APPENDIX G

BENICIA MARTINEZ MAIN SPANS, BR. NO. 23-0153R (ID'S 17, 33, 76)
BACKUP DOCUMENTATION

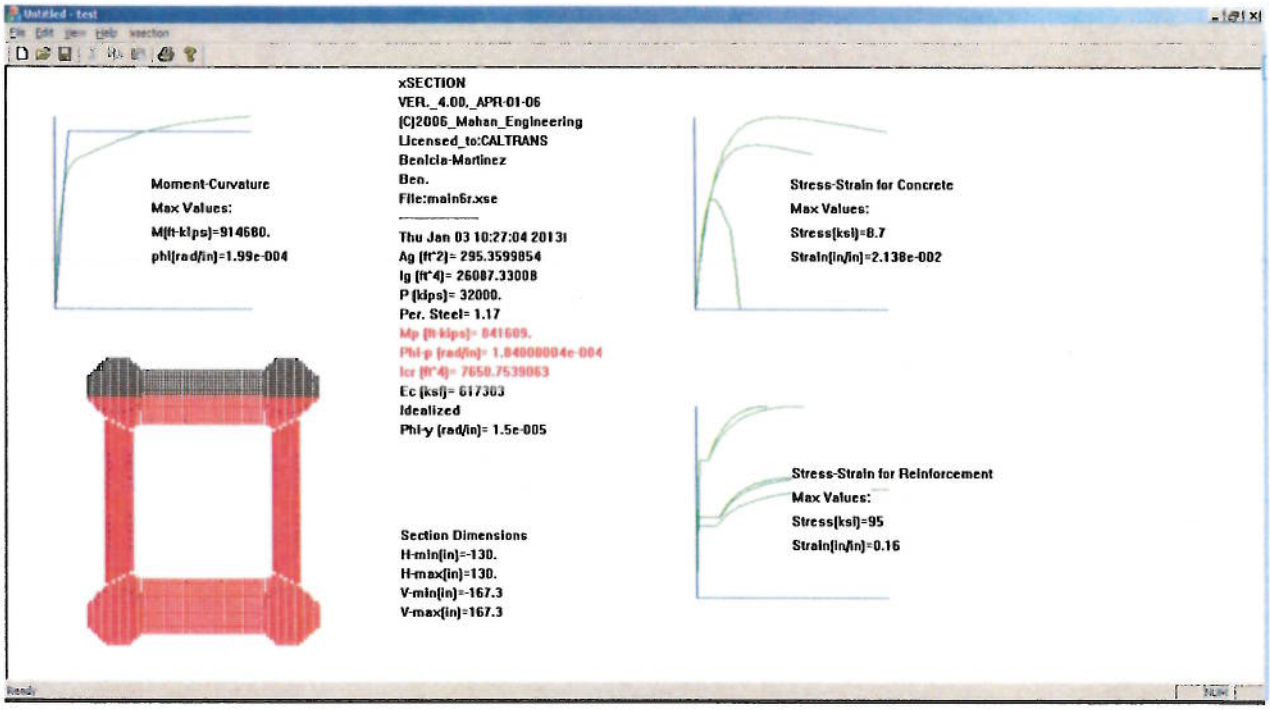
1. Detailed Analysis Results for each ID
2. XSection program output
3. Pile cross section details
4. Steel Casing Mill Certificate Data
5. Additional As-built Plans
6. Secondary Review Analysis Results

G - Part 1: Detailed Analysis Results for each ID

G - Part 2: XSection program output

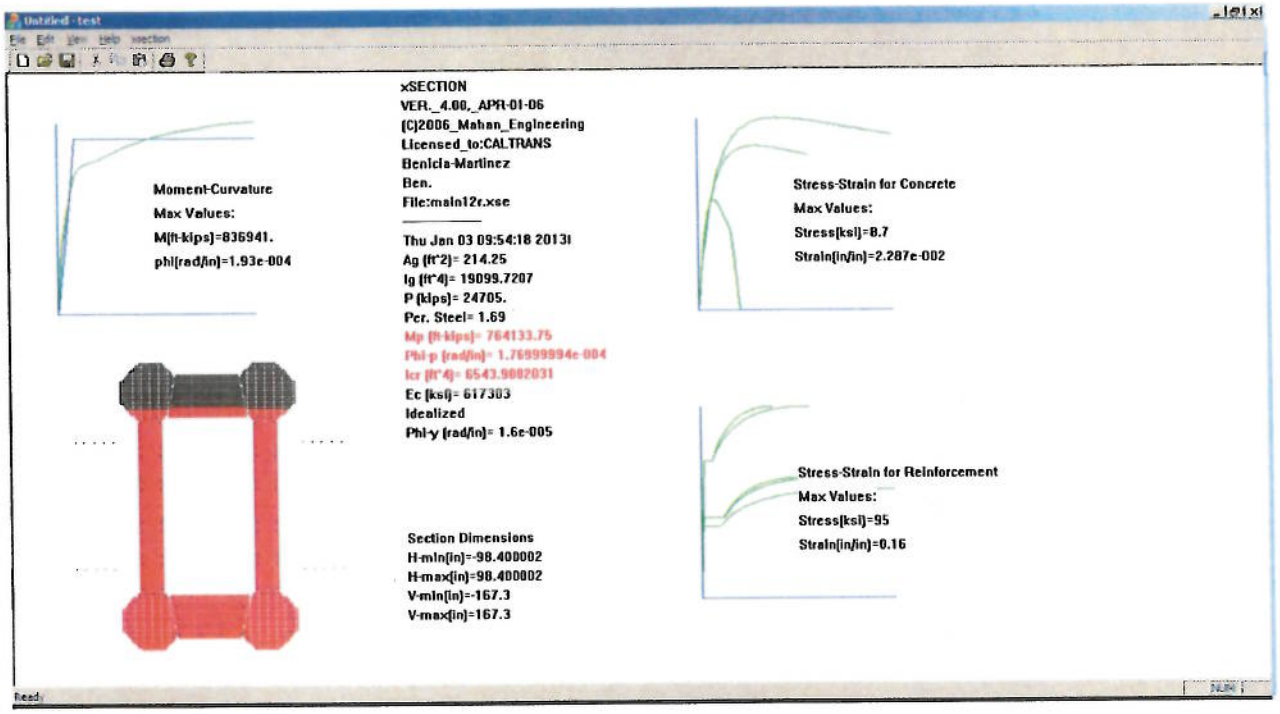
New Benicia Martinez Bridge

Pier 6



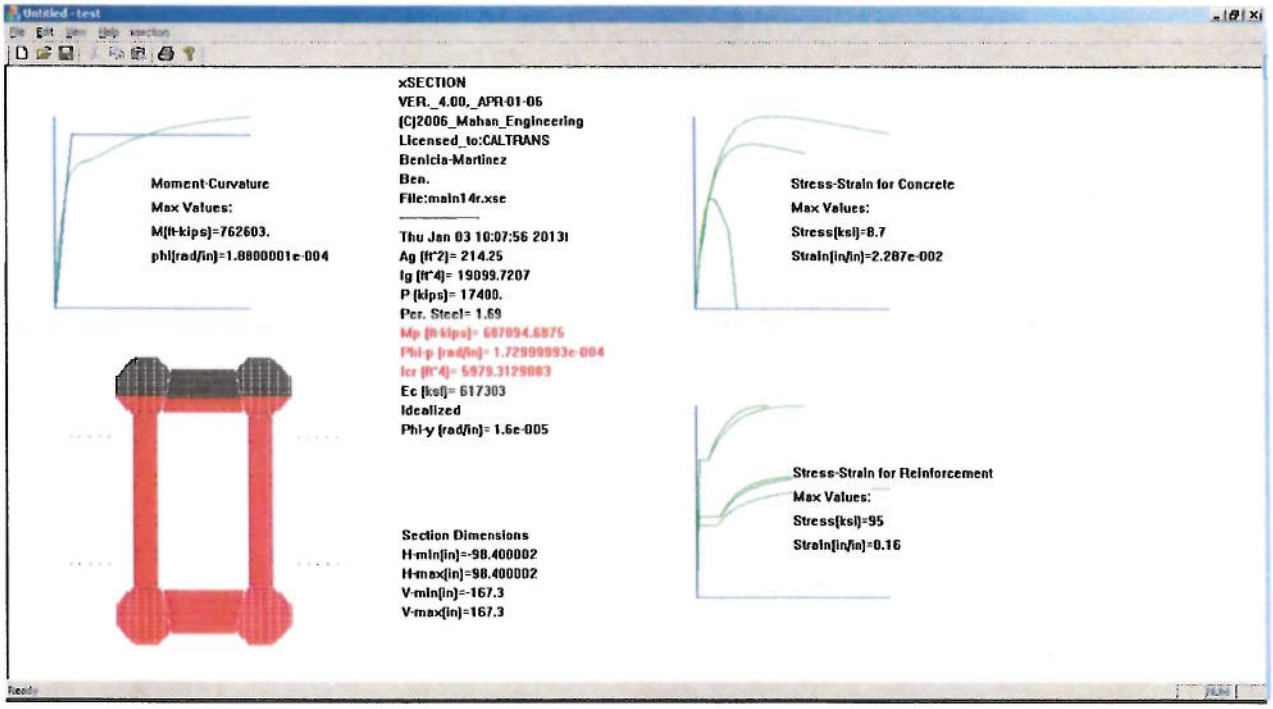
New Benicia Martinez Bridge

Pier 12



New Benicia Martinez Bridge

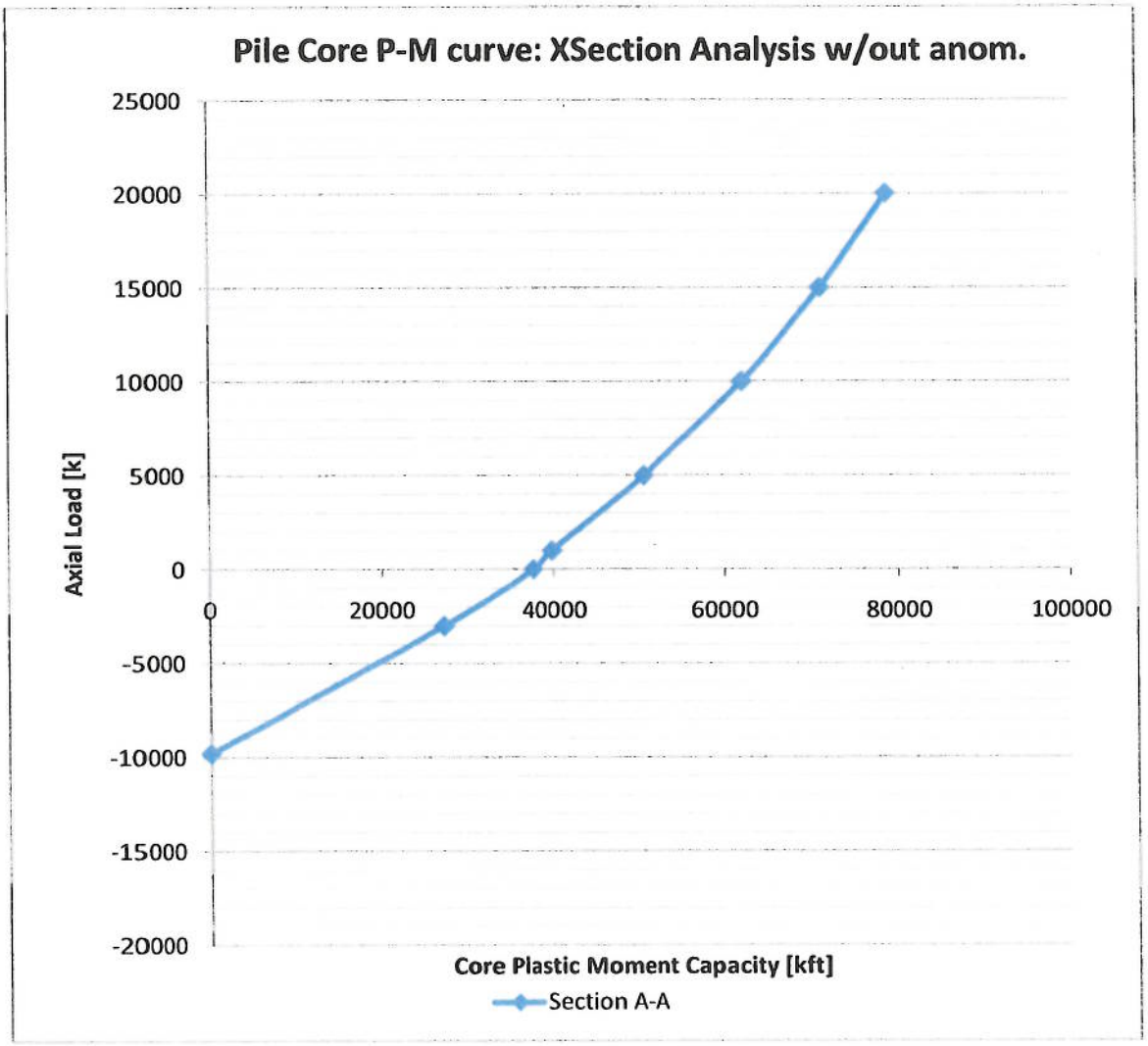
Pier 14



Benicia Martinez Pile Anomaly Review

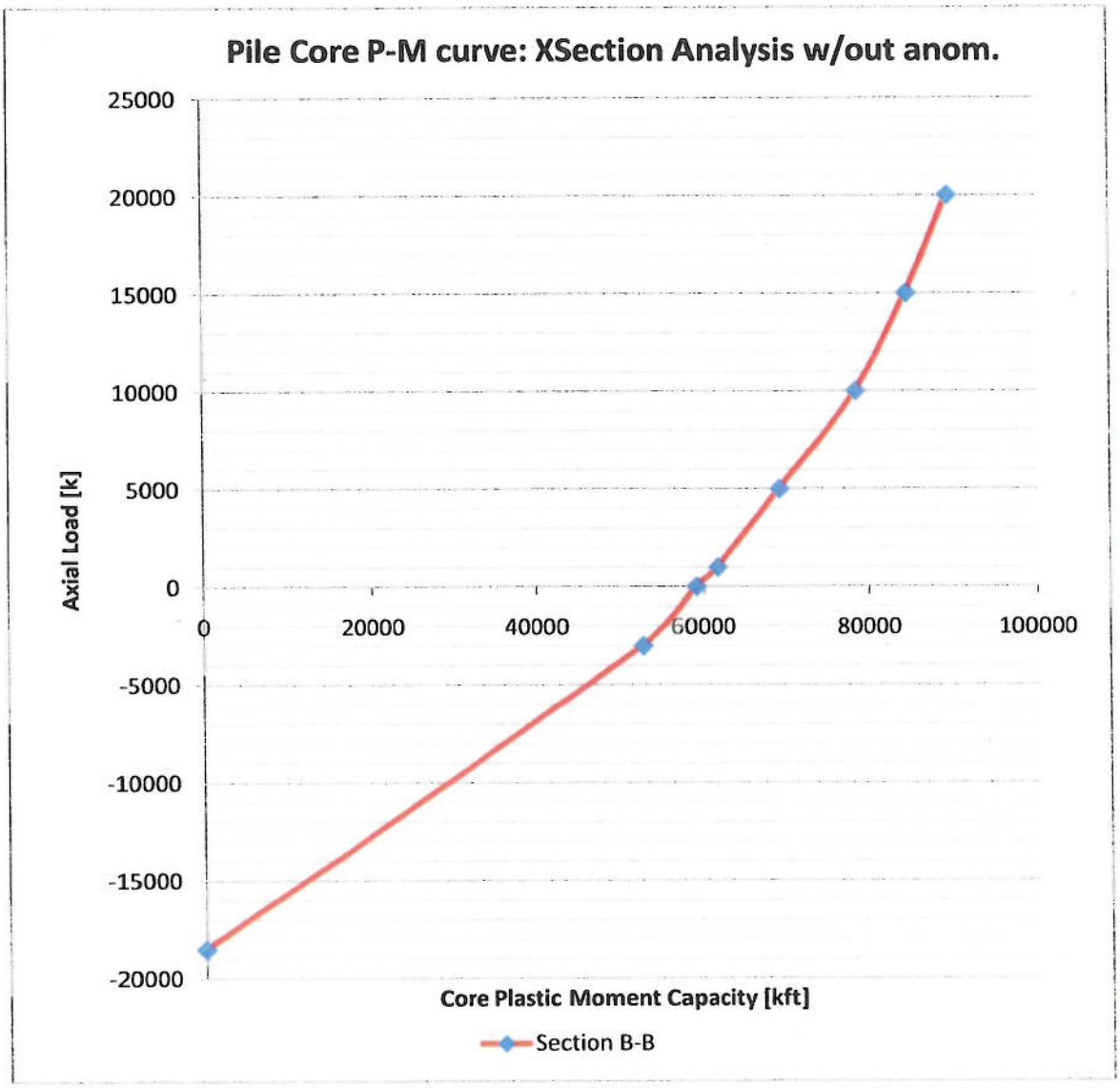
Mp	P	Icr
78580	20000	127.02
71149	15000	125.67
61975	10000	117.41
50477	5000	102.9
39793	1000	84.9
37497	10	79.17
27157	-3000	92.87
0	-9792	na

- 2.5m dia core
- 1.625" GR50 casing as confinement
- Casing strength added seperately



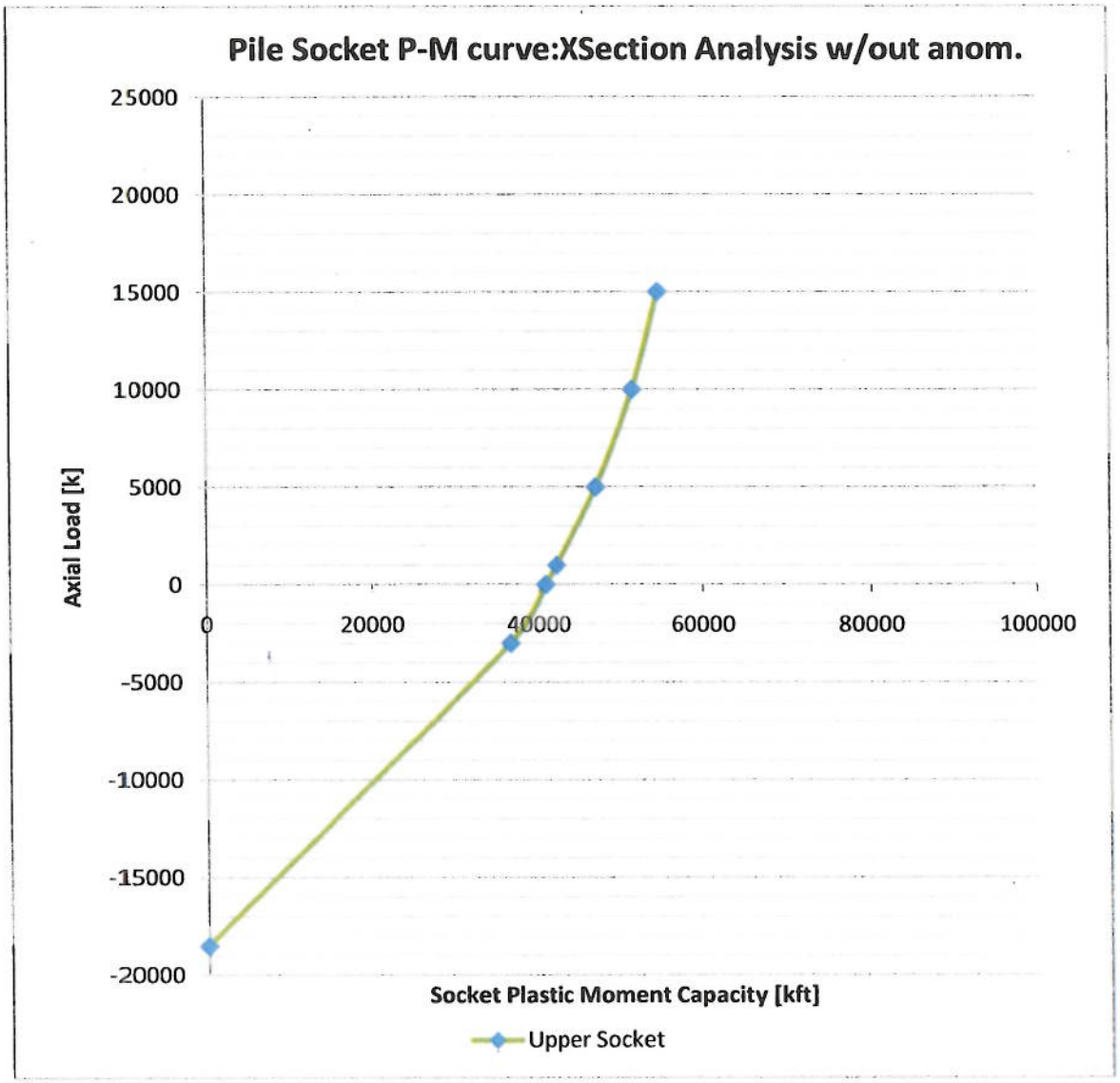
Mp	P	Icr
89489	20000	127.02
84635	15000	125.67
78492	10000	117.41
69347	5000	102.9
61713	1000	84.9
59096	10	79.17
52756	-3000	92.87
0	-18496	na

- 2.5m dia core
- 1.625" GR50 casing as confinement
- Casing strength added seperately



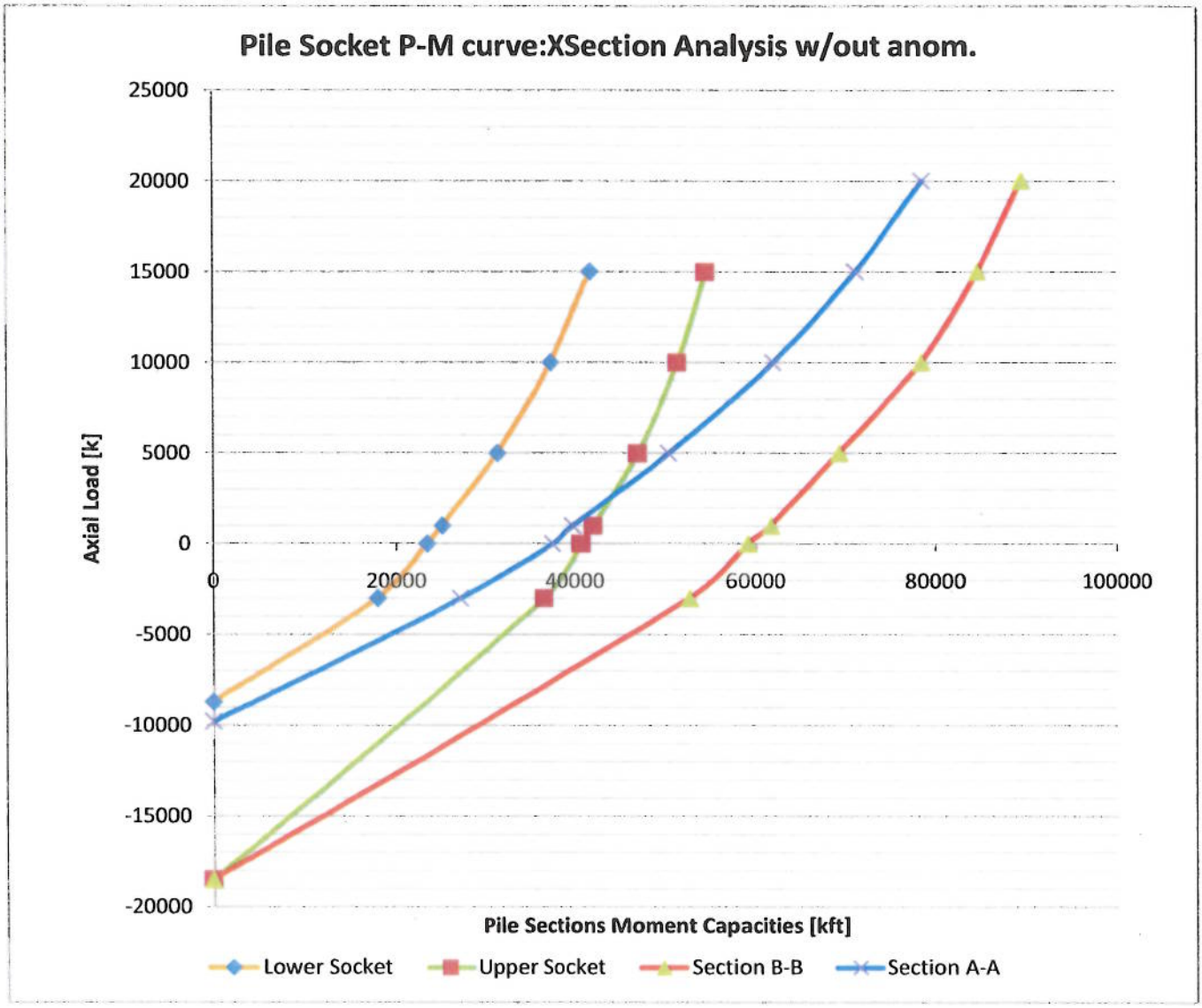
Mp	P	Icr
54576	15000	85.9
51471	10000	89.7
47007	5000	87.2
42098	1000	81.4
40754	10	79.4
36516	-3000	71.5
0	-18496	na

- 7.2 ft. dia upper socket
- No casing; hoop confinement



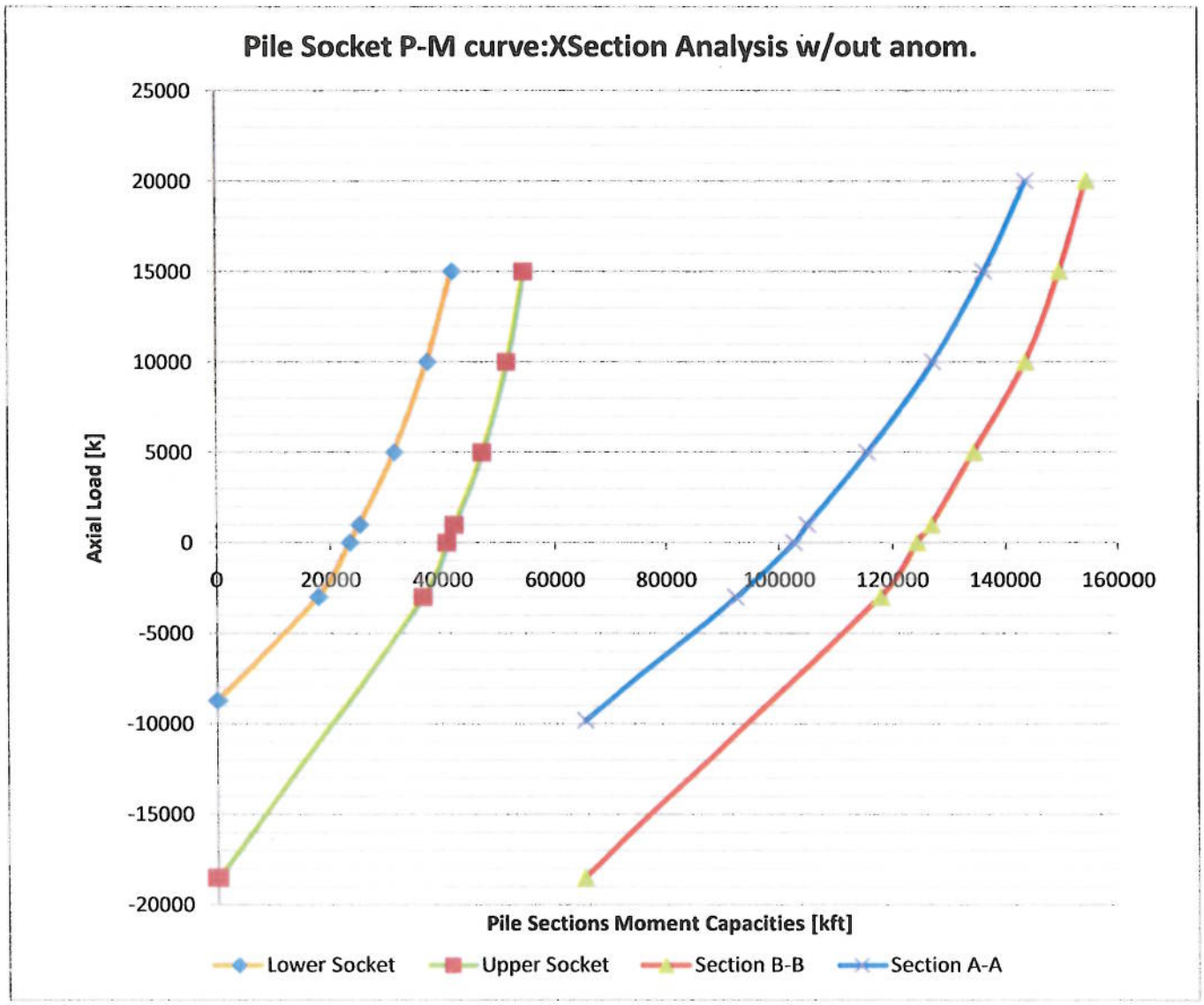
A-A		B-B		Upper S		Lower S	
Mp	P	Mp	P	Mp	P	Mp	P
78580	20000	89489	20000				
71149	15000	84635	15000	54576	15000	41746	15000
61975	10000	78492	10000	51471	10000	37327	10000
50477	5000	69347	5000	47007	5000	31375	5000
39793	1000	61713	1000	42098	1000	25109	1000
37497	10	59096	10	40754	10	23363	10
27157	-3000	52756	-3000	36516	-3000	17910	-3000
0	-9792	0	-18496	0	-18496	0	-8704

NOTE: Values shown do not include casing capacities



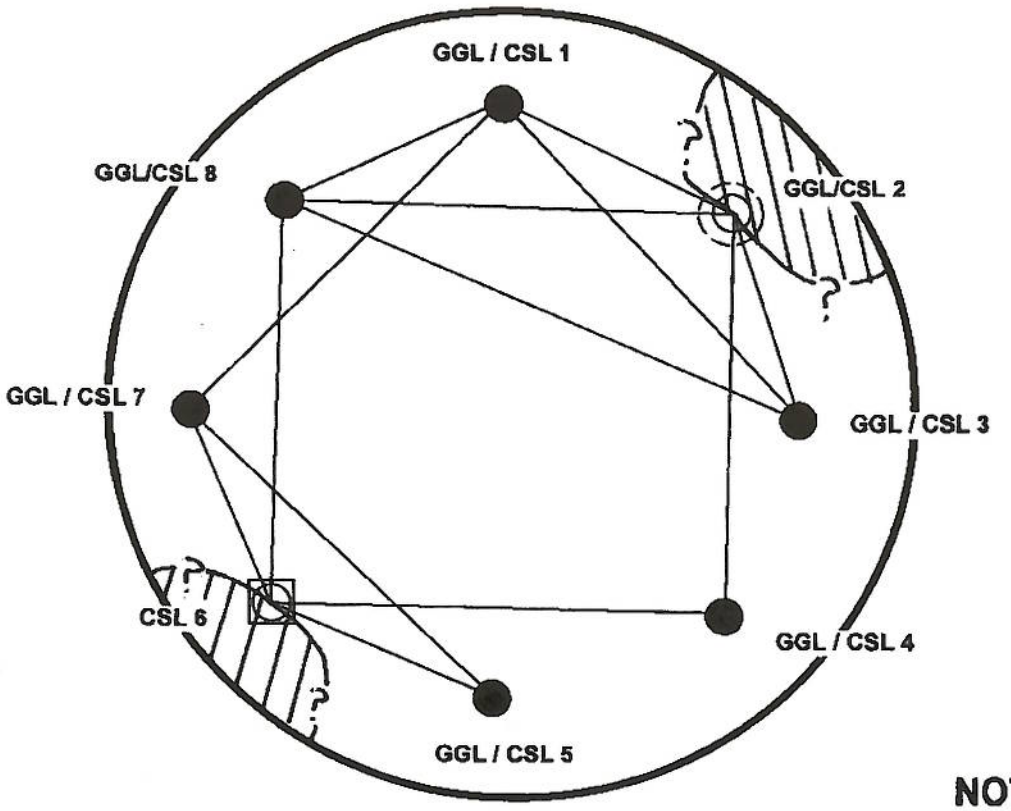
A-A		B-B		Upper S		Lower S	
Mp	P	Mp	P	Mp	P	Mp	P
143790	20000	154699	20000				
136359	15000	149845	15000	54576	15000	41746	15000
127185	10000	143702	10000	51471	10000	37327	10000
115687	5000	134557	5000	47007	5000	31375	5000
105003	1000	126923	1000	42098	1000	25109	1000
102707	10	124306	10	40754	10	23363	10
92367	-3000	117966	-3000	36516	-3000	17910	-3000
65210	-9792	65210	-18496	0	-18496	0	-8704

NOTE: Values shown include strain hardened GR50 casing capacity



G - Part 3: Pile Cross Section Detail

1. Typical CSL Pile Cross Section
2. Idealized Pile Cross Section with Anomaly



NOT TO SCALE

LEGEND

- Anomalies Detected/Inconclusive by Crosshole Sonic Logging
- No Anomalies Detected by Crosshole Sonic Logging (CSL)
- Anomalies Detected by Gamma-Gamma Logging (GGL)
- No Anomalies Detected by GGL
- Inspection Tubes Not Tested by GGL
- Inspection Tubes not Tested by GGL and CSL

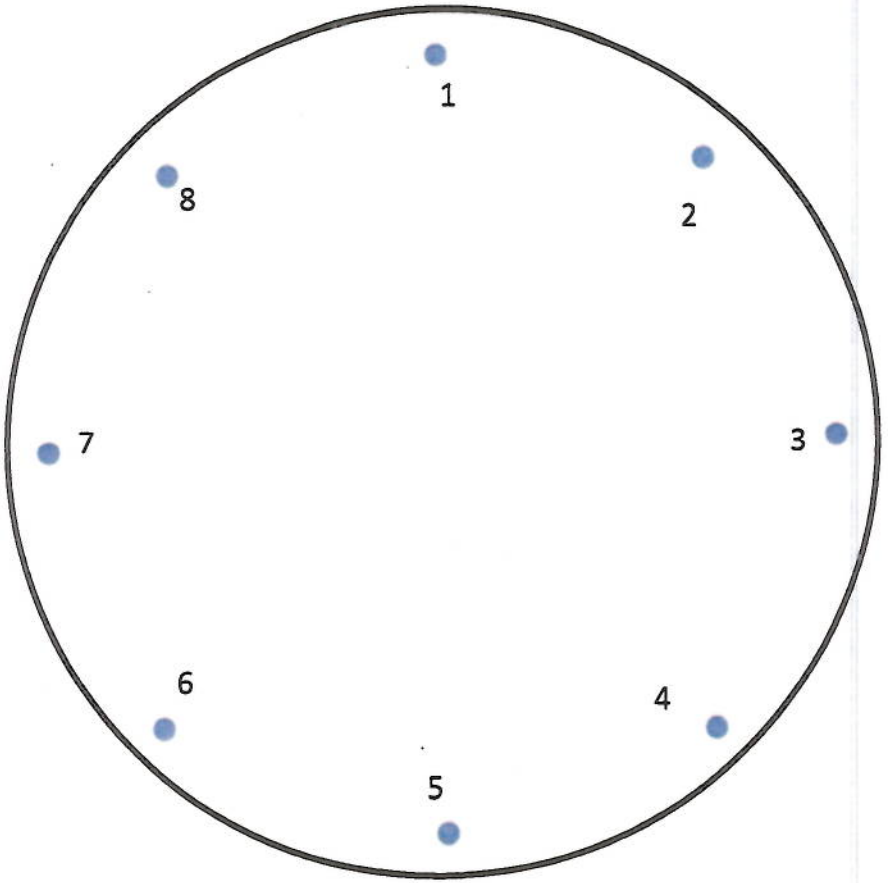
Crosshole Sonic Logging Test Results

New Benicia-Martinez Bridge: Pile 5 at Pier 6: Section E-E
Depth Range: 11.8 meters to 12.4 meters

Bridge Number: 28-0153R
04-CC, SOL-680-40.1/41.4,
L0.0/L1.0
Date Tested: 5-5-2004 and 5-7-2004

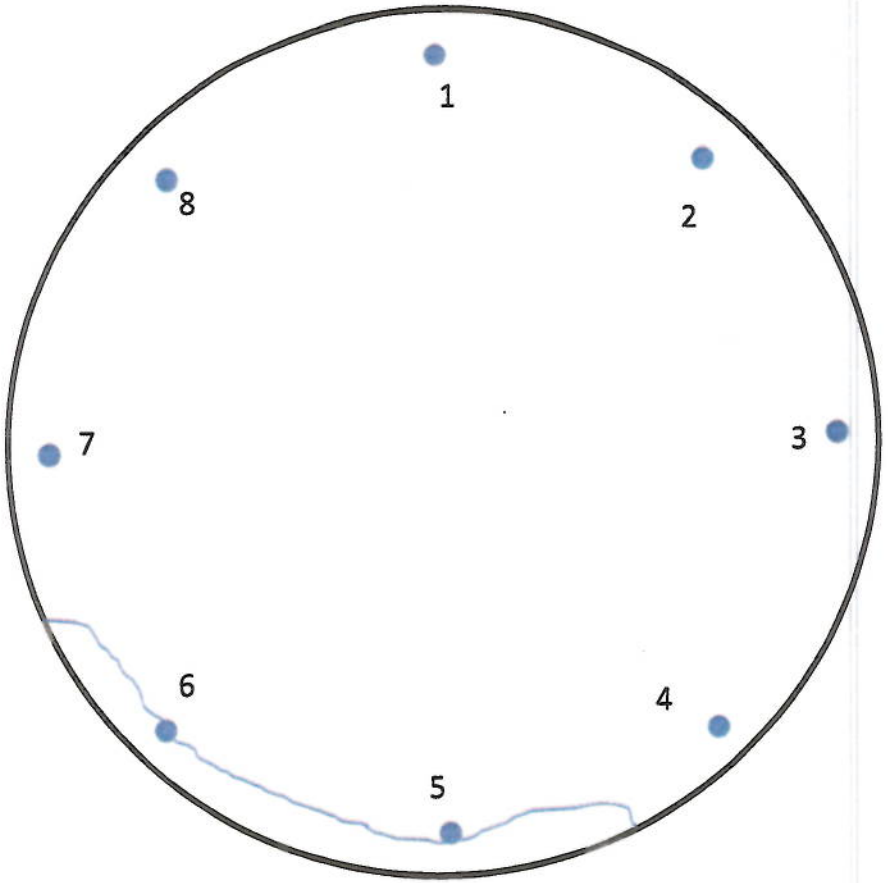
EA 04-006034
2.5-m/2.2-m diameter CIDH Pile
Reported Top Of Concrete Elev.:-15.51 m
Reported Tip Elev.:-53.11 m

Caltrans



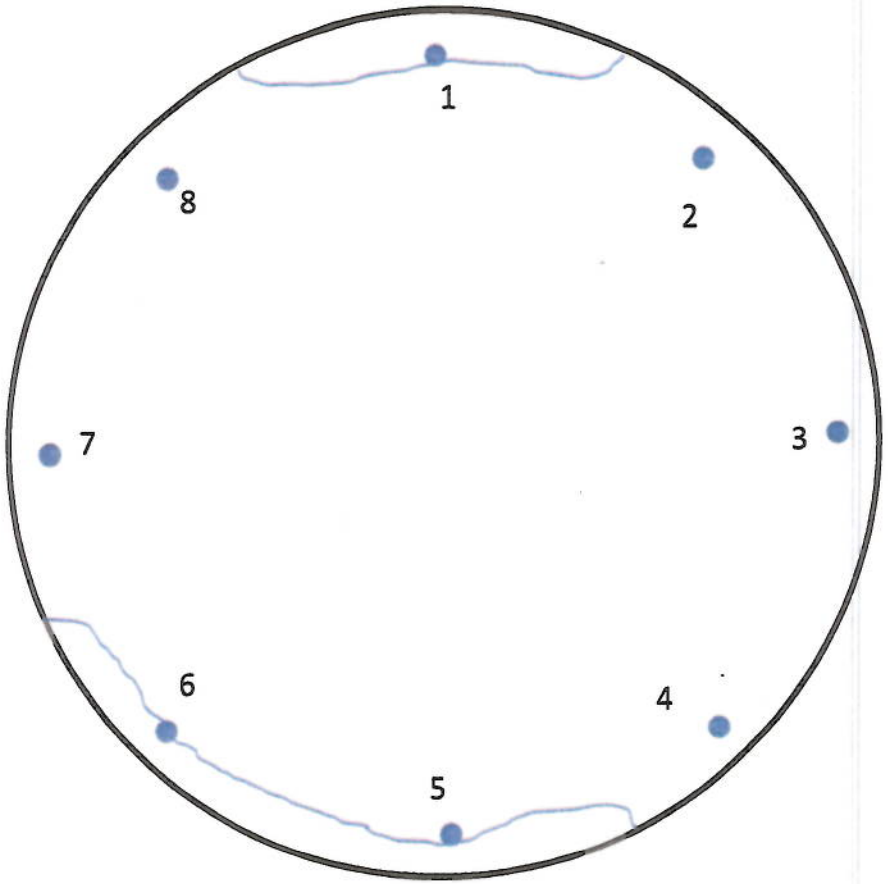
Section: 0.0m – 1.0m
All sections from
Top of Construction Joint

Pier 6 – Pile 5



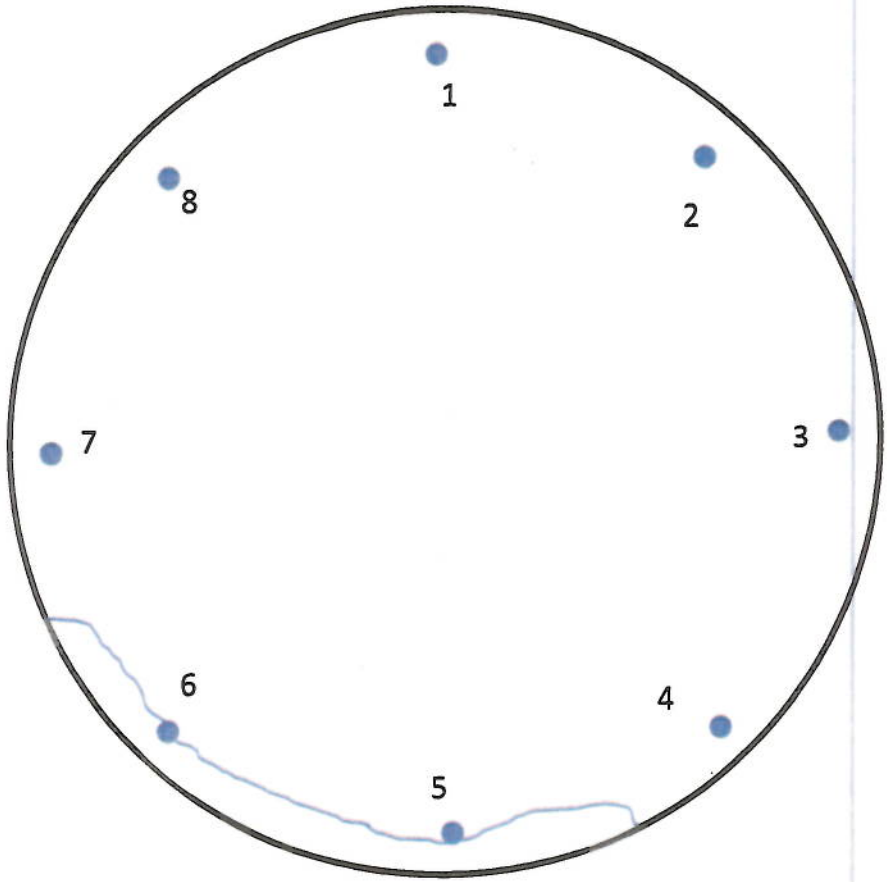
Section: 1.0m – 1.3m
All sections from
Top of Construction Joint

Pier 6 – Pile 5



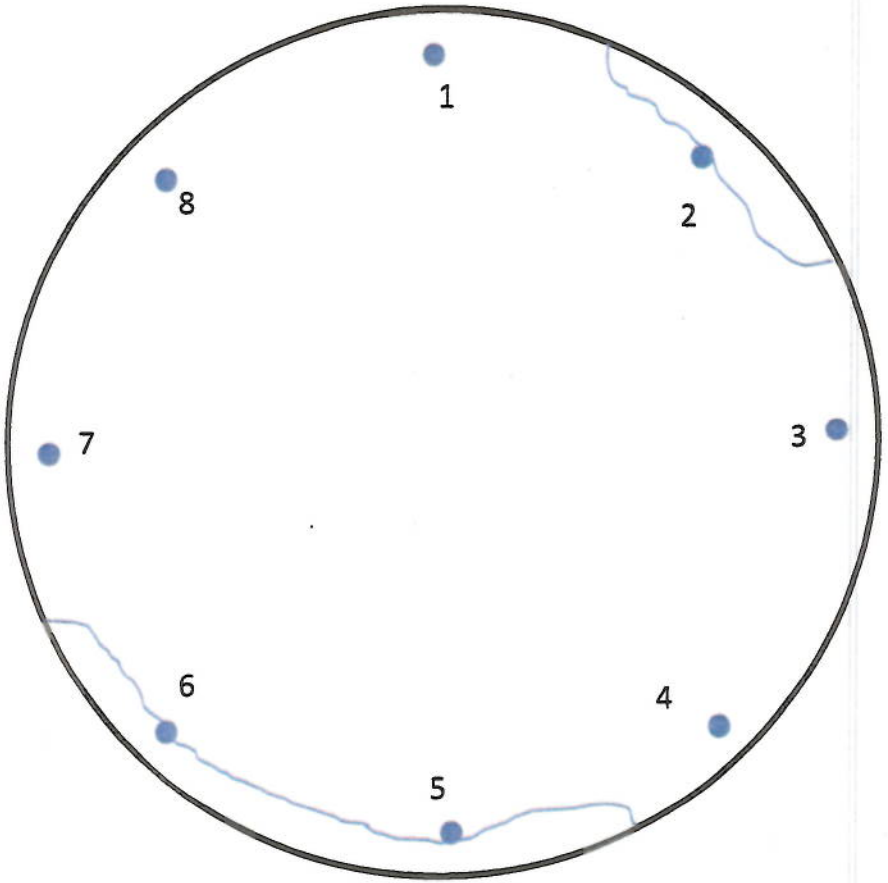
Section: 1.3m – 1.6m
All sections from
Top of Construction Joint

Pier 6 – Pile 5



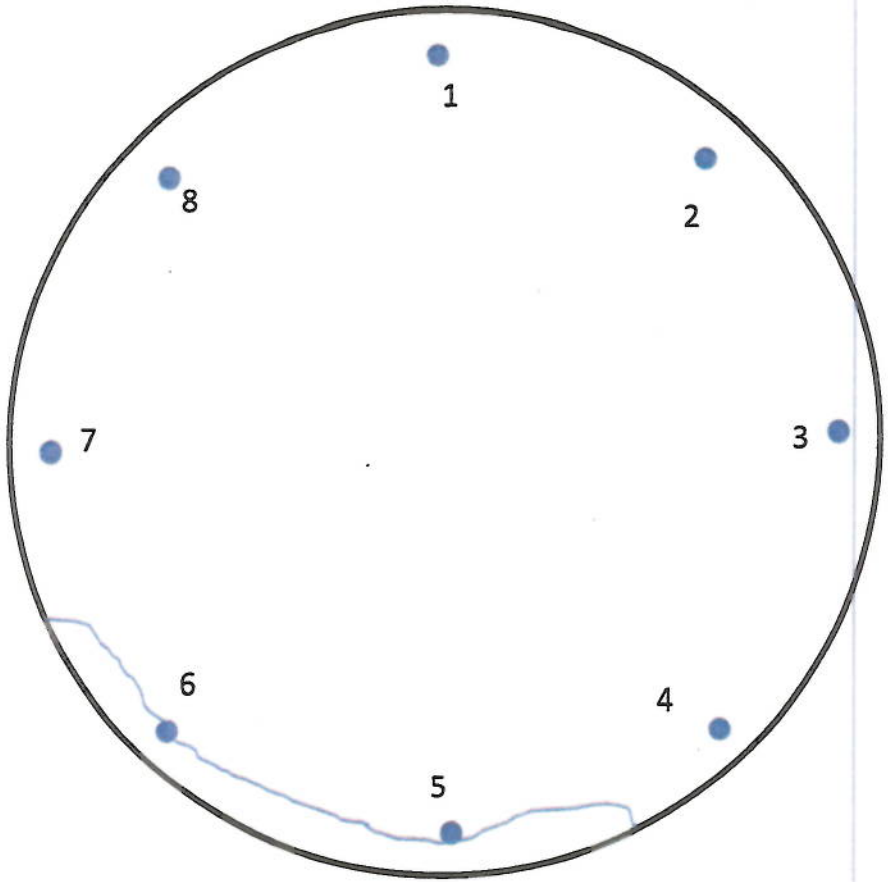
Section: 1.6m – 11.8m
All sections from
Top of Construction Joint

Pier 6 – Pile 5



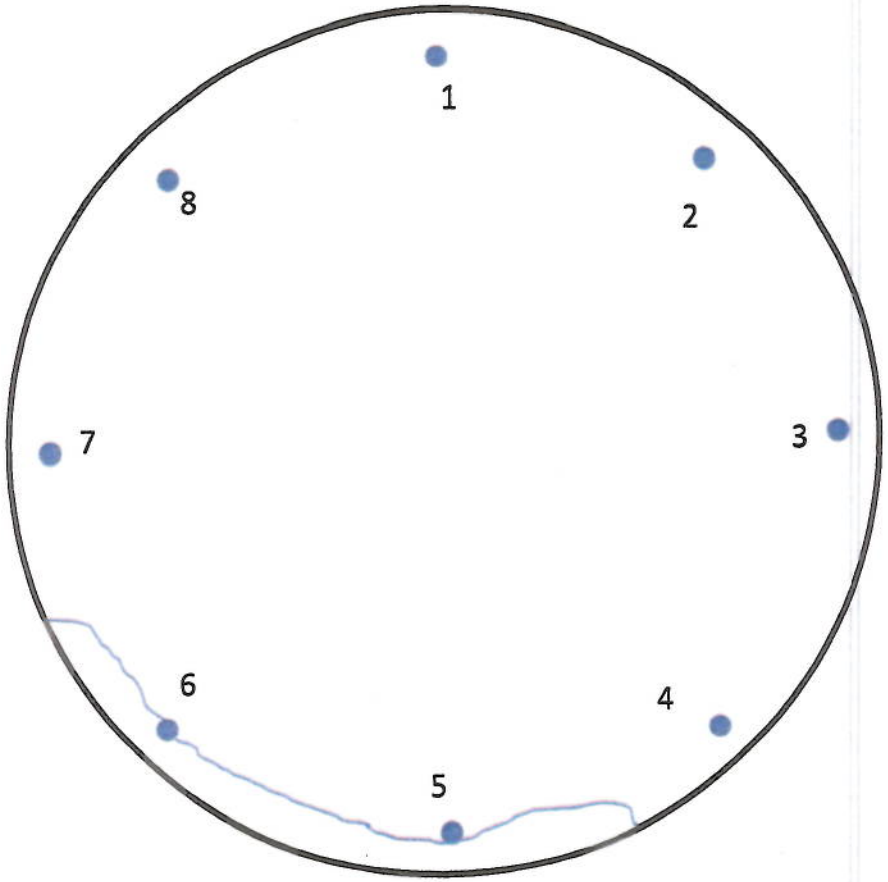
Section: 11.8m – 12.4m
All sections from
Top of Construction Joint

Pier 6 – Pile 5



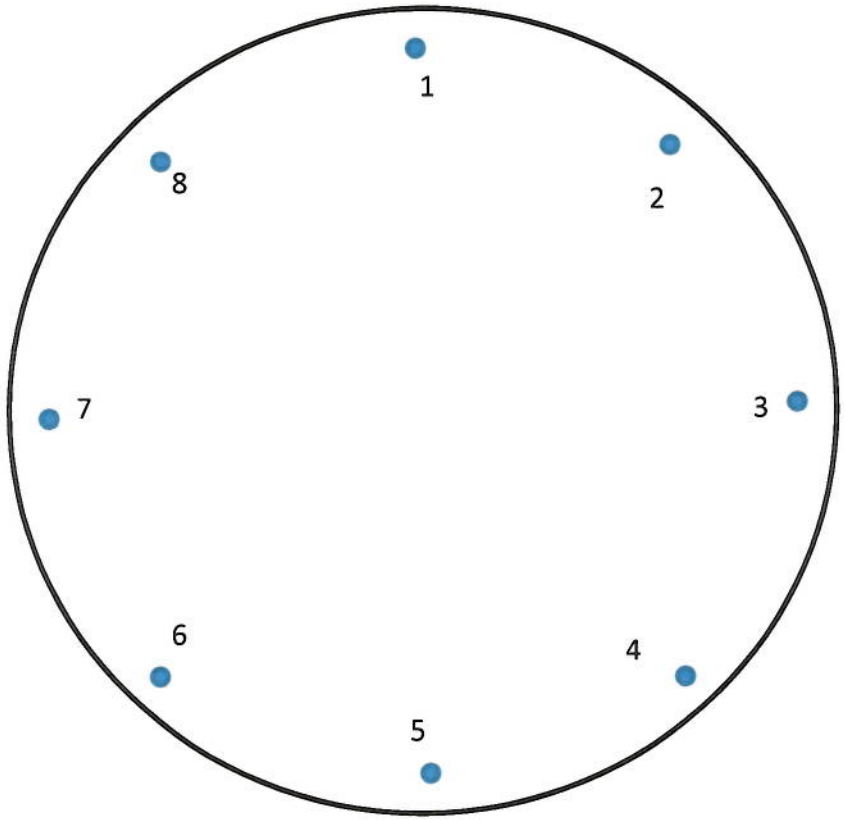
Section: 12.4m – 21.4m
All sections from
Top of Construction Joint

Pier 6 – Pile 5



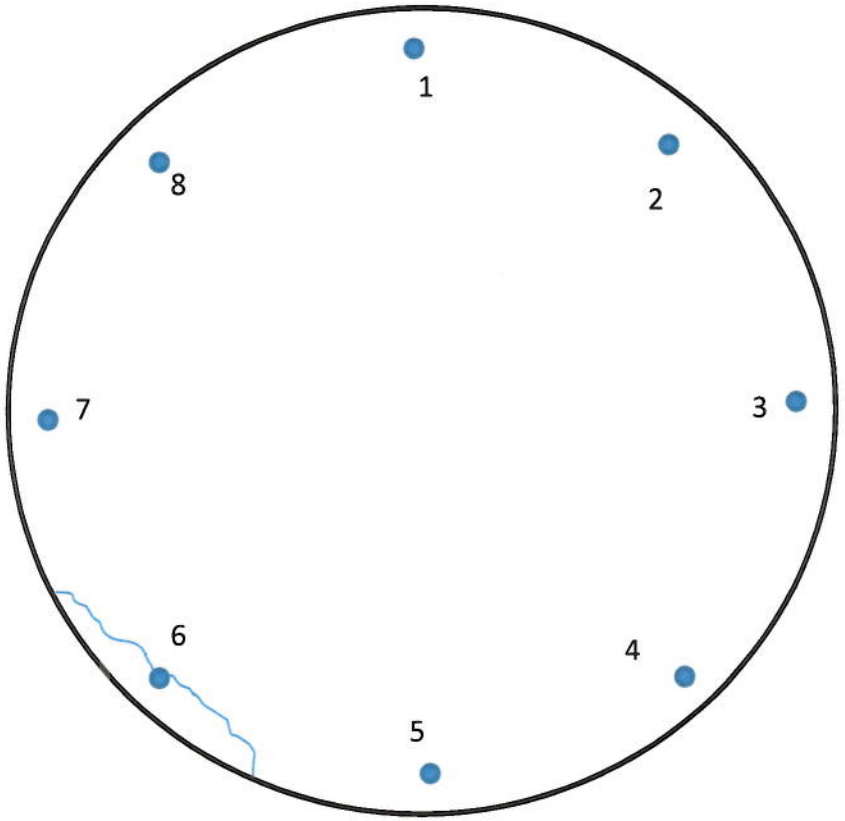
Section: 21.4 – 37.4m
All sections from
Top of Construction Joint

Pier 6 – Pile 5



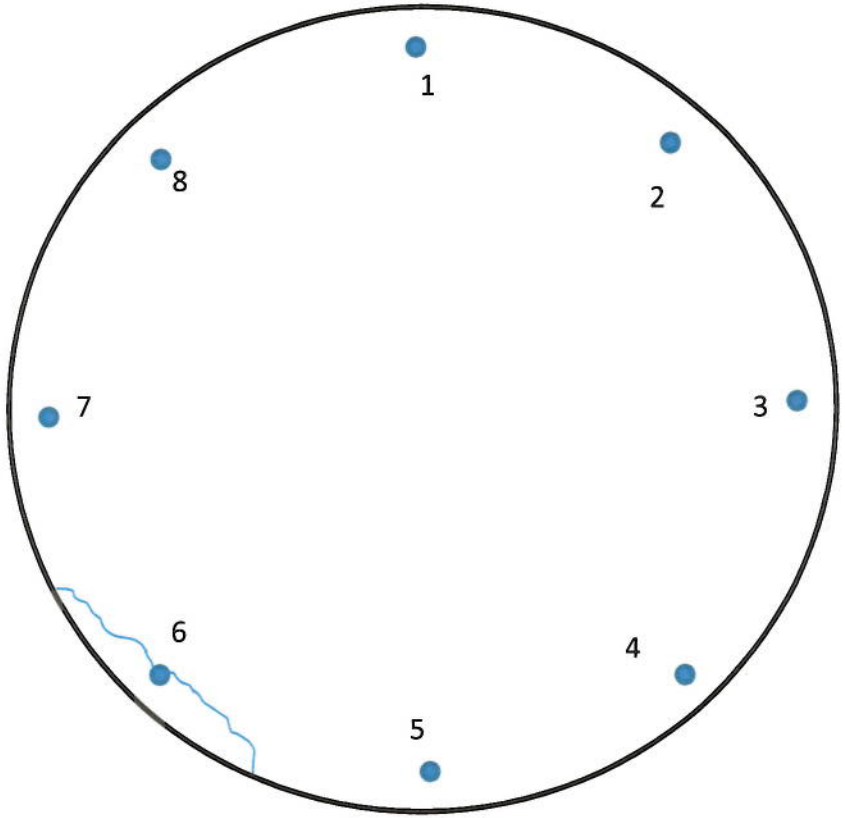
Section: 0.0m – 0.5m
All sections from
Top of Construction Joint

Pier 12 – Pile 6 (Tube 6 assumed anomalous)



Section: 0.5m – 2.7m
All sections from
Top of Construction Joint

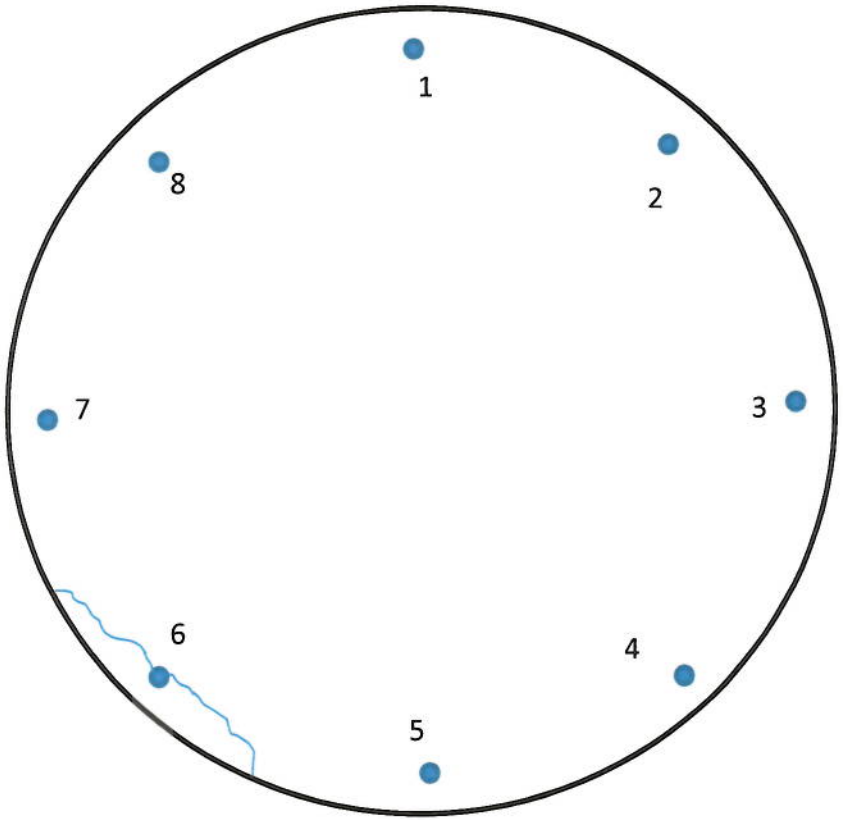
Pier 12 – Pile 6 (Tube 6 assumed anomalous)



Section: 2.7m – 4.3m

All sections from
Top of Construction Joint

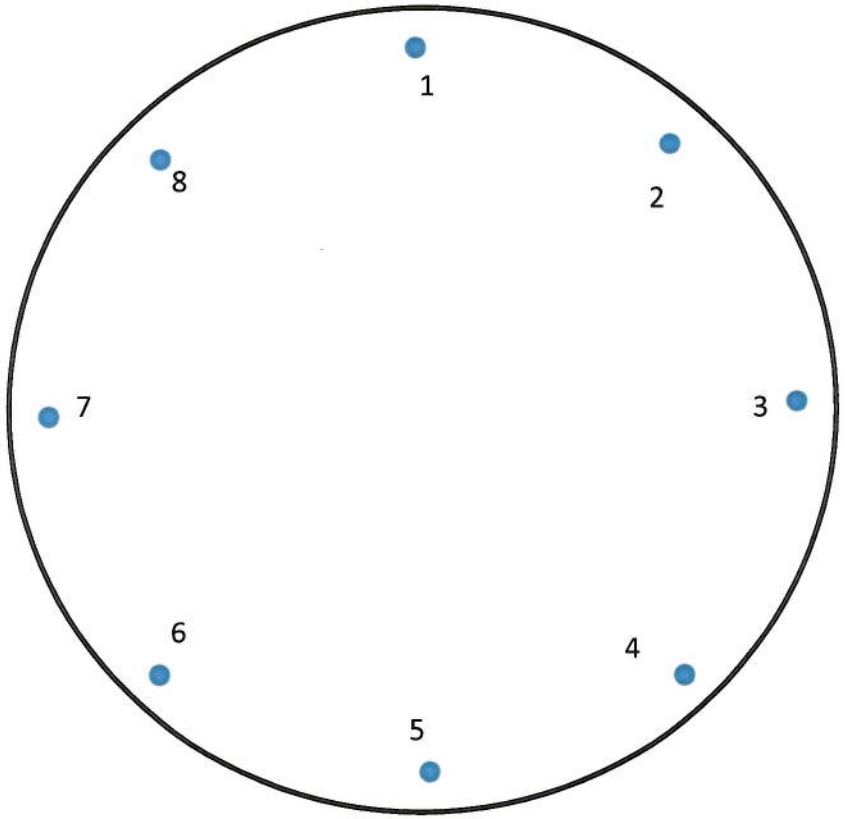
Pier 12 – Pile 6 (Tube 6 assumed anomalous)



Section: 4.3m – 38.2m

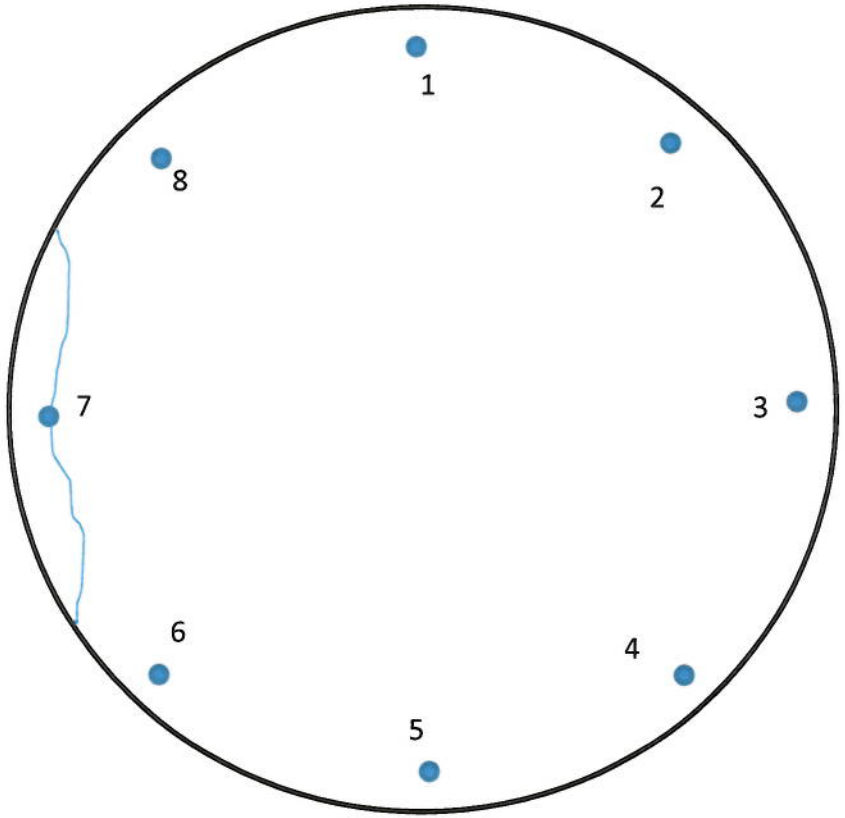
All sections from
Top of Construction Joint

Pier 12 – Pile 6 (Tube 6 assumed anomalous)



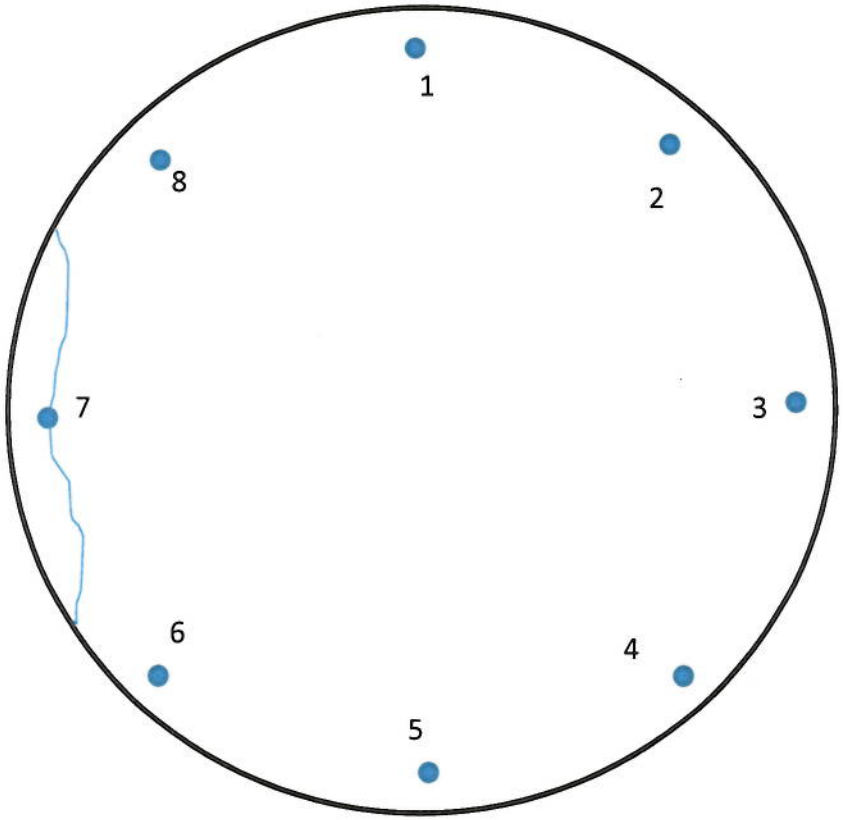
Section: 0.0m – 0.5m
All sections from
Top of Construction Joint

Pier 12 – Pile 6 (Tube 7 assumed anomalous)



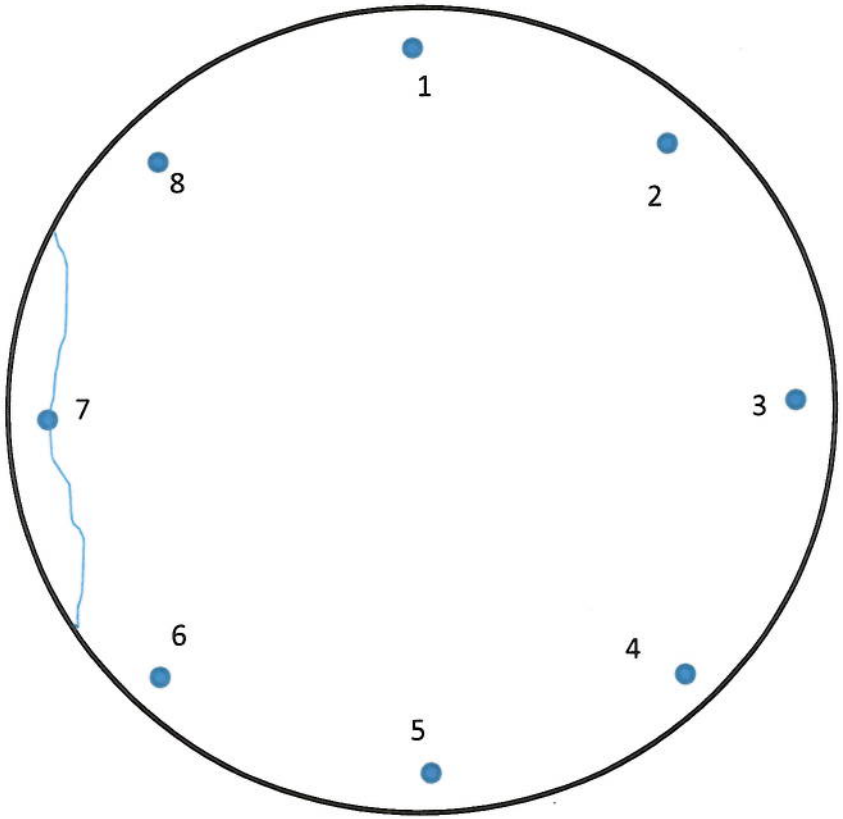
Section: 0.5m – 2.7m
All sections from
Top of Construction Joint

Pier 12 – Pile 6 (Tube 7 assumed anomalous)



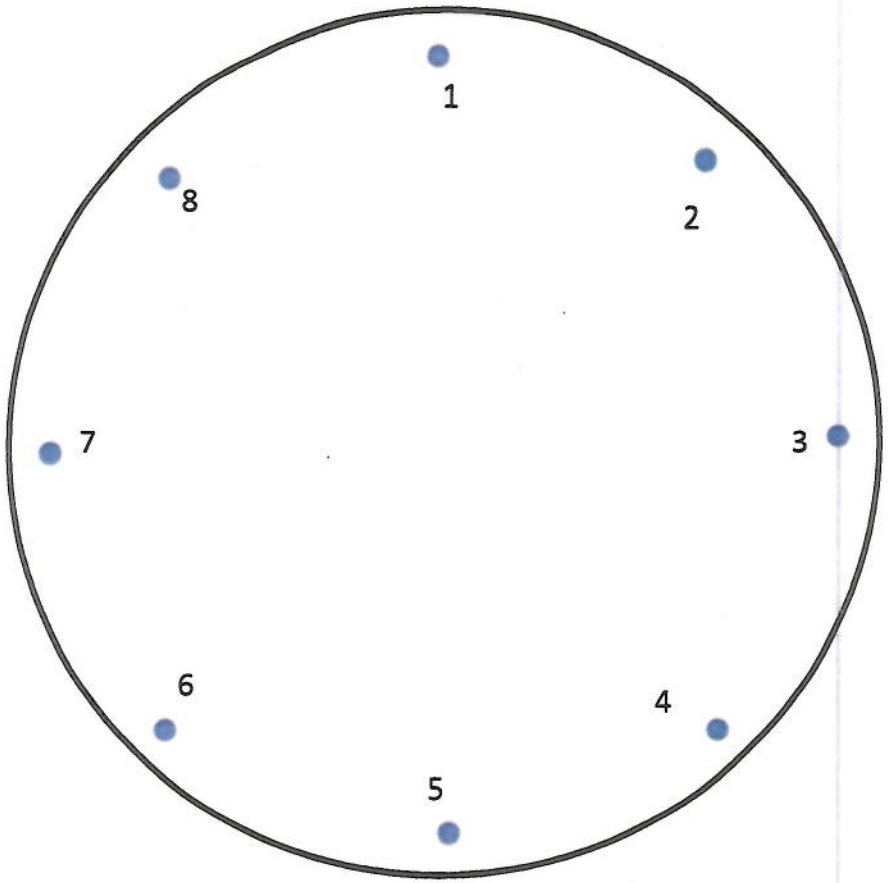
Section: 2.7m – 4.3m
All sections from
Top of Construction Joint

Pier 12 – Pile 6 (Tube 7 assumed anomalous)



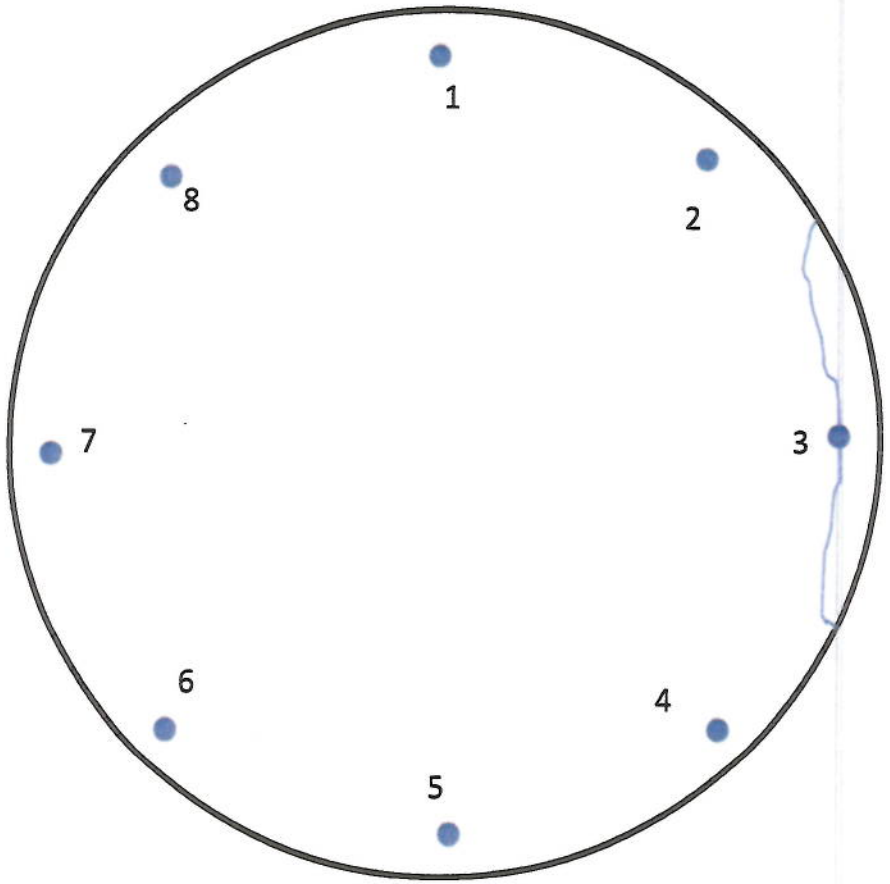
Section: 4.3m – 38.2m
All sections from
Top of Construction Joint

Pier 12 – Pile 6 (Tube 7 assumed anomalous)



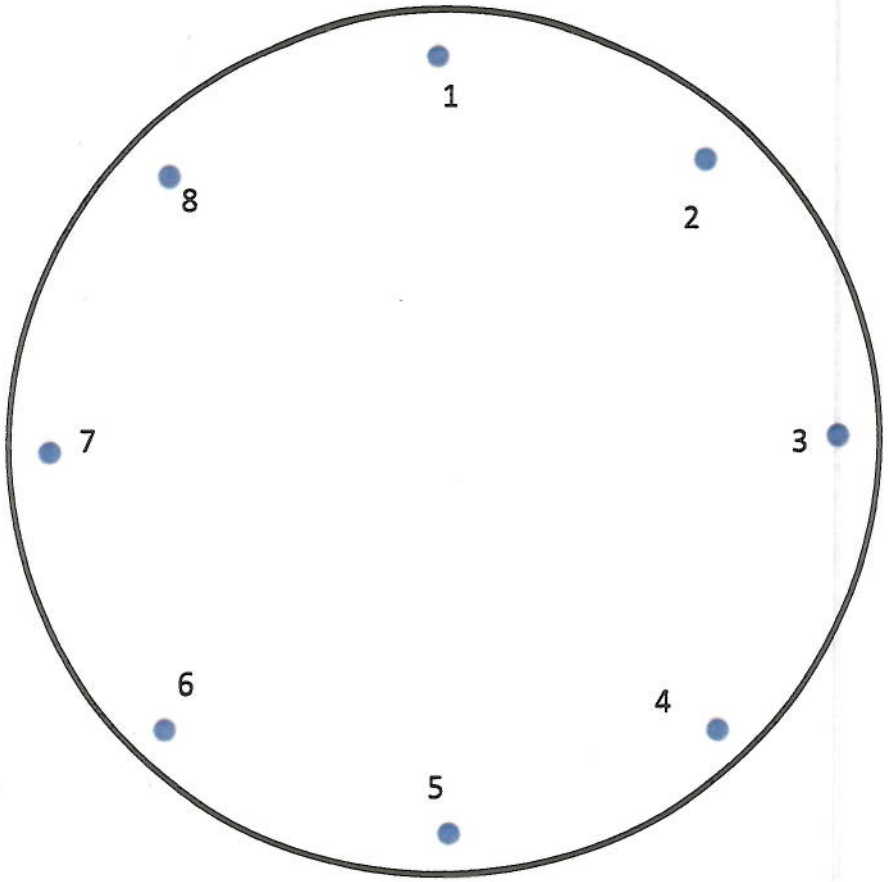
Section: 0.0m – 0.75m
All sections from
Top of Construction Joint

Pier 14 – Pile 8



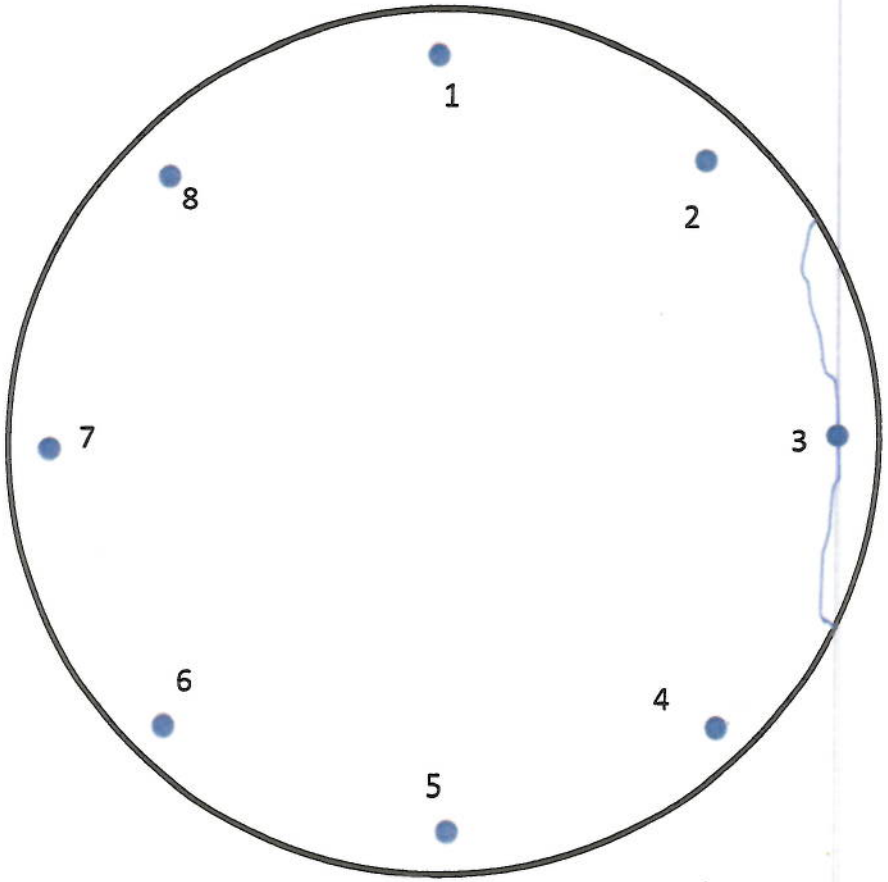
Section: 0.75m – 4.6m
All sections from
Top of Construction Joint

Pier 14 – Pile 8



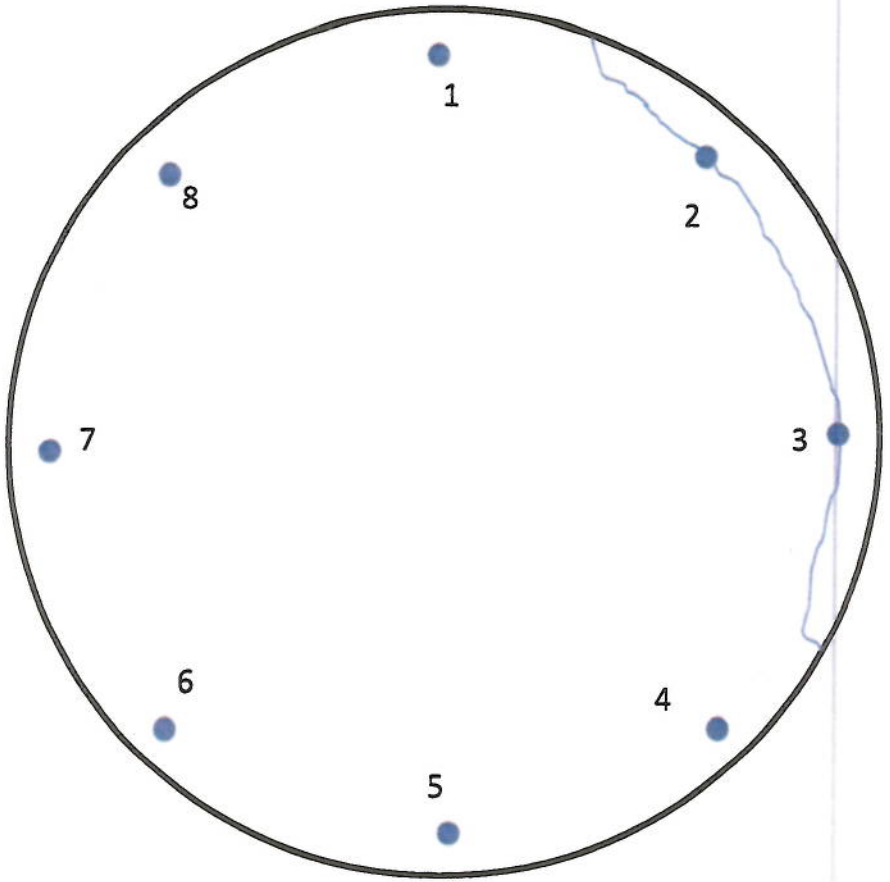
Section: 4.60m – 4.9m
All sections from
Top of Construction Joint

Pier 14 – Pile 8



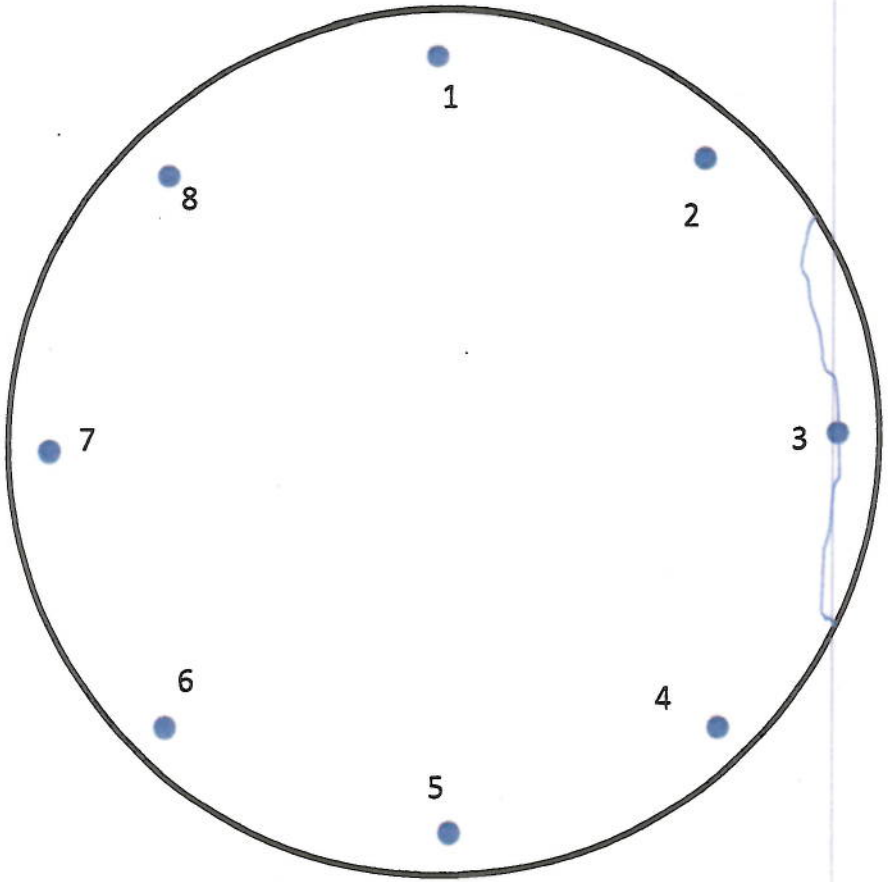
Section: 4.9m – 7.6m
All sections from
Top of Construction Joint

Pier 14 – Pile 8



Section: 7.6m – 7.9m
All sections from
Top of Construction Joint

Pier 14 – Pile 8



Section: 16.0 – 41.3m
All sections from
Top of Construction Joint

Pier 14 – Pile 8

G - Part 4: Steel Mill Certificate Data

Benicia Mill Certification Records from Caltrans OSC dated 2001/2002
1.6 inch thick steel plate pipe used for casings at Pier 6

fy per plans [ksi]	Cert No. (Heat ID)	Test Date	Cert fy [ksi]	Cert fy / Plans fy	Cert fu [ksi]	Cert fu / Cert fy
50	B1K574	Nov 13 2001	58.0	1.16	87.0	1.50
50	B1K588	Nov 13 2001	54.0	1.08	80.0	1.48
50	A1K085	Nov 13 2001	55.0	1.10	80.0	1.45
50	A1K065	Nov 13 2001	51.0	1.02	78.0	1.53
50	A1K065	Nov 13 2001	52.0	1.04	76.0	1.46
50	A1K065	Nov 13 2001	53.0	1.06	80.0	1.51
50	B1K590	Nov 15 2001	51.0	1.02	78.0	1.53
50	B1K590	Nov 15 2001	53.0	1.06	79.0	1.49
50	115463	Jan 29 2002	53.0	1.06	77.0	1.45
50	115463	Jan 29 2002	59.0	1.18	80.0	1.36
50	115496	Jan 29 2002	56.5	1.13	76.5	1.35
50	115496	Jan 29 2002	55.5	1.11	80.5	1.45
50	A1K100	Nov 16 2001	57.0	1.14	77.0	1.35
50	B1K591	Nov 16 2001	54.0	1.08	78.0	1.44
50	114903	Dec 14 2001	53.0	1.06	78.0	1.47
50	114903	Dec 14 2001	52.0	1.04	74.5	1.43
50	114904	Dec 14 2001	53.0	1.06	74.0	1.40
50	114904	Dec 14 2001	54.5	1.09	76.0	1.39
50	114962	Dec 14 2001	55.5	1.11	76.0	1.37
50	114962	Dec 14 2001	53.0	1.06	76.5	1.44
50	B1K575	Nov 15 2001	56.0	1.12	79.0	1.41
50	B1K575	Nov 15 2001	55.0	1.10	79.0	1.44
50	B1K576	Nov 15 2001	57.0	1.14	80.0	1.40
50	A1K033	Nov 15 2001	52.0	1.04	81.0	1.56
50	A1K064	Nov 15 2001	57.0	1.14	84.0	1.47
50	A1K035	Nov 15 2001	54.0	1.08	81.0	1.50
50	115492	Jan 27 2002	59.5	1.19	80.0	1.34
50	115492	Jan 27 2002	58.5	1.17	79.0	1.35
50	115494	Jan 27 2002	59.5	1.19	81.0	1.36
50	115494	Jan 27 2002	60.0	1.20	81.0	1.35
50	115500	Jan 27 2002	57.5	1.15	77.0	1.34
50	115500	Jan 27 2002	56.5	1.13	76.5	1.35
50	115576	Feb 8 2002	57.5	1.15	79.5	1.38
50	115576	Feb 8 2002	58.5	1.17	80.0	1.37
50	115577	Feb 8 2002	55.0	1.10	77.0	1.40
50	115577	Feb 8 2002	57.0	1.14	78.5	1.38
50	115589	Feb 8 2002	55.0	1.10	76.5	1.39
50	115589	Feb 8 2002	55.5	1.11	76.0	1.37
50	115597	Feb 8 2002	58.0	1.16	79.0	1.36
50	115597	Feb 8 2002	56.0	1.12	77.5	1.38
50	115598	Feb 8 2002	58.5	1.17	79.5	1.36
50	115598	Feb 8 2002	58.0	1.16	79.0	1.36
50	114786	Dec 1 2001	56.0	1.12	77.5	1.38
50	114786	Dec 1 2001	56.5	1.13	77.0	1.36
50	114788	Dec 1 2001	54.5	1.09	80.0	1.47
50	114788	Dec 1 2001	55.5	1.11	80.5	1.45
50	114792	Dec 1 2001	55.0	1.10	78.5	1.43
50	114792	Dec 1 2001	56.0	1.12	79.0	1.41
		Averages:	**55.58**	1.11	**78.66**	1.42

LEWIT PACIFIC CO.
GENERAL CONSTRUCTION

BENICIA/MARTENIZ BRIDGE PROJECT
Job # 5705

80 Mococo Rd.
P.O. Box 191
Martinez, CA 94553
Fax: 925-957-9323
Phone: 925-957-9322

CERTIFICATE OF COMPLIANCE

I Certify the following materials furnished for the use on Contract No.: 04-006034 / 04 - CC, Sol – 680 - 40.1 / 41.4 - L0.0 / L1.0 Bid Item(s) 68 (2.5M Permanent Steel Casing), conforms to the California D.O.T. Standard and the special provisions for this contract.

Trans Bay Steel Corporation's, Pier 6, PcMk 6-5, T54, M427, M95, M498, M492, M439, M490, M491, M389, X31, M451, M408, B35, P33

I further certify all manufacturing processes* for steel and iron materials occurred in the United States of America.

Signed: _____ Lyle E. Gehlert

Title: Welding Quality Control Manager

Date: 8/6/02

*Application of coatings such as galvanizing, painting and epoxy coating or any other coating that protects or enhances the value of such steel or iron materials shall also be considered a manufacturing process.

Received
AUG - 6 2002
Div

FINAL INSPECTION REPORT

Vendor: TRANS BAY STEEL CORP

Customer: KIEWIT PACIFIC CO

Contract No.: 04-006034

Drawing No.: 1720-A002

Revision No.: 1

Piece No.: PIER 6 PCMK 6-5

Work Order No.: 1720

Quantity Acceptable: 1

I certify the fit-up, back gouge, ultrasonic testing, and final inspection as shown in the "Sign-Off" box are in conformance with Section 6 of AWS D1.1 2000 and Contract Specification.

Inspector Signature

7-24-02
Date

STATE OF CALIFORNIA

LOT NO: B-03-025-02

NAME:

ipsco steel inc.
1770 Bill Sharp Boulevard, Muscatine, IA 52761-9412

Test Certificate

Form TC1: Revision 1: Date 31 Oct 2000

Customer: ALBANY STEEL INCORPORATED C/O TRANS BAY STEEL CORP. 1025 KENNEDY SIDING - SPUR #261 KEN ROCKTRAM, CA	**Customer P.O. No.:** 17319-1720-2	**Mill Order No.:** 93-027404-01	**Shipping Manifest :** 164792
	Product Description: AASHTO M270-345/ASTM A709-50 CVNT 27J@+4C(20FTLBS@+40F)/A673-H	**Ship Date:** 12 Nov 01 **Cert Date:** 13 Nov 01	**Cert No:** 136584
	Size: 1.614 X 120.0 X 324.0 (IN)		

Tested Pieces			Tensiles					Charpy Impact Tests							
Heat Id	Piece Id	Piece Dimensions	YS (PSI)	UTS (PSI)	Elong % of 2in 8in	Bend Test	Average Hardness	Absorbed Energy 1 2 3 Avg	% Shear 1 2 3 Avg	Test Temp	Test Dir	Test Size	BDWTT
B1K574	A01 I	1.605 X 120.8	58000	87000	23			104 98 110 104		-22 F	T	FULL	
B1K588	B12 I	1.607 X 121.0	54000	80000	31			138 93 120 117		-22 F	T	FULL	
A1K085	A19 I	1.610 X 121.1	55000	80000	28			94 131 109 111		-22 F	T	FULL	
B1K574	A01 M	40.80 X 3073	400MPa	600MPa	23			141 133 149 141J		-30 C	T	FULL	
B1K588	B12 M	40.80 X 3073	372MPa	552MPa	31			187 126 163 159J		-30 C	T	FULL	
A1K085	A19 M	40.90 X 3073	379MPa	552MPa	28			127 178 148 151J		-30 C	T	FULL	

Heat Id	Chemical Analysis C	Mn	P	S	Si	Tot Al	Cu	Ni	Cr	Mo	Cb	V	Ti	CEV
B1K574	.16	1.30	.008	.004	.31	.025	.32	.12	.08	.03	.002	.073	.009	.484
B1K588	.16	1.30	.012	.004	.30	.027	.24	.12	.12	.03	.002	.073	.009	.484
A1K085	.15	1.29	.012	.005	.29	.021	.29	.12	.13	.02	.002	.072	.007	.484

100 % MELTED AND MANUFACTURED IN THE USA / DIN 50049 PAR 3.1B COMPLIANCE
B1K574 A01 PIECES: 4, WEIGHT: 72110 ||| B1K588 B12 PIECES: 3, WEIGHT: 54206
A1K085 A19 PIECES: 3, WEIGHT: 53803
KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE
CARBON EQUIVALENT = CEV = C + MN/6 + (CR + MO + V)/5 + (CU + NI)/15 + SI/6
I/M DENOTE IMPERIAL AND METRIC TEST

REVISION #1: 14 NOV 2001

(S) Cust Part # :

WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATION

P. A. CROZIER
Q.A. METALLURGIST

OK

NOV 15 2001 12:41 FR IPSCO INC 604 596 3382 TO 17072591072 P.31/32
11/15/01 14:44 FAX 030
IPSCO STEEL SALES DEPT.
PAGE.30
NOV 15 2001 11:48

NOV 15 2001 12:28 FR IPSCO INC 604 596 3332 TO 17072591072 P.02/32
11/15/01 14:54 FAX 002
IPSCO STEEL SALES DEPT.

ipsco steel inc. — Test Certificate

1770 Bill Sharp Boulevard, Muscatine, IA 52761-9412

Form TC1: Revision 1: Date 31 Oct 2000

Customer:
ALBANY STEEL INCORPORATED
C/O TRANS BAY STEEL CORP. 1025
KENNEDY SIDING - SPUR #261 KEN
ROCKTRAM, CA

Customer P.O. No.: 17319-1720-2 | Mill Order No.: 93-027404-01 | Shipping Manifest: 5164755

Product Description: AASHTO M270-345/ASTM A709-50
CVNT 27J@+4C(20FTLBS@+40F)/A673-H

Ship Date: 13 Nov 01
Cert Date: 13 Nov 01

Cert No: 136556

Size: 1.614 X 120.0 X 324.0 (IN)

Tested Pieces			Tensiles					Charpy Impact Tests								
Heat Id	Piece Id	Piece Dimensions	YS (PSI)	UTS (PSI)	Elong % of 2in 8in	Bend Test	Average Hardness	Absorbed Energy 1 2 3 Avg	% Shear 1 2 3 Avg	Test Temp	Test Dir	Test Size	BDWTT
A1K065	C29 I	1.610 X 121.0	51000	78000	33			61 45 72 59		-22 F	T	FUL	
A1K065	C27 I	1.609 X 121.0	52000	76000	33			67 68 58 64		-22 F	T	FUL	
A1K065	C28 I	1.609 X 121.1	53000	80000	33			40 54 65 53		-22 F	T	FUL	
A1K065	C29 M	40.90 X 3073	352	538	33			83 61 98 80 J		-30 C	T	FUL	
A1K065	C27 M	40.90 X 3073	359	524	33			91 92 79 87 J		-30 C	T	FUL	
A1K065	C28 M	40.90 X 3073	365	552	33			54 73 88 71 J		-30 C	T	FUL	

Chemical Analysis

Heat Id	C	Mn	P	S	Si	Tot Al	Cu	Ni	Cr	Mo	Cb	V	Ti	CEV
A1K065	.15	1.30	.010	.009	.29	.032	.19	.10	.14	.03	.002	.074	.008	.479

100 % MELTED AND MANUFACTURED IN THE USA / DIN 50049 PAR 3.1B COMPLIANCE
A1K065 C29 PIECES: 1, WEIGHT: 18135 [III] A1K065 C27 PIECES: 4, WEIGHT: 72490
A1K065 C28 PIECES: 1, WEIGHT: 18126
KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE
CARBON EQUIVALENT = CEV = C + MN/6 + (CR + MO + V)/5 + (CU + NI)/15 + SI/6
I/M DENOTE IMPERIAL AND METRIC TEST

(1) Cust Part # :

WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATION

P. A. CROZIER
Q.A. METALLURGIST

OK

NOV 15 2001 11:58 PAGE.02

M43

ipsco steel inc.

1770 Bill Sharp Boulevard, Muscatine, IA 52761-9412

Test Certificate

Form TC1: Revision 1: Date 31 Oct 2000

Customer: ALBANY STEEL INCORPORATED C/O TRANS BAY STEEL CORP. 1025 KENNEDY SIDING - SPUR #261 KEN ROCKTRAM, CA	Customer P.O. No.: 17319-1720-2	Mill Order No.: 93-027404-02	Shipping Manifest : 164963
	Product Description: AASHTO M270-345/ASTM A709-50 CVNT 27J@+4C(20FTLBS@+40F)/A673-H	Ship Date: 15 Nov 01 Cert Date: 15 Nov 01	Cert No: 136756
	Size: 1.614 X 120.0 X 324.0 (IN)		

Tested Pieces / Tensiles / Charpy Impact Tests

Heat Id	Piece Id	Piece Dimensions	YS (PSI)	UTS (PSI)	Elong % of 2in	Elong % of 8in	Bend Test	Average Hardness	Absorbed Energy 1	2	3	Avg	% Shear 1	2	3	Avg	Test Temp	Test Dir	Test Size	EDWIT
B1K590	D01 I	1.609 X 121.1	51000	78000	28				191	85	192	156					-22 F	T	FUL	
B1K588	B11 I	1.611 X 121.1	53000	79000	31				195	240	230	222					-22 F	T	FUL	
B1K590	D01 M	40.90 X 3073	352	538	28				259	115	260	212	T				-30 C	T	FUL	
B1K588	B11 M	40.90 X 3073	365	545	31				264	325	312	301	T				-30 C	T	FUL	

Chemical Analysis

Heat Id	C	Mn	P	S	Si	Tot Al	Cu	Ni	Cr	Mo	Cb	V	Ti	CEV
B1K590	.15	1.30	.012	.005	.29	.021	.22	.11	.11	.02	.001	.072	.009	.483
B1K588	.16	1.30	.012	.004	.30	.027	.24	.12	.12	.03	.002	.073	.009	.498

100 % MELTED AND MANUFACTURED IN THE USA / DIN 50049 PAR 3.1B COMPLIANCE
B1K590 D01 PIECES: 2, WEIGHT: 36402 B1K588 B11 PIECES: 4, WEIGHT: 72843
KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE
CARBON EQUIVALENT = CEV = C + MN/6 + (CR + MO + V)/5 + (CU + NI)/15 + SI/6
I/M DENOTE IMPERIAL AND METRIC TEST

Cost Part # :

WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATION

P. A. CROZIER
Q.A. METALLURGIST

OK

11/19/2001 07:32 5258209 ALBANY STEEL PAGE 07
IPSCO STEEL SALES DEPT. 004
11/19/01 08:35 FAX

M498

OREGON STEEL MILLS

P.O. BOX 2760, Portland, Oregon 97208 • (503) 286-9651 Fax (503) 240-5268

REPORT OF CHEMICAL/PHYSICAL TESTS

THE FIRST ISO9002 REGISTERED U.S. PLATE PRODUCER

SOLD TO

ALBANY STEEL-TRANS BAY NAPA
ATTN:BILL KROPLIN/VP PURCHASING
536 CLEVELAND AVE
ALBANY, CA 94710

ALBANY STEEL-TRANS BAY NAPA
ATTN:BILL KROPLIN/VP PURCHASING
536 CLEVELAND AVE
ALBANY, CA 94710

CERTIFICATE NO	DATE	PAGE
690626	Jan 29, 2002	1

MILL ORDER NO.	DATE
138804	

CUSTOMER ORDER NO.: 17372-1720-2

JOB/REQ. NO.:

SHIPPING NO.	DATE
690626	01/29/2002

CARRIER: UNION PACIFIC

CAR/TRUCK NO.: CW6064

THIS MATERIAL HAS BEEN MANUFACTURED, TESTED AND FOUND TO MEET THE SPECIFICATIONS AND PURCHASE ORDER REQUIREMENTS
OSM HSLA STRUCTURAL QUALITY PLATE AASHTO M270-96 GR 50 ASTM A709-97B GRADE 50.
KILLED FINE GRAIN PRACTICE. .05 MAX S . TCVN 20 FT/LBS AVG @ +40 F (H). C.E.
(CED FORMULA) .45 MAX. "ALL MATERIAL CERTIFIED HEREIN WAS MELTED & (continued)

PHYSICAL PROPERTIES

OSM ITEM NO.	DESCRIPTION	HEAT NO.	SLAB	YIELD PSI-X 100	TENSILE PSI X 100	% ELONG 8"	% ELONG 2"	% RA	HARDNESS BHN	BEND TEST	IMPACTS
	MANUFACTURED IN THE USA".										
1	1.6140 X 120.000M X 324.000										
	¶ 2 PCS 35594 LBS +	115463		530	770	29					
				590	800	26					
								TCVN @ 40	DEG F	10.0mm	86 103 112/100 ft/lbs
								TCVN @ 40	DEG F	10.0mm	77 70 81 /76 ft/lbs
	3 PCS 53391 LBS ‖ +	115496		565	765	27					
				555	805		31				
								TCVN @ 40	DEG F	10.0mm	90 98 96 /94 ft/lbs
								TCVN @ 40	DEG F	10.0mm	79 94 95 /89 ft/lbs
	5 PCS 88985 LBS TOTALS										

CHEMICAL ANALYSIS

HEAT NO.	C	Mn	P	S	Si	Cu	Ni	V	Cb	Al	Cr	Mo	Ti	B	N	Ca			CE	McQuaid Ehn Grain Size
+115463	.11	1.12	.005	.005	.21	.23	.08	.058	.001	.024	.07	.03							.39	
+115496	.11	1.13	.006	.005	.23	.26	.09	.057	.002	.026	.05	.03							.39	

HEATS INDICATED WITH (+) WERE MELTED & MANUFACTURED IN THE USA. ALL OTHER HEATS WERE ROLLED IN THE USA.

..... END OF REPORT .....

I certify the above to be correct as contained in the records of OREGON STEEL MILLS By Angie McCaleb

From OSM
Wed 30 Jan 2002 11:21:04 AM PST

M47a

ALBANY STEEL
IPSCO STEEL SALES DEPT.

11/20/01 15:54 FAX

ipsco steel inc.

1770 Bill Sharp Boulevard, Muscatine, IA 52761-9412

Test Certificate

Form TC1: Revision 1: Date 31 Oct 2000

Customer: ALBANY STEEL INCORPORATED C/O TRANS BAY STEEL CORP. 1025 KENNEDY SIDING - SPUR #261 KEN ROCKTRAM, CA	Customer P.O. No.: 17319-1720-2	Mill Order No.: 93-027404-02	Shipping Manifest: [illegible]
	Product Description: AASHTO M270-345/ASTM A709-50 CVNT 27J@+4C(20FTLBS@+40F)/A673-H	Ship Date: 16 Nov 01 Cert Date: 16 Nov 01	Cert No: 136893
	Size: 1.614 X 128.0 X 324.0 (IN)		

Tested Pieces			Tensiles					Charpy Impact Tests											
Heat Id	Piece Id	Piece Dimensions	YS (PSI)	UTS (PSI)	Elong % of 2in	Elong % of 8in	Bend Test	Average Hardness	Absorbed Energy 1	2	3	Avg	% Shear 1	2	3	Avg	Test Temp	Test Dir	Test Size	BDWTT
A1K100	D07 I	1.611 X 121.2	57000	77000		20			205	143	178	175					-22 F	T	FUL	
B1K591	D10 L	1.610 X 122.0	54000	78000		22			188	108	153	150					-22 F	T	FUL	
A1K100	D07 M	40.90 X 3079	393	531		20			278	194	241	237 J					-30 C	T	FUL	
B1K591	D10 M	40.90 X 3089	372	538		22			255	146	207	203 J					-30 C	T	FUL	

Chemical Analysis

Heat Id	C	Mn	P	S	Si	Tot Al	Cu	Ni	Cr	Mo	Cb	V	Ti	CEV
A1K100	.15	1.30	.012	.005	.31	.030	.21	.10	.09	.03	.002	.072	.010	.481
B1K591	.16	1.30	.011	.004	.30	.028	.22	.10	.11	.02	.002	.074	.009	.485

100 % MELTED AND MANUFACTURED IN THE USA / DIN 50049 PAR 3.1B COMPLIANCE
B1K591 D10 PIECES: 3, WEIGHT: 54223 | A1K100 D07 PIECES: 4, WEIGHT: 72411
KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE
CARBON EQUIVALENT = CEV = C + MN/6 + (CR + MO + V)/5 + (CU + NI)/15 + SI/6
I/M DENOTE IMPERIAL AND METRIC TEST

Cust Part # :

WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATION

P. A. CROZIER
C.A. METALLURGIST

OK

M439

OREGON STEEL MILLS

P.O. BOX 2760, Portland, Oregon 97208 • (503) 286-9651 Fax (503) 240-5268

REPORT OF CHEMICAL/PHYSICAL TESTS

THE FIRST ISO9002 REGISTERED U.S. PLATE PRODUCER

CERTIFICATE NO.	DATE	PAGE
685017	Dec 14, 2001	2

SOLD TO

ALBANY STEEL-TRANS BAY NAPA
ATTN:BILL KROPLIN/VP PURCHASING
536 CLEVELAND AVE
ALBANY, CA 94710

ALBANY STEEL-TRANS BAY NAPA
ATTN:BILL KROPLIN/VP PURCHASING
536 CLEVELAND AVE
ALBANY, CA 94710

MILL ORDER NO.	DATE
138799	
CUSTOMER ORDER NO.	
17372-1720-2	
JOB/REQ. NO.	
SHIPPING NO.	DATE
685017	12/14/2001
CARRIER	
UNION PACIFIC	
CAR/TRUCK NO.	
TTPX82228	

THIS MATERIAL HAS BEEN MANUFACTURED, TESTED AND FOUND TO MEET THE SPECIFICATIONS AND PURCHASE ORDER REQUIREMENTS

OSM HSLA STRUCTURAL QUALITY PLATE AASHTO M270-96 GR 50 ASTM A709-97B GRADE 50. KILLED FINE GRAIN PRACTICE. .05 MAX S . TCVN 20 FT/LBS AVG @ +40 F (H). C.E. (CED FORMULA) .45 MAX. "ALL MATERIAL CERTIFIED HEREIN WAS MELTED & (continued)

PHYSICAL PROPERTIES

OSM ITEM NO	DESCRIPTION	HEAT NO.	SLAB	YIELD PSI X 100	TENSILE PSI X 100	% ELONG 8"	% ELONG 2"	% RA	HARDNESS BHN	BEND TEST	IMPACTS
	MANUFACTURED IN THE USA".										
1	1.6140 X 120.000M X 324.000										
	| 1 PC 17797 LBS +	114903		530	780		29				
				520	745	27					
								TCVN @ 40 DEG F			10.0mm 30 36 26 /30 ft/lbs
								TCVN @ 40 DEG F			10.0mm 58 50 41 /49 ft/lbs
	\\ 3 PCS 53391 LBS +	114904		530	740	27					
				545	760	30					
								TCVN @ 40 DEG F			10.0mm 89 86 86 /87 ft/lbs
								TCVN @ 40 DEG F			10.0mm 86 80 82 /82 ft/lbs
	1 PC 17797 LBS +	114962		555	760	27					
				530	765	28					
								TCVN @ 40 DEG F			10.0mm 76 76 73 /75 ft/lbs
								TCVN @ 40 DEG F			10.0mm /75 ft/lbs

CHEMICAL ANALYSIS

HEAT NO.	C	Mn	P	S	Si	Cu	Ni	V	Cb	Al	Cr	Mo	Ti	B	N_2	Ca			CE	MacQuaid Env Grain Size
+114903	.12	1.15	.007	.008	.20	.30	.10	.057	<.008	.030	.08	.03							.40	
+114904	.12	1.13	.008	.004	.20	.30	.12	.059	<.008	.024	.11	.04							.41	
+114962	.12	1.13	.008	.008	.21	.28	.10	.062	<.008	.022	.07	.03							.40	

HEATS INDICATED WITH (+) WERE MELTED & MANUFACTURED IN THE USA. ALL OTHER HEATS WERE ROLLED IN THE USA.

I certify the above to be correct as contained in the records of OREGON STEEL MILLS By Christine Wrinkle

CHRISTINE WRINKLE
Q.C. RECORDS ADMINISTRATOR

11/20/2001 12:52 5258209 ALBANY STEEL PAGE 02
11/20/01 15:38 FAX 002 IPSCO STEEL SALES DEPT.

ipsco steel inc.

1770 Bill Stump Boulevard, Muscatine, IA 52761-9412

Test Certificate

Form TC1: Revision 1: Date 11 Oct 2000

Customer:
ALBANY STEEL INCORPORATED
C/O TRANS BAY STEEL CORP. 1025
KENNEDY SIDING - SPUR #261 KEN
ROCKTRAM, CA

Customer P.O. No.: 17319-1710-2

Mill Order No.: 93-027404-01

Shipping Manifest: [redacted]

Product Description: AASHTO M270-345/ASTM A709-50
CVNT 27J@+4C(20FTLBS@+40F)/A673-H

Ship Date: 15 Nov 01
Cert Date: 15 Nov 01

Cert No: 136801

Size: 1.614 X 120.0 X 324.0 (IN)

Tested Pieces			Tensiles					Charpy Impact Tests								
Heat Id	Piece Id	Piece Dimensions	YS (PSI)	UTS (PSI)	Elong % of 2in 8in	Bend Test	Average Hardness	Absorbed Energy 1 2 3 Avg	% Shear 1 2 3 Avg	Test Temp	Test Dir	Test Size	BDWTT
B1K575	A15 I	1.610 X 121.1	56000	79000	31			142 92 158 131		-22 F	T	FULL	
B1K575	A16 I	1.610 X 121.1	55000	79000	25			170 147 250 189		-22 F	T	FULL	
B1K576	A23 I	1.610 X 121.0	57000	80000	31			140 162 138 147		-22 F	T	FULL	
B1K575	A15 M	40.90 X 3073	386	545	31			193 125 214 178 J		-30 C	T	FULL	
B1K575	A16 M	40.90 X 3073	379	545	25			230 199 339 256 J		-30 C	T	FULL	
B1K576	A23 M	40.90 X 3073	393	552	31			190 220 187 199 J		-30 C	T	FULL	

Heat Id	Chemical Analysis C	Mn	P	S	Si	Tot Al	Cu	Ni	Cr	Mo	Cb	V	Ti	CEV
B1K575	.15	1.28	.010	.004	.29	.031	.35	.11	.09	.02	.003	.072	.009	.478
B1K576	.16	1.30	.008	.004	.30	.030	.25	.10	.09	.03	.002	.073	.010	.491

100 % MELTED AND MANUFACTURED IN THE USA / DIN 50049 PAR 3.1B COMPLIANCE
B1K575 A15 PIECES: 4, WEIGHT: 72876
B1K575 A16 PIECES: 3, WEIGHT: 54112
B1K576 A23 PIECES: 3, WEIGHT: 54478
KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE
CARBON EQUIVALENT = CEV = C + MN/6 + (CR + MO + V)/5 + (CU + NI)/15 + SI/6
I/M DENOTE IMPERIAL AND METRIC TEST

Cust Part # :

WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATION

P. A. CROZIER
Q.A. METALLURGIST

OK

M389

PAGE 38
008
ALBANY STEEL
IPSCO STEEL SALES DEPT.
11/20/01 15:40 FAX 5259209
11/23/2001 12:52

ipsco steel inc.

1770 Bill Sharp Boulevard, Muscatine, IA 52761-9412

Test Certificate

Form TC1: Revision 1: Date 31 Oct 2000

Customer:	Customer P.O. No.: 17319-1720-2	Mill Order No.: 93-027404-02	Shipping Manifest : 164751
ALBANY STEEL INCORPORATED C/O TRANS BAY STEEL CORP. 1025 KENNEDY SIDING - SPUR #261 KEN ROCKTRAM, CA	Product Description: AASHTO M270-345/ASTM A709-50 CVNT 27J@+4C(20FTLBS@+40F)/A673-H	Ship Date: 11 Nov 01 Cert Date: 15 Nov 01	Cert No: 136812
	Size: L.614 X 120.0 X 324.0 (IN)		

Tested Pieces			Tensiles					Charpy Impact Tests								
Heat Id	Piece Id	Piece Dimensions	YS (PSI)	UTS (PSI)	Elong % of 2in 8in	Bend Test	Average Hardness	Absorbed Energy 1 2 3 Avg	% Shear 1 2 3 Avg	Test Temp	Test Dir	Test Size	BDWTT
A1K033	D12 I	1.610 X 121.0	52000	81000	36			64 62 70 65		-22 F	T	3/4	
A1K064	C18 I	1.608 X 121.2	57000	84000	31			107 88 110 102		-22 F	T	FUL	
A1K035	D32 I	1.611 X 121.0	54000	81000	31			40 50 44 45		-22 F	L	3/4	
A1K033	D12 M	40.9 X 3073.4	359	558	36			87 84 95 88 T		-30 C	T	3/4	
A1K064	C18 M	40.8 X 3076.5	393	579	31			145 119 149 138 T		-30 C	T	FUL	
A1K035	D32 M	41.0 X 3073.4	372	558	31			54 68 60 61 T		-30 C	T	3/4	

Heat Id	Chemical Analysis C	Mn	P	S	Si	Tot Al	Cu	Ni	Cr	Mo	Cb	V	Ti	CEV
A1K033	.15	1.33	.011	.005	.30	.028	.22	.16	.10	.03	.002	.074	.009	.490
A1K064	.15	1.28	.011	.004	.27	.030	.20	.10	.18	.03	.002	.073	.009	.486
A1K035	.15	1.30	.011	.010	.32	.027	.20	.10	.11	.03	.003	.074	.008	.486

100 % MELTED AND MANUFACTURED IN THE USA / DIN 50049 PAR 3.1B COMPLIANCE
A1K064 C18 PIECES: 2, WEIGHT: 36160 || A1K035 D32 PIECES: 4, WEIGHT: 72734
A1K033 D12 PIECES: 4, WEIGHT: 72394
KILLED STEEL, PRODUCED TO A FINE GRAIN PRACTICE
CARBON EQUIVALENT = CEV = C + MN/6 + (CR + MO + V)/5 + (CU + NI)/15 + SI/6
I/M DENOTE IMPERIAL AND METRIC TEST

01 Cust Part # :

WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATION

P. A. CROZIER PAC
QA METALLURGIST

OK

OREGON STEEL MILLS

P.O. BOX 2760, Portland, Oregon 97208 • (503) 286-9651 Fax (503) 240-5268

REPORT OF CHEMICAL/PHYSICAL TESTS

THE FIRST ISO9002 REGISTERED U.S. PLATE PRODUCER

SOLD TO

ALBANY STEEL-TRANS BAY NAPA
ATTN:BILL KROPLIN/VP PURCHASING
536 CLEVELAND AVE
ALBANY, CA 94710

ALBANY STEEL-TRANS BAY NAPA
ATTN:BILL KROPLIN/VP PURCHASING
536 CLEVELAND AVE
ALBANY, CA 94710

CERTIFICATE NO.	DATE	PAGE
690502	Jan 27, 2002	1

MILL ORDER NO.	DATE
138804	

CUSTOMER ORDER NO.: 17372-1720-2

JOB/REQ. NO.:

SHIPPING NO.	DATE
690502	01/27/2002

CARRIER: UNION PACIFIC

CAR/TRUCK NO.: IIPX805154

THIS MATERIAL HAS BEEN MANUFACTURED, TESTED AND FOUND TO MEET THE SPECIFICATIONS AND PURCHASE ORDER REQUIREMENTS
OSM HSLA STRUCTURAL QUALITY PLATE AASHTO M270-96 GR 50 ASTM A709-97B GRADE 50.
KILLED FINE GRAIN PRACTICE. .05 MAX S . TCVN 20 FT/LBS AVG @ +40 F (H). C.E.
(CED FORMULA) .45 MAX. "ALL MATERIAL CERTIFIED HEREIN HAS MELTED & (continued)

PHYSICAL PROPERTIES

OSM ITEM NO	DESCRIPTION	HEAT NO.	SLAB	YIELD PSI X 100	TENSILE PSI X 100	% ELONG 8"	% ELONG 2"	% RA	HARDNESS BHN	BEND TEST	IMPACTS
	MANUFACTURED IN THE USA".										
1	1.6140 X 120.000M X 324.000										
	1 PC 17797 LBS	+ 115492		595	800	24					
				585	790	24					
								TCVN @ 40	DEG F	10.0mm	105 92 118/105 ft/lbs
								TCVN @ 40	DEG F	10.0mm	102 85 101/96 ft/lbs
	1 PC 17797 LBS	+ 115494		595	810	24					
				600	810	25					
								TCVN @ 40	DEG F	10.0mm	75 68 72 /71 ft/lbs
								TCVN @ 40	DEG F	10.0mm	57 84 63 /68 ft/lbs
	2 PCS 35594 LBS	+ 115500		575	770	25					
				565	765	28					
								TCVN @ 40	DEG F	10.0mm	72 88 77 /79 ft/lbs
								TCVN @ 40	DEG F	10.0mm	48 74 65 /62 ft/lbs

CHEMICAL ANALYSIS

HEAT NO.	C	Mn	P	S	Si	Cu	Ni	V	Cb	Al	Cr	Mo	Ti	B	N_2	Ca			CE	McQuaid Ehn Grain Size
+115492	.10	1.14	.009	.004	.22	.31	.08	.060	.002	030	.03	.03						.38		
+115494	.12	1.15	.008	.006	.21	.26	.07	.058	.001	021	.04	.02						.39		
+115500	.10	1.15	.010	008	.22	.26	.08	.057	.001	017	.09	.02						.39	8	

HEATS INDICATED WITH (+) WERE MELTED & MANUFACTURED IN THE USA. ALL OTHER HEATS WERE ROLLED IN THE USA

I certify the above to be correct as contained in the records of OREGON STEEL MILLS By Angie McCasland

Monday, January 28, 2002 12:22PM Oregon Steel

M408

OREGON STEEL MILLS

P.O. BOX 2760, Portland, Oregon 97208 • (503) 286-9651 Fax (503) 240-5268

REPORT OF CHEMICAL/PHYSICAL TESTS

CERTIFICATE NO	DATE	PAGE
691727	Feb 08, 2002	2

THE FIRST ISO9002 REGISTERED U.S. PLATE PRODUCER

SOLD TO

ALBANY STEEL-TRANS BAY NAPA
ATTN:BILL KROPLIN/VP PURCHASING
536 CLEVELAND AVE
ALBANY, CA 94710

ALBANY STEEL-TRANS BAY NAPA
ATTN:BILL KROPLIN/VP PURCHASING
536 CLEVELAND AVE
ALBANY, CA 94710

MILL ORDER NO.	DATE
138806	

CUSTOMER ORDER NO: 17372-1720-2

JOB/REQ. NO:

SHIPPING NO.	DATE
691727	02/08/2002

CARRIER: UNION PACIFIC

CAR/TRUCK NO.: CW6058

THIS MATERIAL HAS BEEN MANUFACTURED, TESTED AND FOUND TO MEET THE SPECIFICATIONS AND PURCHASE ORDER REQUIREMENTS

OSM HSLA STRUCTURAL QUALITY PLATE AASHTO M270-96 GR 50 ASTM A709-97B GRADE 50. KILLED FINE GRAIN PRACTICE. .05 MAX S . TCVN 20 FT/LBS AVG @ +40 F (H). C.E. (CED FORMULA) .45 MAX. "ALL MATERIAL CERTIFIED HEREIN WAS MELTED & (continued)

PHYSICAL PROPERTIES

OSM ITEM NO	DESCRIPTION	HEAT NO.	SLAB	YIELD PSI X 100	TENSILE PSI X 100	% ELONG 8"	% ELONG 2"	% RA	HARDNESS BHN	BEND TEST	IMPACTS
	MANUFACTURED IN THE USA".										
1	1.6140 X 120.000M X 324.000										
	1 PC 17797 LBS	+ 115576		575	795	26					
				585	800	26					
								TCVN @ 40 DEG F			10.0mm 57 46 46 /49 ft/lbs
								TCVN @ 40 DEG F			10.0mm 50 74 56 /60 ft/lbs
	2 PCS 35594 LBS	+ 115577		550	770	26					
				570	785	26					
								TCVN @ 40 DEG F			10.0mm 56 47 52 /51 ft/lbs
								TCVN @ 40 DEG F			10.0mm 58 50 55 /54 ft/lbs
	1 PC 17797 LBS	+ 115589		550	765	28					
				555	760	29					
								TCVN @ 40 DEG F			10.0mm 227 232 234/231 ft/lbs
								TCVN @ 40 DEG F			10.0mm 220 180 160/186 ft/lbs

CHEMICAL ANALYSIS

HEAT NO.	C	Mn	P	S	Si	Cu	Ni	V	Cb	Al	Cr	Mo	Ti	B	N_2	Ca			CE	McQuaid Ehn Grain Size
+115576	.10	1.15	.007	.007	.21	.25	.08	.058	.001	.024	.07	.02							.38	
+115577	.12	1.14	.006	.008	.21	.28	.10	.060	.001	.022	.06	.02							.40	
+115589	.10	1.16	.006	.002	.24	.22	.08	.058	.000	.023	.06	.02							.38	

HEATS INDICATED WITH (+) WERE MELTED & MANUFACTURED IN THE USA. ALL OTHER HEATS WERE ROLLED IN THE USA.

I certify the above to be correct as contained in the records of OREGON STEEL MILLS By Christine Wrinkle

CHRISTINE WRINKLE
Q.C. RECORDS ADMINISTRATOR

03F

OREGON STEEL MILLS

P.O. BOX 2760, Portland, Oregon 97208 - (503) 286-9651 Fax (503) 240-5268

REF ... OF CHEMICAL/PHYSICAL TESTS

CERTIFICATE NO	DATE	PAGE
691723	Feb 08, 2002	3

THE FIRST ISO9002 REGISTERED U.S. PLATE PRODUCER

SOLD TO

ALBANY STEEL-TRANS BAY NAPA
ATTN:BILL KROPLIN/VP PURCHASING
536 CLEVELAND AVE
ALBANY, CA 94710

ALBANY STEEL-TRANS BAY NAPA
ATTN:BILL KROPLIN/VP PURCHASING
536 CLEVELAND AVE
ALBANY, CA 94710

MILL ORDER NO	DATE
138806	

CUSTOMER ORDER NO: 17372-1720-2

JOB/REQ. NO:

SHIPPING NO	DATE
691723	02/08/2002

CARRIER: UNION PACIFIC

CAR/TRUCK NO.: CW6048

THIS MATERIAL HAS BEEN MANUFACTURED, TESTED AND FOUND TO MEET THE SPECIFICATIONS AND PURCHASE ORDER REQUIREMENTS

OSM HSLA STRUCTURAL QUALITY PLATE AASHTO M270-96 GR 50 ASTM A709-97B GRADE 50. KILLED FINE GRAIN PRACTICE. .05 MAX S . TCVN 20 FT/LBS AVG @ +40 F (H). C.E. (CED FORMULA) .45 MAX. "ALL MATERIAL CERTIFIED HEREIN WAS MELTED & (continued)

PHYSICAL PROPERTIES

OSM ITEM NO	DESCRIPTION	HEAT NO.	SLAB	YIELD PSI X 100	TENSILE PSI X 100	% ELONG 8"	% ELONG 2"	% RA	HARDNESS BHN	BEND TEST	IMPACTS
	MANUFACTURED IN THE USA".										
1	1.6140 X 120.000M X 324.000										
	1 PC 17797 LBS +	115597		580	790		32				
				560	775	27					
								TCVN @ 40	DEG F	10.0mm	100 112 103/105 ft/lbs
								TCVN @ 40	DEG F	10.0mm	119 98 108/108 ft/lbs
	2 PCS 35594 LBS +	115598		585	795	25					
				580	790	25					
								TCVN @ 40	DEG F	10.0mm	51 59 50 /53 ft/lbs
								TCVN @ 40	DEG F	10.0mm	45 55 56 /52 ft/lbs
	10 PCS 177970 LBS TOTALS										

CHEMICAL ANALYSIS

HEAT NO.	C	Mn	P	S	Si	Cu	Ni	V	Cb	Al	Cr	Mo	Ti	B	N_2	Ca			CE	McQuaid Ehn Grain Size
+115597	.10	1.15	.006	.004	.26	.23	.11	.060	.000	.025	.10	.03							.40	
+115598	.11	1.15	.006	.007	.23	.30	.10	.058	.000	.032	.07	.03							.40	

HEATS INDICATED WITH (+) WERE MELTED & MANUFACTURED IN THE USA. ALL OTHER HEATS WERE ROLLED IN THE USA.

..... END OF REPORT .....

I certify the above to be correct as contained in the records of OREGON STEEL MILLS By _____

CHRISTINE WRINKLE
RECORDS ADMINISTRATOR

P33

OREGON STEEL MILLS

P.O. BOX 2760, Portland, Oregon 97208 • (503) 286-9651 Fax (503) 240-5268

REPORT OF CHEMICAL/PHYSICAL TESTS

THE FIRST ISO9002 REGISTERED U.S. PLATE PRODUCER

SOLD TO

ALBANY STEEL-TRANS BAY NAPA
ATTN:BILL KROPLIN/VP PURCHASING
536 CLEVELAND AVE
ALBANY, CA 94710

ALBANY STEEL-TRANS BAY NAPA
ATTN:BILL KROPLIN/VP PURCHASING
536 CLEVELAND AVE
ALBANY, CA 94710

CERTIFICATE NO.	DATE	PAGE
683731	Dec 07, 2001	1

MILL ORDER NO.	DATE
138796	

CUSTOMER ORDER NO. 17403-1720-2

JOB/REQ. NO

SHIPPING NO.	DATE
683731	12/06/2001

CARRIER: UNION PACIFIC

CAR/TRUCK NO. UP262063

THIS MATERIAL HAS BEEN MANUFACTURED, TESTED AND FOUND TO MEET THE SPECIFICATIONS AND PURCHASE ORDER REQUIREMENTS

OSM HSLA STRUCTURAL QUALITY PLATE AASHTO M270-96 GR 50 ASTM A709-97B GRADE 50. KILLED FINE GRAIN PRACTICE. .05 MAX S . TCVN 20 FT/LBS AVG @ +40 F (H). C.E. (CED FORMULA) .45 MAX. "ALL MATERIAL CERTIFIED HEREIN WAS MELTED & (continued)

PHYSICAL PROPERTIES

OSM ITEM NO.	DESCRIPTION	HEAT NO.	SLAB	YIELD PSI X 100	TENSILE PSI X 100	% ELONG 8"	% ELONG 2"	% RA	HARDNESS BHN	BEND TEST	IMPACTS
	MANUFACTURED IN THE USA".										
1	2.3620 X 88.000M X 324.000										
	5 PCS 95495 LBS	+ 114786		560	775		22				
				565	770		25				
								TCVN @ 40	DEG F		10.0mm 47 42 46 /45 ft/lbs
								TCVN @ 40	DEG F		10.0mm 49 45 48 /47 ft/lbs
	3 PCS 57297 LBS	+ 114788		545	800		24				
				555	805		28				
								TCVN @ 40	DEG F		10.0mm 82 75 76 /77 ft/lbs
								TCVN @ 40	DEG F		10.0mm 57 78 57 /64 ft/lbs
	2 PCS 38198 LBS	+ 114792		550	785		25				
				560	790		24				
								TCVN @ 40	DEG F		10.0mm 46 49 36 /43 ft/lbs
								TCVN @ 40	DEG F		10.0mm 39 64 49 /50 ft/lbs

CHEMICAL ANALYSIS

HEAT NO.	C	Mn	P	S	Si	Cu	Ni	V	Cb	Al	Cr	Mo	Ti	B	N2	Ca			CE	McQuaid Ehn Grain Size
+114786	.11	1.15	.007	.008	.18	.25	.10	.059	<.008	.023	.09	.03							.39	
+114788	.13	1.16	.006	.004	.27	.27	.10	.061	<.008	.023	.08	.02							.43	
+114792	.12	1.21	.008	.006	.27	.25	.09	.061	<.008	.029	.08	.02							.43	

HEATS INDICATED WITH (+) WERE MELTED & MANUFACTURED IN THE USA. ALL OTHER HEATS WERE ROLLED IN THE USA.

I certify the above to be correct as contained in the records of OREGON STEEL MILLS By Christine Wrinkle

CHRISTINE WRINKLE
Q.C. RECORDS ADMINISTRATOR

12/10/01 07:54 ☎503 240 5268 OREGON STEEL LAB 002/003