Appendix D

Bridge Hydraulics Study (2010)

BRIDGE HYDRAULICS STUDY

PEACH TREE ROAD AT PANCHO RICO CREEK BRIDGE 412

Prepared for:
Biggs Cardosa Associates

March 9, 2010

Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS
100 N. Winchester Blvd., Suite 200
Santa Clara, CA 95050
(408) 246-4848

BRIDGE HYDRAULICS STUDY

PEACH TREE ROAD AT PANCHO RICO CREEK

FILE (Dist/Co/Route) 05-Mon-Co.Rd.
County Bridge No. 412 (44C-0151)

INTRODUCTION

This report describes the results of the hydraulic investigation of the existing and proposed **Peach Tree Road Bridge** at **Pancho Rico Creek** in **Monterey County, California**. These hydraulic analyses were completed as part of the seismic retrofit study for the existing bridge and build upon previous analyses. The purpose of this study is to:

1. document the existing bridge hydrology and hydraulics;
2. evaluate pier and contraction scour; and
3. identify long-term channel degradation/aggradation potential; and
4. evaluate the proposed project hydraulics.

PROJECT DESCRIPTION

The proposed project includes the replacement of the Peach Tree Road Bridge at Pancho Rico Creek and accompanying roadwork to conform to the existing roadway. The replacement bridge would be located in the same location as the existing bridge, which will be removed during construction. **Attachment A** includes the General Plan of the proposed bridge from the March 3, 2010 Type Selection.

Existing Bridge

The existing Peach Tree Road Bridge is a three-span structure constructed in 1955. The superstructure consists of simply supported steel deck units. The bridge is supported at the abutments and bents by four 'Z'-shaped piles built up from two 6-inch by 6-inch steel angles welded together. The bridge supports are skewed 45 degrees to the bridge deck to align with the Pancho Rico Creek channel. The abutment fills are retained by perforated steel channels/panels spanning between the abutment piles. The wingwalls are also comprised of perforated steel channels/panels and are reinforced with steel rail piles and cross bracing. Concrete slurry has been injected at both abutments to prevent loss of fill and settling of the approach fills.

The existing bridge is 58.67 feet long with individual spans of 18.5 feet, 20.8 feet, and 18.5 feet from south to north. The bridge has one traveled way measuring 13 feet from curb to curb, with two 18-inch curbs.

Proposed Replacement Bridge

Based on the Type Selection General Plan (03/02/10), the proposed replacement bridge for Peach Tree Road is a clear-span structure, using a precast/prestressed concrete voided slab. Although previously planned with one support bent within the stream channel, the current project plans do not include any bents within the channel. The bridge abutments would be skewed 45 degrees to the bridge deck to align with the stream channel.

The proposed bridge is 80 feet long, with one span, 26.83 feet wide, with two 10.0-feet traffic lanes and 2-foot shoulders. The remaining bridge section includes two 1.42-feet concrete barriers on either side.

HYDROLOGY

The Salinas River drains the Salinas Valley northward to the Pacific Ocean. The discharge to the ocean is located north of the City of Marina. Pancho Rico Creek is in the eastern portion of the Salinas River watershed, draining westward out of the San Andreas fault zone near the Monterey/Fresno County line into the Salinas River near San Ardo.

The 100-year flood discharge at the Peach Tree Road Bridge was estimated using the US Army Corps of Engineers (COE) HEC-1 rainfall-runoff computer program. The hydrologic analysis was based on the rainfall-runoff model developed by the COE and subsequently used by the Federal Emergency Management Agency (FEMA) when developing the (1998) Flood Insurance Study for this portion of Monterey County. The COE model generated flood hydrographs for ungaged basins using the Soil Conservation Service (SCS) curve number methodology, which uses the basin area unit hydrograph, soil type, ground cover, antecedent moisture condition (AMC), and a storm rainfall depth and time distribution to develop runoff hydrographs. The AMC was calibrated based on frequency statistics of the El Toro Creek stream gage. The precipitation pattern used to distribute the rainfall was the SCS Type I pattern, adjusted to reflect the rainfall statistics for Monterey County. An AMC of 2.5 was used to compute the 100-year flood discharge at the Peach Tree Road Bridge.

The 100-year, 24-hour precipitation depth for the basin was estimated by a comparison to the mean annual precipitation (MAP) of the basin. Using the Department of Water Resources (DWR) Rainfall Depth-Duration-Frequency for California report, the MAP values for 15 rain gages in Monterey County were plotted against the 100-year, 24-hour depths. A best-fit line was drawn through the

points, representing an average relationship between the MAP and 100-year, 24-hour depth for the 15 gages within the county. The MAP for the basin draining to the Peach Tree Road Bridge was determined, and based on the relationship between MAP and 24-hour depth for the gages within the county, the corresponding 100-year, 24-hour depth was estimated. The estimated 100-year flood discharge at the Peach Tree Road Bridge is 3,630 cubic feet per second (cfs).

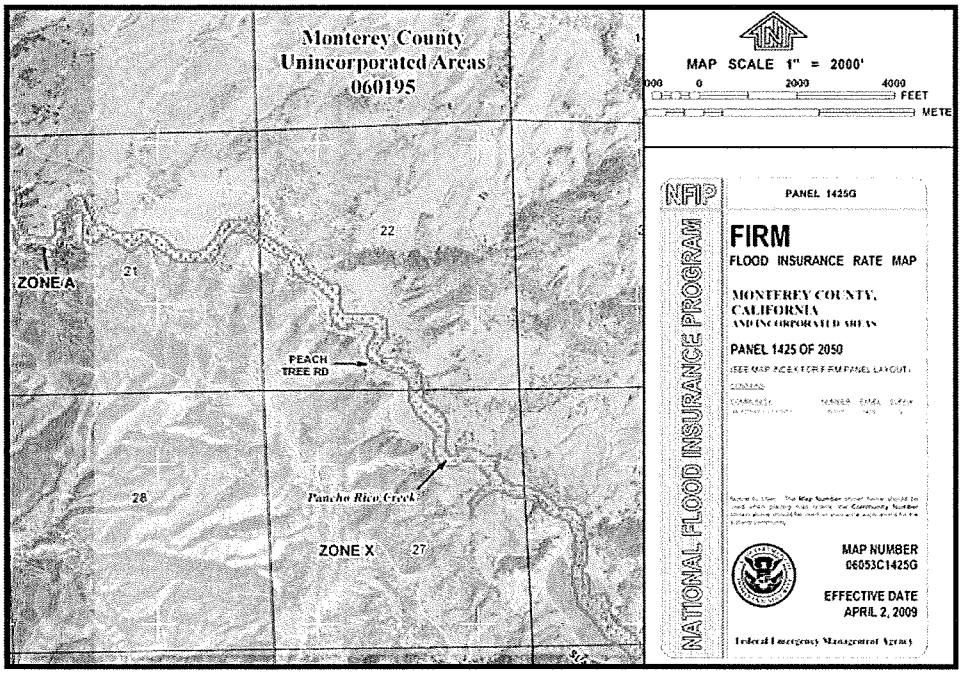
The estimated 50-year flood discharge at the Peach Tree Road Bridge was 3,090 cfs, and the estimated 500-year flood discharge was 4,830 cfs. The 50-year and 500-year flood discharges were estimated based on ratios of the 50-year and 500-year flood discharges to the 100-year flood discharge. The ratios were computed from a statistical analysis of peak flow data for the Arroyo Seco stream gage near Soledad.

For comparison purposes, the 100-year discharge was also calculated based on the USGS regional regression equations. The estimated 100-year discharge for the 14 square mile watershed at Peach Tree Road was 1,600 cfs based on the USGS equations.

REGULATORY FLOOD CONDITIONS

The 100-year floodplain at the Peach Tree Road Bridge was studied by approximate methods for the FEMA Flood Insurance Study. The floodplain delineation was based on the COE report on the January and February 1969 floods. The 100-year floodplain at the bridge is shown as Zone A (see Figure 1). No flood discharges or flood elevations are included.

Figure 1 - FEMA FIRM showing 100-year Floodplain near Peach Tree Road



HYDRAULICS APPROACH

The 50-year, 100-year, and 500-year flow conditions for the Pancho Rico Creek were modeled using the COE HEC-RAS (Version 4.0.0) computer program. The channel cross sections for the model were based on 1998 field surveys. Recent field surveys (2009) confirmed unchanged conditions from the previous survey. The field surveys were based on the NGVD29 datum. The channel roughness factor was estimated by field observation. The estimated roughness factor for the channel was 0.04.

The computed 100-year water surface elevation at the upstream face of the existing Peach Tree Road Bridge is 1,739.6 ft. This is approximately 0.1 feet above the top of road elevation, and 1.9 feet above the bridge soffit elevation. The average channel velocity through the bridge is 11.5 feet per second (fps). The maximum depth of flow at the bridge is approximately 11.2 ft. The HEC-RAS model results for the Existing Conditions are included in **Attachment B**.

For the proposed replacement bridge, the estimated 100-year water surface elevation at the upstream face of the bridge is 1,737.9 feet, a decrease of approximately 1.7 feet over existing conditions. The maximum channel velocity within the bridge is 11.6 fps. For the 50-year flood, the water surface elevation at the upstream face of the bridge is 1,737.2 feet, a decrease of approximately 1.4 feet over the existing 50-year flood conditions. A summary of the HEC-RAS model calculations for the proposed Project Conditions are included in **Attachment C**.

PROPOSED BRIDGE HYDRAULICS SUMMARY

Drainage Area (Pancho Rico Creek at Peach Tree Road Bridge): 14.2 square miles

	Flood Event		
Frequency (Years)	50	100	500
Discharge (cfs)	3,090	3,630	4,830
Water Surface (ft)	1,737.2	1,737.9	1,739.5
Freeboard[1] (ft)	1.7	1.0	-0.6

[1]Freeboard is based on estimated water surface elevations, the lowest bridge deck elevation of 1,741.60 feet, and a structure depth of 2.75 feet.

DRIFT

Pancho Rico Creek at Peach Tree Road is subject to significant floating debris. The creek has extensive riparian vegetation which is likely to become floating debris in a major flood event. The

upstream channel is a natural channel with exposed rocks and cobbles which may become bed load debris in a large flood event.

Since the project does not include a pier, no analysis of debris catching on the piers is necessary. Any potential debris would not significantly affect the estimated 100-year water surface for the project conditions.

SCOUR

The proposed Peach Tree Road Bridge was evaluated for scour based on the Federal Highway Administration (FHWA) circular, HEC-18 (May 2001).

Pier Scour

There is no pier planned for the proposed bridge, so pier scour is not a concern and has not been estimated for the current analysis.

General/Contraction Scour

Contraction scour was not considered to be significant for the proposed Peach Tree Road Bridge. Contraction scour is due to the increased flow velocities through a bridge cross section which is narrow compared to the upstream channel. The channel section upstream of the bridge is maintained through the bridge without a contraction.

Another type of general scour is pressure flow scour. Given the height of the bridge over the estimated 100-year water surface elevation, pressure flow will not occur. Therefore, pressure flow scour is not a consideration for this bridge.

Abutment Scour

The Peach Tree Road bridge is located on a bend in Pancho Rico Creek. The low-flow channel within the creek bed is located on the outside of the channel bend between Bent 3 and Abutment 4, the east abutment. The east abutment has been subject to scour at the toe of the abutment. The abutment toe has been protected with rock and mortar slope protection.

Abutment scour was not considered to be significant for the proposed Peach Tree Road Bridge. Abutment scour is due to abutment fill areas which project into overbank areas upstream of the bridge. The proposed Peach Tree Road Bridge does not include abutment fills within the channel.

Long-Term Bed Elevation Changes

The Pancho Rico Creek at the Peach Tree Road Bridge is not expected to be subjected to long-term channel degradation or aggradation. These are long-term stream bed elevation changes due to modifications to the stream or watershed. Such changes may be the result of natural processes or man's activities. Bridge inspections have not indicated a trend of either a positive or negative elevation change at Peach Tree Road. The current stream bed elevations are consistent with the original ground elevations from the bridge construction plans. The bridge was constructed in 1955.

CONCLUSIONS

The existing Peach Tree Road Bridge at Pancho Rico Creek does not have capacity for the estimated 50-year flood. The estimated 50-year water surface elevation is 0.9 feet above the upstream soffit elevation. The estimated 100-year water surface elevation is 0.1 feet above the existing top of road elevation. Flood events greater than the 100-year flood would overtop the bridge and the approach roads.

The proposed replacement bridge and associated grading would improve the hydraulic conditions at the bridge. The proposed bridge would have a longer span with no bents instead of the existing two bents within the channel. The proposed bridge would have 1.7 feet of freeboard for the 50-year flood and 1.0 foot of freeboard for the 100-year flood.

REFERENCES

Biggs Cardosa Associates, **Field Review Report, Peach Tree Road at Pancho Rico Creek**, October 3, 1997.

Federal Emergency Management Agency, **Flood Insurance Study, Monterey County, California and Incorporated Areas**, April 2, 2009.

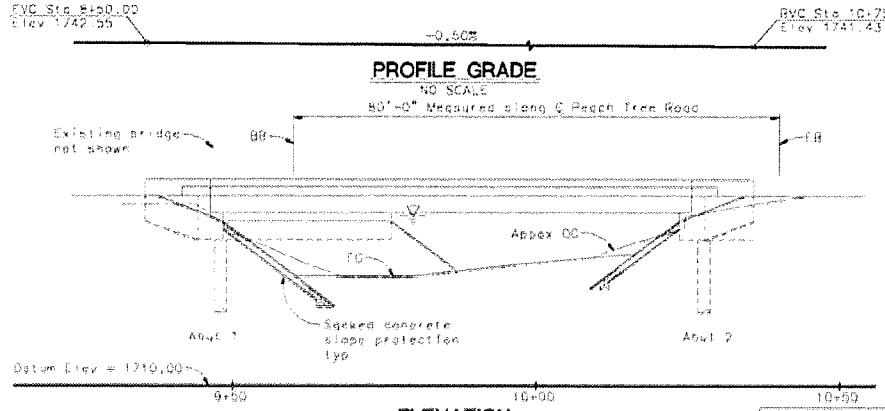
Federal Emergency Management Agency, **Flood Insurance Study, Monterey County, California**, September 27, 1991.

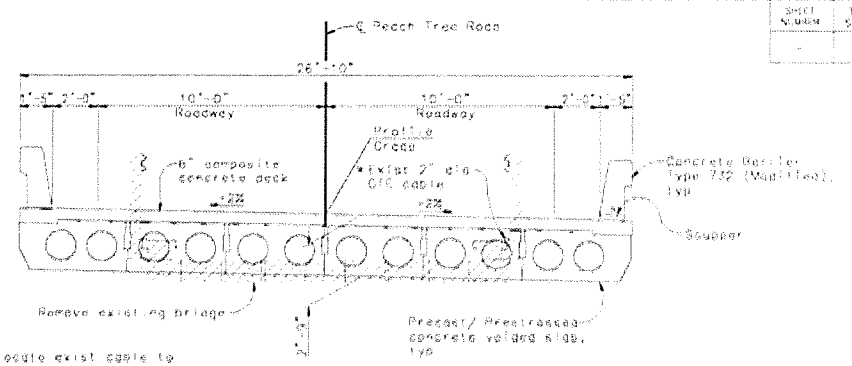
U.S. Department of Transportation, Federal Highway Administration, **Evaluating Scour at Bridges, 4th Edition**. Hydraulic Engineering Circular No. 18, May 2001.

U.S. Army, Corps of Engineers, San Francisco District, **Report on January and February 1969 Floods, Central Coastal Streams, California**, September 1970.

Attachment A

Bridge Plans





SHEET NUMBER	TOTAL SHEETS
-	-

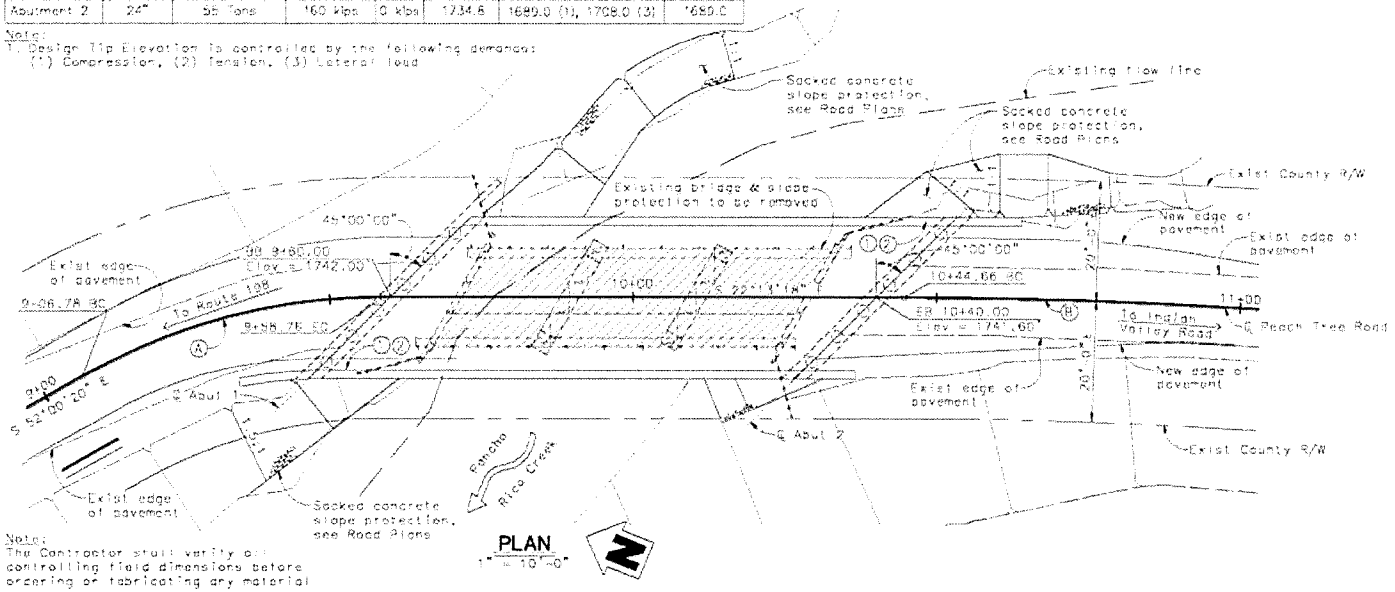
PILE DATA: CIDH CONCRETE PILES

Location	Diameter	Design Loading (Service Load)	Nominal Resistance Compression	Tension	Cut-off Elev	Design Tip Elev	Specified Tip Elev
Abutment 1	24"	55 Tons	160 kips	0 kips	1734.6	1694.0 (1), 1708.0 (3)	1694.0
Abutment 2	24"	55 Tons	160 kips	0 kips	1734.6	1689.0 (1), 1708.0 (3)	1689.0

Note:
1. Design Tip Elevation is controlled by the following demands:
(1) Compression, (2) Tension, (3) Lateral load

CURVE ALIGNMENT DATA

No	R	Δ	Tangent	Length
Ⓐ	100.00'	29°47'02"	26.59'	51.98'
Ⓑ	800.00'	6°21'07"	42.07'	84.07'



Note:
The Contractor shall verify all controlling field dimensions before ordering or fabricating any material

Legend:
① Point "PEACH TREE ROAD BRIDGE"
② Point "BRIDGE No. 418"
Indicates existing structure
Indicates new construction
Indicates 100 year high water (± 1738.0±)
Indicates stanpara plan sheet no.
Indicates detail no.
Indicates section no.
Indicates sheet no. shown on
Indicates detail no.
Indicates sheet no. shown on

VEHICULAR TRAFFIC
1 ___ NEW ALIGNMENT, NO TRAFFIC AT THE SITE.
2 ___ TRAFFIC WILL BE DETOURED AWAY FROM THE SITE.
3 X TRAFFIC WILL BE CARRIED ON THE STRUCTURE. STAGE CONSTRUCTION WILL BE REQUIRED TO MAINTAIN TRAFFIC ALONG PEACH TREE ROAD:
___ BND. ___ LANE (MIN) ___
___ BND. ___ LANE (MIN) ___
4 ___ TRAFFIC WILL PASS UNDER THE STRUCTURE ON ___ (NAME OF ST. OR HWY.)
A ___ NO FALSEWORK ALLOWED OVER TRAFFIC.
B ___ FALSEWORK OPENING(S) REQUIRED:

	TEMPORARY VERTICAL CLEARANCE	WIDTH OF TRAFFIC OPENING
___ BND.		
___ BND. RAMP		
___ BND.		
___ BND. RAMP		

C ___ TEMPORARY TRAFFIC LANE REDUCTION NEEDED FOR FOOTING EXCAVATION.

TYPE SELECTION (3/2/10)

SUBMITTED BY	BIGGS CARDOSA ASSOCIATES, INC	BIGGS CARDOSA ASSOCIATES INC STRUCTURAL ENGINEERS
DESIGN BY	A. NOTARO, Project Engineer	CHKD BY
DRAWN BY	S. HICKEY	CHKD BY
RECOMMENDED BY	R. SOMMARIEL	CHKD BY
RECOMMENDED BY	TRAFFIC DIVISION OF PUBLIC WORKS	DATE ___ TIME ___ AM/PM SCH TIME: 05:15

NO.	DATE	REVISION	APPROVED
1			
2			
3			
4			
5			

COUNTY OF MONTEREY
RESOURCE MANAGEMENT AGENCY
DEPARTMENT OF PUBLIC WORKS
Design Engineering
168 WEST ALISAL STREET
SALINAS, CALIFORNIA 93901-2680
(831) 755-4800 / FAX (831) 755-4958

PEACH TREE ROAD BRIDGE (REPLACEMENT)
AT PANCHO RICO CREEK

GENERAL PLAN

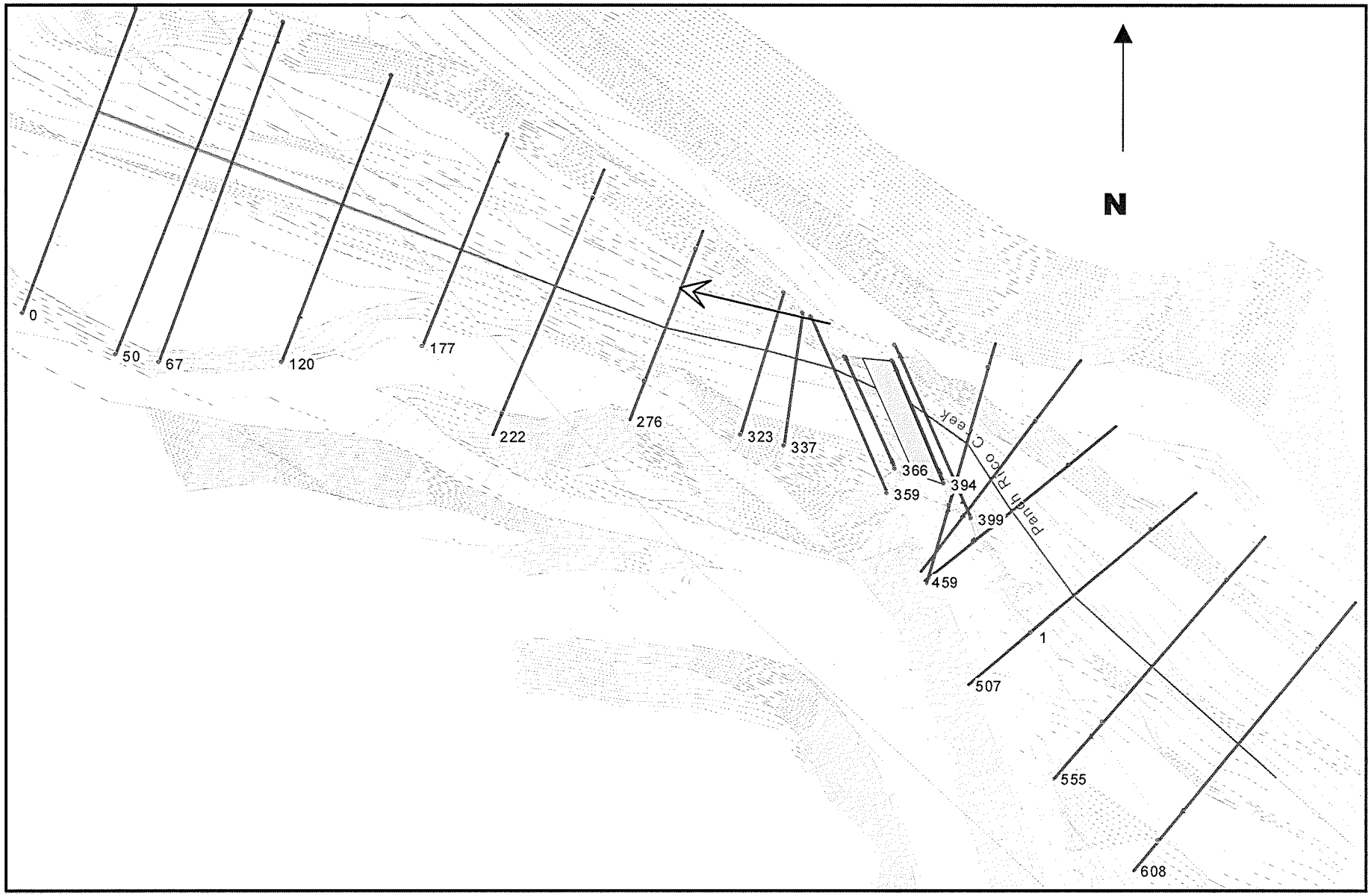
JOB	DRAWING	SHEET
1/2/10	3706-1A01	S-1
SCALE	VAR. DRWG #	OF
AS SHOWN		

REGISTERED PROFESSIONAL ENGINEER
ALFRED NOTARO
No. 05739
(RE-12/31/10)
STATE OF CALIFORNIA

Attachment B

HEC-RAS Calculations

Existing Conditions

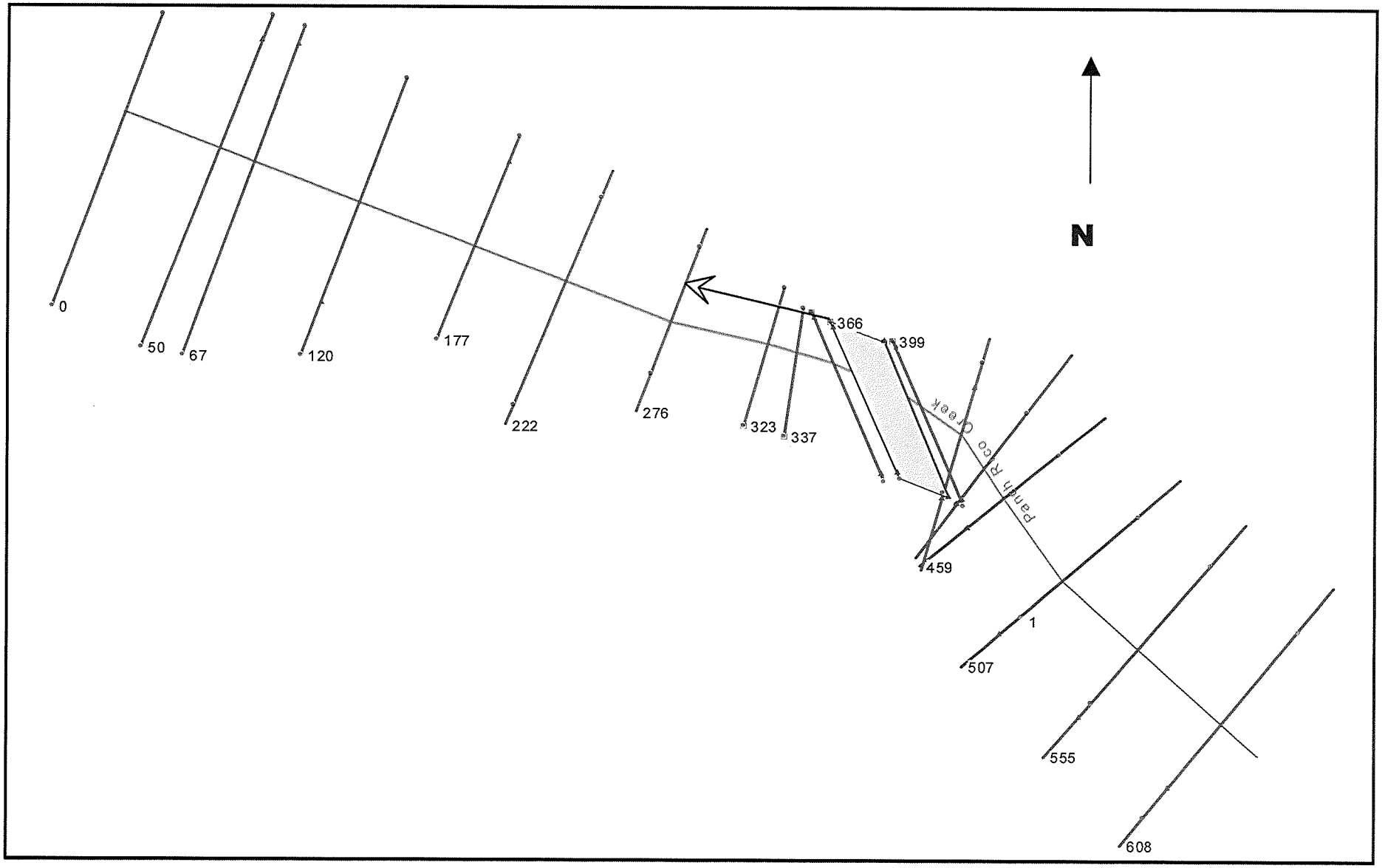

N
0
50
67
120
177
222
276
323
337
359
366
394
399
459
Pandh Rico Creek
1
507
555
608

River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	Chl
	100-yr	3630	1730.90	1741.93	1739.30	1742.40	0.002219	5.51	668.69	130.28	0.40
608	50-yr	3090	1730.90	1741.00	1738.83	1741.49	0.002931	5.62	551.84	119.61	0.45
	100-yr	3630	1730.50	1741.32	1739.48	1742.20	0.004382	7.53	486.25	110.82	0.56
555	50-yr	3090	1730.50	1740.21	1739.02	1741.21	0.006661	8.02	385.61	87.52	0.67
	100-yr	3630	1730.20	1741.15	1738.49	1742.01	0.003343	7.43	492.53	80.49	0.50
507	50-yr	3090	1730.20	1740.02	1737.98	1740.92	0.004470	7.61	406.28	72.16	0.56
	100-yr	3630	1728.73	1740.56	1738.02	1741.78	0.004696	8.89	408.73	79.87	0.57
459	50-yr	3090	1728.73	1739.40	1737.41	1740.64	0.005708	8.95	345.17	53.56	0.62
	100-yr	3630	1728.90	1740.11	1737.70	1741.66	0.005805	9.99	363.26	52.02	0.63
442	50-yr	3090	1728.90	1739.01	1737.00	1740.51	0.006265	9.84	314.03	43.91	0.65
	100-yr	3630	1728.90	1740.31	1737.11	1741.46	0.003749	8.61	425.38	78.46	0.52
424	50-yr	3090	1728.90	1739.20	1736.43	1740.30	0.004168	8.43	368.18	50.52	0.54
	100-yr	3630	1728.50	1739.63	1736.67	1741.29	0.006103	10.33	351.52	43.10	0.58
399	50-yr	3090	1728.50	1738.66	1735.97	1740.14	0.005979	9.75	316.84	35.90	0.58
	100-yr	3630	1728.50	1739.58	1736.67	1741.25	0.006215	10.38	349.61	43.10	0.59
394	50-yr	3090	1728.50	1738.61	1735.97	1740.11	0.006082	9.81	314.97	35.90	0.58
380		Bridge									
	100-yr	3630	1728.50	1737.74	1736.80	1740.18	0.011615	12.55	289.17	39.12	0.81
366	50-yr	3090	1728.50	1737.01	1736.13	1739.19	0.011445	11.85	260.68	39.04	0.81
	100-yr	3630	1728.50	1736.77	1736.77	1740.01	0.017577	14.43	251.52	39.02	1.00
359	50-yr	3090	1728.50	1736.11	1736.11	1739.02	0.017617	13.69	225.79	38.95	1.00
	100-yr	3630	1728.20	1735.26	1735.26	1737.97	0.015107	13.21	274.71	51.33	1.01
337	50-yr	3090	1728.20	1734.67	1734.67	1737.14	0.015382	12.61	244.97	50.08	1.01
	100-yr	3630	1727.91	1734.92	1734.92	1737.48	0.014655	12.84	282.70	55.28	1.00
323	50-yr	3090	1727.91	1734.35	1734.35	1736.69	0.014974	12.28	251.60	53.73	1.00
	100-yr	3630	1726.30	1735.01	1733.76	1736.53	0.007426	9.88	367.40	64.03	0.73
276	50-yr	3090	1726.30	1734.58	1733.22	1735.86	0.006714	9.07	340.50	62.63	0.69
	100-yr	3630	1725.90	1733.81	1733.81	1735.91	0.015516	11.62	312.38	76.11	1.01
222	50-yr	3090	1725.90	1733.29	1733.29	1735.26	0.015799	11.27	274.22	70.92	1.01
	100-yr	3630	1725.69	1733.27	1732.92	1734.92	0.011936	10.28	353.02	84.98	0.89
177	50-yr	3090	1725.69	1733.00	1732.43	1734.36	0.010581	9.37	329.92	83.53	0.83
	100-yr	3630	1725.50	1733.31	1732.27	1734.21	0.006415	7.60	477.41	132.88	0.66
120	50-yr	3090	1725.50	1732.95	1731.96	1733.73	0.006215	7.08	436.53	131.26	0.64
	100-yr	3630	1725.00	1733.04	1732.21	1733.81	0.007108	7.06	514.02	152.59	0.67
67	50-yr	3090	1725.00	1732.62	1731.93	1733.35	0.007831	6.83	452.10	150.04	0.69
	100-yr	3630	1724.80	1732.93	1732.05	1733.69	0.006747	6.97	520.99	149.56	0.66
50	50-yr	3090	1724.80	1732.50	1731.76	1733.21	0.007442	6.76	457.15	147.18	0.68
	100-yr	3630	1724.10	1732.28	1731.49	1733.29	0.008302	8.06	450.52	117.97	0.73
0	50-yr	3090	1724.10	1731.90	1731.16	1732.80	0.008300	7.61	406.23	116.04	0.72

Attachment C

HEC-RAS Calculations

Project Conditions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177
222
276
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337
366
399
459
1
507
555
608
Panch Rico Creek

River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	Chl
	100-yr	3630	1730.90	1741.51	1739.30	1742.06	0.002881	5.96	614.34	125.42	0.46
608	50-yr	3090	1730.90	1740.79	1738.83	1741.33	0.003395	5.88	527.27	118.45	0.48
	100-yr	3630	1730.50	1740.61	1739.48	1741.77	0.006936	8.65	420.51	95.73	0.69
555	50-yr	3090	1730.50	1739.70	1739.02	1740.97	0.009628	9.05	341.46	83.72	0.79
	100-yr	3630	1730.20	1740.37	1738.51	1741.47	0.005065	8.42	431.51	74.63	0.61
507	50-yr	3090	1730.20	1739.45	1738.01	1740.56	0.006088	8.46	365.44	69.79	0.65
	100-yr	3630	1728.73	1739.36	1738.02	1741.10	0.008013	10.58	343.12	53.47	0.74
459	50-yr	3090	1728.73	1738.43	1737.41	1740.14	0.009025	10.50	294.36	51.23	0.77
	100-yr	3630	1728.90	1737.70	1737.70	1740.78	0.015217	14.08	257.79	41.81	1.00
442	50-yr	3090	1728.90	1737.00	1737.00	1739.83	0.015555	13.50	228.91	40.69	1.00
	100-yr	3630	1728.90	1737.11	1737.11	1739.98	0.015368	13.61	266.73	46.37	1.00
424	50-yr	3090	1728.90	1736.52	1736.44	1739.09	0.015031	12.87	240.17	44.70	0.98
	100-yr	3630	1728.40	1737.89	1735.93	1739.32	0.005257	9.58	378.76	56.27	0.63
399	50-yr	3090	1728.40	1737.25	1735.37	1738.49	0.005190	8.95	345.20	54.95	0.61
	100-yr	3630	1728.40	1737.89	1735.92	1739.28	0.005702	9.44	384.62	56.27	0.64
394	50-yr	3090	1728.40	1737.23	1735.34	1738.46	0.005544	8.88	347.80	54.91	0.62
380		Bridge									
	100-yr	3630	1728.44	1736.92	1736.24	1739.00	0.009962	11.59	313.20	54.26	0.83
366	50-yr	3090	1728.44	1736.35	1735.67	1738.19	0.010022	10.89	283.84	53.10	0.82
	100-yr	3630	1728.44	1736.21	1736.21	1738.87	0.014848	13.07	277.81	52.79	1.00
359	50-yr	3090	1728.44	1735.66	1735.66	1738.05	0.015210	12.41	249.07	51.65	1.00
	100-yr	3630	1728.20	1735.26	1735.26	1737.97	0.015107	13.21	274.71	51.33	1.01
337	50-yr	3090	1728.20	1734.67	1734.67	1737.14	0.015386	12.61	244.95	50.08	1.01
	100-yr	3630	1727.91	1734.92	1734.92	1737.48	0.014655	12.84	282.70	55.28	1.00
323	50-yr	3090	1727.91	1734.35	1734.35	1736.69	0.014978	12.28	251.58	53.73	1.00
	100-yr	3630	1726.30	1735.01	1733.76	1736.53	0.007426	9.88	367.40	64.03	0.73
276	50-yr	3090	1726.30	1734.58	1733.22	1735.86	0.006714	9.07	340.50	62.63	0.69
	100-yr	3630	1725.90	1733.81	1733.81	1735.91	0.015516	11.62	312.38	76.11	1.01
222	50-yr	3090	1725.90	1733.29	1733.29	1735.26	0.015798	11.27	274.23	70.92	1.01
	100-yr	3630	1725.69	1733.29	1732.94	1734.92	0.011809	10.25	354.29	85.06	0.88
177	50-yr	3090	1725.69	1733.00	1732.50	1734.36	0.010565	9.36	330.08	83.54	0.83
	100-yr	3630	1725.50	1733.29	1732.27	1734.22	0.006488	7.73	469.77	132.80	0.66
120	50-yr	3090	1725.50	1732.94	1731.93	1733.74	0.006229	7.17	430.70	131.20	0.64
	100-yr	3630	1725.00	1733.04	1732.21	1733.81	0.007108	7.06	514.02	152.59	0.67
67	50-yr	3090	1725.00	1732.62	1731.93	1733.35	0.007831	6.83	452.10	150.04	0.69
	100-yr	3630	1724.80	1732.93	1732.05	1733.69	0.006747	6.97	520.99	149.56	0.66
50	50-yr	3090	1724.80	1732.50	1731.76	1733.21	0.007442	6.76	457.15	147.18	0.68
	100-yr	3630	1724.10	1732.28	1731.49	1733.29	0.008302	8.06	450.52	117.97	0.73
0	50-yr	3090	1724.10	1731.90	1731.16	1732.80	0.008300	7.61	406.23	116.04	0.72