February 11, 2015

Sutro Tower, Inc.
1 La Avanzada Street
San Francisco, CA 94131-1124

Attention: Mr. Eric Dausman

Re: **Field Evaluation of Existing**
977-Foot Self-Support Tower
San Francisco, California
TCI Project Number 14.082.001

Dear Mr. Dausman,

We are pleased to submit our report on the field observation of the above referenced self-support tower.

Authorization / Purpose:

Tower Consultants Incorporated was retained by Sutro Tower Company to conduct a field observation of the 977-foot self-support tower. The inspection work has been performed in accordance with the requirements of the ANSI/TIA-222-G standard.

The purpose of the field observation was to visually evaluate the condition and structural integrity of the tower. A routine inspection was performed of leg C, the south face trusses, the strands and the bases and stack C above the 6th level.

The tower is located in San Francisco, California. J. Altmyer, P.E. & Y. Kabatski performed the site observations between May 2014 and November 2014.

Field Observations:

The inspection consisted of a tower climb and visual examination of the tower members, connections, antennas, feed lines and mounting hardware. Only those members that could be seen with binoculars and the naked eye were inspected. There are some areas on the faces and legs that were covered by skin and could not be inspected.

The structural elements of the tower appear to be in fair condition, with no bent members, loose bolts, short bolts or other deficiencies. However, with completion of the recommended actions below, we anticipate the elements will be improved to good condition. The structural beams at levels 2 and 3 were recently cleaned and painted. There are areas of the tower where rust has formed on the tower member surfaces. Minor to medium rust was seen on gusset plates between levels 1 and 4. We recommend that these areas be scraped and painted during the next maintenance project. Many diagonal connections to leg members have drain holes that are plugged causing standing water that will lead to rusted steel. These connections should be power washed by Sutro personnel and the drain holes unplugged and inspected next year to evaluate their condition. There are many corroded fasteners throughout the tower height. A criteria has been developed for replacing nuts or bolts. Approximately 1,000 bolts were replaced in 2014 and many others were cleaned and painted. Inspection and evaluation of the nuts and bolts should be continued in 2015. If the nuts or bolts meet the acceptance criteria specified by Simpson Gumpertz & Heger Inc. they should be painted and then evaluated in the future for additional corrosion. If the nuts or bolts do not meet the acceptance criteria then they should be replaced.

The tower skin showed no distress. The strands and guy wires are in good condition and are properly tensioned.

The tower bases are in good condition. Weld testing at the tower bases revealed no problems. The exposed surfaces of the concrete foundation at the tower base are in good condition. The tower base is properly grounded.

The climbing facilities and platforms were secure and appear to be in good condition with the exception of the kinked safety cable in leg C between levels 4 and 5. This cable is scheduled for replacement in 2015 by Sutro personnel.

The tower lighting system appears to be in good condition with some minor exceptions. All of the lighting levels are operational and synchronized. The following items were noted:

- The lighting conduits and conduit hardware are typically rusted throughout the tower height.
- A few of the junction boxes have damaged connections.
- A few the internal lights in the tower legs are missing covers and one light is broken.

The lights that are broken or are missing covers are currently being replaced by the Sutro Tower crew. The lighting system is scheduled to be replaced in 2015.

The antennas, transmission lines and associated mounting hardware appear to be in fair condition. The following items were noted and with their repair, the condition is anticipated to be improved to good:

- There are abandoned lines in some locations.
- There is a broken ground wire for a feed line in one location. This has been referred to the Sutro Tower crew for replacement.
- There are some loose feed lines that are poorly connected to the tower.

For detailed information see the attached inspection data sheets and photo logs.

Should you have any questions or wish to discuss any aspect of this report, please do not hesitate to contact the undersigned.

Sincerely,

Digitally signed by Jeff Altmyer
DN: cn=Jeff Altmyer, email=jaltmyer@tower-tci.com, o=Tower Consultants Inc., ou=Lynnwood Office, c=US
Date: 2015.02.26 13:10:07 -08'00'

Jeff Altmyer, P.E.
Tower Engineer
Tower Consultants Incorporated

Inspection Summary – Year 2014

Description of Inspection:

- Routine inspection of Leg C
- Routine inspection of horizontal levels on South face
- Routine inspection of strands on all faces
- Routine inspection of strand anchors on all legs
- Routine inspection of base – all legs

Special or In-Depth Inspections:

- Load test of all diagonal strands
- Test welds at base of all legs

Summary of Results:

Rusted fasteners, rusted members and some rusted gussets. There are leg gussets that have drain holes that are plugged which retains water. The safety climb cable is kinked in one section. Rusted conduit and conduit hardware. Some junction boxes have damaged connectors. A few antenna feed lines are abandoned. Loose feed lines in some locations and one broken ground cable. There are broken lights and light covers in leg C.

Summary of Recommendations: See report text

Checklist:

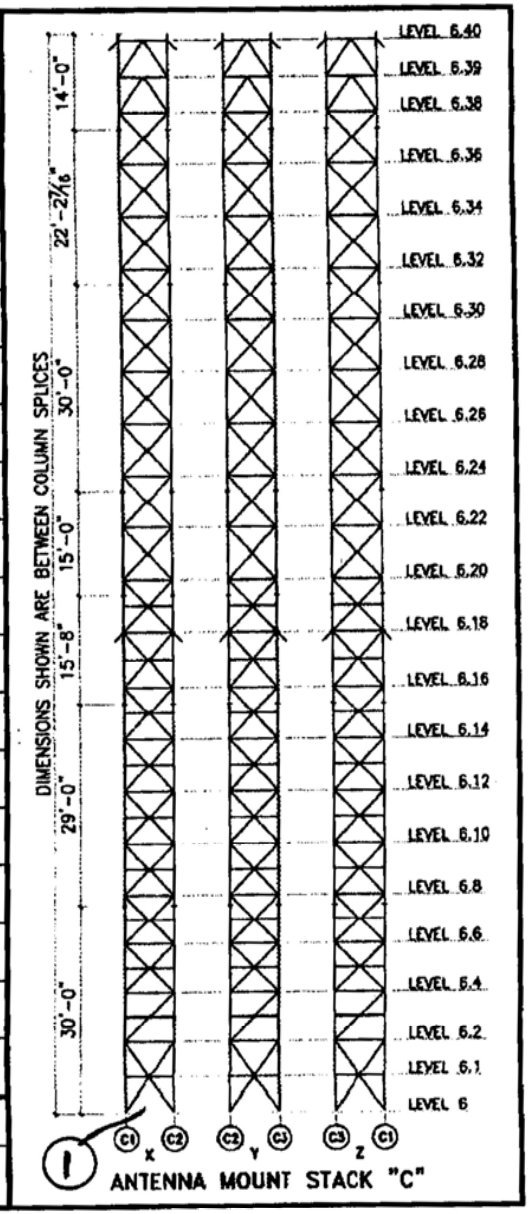
- Has a severe event occurred since the previous inspection ? Yes (No)
- Have action items and recommendations from previous inspections been addressed in the scope of work ? (Yes) No
- Has the inspection log for future years been revised to account for scope of work and findings of this inspection ? (Yes) No

Signature: Jeff Altmyer

Date: 1/9/15

Inspection Data Sheet: Antenna Mount Stack "C" (Level 6 to base of antenna)

Observ. No.	Location/Identification			Photo No.	Observation Comments
	Column	Elevation	Item[1]		
					NO DISTRESS NOTED FOR THE
					ANTENNA MOUNT STACK "C"
					BECAUSE IT WAS RECENTLY
					CLEANED AND PAINTED
					WITH THE EXCEPTION OF (1)
					ITEM:
1	X-FACE	6	C	1	RF(3) ON HORIZONTAL BRACE
					TYPICAL FOR 3 LEGS



Sutro Tower	Signature:	Page: 1 of 1
San Francisco, CA	File:	Date: 1/9/15

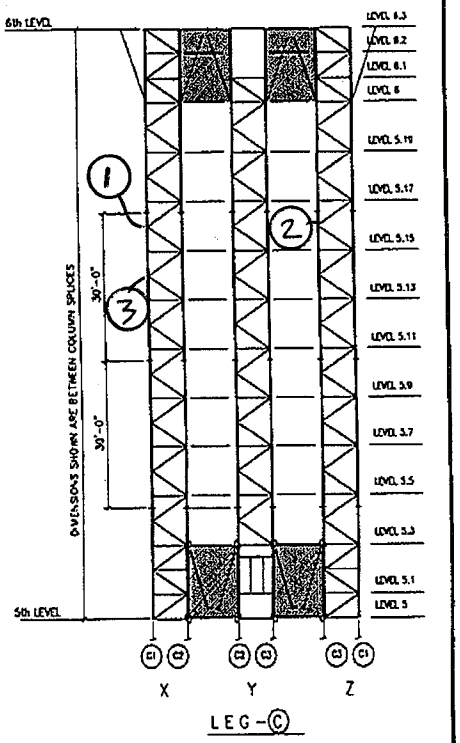
[1] Item designation: L=leg member, D=diagonal, H=horizontal, C=connection, O=others

Photo 1.JPG
8/25/2014

Antenna Mount Stack "C" (Level 6 to base of antenna)

Inspection Data Sheet: Leg C (Level 5 to Level 6)

Observ. No.	Location / Identification			Photo No.	Observation Comments
	Column	Elevation	Item[1]		
1	X-FACE	3.16	C	1	MINOR RUST ON GUSSET PLATE
2	Z-FACE	3.16	O	2	DRAIN HOLES ARE PLUGGED, TYPICAL
3	X-FACE	3.14	C	3	RF(2), LEG BOLTS



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[1] Item designation: L=leg member, D=diagonal, H=horizontal, C=connection, O=others

Photo 1.JPG
8/26/2014

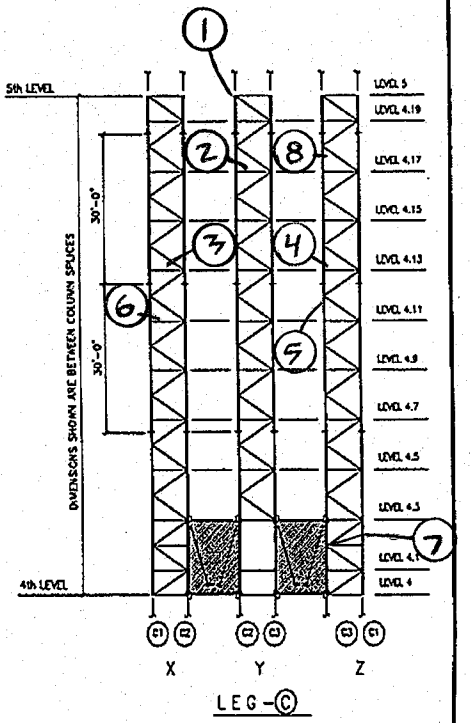
Photo 2.JPG
8/26/2014

Photo 3.JPG
8/26/2014

Leg C (Level 5 to Level 6)

Inspection Data Sheet: Leg C (Level 4 to Level 5)

Observ. No.	Location / Identification			Photo No.	Observation Comments
	Column	Elevation	Item[1]		
1	Y-FACE	5	O	1	(2) LOOSE 1/8" LINES
2	Y-FACE	4.17	O	2	ABANDONED 3" LINE
3	CENTER	4.13	O	3	THERE ARE KINKS IN THE SAFETY CABLE
4	Z-FACE	4.13	C	4	RF (2), HORIZONTAL BOLTS
5	C3	4.12	C	5	RF (2), LEG BOLTS
6	X-FACE	4.11	O	6	BROKEN CONDUIT CONNECTION
7	C3	4.7	C	7	RF (4), LEG BOLTS
8	C3	4.18	C	8	RF (1), LEG BOLTS



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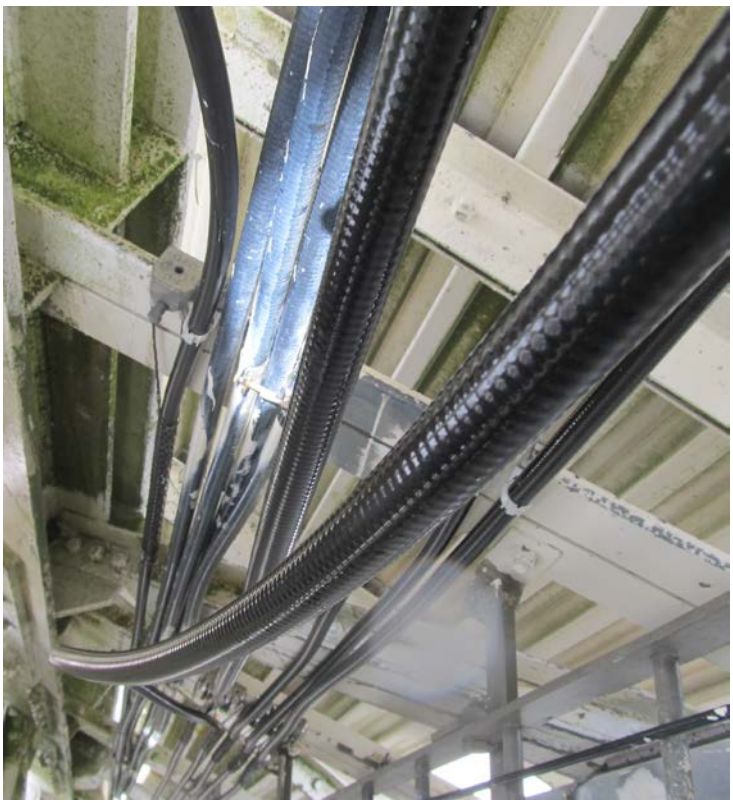


Photo 1.JPG
5/23/2014

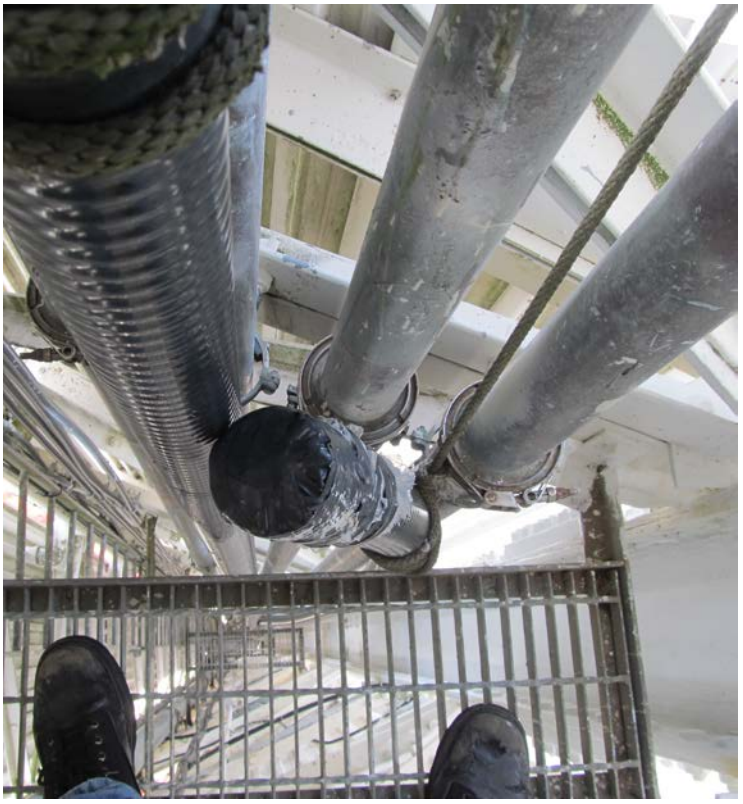


Photo 2.JPG
5/23/2014

Photo 3.JPG
5/23/2014

Photo 4.JPG
5/23/2014

Leg C (Level 4 to Level 5)

Photo 5.JPG
5/23/2014

Photo 6.JPG
5/23/2014

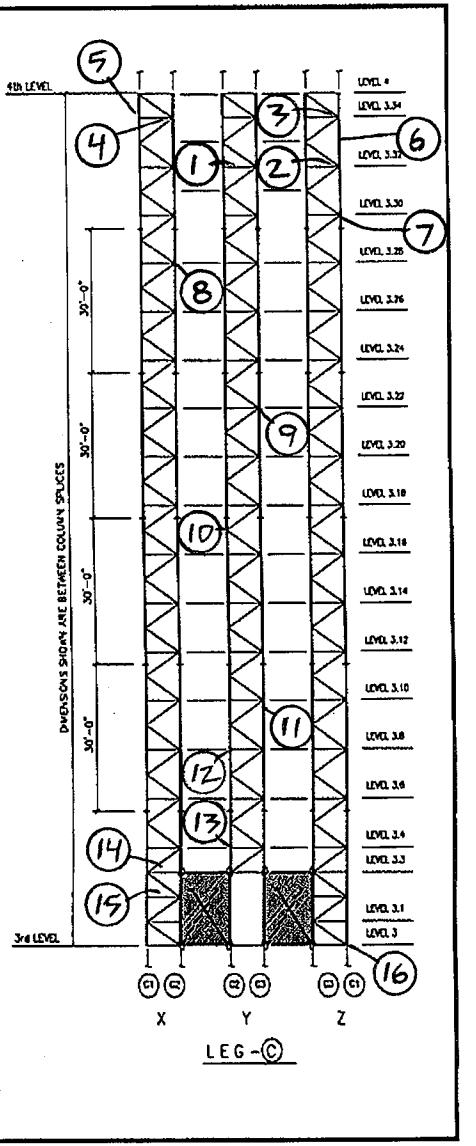
Photo 7.JPG
5/23/2014

Photo 8.JPG
5/23/2014

Leg C (Level 4 to Level 5)

Inspection Data Sheet: Leg C (Level 3 to Level 4)

Observ. No.	Location / Identification			Photo No.	Observation Comments
	Column	Elevation	Item[1]		
1	Y-FACE	3.32	O	1	3" FLEX LINE IS ABANDONED
2	Z-FACE	3.32	C	2	RF(1), FOR SKIN SUPPORT
3	C1	3.34	C	3	RF(1), LEG BOLT
4	C2	3.34	C	4	RF(1), GUSSET TO LEG BOLT
5	C1	3.34	C	5	RF(5), GUSSET TO LEG CONNECTION
6	CENTER	3.33	O	6	RUST ON LIGHT CONDUIT
7	Z-FACE	3.30	O	7	ABANDONED 1/4" CABLE
8	C2	3.28	C	8	RF(3), LEG SPLICE
9	Y-FACE	3.22	C	9	RF(1) AND RUSTED SPOT ON LEG
10	Y-FACE	3.17	D	10	RUST ON DIAGONAL GUSSET
11	C3	3.10	L	11	RUST ON LEG
12	Y-FACE	3-4	H	12	RUST ON SKIN SUPPORT ANGLE
13	Y-FACE	3.4	D	13	RUST ON DIAGONAL GUSSET
14	X-FACE	3.3	O	14	COVER IS MISSING FOR LIGHT
15	X-FACE	3.2	O	15	BROKEN LIGHT & LIGHT COVER
16	Z-FACE	3	O	16	BROKEN GROUND FOR 1 5/8" LINE



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[1] Item designation: L=leg member, D=diagonal, H=horizontal, C=connection, O=others

Photo 01.JPG
6/18/2014

Photo 02.JPG
6/18/2014

Photo 03.JPG
6/18/2014

Photo 04.JPG
6/18/2014

Leg C (Level 3 to Level 4)

Photo 05.JPG
6/18/2014

Photo 06.JPG
6/18/2014

Photo 07.JPG
6/18/2014

Photo 08.JPG
6/18/2014

Leg C (Level 3 to Level 4)

Photo 09.JPG
6/18/2014

Photo 10.JPG
6/18/2014

Photo 11.JPG
6/18/2014

Photo 12.JPG
6/18/2014

Leg C (Level 3 to Level 4)

Photo 13.JPG
6/18/2014

Photo 14.JPG
6/18/2014

Photo 15.JPG
6/18/2014

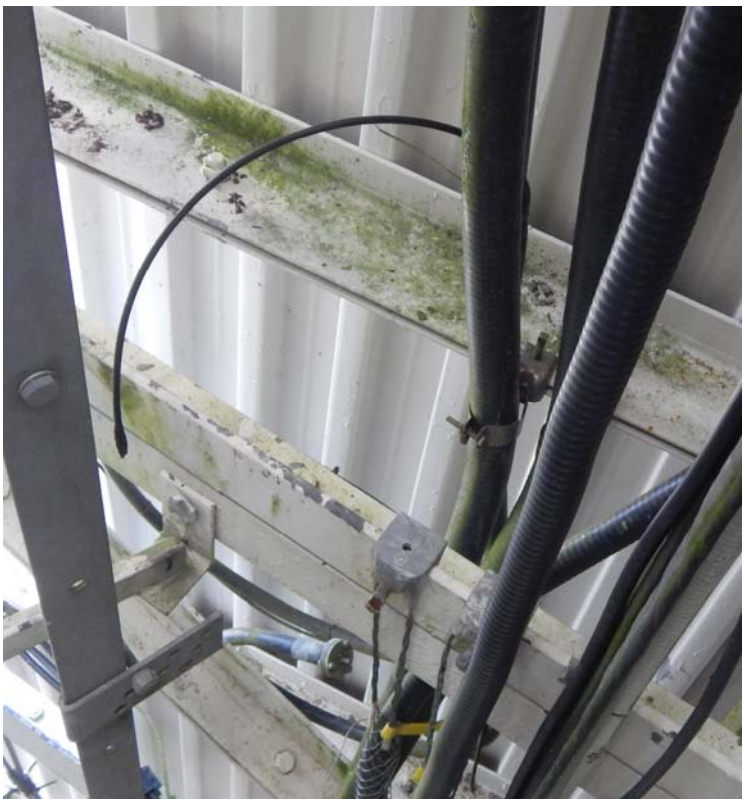
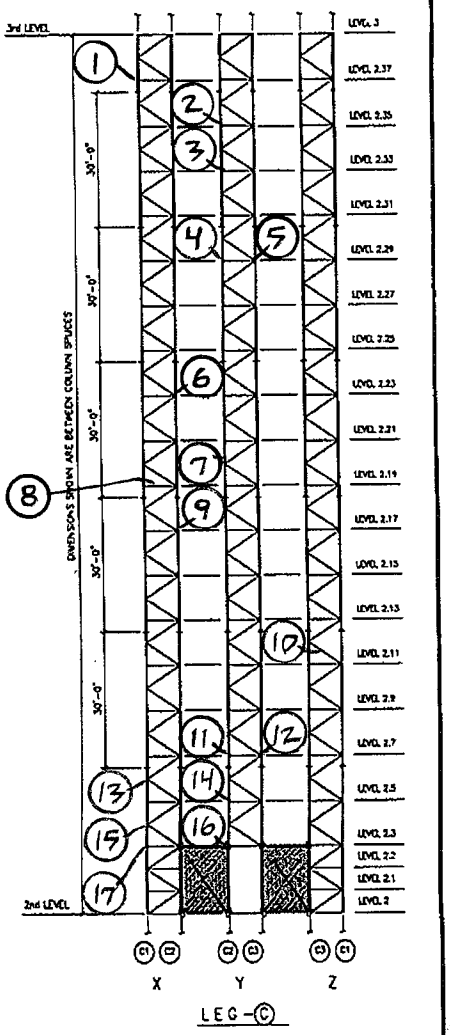


Photo 16.JPG
6/18/2014

Leg C (Level 3 to Level 4)

Inspection Data Sheet: Leg C (Level 2 to Level 3)

Observ. No.	Location / Identification			Photo No.	Observation Comments
	Column	Elevation	Item[1]		
1	C1	2.37	C	1	RF(6), LEG BOLTS
2	C2	2.35	C	2	RF(10), LEG BOLTS
3	C2	2.33	L	3	RUST ON LEG
4	C2	2.29	C	4	RF(10), LEG BOLTS
5	C3	2.29	L	5	RUST ON LEG
6	C2	2.23	C	6	RF(10), LEG BOLTS
7	C2	2.20	L	7	RUST ON GUSSET PLATE
8	X-FACE	2.19	O	8	JUNCTION BOX HAS DAMAGED CONNECTORS
9	C2	2.17	C	9	RF(9), LEG BOLTS
10	Z-FACE	2.12	C	10	RF(1), DIAGONAL BOLT
11	C2	2.7	L	11	RUST ON GUSSET
12	C3	2.7	L	12	RUST ON GUSSET
13	C1	2.6	L	13	RUST ON GUSSET
14	C2	2.5	L	14	RUST ON GUSSET
15	C1	2.4	L	15	RUST ON GUSSET
16	C2	2.3	L	16	RUST ON GUSSET
17	C1	2.3	L	17	MINOR RUST ON LEG



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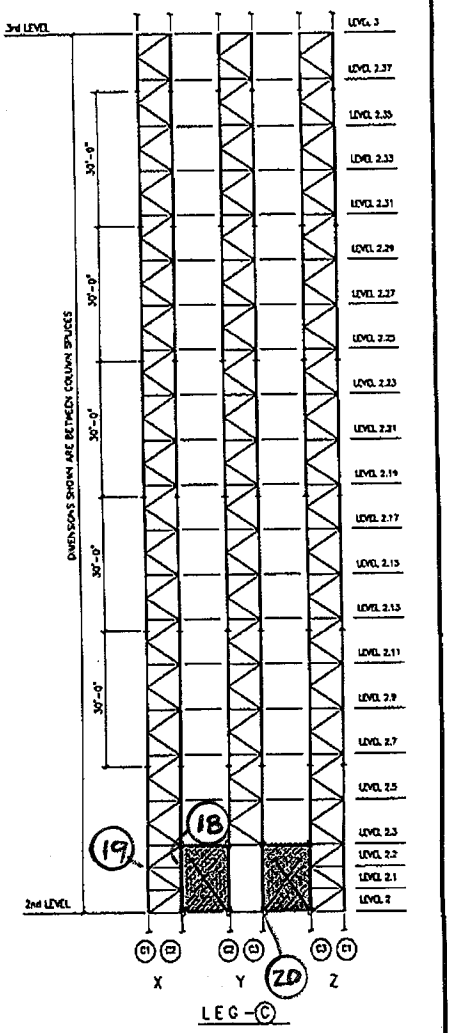
[1] Item designation: L=leg member, D=diagonal, H=horizontal, C=connection, O=others

Inspection Data Sheet: Leg C (Level 2 to Level 3)

Observ. No.	Location / Identification			Photo No.	Observation Comments
	Column	Elevation	Item[1]		
18	C2	2.2	C	18	RF(22), LEG BOLTS
19	C1	2.2	C	19	RF(4), LEG BOLTS
20	C3	2	C	20	RF(2), DIAGONAL BOLTS



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[1] Item designation: L=leg member, D=diagonal, H=horizontal, C=connection, O=others

Photo 01.JPG
7/11/2014

Photo 02.JPG
7/11/2014

Photo 03.JPG
7/11/2014

Photo 04.JPG
7/11/2014

Leg C (Level 2 to Level 3)

Photo 05.JPG
7/11/2014

Photo 06.JPG
7/11/2014

Photo 07.JPG
7/11/2014

Photo 08.JPG
7/11/2014

Leg C (Level 2 to Level 3)

Photo 09.JPG
7/11/2014

Photo 10.JPG
7/11/2014

Photo 11.JPG
7/11/2014

Photo 12.JPG
7/11/2014

Leg C (Level 2 to Level 3)

Photo 13.JPG
7/11/2014

Photo 14.JPG
7/11/2014

Photo 15.JPG
7/11/2014

Photo 16.JPG
7/11/2014

Photo 17.JPG
7/11/2014

Leg C (Level 2 to Level 3)

Photo 18.JPG
7/11/2014

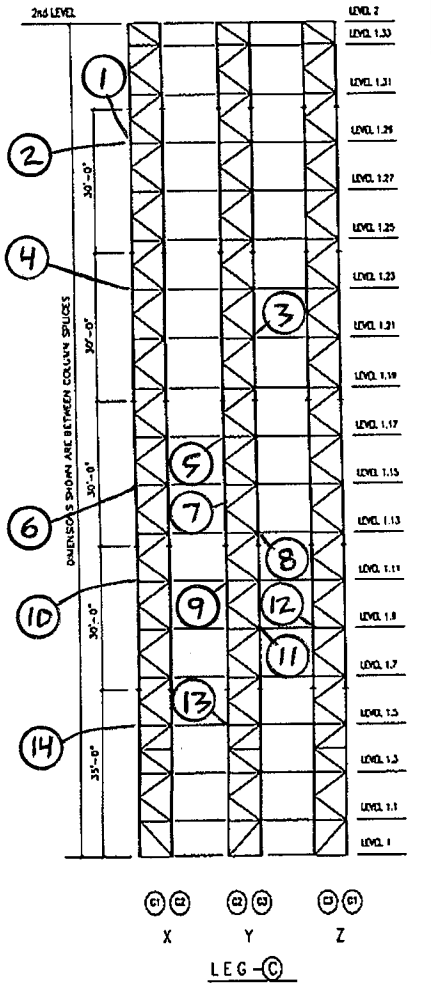
Photo 19.JPG
7/11/2014

Photo 20.JPG
7/11/2014

Leg C (Level 2 to Level 3)

Inspection Data Sheet: Leg C (Level 1 to Level 2)

Observ. No.	Location / Identification			Photo No.	Observation Comments
	Column	Elevation	Item[1]		
1	C1	1.29	C	1	RF(3), LEG BOLTS
2	C1	1.29	L	2	RUST ON GUSSET PLATE
3	C3	1.21	L	3	MINOR RUST ON GUSSET PLATE
4	C1	1.23	C	4	RF(2), LEG BOLTS
5	Y-FACE	1.17	O	5	RUSTED CONDUIT
6	C1	1.15	L	6	RUSTED GUSSET
7	Y-FACE	1.14	C	7	RF(1), DIAGONAL BOLT
8	C3	1.13	L	8	RUST ON GUSSET
9	C2	1.11	C	9	RF(4), LEG BOLTS
10	C1	1.11	L	10	RUST ON GUSSET
11	C3	1.9	C	11	RF(3), DIAGONAL BOLTS
12	C3	1.9	L	12	RUSTED GUSSET PLATE
13	C2	1.5	C	13	RF(4), LEG BOLTS
14	C1	1.5	L	14	RUSTED GUSSET PLATE



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[1] Item designation: L=leg member, D=diagonal, H=horizontal, C=connection, O=others

Photo 01.JPG
7/11/2014

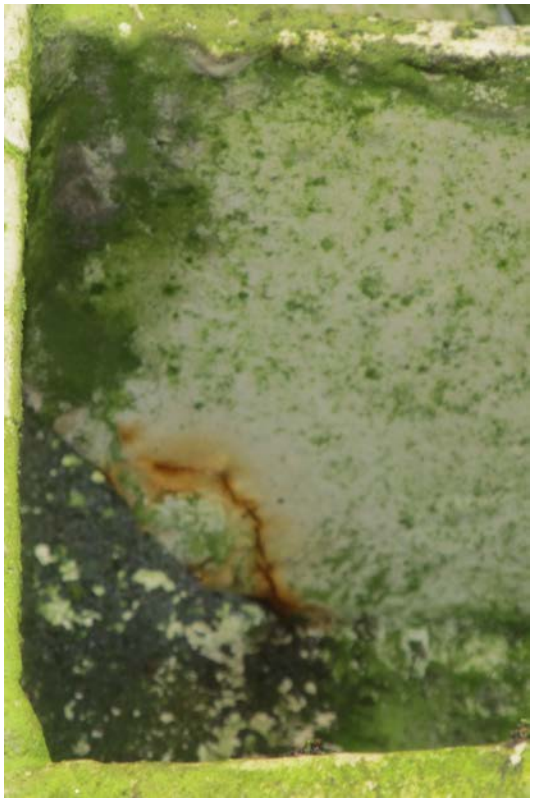

Photo 02.JPG
7/11/2014

Photo 03.JPG
7/11/2014

Photo 04.JPG
7/11/2014

Leg C (Level 1 to Level 2)

Photo 05.JPG
7/11/2014

Photo 06.JPG
7/11/2014

Photo 07.JPG
7/11/2014

Photo 08.JPG
7/11/2014

Leg C (Level 1 to Level 2)

Photo 09.JPG
7/11/2014

Photo 10.JPG
7/11/2014

Photo 11.JPG
7/11/2014

Photo 12.JPG
7/11/2014

Leg C (Level 1 to Level 2)

Photo 13.JPG
7/11/2014

Photo 14.JPG
7/11/2014

Leg C (Level 1 to Level 2)

Inspection Data Sheet: South Truss (Level 6)

Observ. No.	Location / Identification			Photo No.	Inspection Comments
	Chord[1]	Horiz. Location	Item[2]		
					NO DISTRESS NOTED FOR
					THE CHORDS BECAUSE THEY
					WERE RECENTLY CLEANED
					AND PAINTED

Sutro Tower	Signature:	Page: 1 of 1
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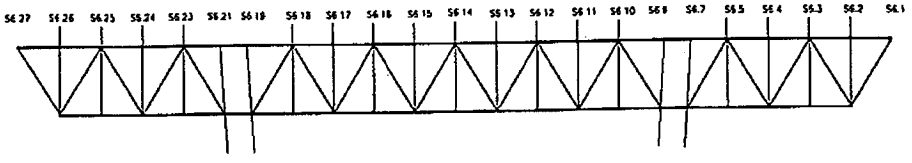
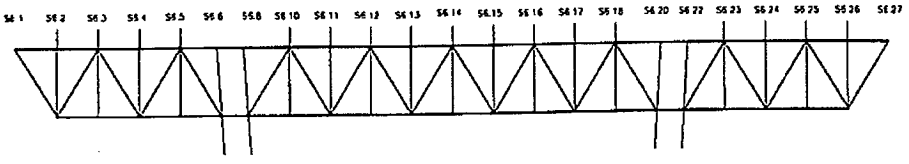
[1] Chord member designation: OU = outer upper, OL = outer lower, IU = inner upper, and IL = inner lower
[2] Item designation: H = horizontal, V = vertical, D = diagonal, C = connection, O = others



SOUTH FACE
(VIEW TO INSIDE)



SOUTH FACE
(VIEW TO OUTSIDE)

Inspection Data Sheet: South Truss (Level 5)

Observ. No.	Location / Identification			Photo No.	Inspection Comments
	Chord[1]	Horiz. Location	Item[2]		
1	U	S.6	C	1	RF(2)
2	U	S.3	C	2	RF(2)
3	L	S.2	C	3	RF(2)
4	U	S.1	C	4	RF(3)

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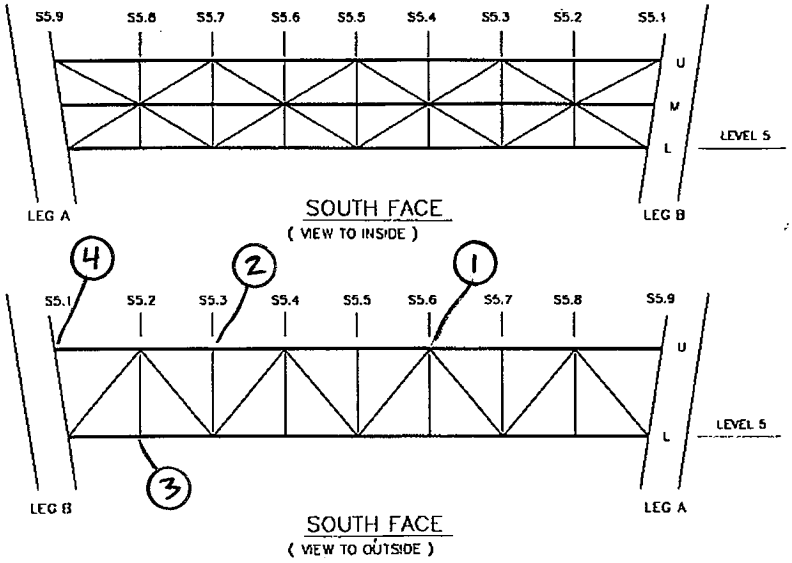
[1] Chord member designation: OU=outer upper, OL=outer lower, IU=inner upper, and IL=inner lower
[2] Item designation: H=horizontal, V=vertical, D=diagonal, C=connection, O=others



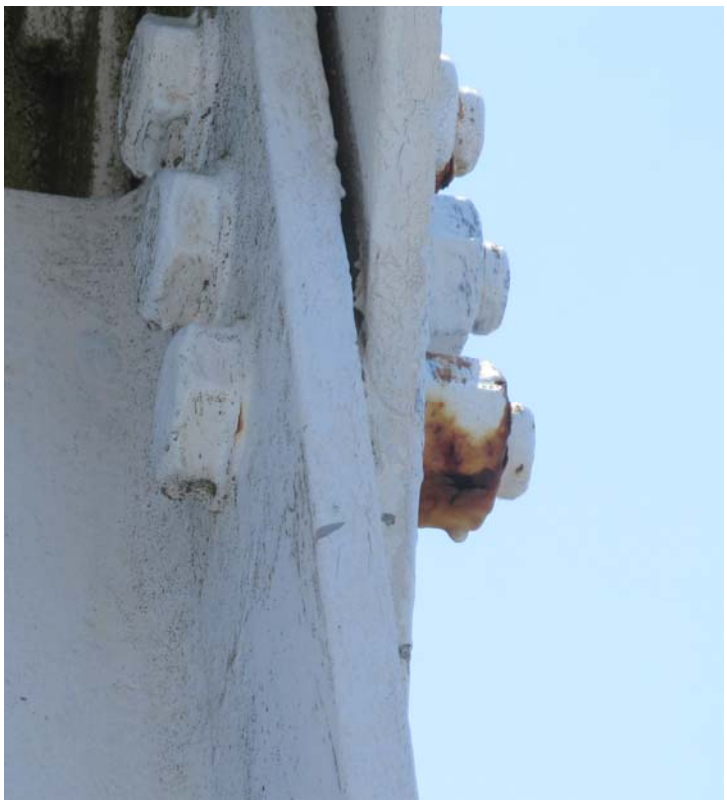


Photo 01.JPG
8/27/2014

Photo 02.JPG
8/27/2014

Photo 03.JPG
8/27/2014

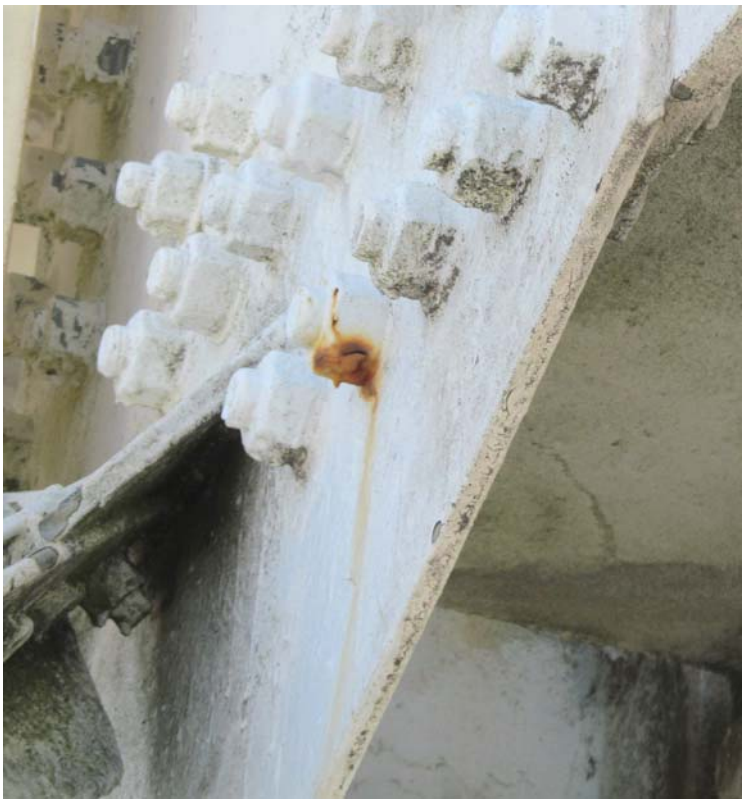


Photo 04.JPG
8/27/2014

South Truss (Level 5)

Inspection Data Sheet: South Truss (Level 4)

Observ. No.	Location / Identification			Photo No.	Inspection Comments
	Chord[1]	Horiz. Location	Item[2]		
1	U	4.7	C	1	RF(2)
2	U	4.65	H	2	RUST ON BEAM
3	V	4.7	V	3	RUST ON LEG
4	U	4.6	C	4	RF(2)
5	U	4.5	H	5	RUST ON BEAM
6	U	4.5	C	6	RF(14)
7	D	4.45	D	7	RUST ON BEAM
8	U	4.45	H	8	RUST ON BEAM
9	V	4.4	V	9	RUST ON BEAM
10	U	4.4	C	10	RF(5)
11	U	4.35	H	11	RUST ON BEAM
12	L	4.3	H	12	RUST ON BEAM
13	U	4.3	C	13	RF(17)
14	D	4.25	D	14	RUST ON BEAM
15	U	4.25	H	15	RUST ON BEAM

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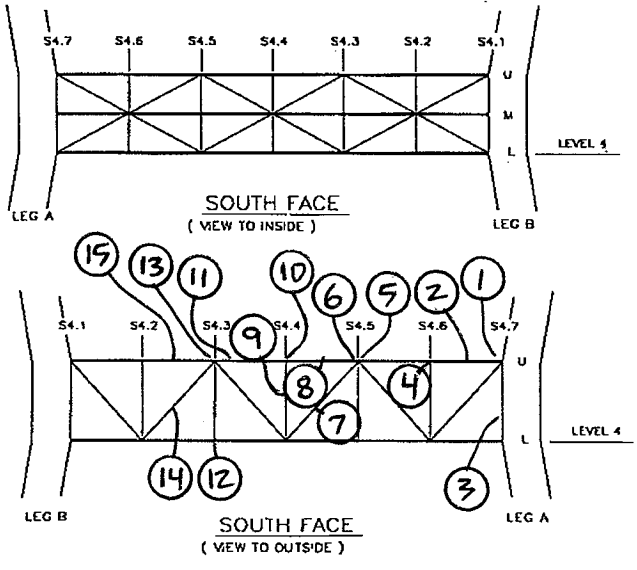
[1] Chord member designation: OU=outer upper, OL=outer lower, IU=inner upper, and IL=inner lower
[2] Item designation: H=horizontal, V=vertical, D=diagonal, C=connection, O=others

U = UPPER M = MIDDLE L = LOWER



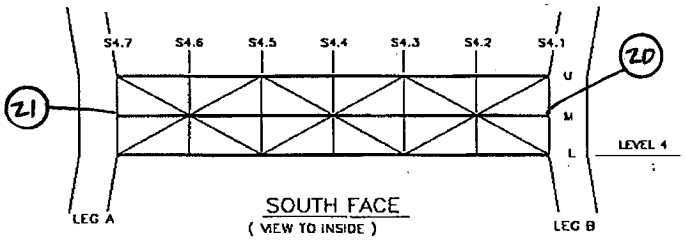
Inspection Data Sheet: South Truss (Level 4)

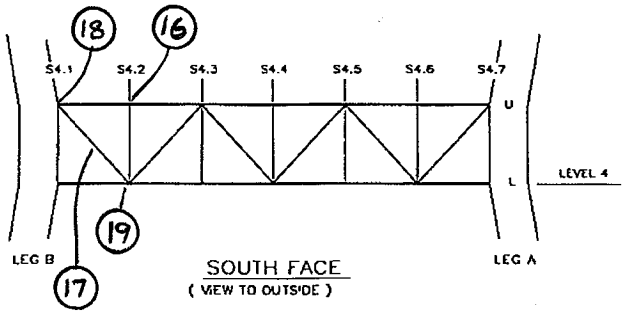
Observ. No.	Location / Identification			Photo No.	Inspection Comments
	Chord[1]	Horiz. Location	Item[2]		
16	U	4.2	C	16	RF(2)
17	D	4.15	D	17	RUST ON BEAM
18	U	4.1	C	18	RF(12)
19	L	4.2	C	19	RF(8)
20	M	4.1	H	20	RUST ON BEAM
21	M	4.7	H	21	RUST ON BEAM

Sutro Tower	Signature:	Page: 2 of 2
San Francisco, CA	File:	Date: 1/9/15

[1] Chord member designation: OU=outer upper, OL=outer lower, IU=inner upper, and IL=inner lower
[2] Item designation: H=horizontal, V=vertical, D=diagonal, C=connection, O=others

U = UPPER M = MIDDLE L = LOWER





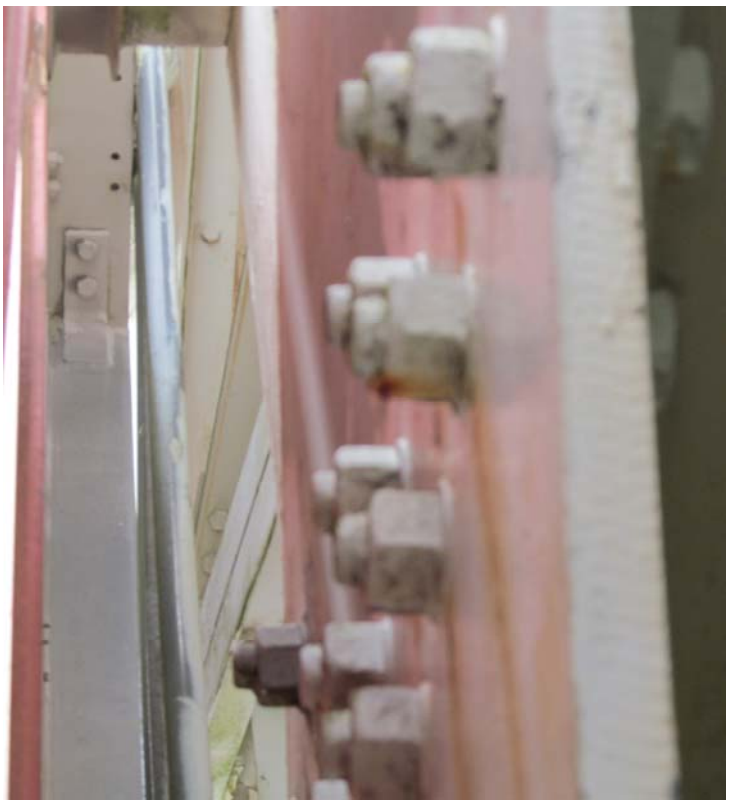


Photo 01.JPG
9/23/2014

Photo 02.JPG
9/23/2014

Photo 03.JPG
9/23/2014

Photo 04.JPG
9/23/2014

South Truss (Level 4)

Photo 05.JPG
9/23/2014

Photo 06.JPG
9/23/2014

Photo 07.JPG
9/23/2014

Photo 08.JPG
9/23/2014

South Truss (Level 4)

Photo 09.JPG
9/23/2014

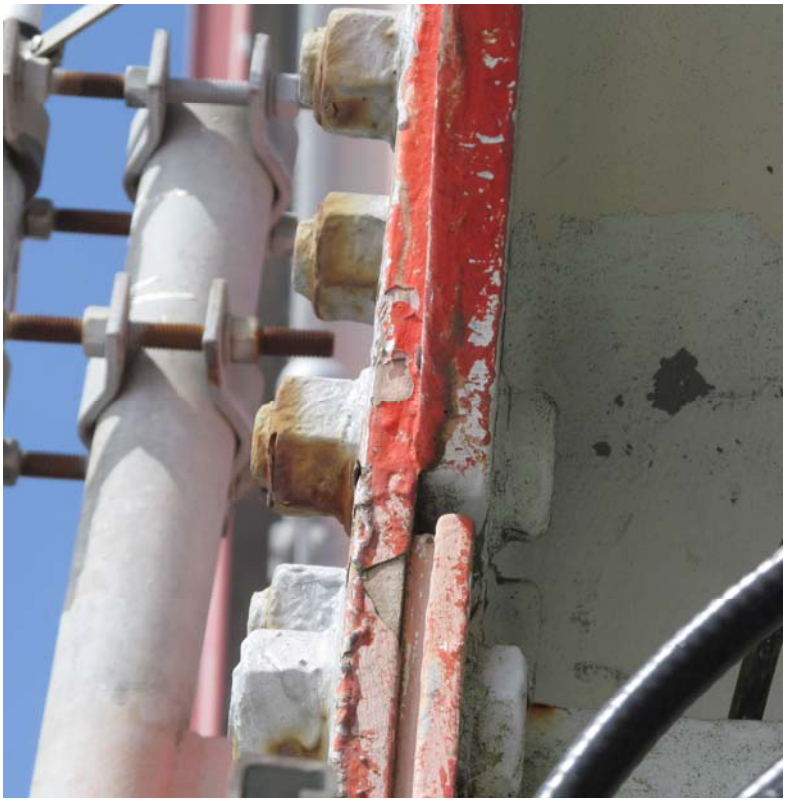


Photo 10.JPG
9/23/2014

Photo 11.JPG
9/23/2014

Photo 12.JPG
9/23/2014

South Truss (Level 4)

Photo 13.JPG
9/23/2014

Photo 14.JPG
9/23/2014

Photo 15.JPG
9/23/2014

Photo 16.JPG
9/23/2014

South Truss (Level 4)

Photo 17.JPG
9/23/2014

Photo 18.JPG
9/23/2014

Photo 19.JPG
9/23/2014

Photo 20.JPG
9/23/2014

South Truss (Level 4)

Photo 21.JPG
9/23/2014

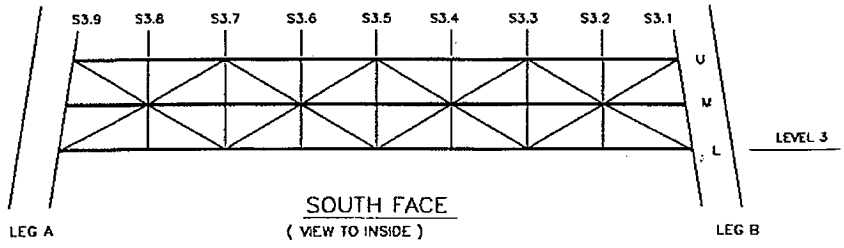
South Truss (Level 4)

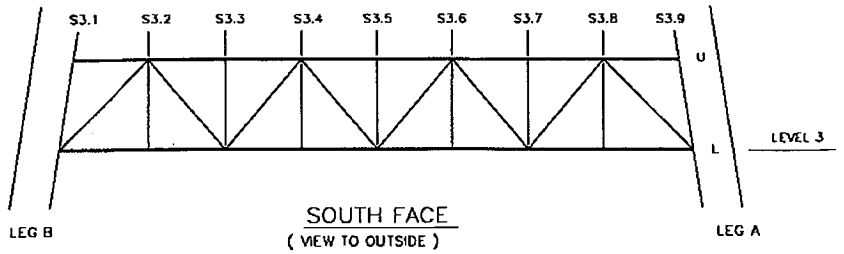
Inspection Data Sheet: South Truss (Level 3)

Observ. No.	Location / Identification			Photo No.	Inspection Comments
	Chord[1]	Horiz. Location	Item[2]		
					NO DISTRESS NOTED FOR
					THE CHORDS BECAUSE THEY
					WERE RECENTLY CLEANED
					AND PAINTED

Sutro Tower	Signature:	Page: 1 of 1
San Francisco, CA	File:	Date: 1/9/15

[1] Chord member designation: OU=outer upper, OL=outer lower, IU=inner upper, and IL=inner lower
[2] Item designation: H=horizontal, V=vertical, D=diagonal, C=connection, O=others



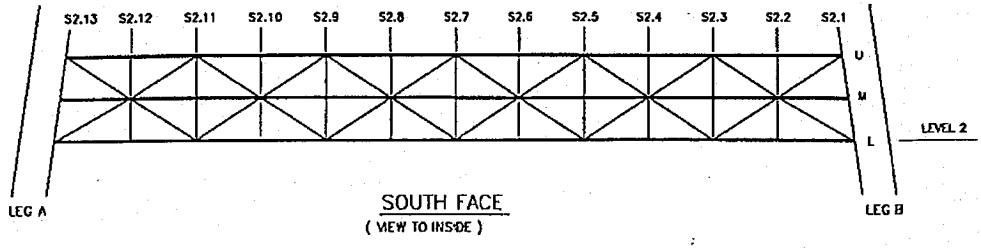


Inspection Data Sheet: South Truss (Level 2)

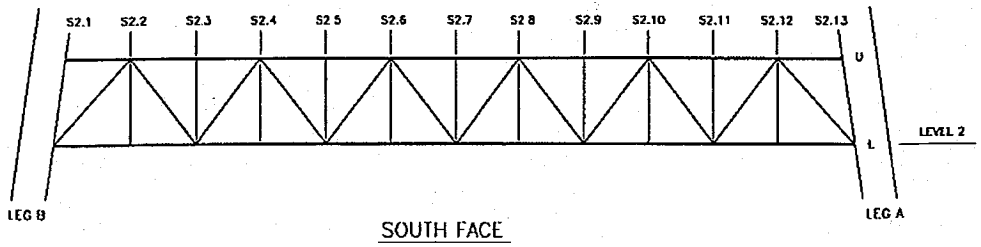
Observ. No.	Location / Identification			Photo No.	Inspection Comments
	Chord[1]	Horiz. Location	Item[2]		
					NO DISTRESS NOTED FOR
					THE CHORDS BECAUSE THEY
					WERE RECENTLY CLEANED
					AND PAINTED

Sutro Tower	Signature:	Page: 1 of 1
San Francisco, CA	File:	Date: 1/9/15

[1] Chord member designation: OU=outer upper, OL=outer lower, IU=inner upper, and IL=inner lower
[2] Item designation: H=horizontal, V=vertical, D=diagonal, C=connection, O=others



SOUTH FACE
(VIEW TO INSIDE)



SOUTH FACE
(VIEW TO OUTSIDE)

Inspection Data Sheet: STRANDS & Miscellaneous Tower Items

Observ. No.	Location / Identification[1]	Photo No.	Inspection Comments
			NO DISTRESS NOTED

Sutro Tower	Signature:	Page: 1 of 1
San Francisco, CA	File:	Date: 1|9|15

[1] Miscellaneous items for the entire tower in addition to those contained in the column leg and truss forms.

Inspection Data Sheet: BASE & Miscellaneous Tower Items

Observ. No.	Location / Identification[1]	Photo No.	Inspection Comments
			NO DISTESS NOTED FOR
			THE BASES BECAUSE THEY
			WERE RECENTLY CLEANED
			AND PAINTED

Sutro Tower	Signature:	Page: 1 of 1
San Francisco, CA	File:	Date: 1/9/15

[1] Miscellaneous items for the entire tower in addition to those contained in the column leg and truss forms.

CONSOLIDATED ENGINEERING LABORATORIES
INSPECTION/TESTING REPORT

CONSOLIDATED ENGINEERING
LABORATORIES

2001 Crow Canyon Road, Suite 100
San Ramon, CA 94583-5387
Tel. 925 314-7100 Fax. 925 855-7140
www.ce-labs.com

INSPECTION/TESTING REPORT

Date Of Issue: 9/2/2014

RE: 2013 Bolt Replacement
1 La Avanzada Street
San Francisco, CA 94131

Permit NA
CEL# 1027917

Inspection Date(s): 8/11/2014 - 8/14/2014
Location: Jobsite
Report # 0815Field
Inspector(s): Arturo Lozano, John Hyslop

NDE (MT) / FIELD WELDING

On the above dates, our representatives inspected the referenced project.

Please refer to the attached reports for details and locations of our testing and/or inspection services for the above noted dates.

Note: On 08/14/14, John Hyslop inspected repair at Tower A/Column B (column to base plate) that was previously rejected (MT) by CEL's Josefina Sigmon on 08/12/14. This previously reported reject has been re-inspected and is now acceptable.

Work final inspected was in compliance with approved plans and specifications, and as noted.

CC: **Enclosures (5)** **Reviewing Engineer: Chris Kavalaris, PE**

Tower Consulting, Inc. (ER)
Sutro Tower, Inc. (ER)
SGH, Inc. (ER)

CONSOLIDATED ENGINEERING LABORATORIES

Form ID 072 Rev.0

Certified Report of Non-Destructive Examination

Customer			Date 08/11/2014 Day Monday	
Address 1 La Avanzada Street, San Francisco, CA 94131			Lab No.	
Job or Project Location	PO No		Plan or DWG No.	
Surface Condition	Heat No.	Heat Treat ○ Before ○ Afte ○ N/A	Type of Material	Temp of Material
Type of Examination ○ UT ◉ M ○ PT	Examination Standard	Acceptance Standard	Date	

ULTRASONIC EXAMINATION

Equipment	Serial No.	Transducer Type	Transducer Size	Trans. Frequency	Search Beam Angle
Sensitivity Level	Test Block	Method Used	Scanning Method	Sensitivity Level	Couplant

MAGNETIC PARTICLE EXAMINATION

Equipment probe	☐ Wet ☐ Visible ☒ Dry ☐ Fluorescent	☒ AC ☐ Rectified ☐ DC	Amperage 6	Prod Spacing 5" ☒ Head ☐ Coil	Particles - Color Red

LIQUID PENETRANT EXAMINATION

Method	Penetrant			Cleaner		Emulsifier			Developer		Dev Time
	Brand No.	Batch No.	Dwell Time	Brand No.	Batch No.	Brand No.	Batch No.	Emul Time	Brand No.	Batch No.	

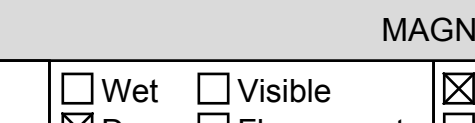
Part No.	Total Length Examined Ft In	Type of Work ☐ New ☐ Repair	No. Items Accepted	No. Items Rejected	☐ Wet ☐ Dry ☐ Non-Aqueous

TYPE OF DEFECTS CODE

C - Cracks	P - Porosity	NF - Non-Fusion	LI - Linear Indication	S - Slag	LA - Lamination	OTHER - Specify

PC # S/N	ACC	REJ	Defect Code	Remarks
leg C -1	X		0	
13 welds	X		0	east side of column
7 welds	X		0	north side of column
11 welds	X		0	west side of column
7 welds	X		0	south side of column

PC # S/N	ACC	REJ	Defect Code	Remarks
Leg C 2				
11 welds	X		0	east side of column
7 welds	X		0	north side of column
11 welds	X		0	west side of column
7 welds	X		0	south side of column

Technician 

Print Name/Title Arturo Lozano

Asst. Technician

Print Name/Title

Witness

Page of

CONSOLIDATED ENGINEERING LABORATORIES

Form ID 021 Rev.0

Structural Steel Welding/NDE

Project Name: **2013 Bolt Replacement** | DSA File #:
CEL Project #: **1027917** | DSA Appl #:
Project Location: **1 La Avanzada Street, San Francisco, CA 94131** | LEA #:
Contractor: | OSHPD #:
Date: **08/13/2014** | Day: **Wednesday** | IR #: | Permit/Appl #: **NA**

Work at: ☐ Shop ☒ Jobsite **Type of work:** ☐ Structural Steel ☒ NDT

For shop inspections:
Shop Name:
Address:

Reported to (Name): **Terry** Company: **Sutro Towers**

NDE (UT-MT-PT) Performed: ☐ Ultrasonic ☒ Magnetic Particle ☐ PT
Exams on ☐ Complete ☐ Partial penetration ☒ Fillet welds

NDT testing was performed at: **4** connections with a total of **72** welds inspected with **0** rejectable indications.

Rejectable indications were detected at: **NA**

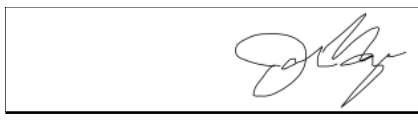
retests were performed on repaired welds and rejectable indications were detected.

Retest of repaired welds was performed at:

Piece No./Locations	NDE Type	Accept/ Reject	Repaired/ Reinspected	Status	Remarks
Column C	**MT**	**Accept**		**Complete**	**Column C Base 2 sides**
Column B	**MT**	**Accept**		**Complete**	**Column a,b,c. all on 4 sides**

This Work **Was** INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE **CITY** APPROVED DOCUMENTS
The Work Inspected **Met** THE REQUIREMENTS OF THE **CITY** APPROVED DOCUMENTS
Material Sampling **Was** PERFORMED IN ACCORDANCE WITH THE **CITY** APPROVED DOCUMENTS

CC: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector  Date **8/13/2014**

Print Name/Title **John Hyslop**

Certification #: **5057109**

CONSOLIDATED ENGINEERING LABORATORIES

Form ID 017 Rev.0

Structural Steel Welding

Project Name: **2013 Bolt Replacement** | DSA File #:
CEL Project #: **1027917** | DSA Appl #:
Project Location: **1 La Avanzada Street, San Francisco, CA 94131** | LEA #:
Contractor: | OSHPD #:
Date: **08/14/2014** Day: **Thursday** IR #: | Permit/Appl #: **NA**
Drawing No.: **NA** Detail No.: **NA** Other: **FEILD Repair**

Work at: ☐ Shop ☒ Jobsite **Type of work:** ☒ Structural Steel

For shop inspections:
Shop Name:
Address:
Reported to (Name): **Terry**
Company: **Sutro Tower**

Material Identification

☐ Collected ☐ Checked mill certificates Sampled:
Verified: ☒ Welder qualification ☐ Procedure qualification ☐ Weld procedure specification
Visually inspected the: ☐ In progress Welding performed by:
☒ Completed Qualified welders using: **SMAW**

SMAW ☒ Filler Metal Type(s) E **8018** SAW ☐ Filler Metal Type(s) E
FCAW ☐ Filler Metal Type(s) E GMAW ☐ Filler Metal Type(s) E
Other ☐ Fillet Metal Type(s) E ☐ Verified proper electrode storage.

Preheat temperature maintained ☒ at **NA** ☒ Maintained per WPS requirements
☐ Maintained per AWS D1.1

Weldments consisted of

☐ Groove welds ☐ Complete penetration ☐ Partial penetration ☐ Flare-bevel
Fillet welds: ☒ single-pass ☒ multi-pass ☐ Direct ☐ Indirect butt splice on reinforcing steel
☐ Other

For: ☒ Base plate ☐ Gusset plate ☐ Connection plate ☐ Moment plate ☐ Plate-to-plate Splices
☐ Stiffener plate ☐ Reinforcing steel ☐ Brackets ☐ Bent plate ☐ Beam to column connections
☒ Other: **Column to Base Plate**

at: ☐ Wide flange columns ☐ Wide flange beams ☐ Tube steel columns ☐ Tube steel beams ☐ Embeds
☐ Beam to column ☐ Girder to column ☐ Column to column splice ☐ Chord bar splices
☐ Diagonal brace to ☐ Angle to
☐ Studs to ☐ Other

Metal Deck/ Studs

Inspected on metal decking
☐ Arc spot welds ☐ Stitch welds ☐ Shear studs ☐ Button punch

CONSOLIDATED ENGINEERING LABORATORIES

Form ID 017 Rev.0

Structural Steel Welding

Report Summary

Refer to the attached: ☐ Field Inspection Record ☐ Member Completion Record ☐ Material Identification Record

Work inspected was: ☐ Completed ☐ In progress ☐ Pending approval ☐ W.I.P. punch list

☐ Non-compliance report was left with contractor

☐ Items were reinspected and ☐ Accepted ☐ Remain in progress

See the attached ☐ Punch list ☐ Non-compliance Item #

Issues/Problems? ○ **Yes** ◉ **No**

Notified: Company Name:

Notes/Comments

This Work **Was** INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE **CITY** APPROVED DOCUMENTS

The Work Inspected **Met** THE REQUIREMENTS OF THE **CITY** APPROVED DOCUMENTS

Material Sampling PERFORMED IN ACCORDANCE WITH THE APPROVED DOCUMENTS

CC: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector

Date **8/14/2014**

Print Name/Title **John Hyslop**

Certification #:

CONSOLIDATED ENGINEERING LABORATORIES

Form ID 020 Rev.0

Field Inspection Record

Project Name **2013 Bolt Replacement**

CEL Project # **1027917**

Project Location **1 La Avanzada Street, San Francisco, CA 94131**

Contractor

Date **08/14/2014** Day **Thursday** IR #

DSA File #

DSA Appl #

LEA #

OSHPD #

Permit/Appl # **NA**

☐ Field Inspection

Note: Use seperate line for each rejected weld. Upon reinspection, if weld is rejected, list weld as a new rejected weld.

Weld/Connection Type

CP Complete Penetration Groove Weld
PP Partial Penetration Groove Weld
FB Flare Bevel Groove Weld
FW Fillet Weld
AS Arc Spot Weld
SS Steel Stud
HSB High Strength SC Bolt
S Stitch Weld
BG Backgouge

Member/Joint Type

PC Plate to Column
PB Plate to Beam
PP Plate to Plate
BC Beam to Column
CC Column to Column
BB Beam to Beam
TA Tube Steel to Angle
TB Tube Steel to Beam
TS Tube Steel to Tube Steel
DD Deck to Deck
DB Deck to Beam
SD Stud to Beam/Deck
TB Tube Steel to Beam
GB Gusset Plate to Beam
GC Gusset to Column
PreC Precast Connections
MSF/D Metal Stud Framing/Drywall
RLS Rebar Lap Splice
IRS Indirect Rebar Splice
DRS Direct Rebar Splice

N.D.E.

VT Visual
UT Ultrasonic Testing
MT Magnetic Particle Testing
DT Dye Penetrant Testing
RT Radiographic Testing
TT Torque Testing

Level	Weld/ Connection Type	Member/ Joint Type	Locations	Visual	NDE Type	Accept/ Reject	Repaired/ Reinspected	Status	Remarks
1	**FW**	**P-P**	**Tower A, Column B**	**Yes**		**Accept**		**Comp**	**Column to Base Plate Repair**

Notes/ Comments:

This Work **Was** INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE **CITY** APPROVED DOCUMENTS

The Work Inspected **Met** THE REQUIREMENTS OF THE **CITY** APPROVED DOCUMENTS

CC: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector

Date **8/14/2014**

Print Name/Title **John Hyslop**

Certification #: **5057109**

CONSOLIDATED ENGINEERING
LABORATORIES

2001 Crow Canyon Road, Suite 100
San Ramon, CA 94583-5387
Tel. 925 314-7100 Fax. 925 855-7140
www.ce-labs.com

INSPECTION/TESTING REPORT

Date Of Issue: 8/18/2014

RE: 2013 Bolt Replacement
1 La Avanzada Street
San Francisco, CA 94131

Permit NA
CEL# 1027917

Inspection Date(s): 7/25/2014
Location: Jobsite
Report # 0725Field
Inspector(s): Juanita Barron

HIGH STRENGTH BOLTING (REPLACEMENT VERIFICATION)

On the above date, our representative inspected the referenced project.

Please refer to the attached report for details.

CC: **Enclosures (1)** **Reviewing Engineer: Chris Kavalaris, PE**

Tower Consulting, Inc. (ER)
Sutro Tower, Inc. (ER)
SGH, Inc. (ER)

CONSOLIDATED ENGINEERING LABORATORIES

Form ID 041 Rev.0

Special Inspection Report

Project Name	2013 Bolt Replacement	DSA File #	
CEL Project #	1027917	DSA Appl #	
Project Location	1 La Avanzada Street, San Francisco, CA 94131	LEA #	
Contractor	Tower King	OSHPD #	
Date	07/25/2014	Day	Friday	IR #		Permit/Appl #	NA

Type of Inspection:

☐ Engineered Fill	☐ Prestressed Concrete	☒ High Strength Bolting	☐ Concrete Placement/Sampling	☐ Reinforcing Steel Placement
☐ Foundation	☐ Shotcrete	☐ Rebar Sample/Tag/I.D.	☐ Material I.D.	☐ Anchor Bolts
☐ Batch Plant	☐ Masonry (Hollow)	☐ Masonry (Veneer)	☐ Anchor/Dowel Install	☐ Fireproofing
☐ Proofload	☐ Welding/Shop/Field	☐ NDE (UT/MT/PT)	☐	☐
☐ Verified WPS	☐	☐	☐	☐

Notes/ Comments:

Arrived on site as scheduled and met Terry Schradar with Tower King.
Observed (1) 1 1/4" dia. x 5 1/2" A490 HS bolt installed as replacement, turn of nut method with no match marking at level 3 bottom core of AC face at C leg. No mill certifications nor specifications available on site.

This Work [ ] INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY APPROVED DOCUMENTS

The Work Inspected [ ] THE REQUIREMENTS OF THE CITY APPROVED DOCUMENTS

Material Sampling N/A PERFORMED IN ACCORDANCE WITH THE CITY APPROVED DOCUMENTS

CC: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector: Signature 7/25/2014 8:54:49 AM.png Date 7/25/2014

Print Name/Title: Juanita Barron

Certification #: 8082585

CONSOLIDATED ENGINEERING
LABORATORIES

7/9/2014

Sutro Tower, Inc. (E)
Eric Dausman
1 La Avanzada Street
San Francisco, CA 94131

RE: **2013 Bolt Replacement**
1 La Avanzada Street
San Francisco, CA 94131

Inspection Date: **06/18/14**
Location: **Jobsite**
Inspector: **M. Haynes**
Report #: **0620Field**

CEL#: **1027917**

HIGH STRENGTH BOLTING INSPECTION REPORT

On the above date, our representative inspected the referenced project.

Please refer to the attached reports for details and locations of our testing and/or inspection services for the above noted date.

Work inspected was in compliance with approved plans and specifications.

REVIEWING ENGINEER: CHRIS KAVALARIS, R.C.E.

REGISTERED PROFESSIONAL ENGINEER
CHRIS N. KAVALARIS
No. C38179
Exp. 06/30/16
CIVIL
STATE OF CALIFORNIA

CC:
Sutro Tower, Inc. (E)
SGH, Inc. (E)
Tower Consulting, Inc. (E)

Enclosures (2)

Form ID 23 Rev.1

CONSOLIDATED ENGINEERING LABORATORIES

DSA FILE#	
DSA APPL#	
LEA#	
OSHPD#	
PERMIT/APPL#	

HIGH STRENGTH BOLTING

Project Name:	**2013 bolt replacement**
CEL Project#:	**1027917**
Project Location:	**1 La Avendaza st San Francisco ca**
Contractor:	

Testing/Inspection Date(s): 2014-06-18

Drawing No.: _____ Detail No.: _____ Other: _____

Work at: ☐ Shop ☒ Jobsite

For shop inspections:

Shop Name: _____

Address: _____

Material Identification:

☐ Collected ☐ Checked Mill Certificates

Sampled: _____

Reported to (Name): **Allen** Company: _____

☒ Verified the use of specified high strength bolts, nuts and washers

☐ Verified installation equipment and bolts using a Skidmore-Wilhelm tension measuring device ☒ Verified minimum required pretension

☐ Monitored installation and tightening of bolts using:

☐ Turn-of-the-nut ☐ Direct tension indicator washers ☐ Calibrated wrench ☐ Alternative design bolts

☐ Applied inspection torque with calibrated wrench of: ☐ A total of 10% or 2 per connection were tested

_____ ft.-lbs. to _____ " diameter high strength bolts.

_____ ft.-lbs. to _____ " diameter high strength bolts.

☐ Retest of loose bolts was satisfactory ☐ Loose bolts were identified and reported to the contractor

☐ Refer to the attached for HSB locations inspected ☐ With the exception of _____

Report Summary Refer to the attached: ☒ Field Inspection Record ☐ Member Completion Record ☐ Material Identification Record

Work inspected was ☐ Completed ☒ In progress ☐ Pending approval ☐ _____

Issues/Problems? ☒ No ☐ Yes, describe below Notified: _____ Company name: _____

Notes/ Comments: **1-5/8" & 1-1/8" A490 bolts**

The Work: ☒ WAS ☐ WAS NOT **INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE** ☐ DSA ☐ OSHPD ☒ CITY **APPROVED DOCUMENTS**

Material Sampling: ☒ WAS ☐ WAS NOT ☐ N/A **PERFORMED IN ACCORDANCE WITH THE** ☐ DSA ☐ OSHPD ☐ CITY **APPROVED DOCUMENTS**

The Work Inspected: ☐ MET ☐ DID NOT MEET **THE REQUIREMENTS OF THE** ☐ DSA ☐ OSHPD ☐ CITY **APPROVED DOCUMENTS**

CC: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector: _____ **Date:** 2014-06-18

Print Name/Title: _____

CERTIFICATION#: 5283250

Form ID 20 Rev.1

FIELD INSPECTION RECORD

CONSOLIDATED ENGINEERING LABORATORIES

DSA FILE#	
DSA APPL#	
LEA#	
OSHPD#	
PERMIT/APPL#	

Project Name:	2121 3rd st	Testing/Inspection Date(s):	2014-06-17
CEL Project#:	1027917		
Project Location:	2121 3rd Street San Francisco	Contractor:	

Weld/Connection Type

CP - Complete Penetration Groove Weld
PP - Partial Penetration Groove Weld
FB - Flare Bevel Groove Weld
FW - Fillet Weld
AS - Arc Spot Weld
SS - Steel Stud
HSB - High Strength SC Bolt
S - Stitch Weld
BG - Backgouge

Member/Joint Type

PC - Plate to Column
PB - Plate to Beam
PP - Plate to Plate
BC - Beam to Column
CC - Column to Column
BB - Beam to Beam
RLS - Rebar Lap Splice
TA - Tube Steel to Angle
TB - Tube Steel to Beam
TS - Tube Steel to Tube Steel
DD - Deck to Deck
DB - Deck to Beam
SD - Stud to Beam/Deck
IRS - Indirect Rebar Splice
PreC - Precast Connections
TB - Tube Steel to Beam
GB - Gusset Plate to Beam
GC - Gusset to Column
GB - Gusset Plate to Beam
MSF/D - Metal Stud Framing/Drywall
DRS - Direct Rebar Splice

N.D.E.

VT - Visual
UT - Ultrasonic Testing
MT - Magnetic Particle Testing
DT - Dye Penetrant Testing
RT - Radiographic Testing
TT - Torque Testing

☒ Field Inspection

Note: Use separate line for each rejected weld. Upon reinspection, if weld is rejected, list weld as a new rejected weld.

Floor/Level	Weld/ Connection Type	Member/ Joint Type	Locations	Visual	NDE Type	Acc/Rej	Repaired/ Reinspected	Status	Remarks
garage	Fw	Bent plat	Parking racks	Yes	Na		Na	In p	In progress

Notes/Comments:

The Work: ☒ WAS ☐ WAS NOT **INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE** ☐ DSA ☐ OSHPD ☒ CITY **APPROVED DOCUMENTS**

The Work Inspected: ☒ MET ☐ DID NOT MEET **THE REQUIREMENTS OF THE** ☐ DSA ☐ OSHPD ☒ CITY **APPROVED DOCUMENTS**

CC: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector: _____ **Date:** 2014-06-17

Print Name/Title: _____

CERTIFICATION#: 5283250

CONSOLIDATED ENGINEERING
LABORATORIES

2001 Crow Canyon Road, Suite 100
San Ramon, CA 94583-5387
Tel. 925 314-7100 Fax. 925 855-7140
www.ce-labs.com

INSPECTION/TESTING REPORT

Date Of Issue: 6/12/2014

RE: 2013 Bolt Replacement
1 La Avanzada Street
San Francisco, CA 94131

Permit NA
CEL# 1027917

Inspection Date(s): 6/2/2014
Location: Jobsite
Report # 0606Field
Inspector(s): Daniel Dorst

HIGH STRENGTH BOLTING

On the above date, our representative inspected the referenced project.

Please refer to the attached reports for details and locations of our inspection services for the above noted date.

Work inspected was in compliance with approved plans and specifications.

CC: **Enclosures (2)** **Reviewing Engineer: Dan Allopenna, PE**

Tower Consulting, Inc. (ER)
Sutro Tower, Inc. (ER)
SGH, Inc. (ER)

CONSOLIDATED ENGINEERING LABORATORIES

Form ID 023 Rev.0

High Strength Bolting

Project Name **2013 Bolt Replacement** | DSA File #
CEL Project # **1027917** | DSA Appl #
Project Location **1 La Avanzada Street, San Francisco, CA 94131** | LEA #
Contractor | OSHPD #
Date **06/02/2014** Day **Monday** | Permit/Appl # **NA**
Drawing No. | Detail No. | Other

Work at: ☐ Shop ☒ Jobsite

For shop inspections:
Shop Name:
Address:

Material Identification:
☐ Collected ☐ Checked Mill Certificates
Sampled:

Reported to (Name): **Steve Lemay** Company: **Tower King II**

☒ Verified the use of specified high strength bolts, nuts and washers

☐ Verified installation equipment and bolts using a Skidmore-Wilhelm tension measuring device ☒ Verified minimum required pretension

☒ Monitored installation and tightening of bolts using:

☒ Turn-of-the-nut ☐ Direct tension indicator washers ☐ Calibrated wrench ☐ Alternative design bolts

☐ Applied inspection torque with calibrated wrench of: ☐ A total of 10% or 2 per connection were tested

ft.-lbs. to in. diameter high strength bolts.
ft.-lbs. to in. diameter high strength bolts.

☐ Retest of loose bolts was satisfactory ☐ Loose bolts were identified and reported to the contractor

☒ Refer to the attached for HSB locations inspected ☐ With the exception of

Report Summary Refer to the attached: ☒ Field Inspection Record ☐ Member Completion Record ☐ Material Identification Record

Work inspected was ☒ Completed ☒ In progress ☐ Pending Approval ☐

Issues/Problems? ○ **Yes** ● **No** Notified: Company name:

Notes/ Comments: **Replacing corroded high strength bolts**

This Work **Was** INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE **CITY** APPROVED DOCUMENTS
The Work Inspected **Met** THE REQUIREMENTS OF THE **CITY** APPROVED DOCUMENTS
Material Sampling **N/A** PERFORMED IN ACCORDANCE WITH THE **CITY** APPROVED DOCUMENTS

CC: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector Signature 6/2/2014 9:32:03 PM.png Date **6/2/2014**

Print Name/Title **Daniel Dorst - Special Inspector**

Certification #: **ICC # 8214433**

CONSOLIDATED ENGINEERING LABORATORIES

Form ID 020 Rev.0

Field Inspection Record

Project Name **2013 Bolt Replacement**

CEL Project # **1027917**

Project Location **1 La Avanzada Street, San Francisco, CA 94131**

Contractor

Date **06/02/2014** Day **Monday**

DSA File #

DSA Appl #

LEA #

OSHPD #

Permit/Appl # **NA**

☒ Field Inspection

Note: Use seperate line for each rejected weld. Upon reinspection, if weld is rejected, list weld as a new rejected weld.

Weld/Connection Type

CP	Complete Penetration Groove Weld	HSB	High Strength SC Bolt
PP	Partial Penetration Groove Weld	S	Stitch Weld
FB	Flare Bevel Groove Weld	BG	Backgouge
FW	Fillet Weld		
AS	Arc Spot Weld		
SS	Steel Stud		

Member/Joint Type

PC	Plate to Column	TA	Tube Steel to Angle	TB	Tube Steel to Beam	RLS	Rebar Lap Splice
PB	Plate to Beam	TB	Tube Steel to Beam	GB	Gusset Plate to Beam	IRS	Indirect Rebar Splice
PP	Plate to Plate	TS	Tube Steel to Tube Steel	GC	Gusset to Column	DRS	Direct Rebar Splice
BC	Beam to Column	DD	Deck to Deck				
CC	Column to Column	DB	Deck to Beam				
BB	Beam to Beam	SD	Stud to Beam/Deck				
				PreC	Precast Connections		
				MSF/D	Metal Stud Framing/Drywall		

N.D.E.

VT	Visual
UT	Ultrasonic Testing
MT	Magnetic Particle Testing
DT	Dye Penetrant Testing
RT	Radiographic Testing
TT	Torque Testing

Level	Weld/ Connection Type	Member/ Joint Type	Locations	Visual	NDE Type	Accept/ Reject	Repaired/ Reinspected	Status	Remarks
2	HSB		Leg A - Leg B, bottom chord	Yes		Accept		complete	54-1"x3", 11-1"x2_3/4", 23-3/4"x2_3/4"
2	HSB		Leg A - Leg, middle chord	Yes		Accept		complete	17-3/4"x2_3/4"
2	HSB		Leg A - Leg, top chord	Yes		Accept		complete	7-3/4"x2_3/4", 4-1"x3", 7-1"x2_3/4"

Notes/ Comments:

This Work **Was** INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE **CITY** APPROVED DOCUMENTS

The Work Inspected **Met** THE REQUIREMENTS OF THE **CITY** APPROVED DOCUMENTS

CC: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector Signature 6/2/2014 9:54:41 PM.png Date **6/2/2014**

Print Name/Title **Daniel Dorst-Special Inspector**

Certification #: **ICC # 8214433**

CONSOLIDATED ENGINEERING
LABORATORIES

2001 Crow Canyon Road, Suite 100
San Ramon, CA 94583-5387
Tel. 925 314-7100 Fax. 925 855-7140
www.ce-labs.com

INSPECTION/TESTING REPORT

Date Of Issue: 5/21/2014

RE: 2013 Bolt Replacement
1 La Avanzada Street
San Francisco, CA 94131

Permit NA
CEL# 1027917

Inspection Date(s): 5/9/2014
Location: Jobsite
Report # 0509Field
Inspector(s): John Hornyak

HIGH STRENGTH BOLTING

On the above date, our representative inspected the referenced project.

Please refer to the attached reports for details and locations of our testing and/or inspection services for the above noted date.

Work inspected was in compliance with approved plans and specifications.

CC: **Enclosures (2)** **Reviewing Engineer: Chris Kavalaris, PE**

Tower Consulting, Inc. (ER)
Sutro Tower, Inc. (ER)
SGH, Inc. (ER)

CONSOLIDATED ENGINEERING LABORATORIES

Form ID 023 Rev.0

High Strength Bolting

Project Name **2013 Bolt Replacement**
CEL Project # **1027917**
Project Location **1 La Avanzada Street, San Francisco, CA 94131**
Contractor **TCI**
Date **05/09/2014** Day **Friday**

DSA File #
DSA Appl #
LEA #
OSHPD #
Permit/Appl # **NA**

Drawing No. Detail No. Other

Work at: ☐ Shop ☒ Jobsite

For shop inspections:
Shop Name:
Address:

Material Identification:
☐ Collected ☐ Checked Mill Certificates
Sampled:

Reported to (Name): Company:

☒ Verified the use of specified high strength bolts, nuts and washers

☐ Verified installation equipment and bolts using a Skidmore-Wilhelm tension measuring device ☐ Verified minimum required pretension

☒ Monitored installation and tightening of bolts using:

☒ Turn-of-the-nut ☐ Direct tension indicator washers ☐ Calibrated wrench ☐ Alternative design bolts

☐ Applied inspection torque with calibrated wrench of: ☐ A total of 10% or 2 per connection were tested

ft.-lbs. to **3/4"** in. diameter high strength bolts.
ft.-lbs. to in. diameter high strength bolts.

☐ Retest of loose bolts was satisfactory ☐ Loose bolts were identified and reported to the contractor

☒ Refer to the attached for HSB locations inspected ☐ With the exception of

Report Summary Refer to the attached: ☒ Field Inspection Record ☐ Member Completion Record ☐ Material Identification Record

Work inspected was ☒ Completed ☒ In progress ☐ Pending Approval ☐

Issues/Problems? ○ **Yes** ● **No** Notified: Company name:

Notes/ Comments:

This Work **Was** INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPROVED DOCUMENTS
The Work Inspected **Met** THE REQUIREMENTS OF THE APPROVED DOCUMENTS
Material Sampling PERFORMED IN ACCORDANCE WITH THE APPROVED DOCUMENTS

CC: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector

Date **5/9/2014**

Print Name/Title **John Hornyak**

Certification #: **1058866**

CONSOLIDATED ENGINEERING LABORATORIES

Form ID 020 Rev.0

Field Inspection Record

Project Name **2013 Bolt Replacement**

CEL Project # **1027917**

Project Location **1 La Avanzada Street, San Francisco, CA 94131**

Contractor **TCI**

Date **05/09/2014** Day **Friday**

DSA File #

DSA Appl #

LEA #

OSHPD #

Permit/Appl # **NA**

☒ Field Inspection

Note: Use seperate line for each rejected weld.
Upon reinspection, if weld is rejected, list weld as a new rejected weld.

Weld/Connection Type

CP	Complete Penetration Groove Weld	HSB	High Strength SC Bolt
PP	Partial Penetration Groove Weld	S	Stitch Weld
FB	Flare Bevel Groove Weld	BG	Backgouge
FW	Fillet Weld		
AS	Arc Spot Weld		
SS	Steel Stud		

Member/Joint Type

PC	Plate to Column	TA	Tube Steel to Angle	TB	Tube Steel to Beam
PB	Plate to Beam	TB	Tube Steel to Beam	GB	Gusset Plate to Beam
PP	Plate to Plate	TS	Tube Steel to Tube Steel	GC	Gusset to Column
BC	Beam to Column	DD	Deck to Deck		
CC	Column to Column	DB	Deck to Beam		
BB	Beam to Beam	SD	Stud to Beam/Deck		

RLS	Rebar Lap Splice
IRS	Indirect Rebar Splice
DRS	Direct Rebar Splice

PreC Precast Connections
MSF/D Metal Stud Framing/Drywall

N.D.E.

VT	Visual
UT	Ultrasonic Testing
MT	Magnetic Particle Testing
DT	Dye Penetrant Testing
RT	Radiographic Testing
TT	Torque Testing

Level	Weld/ Connection Type	Member/ Joint Type	Locations	Visual	NDE Type	Accept/ Reject	Repaired/ Reinspected	Status	Remarks
2ND	**HSB**	**BB/BC**		**Yes**	**N/A**	**Accept**			**Turn of the nut**

Notes/ Comments:

This Work **Was** INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPROVED DOCUMENTS

The Work Inspected **Met** THE REQUIREMENTS OF THE APPROVED DOCUMENTS

CC: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector

Date **5/9/2014**

Print Name/Title **John Hornyak**

Certification #: **1058866**

CONSOLIDATED ENGINEERING
LABORATORIES

2001 Crow Canyon Road, Suite 100
San Ramon, CA 94583-5387
Tel. 925 314-7100 Fax. 925 855-7140
www.ce-labs.com

INSPECTION/TESTING REPORT

Date Of Issue: 9/29/2014

RE: 2013 Bolt Replacement
1 La Avanzada Street
San Francisco, CA 94131

Permit NA
CEL# 1027917

Inspection Date(s): 9/22/2014
Location: Jobsite
Report # 0926Field
Inspector(s): Calvin Andersen

FIELD WELDING

On the above date, our representative inspected the referenced project.

Please refer to the attached reports for details and locations of our inspection services for the above noted date.

Work inspected was in compliance with approved plans and specifications.

CC: **Enclosures (3)** **Reviewing Engineer: Chris Kavalaris, PE**

Tower Consulting, Inc. (ER)
Sutro Tower, Inc. (ER)
SGH, Inc. (ER)

CONSOLIDATED ENGINEERING LABORATORIES

Form ID 017 Rev.0

Structural Steel Welding

Project Name: **2013 Bolt Replacement** | DSA File #:
CEL Project #: **1027917** | DSA Appl #:
Project Location: **1 La Avanzada Street, San Francisco, CA 94131** | LEA #:
Contractor: | OSHPD #:
Date: **09/22/2014** Day: **Monday** IR #: | Permit/Appl #: **NA**
Drawing No.: **D 2** Detail No.: **1** Other:

Work at: ☐ Shop ☒ Jobsite **Type of work:** ☒ Structural Steel

For shop inspections:
Shop Name:
Address:
Reported to (Name): **Steve**
Company: **tower king 11**

Material Identification

☐ Collected ☐ Checked mill certificates Sampled:
Verified: ☒ Welder qualification ☒ Procedure qualification ☐ Weld procedure specification
Visually inspected the: ☐ In progress Welding performed by: **1**
☒ Completed Qualified welders using: **stick**

SMAW ☒ Filler Metal Type(s) E **8018** SAW ☐ Filler Metal Type(s) E
FCAW ☐ Filler Metal Type(s) E GMAW ☐ Filler Metal Type(s) E
Other ☐ Fillet Metal Type(s) E ☐ Verified proper electrode storage.

Preheat temperature maintained ☐ at ☐ Maintained per WPS requirements
☐ Maintained per AWS D1.1

Weldments consisted of

☐ Groove welds ☐ Complete penetration ☐ Partial penetration ☐ Flare-bevel
Fillet welds: ☒ single-pass ☐ multi-pass ☐ Direct ☐ Indirect butt splice on reinforcing steel
☐ Other

For: ☐ Base plate ☐ Gusset plate ☒ Connection plate ☐ Moment plate ☐ Plate-to-plate Splices
☐ Stiffener plate ☐ Reinforcing steel ☐ Brackets ☐ Bent plate ☐ Beam to column connections
☐ Other:

at: ☒ Wide flange columns ☐ Wide flange beams ☐ Tube steel columns ☐ Tube steel beams ☐ Embeds
☐ Beam to column ☐ Girder to column ☐ Column to column splice ☐ Chord bar splices
☐ Diagonal brace to ☐ Angle to
☐ Studs to ☐ Other

Metal Deck/ Studs

Inspected on metal decking
☐ Arc spot welds ☐ Stitch welds ☐ Shear studs ☐ Button punch

CONSOLIDATED ENGINEERING LABORATORIES

Form ID 017 Rev.0

Structural Steel Welding

Report Summary

Refer to the attached: ☒ Field Inspection Record ☐ Member Completion Record ☐ Material Identification Record

Work inspected was: ☒ Completed ☐ In progress ☐ Pending approval ☐ W.I.P. punch list

☐ Non-compliance report was left with contractor

☐ Items were reinspected and ☐ Accepted ☐ Remain in progress

See the attached ☐ Punch list ☐ Non-compliance Item #

Issues/Problems? ○ **Yes** ◉ **No**

Notified: Company Name:

Notes/Comments

This Work **Was** INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE **CITY** APPROVED DOCUMENTS

The Work Inspected **Met** THE REQUIREMENTS OF THE **CITY** APPROVED DOCUMENTS

Material Sampling PERFORMED IN ACCORDANCE WITH THE APPROVED DOCUMENTS

CC: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector Signature 9/22/2014 12:06:36 PM.png Date **9/22/2014**

Print Name/Title **Calvin Andersen /Special inspeoctor**

Certification #: **5280698**

CONSOLIDATED ENGINEERING LABORATORIES

Form ID 020 Rev.0

Field Inspection Record

Project Name **2013 Bolt Replacement**

CEL Project # **1027917**

Project Location **1 La Avanzada Street, San Francisco, CA 94131**

Contractor **Tower King 11**

Date **09/22/2014** Day **Monday** IR #

DSA File #

DSA Appl #

LEA #

OSHPD #

Permit/Appl # **NA**

☐ Field Inspection

Note: Use seperate line for each rejected weld. Upon reinspection, if weld is rejected, list weld as a new rejected weld.

Weld/Connection Type

CP	Complete Penetration Groove Weld	HSB	High Strength SC Bolt
PP	Partial Penetration Groove Weld	S	Stitch Weld
FB	Flare Bevel Groove Weld	BG	Backgouge
FW	Fillet Weld		
AS	Arc Spot Weld		
SS	Steel Stud		

Member/Joint Type

PC	Plate to Column	TA	Tube Steel to Angle	TB	Tube Steel to Beam	RLS	Rebar Lap Splice
PB	Plate to Beam	TB	Tube Steel to Beam	GB	Gusset Plate to Beam	IRS	Indirect Rebar Splice
PP	Plate to Plate	TS	Tube Steel to Tube Steel	GC	Gusset to Column	DRS	Direct Rebar Splice
BC	Beam to Column	DD	Deck to Deck				
CC	Column to Column	DB	Deck to Beam				
BB	Beam to Beam	SD	Stud to Beam/Deck				
				PreC	Precast Connections		
				MSF/D	Metal Stud Framing/Drywall		

N.D.E.

VT	Visual
UT	Ultrasonic Testing
MT	Magnetic Particle Testing
DT	Dye Penetrant Testing
RT	Radiographic Testing
TT	Torque Testing

Level	Weld/ Connection Type	Member/ Joint Type	Locations	Visual	NDE Type	Accept/ Reject	Repaired/ Reinspected	Status	Remarks
2	**FW**	**PC**	**Column B 30 ft below level 2**	**Yes**	**N/A**	**Accept**		**comp**	**1. plate. 5/16. weld**

Notes/ Comments: **Welder Marcus Goffena 7783**

This Work **Was** INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE **CITY** APPROVED DOCUMENTS

The Work Inspected **Met** THE REQUIREMENTS OF THE **CITY** APPROVED DOCUMENTS

CC: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector Signature 9/22/2014 12:11:47 PM.png Date **9/22/2014**

Print Name/Title **Calvin Andersen**

Certification #: **5280698**

CONSOLIDATED ENGINEERING
LABORATORIES

8/25/2014

Sutro Tower, Inc. (E)
Eric Dausman
1 La Avanzada Street
San Francisco, CA 94131

RE:	**2013 Bolt Replacement** **1 La Avanzada Street** **San Francisco, CA 94131**	**Inspection Date:** **Location:** **Inspector:** **Report #:**	**08/12/14** **Jobsite** **J. Sigmon** **0815FieldA**

CEL#: 1027917

NDE (MT) INSPECTION REPORT

On the above date, our representative inspected the referenced project.

Please refer to the attached report for details and locations of our testing and/or inspection services for the above noted date.

Note: One (1) MT reject at column web only at Leg A/column B (2 of 3). In progress.

Work final inspected was in compliance with approved plans and specifications except as noted.

REVIEWING ENGINEER: CHRIS KAVALARIS, R.C.E.

REGISTERED PROFESSIONAL ENGINEER
CHRIS N. KAVALARIS
No. C33179
Exp. 06/30/16
CIVIL
STATE OF CALIFORNIA

CC:
Sutro Tower, Inc. (E)
SGH, Inc. (E)
Tower Consulting, Inc. (E)

Enclosure (1)

Form ID 21 Rev.0

CONSOLIDATED ENGINEERING LABORATORIES

DSA FILE#	
DSA APPL#	
LEA#	
OSHPD#	
PERMIT/APPL#	

STRUCTURAL STEEL - WELDING/NDE

Project Name:	**2013 BOLT REPLACEMENT**
CEL Project#:	**1027917**
Project Location:	**1 LA AVANZADA STREET, SAN FRANCISCO**
Contractor:	

Testing/Inspection Date(s): 2014-08-12

Work at: ☐ Shop ☒ Jobsite **Type of work:** ☐ Structural Steel ☒ NDT

For shop inspections:

Shop Name: _____

Address: _____

Reported to (Name): **Terry/214-215-6631** Company: _____

NDE (UT-MT-PT) Performed: ☐ Ultrasonic ☒ Magnetic particle ☐ PT Exams on ☒ Complete ☐ Partial penetration ☐ Fillet welds

NDT testing was performed at: **18** connections with a total of **44** welds inspected with **1** rejectable indications.

Rejectable indications were detected at: _____

_____ retests were performed on repaired welds and _____ rejectable indications were detected.

Retest of repaired welds was performed at: _____

Piece No. / Locations	NDE Type	Acc/Rej	Repaired/ Reinspected	Status	Remarks
Leg A / Column B (1 of 3)	**MT**	**Accept**	**----------**	**Complete**	**C-BP & 4 gusset - 12 welds- 5 connection**
Leg A/ Column B (2 of 3)	**MT**	**Reject**		**In Progress**	**Column Web only**
Leg A/ Column B (3 of 3)	**MT**	**Accept**	**----------**	**Complete**	**2P-BP-20 welds - 4 and 4 connection**
Leg A/ Column B (2 of 3)	**Mt**	**Accept**		**In Progress**	**C-BP & 4 gusset - 11 welds ACC/ 1 REJ**
					5 connection

The Work: ☒ WAS ☐ WAS NOT **INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE** ☐ DSA ☐ OSHPD ☒ CITY **APPROVED DOCUMENTS**

The Work Inspected: ☒ MET ☐ DID NOT MEET **THE REQUIREMENTS OF THE** ☐ DSA ☐ OSHPD ☒ CITY **APPROVED DOCUMENTS**

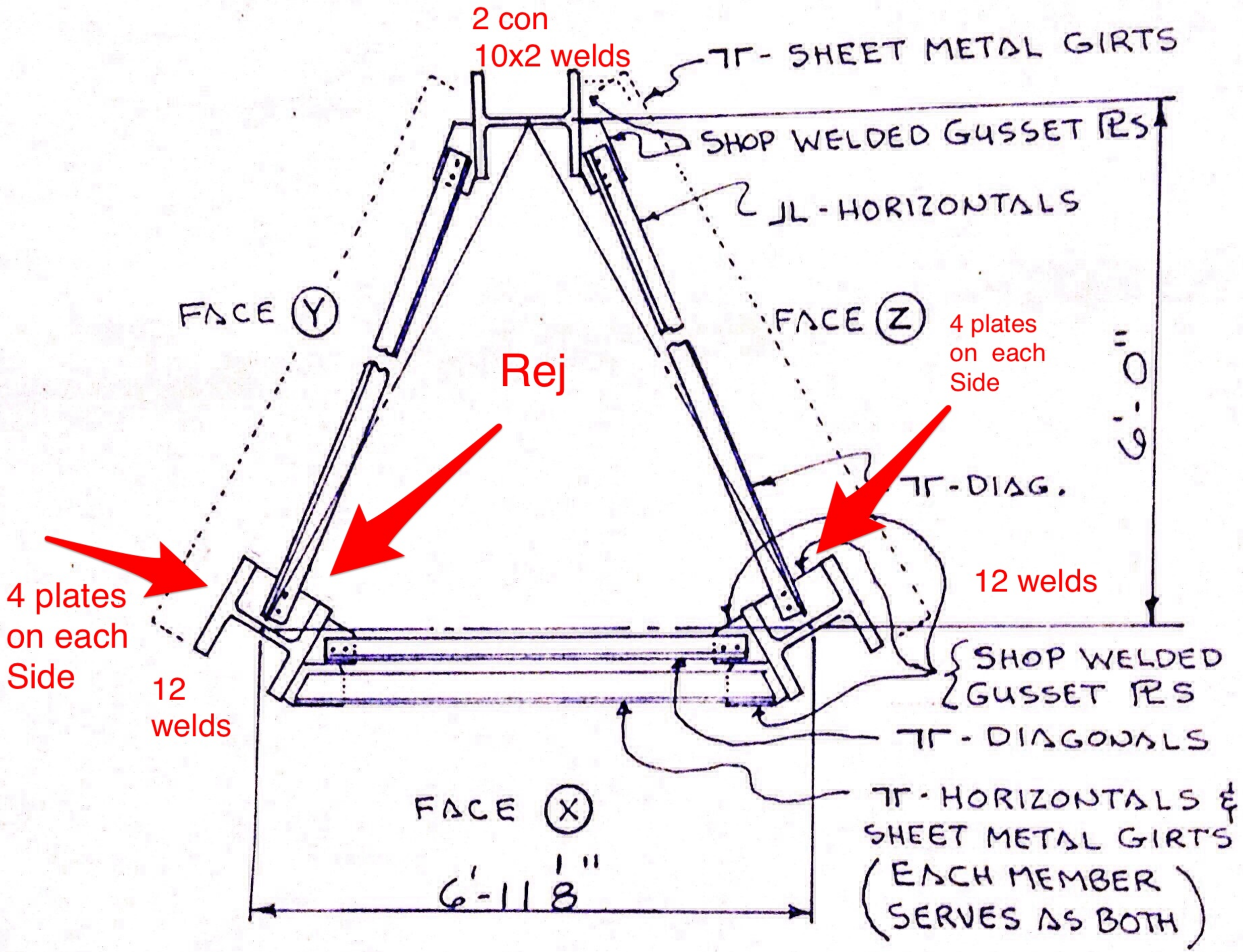
The Material Tested: ☒ MET ☐ DID NOT MEET **THE REQUIREMENTS OF THE** ☐ DSA ☐ OSHPD ☐ CITY **APPROVED DOCUMENTS**

CC: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector: _____ **Date:** 2014-08-12

Print Name/Title: Josefina Sigmon

CERTIFICATION#: _____



TYPICAL LEG DETAIL

Leg A/ Col B

LOAD TEST RESULTS
FOR STRANDS AND GUY WIRES

GUY TENSIONS DETERMINED BY THE DIRECT METHOD

977' SELF SUPPORTED TOWER, SAN FRANCISCO (SUTRO), CA

Date: 8-4-14 thru 8-12-14
Weather Conditions: Sunny, Calm, 65 degrees
T = Measured Tension at 65 degrees (kips)
Td = Design Tension at 65 degrees (kips)

Less than 5% out of tolerance is acceptable

STACK "A"

Guy Location	Guy Size	T (kips)	Td (kips)	% out of Tolerance
1A-AR	HPTG 130000	29.30	28.00	4.6
1A-AL	HPTG 130000	29.30	28.00	4.6
1A-BR	HPTG 130000	29.30	28.00	4.6
1A-BL	HPTG 130000	29.30	28.00	4.6
1A-CR	HPTG 130000	29.30	28.00	4.6
1A-CL	HPTG 130000	29.30	28.00	4.6
1A-DR	HPTG 130000	29.30	28.00	4.6
1A-DL	HPTG 130000	29.30	28.00	4.6
2A-AR	HPTG 130000	29.30	28.00	4.6
2A-AL	HPTG 130000	29.30	28.00	4.6
2A-BR	HPTG 130000	29.30	28.00	4.6
2A-BL	HPTG 130000	29.30	28.00	4.6
2A-CR	HPTG 130000	29.30	28.00	4.6
2A-CL	HPTG 130000	29.30	28.00	4.6
2A-DR	HPTG 130000	29.30	28.00	4.6
2A-DL	HPTG 130000	29.30	28.00	4.6
3A-AR	HPTG 130000	29.30	28.00	4.6
3A-AL	HPTG 130000	29.30	28.00	4.6
3A-BR	HPTG 130000	29.30	28.00	4.6
3A-BL	HPTG 130000	29.30	28.00	4.6
3A-CR	HPTG 130000	29.30	28.00	4.6
3A-CL	HPTG 130000	29.30	28.00	4.6
3A-DR	HPTG 130000	29.30	28.00	4.6
3A-DL	HPTG 130000	29.30	28.00	4.6

19711 64th Ave. W, Suite A
Lynnwood, WA 98036
425-778-5169 FAX 425-778-5103

977' SELF SUPPORTED TOWER
SAN FRANCISCO, CA
SUTRO

Sheet No.	**A-1**
Project No.	14.082.001
Date :	
Scale:	None

GUY TENSIONS DETERMINED BY THE DIRECT METHOD

977' SELF SUPPORTED TOWER, SAN FRANCISCO (SUTRO), CA

Date: 8-4-14 thru 8-12-14
Weather Conditions: Sunny, Calm, 65 degrees
T = Measured Tension at 65 degrees (kips)
Td = Design Tension at 65 degrees (kips)

Less than 5% out of tolerance is acceptable

STACK "B"				
Guy Location	Guy Size	T (kips)	Td (kips)	% out of tolerance
1B-AR	HPTG 130000	29.30	28.00	4.6
1B-AL	HPTG 130000	29.30	28.00	4.6
1B-BR	HPTG 130000	29.30	28.00	4.6
1B-BL	HPTG 130000	29.30	28.00	4.6
1B-CR	HPTG 130000	29.30	28.00	4.6
1B-CL	HPTG 130000	29.30	28.00	4.6
1B-DR	HPTG 130000	29.30	28.00	4.6
1B-DL	HPTG 130000	29.30	28.00	4.6
2B-AR	HPTG 130000	29.30	28.00	4.6
2B-AL	HPTG 130000	29.30	28.00	4.6
2B-BR	HPTG 130000	29.30	28.00	4.6
2B-BL	HPTG 130000	29.30	28.00	4.6
2B-CR	HPTG 130000	29.30	28.00	4.6
2B-CL	HPTG 130000	29.30	28.00	4.6
2B-DR	HPTG 130000	29.30	28.00	4.6
2B-DL	HPTG 130000	29.30	28.00	4.6
3B-AR	HPTG 160000	37.60	36.00	4.4
3B-AL	HPTG 160000	37.60	36.00	4.4
3B-BR	HPTG 160000	37.60	36.00	4.4
3B-BL	HPTG 160000	37.60	36.00	4.4
3B-CR	HPTG 160000	37.60	36.00	4.4
3B-CL	HPTG 160000	37.60	36.00	4.4
3B-DR	HPTG 160000	37.60	36.00	4.4
3B-DL	HPTG 160000	37.60	36.00	4.4
4B-AR	HPTG 130000	29.30	28.00	4.6
4B-AL	HPTG 130000	29.30	28.00	4.6
4B-BR	HPTG 130000	29.30	28.00	4.6
4B-BL	HPTG 130000	29.30	28.00	4.6
4B-CR	HPTG 130000	29.30	28.00	4.6
4B-CL	HPTG 130000	29.30	28.00	4.6
4B-DR	HPTG 130000	29.30	28.00	4.6
4B-DL	HPTG 130000	29.30	28.00	4.6

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977' SELF SUPPORTED TOWER
SAN FRANCISCO, CA
SUTRO

Sheet No.	**A-2**
Project No.	14.082.001
Date :	
Scale:	None

GUY TENSIONS DETERMINED BY THE DIRECT METHOD

977' SELF SUPPORTED TOWER, SAN FRANCISCO (SUTRO), CA

Date: 8-4-14 thru 8-12-14
Weather Conditions: Sunny, Calm, 65 degrees
T = Measured Tension at 65 degrees (kips)
Td = Design Tension at 65 degrees (kips)

Less than 5% out of tolerance is acceptable

STACK "C"

Guy Location	Guy Size	T (kips)	Td (kips)	% out of Tolerance
1C-AR	HPTG 130000	29.30	28.00	4.6
1C-AL	HPTG 130000	29.30	28.00	4.6
1C-BR	HPTG 130000	29.30	28.00	4.6
1C-BL	HPTG 130000	29.30	28.00	4.6
1C-CR	HPTG 130000	29.30	28.00	4.6
1C-CL	HPTG 130000	29.30	28.00	4.6
1C-DR	HPTG 130000	29.30	28.00	4.6
1C-DL	HPTG 130000	29.30	28.00	4.6
2C-AR	HPTG 130000	29.30	28.00	4.6
2C-AL	HPTG 130000	29.30	28.00	4.6
2C-BR	HPTG 130000	29.30	28.00	4.6
2C-BL	HPTG 130000	29.30	28.00	4.6
2C-CR	HPTG 130000	29.30	28.00	4.6
2C-CL	HPTG 130000	29.30	28.00	4.6
2C-DR	HPTG 130000	29.30	28.00	4.6
2C-DL	HPTG 130000	29.30	28.00	4.6
3C-AR	HPTG 130000	29.30	28.00	4.6
3C-AL	HPTG 130000	29.30	28.00	4.6
3C-BR	HPTG 130000	29.30	28.00	4.6
3C-BL	HPTG 130000	29.30	28.00	4.6
3C-CR	HPTG 130000	29.30	28.00	4.6
3C-CL	HPTG 130000	29.30	28.00	4.6
3C-DR	HPTG 130000	29.30	28.00	4.6
3C-DL	HPTG 130000	29.30	28.00	4.6

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977' SELF SUPPORTED TOWER
SAN FRANCISCO, CA
SUTRO

Sheet No.	**A-3**
Project No.	14.082.001
Date :	
Scale:	None

MAIN GUY TENSIONS DETERMINED BY THE DIRECT METHOD

977' SELF SUPPORTED TOWER, SAN FRANCISCO (SUTRO), CA

Date: 8-4-14 thru 8-12-14
Weather Conditions: Sunny, Calm, 65 degrees
T = Measured Tension at 65 degrees (kips)
Td = Design Tension at 65 degrees (kips)

Less than 5% out of tolerance is acceptable

LEVEL 1				
Guy Location	Guy Size	T (kips)	Td (kips)	% out of Tolerance
A-B INNER	3" BS	270.02	270.00	0.0
A-B OUTER	3" BS	270.02	270.00	0.0
A-C INNER	3" BS	259.86	270.00	-3.8
A-C OUTER	3" BS	267.99	270.00	-0.7
B-A INNER	3" BS	270.02	270.00	0.0
B-A OUTER	3" BS	270.02	270.00	0.0
B-C INNER	3" BS	267.99	270.00	-0.7
B-C OUTER	3" BS	263.93	270.00	-2.2
C-A INNER	3" BS	259.86	270.00	-3.8
C-A OUTER	3" BS	267.99	270.00	-0.7
C-B INNER	3" BS	267.99	270.00	-0.7
C-B OUTER	3" BS	263.93	270.00	-2.2
LEVEL 2				
Guy Location	Guy Size	T (kips)	Td (kips)	% out of Tolerance
A-B INNER	3" BS	263.93	270.00	-2.2
A-B OUTER	3" BS	267.99	270.00	-0.7
A-C INNER	3" BS	270.02	270.00	0.0
A-C OUTER	3" BS	267.99	270.00	-0.7
B-A INNER	3" BS	263.93	270.00	-2.2
B-A OUTER	3" BS	267.99	270.00	-0.7
B-C INNER	3" BS	263.93	270.00	-2.2
B-C OUTER	3" BS	267.99	270.00	-0.7
C-A INNER	3" BS	270.02	270.00	0.0
C-A OUTER	3" BS	267.99	270.00	-0.7
C-B INNER	3" BS	263.93	270.00	-2.2
C-B OUTER	3" BS	267.99	270.00	-0.7

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977' SELF SUPPORTED TOWER
SAN FRANCISCO, CA
SUTRO

Sheet No.	**A-4**
Project No.	14.082.001
Date :	
Scale:	None

MAIN GUY TENSIONS DETERMINED BY THE DIRECT METHOD

977' SELF SUPPORTED TOWER, SAN FRANCISCO (SUTRO), CA

Date: 8-4-14 thru 8-12-14
Weather Conditions: Sunny, Calm, 65 degrees
T = Measured Tension at 65 degrees (kips)
Td = Design Tension at 65 degrees (kips)

Less than 5% out of tolerance is acceptable

LEVEL 3				
Guy Location	Guy Size	T (kips)	Td (kips)	% out of Tolerance
A-B INNER	2.5" BS	188.81	190.00	-0.6
A-B OUTER	2.5" BS	188.81	190.00	-0.6
A-C INNER	2.5" BS	186.78	190.00	-1.7
A-C OUTER	2.5" BS	190.84	190.00	0.4
B-A INNER	2.5" BS	188.81	190.00	-0.6
B-A OUTER	2.5" BS	188.81	190.00	-0.6
B-C INNER	2.5" BS	190.84	190.00	0.4
B-C OUTER	2.5" BS	184.75	190.00	-2.8
C-A INNER	2.5" BS	190.84	190.00	0.4
C-A OUTER	2.5" BS	190.84	190.00	0.4
C-B INNER	2.5" BS	190.84	190.00	0.4
C-B OUTER	2.5" BS	184.75	190.00	-2.8
LEVEL 4				
Guy Location	Guy Size	T (kips)	Td (kips)	% out of Tolerance
A-B INNER	2.5" BS	192.87	190.00	1.5
A-B OUTER	2.5" BS	190.84	190.00	0.4
A-C INNER	2.5" BS	190.84	190.00	0.4
A-C OUTER	2.5" BS	190.84	190.00	0.4
B-A INNER	2.5" BS	192.87	190.00	1.5
B-A OUTER	2.5" BS	190.84	190.00	0.4
B-C INNER	2.5" BS	188.81	190.00	-0.6
B-C OUTER	2.5" BS	188.81	190.00	-0.6
C-A INNER	2.5" BS	190.84	190.00	0.4
C-A OUTER	2.5" BS	190.84	190.00	0.4
C-B INNER	2.5" BS	188.81	190.00	-0.6
C-B OUTER	2.5" BS	188.81	190.00	-0.6

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977' SELF SUPPORTED TOWER
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SUTRO

Sheet No.	**A-5**
Project No.	14.082.001
Date :	
Scale:	None

MAIN GUY TENSIONS DETERMINED BY THE DIRECT METHOD

977' SELF SUPPORTED TOWER, SAN FRANCISCO (SUTRO), CA

Date: 8-4-14 thru 8-12-14
Weather Conditions: Sunny, Calm, 65 degrees
T = Measured Tension at 65 degrees (kips)
Td = Design Tension at 65 degrees (kips)

Less than 5% out of tolerance is acceptable

LEVEL 5				
Guy Location	Guy Size	T (kips)	Td (kips)	% out of Tolerance
A-B INNER	1.5" BS	67.36	70.00	-3.8
A-B OUTER	1.5" BS	70.17	70.00	0.2
A-C INNER	1.5" BS	66.66	70.00	-4.8
A-C OUTER	1.5" BS	66.66	70.00	-4.8
B-A INNER	1.5" BS	67.36	70.00	-3.8
B-A OUTER	1.5" BS	70.17	70.00	0.2
B-C INNER	1.5" BS	67.36	70.00	-3.8
B-C OUTER	1.5" BS	67.36	70.00	-3.8
C-A INNER	1.5" BS	67.36	70.00	-3.8
C-A OUTER	1.5" BS	66.66	70.00	-4.8
C-B INNER	1.5" BS	66.66	70.00	-4.8
C-B OUTER	1.5" BS	67.36	70.00	-3.8

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977' SELF SUPPORTED TOWER
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Sheet No.	**A-6**
Project No.	14.082.001
Date :	
Scale:	None