

Wed Sep 11 08:57:52 1996 s3-v18b2 J:\PLOTS\QUEUES\18B2\ST501C.PRF

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## ABBREVIATIONS

AB	ANCHOR BOLT	MAX	MAXIMUM
ACI	AMERICAN CONCRETE INSTITUTE	MB	MACHINE BOLT
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION	MECH	MECHANICAL
APPROX	APPROXIMATE	MEZZ	MEZZANINE
ARCH	ARCHITECTURAL	MFR	MANUFACTURER
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	MIN	MINIMUM
AWS	AMERICAN WELDING SOCIETY	MISC	MISCELLANEOUS
		MPH	MILES PER HOUR
B/B	BACK TO BACK	NIC	NOT IN CONTRACT
BP	BASE PLATE	NS	NEAR SIDE
BM	BEAM	NTS	NOT TO SCALE
BOF	BOTTOM OF FOOTING		
BOS	BOTTOM OF STEEL	OC	ON CENTER
BRGD	BRACING	OD	OUTSIDE DIAMETER
BTE	BEAM TUBE ENCLOSURE	OH	OPPOSITE HAND
		OPNG	OPENING
C	CAMBER	OPP	OPPOSITE
CC OR C/C	CENTER TO CENTER	OTO	OUT TO OUT
CG	CENTER OF GRAVITY		
C/J	CONSTRUCTION JOINT	PCF	POUNDS PER CUBIC FOOT
CLG	CEILING	PL	PLATE
CLR	CLEAR	PSF	POUNDS PER SQUARE FOOT
CMU	CONCRETE MASONRY UNIT	PSI	POUNDS PER SQUARE INCH
COL	COLUMN	PT	POINT
CONC	CONCRETE		
CONT	CONTINUOUS	R	RADIUS
CU	CUBIC	RD	ROOF DRAIN
DET	DETAIL	REF	REFERENCE
DIAG	DIAGONAL	REFR	REINFORCING STEEL
DIM	DIMENSION	REQD	REQUIRED
DL	DEAD LOAD	REV	REVISE OR REVISION
DO	DITTO		
DWG	DRAWING	SCHED	SCHEDULE
DWE	DOWEL	SECT	SECTION
EA	EACH	SHT	SHEET
EF	EACH FACE	SIM	SIMILAR
EL	ELEVATION	SLV	SHORT LEG VERTICAL
ENCL	ENCLOSURE	SPA	SPACED
ENGR	ENGINEER	ST STL	STAINLESS STEEL
EQ	EQUAL	STD	STANDARD
EQUIP	EQUIPMENT	STIF	STIFFENER
ETC	ETCETERA	SYM	SYMMETRICAL
EW	EACH WAY		
EXIST	EXISTING	T&B	TOP AND BOTTOM
		THK	THICKNESS
FD	FLOOR DRAIN	TOC	TOP OF CONCRETE
FDN	FOUNDATION	TOP	TOP OF FOOTING
FIN	FINISH	TOS	TOP OF STEEL
FLR	FLOOR	TOW	TOP OF WALL
FLSHG	FLASHING	TYP	TYPICAL
FOC	FACE OF CONCRETE		
FRMG	FRAMING	UON	UNLESS OTHERWISE NOTED
FS	FAR SIDE		
FT	FOOT, FEET	VE	VACUUM EQUIPMENT
FTG	FOOTING	VERT	VERTICAL
		W/	WITH
GA	GAUGE	WP	WATER PROOF
GALV	GALVANIZED	WPP	WORKING POINT
GR	GRADE	WS	WELDED STUD
		WT	WEIGHT
HORIZ	HORIZONTAL	WTF	WELDED WIRE FABRIC
HP	HIGH POINT	WWM	WELDED WIRE MESH
HR	HANDRAIL		
HSB	HIGH STRENGTH BOLT		
ID	INSIDE DIAMETER		
IN	INCH		
INFO	INFORMATION		
INSUL	INSULATION		
JST	JOIST		
JT	JOINT		

## SYMBOLS

L	ANGLE	△	DELTA
C	CHANNEL	⊕	SQUARE FEET
PL	PLATE	#	NUMBER OF POUND
⊕	CENTER LINE	&	AND
∅	DIAMETER OF ROUND	@	AT
⊕	WORK POINT OR ELEV BENCH MARK		

  

	NUMBER FOR DETAILS		LETTER
	SHEET ON WHICH DETAIL OCCURS		SHEET ON WHICH SECTION OCCURS
	DETAIL		SECTION
	NUMBER FOR DETAIL		ROOM NUMBER
	LETTER FOR SECTION		REVISION
	REF		
	SHEET NUMBER		
	SHEET WHERE REFERENCED FROM		
	DET/SECT CROSS REF		

## GENERAL NOTES

### GENERAL

1. ALL WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE PROJECT SPECIFICATIONS.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS AFFECTING THE WORK AND SHALL NOTIFY THE CONSTRUCTION MANAGER OF ANY DISCREPANCY WITH THE INFORMATION SHOWN ON THE DRAWINGS PRIOR TO PROCEEDING WITH THE WORK.
3. FOR TOP OF CONCRETE SLAB FOR BEAM TUBE ENCLOSURE SEE CIVIL DRAWINGS.

### FOUNDATIONS AND SOILS

1. ALLOWABLE SOIL BEARING PRESSURE IS 2000 PSF ON FOOTINGS WITH A MINIMUM OF 2'-0" DEPTH. 1/3 INCREASE IN ALLOWABLE BEARING VALUES ARE PERMITTED FOR SHORT DURATION LOADINGS RESULTING FROM WIND OR SEISMIC.
2. FOUNDATION AND SOIL REQUIREMENTS ARE BASED ON SOIL REPORT BY WOODWARD CLYDE; REPORT NO. 93B107C DATED JANUARY, 1995.
3. REFER TO CIVIL DRAWINGS FOR BASE COURSE FOR SLABS AND FOUNDATIONS.

### CONCRETE

1. PORTLAND CEMENT SHALL BE TYPE I OR II CONFORMING TO ASTM C150.
2. CONCRETE SHALL BE NORMAL WEIGHT AND SHALL HAVE A COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
3. ALL STEEL REINFORCEMENT, ANCHOR BOLTS AND OTHER EMBEDDED ITEMS SHALL BE SECURED IN PLACE. CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER PRIOR TO CONCRETE PLACEMENT.
4. ALL CONCRETE MIX DESIGNS SHALL BE SUBMITTED TO THE CONSTRUCTION MANAGER FOR REVIEW 3 WEEKS PRIOR TO SCHEDULED CONCRETE PLACEMENT.
5. ALL EXPOSED EDGES SHALL BE CHAMFERED TO 3/8" UNLESS OTHERWISE NOTED ON THE DESIGN DRAWINGS.
6. CONTACT SURFACE AT CONSTRUCTION JOINTS WITHOUT A SHEAR KEY SHALL BE ROUGHENED TO A FULL AMPLITUDE OF 1/4" THROUGHOUT.
7. NO SAWCUTTING OF CONCRETE WALLS OR SLABS SHALL BE PERFORMED WITHOUT PRIOR WRITTEN APPROVAL FROM THE CONSTRUCTION MANAGER.
8. ANCHOR FOUNDATIONS AT VACUUM EQUIPMENT INTERFACES AT CORNER, MID AND END STATIONS SHALL BE CURED WITH MOISTURE CURING METHOD. SEE SPECIFICATION SECTION 03300, "CAST-IN PLACE CONCRETE".
9. SEE SPECIFICATION SECTION 7110 FOR UNDERSLAB WATERPROOFING OCCURRING AT BEAM TUBE TERMINATION SLABS.

### STEEL REINFORCEMENT FOR CONCRETE

1. STEEL REINFORCEMENT SHALL BE DEFORMED BARS CONFORMING TO ASTM A615, GRADE 60.
2. STEEL REINFORCEMENT SHALL HAVE THE FOLLOWING MINIMUM CONCRETE COVER UNLESS OTHERWISE NOTED:  
 CONCRETE CAST AGAINST EARTH ----- 3"  
 CONCRETE EXPOSED TO EARTH OR WEATHER: #6 BARS & LARGER ----- 2"  
 (INCLUDING VAPOR BARRIER) #5 BARS & SMALLER ----- 1 1/2"  
 CONCRETE NOT EXPOSED TO EARTH OR WEATHER: SLABS & WALLS ----- 2"
3. ALL CONCRETE STEEL REINFORCEMENT SHALL BE DETAILED, FABRICATED AND PLACED IN ACCORDANCE WITH ACI 318-89 AND ACI 315-80.
4. MINIMUM SPLICE LENGTH SHALL BE 2'-0".

### STRUCTURAL AND MISC METAL WORKS

1. STRUCTURAL AND MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36.
2. ALL WELDING AND ELECTRODES SHALL CONFORM TO THE REQUIREMENTS OF AWS D1.1 STRUCTURAL WELDING CODE.
3. FIELD WELDING SHALL BE PERFORMED BY CERTIFIED WELDERS AND CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER PRIOR TO WELDING.
4. ALL STRUCTURAL STEEL SHALL BE FABRICATED BY AN APPROVED FABRICATION SHOP.
5. CONTRACTOR SHALL SUBMIT STRUCTURAL AND MISCELLANEOUS METAL WORK SHOP DRAWINGS TO THE CONSTRUCTION MANAGER FOR REVIEW AND APPROVAL PRIOR TO START OF FABRICATION.
6. HEADED ANCHORS SHALL BE "WELSON" TYPE H4L OR S3L, FLUX FILLED, MADE FROM COLD DRAWN STEEL GRADES C-1010 THROUGH C-1020 PER ASTM A108 OR APPROVED EQUAL. ANCHORS SHALL BE WELDED PER THE MANUFACTURER'S SPECIFICATIONS.

### DESIGN LOADS - FOR THE BEAM TUBE ENCLOSURE

1. DEAD LOADS: ACTUAL LOAD
2. LIVE LOADS: SNOW LOADS --- 20 PSF
3. LATERAL LOADS: PER UBC 1994  
 A) SEISMIC LOADS: ZONE 2B  
 IMPORTANCE FACTOR 1.0  
 COEFFICIENT R<sub>w</sub> 4.0  
 B) WIND LOADS: BASIC WIND VELOCITY - 100 MPH  
 WIND EXPOSURE C  
 IMPORTANCE FACTOR 1.0
4. CONSTRUCTION LOADS:  
 A) HANDLING AND TRANSPORTATION LOADS INCLUDING IMPACT.  
 B) LOADS DUE TO FOUNDATION SLAB ALLOWABLE TOLERANCES - 1/2 INCH OF VERTICAL DISPLACEMENT BETWEEN OPPOSITE DIAGONAL ENDS OF SEGMENT BASE.
5. BEAM TUBE ENCLOSURE AND ACCESS DOORS SHALL BE CAPABLE OF STOPPING THE PENETRATION OF A STRAY BULLET WITH THE FOLLOWING PROPERTIES:  
 A) CALIBER ----- 308  
 B) WEIGHT ----- 180 GRAINS  
 C) VELOCITY AT IMPACT --- 2900 FEET PER SECOND  
 D) ENERGY AT IMPACT ----- 2800 FEET-POUNDS  
 E) MATERIAL ----- LEAD CORE, FULLY JACKETED WITH COOPER

## DRAWING INDEX

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LA-S-503	BEAM TUBE ENCLOSURE PLANS, SECTIONS & DETAILS
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LA-S-508	BEAM TUBE ENCLOSURE - CONCRETE SLAB & JOINT DETAILS

## MATERIALS LEGEND

	CONCRETE		WELDED WIRE FABRIC
	GRAVEL		EARTH
			STRUCTURAL BACKFILL

NO.	DATE	BY	CHKD	ENGR	PROJ	DESCRIPTION
C	9-10-96	MCS				BID ADDENDUM #2
B	6-14-96	MCS				FINAL DESIGN REVIEW
A	10-31-95	MCS				PRELIMINARY DESIGN REVIEW

DRAWN	MCS
CHECKED	
ENGINEER	
PROJ	

**PARSONS**  
 100 WEST WALNUT STREET  
 PASADENA, CALIFORNIA

**LIGO**  
 CALIFORNIA INSTITUTE OF TECHNOLOGY  
 MASSACHUSETTS INSTITUTE OF TECHNOLOGY

LASER INTERFEROMETER  
 GRAVITATIONAL-WAVE OBSERVATORY  
 BEAM TUBE ENCLOSURE - LIVINGSTON, LA

TITLE	SCALE	CONTRACT NUMBER	PROJECT NUMBER
STRUCTURAL BEAM TUBE ENCLOSURE GENERAL NOTES, ABBREVIATIONS & LEGEND	NONE	PP150969	8094
DRAWING NO.	SHEET NUMBER	NO. OF SHEETS	REVISIONS
	LA-S-501		