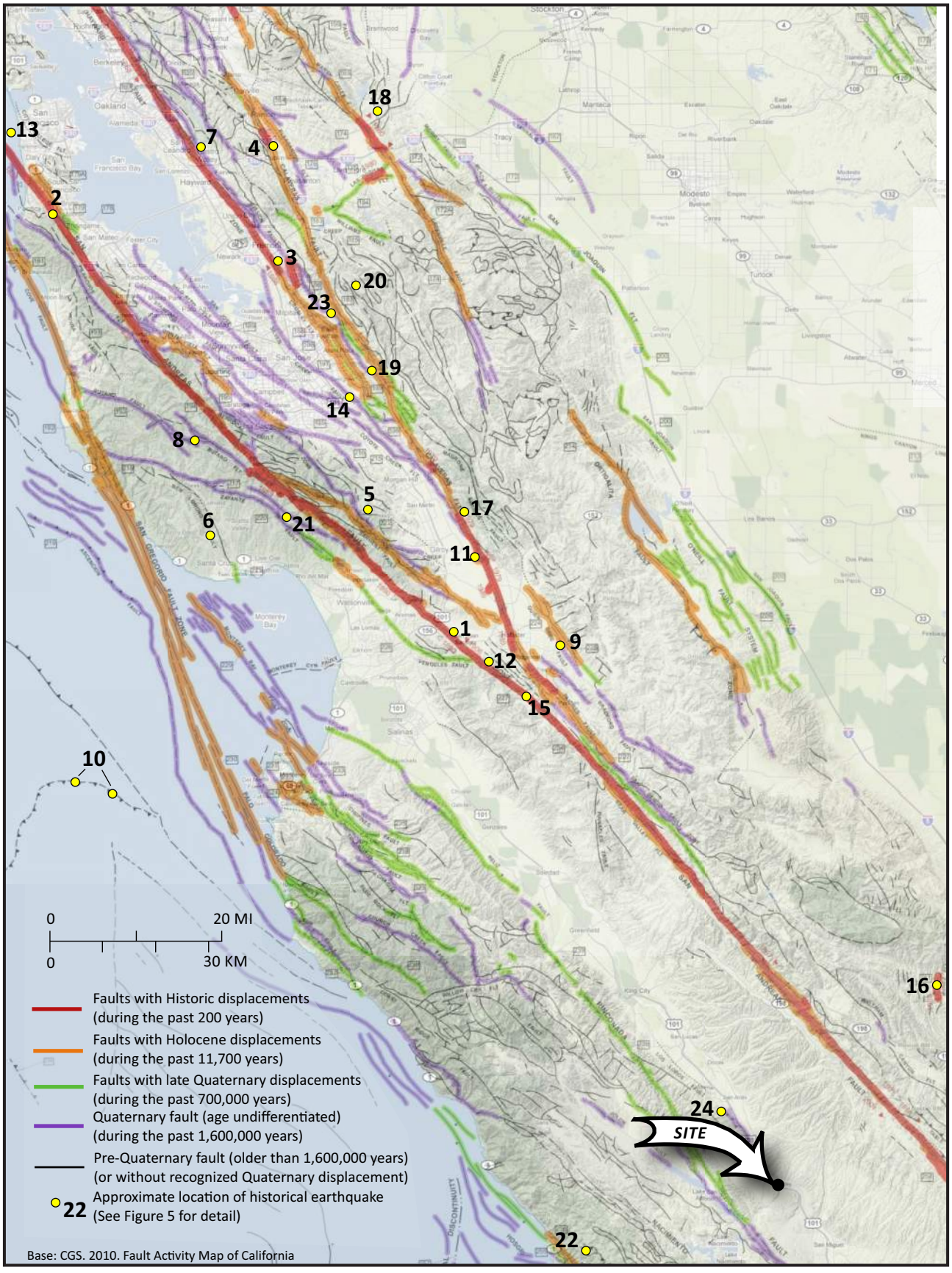
Approximate Scale in Feet

0 2000 4000 6000

Base: Monterey County Geologic Hazards Zones, web application (2022)

Earth Systems Pacific	New Bradley Branch Library Feasibility Study 65607 Dixie Street, APN 424-351-038 Bradley, California	GEOLOGIC HAZARD ZONES 305777-001

Figure 6

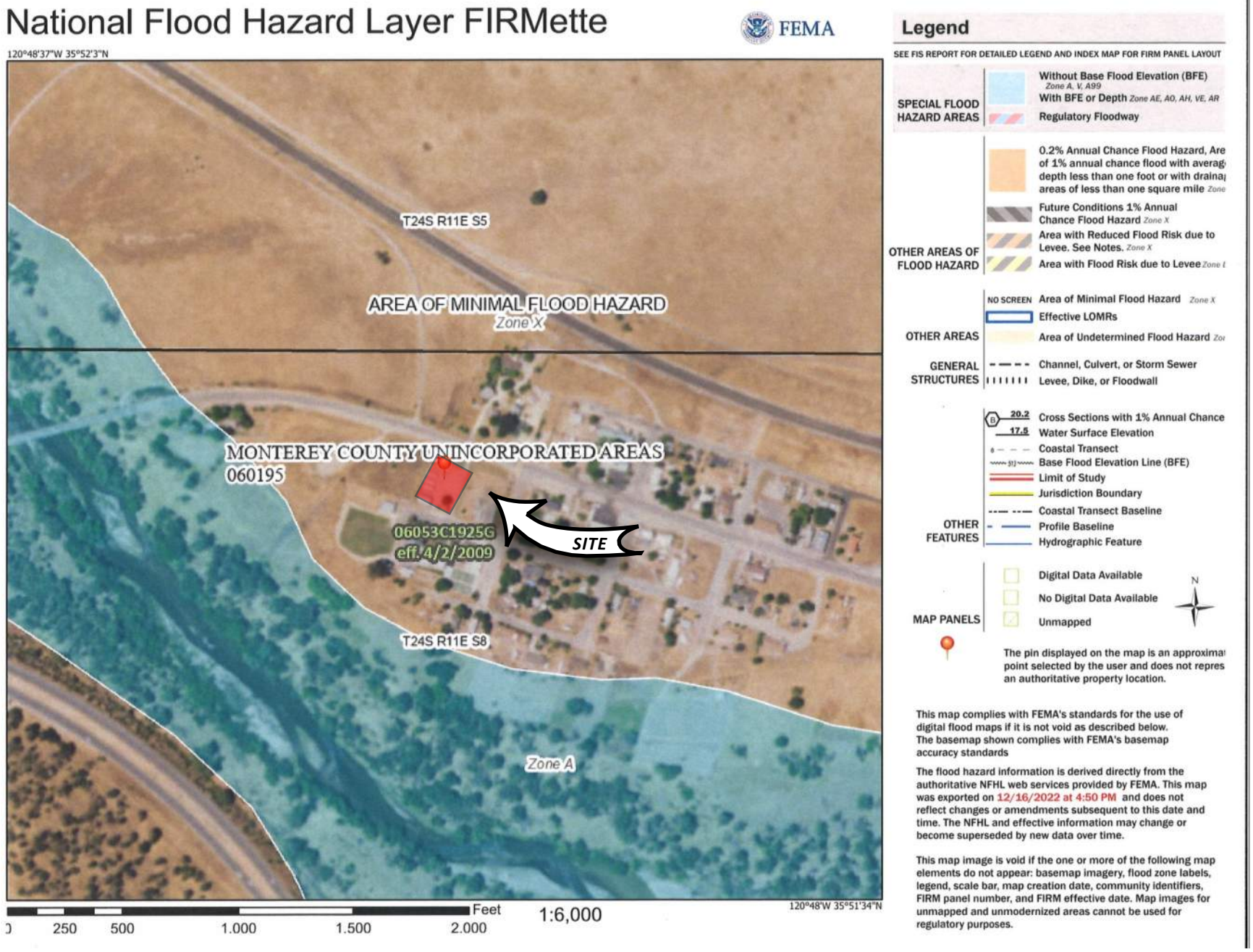


Earth Systems Pacific	New Bradley Branch Library Feasibility Study 65607 Dixie Street, APN 424-351-038 Bradley, California	REGIONAL FAULTS AND EARTHQUAKES 305777-001

Selected Monterey BayArea Earthquakes

Location Number (See Regional Faults and Earthquakes map For Locations)	Earthquake and Year	Magnitude Reported	Reference
1	Monterey Bay Area, 1836	M 6.8	Toppozada, 1998
2	San Francisco, 1838	M 7.0	Toppozada, 1981
3	Hayward, 1858	M 6.1	Toppozada, 1981
4	Calaveras-Dublin, 1861	M 5.9	Toppozada, 1981
5	Santa Clara Valley, 1864	M 5.9	Toppozada, 1981
6	Santa Cruz, 1865	M 6.3	Toppozada, 1981
7	Hayward, 1868	M 6.8	Toppozada, 1981
8	San Andreas, 1870	M 5.8	Toppozada, 1981
9	Quien Sabe, 1986	M 5.5	NCDEC, 2010
10	Monterey Bay		
	1926	M 6.1	NCDEC, 2010
	1926	M 6.1	NCDEC, 2010
11	Calaveras, 1897	M 6.2	Toppozada, 1981
12	Hollister Area, 1939	M 5.5	NCDEC, 2010
13	San Francisco, 1906	M 7.8	U.S. Geological Survey, 2010
14	San Jose, 1911	M 6.5	Toppozada and Parke, 1982
15	San Andreas, 1961	M 5.6	NCDEC, 2010
16	Nunez Fault, 1982	M 5.4	NCDEC, 2010
17	Coyote Lake, 1979	M 5.9	Hart, 1988
18	Greenville, 1980	M 5.8	Oppenheimer, 1990
19	Morgan Hill, 1984	M 6.2	Oppenheimer, 1990
20	Mount Lewis, 1986	M 5.7	U.S. Geological Survey, 1989
21	Loma Prieta, 1989	M 7.1	U.S. Geological Survey, 1989
22	Central California		
	1983	M 5.2	NCDEC, 2010
	1991	M 5.2	NCDEC, 2010
23	Calaveras Reservoir, 2007	M 5.4	U.S. Geological Survey, 2009
24	San Ardo, 1955	M 5.2	NCDEC, 2010

NOTE: Modified After Geomatrix, (1992)
Updated, 2010



Earth Systems Pacific	New Bradley Branch Library Feasibility Study 65607 Dixie Street, APN 424-351-038 Bradley, California	FLOOD ZONE MAP 305777-001

APPENDIX A

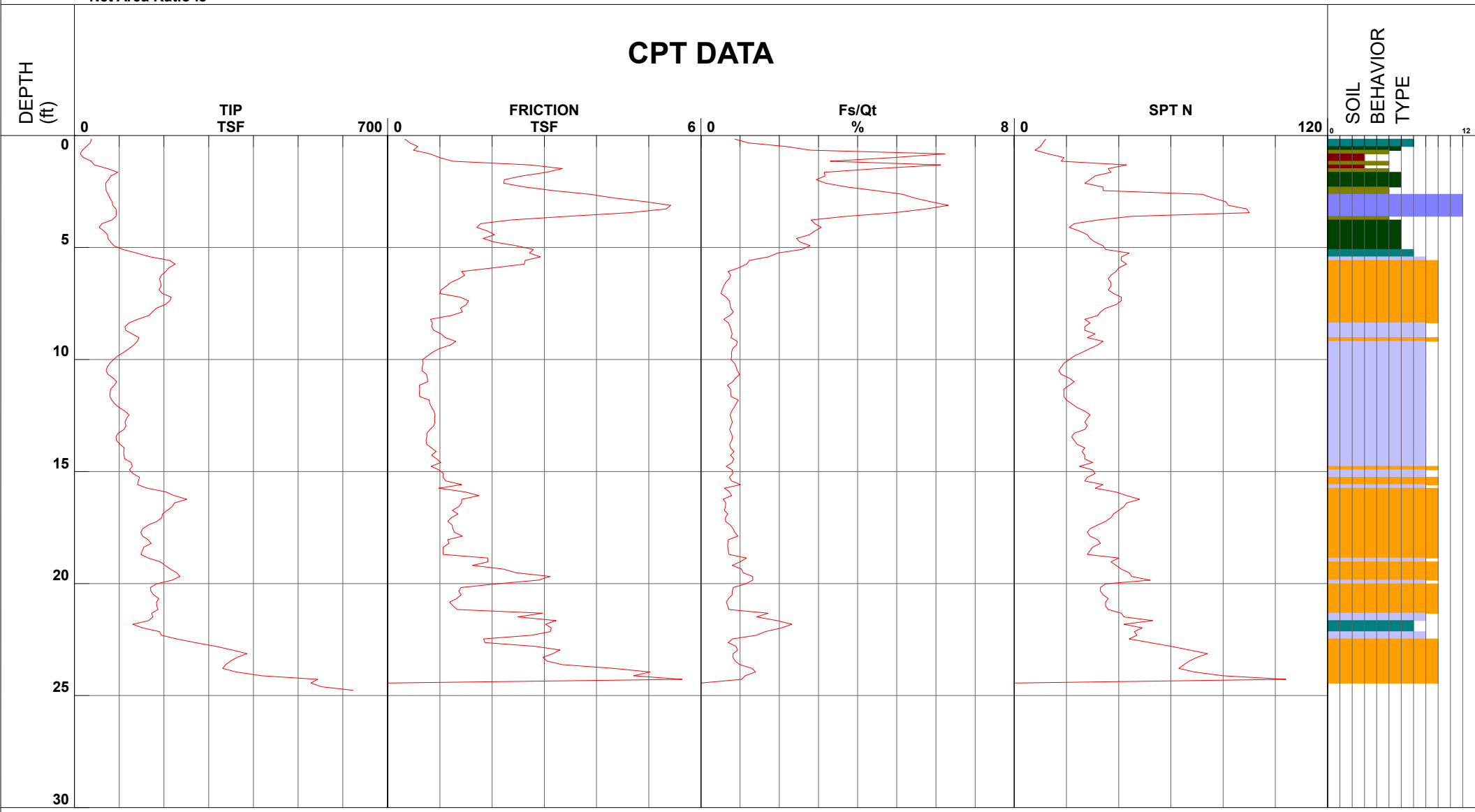
Cone Penetrometer Test (CPT) Data
Boring Logs (7)
Boring Log Legend

Earth Systems

Project	New Bradley Branch Library Feasibility Study	Operator	AJ-BH	Filename	SDF(381).cpt
Job Number	305777-001	Cone Number	DDG1587	GPS	
Hole Number	CPT-01	Date and Time	305777-001	Maximum Depth	24.77 ft
EST GW Depth During Test		NO GW			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

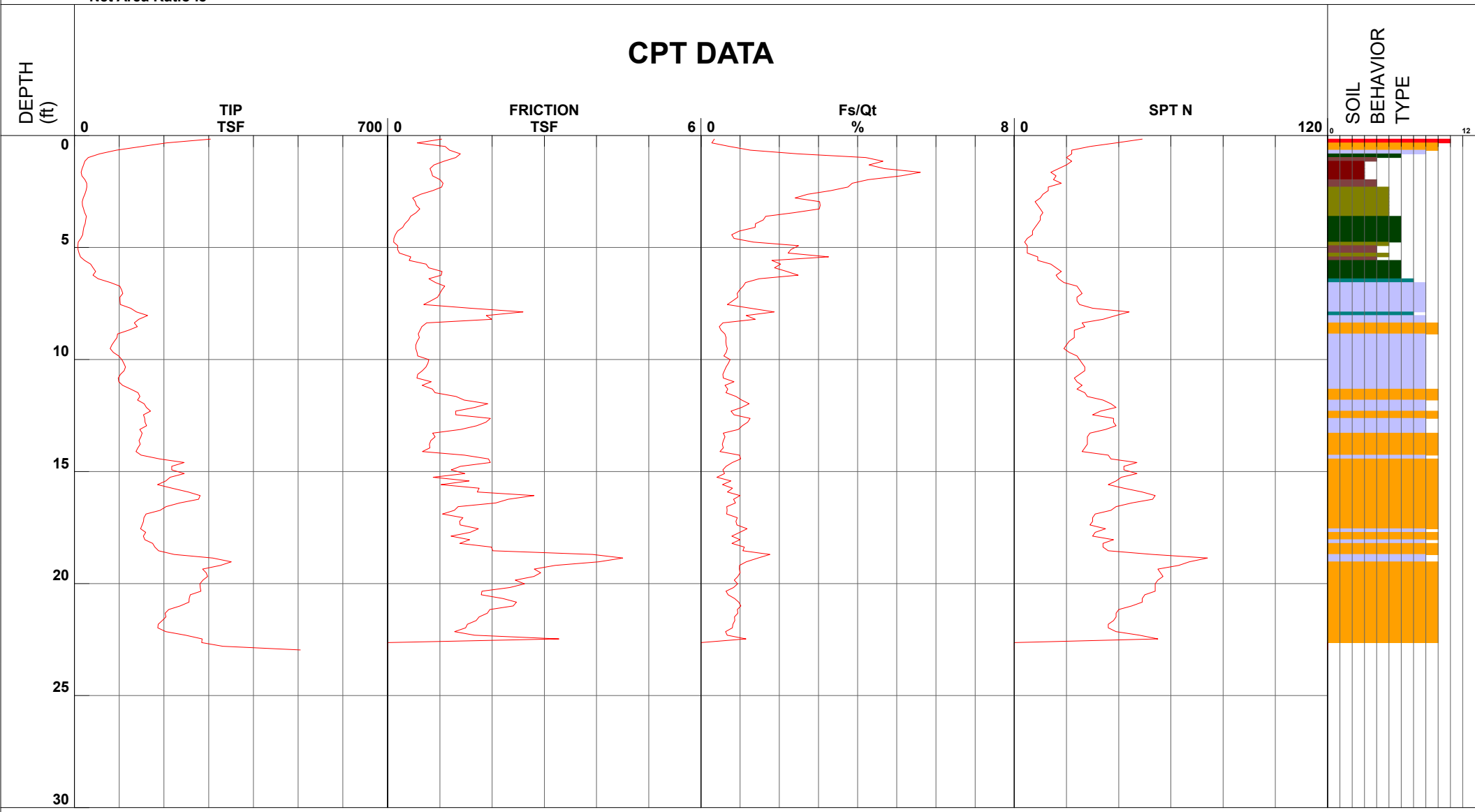
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	New Bradley Branch Library Feasibility Study	Operator	AJ-BH	Filename	SDF(382).cpt
Job Number	305777-001	Cone Number	DDG1587	GPS	
Hole Number	CPT-02	Date and Time	305777-001	Maximum Depth	22.97 ft
EST GW Depth During Test		NO GW			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

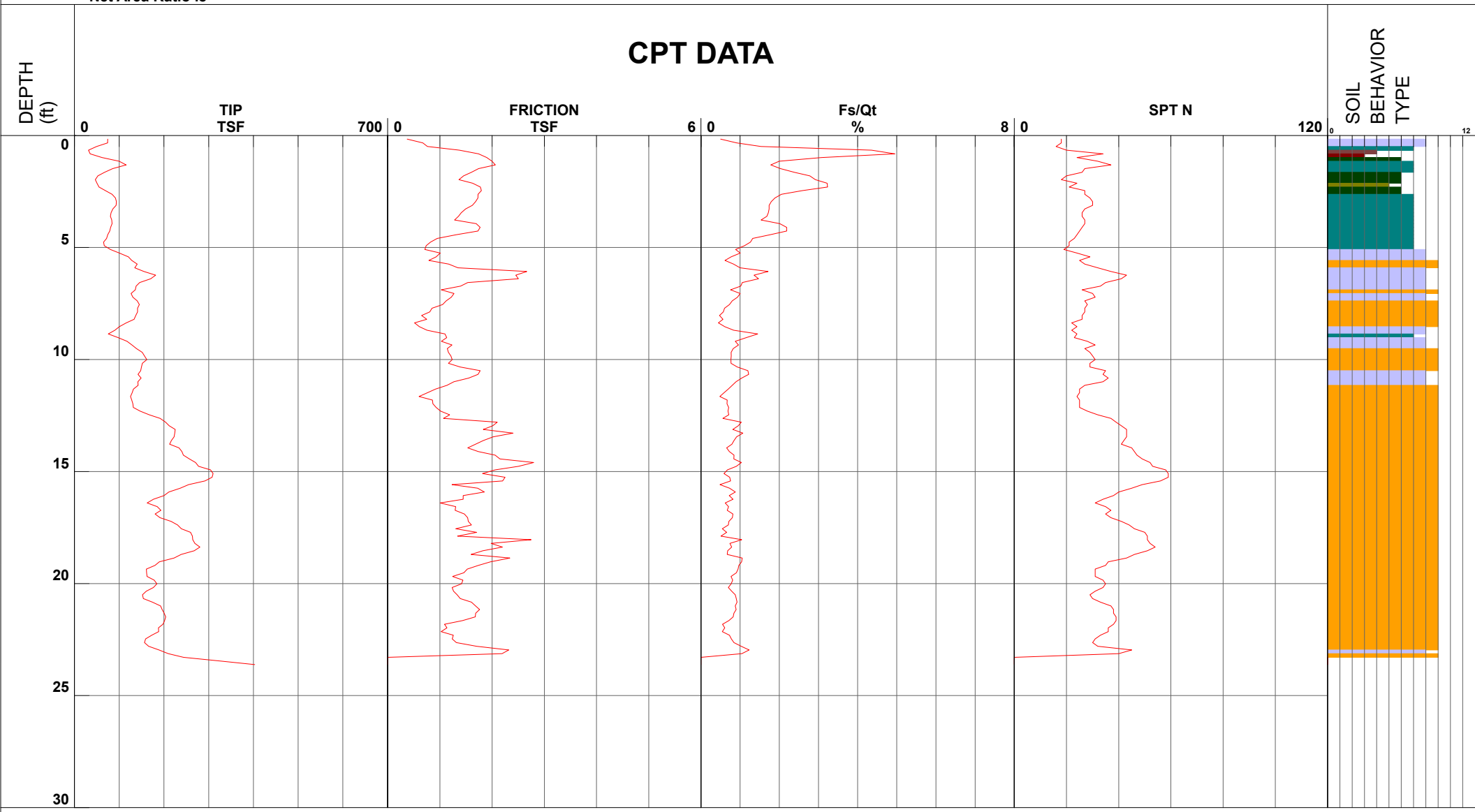
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	New Bradley Branch Library Feasibility Study	Operator	AJ-BH	Filename	SDF(380).cpt
Job Number	305777-001	Cone Number	DDG1587	GPS	
Hole Number	CPT-03	Date and Time	305777-001	Maximum Depth	23.62 ft
EST GW Depth During Test		NO GW			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

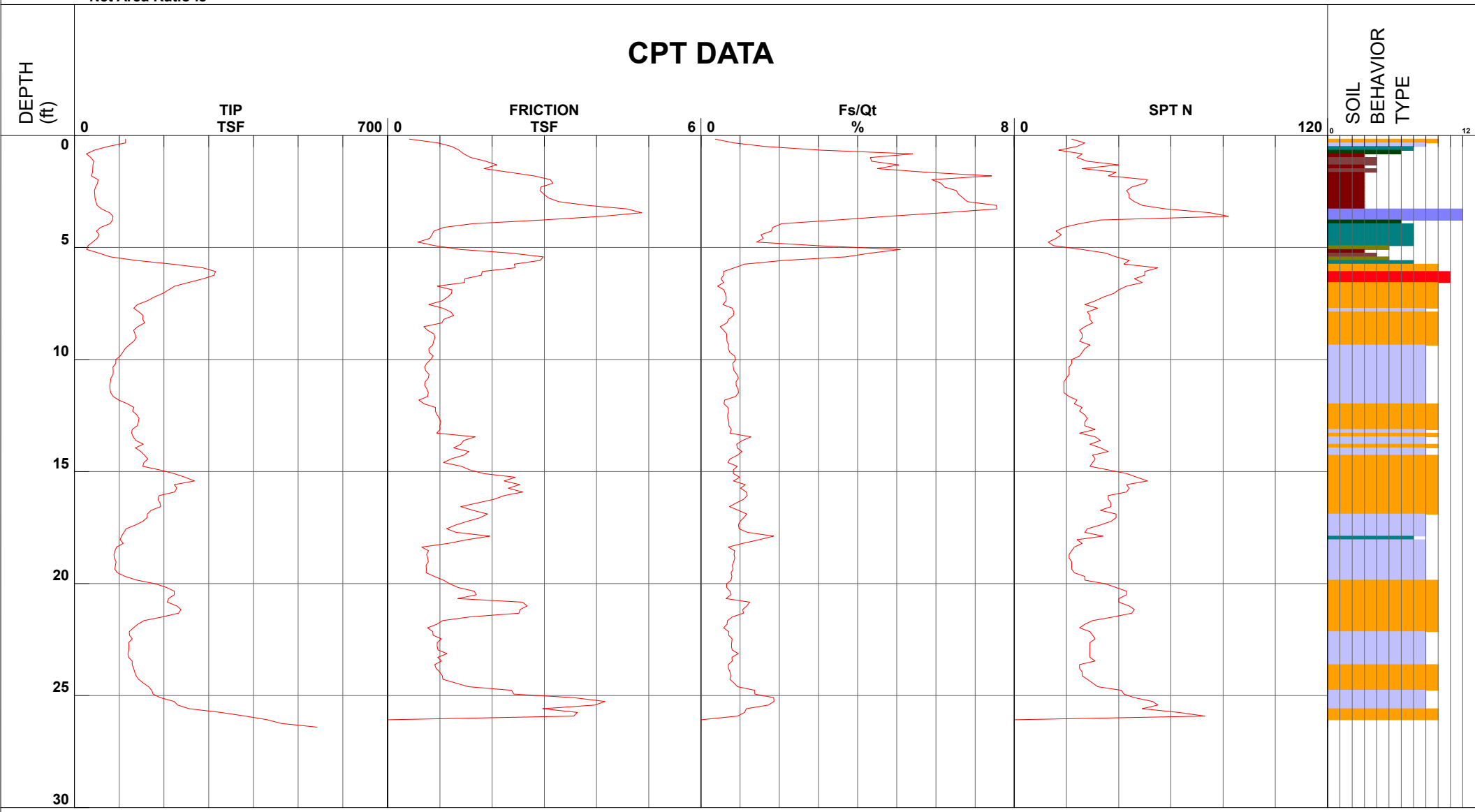
S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems

Project	New Bradley Branch Library Feasibility Study	Operator	AJ-BH	Filename	SDF(383).cpt
Job Number	305777-001	Cone Number	DDG1587	GPS	
Hole Number	CPT-04	Date and Time	305777-001	Maximum Depth	26.41 ft
EST GW Depth During Test		NO GW			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 15cm squared

S*Soil behavior type and SPT based on data from UBC-1983

Earth Systems Pacific

Boring No. 1
PAGE 1 OF 1
FILE NO.: 305777-001
DATE: 12/28/2022

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0			2" AC / 3" SAND							
	CH		FAT CLAY; dark brown, moist, medium stiff, trace fine to medium grained sand	1.0 - 2.5	1-1	■	92.1	24.3	2 5 7	1.5
			- brown		1-2	■	98.6	25.1		1.5
	CL		SANDY LEAN CLAY; yellowish brown, moist, stiff, very fine grained sand	1.0 - 5.0	BAG A	◯				
				5.0 - 6.5	1-3	■	99.7	22.0	3 8 9	2.0
	SW		WELL GRADED SAND; light yellowish brown, moist, loose, fine to coarse grained sand	8.5 - 10.0	1-4	●			6 5 4	
	SP		POORLY GRADED SAND; light yellowish brown, moist, loose, fine to medium grained sand	13.5 - 15.0	1-5	●			3 4 3	
15			Bottom of boring at 15 feet. No groundwater encountered.							

LEGEND: ■ 2.5" Mod Cal Sample ▭ Shelby ● SPT ◯ Bulk Sample ▽ Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Boring No. 2
PAGE 1 OF 2
FILE NO.: 305777-001
DATE: 12/28/2022

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0	CL		SANDY LEAN CLAY; brown, moist, stiff, fine to medium grained sand, trace silt, some ½" diameter gravel							
			- reduce gravel content [LL = 39, PI = 22]	1.0 - 2.5	2-1 2-2	■ ■			5 9 12	1.5 1.5
			- yellowish brown	1.0 - 3.0	BAG B	◯				
	CL		SANDY LEAN CLAY; yellowish brown, moist, hard, fine to medium grained sand, micaceous						15 31 26	4.0 >4.0
				5.0 - 6.5	2-3 2-4	■	95.5 123.0	9.2 3.9		
	SW		WELL GRADED SAND with GRAVEL; light yellowish brown, moist, dense, fine to coarse grained sand, many ½" diameter gravel							
	SP		POORLY GRADED SAND; yellowish brown, moist, loose, fine to medium grained sand						3 4 6	0.0 0.0
				8.5 - 10.0	2-5 2-6	■ ■	94.9 93.2	2.8 5.4		
	SW		WELL GRADED SAND; yellowish brown, moist, medium dense, fine to coarse grained sand							
			- few ½" diameter gravel	13.5 - 15.0	2-7 2-8	■ ■	106.0 101.3	2.5 4.0	3 5 6	0.0 0.0
			- some fine grained gravel	18.5 - 20.0	2-9	●			3 5 6	
			- increase gravel content, some ½" diameter gravel, medium dense	24.0 - 25.5	2-10	●			4 9 18	

LEGEND: ■ 2.5" Mod Cal Sample ▭ Shelby ● SPT ◯ Bulk Sample ▽ Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Boring No. 2
PAGE 2 OF 2
FILE NO.: 305777-001
DATE: 12/28/2022

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0	SW		- some 1" to 1½" diameter gravel							
5										
10			- wet, dense, increase coarse content	28.5 - 30.0	2-11	●			25 13 21	
15										
20			- decrease coarse content, refusal, possible cobbles	33.5 - 34.5	2-12	●			21 50/5"	
25			Bottom of boring at 34.5 feet. Groundwater encountered at 28 feet.							
30										

LEGEND: ■ 2.5" Mod Cal Sample ▭ Shelby ● SPT ○ Bulk Sample ▼ Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Monitoring Well No. 1

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

FILE NO.: 305777-001
DATE: 12/28/2022

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0	CL		SANDY LEAN CLAY with GRAVEL; brown, moist, occasional ½" diameter gravel, fine to medium grained sand							
5	CL		SANDY LEAN CLAY with GRAVEL; light brown, moist, some very fine grained gravel							
10	SW		WELL GRADED SAND; yellowish brown, moist, fine to coarse grained sand							
15			- occasional very fine to ½" diameter gravel							
20			- many ½" to 1" diameter gravel							
25										

LEGEND: 2.5" Mod Cal Sample | Shelby | SPT | Bulk Sample | Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Monitoring Well No. 1

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

FILE NO.: 305777-001
DATE: 12/28/2022

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
	SW									
			Bottom of boring at 30 feet. Groundwater encountered at 28 feet.							

LEGEND: 2.5" Mod Cal Sample Shelby SPT Bulk Sample Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Percolation No. 1

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

FILE NO.: 305777-001
DATE: 12/28/2022

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0	CL		SANDY LEAN CLAY with GRAVEL; brown, moist, occasional ½" diameter gravel, fine to medium grained sand							
5	CL		SANDY LEAN CLAY with GRAVEL; light brown, moist, some very fine grained gravel							
	SW		WELL GRADED SAND; light yellowish brown, moist, loose, fine to coarse grained sand							
7			Bottom of boring at 7 feet. No groundwater encountered.							
10										
15										
20										
25										

LEGEND: ■ 2.5" Mod Cal Sample ▭ Shelby ● SPT ○ Bulk Sample ▼ Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g.
[redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Percolation No. 2

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

FILE NO.: 305777-001
DATE: 12/28/2022

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0	CL		SANDY LEAN CLAY with GRAVEL; brown, moist, occasional $\frac{1}{2}$" diameter gravel, fine to medium grained sand							
	CL		SANDY LEAN CLAY with GRAVEL; light brown, moist, some very fine grained gravel							
5			Bottom of boring at 5 feet. No groundwater encountered.							

LEGEND: 2.5" Mod Cal Sample | Shelby | SPT | Bulk Sample | Groundwater

[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Percolation No. 3

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

FILE NO.: 305777-001
DATE: 12/28/2022

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0	CL		SANDY LEAN CLAY; brown, moist, fine to medium grained sand, some $\frac{1}{2}$" diameter gravel							
5	CL		SANDY LEAN CLAY; yellowish brown, moist, fine to medium grained sand, micaceous							
			Bottom of boring at 5 feet. No groundwater encountered.							

LEGEND: 2.5" Mod Cal Sample | Shelby | SPT | Bulk Sample | Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

Percolation No. 4

LOGGED BY: A. Hernandez
RIG TYPE: ESP B-53
AUGER TYPE: 6" Hollow Stem

FILE NO.: 305777-001
DATE: 12/28/2022

New Bradley Branch Library Feasibility Study
65607 Dixie Street, APN 424-351-038
Bradley, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE NUMBER	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.	POCKET PEN (t.s.f)
0	CL		SANDY LEAN CLAY; brown, moist, fine to medium grained sand, some $\frac{1}{2}$" diameter gravel							
5	CL		SANDY LEAN CLAY; yellowish brown, moist, fine to medium grained sand, micaceous							
	SW		WELL GRADED SAND with GRAVEL; light yellowish brown, moist, fine to coarse grained sand, many $\frac{1}{2}$" diameter gravel							
			Bottom of boring at 6.5 feet. No groundwater encountered.							

LEGEND: 2.5" Mod Cal Sample | Shelby | SPT | Bulk Sample | Groundwater

N[redacted] subsurface conditions is a simplification of actual conditions encountered. It applies at the location [redacted]g. [redacted] conditions may differ at other locations [redacted].

Earth Systems Pacific

BORING LOG LEGEND

SAMPLE / SUBSURFACE WATER SYMBOLS	GRAPH. SYMBOL
CALIFORNIA MODIFIED	
STANDARD PENETRATION TEST (SPT)	
SHELBY TUBE	
BULK	
SUBSURFACE WATER DURING DRILLING	
SUBSURFACE WATER AFTER DRILLING	

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

MAJOR DIVISIONS	GROUP SYMBOL	TYPICAL DESCRIPTIONS	GRAPH. SYMBOL
COARSE GRAINED SOILS (MORE THAN HALF OF MATERIAL IS LARGER THAN #200 SIEVE SIZE)	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
	GP	POORLY GRADED GRAVELS, OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES	
	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES	
	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
	SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES	
	SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES	
	SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES	
FINE GRAINED SOILS (HALF OR MORE OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE)	ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	
	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	

OBSERVED MOISTURE CONDITION

DRY	SLIGHTLY MOIST	MOIST	VERY MOIST	WET (SATURATED)

CONSISTENCY

COARSE GRAINED SOILS			FINE GRAINED SOILS		
BLOWS/FOOT		DESCRIPTIVE TERM	BLOWS/FOOT		DESCRIPTIVE TERM
SPT	CA SAMPLER		SPT	CA SAMPLER	
0-10	0-16	LOOSE	0-2	0-3	VERY SOFT
11-30	17-50	MEDIUM DENSE	3-4	4-7	SOFT
31-50	51-83	DENSE	5-8	6-13	MEDIUM STIFF
OVER 50	OVER 83	VERY DENSE	9-15	14-25	STIFF
			16-30	26-50	VERY STIFF
			OVER 30	OVER 50	HARD

GRAIN SIZES

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENING		
# 200	# 40	# 10	# 4	3/4"	3"	12"

SILT & CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

TYPICAL BEDROCK HARDNESS

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
EXTREMELY HARD	CORE, FRAGMENT, OR EXPOSURE CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CAN ONLY BE CHIPPED WITH REPEATED HEAVY HAMMER BLOWS
VERY HARD	CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CORE OR FRAGMENT BREAKS WITH REPEATED HEAVY HAMMER BLOWS
HARD	CAN BE SCRATCHED WITH KNIFE OR SHARP PICK WITH DIFFICULTY (HEAVY PRESSURE); HEAVY HAMMER BLOW REQUIRED TO BREAK SPECIMEN
MODERATELY HARD	CAN BE GROOVED 1/16 INCH DEEP BY KNIFE OR SHARP PICK WITH MODERATE OR HEAVY PRESSURE; CORE OR FRAGMENT BREAKS WITH LIGHT HAMMER BLOW OR HEAVY MANUAL PRESSURE
SOFT	CAN BE GROOVED OR GOUGED EASILY BY KNIFE OR SHARP PICK WITH LIGHT PRESSURE, CAN BE SCRATCHED WITH FINGERNAIL; BREAKS WITH LIGHT TO MODERATE MANUAL PRESSURE
VERY SOFT	CAN BE READILY INDENTED, GROOVED OR GOUGED WITH FINGERNAIL, OR CARVED WITH KNIFE; BREAKS WITH LIGHT MANUAL PRESSURE

TYPICAL BEDROCK WEATHERING

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
FRESH	NO DISCOLORATION, NOT OXIDIZED
SLIGHTLY WEATHERED	DISCOLORATION OR OXIDATION IS LIMITED TO SURFACE OF, OR SHORT DISTANCE FROM, FRACTURES: SOME FELDSPAR CRYSTALS ARE DULL
MODERATELY WEATHERED	DISCOLORATION OR OXIDATION EXTENDS FROM FRACTURES, USUALLY THROUGHOUT; Fe-Mg MINERALS ARE "RUSTY", FELDSPAR CRYSTALS ARE "CLOUDY"
INTENSELY WEATHERED	DISCOLORATION OR OXIDATION THROUGHOUT; FELDSPAR AND Fe-Mg MINERALS ARE ALTERED TO CLAY TO SOME EXTENT, OR CHEMICAL ALTERATION PRODUCES IN SITU DISAGGREGATION
DECOMPOSED	DISCOLORATION OR OXIDATION THROUGHOUT, BUT RESISTANT MINERALS SUCH AS QUARTZ MAY BE UNALTERED; FELDSPAR AND Fe-Mg MINERALS ARE COMPLETELY ALTERED TO CLAY

drafting/masters/Boring Log Legend121714.dwg

APPENDIX B

Geotechnical Laboratory Test Results
CERCO Analytical Corrosivity Test Results

New Bradley Branch
Feasibility Study

305777-001

BULK DENSITY TEST RESULTS

ASTM D 2937-17 (modified for ring liners)

December 29, 2022

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
1-1	1.5 - 2.0	24.3	114.5	92.1
1-2	2.0 - 2.5	25.1	123.4	98.6
1-3	6.0 - 6.5	22.0	121.6	99.7
2-3	5.5 - 6.0	9.2	104.3	95.5
2-4	6.0 - 6.5	3.9	127.8	123.0
2-5	9.0 - 9.5	2.8	97.6	94.9
2-6	9.5 - 10.0	5.4	98.2	93.2
2-7	14.0 - 14.5	2.5	108.7	106.0
2-8	14.5 - 15.0	4.0	105.3	101.3

New Bradley Branch
Feasibility Study

305777-001

PARTICLE SIZE ANALYSIS

ASTM D 7928-16

Boring #2 @ 2.0 - 2.5'

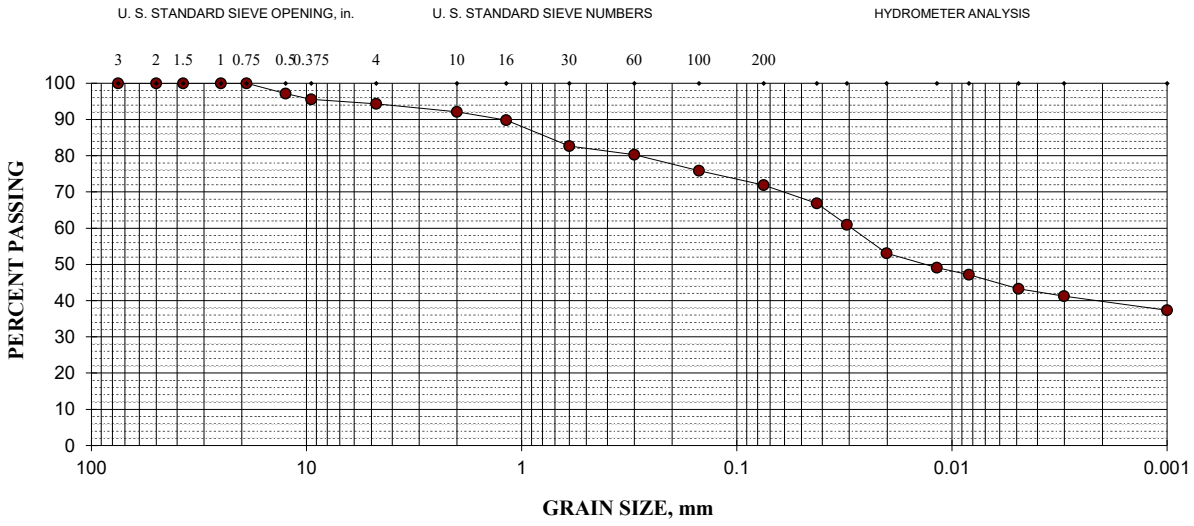
December 29, 2022

Specific Gravity = 2.65 (assumed)

LL = 39; PL = 17; PI = 22

Gravel = 6%; Sand = 22%; Silt = 29%; Clay = 43%

Sieve size	% Retained	% Passing
3" (75.0-mm)	0	100
2" (50.0-mm)	0	100
1-1/2" (37.5-mm)	0	100
1" (25.0-mm)	0	100
3/4" (19.0-mm)	0	100
1/2" (12.5-mm)	3	97
3/8" (9.5-mm)	4	96
#4 (4.75-mm)	6	94
#10 (2.00-mm)	8	92
#16 (1.18-mm)	10	90
#30 (600-µm)	17	83
#50 (300-µm)	20	80
#100 (150-µm)	24	76
#200 (75-µm)	28	72
Hydrometer Analysis		
42-µm		67
31-µm		61
20-µm		53
12-µm		49
8-µm		47
4.9-µm		43
3.0-µm		41
Colloids		37



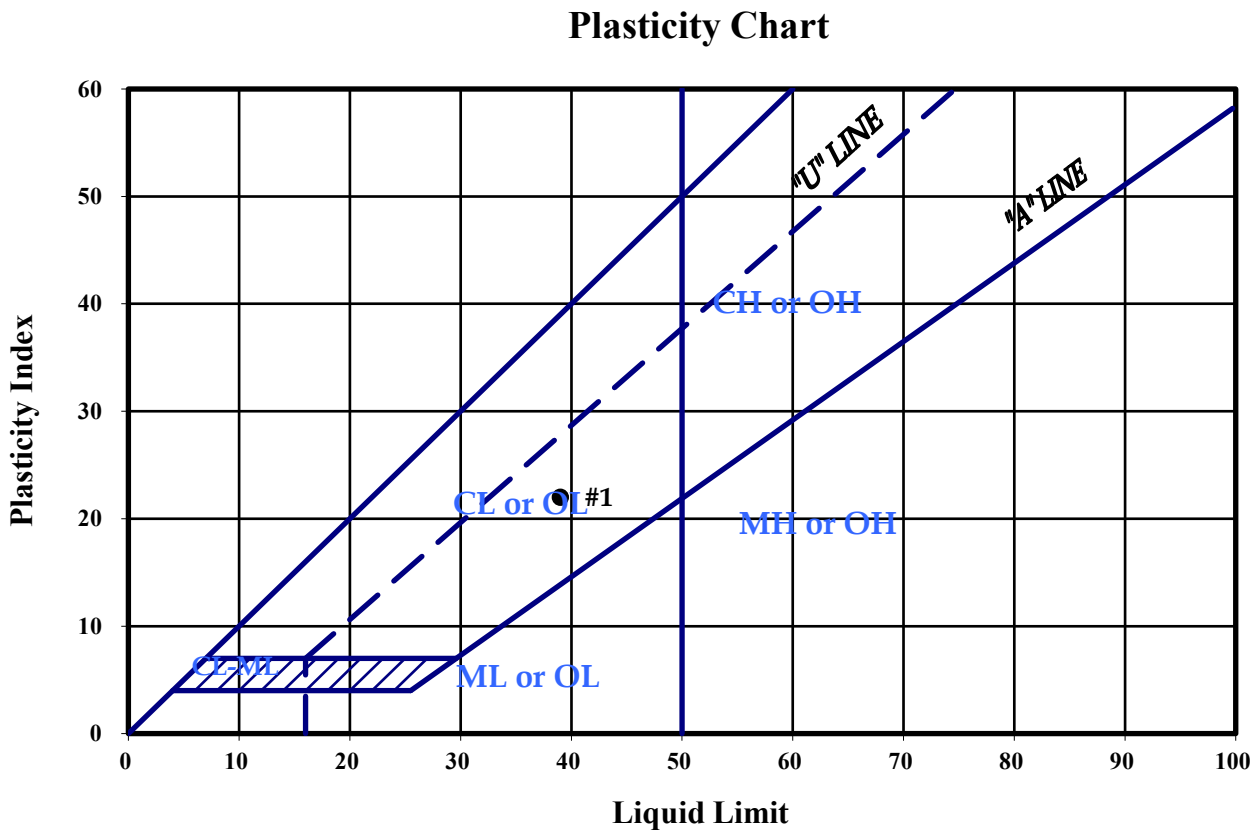
New Bradley Branch 305777-001

PLASTICITY INDEX

ASTM D 4318-17

December 29, 2022

Test No.:	1	2	3	4	5
Boring No.:	2-2				
Sample Depth:	2.0 - 2.5'				
Liquid Limit:	39				
Plastic Limit:	17				
Plasticity Index:	22				



New Bradley Branch Library
Feasibility Study

305777-001

RESISTANCE '*R* ' VALUE AND EXPANSION PRESSURE

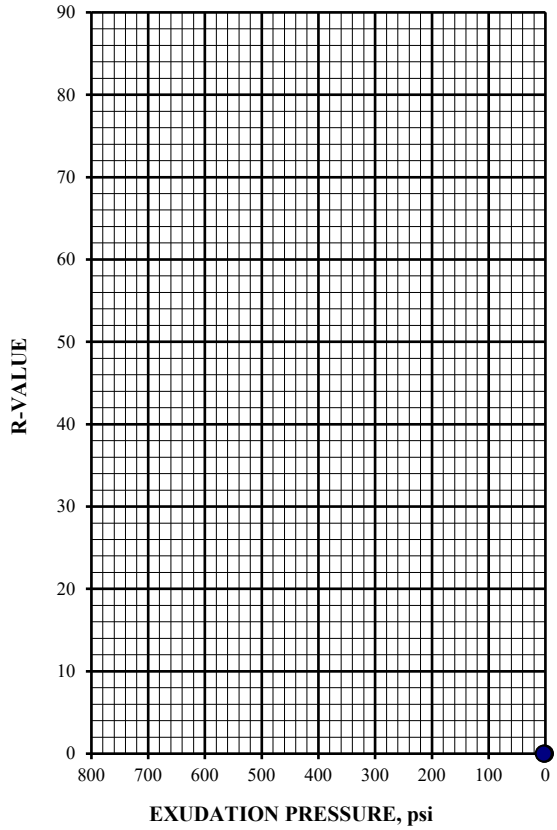
ASTM D 2844/D2844M-18

January 11, 2023

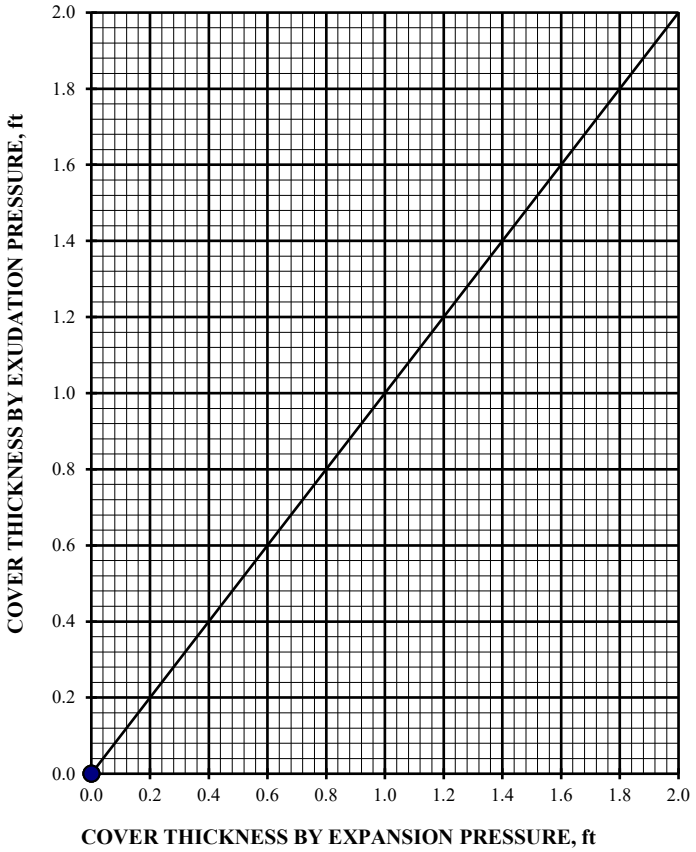
Bag A; Bulk @ 1.0 -3.0'
Brown Sandy Fat Clay (CH)

Dry Density @ 300 psi Exudation Pressure: N/A
%Moisture @ 300 psi Exudation Pressure: N/A
R-Value - Exudation Pressure: N/A
R-Value - Expansion Pressure: N/A
R-Value @ Equilibrium: Less than 5
(sample extruded from mold during testing)

EXUDATION PRESSURE CHART



EXPANSION PRESSURE CHART



CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

12 January, 2023

Job No. 2301012
Cust. No. 13342

Mr. Antonio Hernandez
Earth Systems
1514 Moffett Street, Suite A
Salinas, CA 93905

Subject: Project No.: 305777-001
Project Name: New Bradley Proposed Library Building, Bradley, CA
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Hernandez:

Pursuant to your request, CERCO Analytical has analyzed the soil sample submitted on January 05, 2023. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurement, this sample is classified as "corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentration is 90 mg/kg and is determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentration is 190 mg/kg and is determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at this location.

The pH of the soil is 7.50, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potential is 300-mV and is indicative of potentially "slightly corrosive" soils resulting from anaerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

for, Sherri Moore
J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

Client: Earth Systems
Client's Project No.: 305777-001
Client's Project Name: New Bradley Proposed Library Building, Bradley, CA
Date Sampled: 28-Dec-22
Date Received: 5-Jan-23
Matrix: Soil
Authorization: Transmittal dated 01/03/23

Date of Report: 12-Jan-2023

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Conductivity (umhos/cm)*	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
2301012-001	B2-1	300	7.50	-	680	-	90	190

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
Date Analyzed:	6-Jan-2023	6-Jan-2023	-	11-Jan-2023	-	9-Jan-2023	9-Jan-2023

Sherri Moore
Chemist

* Results Reported on "As Received" Basis
N.D. - None Detected

Quality Control Summary - All laboratory quality control parameters were found to be within established limits

APPENDIX C

Table of Site-Specific Ground Motion Spectra

Table C-1
Fault Parameters

Fault Section Name	Distance (miles)	Distance (km)	Upper Seis. Depth (km)	Lower Seis. Depth (km)	Avg Dip Angle (deg.)	Avg Dip Direction (deg.)	Avg Rake (deg.)	Trace Length (km)	Fault Type	**Mean Mag**	Mean Return Interval (years)	Slip Rate (mm/yr)
Rinconada 2011 CFM FM3.1, 3.2	6.6	10.6	0.0	8.5	82	233	180	123	B	**7.5**		1
San Andreas (Parkfield) FM3.1, 3.2	16.7	26.9	0.0	10.2	90	50	180	36	A	**6.4**	13	20
San Andreas (Creeping Section) FM3.1, 3.2	17.0	27.3	0.0	12.0	90	227	180	121	A	**6.8**	89	9
Oceanic-West Huasna FM3.1, 3.2	21.4	34.5	0.0	7.0	58	49	na	122	B'	**7.1**		
San Juan FM3.1, 3.2	24.7	39.8	0.0	13.0	90	243	180	82	B	**7.1**		1
Hosgri FM3.1, 3.2	26.2	42.2	0.0	6.8	80	59	180	171	B	**7.3**		2.5
San Andreas (Cholame) rev FM3.1, 3.2	29.3	47.2	0.0	12.0	90	51	180	63	A	**6.8**	89	3.5
La Panza FM3.1, 3.2	29.6	47.7	0.0	13.9	51	45	na	72	B'	**7.3**		
Reliz 2011 CFM FM3.1, 3.2	34.4	55.4	0.0	10.9	58	240	na	127	B'	**7.4**		
Los Osos 2011 CFM FM3.1, 3.2	36.2	58.3	0.0	12.0	45	208	90	58	B	**6.9**		0.5
Calaveras (So) - Paicines extension FM3.1, 3.2	39.9	64.3	0.0	13.0	77	na	na	60	B'	**7.0**		
Great Valley 13 (Coalinga) FM3.1, 3.2	41.5	66.8	9.1	15.2	15	226	90	32	B	**7.0**		1.5
Great Valley 14 (Kettleman Hills) FM3.1, 3.2	41.6	66.9	8.1	22.5	22	215	90	24	B	**7.1**		1.5
Great Valley 12 FM3.1, 3.2	41.6	66.9	7.0	9.6	15	243	90	17	B	**6.3**		1.5
Shoreline FM3.1, 3.2	42.6	68.6	0.0	12.0	90	na	na	23	B'	**6.5**		
East Huasna 2011 CFM FM3.1, 3.2	42.7	68.7	0.0	15.0	90	na	na	74	B'	**7.2**		
San Luis Range 2011 CFM, FM3.1	46.3	74.5	0.0	12.0	52	na	na	79	B'	**7.2**		
San Luis Bay 2011 CFM FM3.2	46.5	74.9	0.0	10.0	90	na	na	16	B'	**6.3**		
San Luis Range - Pecho FM3.1, 3.2	46.7	75.1	0.0	12.0	90	na	na	26	B'	**6.6**		
San Luis Range (So Margin) FM3.2	47.1	75.8	0.0	12.0	45	37	90	115	B	**7.1**		0.2
Great Valley 11 FM3.1, 3.2	47.9	77.2	7.0	9.6	15	221	90	24	B	**6.5**		1.5
South Cuyama FM3.1, 3.2	49.6	79.8	0.0	13.9	33	210	na	83	B'	**7.5**		
Lost Hills FM3.1, 3.2	49.6	79.9	4.2	12.0	29	233	na	33	B'	**6.8**		
Monterey Bay-Tularcitos FM3.1, 3.2	51.8	83.3	0.0	14.0	90	49	150	86	B	**7.3**		0.5
San Luis Range - Oceano 2011 CFM, FM3.1	51.9	83.6	0.0	12.0	45	na	na	21	B'	**6.6**		
Ortigalita (South) FM3.1, 3.2	52.6	84.7	0.0	11.0	90	na	na	62	B'	**6.9**		
Great Valley 10 Panoche FM3.1, 3.2	53.5	86.1	7.0	9.6	15	242	90	22	B	**6.4**		1.5
San Gregorio (South) 2011 CFM FM3.1, 3.2	54.1	87.0	0.0	11.6	75	66	180	90	B'	**7.2**		
Casmalia 2011 CFM	60.8	97.9	0.0	12.0	75	na	na	48	B'	**6.9**		
San Andreas (Carrizo) rev FM3.1, 3.2	65.0	104.5	0.0	15.1	90	224	180	59	A	**6.8**	89	3.5
Great Valley 9 Laguna Seca FM3.1, 3.2	65.3	105.1	7.0	9.6	15	237	90	39	B	**6.7**		1.5
Quien Sabe 2011 CFM FM3.1, 3.2	65.5	105.4	0.0	10.1	85	54	180	25	B	**6.5**		1
Lions Head 2011 CFM FM3.1, 3.2	67.5	108.6	0.0	12.0	75	29	90	65	B	**6.7**		0.02
Morales (West) FM3.1, 3.2	69.4	111.6	0.0	8.6	32	49	na	28	B'	**6.8**		
Hosgri (Extension) FM3.1, 3.2	69.7	112.2	0.0	7.5	80	79	na	29	B'	**6.4**		
Zayante-Vergeles FM3.2	73.9	118.9	0.0	12.0	90	36	150	58	B	**7.0**		0.1
Zayante-Vergeles 2011 CFM, FM3.1	74.5	119.8	0.0	11.8	30	211	na	90	B'	**7.5**		
San Andreas (Santa Cruz Mtn) FM3.1, 3.2	74.9	120.5	0.0	15.0	79	42	180	63	A	**7.6**	219	24
Calaveras (So) 2011 CFM FM3.1, 3.2	75.0	120.7	0.0	9.5	85	71	180	26	A	**6.0**	20	6
Sargent 2011 CFM FM3.1, 3.2	77.3	124.4	0.0	12.0	90	na	na	57	B'	**6.9**		

Reference: USGS OFR 2013-1165 (CGS SP 228)

Based on Site Coordinates of 35.863535 Latitude, -120.805166 Longitude

Mean Magnitude for Type A Faults based on 0.1 weight for unsegmented section, 0.9 weight for segmented model (weighted by probability of each scenario with section listed as given on Table 3 of Appendix G in OFR 2008-1437). Mean magntude is average of Ellworths-B and Hanks & Bakun moment area relationship.

Site Coordinates: 35.864 N 120.805 W

Table C-2
Historical Earthquakes in Vicinity of Project Site, M >= 5.5

Day	Year	Epicenter Latitude (Degrees)	Epicenter Longitude (Degrees)	Distance from Site (mi)	Magnitude M_W
1/9	1857	36.10	120.65	18.5	**6.1**
2/2	1881	36.05	120.55	19.2	**6.0**
5/6	1881	36.05	120.55	19.2	**5.5**
3/3	1901	36.00	120.50	19.5	**6.4**
2/1	1853	35.70	121.10	20.0	**5.5**
12/22	2003	35.70	121.10	20.0	**6.6**
1/14	1855	36.15	120.70	20.6	**5.5**
1/9	1857	36.20	120.80	23.2	**7.9**
4/12	1885	36.20	120.80	23.2	**6.5**
9/28	2004	35.82	120.37	24.5	**6.0**
9/2	1853	36.25	120.80	26.7	**6.3**
11/22	1952	35.76	121.27	27.0	**6.2**
6/8	1934	35.79	120.29	29.3	**6.0**
1/9	1857	36.29	120.85	29.6	**5.6**
6/28	1966	35.81	120.27	30.2	**6.0**
5/30	1877	35.70	120.30	30.5	**5.5**
3/10	1922	35.75	120.25	32.1	**6.3**
8/18	1922	35.75	120.25	32.1	**5.7**
12/7	1906	35.50	121.20	33.5	**5.7**
4/17	1860	36.35	120.95	34.5	**6.0**
7/22	1983	36.26	120.38	36.2	**5.7**
99/99	1830	35.35	120.65	36.5	**6.0**
5/2	1983	36.23	120.32	37.1	**6.3**
5/2	1983	36.23	120.29	38.3	**5.7**
4/27	1908	35.60	120.20	38.5	**5.5**
9/5	1922	35.30	120.70	39.4	**5.5**
7/4	2005	36.34	121.23	40.5	**5.7**
12/27	1926	36.40	120.40	43.4	**5.5**
5/26	1905	36.50	120.60	45.4	**6.1**
8/4	1985	36.15	120.05	46.6	**6.1**
3/6	1882	36.50	121.10	46.9	**5.9**
3/25	1903	36.10	121.60	47.3	**5.9**
7/25	1926	36.50	120.40	49.4	**5.8**
4/2	1885	36.60	121.10	53.4	**5.9**
8/6	1916	36.67	121.25	60.9	**5.8**
3/31	1885	36.70	121.20	61.8	**5.7**
4/9	1961	36.68	121.30	62.7	**5.5**
4/9	1961	36.70	121.30	64.0	**5.5**

From full earthquake catalog in USGS OFR 2008-1437h as updated with current events through 2022 (ANSS 2022). For events with an asterisk, alternate solutions are given in the OFR. Ordered By Closest Event. Maximum 40 Closest Events

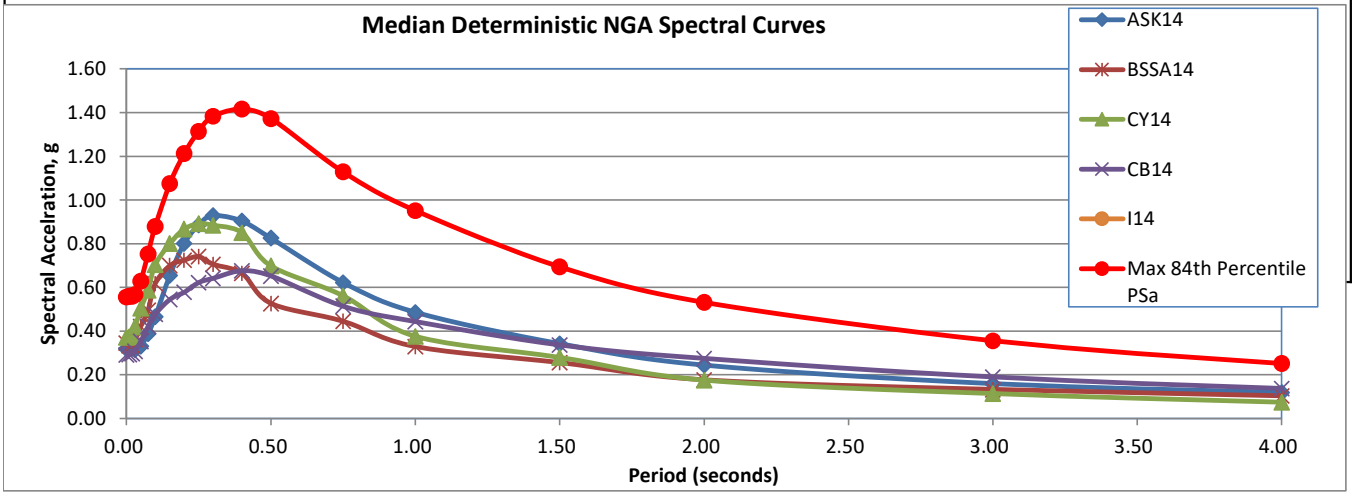
35.8635 -120.80517 Lat/Long

Table C-3 - Deterministic Spectral Response Values
Deterministic NGA Response Spectra for Largest Median Earthquake Ground Motion

Average of NGA: Abrahamson - Silva - Kamai (2014), Boore - Stewart - Seyhan - Atkinson (2013), Campbell-Bozorgnia (2013), Chiou - Youngs (2014), and Idriss (2013)

Mean Spectra Response from Attentuation Relationships

Input Variables	ASK14		BSSA14	CB14	CY14	I14	Average			
	Period (sec)	Median PSa (g)	Median PSa (g)	Median PSa (g)	Median PSa (g)	Median PSa (g)	Period (sec)	Mean PSa (g)	Max 84th Percentile PSa (g)	Max Rotated Determ. PSa
	Weight:	**0.25**	**0.25**	**0.25**	**0.25**	**0.00**				
M 7.45	**0.00**	0.32	0.34	0.29	0.37	-	**0.00**	0.330	0.555	**0.611**
	0.01	0.32	0.34	0.29	0.37	-	**0.01**	0.332	0.559	**0.615**
R_{RUP} 10.60	**0.02**	0.32	0.33	0.30	0.37	-	**0.02**	0.331	0.559	**0.615**
	0.03	0.31	0.33	0.31	0.38	-	**0.03**	0.334	0.566	**0.623**
R_{JB} 10.60	**0.05**	0.33	0.36	0.35	0.42	-	**0.05**	0.366	0.628	**0.691**
	0.075	0.39	0.42	0.42	0.50	-	**0.075**	0.433	0.753	**0.829**
$V_{S\,30}$ 270	**0.10**	0.47	0.50	0.48	0.59	-	**0.10**	0.506	0.879	**0.967**
	0.15	0.65	0.62	0.54	0.70	-	**0.15**	0.630	1.075	**1.182**
F_{RV} 0	**0.20**	0.80	0.70	0.58	0.80	-	**0.20**	0.719	1.213	**1.334**
	0.25	0.89	0.72	0.62	0.87	-	**0.25**	0.774	1.314	**1.507**
F_{NM} 0	**0.30**	0.93	0.74	0.64	0.89	-	**0.30**	0.800	1.383	**1.600**
	0.40	0.90	0.70	0.68	0.88	-	**0.40**	0.792	1.416	**1.667**
W 8.60	**0.50**	0.83	0.66	0.65	0.85	-	**0.50**	0.748	1.372	**1.644**
	0.75	0.62	0.53	0.51	0.70	-	**0.75**	0.590	1.128	**1.409**
Z_{TOR} 0.00	**1.00**	0.49	0.44	0.44	0.56	-	**1.00**	0.484	0.951	**1.236**
	1.50	0.34	0.33	0.34	0.38	-	**1.50**	0.345	0.694	**0.920**
Z_{BOT} 8.50	**2.00**	0.24	0.26	0.27	0.28	-	**2.00**	0.263	0.532	**0.718**
	3.00	0.16	0.18	0.19	0.18	-	**3.00**	0.175	0.355	**0.497**
dip 82	**4.00**	0.12	0.13	0.14	0.11	-	**4.00**	0.125	0.252	**0.365**
	5.00	0.09	0.10	0.10	0.07	-	**5.00**	0.092	0.184	**0.276**
	7.50	0.06	0.06	0.04	0.03	-	**7.50**	0.047	0.091	**0.137**
	10.00	0.04	0.03	0.02	0.02	-	**10.00**	0.027	0.051	**0.077**



35.863535 -120.80517 Lat/Long

Table C-4 - Site Specific Spectral Response Values
Probabilistic and Deterministic Response Spectra for MCE compared to Code Spectra
for 5% Viscous Damping Ratio

Natural Period T (seconds)	GeoMean Probab. 2% in 50 year MCE Spectrum (1) 2475-year (ASCE 21.2.1)	Max Rotated Probab. 2% in 50 year MCEr Spectrum (2) 2475-year (ASCE 21.2.1.1)	Max Rotated 84th Percentile Determ. MCE Spectrum (3) (ASCE 21.2.2)	Determ. Lower Limit MCE Spectrum (4) (3) * 1.00=Scaling (ASCE 21.2.2)	Determ. MCE Spectrum (5) Max (3),(4) (ASCE 21.2.2)	Site Specific MCE, Ground Response (SaM) (6) Min (2),(5) (ASCE 21.2.3)	Site Specific MCE Spectrum Comparator (6b) Max (6),1.5*(8) (ASCE 21.2.3)	2022 CBC MCE Spectrum (7)	Site Specific Design Spectrum (Sa) (8) (ASCE 21.3)	2022 CBC Design Spectrum (9) 2/3*(7)
0.00	0.637	0.685	0.611	0.611	0.611	0.611	0.611	0.512	0.407	0.342
0.05	0.897	0.964	0.691	0.691	0.691	0.691	0.691	0.730	0.460	0.487
0.10	1.156	1.242	0.967	0.967	0.967	0.967	0.967	0.948	0.645	0.632
0.15	1.378	1.481	1.182	1.182	1.182	1.182	1.182	1.166	0.788	0.777
0.20	1.535	1.650	1.334	1.334	1.334	1.334	1.334	1.281	0.889	0.854
0.30	1.642	1.846	1.600	1.600	1.600	1.600	1.600	1.281	1.067	0.854
0.40	1.566	1.782	1.667	1.667	1.667	1.667	1.667	1.281	1.112	0.854
0.50	1.507	1.735	1.644	1.644	1.644	1.644	1.644	1.281	1.096	0.854
0.75	1.194	1.414	1.409	1.409	1.409	1.409	1.409	1.281	0.939	0.854
1.00	0.973	1.182	1.236	1.236	1.236	1.182	1.182	1.130	0.788	0.753
1.50	0.714	0.885	0.920	0.920	0.920	0.885	0.885	0.753	0.590	0.502
2.00	0.531	0.670	0.718	0.718	0.718	0.670	0.670	0.565	0.446	0.377
3.00	0.360	0.472	0.497	0.497	0.497	0.472	0.472	0.377	0.314	0.251
4.00	0.269	0.365	0.365	0.365	0.365	0.365	0.365	0.283	0.243	0.188
5.00	0.210	0.295	0.276	0.276	0.276	0.276	0.276	0.226	0.184	0.151
8.00	0.155	0.217	0.157	0.157	0.157	0.157	0.157	0.141	0.104	0.094
10.00	0.148	0.208	0.077	0.077	0.077	0.077	0.090	0.113	0.060	0.075
12.00	0.146	0.205	0.042	0.042	0.042	0.042	0.075	0.094	0.050	0.063

C_{RS}:	0.977	
C_{R1}:	0.935	
Site Specific To:	0.195	$= 0.2*S_{D1}/S_{DS}$
Site Specific Ts:	0.973	$= S_{D1}/S_{DS}$

The value of Fa used in Column (3) is defined within ASCE 21.2.2 Supplement 3. This Fa value only applies within Column (3).

Site Coefficients	
F_{PGA}	1.10
F_a	1.00
F_v	2.50

Probabilistic spectrum from 2014 USGS Ground Motion Mapping Program adjusted for site conditions and scaled to represent maximum response in a horizontal plane, in accordance with ASCE 7-16 Section 21.2

Mapped MCE Acceleration Values		
PGA	0.500	g
S_S	1.281	g
S_1	0.452	g

Risk Coefficients have been applied to Column (2); If Method 1 was utilized the Risk Coefficients, CRS and CR1 are presented above, if Method 2 was utilized the Risk Coefficients were obtained from the USGS Risk Targeted Ground Motion Calculator (https://earthquake.usgs.gov/designmaps/rtgm).

Seismic Site Class	**D**
Risk Category	**II**

Reference: ASCE 7-16, Chapters 21.2, 21.3, 21.4, 21.5, 11.4, and 11.8

Calculation Utilized ASCE7-16, Section 21.2.1.1 - Method 1

Site-Specific Design Acceleration Values		
PGA_M	**0.611**	**g**
S_{DS}	**1.000**	**g**
S_{D1}	**0.973**	**g**

Short-Period Seismic Design Category:	1-Second Period Seismic Design Category:
D	D

Vertical Coefficient (C_V)
1.36

Deterministic Fault Parameters			
Rinconada 2011 CFM FM3.1, 1		R_{JB} (km)	10.6
Magnitude	7.45	R_{RUP} (km)	10.6
Distance (km)	10.6	Z_{TOR} (km)	0.0
Width (km)	8.6	Z_{BOT} (km)	8.5
Dip (Deg.)	82	V_{S30} (m/s)	270

Site-Specific MCE_R, 5% damped, Spectral Response Acceleration Parameter		
S_{MS}	**1.501**	**g**
S_{M1}	**1.460**	**g**

1 g = 980.6 cm/sec^2 =32.2 ft/sec^2

PSV (ft/sec) = $32.2(S_a)T/(2p)$

Key: Probab. = Probabilistic, Determ. = Deterministic, MCE = Maximum Considered Earthquake

Bradley Branch Library	35.863535 -120.805 Lat/Long	305777-001

Table C-5 - General Procedure Seismic Design Values

2022 California Building Code (CBC) (ASCE 7-16) Seismic Design Parameters

(Values presented should only be used by a Structural Engineer to determine if the exception in 11.4.8 (ASCE 7-16) can be used)

				CBC Reference	ASCE 7-16 Reference
Seismic Design Category		**D**			
Site Class		**D**		Table 1613.5.6	Table 11.6-1
Latitude:		35.864		Table 1613.5.2	Table 20.3-1
Longitude:		-120.805			
Maximum Considered Earthquake (MCE) Ground Motion					
Short Period Spectral Reponse	S_S	**1.281**	**g**	Figure 1613.5	Figure 22-1
1 second Spectral Response	S_1	**0.452**	**g**	Figure 1613.5	Figure 22-2
Site Coefficient	F_a	1.00		Table 1613.5.3(1)	Table 11.4-1
Site Coefficient	F_v	1.85		Table 1613.5.3(2)	Table 11-4.2
	S_{MS}	1.281	g	$= F_a*S_S$	
	S_{M1}	0.835	g	$= F_v*S_1$	
Design Earthquake Ground Motion					
Short Period Spectral Reponse	S_{DS}	**0.854**	**g**	$= 2/3*S_{MS}$	
1 second Spectral Response	S_{D1}	**0.557**	**g**	$= 2/3*S_{M1}$	

Site Specific Evaluation May Be Required Due to Site Class = D or E and S1>=0.2. The Presented SDS and SD1 are NOT Valid Unless the Exception of ASCE7-16, Section 11.4.8 Applies

To	0.13	sec	$= 0.2*S_{D1}/S_{DS}$
Ts (11.4.8 ASCE 7-16 Exception Assumed)	0.65	sec	$= S_{D1}/S_{DS}$
Risk Category	II		Table 1604.5
Seismic Importance Factor	1.00		
F_{PGA}	1.10		
PGA_M	**0.55**		
Vertical Coefficient (C_V)	1.36		Table 11.9-1

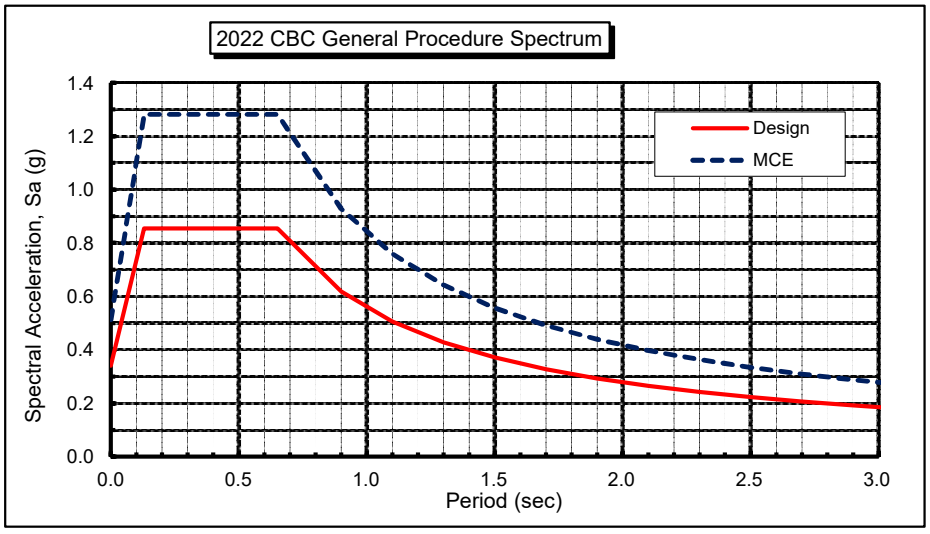


Table 11.5-1 Design

Period T (sec)	Sa (g)
0.00	0.342
0.05	0.538
0.13	0.854
0.65	0.854
0.90	0.619
1.10	0.506
1.30	0.428
1.50	0.371
1.70	0.328
1.90	0.293
2.10	0.265
2.30	0.242
2.50	0.223
2.70	0.206
2.90	0.192
3.10	0.180

APPENDIX D

Liquefaction Analysis

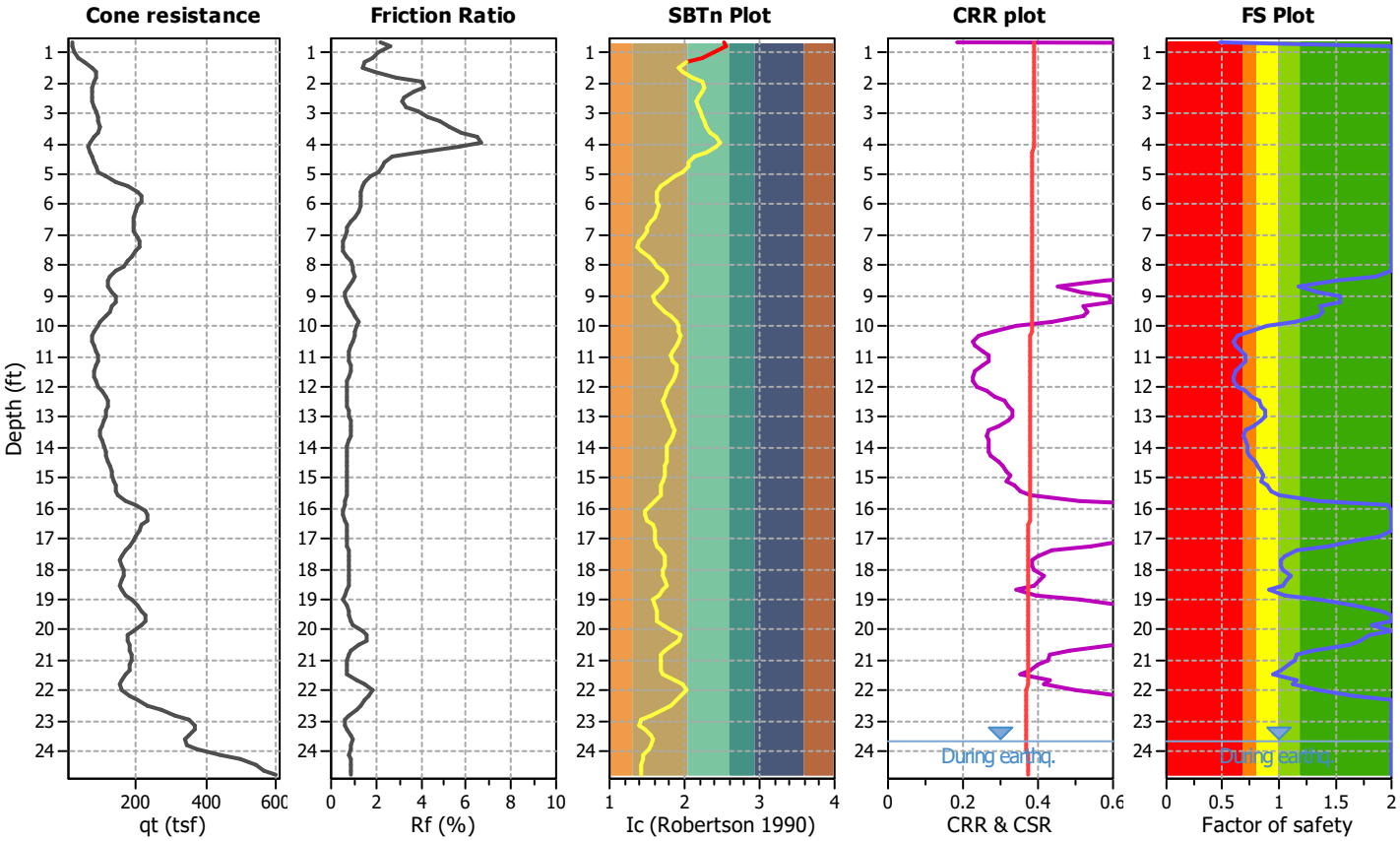
LIQUEFACTION ANALYSIS REPORT

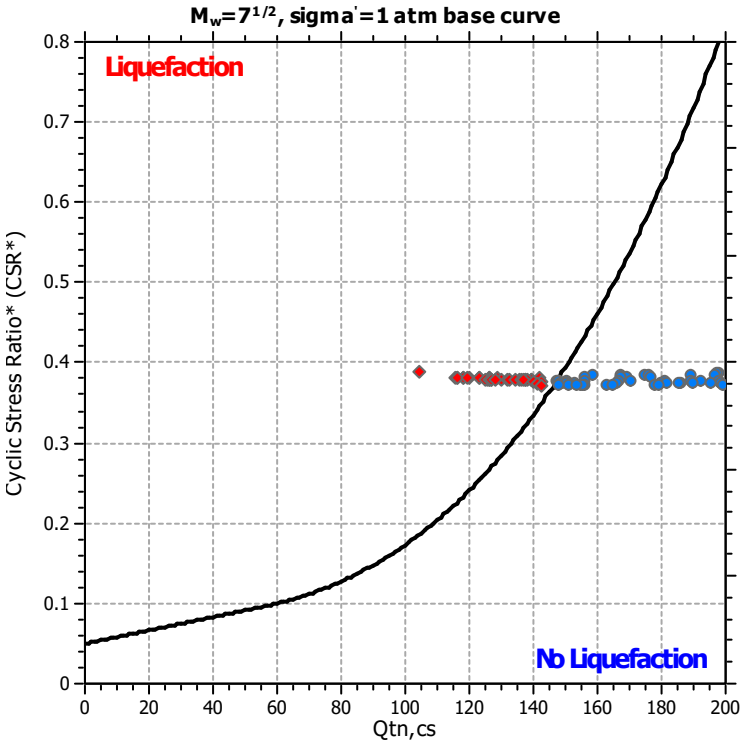
Project title : **Location :**

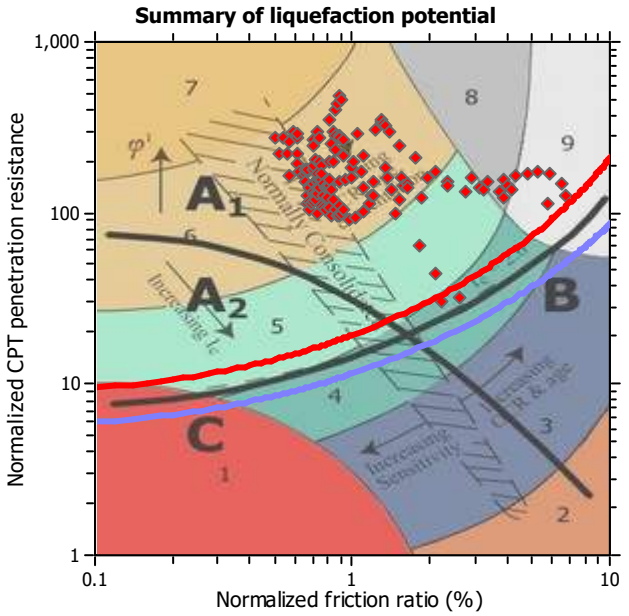
CPT file : CPT-01 - Basic

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	23.67 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	23.67 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.45	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	No		

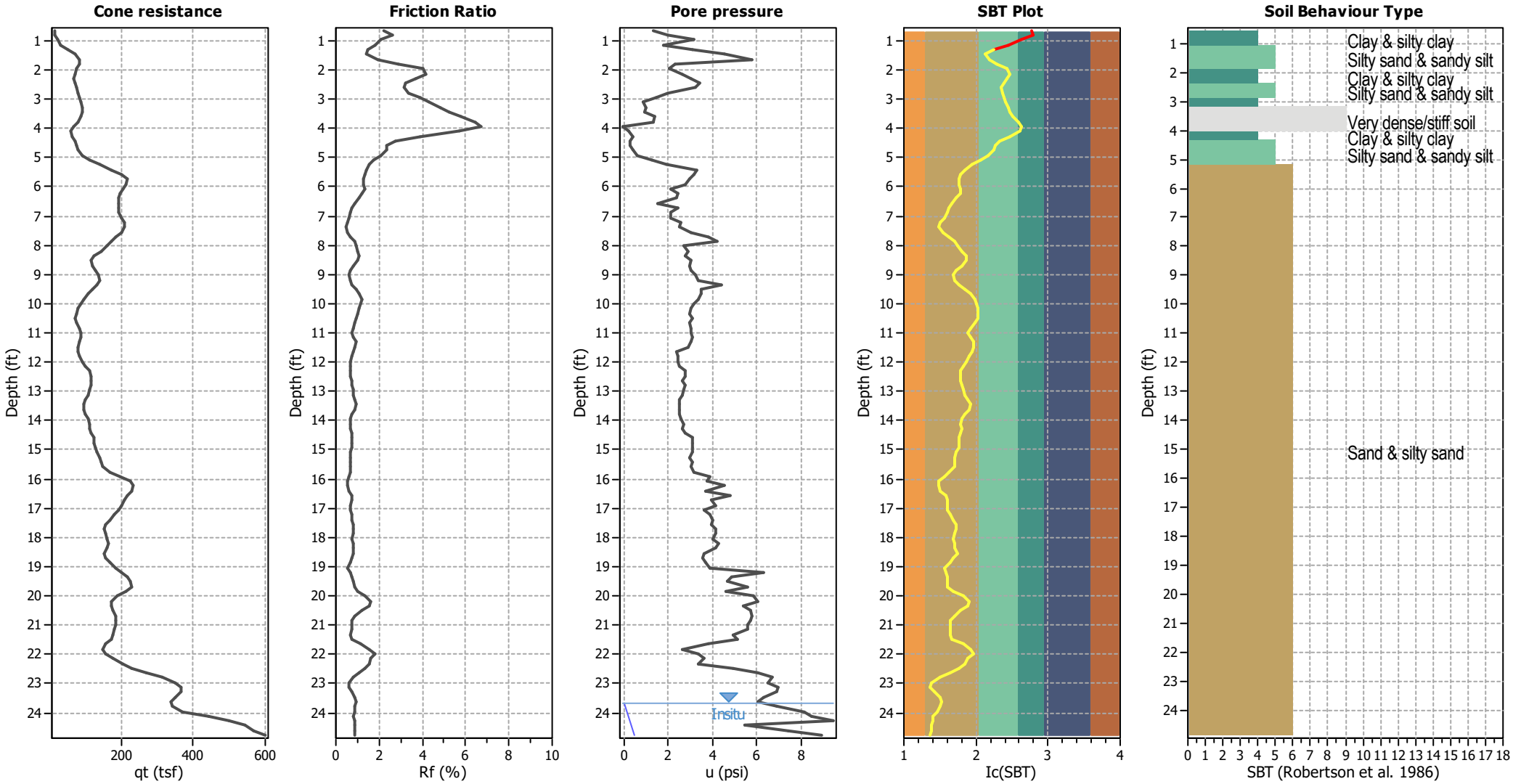






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



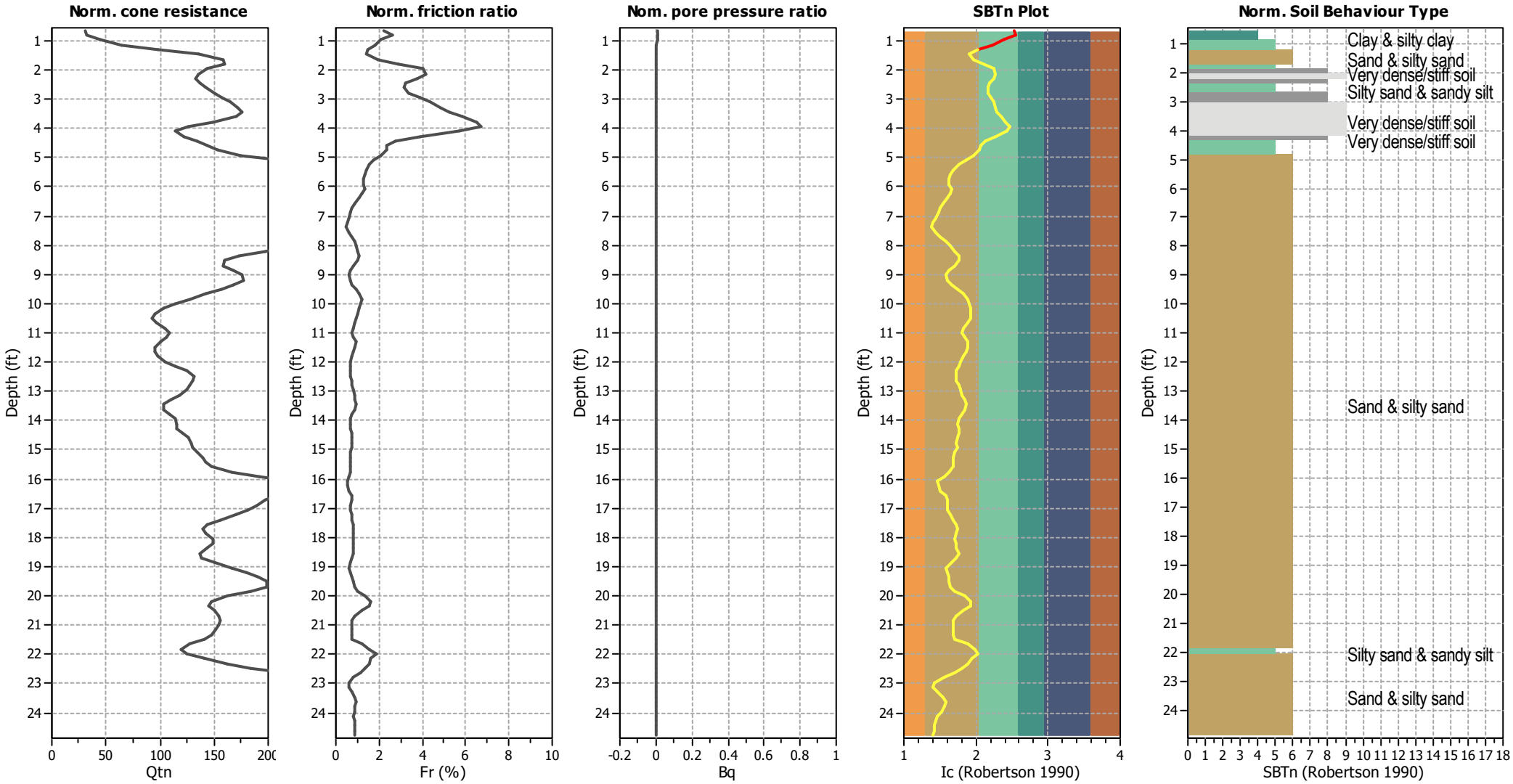
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



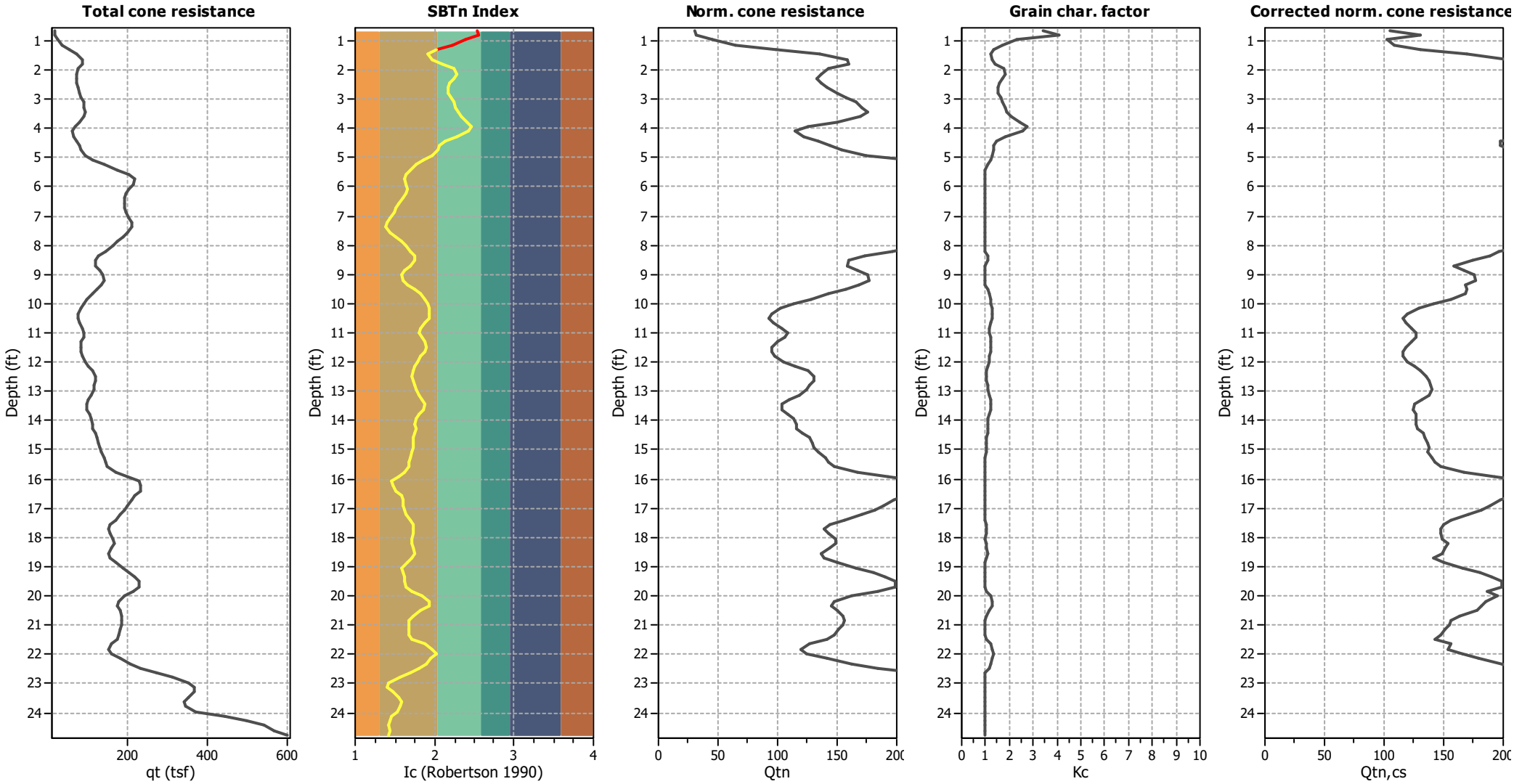
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

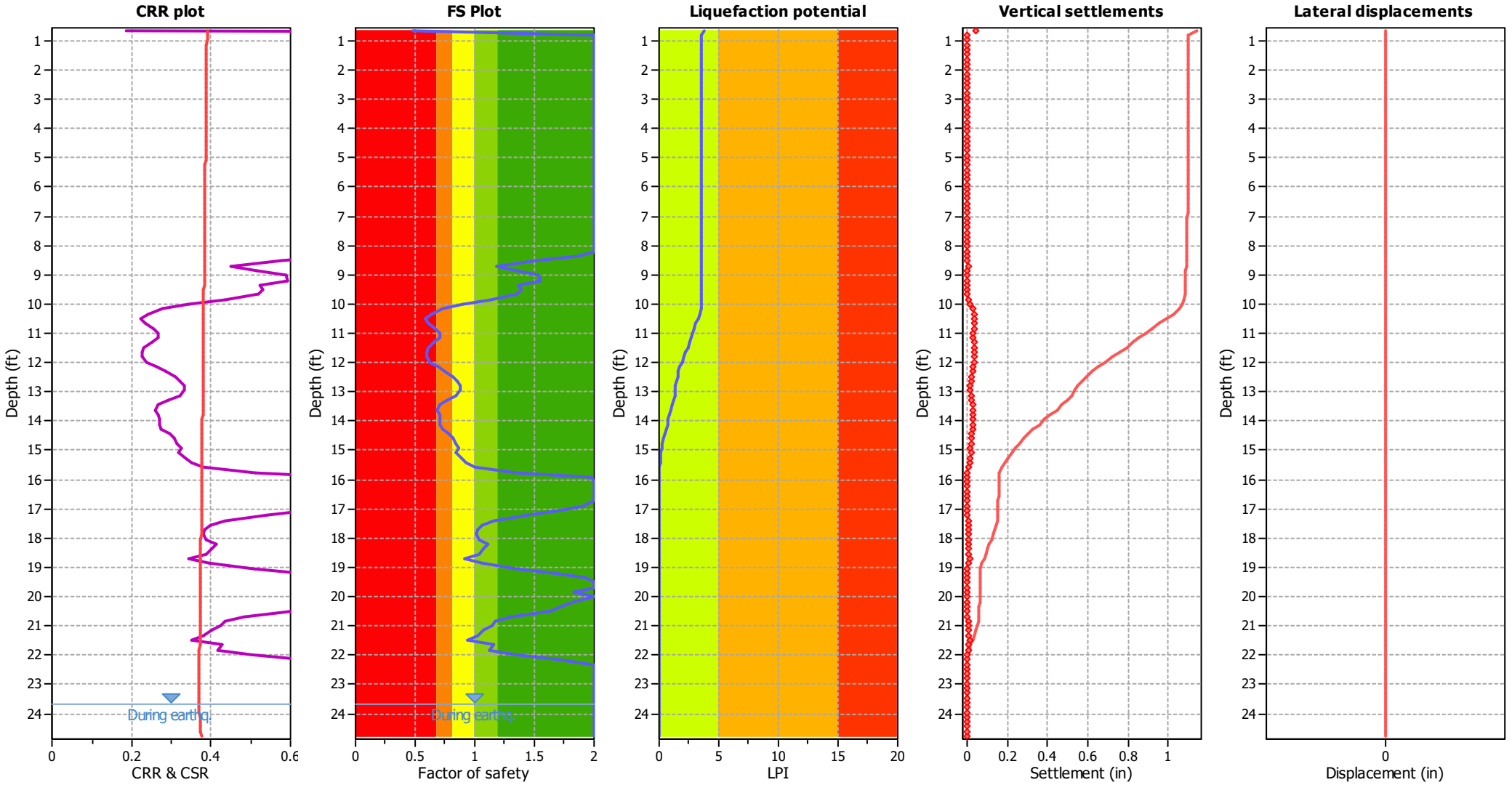
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

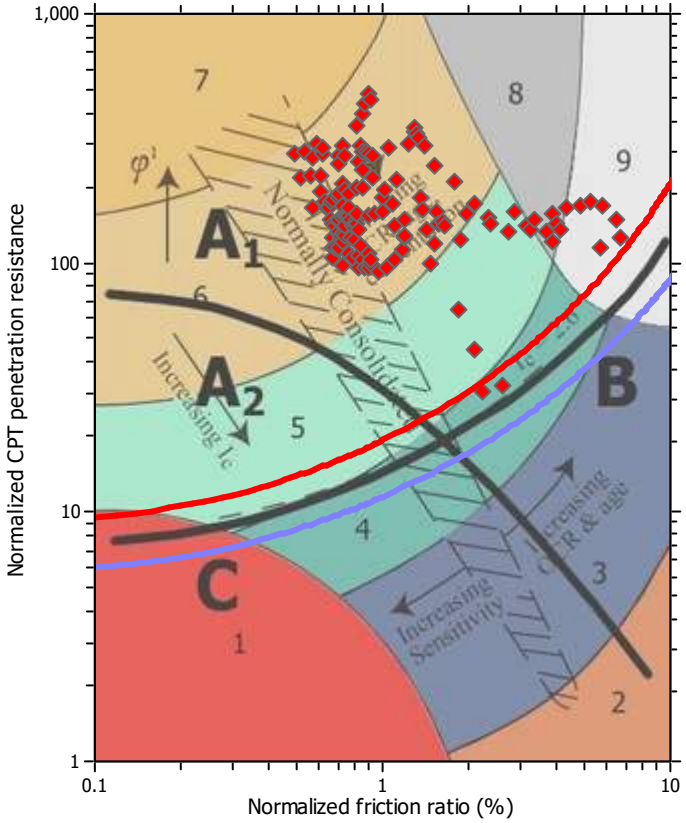
F.S. color scheme

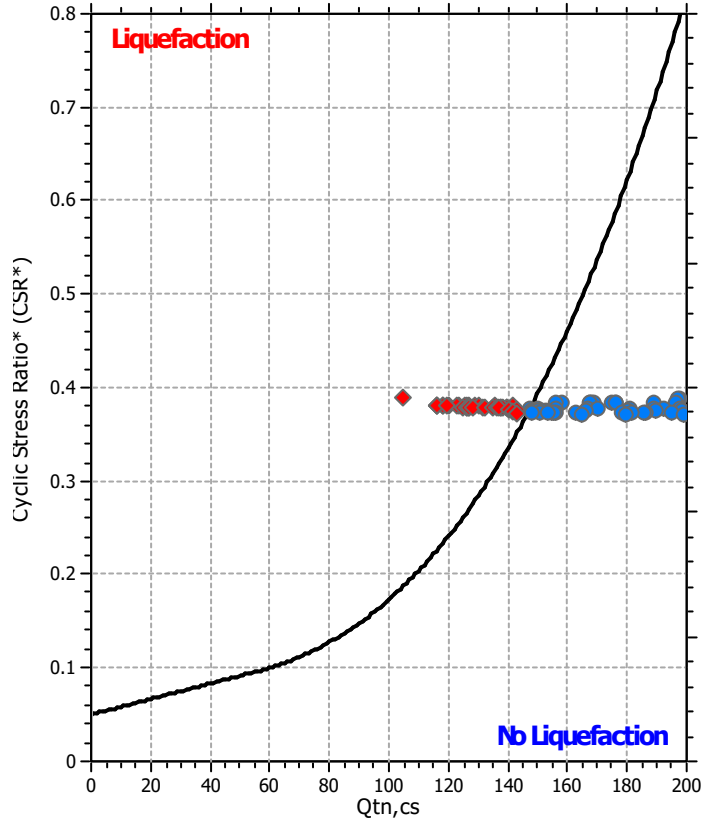
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

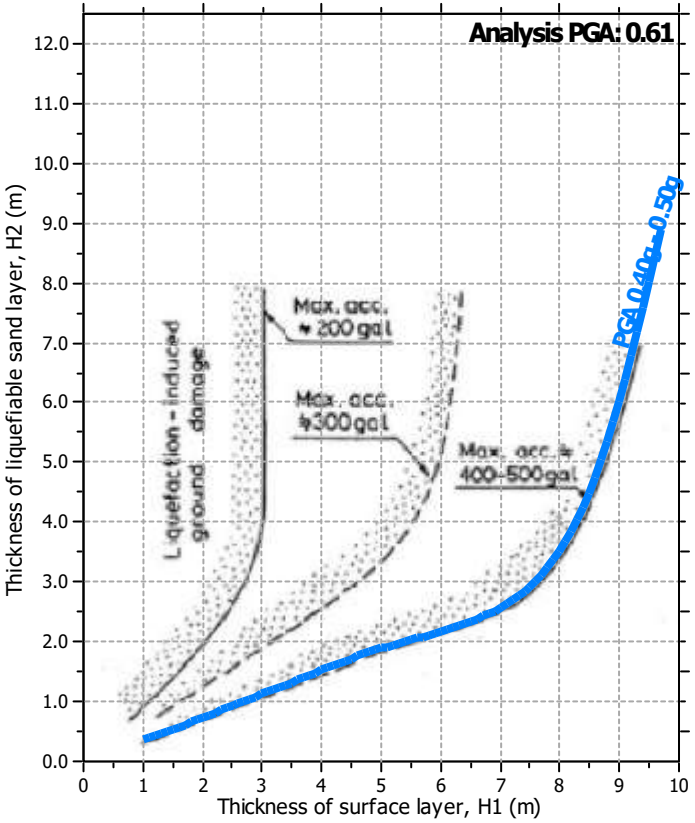
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



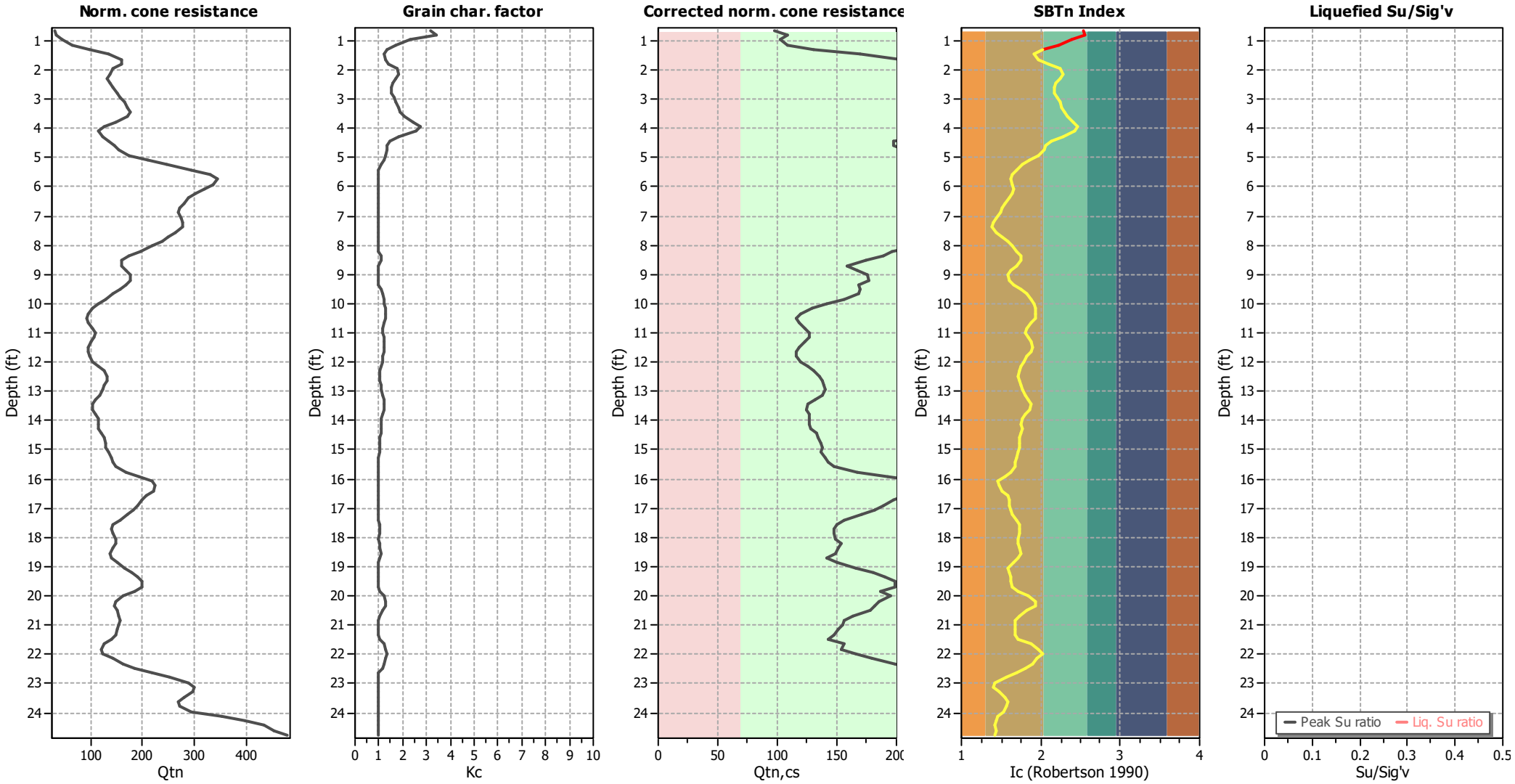




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

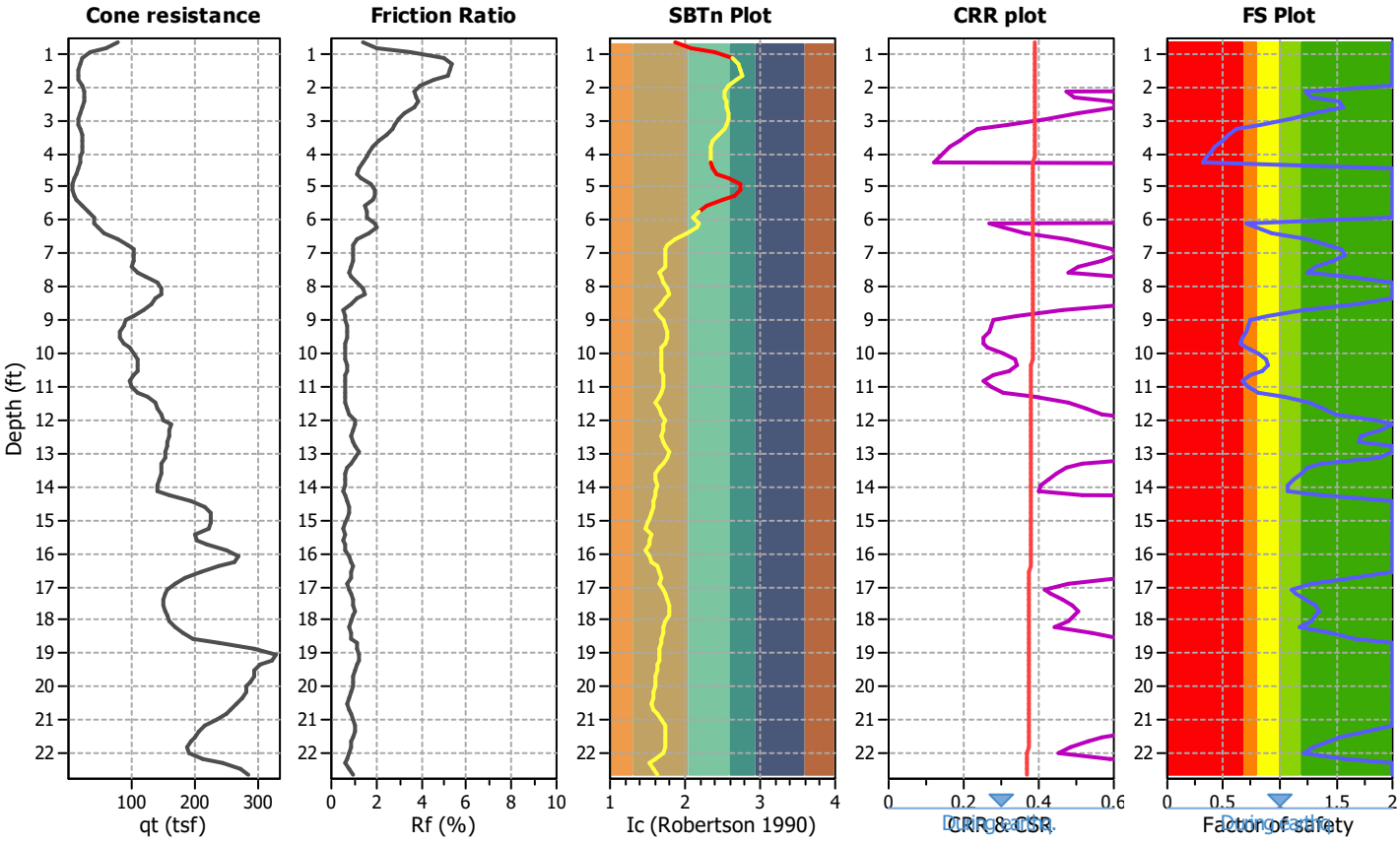
LIQUEFACTION ANALYSIS REPORT

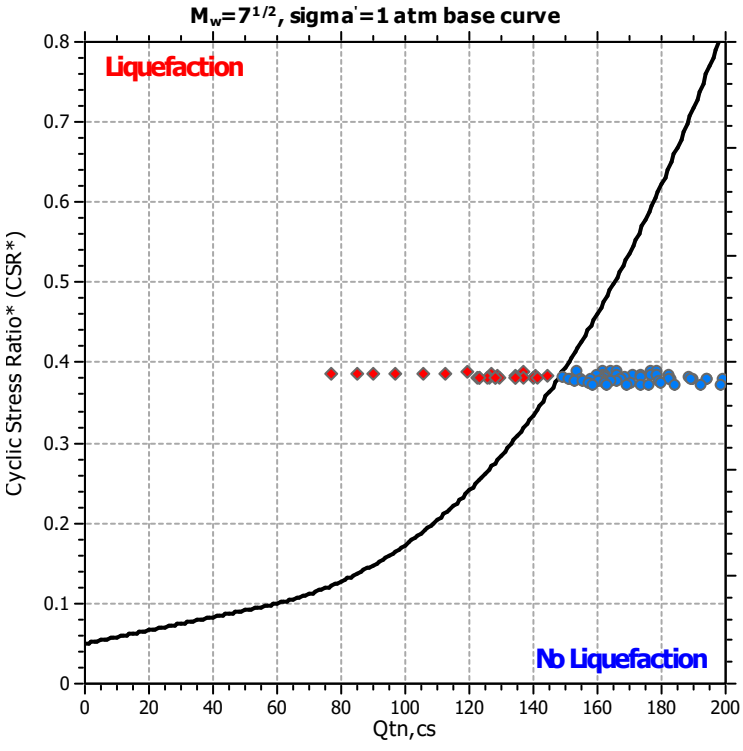
Project title : **Location :**

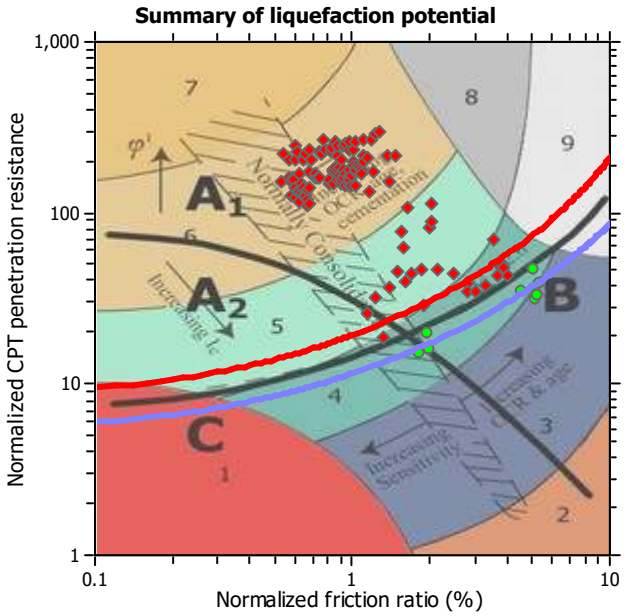
CPT file : CPT-02 - Basic

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	23.67 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	23.67 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.45	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	No		

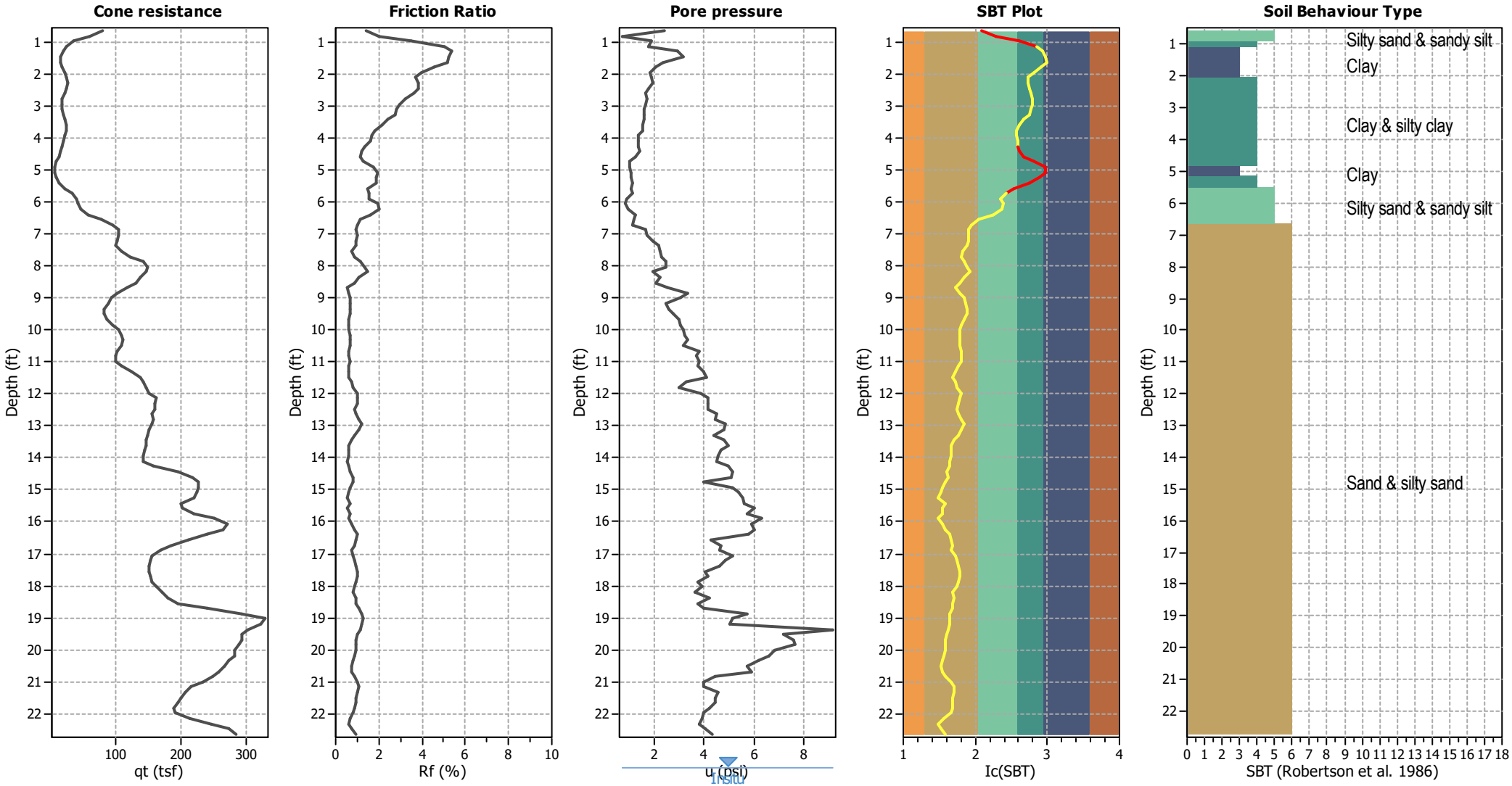






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



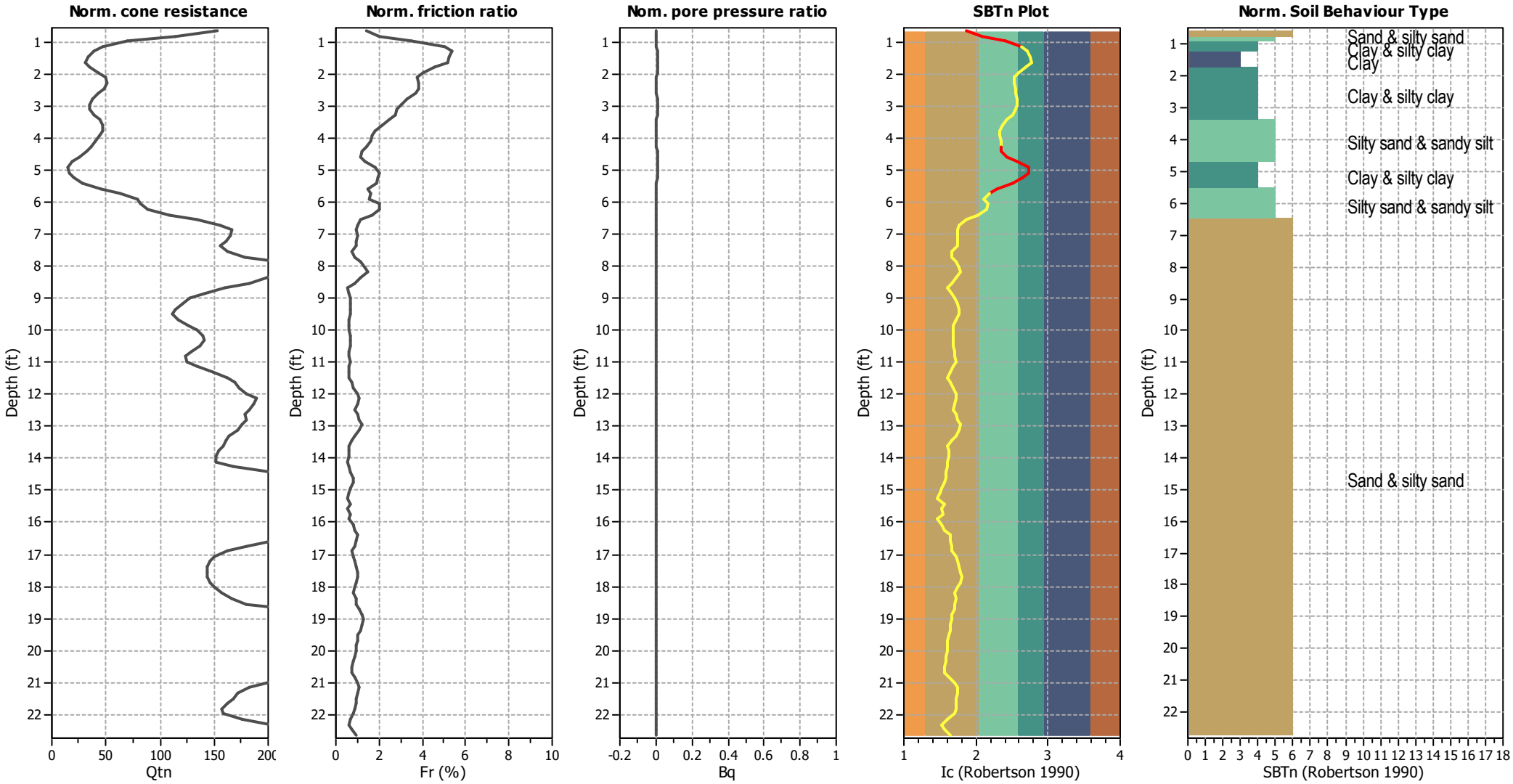
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



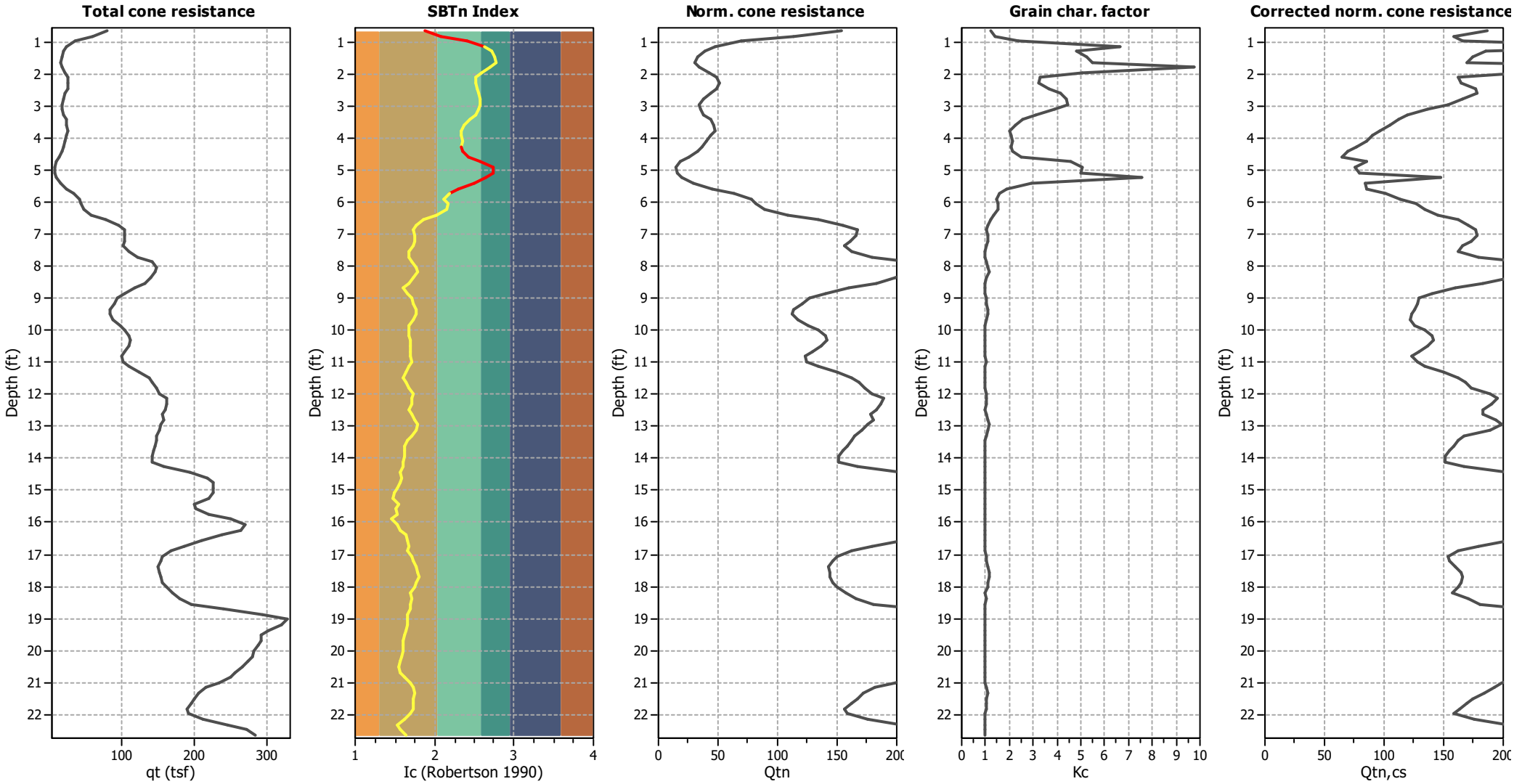
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

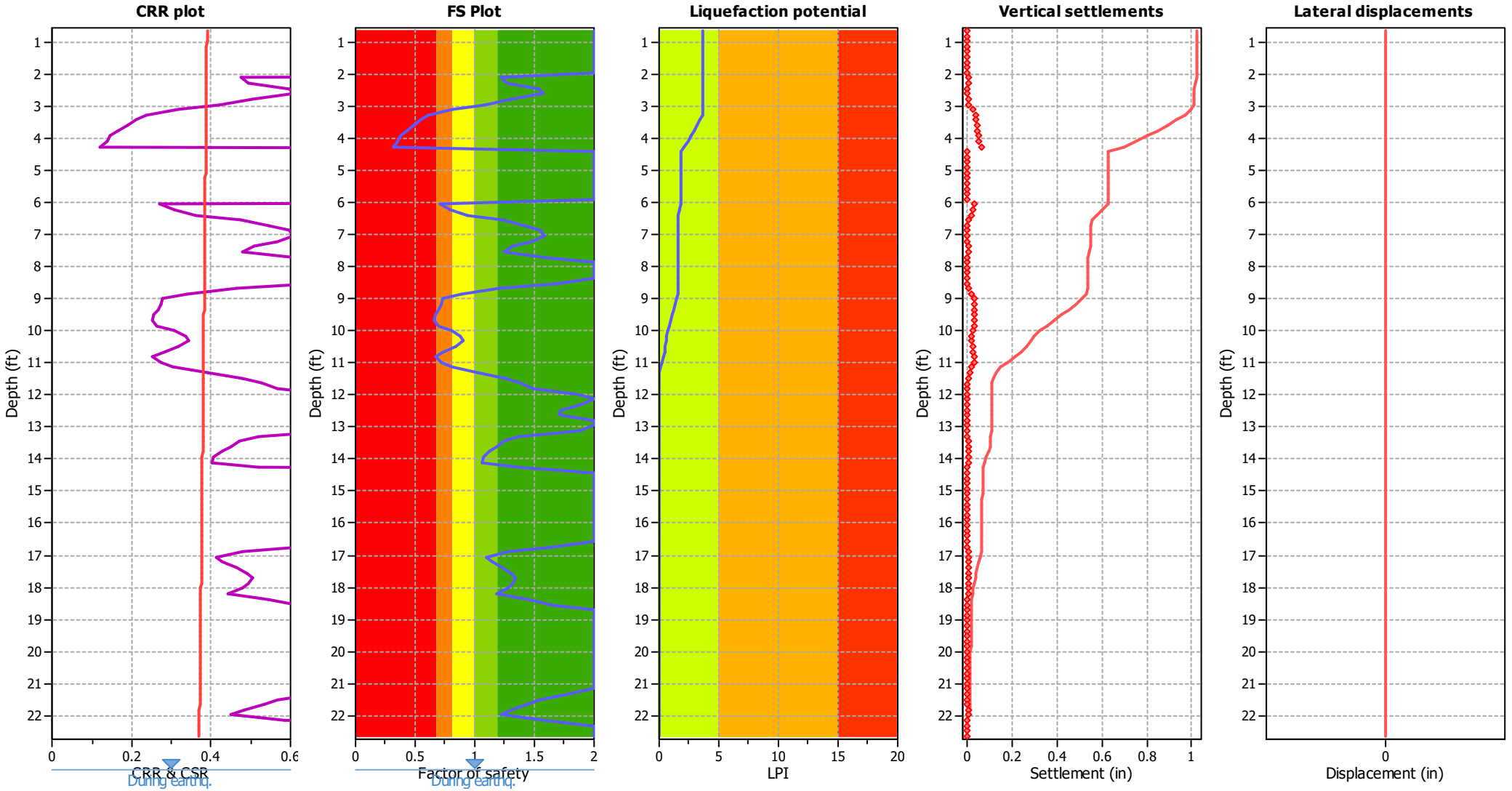
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

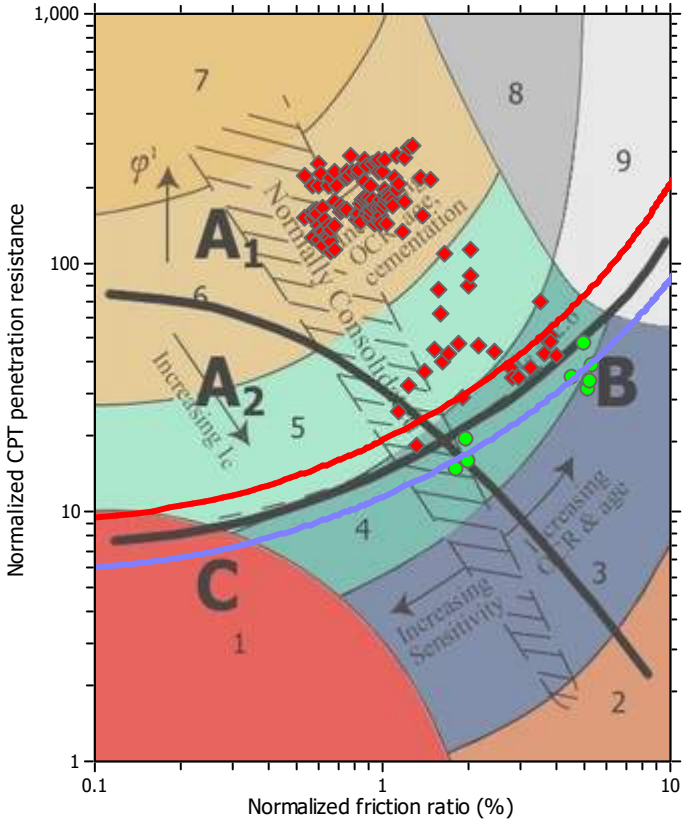
F.S. color scheme

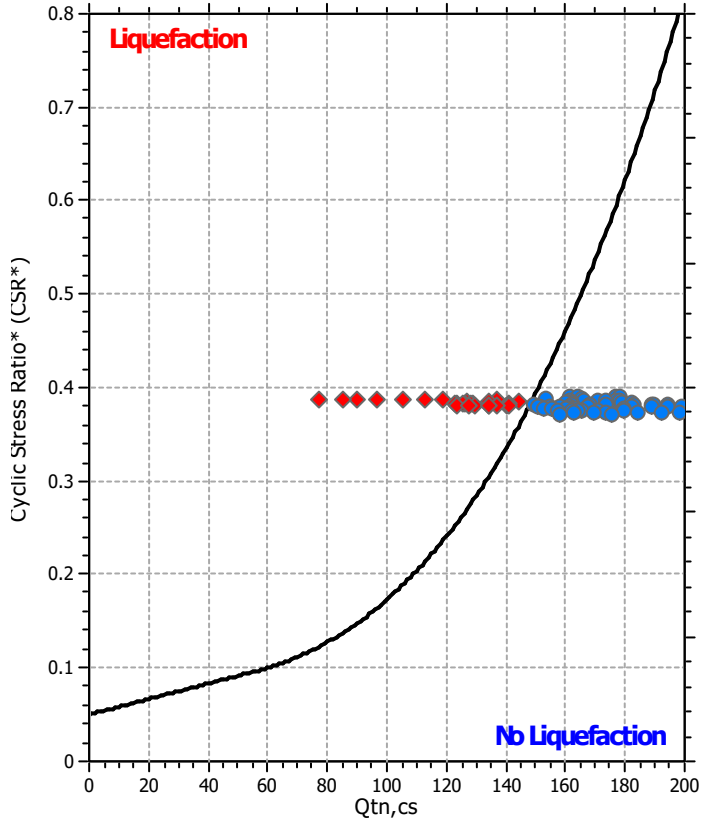
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

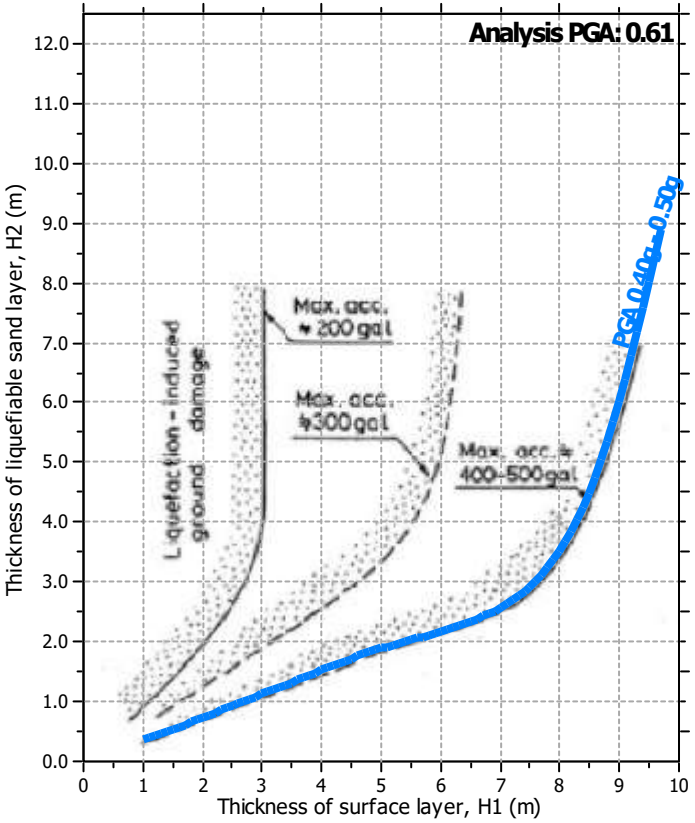
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



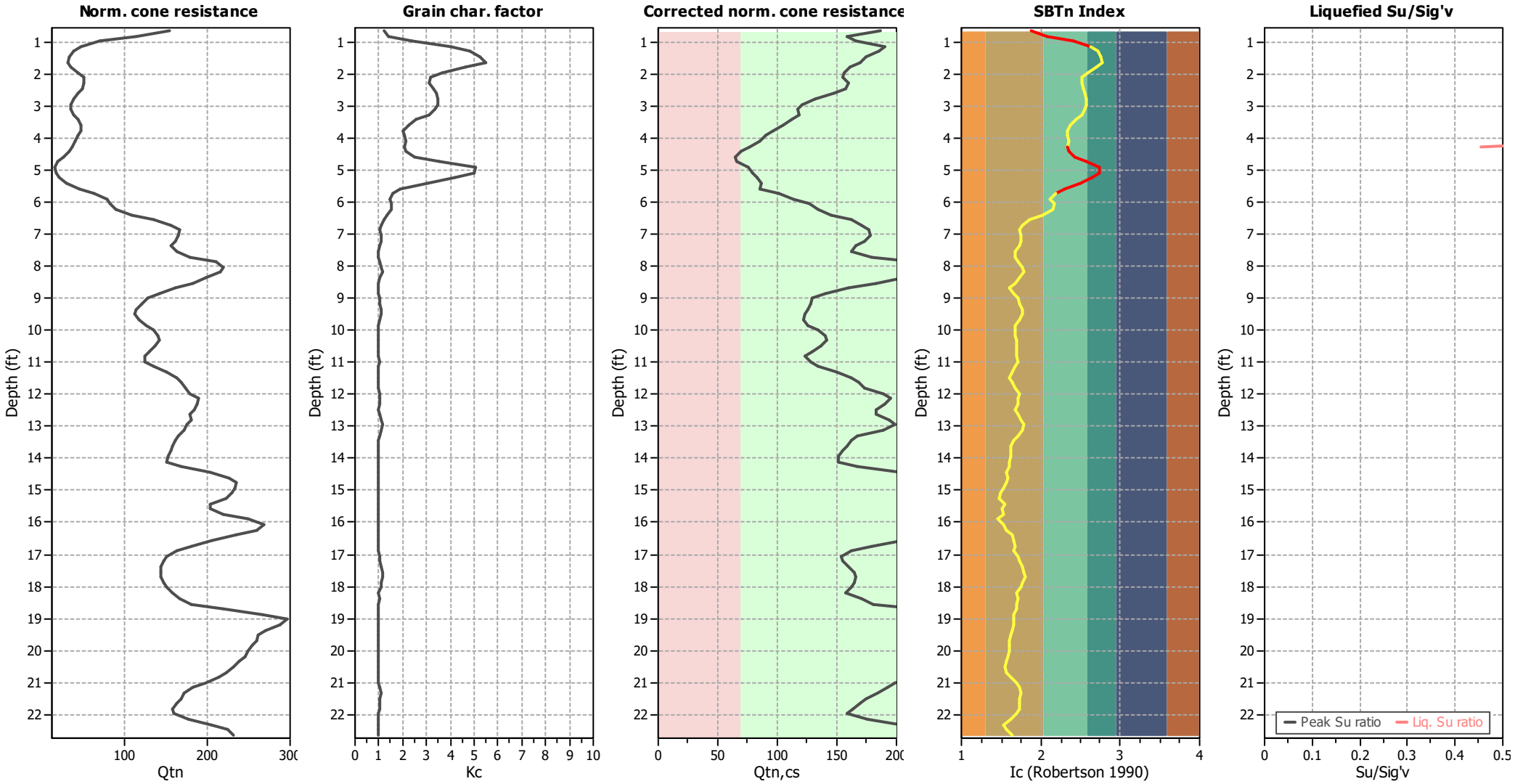




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

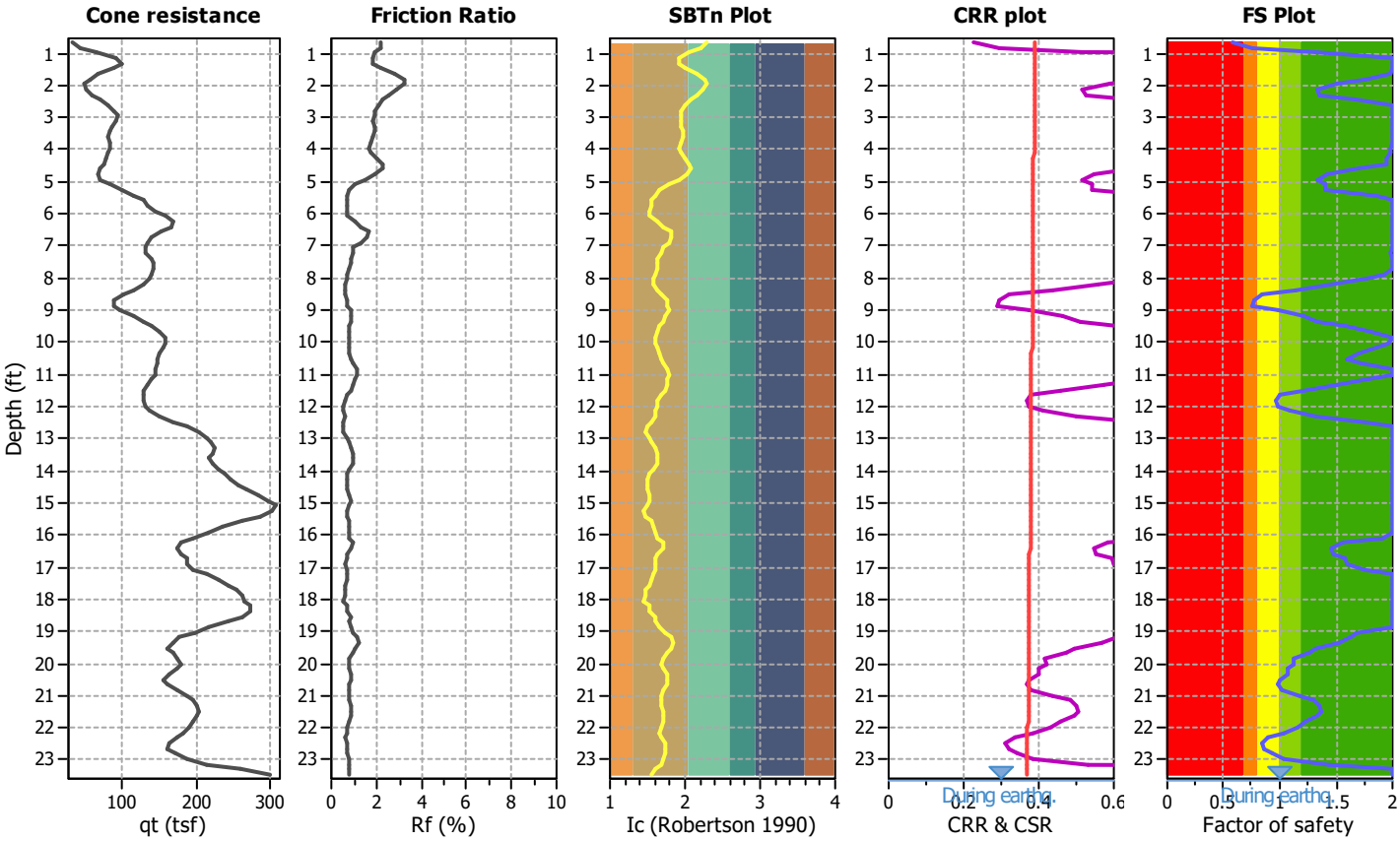
LIQUEFACTION ANALYSIS REPORT

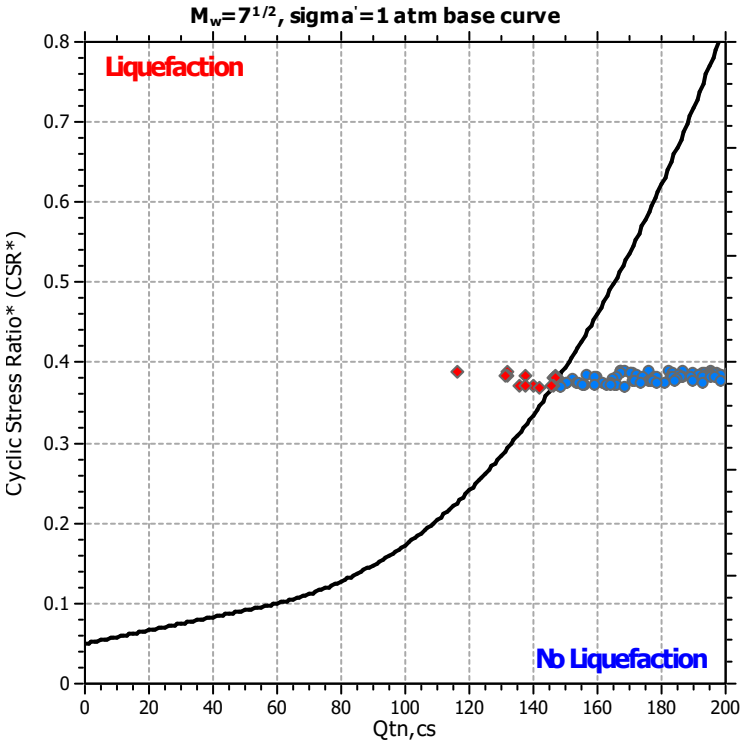
Project title : **Location :**

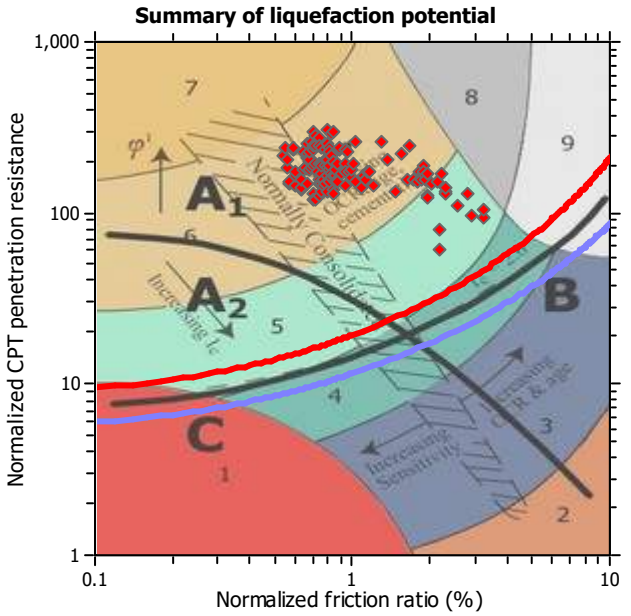
CPT file : CPT-03 - Basic

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	23.67 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	23.67 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.45	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	No		

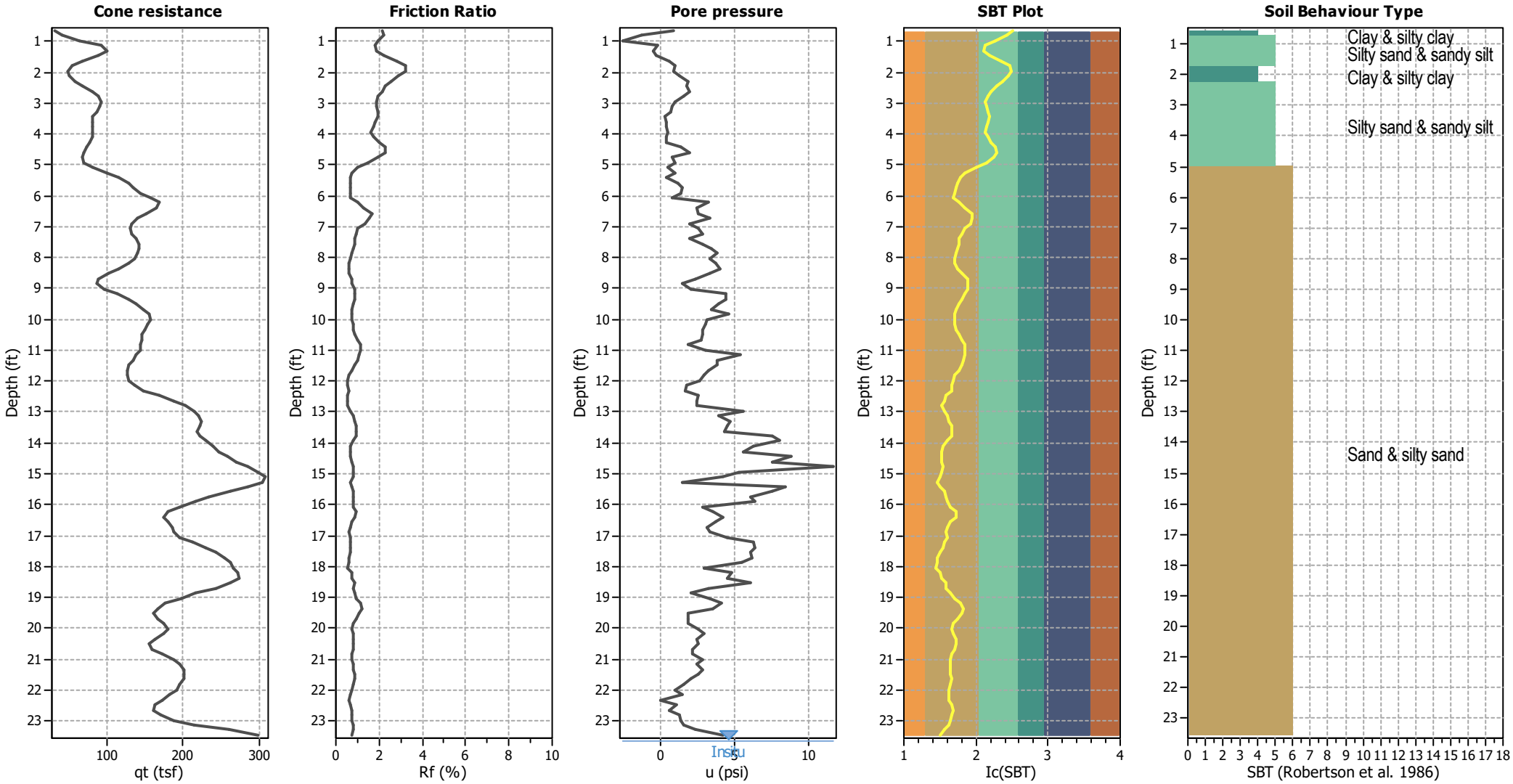






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



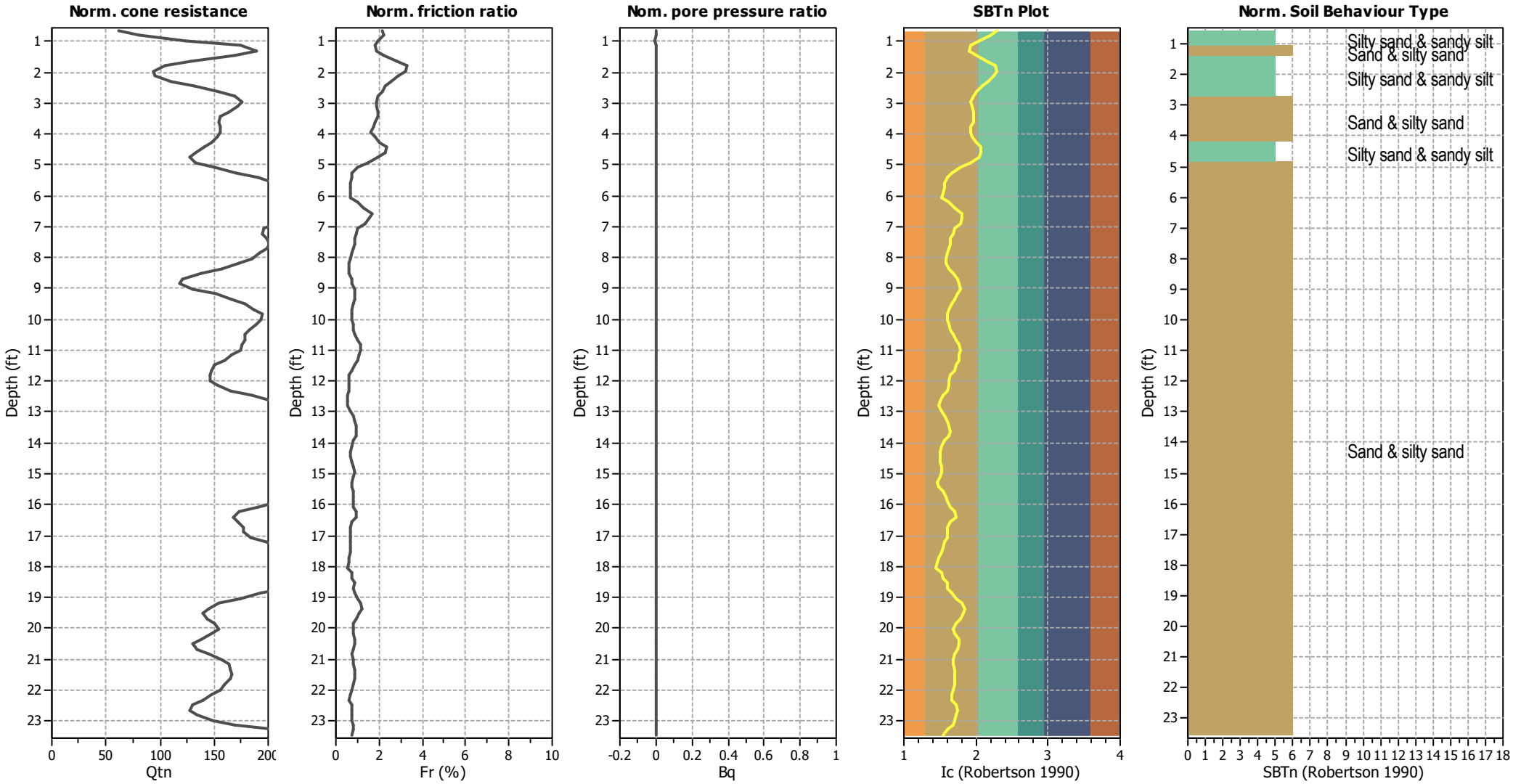
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



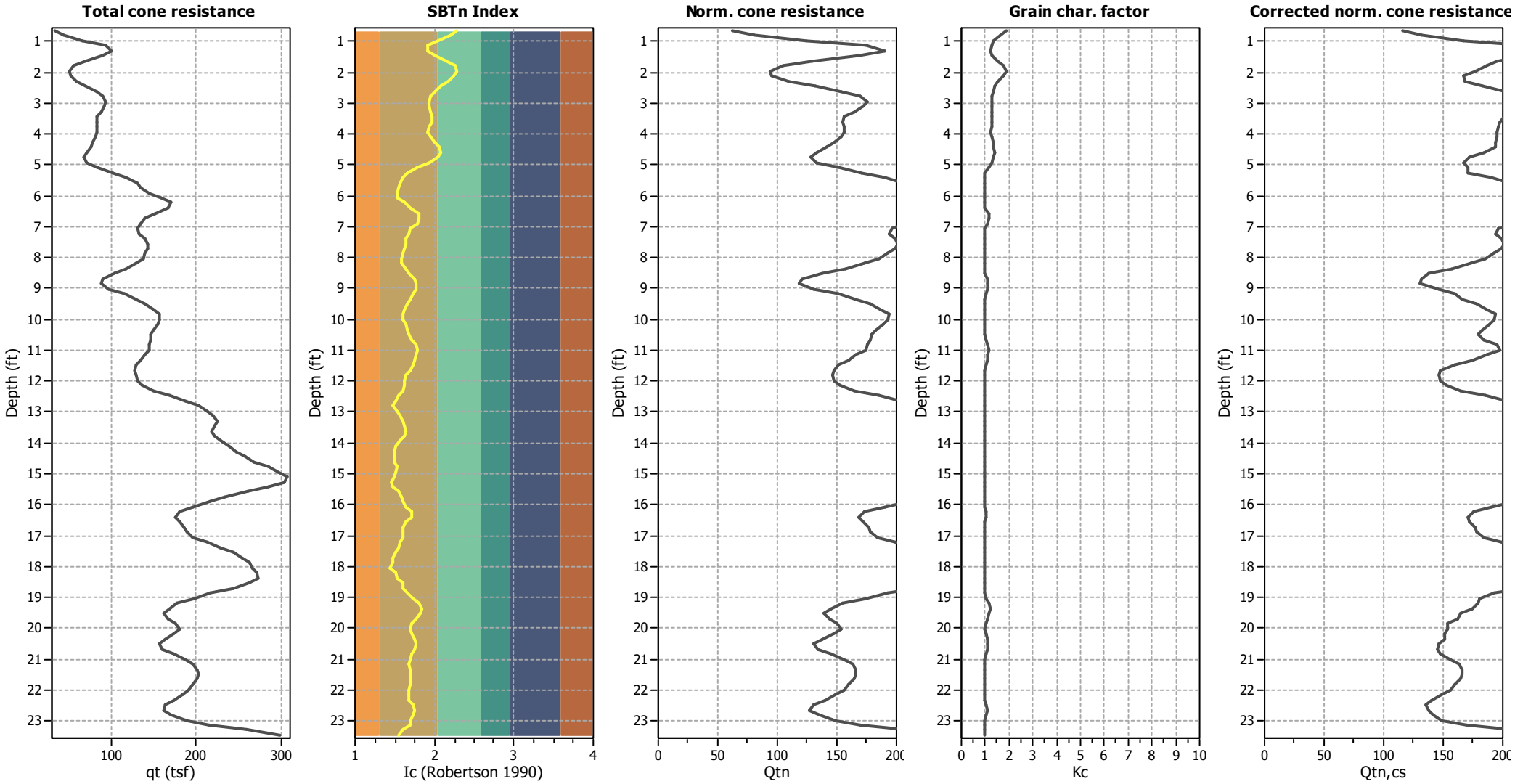
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

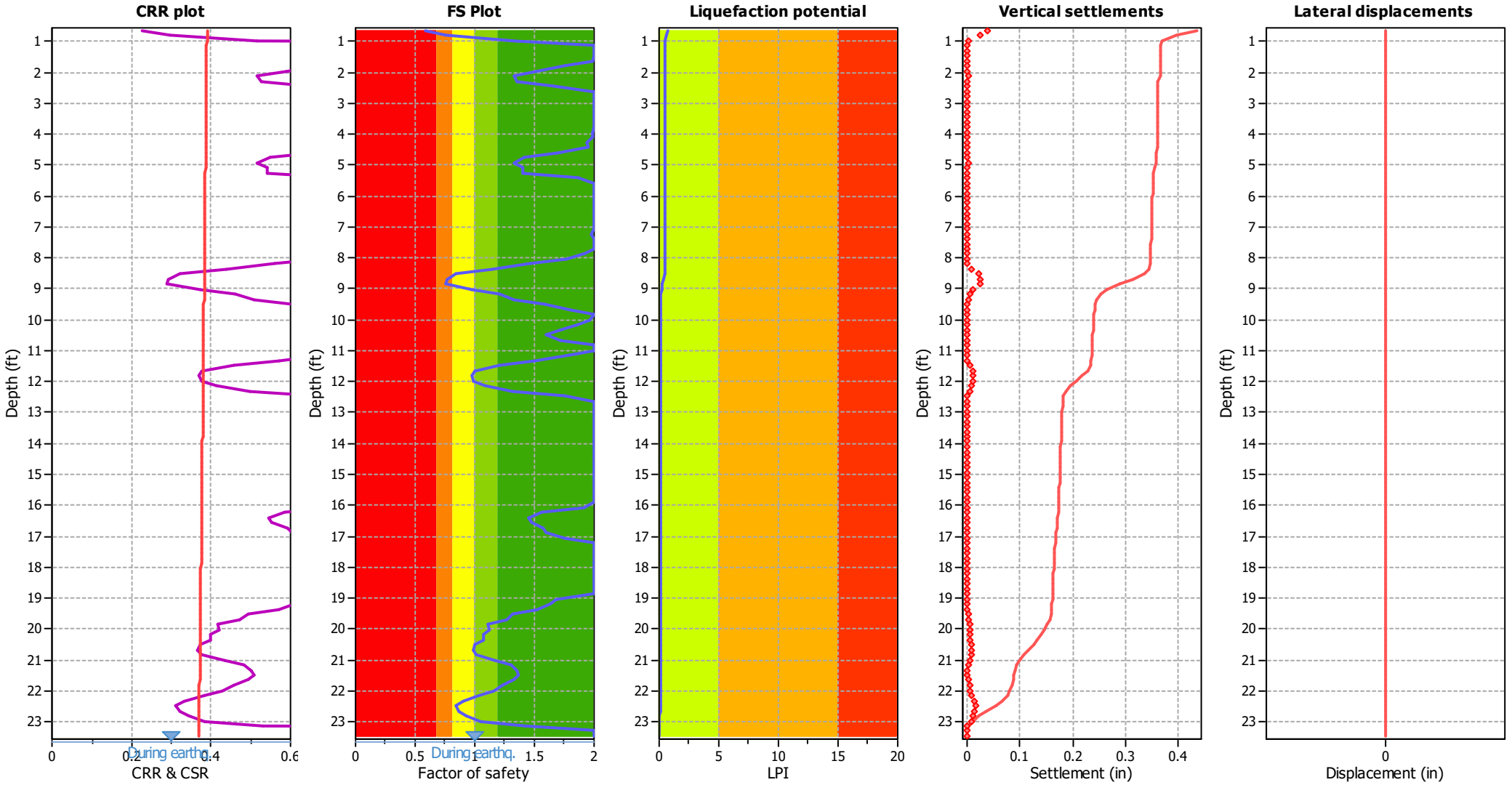
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

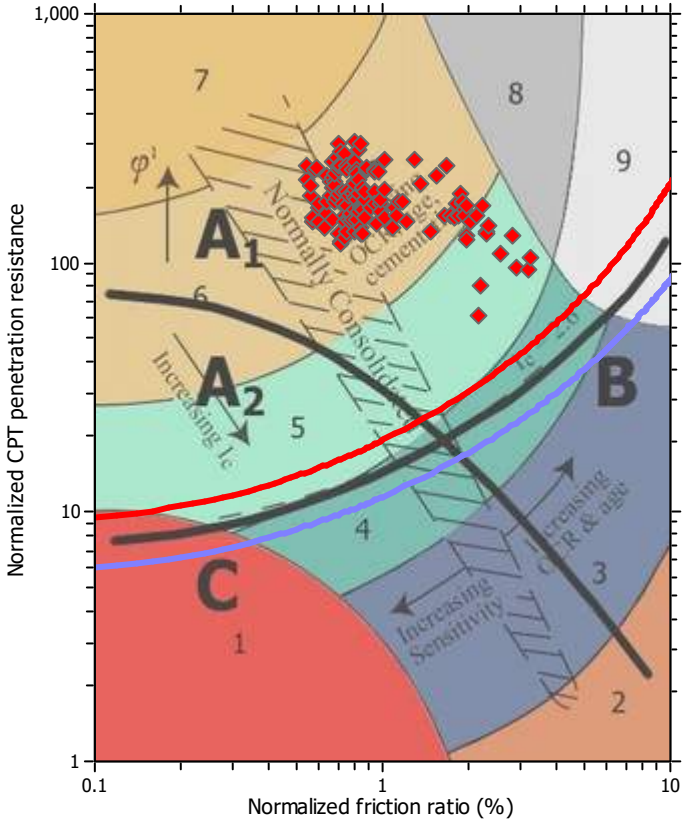
F.S. color scheme

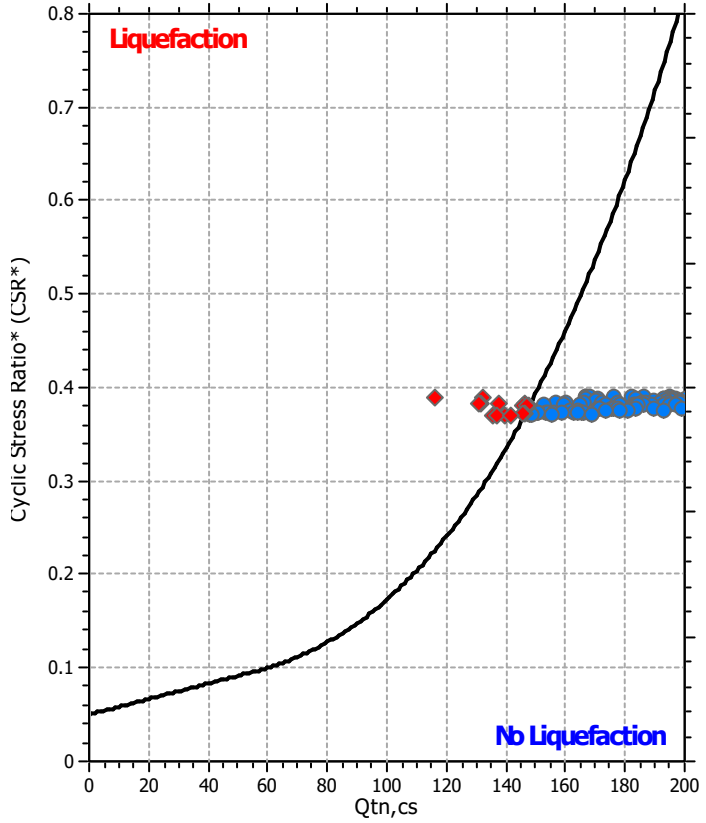
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

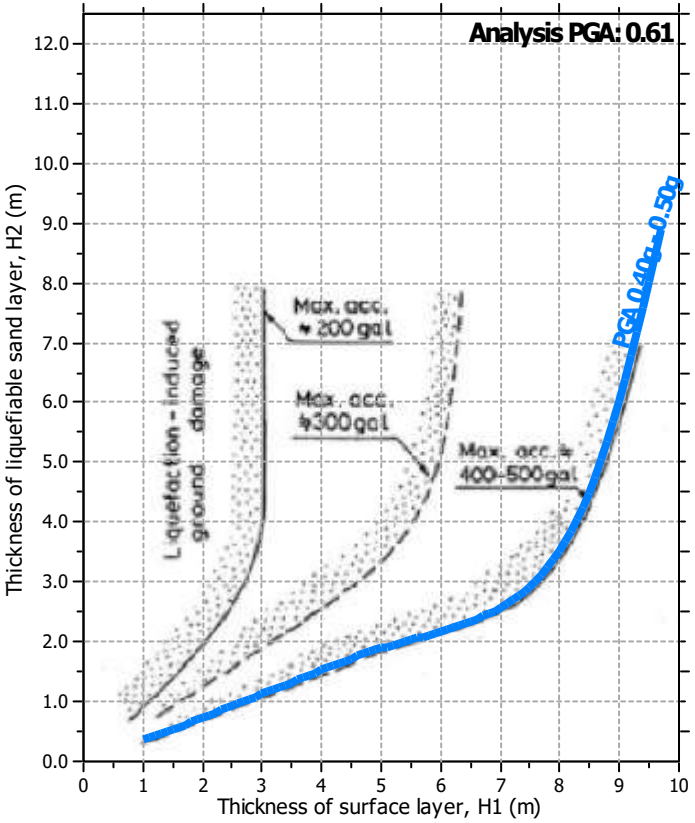
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



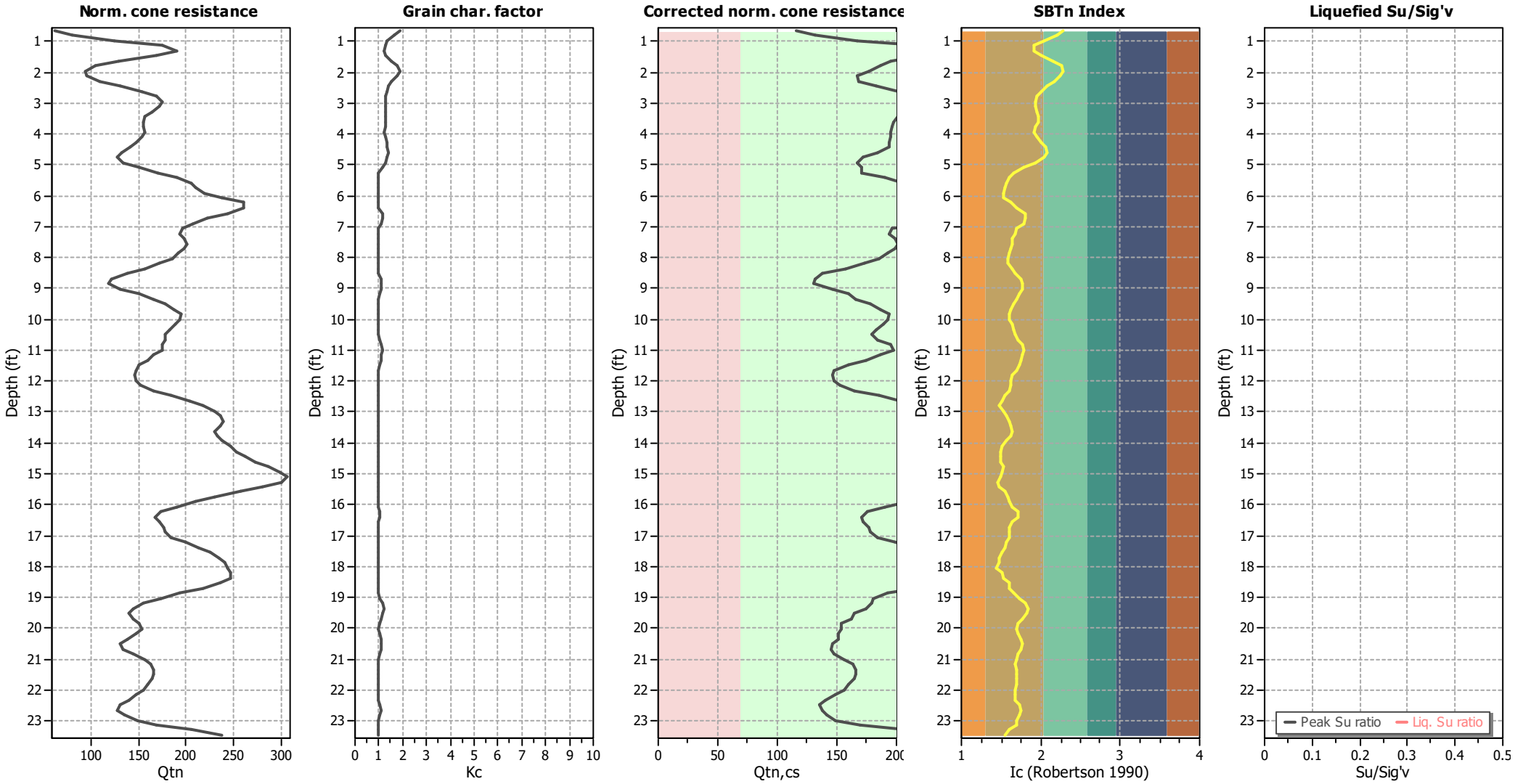




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

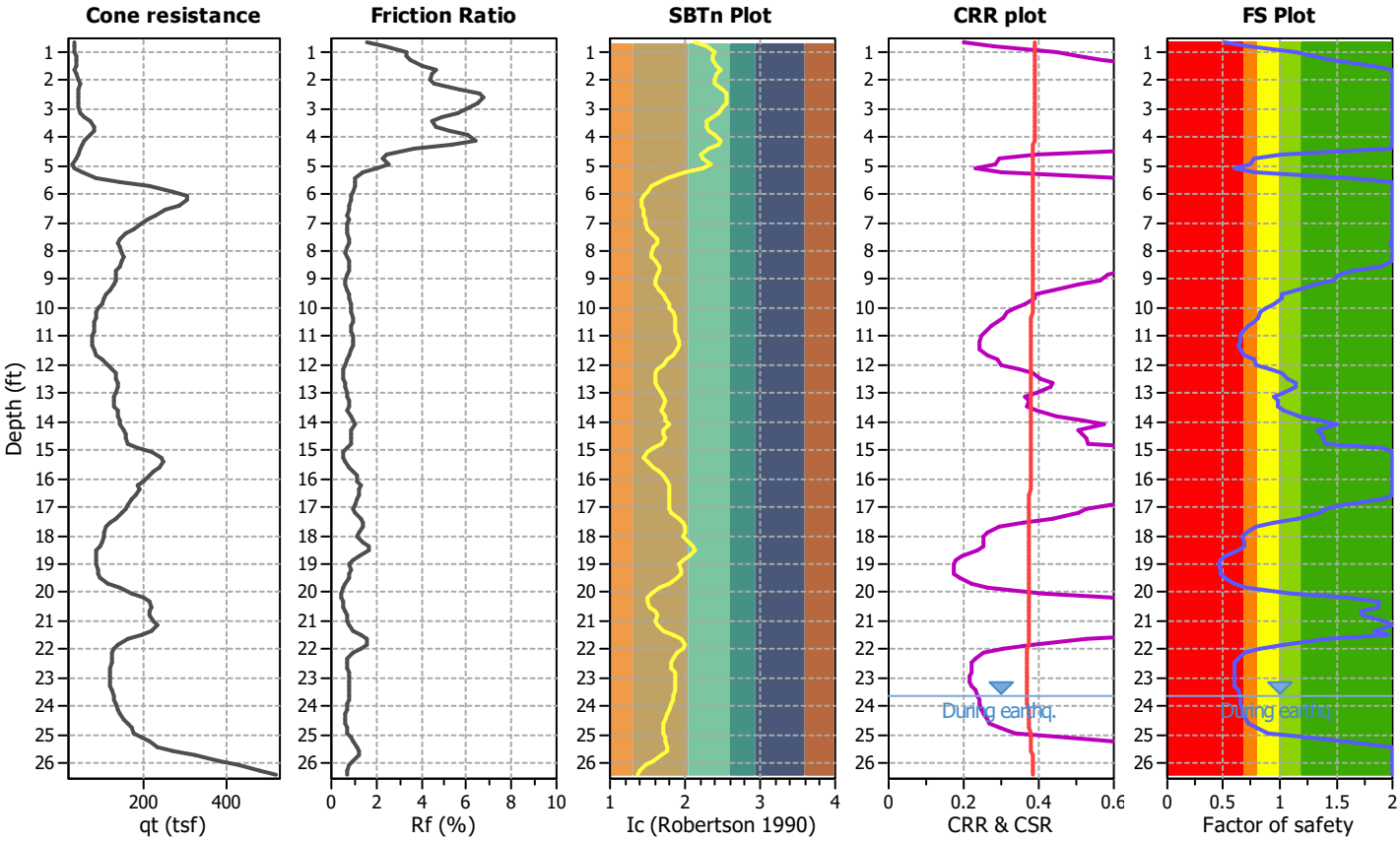
LIQUEFACTION ANALYSIS REPORT

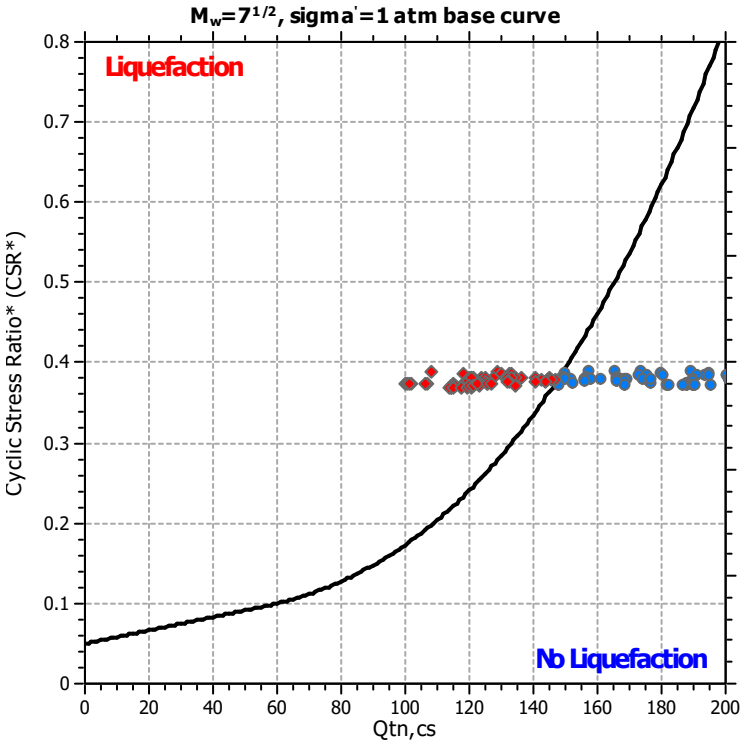
Project title : **Location :**

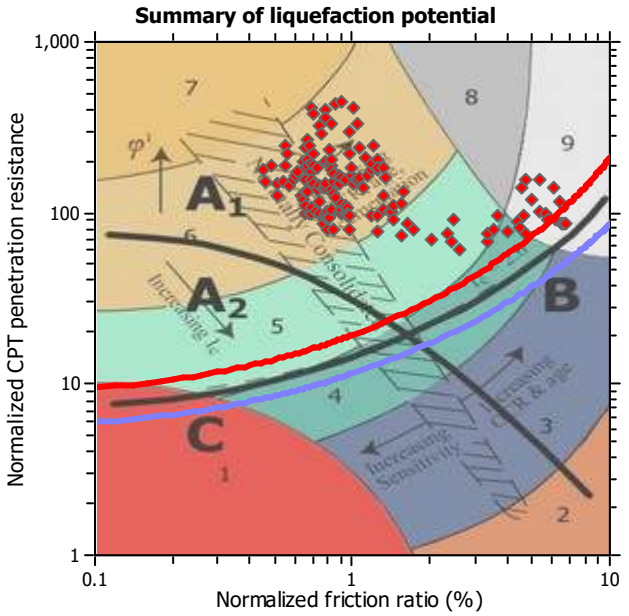
CPT file : CPT-04 - Basic

Input parameters and analysis data

Analysis method:	Robertson (2009)	G.W.T. (in-situ):	23.67 ft	Use fill:	No	Clay like behavior applied:	All soils
Fines correction method:	Robertson (2009)	G.W.T. (earthq.):	23.67 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.45	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	No		

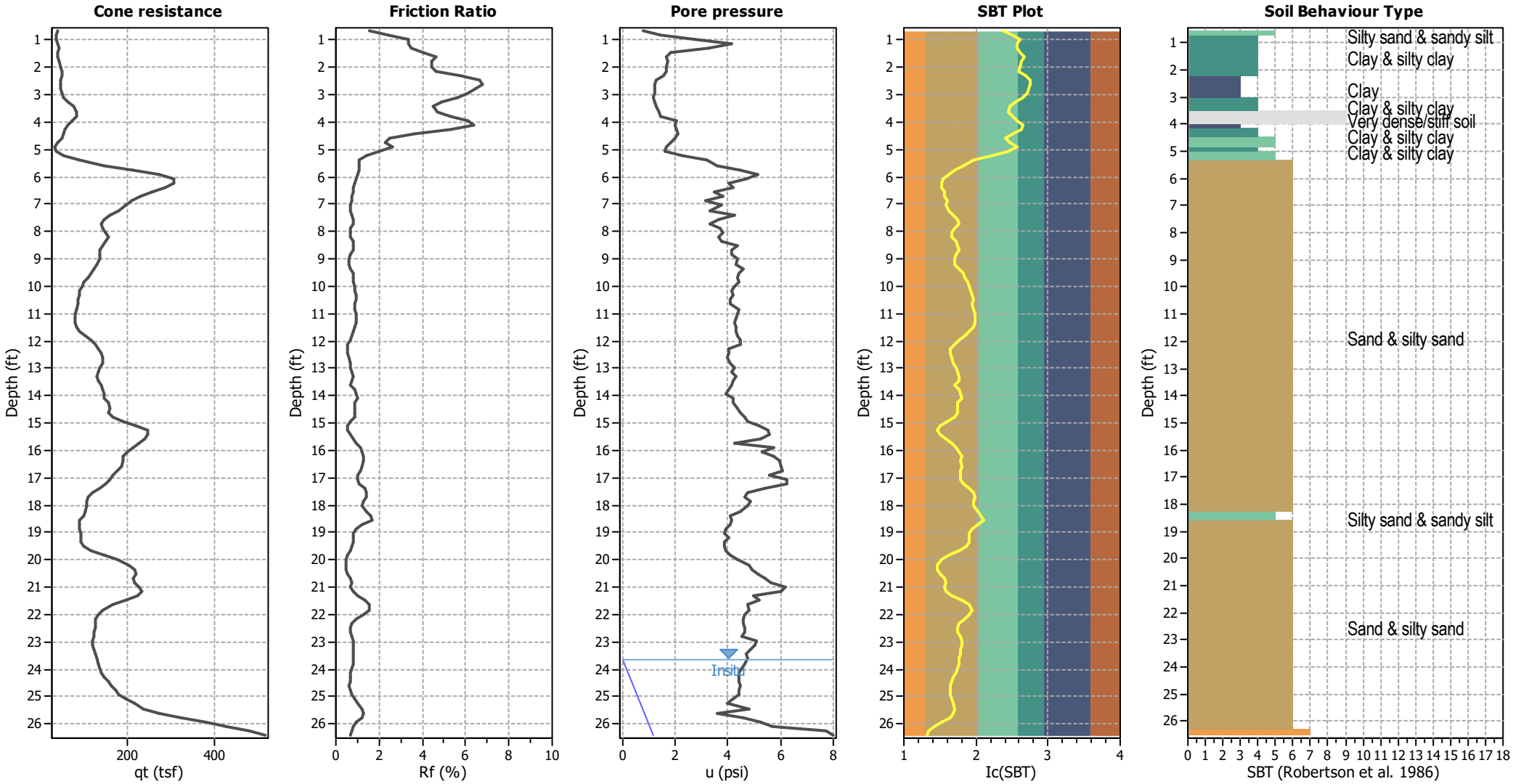






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



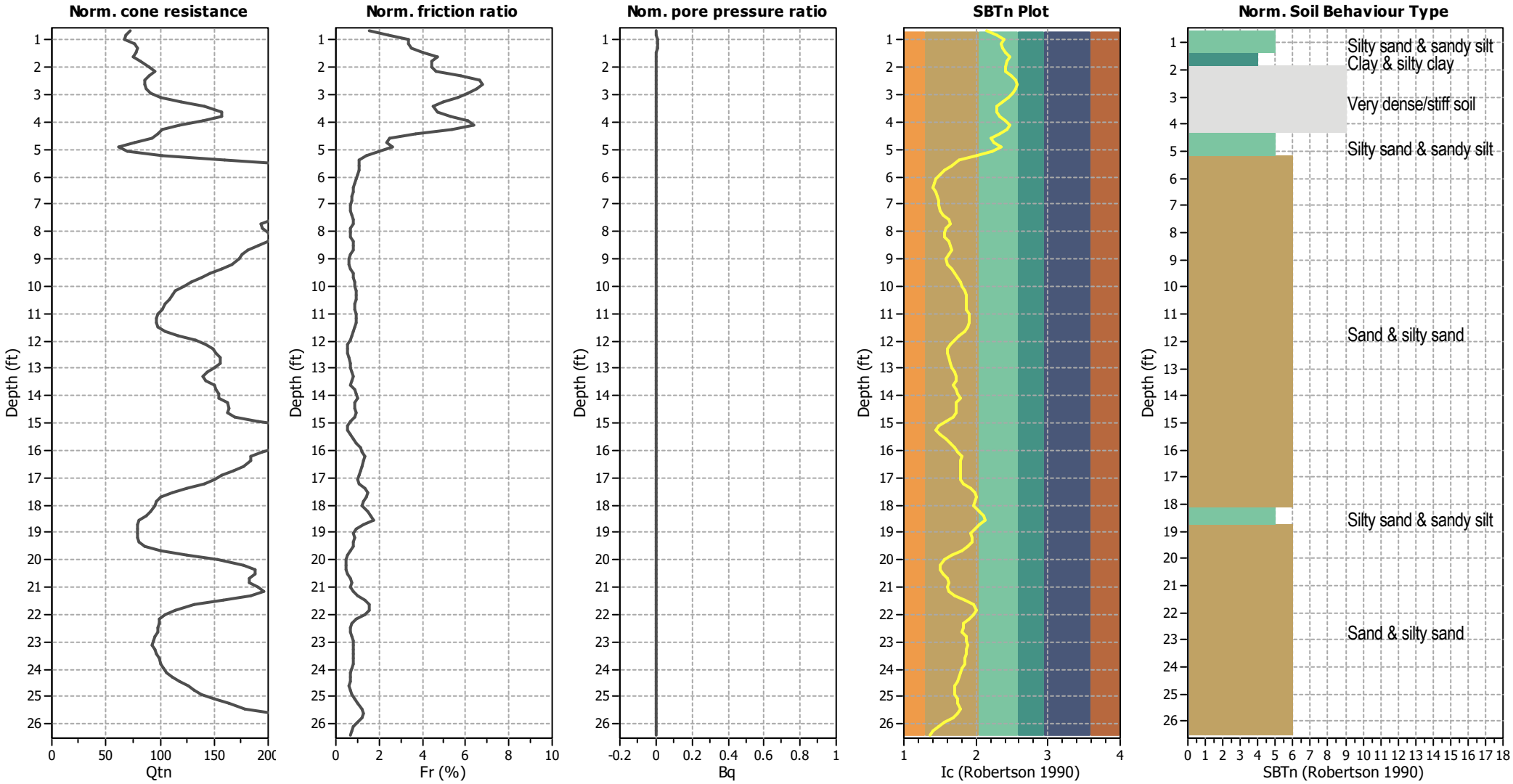
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

CPT basic interpretation plots (normalized)



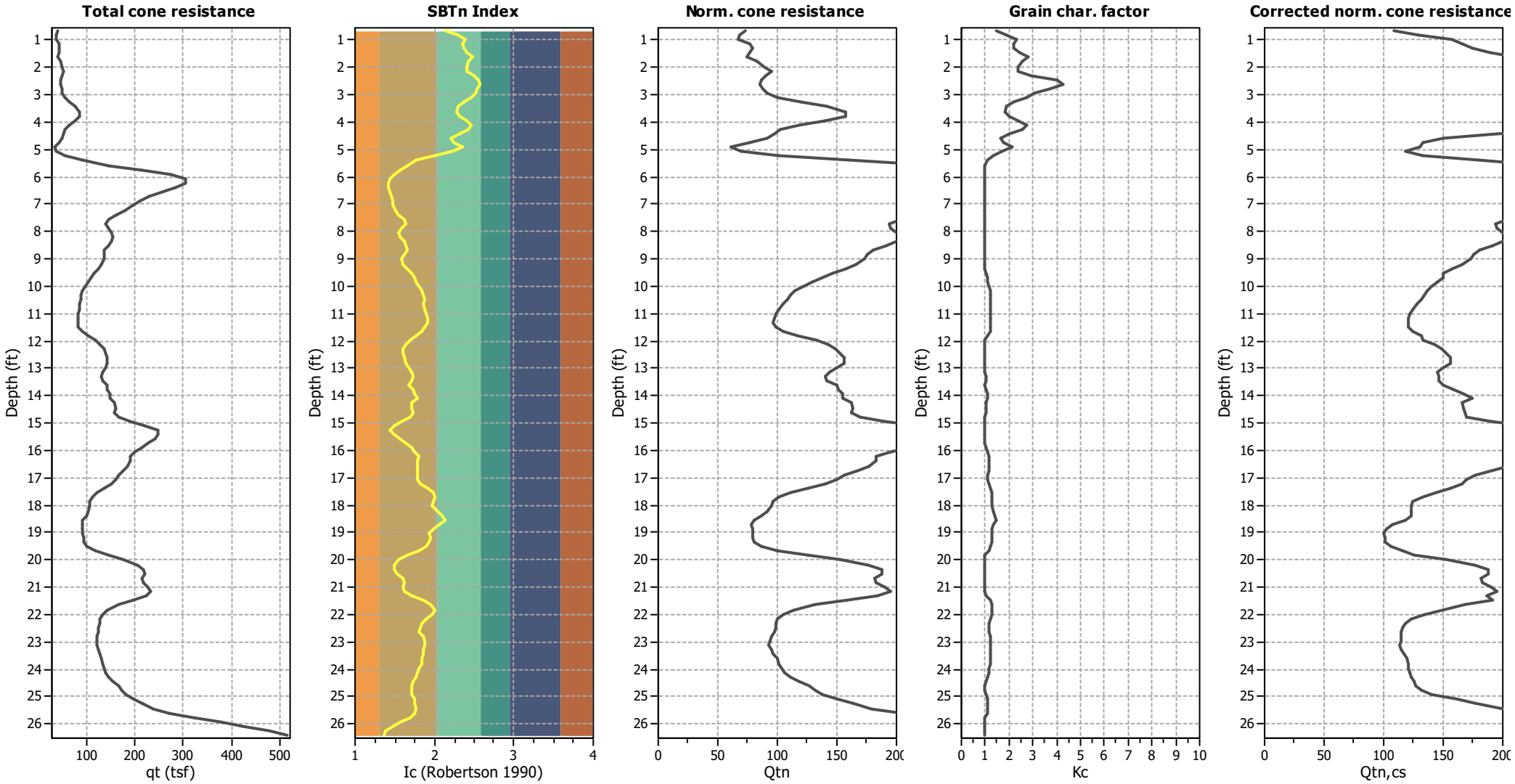
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

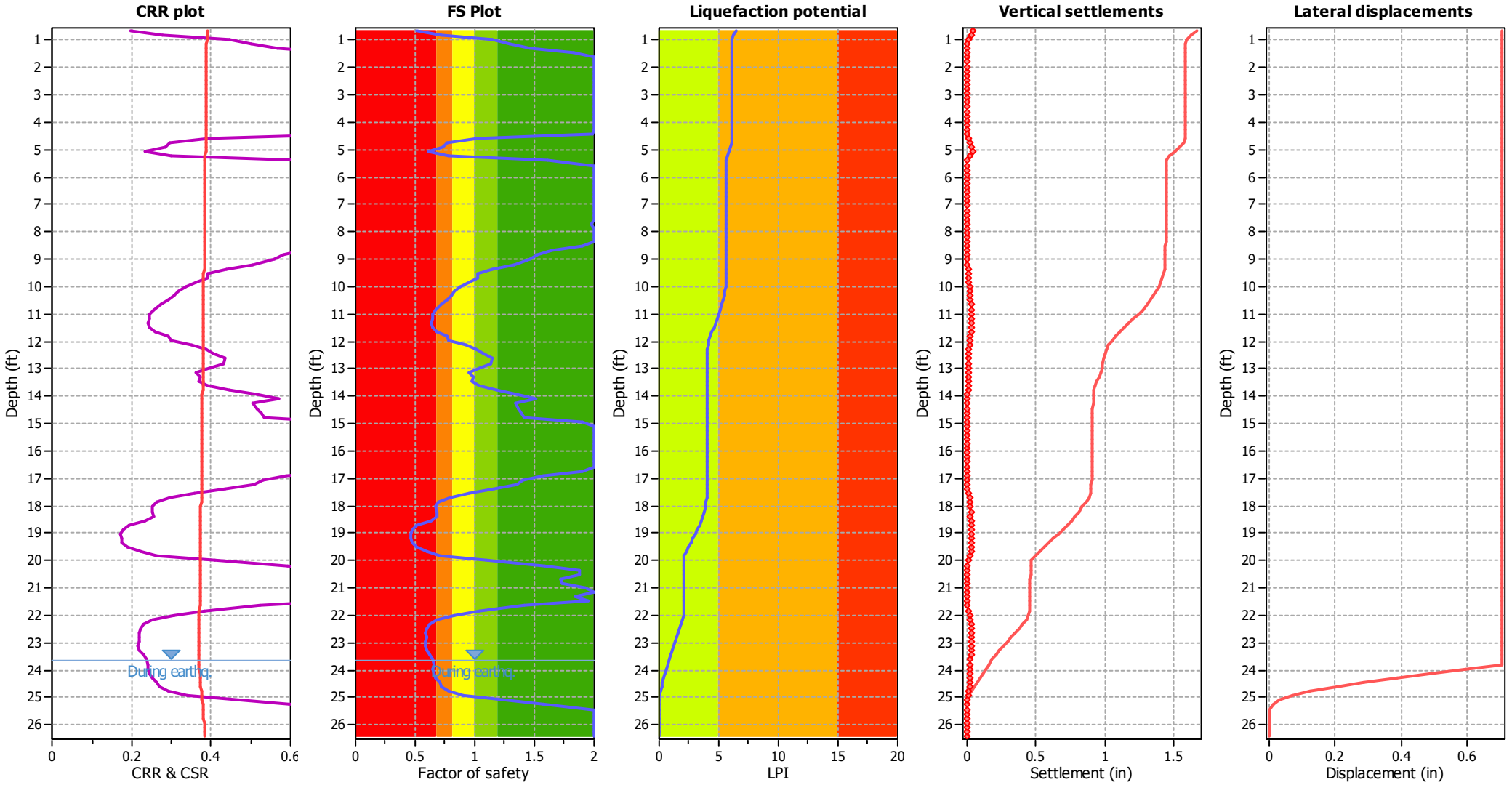
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

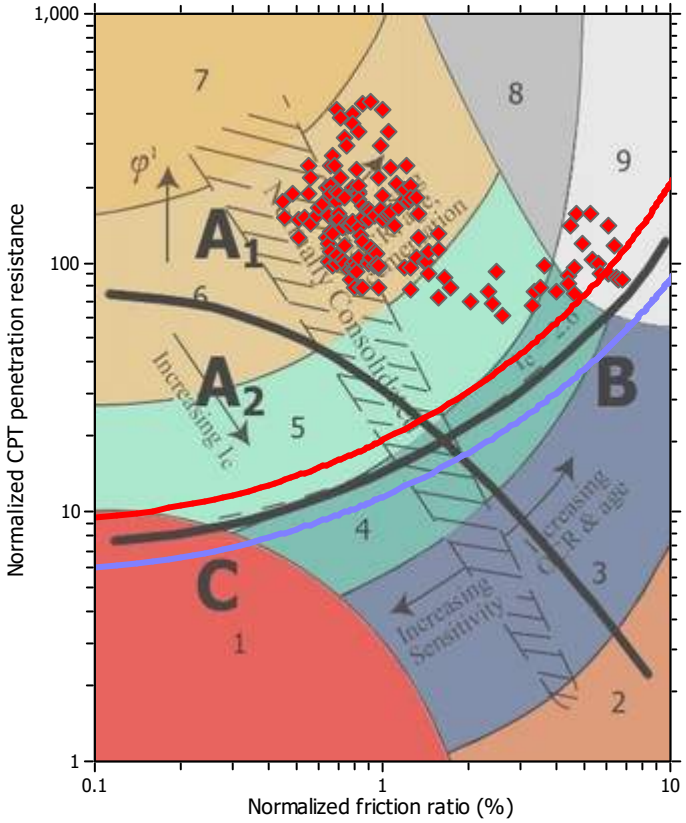
F.S. color scheme

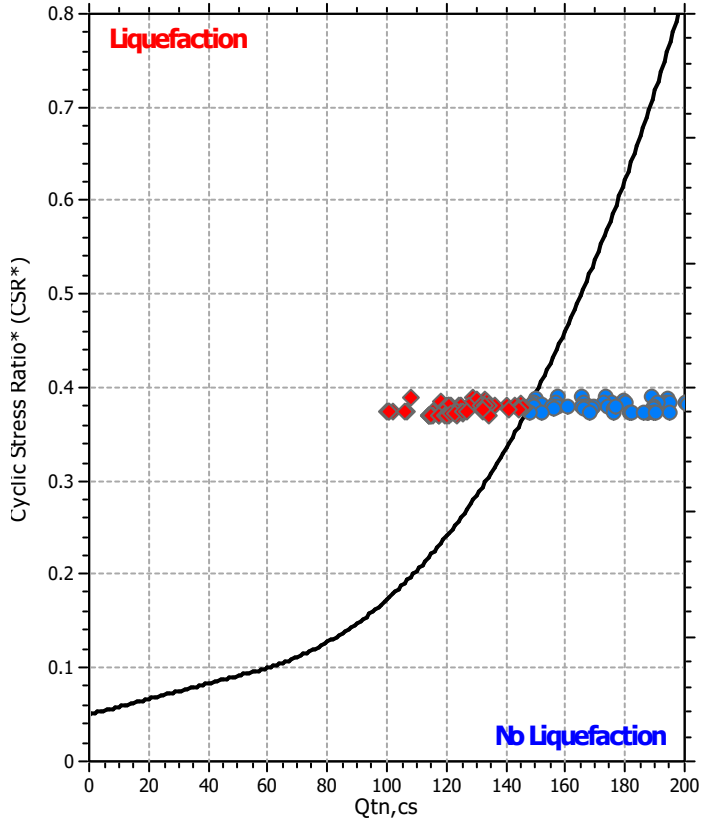
- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

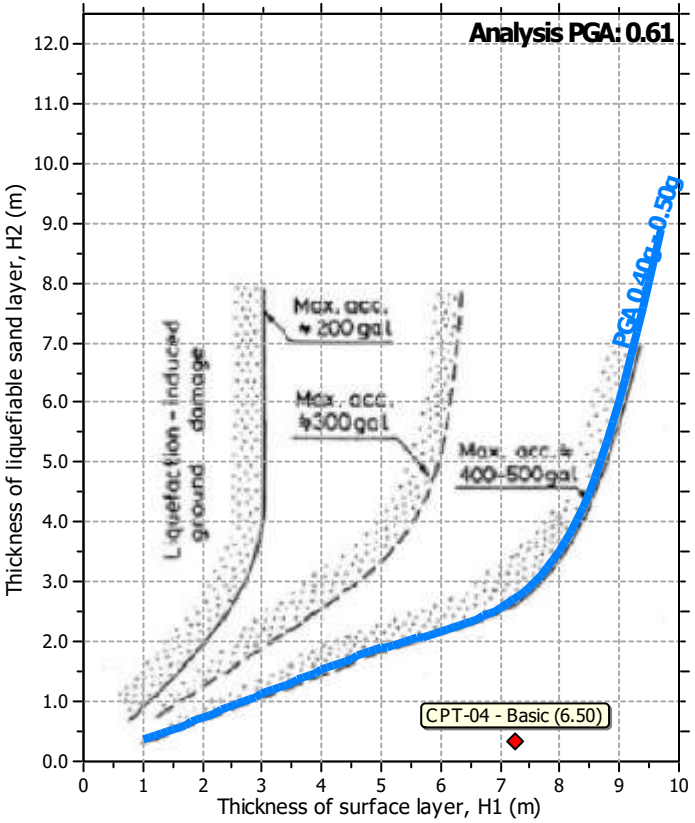
LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis summary plots



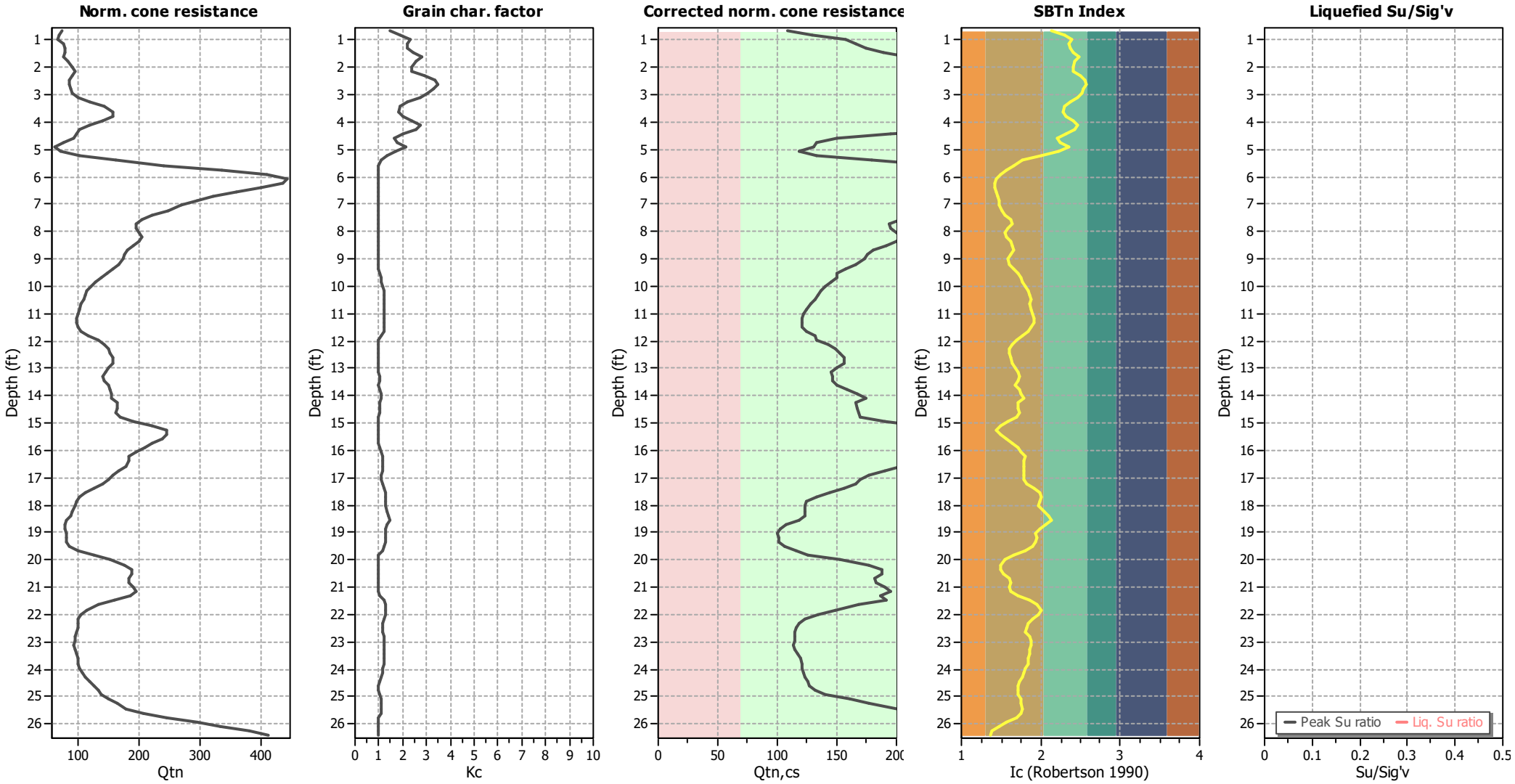




Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

Check for strength loss plots (Robertson (2010))



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	23.67 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	No
Earthquake magnitude M_w:	7.45	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	23.67 ft	Fill height:	N/A	Limit depth:	N/A

APPENDIX E

Percolation Test Data

Project: **New Bradley Branch Library Feasibility Study** File No.: **305777-001**

PERCOLATION TEST RESULTS

PERCOLATION TEST: P-1

TEST HOLE DIAMETER: 3 inch

DATE DRILLED: 12/28/2022

TEST HOLE DEPTH: 7 feet

DATE PRE-SATURATED: 02/09/2023

DATE TESTED: 02/10/2023

RISER HEIGHT: 9 inches

TECHNICIAN: AH

TEST DURATION: 2 hours

Reference of Measurement: Top of Riser

INTERVAL (Minutes)	READING (Feet)	INCREMENTAL FALL (Feet)	PERCOLATION RATE (Minutes / Inch)	PERCOLATION RATE (Inches / Hour)
Fill				
0	7.04	---	---	---
10	7.30	0.26	3.21	18.72
10	7.44	0.14	5.95	10.08
10	7.60	0.16	5.21	11.52
10	7.74	0.14	5.95	10.08
Refill				
0	7.25	---	---	---
10	7.42	0.17	4.90	12.24
10	7.54	0.12	6.94	8.64
10	7.66	0.12	6.94	8.64
10	7.74	0.08	10.42	5.76
Refill				
0	7.25	---	---	---
10	7.37	0.12	6.94	8.64
10	7.47	0.10	8.33	7.20
10	7.57	0.10	8.33	7.20
10	7.67	0.10	8.33	7.20

Project: **New Bradley Branch Library Feasibility Study**

File No.: **305777-001**

PERCOLATION TEST RESULTS

PERCOLATION TEST: P-2

TEST HOLE DIAMETER: 3 inch

DATE DRILLED: 12/28/2022

TEST HOLE DEPTH: 5 feet

DATE PRE-SATURATED: 02/09/2023

DATE TESTED: 02/10/2023

RISER HEIGHT: 6 inches

TECHNICIAN: AH

TEST DURATION: 0 hours

Reference of Measurement: Top of Riser

INTERVAL (Minutes)	READING (Feet)	INCREMENTAL FALL (Feet)	PERCOLATION RATE (Minutes / Inch)	PERCOLATION RATE (Inches / Hour)
>6 inches of standing water after Pre-Saturation, No Test Taken				

Project: **New Bradley Branch Library Feasibility Study**

File No.: **305777-001**

PERCOLATION TEST RESULTS

PERCOLATION TEST: P-3

TEST HOLE DIAMETER: 3 inch

DATE DRILLED: 12/28/2022

TEST HOLE DEPTH: 7 feet

DATE PRE-SATURATED: 02/09/2023

DATE TESTED: 02/10/2023

RISER HEIGHT: 9 inches

TECHNICIAN: AH

TEST DURATION: 61 minutes

Reference of Measurement: Top of Riser

INTERVAL (Minutes)	READING (Feet)	INCREMENTAL FALL (Feet)	PERCOLATION RATE (Minutes / Inch)	PERCOLATION RATE (Inches / Hour)
Fill				
0	6.50	---	---	---
10	7.23	0.73	1.14	52.56
Refill				
0	6.61	---	---	---
1	6.75	0.14	0.60	100.80
1	6.87	0.12	0.69	86.40
1	6.95	0.08	1.04	57.60
1	7.03	0.08	1.04	57.60
1	7.11	0.08	1.04	57.60
1	7.23	0.12	0.69	86.40
Refill				
0	6.21	---	---	---
1	6.34	0.13	0.64	93.60
1	6.51	0.17	0.49	122.40
1	6.60	0.09	0.93	64.80
1	6.71	0.11	0.76	79.20
1	6.80	0.09	0.93	64.80
1	6.90	0.10	0.83	72.00
1	6.98	0.08	1.04	57.60
1	7.06	0.08	1.04	57.60
1	7.14	0.08	1.04	57.60
1	7.23	0.09	0.93	64.80

Project: **New Bradley Branch Library Feasibility Study** File No.: **305777-001**

PERCOLATION TEST RESULTS

PERCOLATION TEST: P-3

TEST HOLE DIAMETER: 3 inch

DATE DRILLED: 12/28/2022

TEST HOLE DEPTH: 7 feet

DATE PRE-SATURATED: 02/09/2023

DATE TESTED: 02/10/2023

RISER HEIGHT: 9 inches

TECHNICIAN: AH

TEST DURATION: 43 minutes

Reference of Measurement: Top of Riser

INTERVAL (Minutes)	READING (Feet)	INCREMENTAL FALL (Feet)	PERCOLATION RATE (Minutes / Inch)	PERCOLATION RATE (Inches / Hour)
Refill				
0	6.26	---	---	---
1	6.35	0.09	0.93	64.80
1	6.46	0.11	0.76	79.20
1	6.58	0.12	0.69	86.40
1	6.70	0.12	0.69	86.40
1	6.80	0.10	0.83	72.00
1	6.88	0.08	1.04	57.60
1	6.96	0.08	1.04	57.60
1	7.04	0.08	1.04	57.60
1	7.12	0.08	1.04	57.60
1	7.23	0.11	0.76	79.20
Refill				
0	6.42	---	---	---
1	6.56	0.14	0.60	100.80
1	6.68	0.12	0.69	86.40
1	6.78	0.10	0.83	72.00
1	6.86	0.08	1.04	57.60
1	6.94	0.08	1.04	57.60
1	7.02	0.08	1.04	57.60
1	7.11	0.09	0.93	64.80
1	7.23	0.12	0.69	86.40

Project: **New Bradley Branch Library Feasibility Study** File No.: **305777-001**

PERCOLATION TEST RESULTS

PERCOLATION TEST: P-3

TEST HOLE DIAMETER: 3 inch

DATE DRILLED: 12/28/2022

TEST HOLE DEPTH: 7 feet

DATE PRE-SATURATED: 02/09/2023

DATE TESTED: 02/10/2023

RISER HEIGHT: 9 inches

TECHNICIAN: AH

TEST DURATION: 43 minutes

Reference of Measurement: Top of Riser

INTERVAL (Minutes)	READING (Feet)	INCREMENTAL FALL (Feet)	PERCOLATION RATE (Minutes / Inch)	PERCOLATION RATE (Inches / Hour)
Refill				
0	6.40	---	---	---
1	6.53	0.13	0.64	93.60
1	6.67	0.14	0.60	100.80
1	6.78	0.11	0.76	79.20
1	6.86	0.08	1.04	57.60
1	6.92	0.06	1.39	43.20
1	7.00	0.08	1.04	57.60
1	7.07	0.07	1.19	50.40
1	7.15	0.08	1.04	57.60
1	7.23	0.08	1.04	57.60
Refill				
0	6.52	---	---	---
1	6.64	0.12	0.69	86.40
1	6.73	0.09	0.93	64.80
1	6.82	0.09	0.93	64.80
1	6.90	0.08	1.04	57.60
1	6.98	0.08	1.04	57.60
1	7.05	0.07	1.19	50.40
1	7.15	0.10	0.83	72.00
1	7.23	0.08	1.04	57.60

Project: **New Bradley Branch Library Feasibility Study**

File No.: **305777-001**

PERCOLATION TEST RESULTS

PERCOLATION TEST: P-4

TEST HOLE DIAMETER: 3 inch

DATE DRILLED: 12/28/2022

TEST HOLE DEPTH: 5 feet

DATE PRE-SATURATED: 02/09/2023

DATE TESTED: 02/10/2023

RISER HEIGHT: 7 inches

TECHNICIAN: AH

TEST DURATION: 2.5 hours

Reference of Measurement: Top of Riser

INTERVAL (Minutes)	READING (Feet)	INCREMENTAL FALL (Feet)	PERCOLATION RATE (Minutes / Inch)	PERCOLATION RATE (Inches / Hour)
Fill				
0	5.09	---	---	---
10	5.35	0.26	3.21	18.72
10	5.55	0.20	4.17	14.40
10	5.75	0.20	4.17	14.40
10	5.82	0.07	11.90	5.04
Refill				
0	5.32	---	---	---
10	5.52	0.20	4.17	14.40
10	5.66	0.14	5.95	10.08
10	5.82	0.16	5.21	11.52
Refill				
0	5.31	---	---	---
10	5.45	0.14	5.95	10.08
10	5.59	0.14	5.95	10.08
10	5.71	0.12	6.94	8.64
10	5.82	0.11	7.58	7.92
Refill				
0	5.28	---	---	---
10	5.42	0.14	5.95	10.08
10	5.58	0.16	5.21	11.52
10	5.72	0.14	5.95	10.08
10	5.82	0.10	8.33	7.20

EARTH SYSTEMS
1514 Moffett Street, Suite A | Salinas, CA 93905 | (831) 240-4624 | www.earthsystems.com

January 21, 2026 File No.: 305777-002

Ms. Nancy Ayala
Monterey County Public Works, Facilities, and Parks
1441 Schilling Place, South 2nd Floor
Salinas, CA 93901

PROJECT: NEW BRADLEY BRANCH LIBRARY
65607 DIXIE STREET
BRADLEY, CALIFORNIA

SUBJECT: Geotechnical Plan Review

REF.: Geotechnical Engineering and Geologic Hazards Evaluation Report, New Bradley Branch Library Feasibility, 65607 Dixie Street, APN 424-351-038, Bradley, California, by Earth Systems Pacific, dated March 10, 2023

Dear Ms. Ayala:

At your request, we reviewed the below listed plans to evaluate their substantial conformance with our geotechnical engineering recommendations for the proposed new library building. The Architectural Plans were prepared by Weston Miles Architects, Inc., last revised January 20, 2026; the Civil Plans were prepared by Brio Engineering Associates, Inc., last revised January 20, 2026; and the Structural Plans were prepared by AKH Structural Engineers, Inc., last revised January 20, 2026.

- Sheet A0.1, Title Sheet
- Sheet A1.2, Enlarged Site Plan
- Sheet A1.3, Site Details
- Sheet C-1, Legend and Notes
- Sheet C-2, Grading and Utility Plan
- Sheet C-3, Sections and Details
- Sheet S1.1, General Notes
- Sheet S2.1, Foundation Plan
- Sheet S4.1, Structural Foundation Details

Based on our review, it is our opinion that the architectural, civil, and structural plans have been prepared in general conformance with our geotechnical engineering recommendations for the project. The plans were reviewed specifically with respect to geotechnical considerations. It is our understanding that the new pervious pavement section and detail was designed by the Project Civil Engineer, as we did not provide recommendations for the design of the pervious pavement system. We make no representation as to the accuracy of the dimensions, calculations, or other aspects of the design.

We trust this letter provides the information requested at this time. If you have any questions or need any additional information, please contact our office.

Sincerely,

Earth Systems Pacific

Michelle Garcia, PG CEG
Senior Engineering Geologist

Tyler Brown, PE, C92495
Project Engineer



Inspection:	When:	Who:	Inspection By:	Date of Inspection:
Inspect and test Keyway/Subexcavation/Overexcavation:	1. Prior to backfilling	Geotechnical Engineering Technician		
	2. During backfill placment - ongoing	Geotechnical Engineering Technician		
Inspect and Test Building Pad Subgrade:	Prior to excavation footings or placement of slab-on-grade materials	Geotechnical Engineering Technician		
Inspect Slab-on-grade Installation:	Prior to concrete placement	Geotechnical Engineering Technician		
Inspect Foundation and/or retaining wall footing excavations:	Prior to reinforcement placement	Geotechnical Engineering Technician		
Inspect and Test Retaining wall backfill:	During backfill placement - ongoing	Geotechnical Engineering Technician		
Inspect and Test Driveway Fill, Subgrade and Baserock Placement:	1. During fill placement	Geotechnical Engineering Technician		
	2. Subgrade, prior to backfill placement	Geotechnical Engineering Technician		
	3. Baserock prior to AC, Concrete, or Pavement	Geotechnical Engineering Technician		
Inspect and Test Drainage Installation:	1. After pipe placement, prior to backfill placement	Geotechnical Engineering Technician		
	2. During backfill placment - ongoing	Geotechnical Engineering Technician		
Inspect site stripping and clearing:	After clearing complete	Geotechnical Engineering Technician		
Inspect utility trench compaction:	After utility trench backfill	Geotechnical Engineering Technician		