

Edl, Michele

From: Albert Barker [apb@idahowaters.com]
Sent: Wednesday, September 30, 2015 6:25 PM
To: Edl, Michele; dennis@rsicorp.net
Cc: Sue Estes
Subject: RE: Permit 63-9206 (Mora Drop Hydroelectric Facility)

18 MB for the engineering drawings. Probably too big.
Dennis can you send a CD to Michelle? Or I can.

Albert P. Barker
Barker Rosholt & Simpson LLP
1010 W Jefferson, Suite 102
Boise, Idaho 83702
(208) 336-0700

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From: Edl, Michele [<mailto:Michele.Edl@idwr.idaho.gov>]
Sent: Wednesday, September 30, 2015 6:18 PM
To: Sue Estes <sle@idahowaters.com>; dennis@rsicorp.net
Cc: Albert Barker <apb@idahowaters.com>
Subject: RE: Permit 63-9206 (Mora Drop Hydroelectric Facility)

Thank you, Sue Estes. I can open both files.

Mr. Dennis Daugherty, I did not receive engineering drawings that you tried to send via email on September 23. The size of the files may have exceeded the size of our email 'pipe'. I didn't receive any notice of a failed message. If you want to try again, please let me know when to expect them so we don't continue missed communications.
Or we could try another transfer method.

IDWR has an FTP site and I would be happy to work with you to use it.

You could provide them to the water right file on a CD.

Another idea?

Sincerely
Michele Edl

From: Sue Estes [<mailto:sle@idahowaters.com>]
Sent: Wednesday, September 30, 2015 5:13 PM
To: Edl, Michele
Cc: Barker, Albert (IWRB Member)
Subject: Permit 63-9206 (Mora Drop Hydroelectric Facility)

Attached is Albert Barker's letter with Exhibits A-G regarding the above matter. Let me know if you have difficulty opening either attachment.

Sue Estes
Assistant to Albert P. Barker

Barker Rosholt & Simpson LLP
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P.O. Box 2139
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MORA DROP HYDROELECTRIC PROJECT

RIVERSIDE INCORPORATED

FERC PROJECT NO. 3403

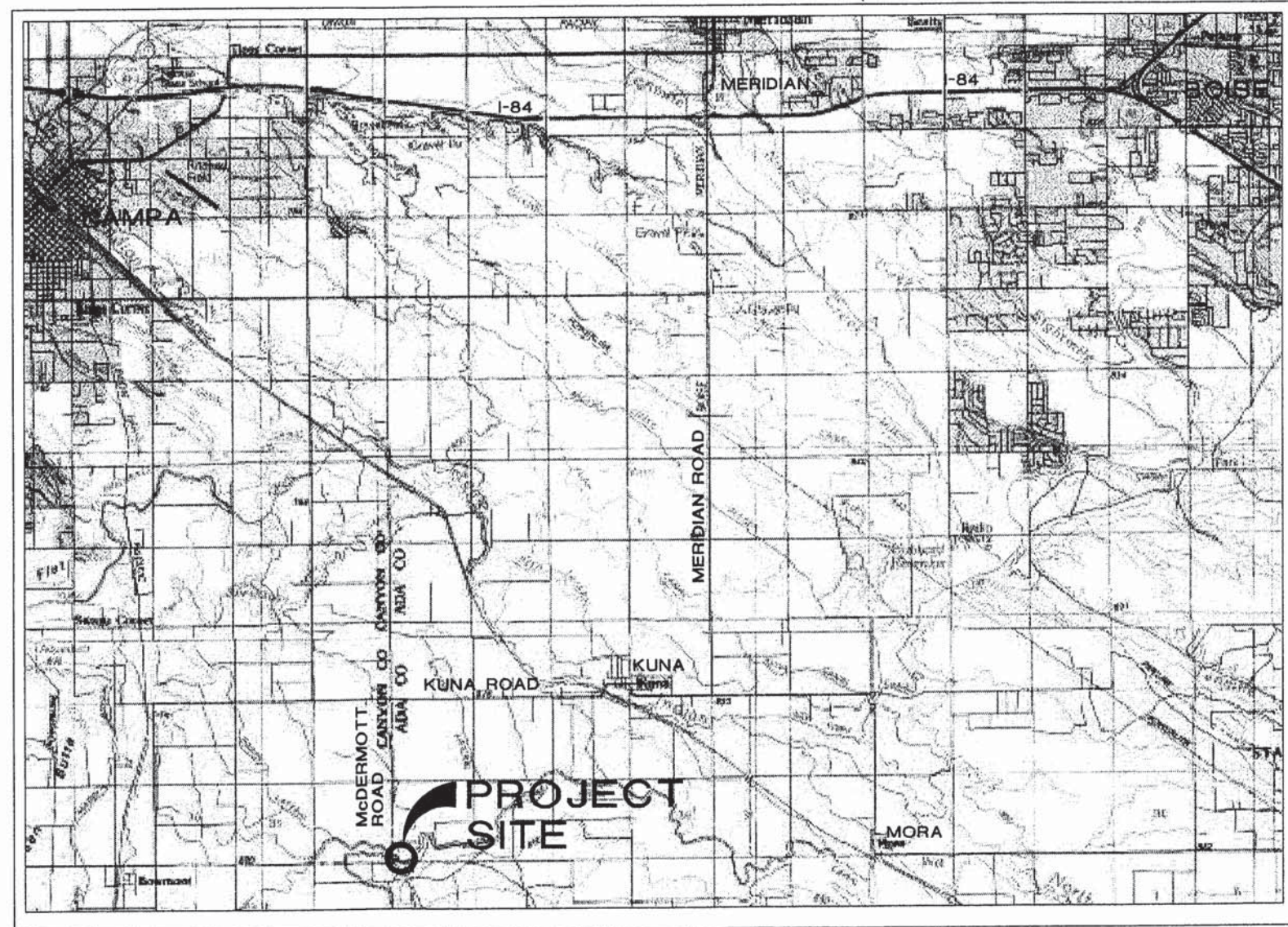
ISSUED FOR CONSTRUCTION JANUARY 30, 2006

AS-BUILT 2007

VICINITY MAP

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E-5	---	(ELECTRICAL SECTION NOT ISSUED)
E-6	---	(ELECTRICAL SECTION NOT ISSUED)
E-7	---	(ELECTRICAL SECTION NOT ISSUED)
E-8	---	(ELECTRICAL SECTION NOT ISSUED)



REV	DATE	DESCRIPTION	REVISIONS
E	SEPTEMBER 2005	SPB	AS-BUILT 2007
F		SUB	
C		TSS	
D		PACKER	

MORA DROP HYDROELECTRIC PROJECT
RIVERSIDE INCORPORATED
COVER SHEET, VICINITY MAP & INDEX TO SHEETS
FERC PROJECT NO. 3403



SORENSEN ENGINEERING
CONSULTING ENGINEERS
IDAHO FALLS, IDAHO
GRAPEVIEW, WASHINGTON

SCALE NOTED
DRAWING NO. D05-0720
SHEET NO. GA-1

THIS DRAWING SHEET HAS
BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY

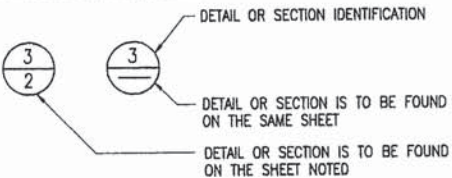
LEGEND

UTILITY POLE	
GATE OR FENCE POST	
SURVEY CONTROL POINT	
MONITORING WELL	
TELEPHONE PED.	
SURFACE WATER FLOW DIRECTION	
DRILL OR TEST HOLE	
SPOT ELEVATION (GRADING)	 x 181.0
STRUCTURE ELEVATION	 181.0
PROJECT BENCH MARK	
US BOR INSTRUMENTATION POINT	
SLOPE DIRECTION INDICATOR	

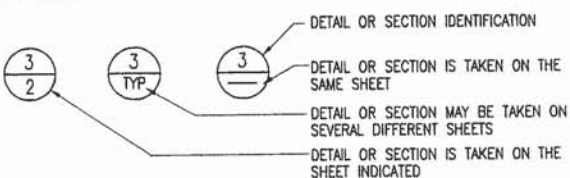
	FEATURE LINE
	HIDDEN FEATURE LINE
	SECTION LINE
	CENTERLINE
	EXISTING 5-FOOT CONTOUR
	EXISTING 1-FOOT CONTOUR
	FENCE LINE
	OVERHEAD POWER LINE

DETAIL & SECTION DESIGNATION

TYPICAL CALLOUT WHERE DETAIL OR SECTION IS TAKEN



TYPICAL CALLOUT WHERE DETAIL OR SECTION IS SHOWN



ABBREVIATIONS

AB	ANCHOR BOLT	INT	INTERIOR OR INTERSECTION
AC	ASPHALTIC CONCRETE	L	LENGTH
ADDL	ADDITIONAL	LB	POUND
AL	ALUMINUM	LF	LINEAL FEET
APPROX	APPROXIMATE	LG	LONG
BC	BOTTOM OF CURB OR BOLT CIRCLE	MATL	MATERIAL
BLDG	BUILDING	MAX	MAXIMUM
BM	BENCH MARK	MECH	MECHANICAL
BOT	BOTTOM	MFGR	MANUFACTURER
BVC	BEGIN VERTICAL CURVE	MH	MAN HOLE
C	CONDUIT	MIN	MINIMUM
CI	CAST IRON	MJ	MECHANICAL JOINT
CISP	CAST IRON SOIL PIPE	N	NORTH
CJ	CONSTRUCTION JOINT	NIC	NOT IN CONTRACT
CL	CENTERLINE	NO.	NUMBER
CLR	CLEAR	NTS	NOT TO SCALE
CMP	CORRIGATED METAL PIPE	OC	ON CENTER
CMU	CONCRETE MASONRY UNIT	OPNG	OPENING
CONC	CONCRETE	PC	POINT OF CURVE
CONN	CONNECT OR CONNECTION	PT	POINT OF TANGENT
CONST	CONSTRUCTION	PCF	POUNDS PER CUBIC FOOT
CONT	CONTINUATION	PEN	PENETRATION
CORP	CORPORATION	PE	PLAIN END
CPLG	COUPLINE	PERF	PERFORATED
CTR	CENTER	PI	POINT OF INTERSECTION
CU	CUBIC	PJF	PREMOLDED JOINT FILLER
CW	COLD WATER	PL	PLATE
CF	CUBIC FEET	PNL	PANEL
D	DRAIN	PRC	POINT OF REVERSE CURVE
DI	DUCTILE IRON	PRES	PRESSURE
DIMJ	DUCTILE IRON MECHANICAL JOINT	PSF	POUNDS PER SQUARE FOOT
DET	DETAIL	PUD	PUBLIC UTILITY DISTRICT
DIA	DIAMETER	PVC	POLYVINYL CHLORIDE
DIM	DIMENSION	RAD,R	RADIUS
DWG	DRAWING	RCP	REINFORCED CONCRETE PIPE
E	EAST	RD	ROAD
EA	EACH	REINF	REINFORCING
EF	EACH FACE	REM	REMOVE
EFF	EFFLUENT	REQD	REQUIRED
EG	EXISTING GRADE	RM	ROOM
EJ	EXPANSION JOINT	ROW	RIGHT OF WAY
ELB	ELBOW	SCH	SCHEDULE
ELEC	ELECTRICAL	SG	SUB GRADE
EQ	EQUAL	SH OR SHT	SHEET
EQUIP	EQUIPMENT	SIM	SIMILAR
EVC	END VERTICAL CURVE	SL OR S	SLOPE
EW	EACH WAY	SPEC	SPECIFICATION
EWEF	EACH WAY EACH FACE	SQ	SQUARE
EXP	EXPANSION OR EXPAND	SS	STAINLESS STEEL
EXIST	EXISTING	STA	STATION
EXT	EXTERIOR	STD	STANDARD
F	FLANGE	STL	STEEL
FCA	FLANGED COUPLING ADAPTER	SYM	SYMBOL
FF	FINISHED FLOOR	T	TANGENT
FG	FINAL GRADE	T&B	TOP & BOTTOM
FLEX	FLEXIBLE	TBD	TO BE DETERMINED
FL	FLOW LINE	TC	TOP OF CURVE
FLG	FLANGE	THK	THICK OR THICKNESS
FM	FORCE MAIN	THRU	THROUGH
FIN	FINISH	TYP	TYPICAL
FT	FOOT OR FEET	UD	UNDER DRAIN
FTG	FOOTING OR FITTING	VERT	VERTICAL
FUT	FUTURE	VPI	VERTICAL POINT OF INTERSECTION
GALV	GALVANIZED	W	WATER LINE
GD	GROUND	W/	WITH
HORIZ	HORIZONTAL	W/O	WITHOUT
HW	HOW WATER	WS	WELDED STEEL
IE	INVERT ELEVATION	WWF	WELDED WIRE FABRIC
INF	INFLUENT	WWM	WELDED WIRE MESH
INV	INVERT	YD	YARD

REVISIONS
AS-BUILT 2007

REV LTR
SEPTEMBER 2005
SPB
SJB
TSS
DOCKEY

MORA DROP HYDROELECTRIC PROJECT
RIVER SIDE INCORPORATED



SORENSEN ENGINEERING
CONSULTING ENGINEERS
IDAHO FALLS, IDAHO
GRAPEVIEW, WASHINGTON

SCALE
NOTED

DRAWING NO.
D05-0702
SHEET NO.
GA-2

THIS DRAWING SHEET HAS
BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY

GENERAL NOTES (UNLESS OTHERWISE SPECIFIED)

1.

ALL INSTRUCTIONS AND SPECIAL CONDITIONS CONTAINED IN THE "NOTICE TO PROCEED" AND THE CONSTRUCTION DETAILS SHOWN ON THIS PLAN SET SHALL BE STRICTLY ADHERED TO. ANY DEVIATIONS SHALL BE APPROVED IN WRITING BY RIVER SIDE INCORPORATED AND ITS PROJECT ENGINEER. UNAUTHORIZED CONSTRUCTION DEVIATIONS TO THESE PLANS WILL VOID ANY AND ALL ENGINEERS LIABILITY THAT MAY BE APPLICABLE WITH RESPECT TO OPERATION, FUNCTION AND PERSONNEL SAFETY.
2.

THE CONSTRUCTION METHODS AND MATERIALS SHALL MEET THE STANDARDS OF RIVER SIDE INCORPORATED, THE PROJECT ENGINEER AND AS SHOWN ON THESE PLANS AND SPECIFICATIONS. IN AREAS OF CONFLICT, THE DECISION OF THE ON-SITE PROJECT ENGINEER SHALL APPLY UNLESS OTHERWISE DIRECTED BY RIVER SIDE INCORPORATED.
3.

VERIFY THE EXACT LOCATION AND DEPTH OF UNDERGROUND FEATURES, POSSIBLE PIPELINES OR ELECTRICAL SERVICE AND WATERLINES TO IDENTIFY POSSIBLE AREAS OF CONFLICTS AND TO PREVENT DAMAGE TO SUCH UNDERGROUND UTILITIES. UNDERGROUND UTILITIES. THE ACTUAL LOCATIONS ARE TO BE VERIFIED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION ACTIVITIES.
4.

GRADE ALL DISTURBED OR CUT AND FILLED AREAS ON SITE, AFTER CONSTRUCTION, WITH A UNIFORM SLOPE THAT WILL DRAIN WITHOUT PONDING OR DAMAGE TO EITHER ON-SITE OR OFF-SITE PROPERTY IMPROVEMENTS. GRADE ALL DISTURBED OR CUT AND FILL AREAS ON THE EXISTING DAM EMBANKMENT TO MATCH THE EXISTING ADJOINING EMBANKMENT FINISHED GRADE SLOPE.
5.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AN AS-CONSTRUCTED DRAWING RECORD AS A CONDITION OF THE "PERMIT TO CONSTRUCT" FOR THIS PROJECT. THE ENGINEER SHALL PROVIDE ONE ADDITIONAL SET OF DRAWINGS TO THE CONTRACTOR FOR THIS PURPOSE. THE AS-CONSTRUCTED DRAWING RECORD SHALL INDICATE ALL CHANGES OR DEVIATIONS FROM THE ENGINEERS DESIGN AS SHOWN ON THESE PLANS. APPROVED CHANGES OF FITTINGS, APPURTENANCES, GRADES, STRUCTURE DEPTHS, STATIONING AND ALIGNMENT SHALL BE DULY NOTED ON THESE AS-CONSTRUCTED PLANS. THE CONTRACTOR SHALL MAINTAIN THE AS-CONSTRUCTED DRAWINGS AND THE DEVIATIONS OF CONSTRUCTION FROM THE APPROVED CONSTRUCTION DRAWINGS AS WELL AS ALL FIELD VERIFIED LOCATIONS AND DEPTHS OF ALL EXISTING UTILITIES ENCOUNTERED SHALL BE NOTED. THE AS-CONSTRUCTED DRAWINGS SHALL BE KEPT UP-TO-DATE AT ALL TIMES AND AVAILABLE FOR DAILY INSPECTIONS BY RIVER SIDE INCORPORATED PROJECT STAFF OR THE ON SITE PROJECT ENGINEER. AT THE COMPLETION OF CONSTRUCTION, THE AS-CONSTRUCTED DRAWINGS WILL BE RETURNED TO THE ENGINEER ALONG WITH A "STATEMENT OF COMPLETION IN ACCORDANCE WITH THE AS-CONSTRUCTED DRAWINGS".
6.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, SUPERVISING, AND COMPLYING WITH ALL APPLICABLE FEDERAL SAFETY AND HEALTH REGULATIONS AS DETERMINED BY THE STATE OF IDAHO REQUIREMENTS. THE CONTRACTOR SHALL BE REQUIRED TO COMPLY WITH ALL REGULATIONS AND REQUIREMENTS OF THE TOLEDO DISTRICT.
7.

SHOP DRAWINGS, INCLUDING SUPPLIERS MANUFACTURERS DRAWINGS, DATA SHEETS, CATALOG CUTS, BROCHURES OR OTHER PRINTED INFORMATION THAT CLEARLY DESCRIBES THE ITEM PROPOSED FOR USE AND ITS INSTALLATION CONFIGURATION SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND ACCEPTANCE FOR ALL SPECIFIED EQUIPMENT AND MATERIALS PRIOR TO SITE DELIVERY. THIS INCLUDES, BUT IS NOT LIMITED TO BUILDING AND CRANE SYSTEMS, CONTROLS, VALVES & PIPING ACCESSORIES, ELECTRICAL CONDUCTORS AND CONDUITS J-BOXES, AND MISCELLANEOUS MISCELLANEOUS HARDWARE.

NOTES (UNLESS OTHERWISE SPECIFIED)

- G1

SCOPE

THE NOTES & TABLES ON THIS SHEET ARE GENERAL AND APPLY TO THE ENTIRE PROJECT EXCEPT WHERE THERE ARE SPECIFIC INDICATIONS TO THE CONTRARY.
- G2

APPLICABLE SPECIFICATIONS AND CODES

CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE UNIFORM BUILDING CODE. THE ABOVE SHALL GOVERN EXCEPT WHERE OTHER APPLICABLE CODES OR THE FOLLOWING NOTES ARE MORE RESTRICTIVE.
- G3

ALTERNATIVE DESIGNS

THE STRUCTURAL SYSTEMS AND DETAILS ON THESE PLANS ARE THE PRIORITY DESIGN. ALTERNATIVE SYSTEMS AND DETAILS MAY BE USED IF THE CONTRACTOR SUBMITS PLANS WITH SUBSTANTIATING CALCULATIONS AND TEST DATA, AND IF THE ALTERNATIVE PLANS ARE ACCEPTED BY THE ENGINEER.
- G4

DIMENSIONS

STRUCTURAL DIMENSIONS CONTROLLED BY OR RELATED TO MECHANICAL OR ELECTRICAL EQUIPMENT SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
- G5

PROVISIONS FOR EQUIPMENT

MECHANICAL AND ELECTRICAL EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, RECESSES AND EMBEDMENTS NOT SHOWN ON THE STRUCTURAL DRAWINGS BUT REQUIRED BY OTHER CONTRACT DRAWINGS SHALL BE PROVIDED PRIOR TO CASTING CONCRETE.
- G6

CONSTRUCTION LOADS

STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL LOADS ON COMPLETED STURCTURES AFTER THEY HAVE BEEN PROPERLY CURED. DURING CONSTRUCTION THE STRUCTURES SHALL BE PROTECTED BY BRACING AND SHORING WHEREVER EXCESSIVE LOADS MAY OCCUR.
- G7

DRAINAGE SURFACES

SLOPE DRAINAGE SURFACES UNIFORMLY TO DRAIN. SLOPE SHALL BE 1/4" PER FOOT EXCEPT WHERE OTHERWISE NOTED OR SHOWN ON THE PLANS.
- G8

FLOOR DRAINS & FLOOR GRATES

SEE MECHANICAL DRAWINGS FOR SIZE AND TYPES.

ALUMINUM NOTES (UNLESS OTHERWISE SPECIFIED)

- A1

APPLICABLE CODE

ALUMINUM CONSTRUCTION SHALL CONFORM TO THE LATEST EDITION OF THE ALUMINUM CONSTRUCTION MANUAL OF THE ALUMINUM ASSOCIATION.
- A2

MATERIAL

UNLESS OTHERWISE SPECIFIED, STRUCTURAL ALUMINUM SHALL BE ALLOY 6061-T6 AS SPECIFIED IN ASTM B-308.
- A3

ALUMINUM IN CONTACT WITH CONCRETE

WHERE ALUMINUM IS IN CONTACT WITH CONCRETE OR MASONRY SURFACES, THE CONTACT SURFACES SHALL BE COATED WITH HEAVY ALKALI RESISTANT BITUMINOUS PAINT.

STRUCTURAL STEEL (UNLESS OTHERWISE SPECIFIED)

- S1

APPLICABLE CODE

STEEL CONSTRUCTION SHALL CONFORM TO THE SPECIFICATIONS AND STANDARDS PRESENTED IN THE LATEST EDITION OF AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION.
- S2

MATERIALS

ALL STRUCTURAL SHAPES, BARS, PLATES AND SHEETS INDICATED ON THE DRAWINGS SHALL BE CARBON STEEL MEETING THE REQUIREMENTS OF ASTM A36, ASTM A529 OR AS NOTED ON THE PLAN SHEETS.
- S3

WELDING

WELDING SHALL CONFORM TO THE AMERICAN WELD SOCIETY SPECIFICATIONS FOR STRUCTURAL WELDING. INSPECTION AND NON-DESTRUCTIVE TESTING OF WELDS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH ANSI/AWS B1.10-86, LATEST EDITION. THE WELDING AND NON-DESTRUCTIVE TESTING SYMBOLS ARE IN ACCORDANCE WITH THE AWS A2.4-79, LATEST REVISION.
- S4

ENCASED STEEL

STEEL COMPLETELY ENCASED IN CONCRETE SHALL NOT BE GALVANIZED OR PAINTED AND SHALL HAVE A RUST FREE CLEAN SURFACE FOR BONDING TO CONCRETE. GALVANIZED ANCHOR BOLTS MAY BE PLACED IN CONCRETE.
- S5

PAINTING

ALL STRUCTURAL STEEL SHALL BE PAINTED IN ACCORDANCE WITH THE SPECIFICATIONS OR AS NOTED ON THE FABRICATION DRAWING SHEETS.

SPECIFICATIONS (UNLESS OTHERWISE SPECIFIED)

(HDPE) PIPE. (HIGH DENSITY POLYETHYLENE)

THE HDPE PIPING AND FITTINGS SHALL BE HIGH DENSITY POLYETHYLENE PIPE CONFORMING TO THE REQUIREMENTS OF ASTM D 1248 TYPE III, CLASS C, CATEGORY 5, GRADE P34, 65 PSI SDR 26. ALL JOINTS SHALL BE FUSION WELDED. ALL COMPRESSION JOINTS (MECHANICAL JOINTS AND SADDLES) SHALL BE RATED FOR USAGE WITH CHLORINATED WATER. THE HDPE PIPE AND FITTINGS SHALL BE PLEXCO HDPE PIPE AS MANUFACTURED BY THE CHEVRON CHEMICAL COMPANY OR APPROVED EQUAL. CONTACT THE FAMILIAN INDUSTRIAL PLASTICS CORP., IN WASHOUGAL, WASHINGTON, (800) 634-5082 FOR SUPPLY SOURCE AND RENTAL OF FUSION EQUIPMENT REQUIRED.

EMBANKMENT REPAIR

THE PORTION OF THE EXISTING DAM EMBANKMENT AND/OR EXISTING NATIVE MATERIALS THAT WILL BE EXCAVATED FOR THE CONSTRUCTION OF FEATURES ASSOCIATED WITH THIS PROJECT SHALL BE REPLACED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS PREPARED FOR THIS PROJECT. BACKFILL MATERIALS SHALL BE PLACED IN ACCORDANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. EXCAVATION BELOW THE BOTTOM ELEVATIONS SHOWN ON THE PLAN SHEETS SHALL BE REPLACED WITH CLASS 2200 CONCRETE. THE REQUIRED COMPACTION IN PIPE ZONES SHALL BE 95% OF LABORATORY STANDARD MAXIMUM DENSITY IN ACCORDANCE WITH AASHTO T99, CLASS C1. BACKFILL IN THE PIPE ZONE SHALL BE PLACED IN 8-INCH MAXIMUM THICK LIFTS AND COMPACTED PRIOR TO THE PLACEMENT OF THE NEXT LIFT. COMPACTION ABOVE THE PIPE ZONE SHALL BE AS SHOWN ON THE PLAN SHEETS.

PRECAST CONCRETE

PRECAST CONCRETE MANHOLES AND CONCRETE STRUCTURES SHALL COMPLY WITH THE DETAILS SHOWN ON THE PLAN SHEETS AND BE IN ACCORDANCE WITH THE FOLLOWING: ALL PRECAST COMPONENTS SHALL CONFORM TO ASTM C478. MINIMUM WALL THICKNESS SHALL BE 5 INCHES. PROVIDE ECCENTRIC CONES UNLESS OTHERWISE SPECIFIED. WHERE CALLED FOR, MANHOLE STEPS SHALL BE THE "DROP CENTER SAFETY TYPE" AND CONSTRUCTED FROM 1/2-INCH DIAMETER REINFORCING REBAR AND COMPLETELY ENCASED IN CORROSION RESISTANT RUBBER AND HAVING A VERTICAL LOAD RESISTANCE OF NOT LESS THAN 400 POUNDS AND A PULLOUT RESISTANCE OF NOT LESS THAN 1000 POUNDS. THE STEPS SHALL BE AS MANUFACTURED BY THE OLIN TIRE AND RUBBER COMPANY OF OAKLAND, CALIFORNIA, OR APPROVED EQUAL. THE DISTANCE FROM THE CENTERLINE OF THE STEP TO THE ADJACENT WALL SHALL NOT BE LESS THAN 7-INCHES.

MORTAR AND GROUT MIX FOR PRECAST MANHOLE AND STRUCTURES CONSTRUCTION

MORTAR FOR MANHOLE CONSTRUCTION SHALL BE AS FOLLOWS: ONE PART PORTLAND CEMENT TO TWO PARTS OF CLEAN, WELL GRADED SAND WHICH WILL PASS THROUGH A 1/8-INCH SIEVE SCREEN. ADMIXTURES MAY BE USED NOT EXCEEDING THE FOLLOWING PERCENTAGES OF WEIGHT OF CEMENT: HYDRATED LIME, TEN PERCENT; DIATOMACEOUS EARTH, OR OTHER INERT MATERIALS, FIVE PERCENT. THE CONSISTENCY OF MORTAR SHALL BE SUCH THAT IT WILL READILY ADHERE TO THE CONCRETE SURFACES. MORTAR MIXED FOR LONGER THAN 30 MINUTES SHALL NOT BE USED.

EROSION CONTROL FABRIC

THE EROSION CONTROL FABRIC SHALL BE A BIODEGRADABLE NATURAL FIBER EROSION CONTROL FABRIC MANUFACTURED FROM UN-DYED AND UN-BLEACHED WOVEN JUTE MAT. THE MATERIAL SHALL HAVE A GRAB TENSILE OF 300 LBS/FT DRY AND 125 LBS/FT WET IN ACCORDANCE WITH ASTM D-4632. THE MATERIAL SHALL HAVE AN OPEN AREA OF 60 TO 65 PERCENT. THE MATERIAL SHALL BE ATTACHED TO THE COVERED SLOPE IN ACCORDANCE WITH THE SUPPLIER RECOMMENDATIONS. THE MATERIAL SHALL BE TOTALLY BIODEGRADEABLE WITHIN TWO YEARS. THE EROSION CONTROL FABRIC SHALL BE ANTI-WASH GEOJUTE AS MANUFACTURED BY BELTON INDUSTRIES, 8613 ROSWELL ROAD, ATLANTA, GA. 30350 (800) 225-4099 OR APPROVED EQUAL.

REVISEIONS

REV LTR

DATE

SEPTEMBER 2005

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ENGINEER

MORA DROP HYDROELECTRIC PROJECT

RIVER SIDE INCORPORATED

GENERAL NOTES AND SPECIFICATIONS

FERC PROJECT NO. 3403

REGISTERED PROFESSIONAL ENGINEER

15456

STATE OF IDAHO

NO. 15456

SORENSEN ENGINEERING

CONSULTING ENGINEERS

IDAHO FALLS, IDAHO

GRAPEVIEW, WASHINGTON

SCALE

NOTED

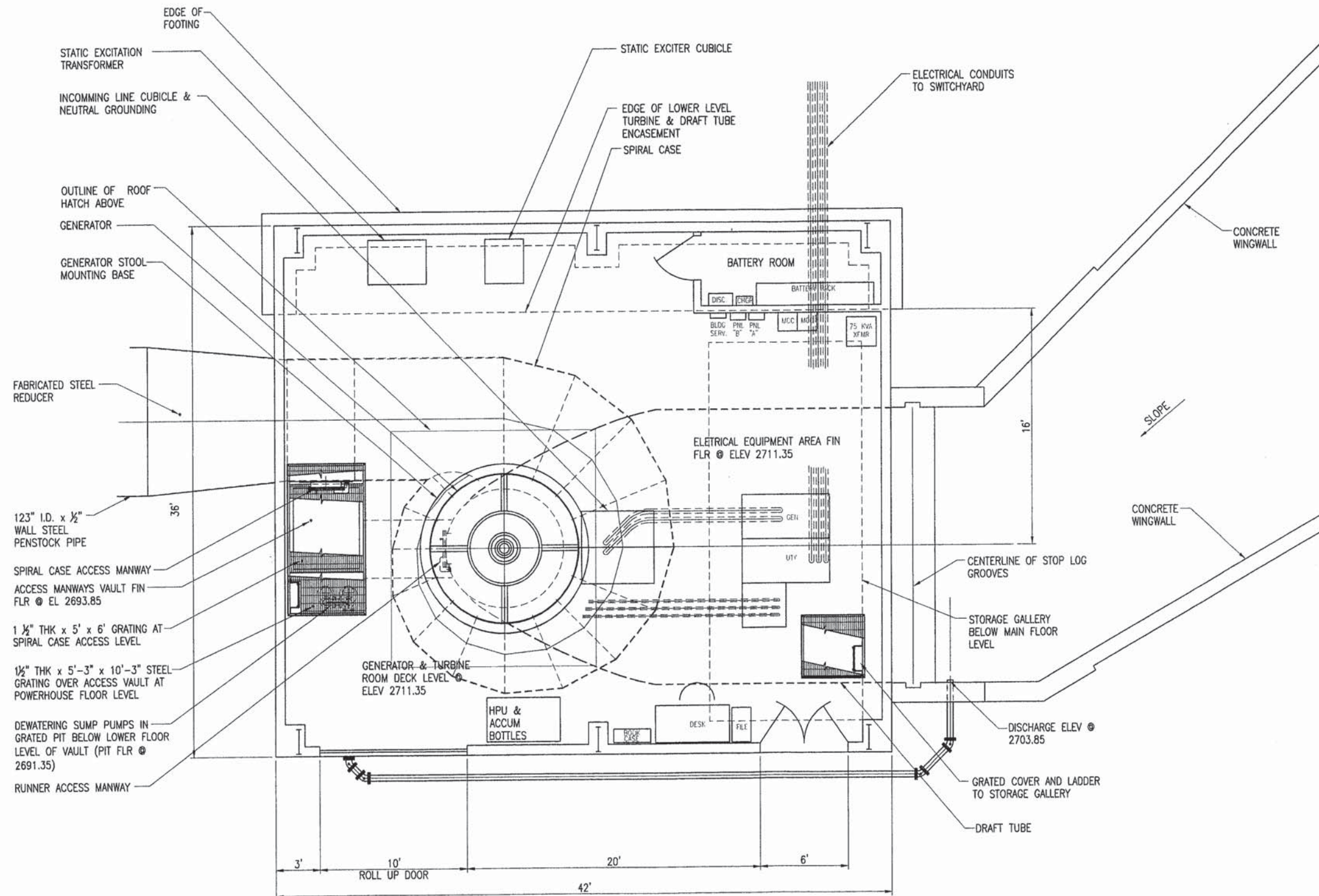
DRAWING NO.

D05-0720

SHEET NO.

GA-3

THIS DRAWING SHEET HAS BEEN REDUCED TO ONE-HALF SIZE--REDUCE SCALES ACCORDINGLY



POWERHOUSE ARCHITECTURAL
MAIN LEVEL PLAN
SCALE: 1/4" = 1'-0"

REVISIONS
REV. DATE
A JULY 2005

AS-BUILT 2007
SPB
SJB
TSS
DICKER

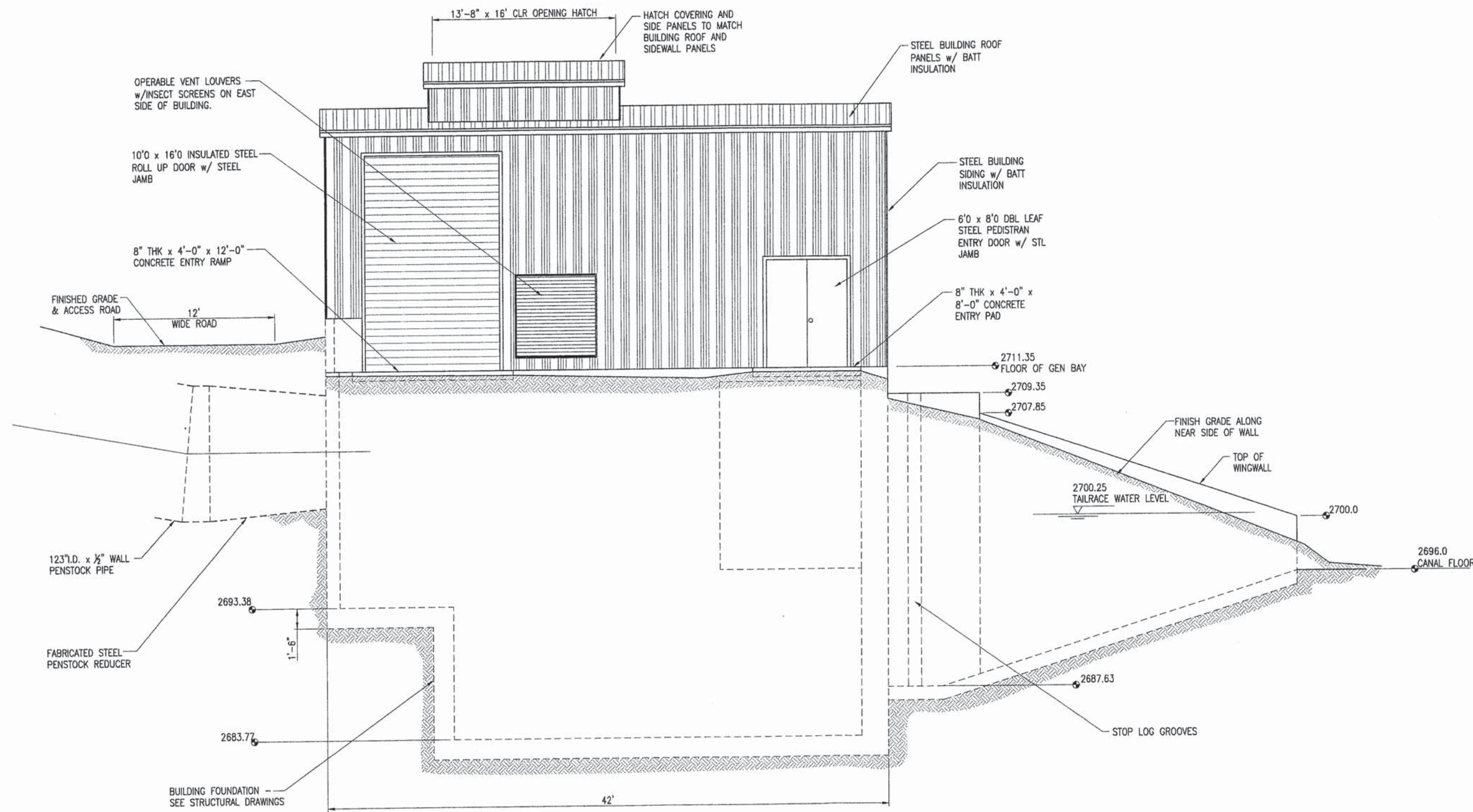
MORA DROP HYDROELECTRIC PROJECT
RIVER SIDE INCORPORATED
POWERHOUSE ARCHITECTURAL MAIN LEVEL PLAN
FERC PROJECT NO. 3403



SORENSEN ENGINEERING
CONSULTING ENGINEERS
IDAHO FALLS, IDAHO
GRAPEVIEW, WASHINGTON

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SIZE--REDUCE SCALES
ACCORDINGLY

DRAWING NO.
D05-0720
SHEET NO.
A-1



POWERHOUSE ARCHITECTURAL
EAST ELEVATION
SCALE: 1/4" = 1'-0"

REV		NOVEMBER, 2005		REVISIONS	
DATE	BY	DATE	BY	DATE	BY
A		A		AS-BUILT 2007	
SPB		SPB		SPB	
SUB		SUB		SUB	
TSS		TSS		TSS	
CHECKER		CHECKER		CHECKER	

MORA DROP HYDROELECTRIC PROJECT
RIVER SIDE INCORPORATED

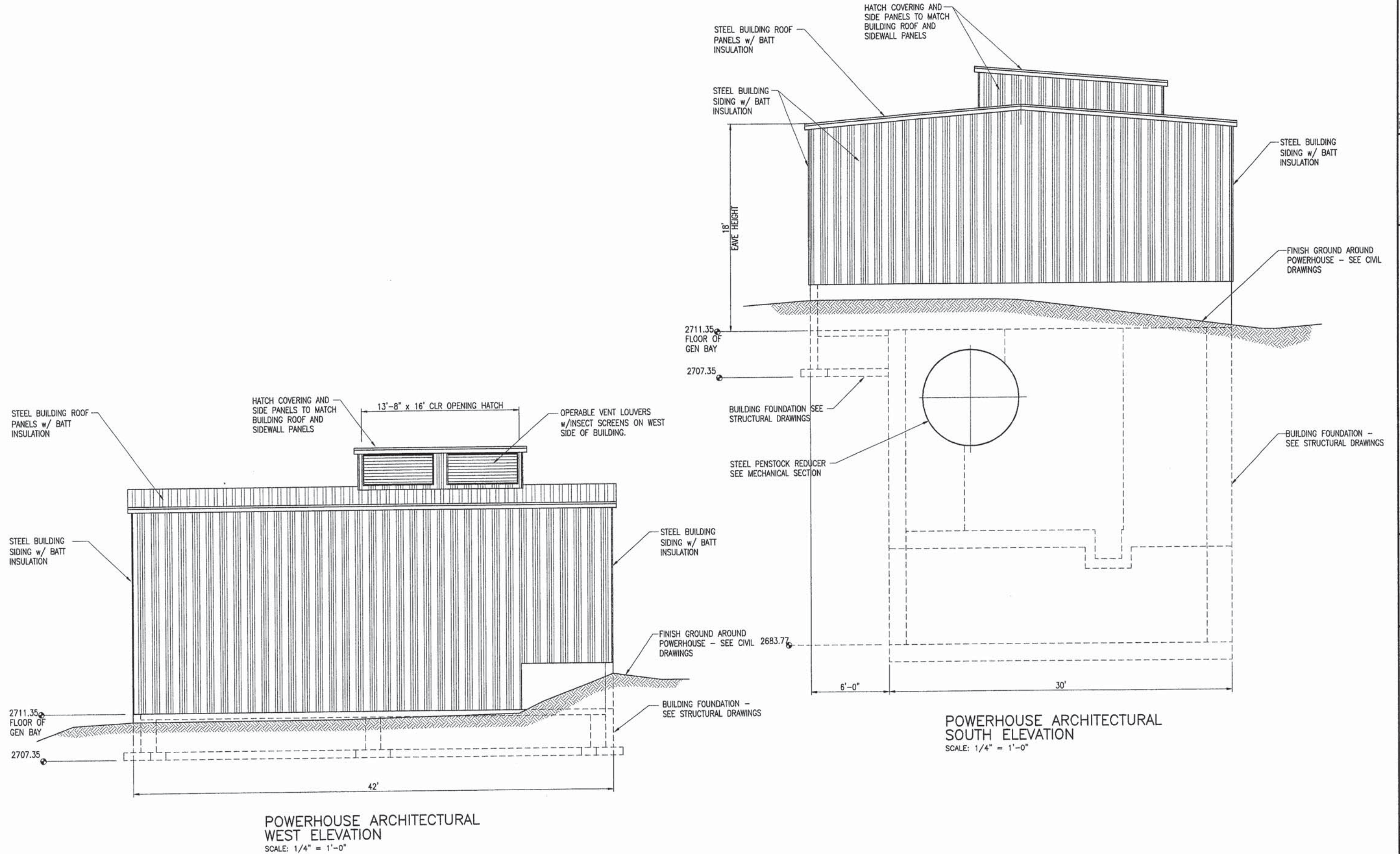
POWERHOUSE ARCHITECTURAL
EAST ELEVATION
FERC PROJECT NO. 3403

SORENSEN ENGINEERING
CONSULTING ENGINEERS
IDAHO FALLS, IDAHO
GRAPEVIEW, WASHINGTON

SCALE: _____

DRAWING NO. **D05-0720**
SHEET NO. **A-3**

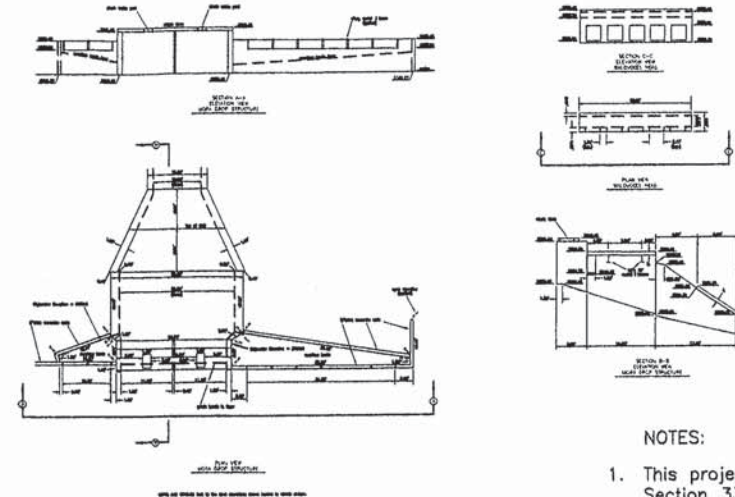
THIS DRAWING SHEET HAS
BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY



REVISIONS		AS-BUILT 2007	
NOVEMBER, 2005	SPB	SJB	TSS
MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED			
POWERHOUSE ARCHITECTURAL SOUTH & WEST ELEVATION FERC PROJECT NO. 3403			
SORENSEN ENGINEERING CONSULTING ENGINEERS		IDaho FALLS, IDaho GRAPEVIEW, WASHINGTON	
DRAWING NO. D05-0720		SHEET NO. A-4	

THIS DRAWING SHEET HAS BEEN REDUCED TO ONE-HALF SIZE--REDUCE SCALES ACCORDINGLY

STRUCTURE DETAILS

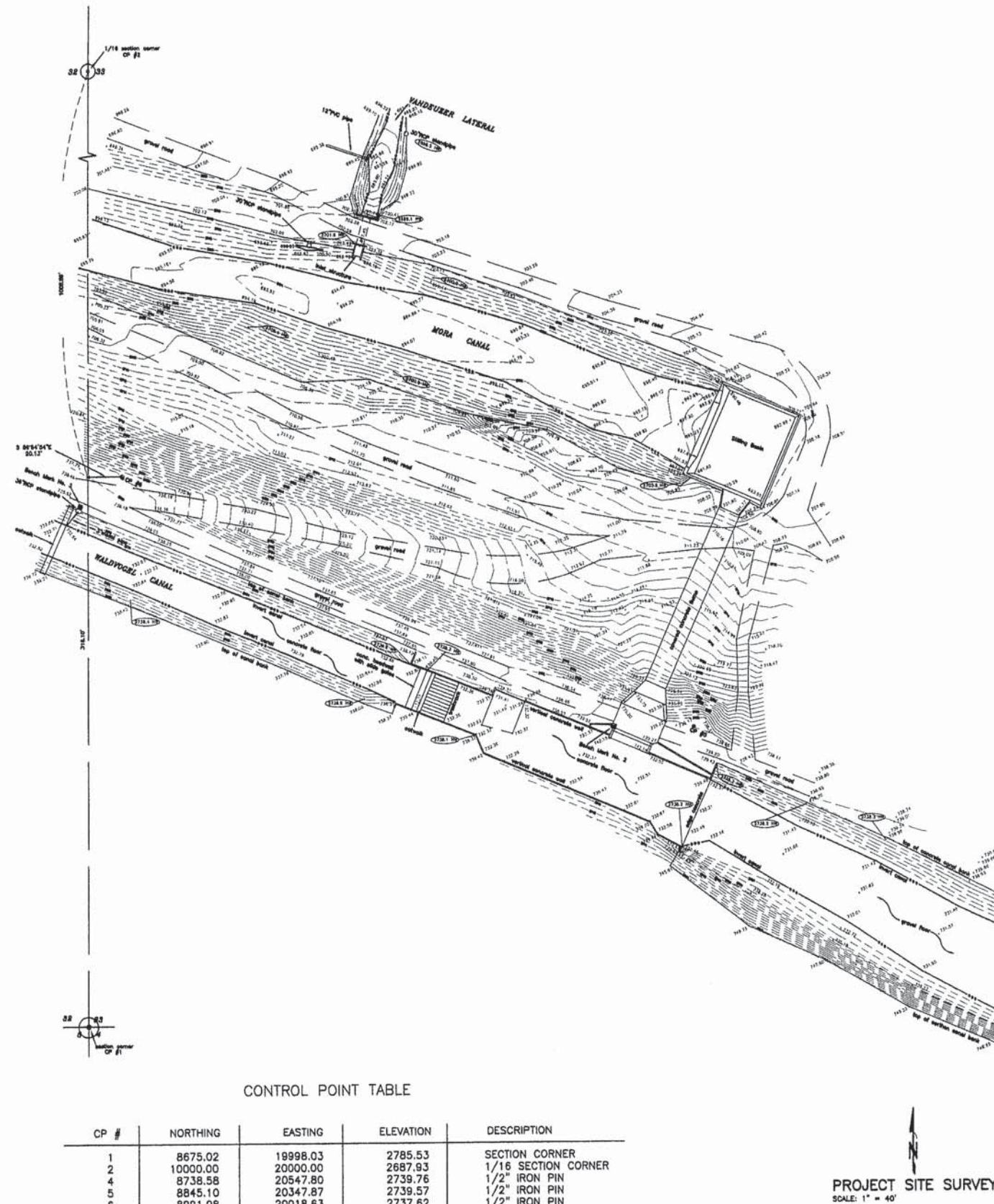


NOTES:

1. This project is located in the southwest 1/4 of the southwest 1/4 of Section 33, Township 2 North, Range 1 West, Boise Meridian.
2. Points 1 and 2, were used as the Basis of Control:
3. CP #1, marking the section corner common to Sections 32 and 33 T.2 N., R.1 W., B.M. and Sections 4 and 5, T. 1 N., R. 1 W., B.M., is a found 3-1/2" G.L.O. Brass Cap (1910) on a 3" diameter metal pipe. Said Brass Cap is in natural ground and is 0.5 feet above the surface.
4. CP #2, marking the south 1/16 corner common to Sections 32 and 33 is a found 5/8" iron pin set inside of a 4" dia. sleeve at the intersection of S. McDermott Road and W. Green Lane. The top of the pin is 0.5 feet below the pavement surface.
5. The Basis of Coordinates on CP #2 is an assumed coordinate of: Northing = 10000.00 and Easting = 20000.00; the Basis of Bearing between CP #1 and CP #2 is: N 0°05'06" E, and was derived from the plat of Mora Subdivision, recorded in Book 62 of Plats at Pages 6223 and 6224, Records of Ada County, Idaho.
6. The Basis of Elevation for this project is a found Bureau of Reclamation Brass Cap (Bench Mark No. 2) set in concrete at the northeast corner of the spillway gate on the irrigation structure for the Mora Canal Drop. An elevation of 2736.16 is stamped on said Brass Cap. This elevation is in NGVD-29 datum. For this project area, to convert NGVD-29 elevation to an NAVD-88 elevation, add 0.954 meters (3.13 feet). For example, adding 3.13 feet to the stamped elevation of 2736.16 feet results in an elevation of 2739.29 feet. This project's elevation basis is NAVD-88 datum.
7. Add 2000.00 feet to the spot elevations shown hereon to obtain datum. (Highwater elev's. are already shown at datum. See Legend shown hereon.)

LEGEND

- Bench Mark
- ⊕ Brass Cap Monument
- ⊕ Aluminum Cap Monument
- 5/8" dia. Iron Pin
- 1/2" dia. Iron Pin
- × Calculated Point, not set
- 2736.3 HW Approximate Highwater Elevation



CONTROL POINT TABLE

CP #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	8675.02	19998.03	2785.53	SECTION CORNER
2	10000.00	20000.00	2687.93	1/16 SECTION CORNER
4	8738.58	20547.80	2739.76	1/2" IRON PIN
5	8845.10	20347.87	2739.57	1/2" IRON PIN
6	8991.08	20018.63	2737.62	1/2" IRON PIN

BENCH MARK TABLE

No.	NAVD 88 ELEVATION	DESCRIPTION
1	2739.28	Chiseled Cross on top of concrete canal bank
2	2739.29	U.S. Bureau of Reclamation Brass Cap (NGVD 29 Elev. = 2736.16)
3	2738.76	Chiseled Square in concrete, 2.5' north of 36" RCP standpipe

SURVEY DATA BY PORTER LAND SURVEY, INC.

REVISIONS
REV LTR A AS-BUILT 2007

DATE JULY 2005
DRAWN BY SPB
CHECKED BY SUB
APPROVED BY TSS

MORA DROP HYDROELECTRIC PROJECT
RIVER SIDE INCORPORATED
EXISTING SITE SURVEY
FERC PROJECT NO. 3403

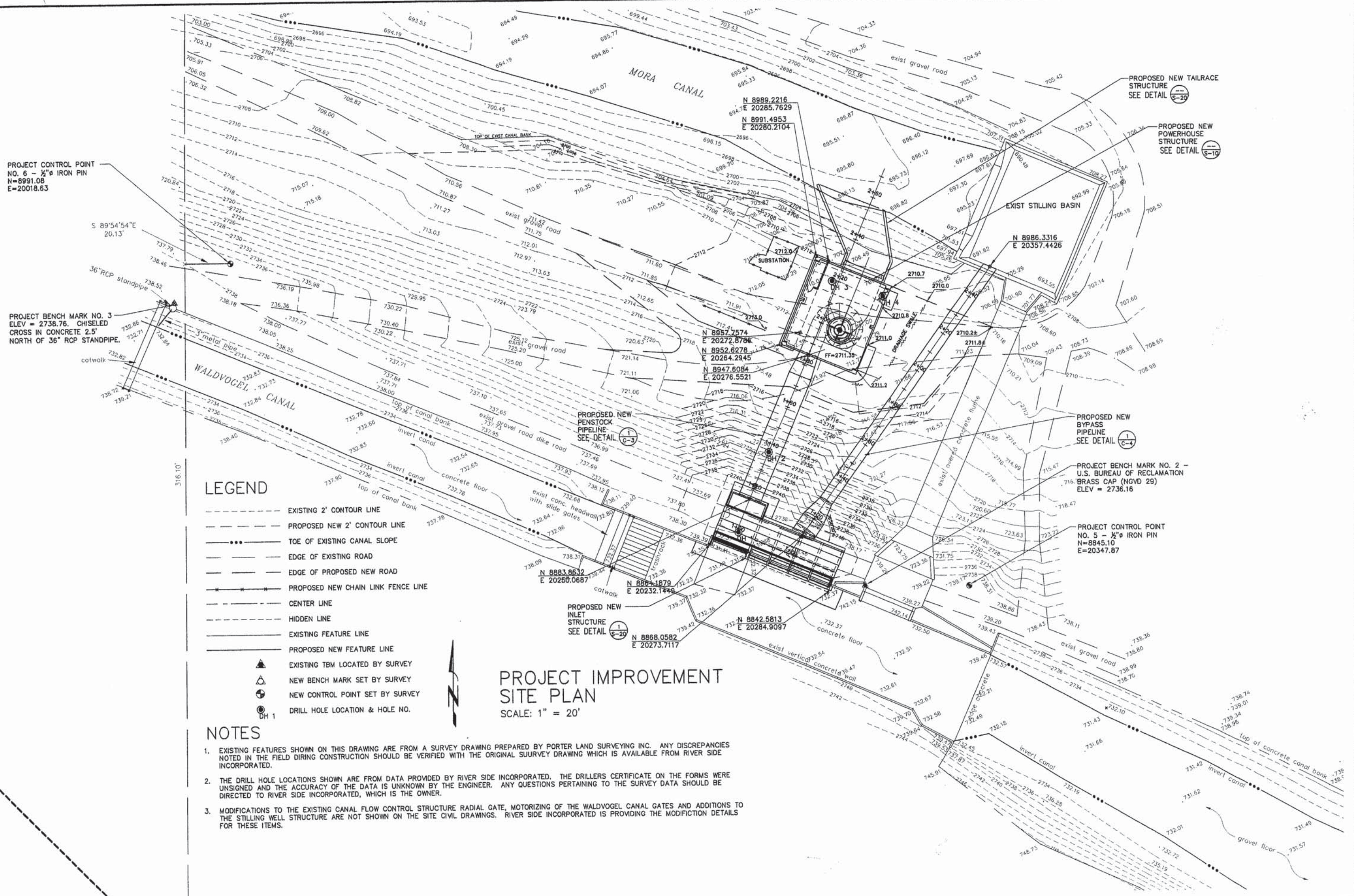


SORENSEN ENGINEERING
CONSULTING ENGINEERS
IDAHO FALLS, IDAHO
GRAPEVIEW, WASHINGTON

SCALE NOTED

DRAWING NO. D05-0720
SHEET NO. C-1

THIS DRAWING SHEET HAS BEEN REDUCED TO ONE-HALF SIZE--REDUCE SCALES ACCORDINGLY



PROJECT CONTROL POINT
NO. 6 - 1/2" IRON PIN
N=8991.08
E=20018.63

PROJECT BENCH MARK NO. 3
ELEV = 2738.76, CHISELED
CROSS IN CONCRETE 2.5'
NORTH OF 36" RCP STANDPIPE.

LEGEND

- EXISTING 2' CONTOUR LINE
- - - PROPOSED NEW 2' CONTOUR LINE
- ... TOE OF EXISTING CANAL SLOPE
- EDGE OF EXISTING ROAD
- EDGE OF PROPOSED NEW ROAD
- - - PROPOSED NEW CHAIN LINK FENCE LINE
- CENTER LINE
- HIDDEN LINE
- EXISTING FEATURE LINE
- PROPOSED NEW FEATURE LINE
- ▲ EXISTING TBM LOCATED BY SURVEY
- △ NEW BENCH MARK SET BY SURVEY
- ⊕ NEW CONTROL POINT SET BY SURVEY
- ⊙ DH 1 DRILL HOLE LOCATION & HOLE NO.

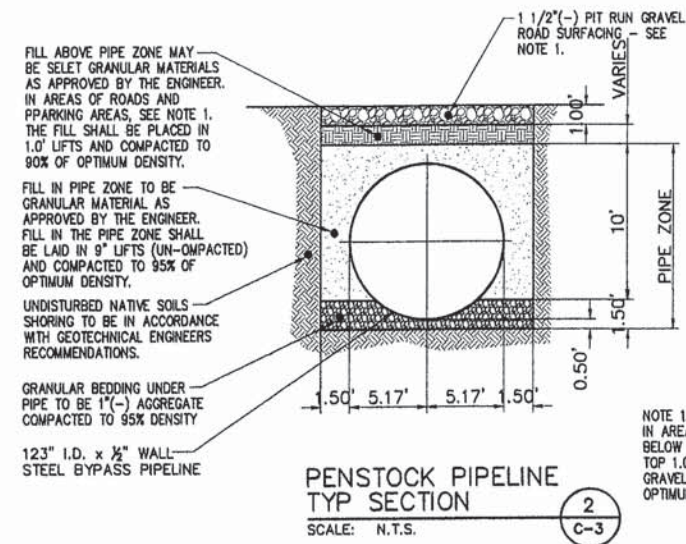
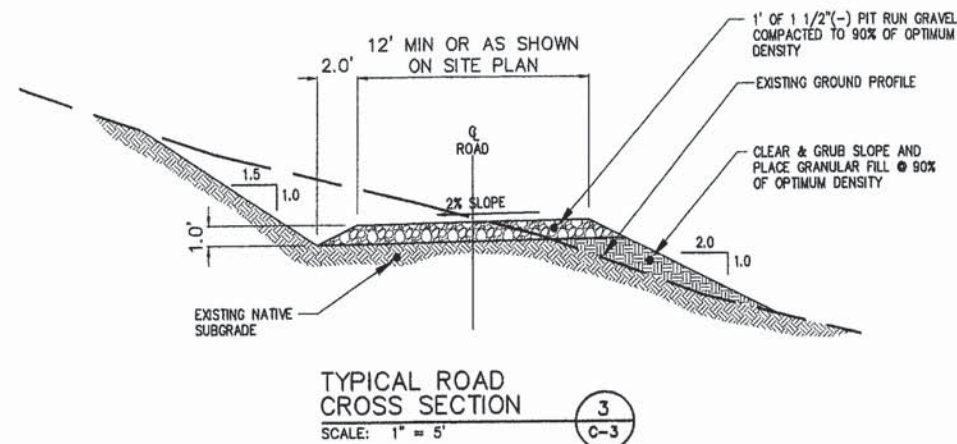
NOTES

- EXISTING FEATURES SHOWN ON THIS DRAWING ARE FROM A SURVEY DRAWING PREPARED BY PORTER LAND SURVEYING INC. ANY DISCREPANCIES NOTED IN THE FIELD DURING CONSTRUCTION SHOULD BE VERIFIED WITH THE ORIGINAL SURVEY DRAWING WHICH IS AVAILABLE FROM RIVER SIDE INCORPORATED.
- THE DRILL HOLE LOCATIONS SHOWN ARE FROM DATA PROVIDED BY RIVER SIDE INCORPORATED. THE DRILLERS CERTIFICATE ON THE FORMS WERE UNSIGNED AND THE ACCURACY OF THE DATA IS UNKNOWN BY THE ENGINEER. ANY QUESTIONS PERTAINING TO THE SURVEY DATA SHOULD BE DIRECTED TO RIVER SIDE INCORPORATED, WHICH IS THE OWNER.
- MODIFICATIONS TO THE EXISTING CANAL FLOW CONTROL STRUCTURE RADIAL GATE, MOTORIZING OF THE WALDVOGEL CANAL GATES AND ADDITIONS TO THE STILLING WELL STRUCTURE ARE NOT SHOWN ON THE SITE CIVIL DRAWINGS. RIVER SIDE INCORPORATED IS PROVIDING THE MODIFICATION DETAILS FOR THESE ITEMS.

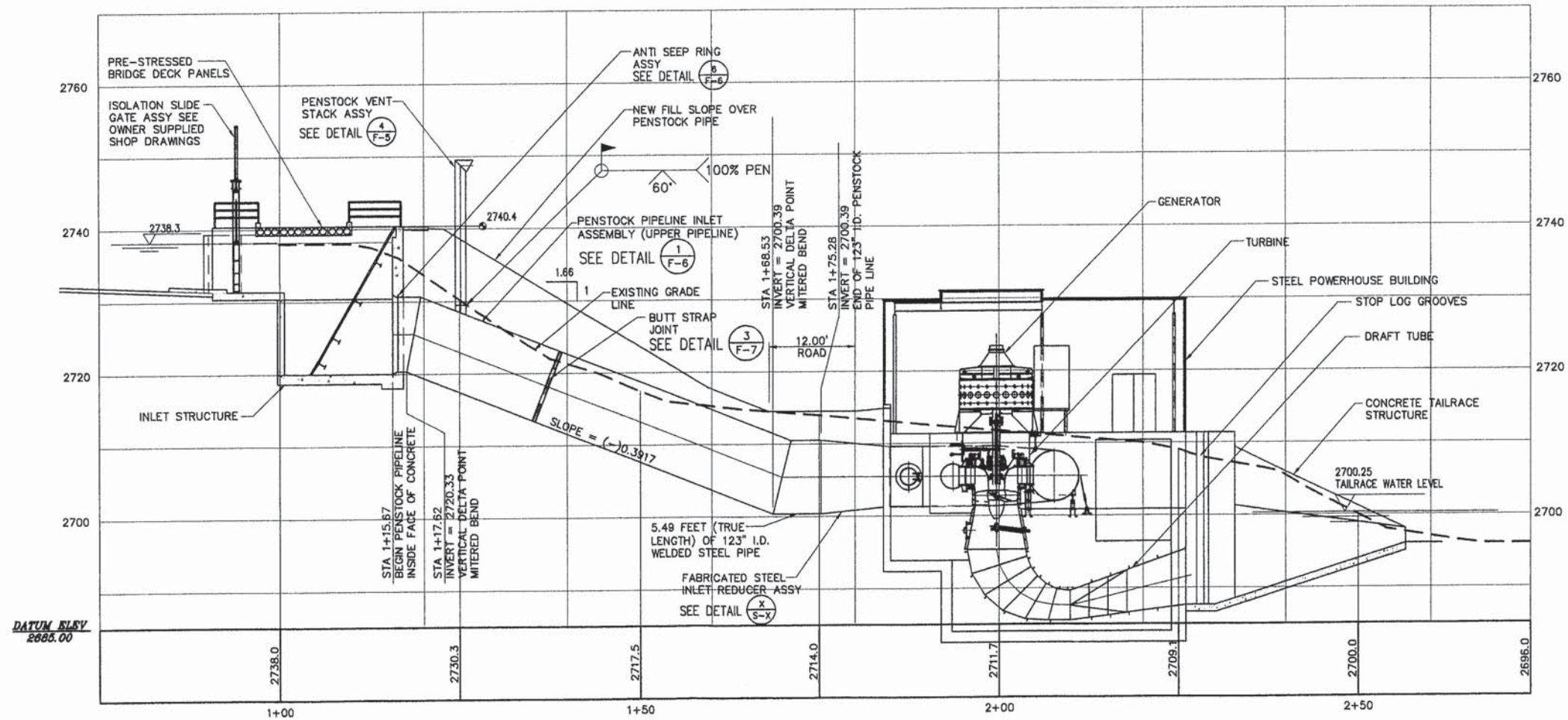
PROJECT IMPROVEMENT
SITE PLAN
SCALE: 1" = 20'

REVISED		AS-BUILT 2007	
REV	LTR	DATE	BY
A		AUGUST 2005	SPB
PROJECT IMPROVEMENT SITE PLAN		DESIGNED	ISS
MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED		APPROVED	PROJECT
SORENSEN ENGINEERING CONSULTING ENGINEERS		FERC PROJECT NO. 3403	
IDAHO FALLS, IDAHO		GRAPEVIEW, WASHINGTON	
NOTED		D05-0702	
SHEET NO.		C-2	

THIS DRAWING SHEET HAS
BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY



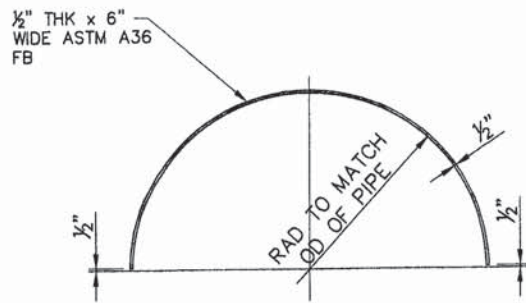
NOTE 1.
IN AREAS WHERE THE PIPE IS LOCATED BELOW ROADS AND PARKING AREAS, THE TOP 1.0' SHALL BE 1 1/2\"/>



NOTE:
ALL PIPE JOINTS SHALL BE BUTT STRAP TYPE IN ACCORDANCE WITH THE DETAILS SHOWN ON SHEET C-4.

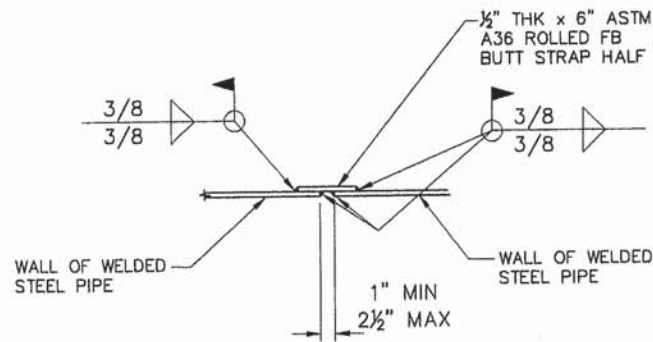
REVISIONS REV LTR A AS-BUILT 2007	
DATE AUGUST 2005 BY SPB CHECKED SJB APPROVED TSS DRAWN SJB	MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED PENSTOCK PROFILE FERC PROJECT NO. 3403
SORENSEN ENGINEERING CONSULTING ENGINEERS IDAHO FALLS, IDAHO GRAPEVIEW, WASHINGTON	
SCALE NOTED	DRAWING NO. D05-0702 SHEET NO. C-3

THIS DRAWING SHEET HAS BEEN REDUCED TO ONE-HALF SIZE--REDUCE SCALES ACCORDINGLY



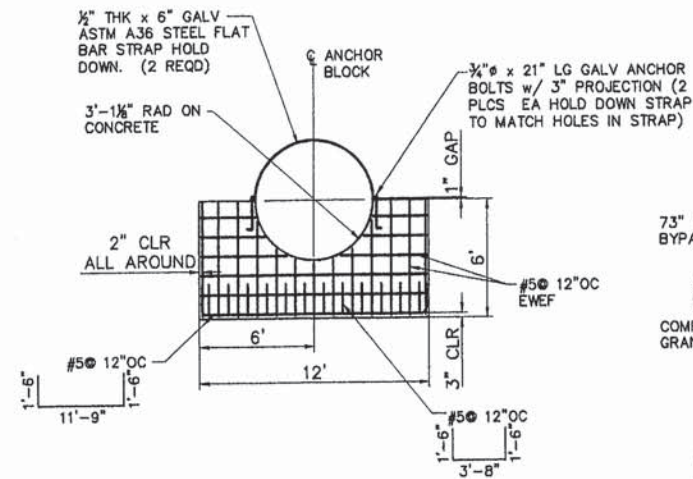
PIPE BUTT STRAP DETAIL
SCALE: N.T.S.

5
C-4



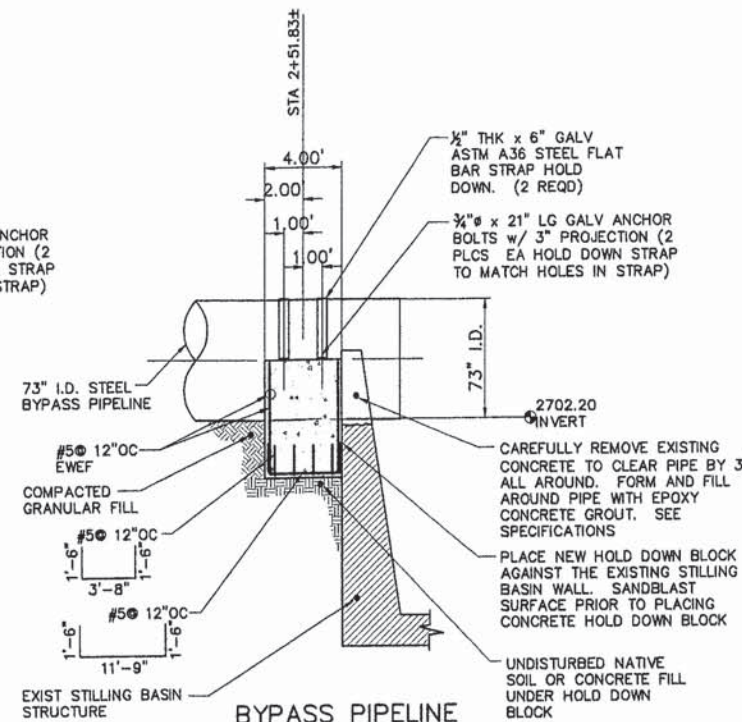
PIPE BUTT STRAP WELD DETAIL
SCALE: N.T.S.

6
C-4



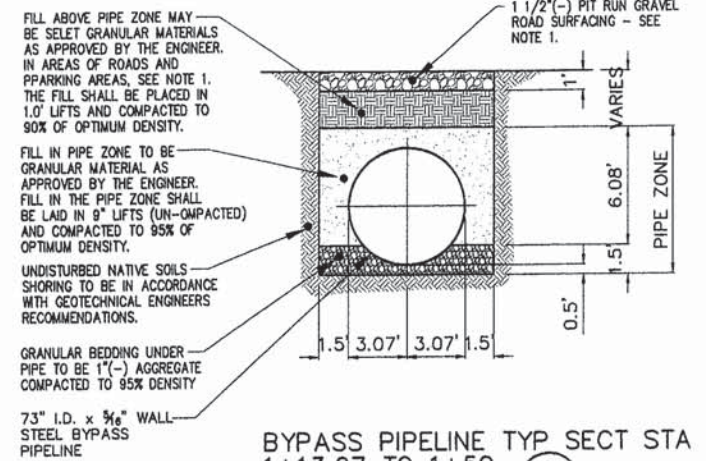
BYPASS PIPELINE HOLD DOWN BLOCK
SCALE: 1" = 5'

4
C-4



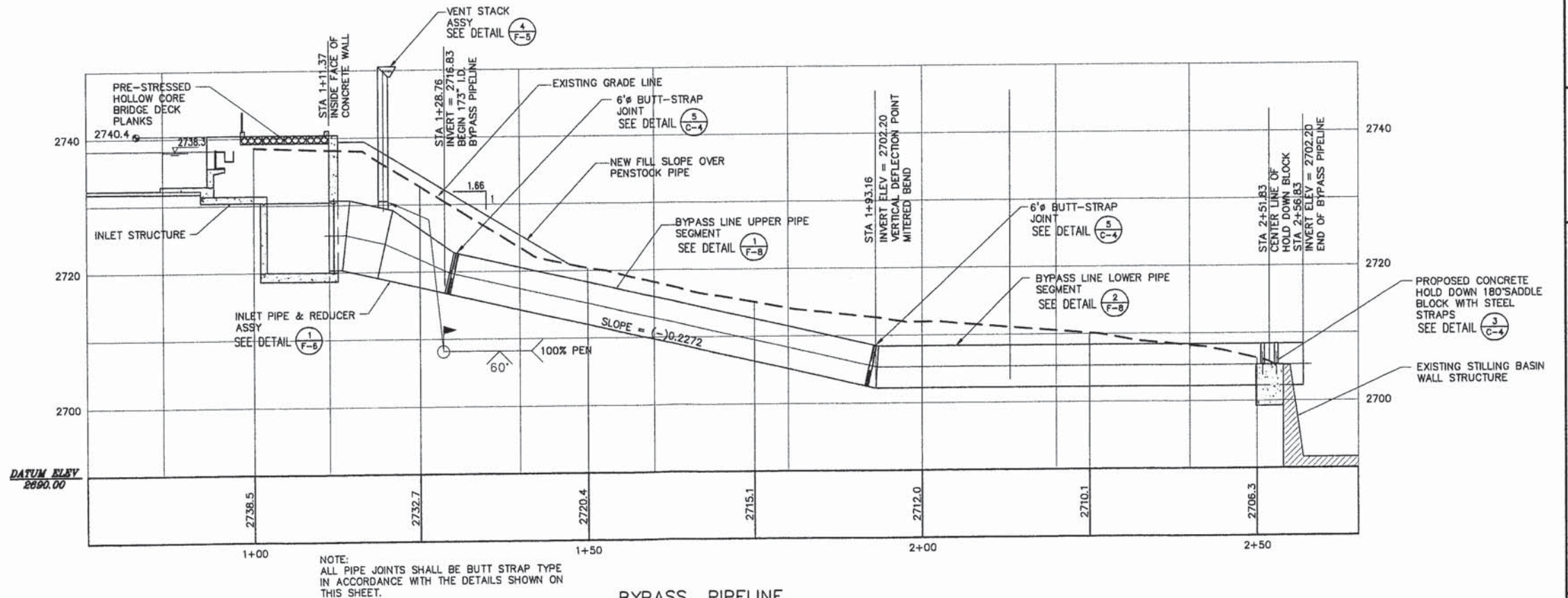
BYPASS PIPELINE HOLD DOWN BLOCK
SCALE: 1" = 5'

3
C-4



BYPASS PIPELINE TYP SECT STA 1+13.07 TO 1+50
SCALE: 1" = 5'

2
C-4



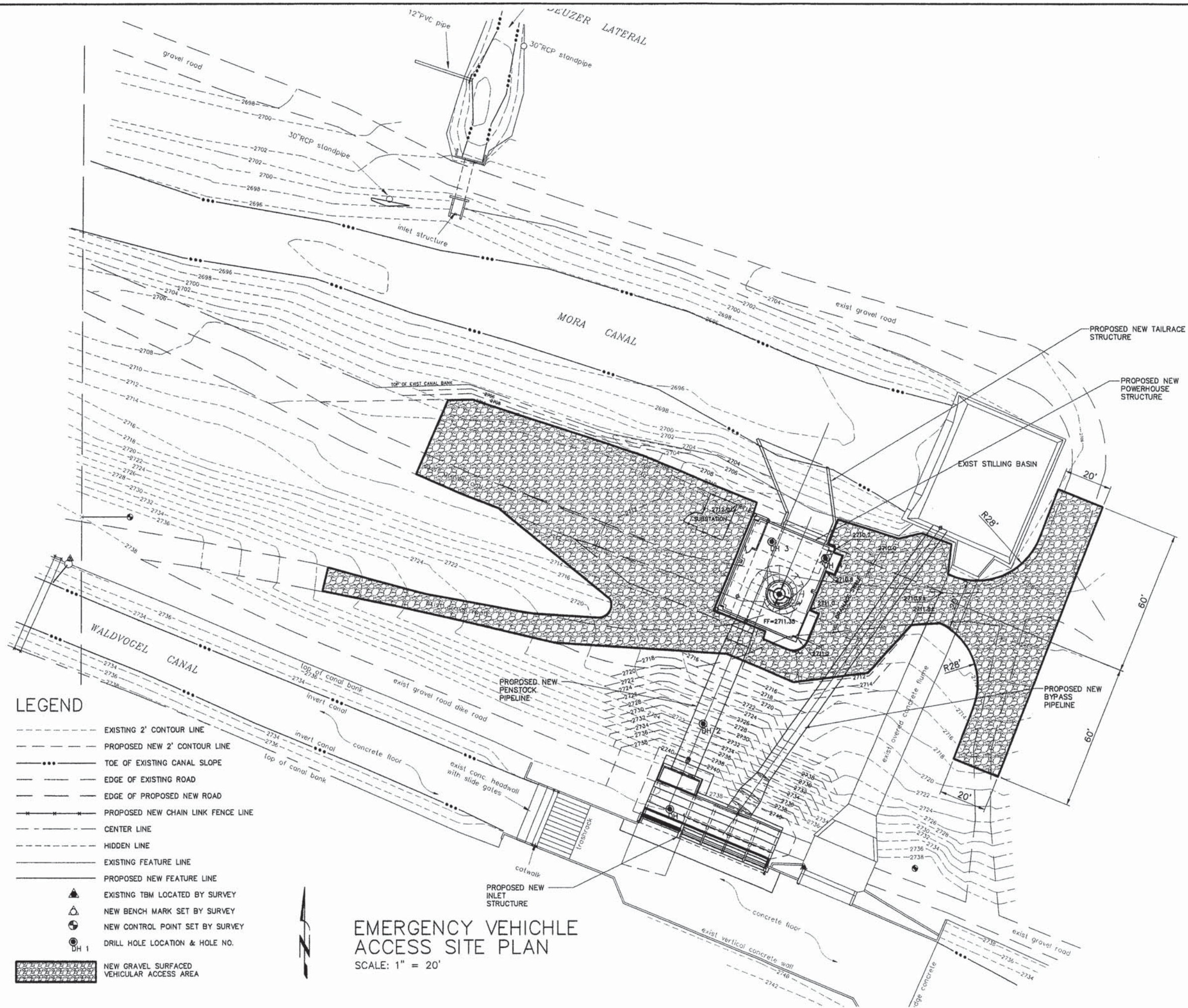
BYPASS PIPELINE PROFILE
SCALE: 1" = 10'

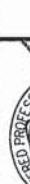
1
C-4

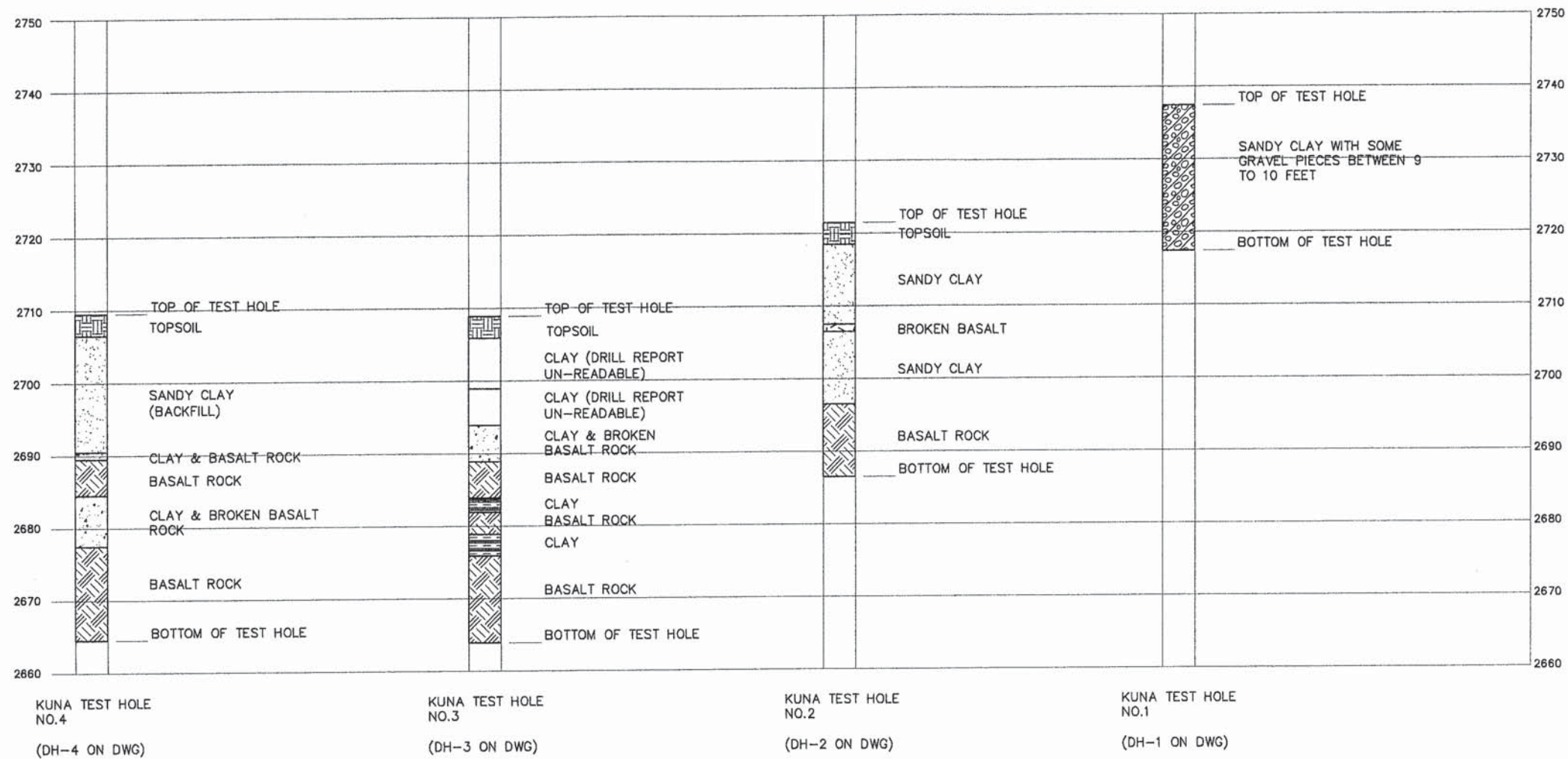
NOTE:
ALL PIPE JOINTS SHALL BE BUTT STRAP TYPE
IN ACCORDANCE WITH THE DETAILS SHOWN ON
THIS SHEET.

THIS DRAWING SHEET HAS
BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY

REVISIONS		MORA DROP HYDROELECTRIC PROJECT		BYPASS PIPELINE PROFILE		FERC PROJECT NO. 3403
REV	DATE	BY	CHKD	APP'D	NOTED	
A	AUGUST 2005	SPB	SAB	ISS		
		RIVER SIDE INCORPORATED		SORENSEN ENGINEERING		
		AS-BUILT 2007		CONSULTING ENGINEERS		
				IDAHO FALLS, IDAHO		
				GRAPEVIEW, WASHINGTON		
				NOTED		
				DRAWING NO. D05-0702		
				SHEET NO. C-4		



SORENSEN ENGINEERING CONSULTING ENGINEERS IDAHO FALLS, IDAHO GRAPEVIEW, WASHINGTON				MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED EMERGENCY VEHICLE ACCESS SITE PLAN FERC PROJECT NO. 3403		DATE: AUGUST 2005 DRAWN: SPB CHECKED: SJB APPROVED: TSS DESIGNED: S. SORENSON		REV LTR AS-BUILT 2007		REVISIONS	
SCALE NOTED											
DRAWING NO. D05-0702											
SHEET NO. C-5											



DRILL HOLE LOG

SCALE: N.T.S.

NOTE:
FOR QUESTIONS REGARDING THE ACCURACY
AND DATA PROVIDED ON THESE DRILL HOLE
LOGS, SEE THE ORIGINAL DRILL HOLE FIELD
REPORTS AT THE OFFICE OF THE OWNER. THE
ENGINEER TAKES NO RESPONSIBILITY IN THE
DATA PROTRAYED ON THE DRILL HOLE LOGS.

MORA DROP HYDROELECTRIC PROJECT
RIVER SIDE INCORPORATED

WELL DRILLERS DRILL
HOLE LOG
FERC PROJECT NO. 3403



SORENSEN ENGINEERING
CONSULTING ENGINEERS
IDAHO FALLS, IDAHO
GRAPEVIEW, WASHINGTON

SCALE
NOTED

DRAWING NO.
D05-0702
SHEET NO.
C-6

THIS DRAWING SHEET HAS
BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY

REVISIONS
REV LTR
A
AS-BUILT 2007

DATE
JANUARY 2006
DRAWN
SPB
CHECKED
SUB
APPROVED
TSS
ENGINEER

CONCRETE (UNLESS OTHERWISE SPECIFIED)

C1 APPLICABLE CODES

CONCRETE CONSTRUCTION SHALL CONFORM TO THE LATEST EDITION OF THE AMERICAN CONCRETE INSTITUTE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318).

C2 REINFORCING STEEL DETAILS

ALL DETAILING, FABRICATION, AND ERECTION OF REINFORCING BARS SHALL BE IN ACCORDANCE WITH THE MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES (ACI 315), LATEST EDITION.

C3 DESIGN STRESSES

- A. CLASS 4000 CONCRETE:
f'c=4,000 PSI ULTIMATE COMPRESSIVE STRESS AT 28 DAYS.
ALL STRUCTURAL CONCRETE AND INFILL CONCRETE SHALL BE CLASS 4000 CONCRETE
- CLASS 2200 CONCRETE:
f'c=2,200 PSI ULTIMATE COMPRESSIVE STRESS AT 28 DAYS.
ALL LEAN CONCRETE AND FLOWABLE FILL CONCRETE SHALL BE CLASS 2200 CONCRETE.
- B. REINFORCING STEEL
THE REINFORCING STEEL REQUIRED FOR THIS PROJECT SHALL BE AS NOTED IN THE PROJECT SPECIFICATIONS.
REBAR FOR CONCRETE REINFORCING SHALL BE GRADE 60 IN ACCORDANCE WITH ASTM A615. IN LOCATIONS WHERE THE CONTRACTOR CHOOSES TO UTILIZE WELDABLE REBAR FOR SPLICING IN PLACE OF LAP SPLICING, THE REBAR SHALL BE GRADE 60 WELDABLE REBAR IN ACCORDANCE WITH ASTM A706.

C4 CONCRETE COVER

CONCRETE COVER FOR REINFORCING BARS SHALL BE AS FOLLOWS WITH MINIMUM COVER OF ONE BAR DIAMETER.

- A. CONCRETE CAST AGAINST EARTH - 3"
B. CONCRETE TO BE IN CONTACT WITH LIQUID - 2"
C. CONCRETE TO BE IN CONTACT WITH EARTH OR WEATHER:
(1) BARS #5 OR LESS - 1 1/2"
(2) BARS GREATER THAN #5 - 2"
D. CONCRETE NOT EXPOSED TO EARTH, WEATHER OR LIQUID:
(1) SLABS, WALLS AND JOISTS - 3/4"
(2) BEAMS AND COLUMNS - 1 1/2"

C5 ADDED TOP STEEL IN SLABS

WHERE BEAMS OR WALLS ARE PARALLEL TO MAIN REINFORCING IN SLAB, PROVIDE #4 @ 18" OC IN TOP OF SLAB NORMAL TO THE BEAM OR WALL. EXTEND BARS 2'-0" BEYOND THE FACE OF THE BEAM OR WALL. WHEN THE SLAB IS ON ONE SIDE ONLY, TERMINATE THE BARS WITH A STANDARD HOOK ON THE OTHER SIDE OF THE BEAM OR WALL.

C6 EXTRA ACCESSORY BARS

IN ADDITION TO NORMAL ACCESSORIES USED TO HOLD REINFORCING STEEL FIRMLY IN POSITION, EXTRA ACCESSORY BARS SHALL BE USED AS FOLLOWS:

- A. IN SLABS, #5 RAISER BARS AT 36" OC MAXIMUM TO SUPPORT THE TOP LAYER OF REINFORCING STEEL.
B. IN WALLS WITH TWO CURTAINS #3 U OR Z SHAPE SPACERS AT 6" OCEW.

C7 BAR LAP SPICES

DOWELS SHALL BE THE SAME SIZE AND SPACING AS THE BARS WITH WHICH THEY ARE LAPPED. VERTICAL REINFORCING BAR SPICES IN COLUMNS SHALL BE AS NOTED ON THE DRAWINGS, AND ALL OTHER BAR SPICES SHALL BE LAPPED AS FOLLOWS UNLESS OTHERWISE NOTED:

BAR SIZE	SPICE LENGTH
#3	15"
#4	20"
#5	25"
#6	30"
#7	35"
#8	40"
#9	50"

THE LENGTH OF THE LAP SPICES SHALL BE MADE IN ACCORDANCE WITH THE AMERICAN CONCRETE INSTITUTE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318, LATEST EDITION) IF THE SPICE LENGTH SHOWN ON THE PLAN SHEETS IS DIFFERENT FROM THAT LISTED IN THE ACI 318, THE ACI 318 SHALL GOVERN. LAP SPICES MAY BE MADE BY WELDING IN ACCORDANCE WITH THE AMERICAN WELD SOCIETY SPECIFICATION AWS D1.4, LATEST EDITION.

C9 RESTRICTIVE BAR ANCHORAGE

IN CASES WHERE REINFORCING BARS CANNOT BE EXTENDED AS FAR AS REQUIRED DUE TO THE LIMITED EXTENT OF THE ADJACENT CONCRETE STRUCTURE, THE BARS SHALL EXTEND AS FAR AS POSSIBLE AND END IN STANDARD HOOKS.

C10 STANDARD HOOKS

BARS ENDING IN RIGHT ANGLE BENDS OR HOOKS SHALL CONFORM TO THE REQUIREMENTS OF SECTION 7 OF THE AMERICAN CONCRETE INSTITUTE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318, LATEST EDITION).

C11 SLOPING SLABS

MONOLITHIC SLABS WITH TOPS THAT ARE SLOPED SHALL HAVE BOTTOMS SLOPED THE SAME AMOUNT, MAINTAINING A UNIFORM SLAB THICKNESS, UNLESS OTHERWISE NOTED ON THE PLAN SHEETS.

C12 GROUND SUPPORTED SLABS

CONCRETE SLABS SUPPORTED BY GROUND, UNLESS OTHERWISE NOTED, SHALL BE 4" THICK AND REINFORCED WITH 4 x 4 W2.9 WWF AT MID-DEPTH OF THE SLAB AND DOWELED ALONG THE EDGE OF THE SLAB TO ALL ADJACENT WALLS, COLUMNS AND FOUNDATIONS WITH #4 @ 8" OC THAT LAP 12" WITH THE WWF AND EXTEND INTO THE WALLS, COLUMNS AND FOUNDATIONS AT LEAST 12". IF THE SLAB IS DESIGNATED AS AN ISOLATED SLAB ON THE DRAWINGS, OMIT THE DOWELS AND SUBSTITUTE 1/4" THICK PRE-MOLDED JOINT FILLER TO ISOLATE THE SLAB FROM CONTACT WITH THE STRUCTURE ALONG ITS PERIMETER.

C13 CHAMFERS

EXCEPT AS OTHERWISE NOTED, EXPOSED CONCRETE CORNERS AND EDGES SHALL HAVE 3/4" CHAMFERS. RE-ENTRANT CORNERS (INSIDE) SHALL NOT HAVE FILLETS.

C14 ANCHOR BOLTS

THE USE OF ANCHOR BOLTS SHALL BE GOVERNED BY THE FOLLOWING TABLE UNLESS OTHERWISE SPECIFIED ON THE DRAWING SHEETS:

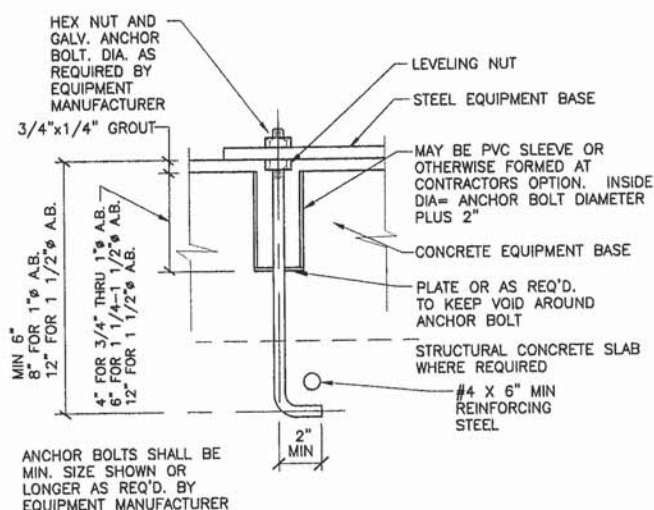
BOLT DIA	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"
MIN EMBED.	6"	6"	8"	8"	10"	12"	12"
ALLOWABLE SHEAR	1000#	1500#	1780#	2075#	2175#	2250#	2650#

ALL BOLTS SHALL BE HOT DIPPED GALVANIZED UNLESS OTHERWISE NOTED. EMBEDMENT LENGTH FOR BOLTS SHALL BE AS SHOWN ON THE PLAN SHEET OR AS DETERMINED BY THE ENGINEER.

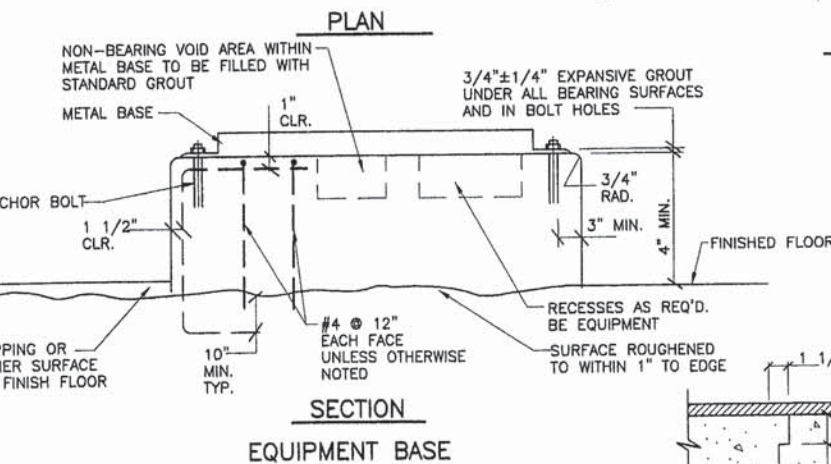
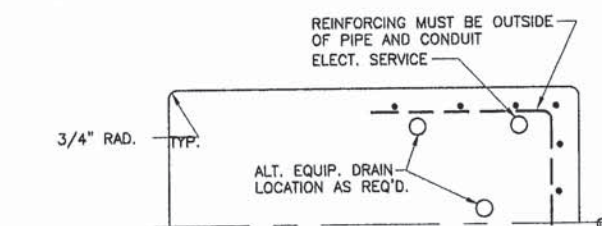
C15 DOWELS IN WALL

DOWELS FROM FOOTING OR SLAB SHALL LAP WITH THE WALL OR COLUMN REINFORCEMENT BY THE FOLLOWING LENGTHS:

- #5 AND SMALLER - 2'-0"
#6 AND #7 - 2'-6"
#8 AND LARGER - 4'-0"

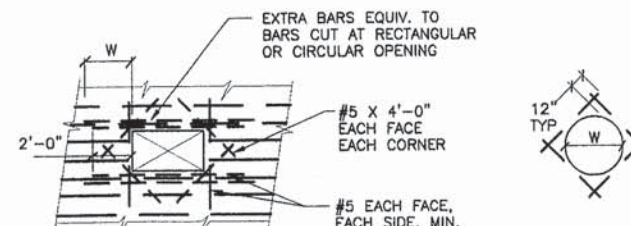
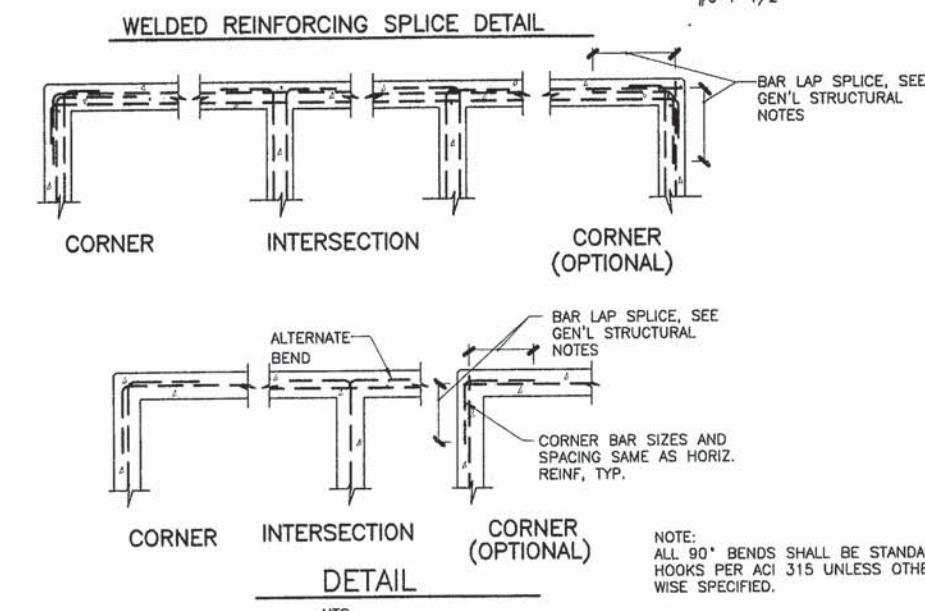
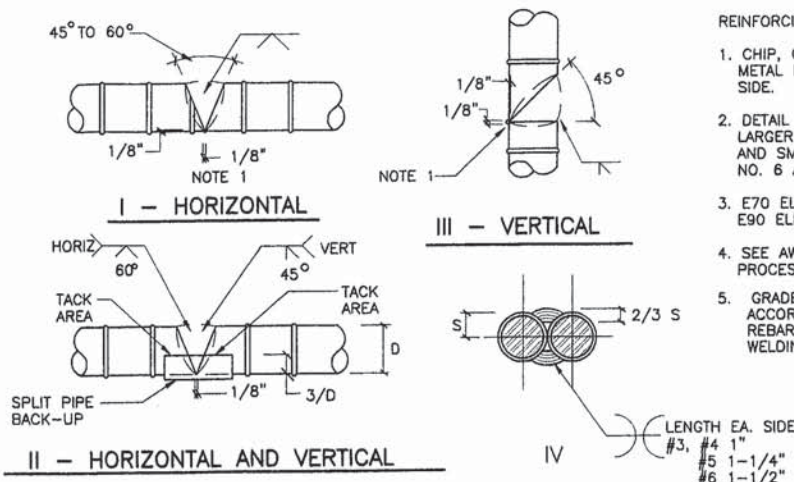


ANCHOR BOLT FOR EQUIPMENT

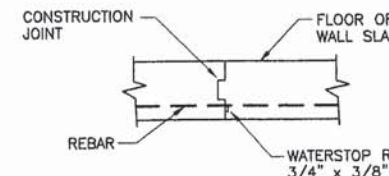


SECTION EQUIPMENT BASE

HORIZONTAL JOINT IN SLAB (UNLESS OTHERWISE NOTED ON PLAN SHEETS)



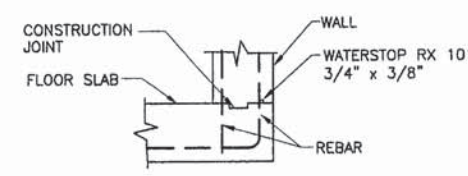
REINFORCEMENT AT SLAB AND WALL OPENINGS



FLOOR OR WALL JOINT

NOTE: PLACE WATER STOPS WHERE SHOWN ON THE PLANS AND AS REQUIRED BY THE SPECIFICATIONS. INSTALLATION SHALL BE PER THE SUPPLIER INSTRUCTIONS.

COLD JOINT WATER STOP DETAIL



FLOOR SLAB TO WALL

NOTE: PLACE WATER STOPS WHERE SHOWN ON THE PLANS AND AS REQUIRED BY THE SPECIFICATIONS. INSTALLATION SHALL BE PER THE SUPPLIER INSTRUCTIONS.

REINFORCING WELDING NOTES:

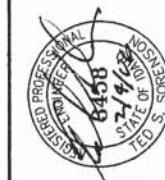
1. CHIP, GRIND OR GOUGE TO SOUND METAL BEFORE WELDING OTHER SIDE.
2. DETAIL I AND III FOR NO. 9 AND LARGER. DETAIL II FOR NO. 8 AND SMALLER. DETAIL IV FOR NO. 6 AND SMALLER.
3. E70 ELECTRODE FOR GR40 E90 ELECTRODE FOR GR60.
4. SEE AWS D12-1 FOR WELDING PROCESS AND OTHER DETAILS.
5. GRADE 60 WELDABLE REBAR IN ACCORDANCE WITH ASTM A706 REBAR SHALL BE USED WHEN WELDING OF REBAR IS REQUIRED.

REVISIONS

REV

AUGUST, 2005

MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED



SORENSON ENGINEERING CONSULTING ENGINEERS

IDAHO FALLS, IDAHO

SCALE

NOTED

DRAWING NO.

D05-0720

SHEET NO.

S-1

THIS DRAWING SHEET HAS BEEN REDUCED TO ONE-HALF SIZE--REDUCE SCALES ACCORDINGLY

ROCK ANCHOR GUIDE SPECIFICATION

Rock Anchors Performance Requirements:

Design is based on an allowable rock anchor load of 60 kips for (Type I) tension anchors. Proof-test 25% of all tension anchors. Pull-Test at least one tension anchor in each project area. Duration of load at least 5 minutes. Maximum deflection at 60 kips is 0.5-inches.

Proof-test 10% of all shear anchors (Type II) for a tension load of 20 kips and 0.25-inch movement.

The Resident Engineer or independent inspector shall supervise and witness all testing and installation. See "Proof Loading" Guidelines.

Rock Anchor Reinforcement:

Type I: Tension anchors shall be installed horizontally or at an angle shown on the plans into solid rock. Use #8 Grade 60 rebar or threadbar. Embed all tension anchors at least 8-feet into solid competent rock. Threaded ends will be required at tested anchors for equipment attachment.

Type II: Shear anchors shall be installed vertically into rock to positively connect walls rock. Use #8 Grade 60 reinforcing bars. Embed all shear anchors at least 4-feet into solid competent rock. Threaded ends will be required at proof-tested anchors for testing equipment attachment.

Drill Operators: Drilling operators and foreman shall have a minimum of 2 years installing rock anchors or permanent ground anchors with the contractor's organization. List of project personnel having appropriate qualifications shall be submitted for the Engineer's approval at least 7 working days prior to any physical work at the site.

Grout for Anchors: Provide a neat cement or a sand cement grout to be used in rock anchors of a pumpable mixture capable of reaching a minimum cube strength of 5000 psi. Chemical additives which control, bleed, or retard set in the grout are to be used only when approved in writing by the Engineer. Expansive additives shall not be used.

Anchor installation: Drill holes for rock anchors at the locations shown on the drawings. Provide anchors length and diameter as shown on the drawings. Core drilling, rotary drilling, percussion drilling, or auger drilling may be used. It shall be the contractor's responsibility to choose the drilling methods that will maintain open drill holes and do not promote mining and loosening of the soil/rock at the perimeter of the drill hole or fracture rock/soils with weak stratification planes by the use of high flush volumes and pressure. At the ground surface the drill hole shall be located within 6 inches of the location shown. At the point of entry the anchor edge shall be within 5 degrees of the angle shown on the drawings.

Place centralizers at 6 foot intervals along the length of the anchors with the last centralizer 1 foot from each end of the nail and ensure that there is no less than 1 inch of grout cover along the length of the anchor.

Inject grout into the lowest point of the drill hole. Pump grout through tubes, casing, hollow stem augers or drill holes such that the hole is filled to prevent air voids working progressively from the bottom to the top. Maintain operation until the hole is completely filled with grout and clean grout is seen to run from the top of the hole.

Provide grouting equipment capable of continuous mixing and producing a grout free of lumps. Anchors shall be placed in each drilled hole within 15 minutes of the grout injection.

Proof Testing - General Specification:

Performance Tests

A Performance test involves incremental loading and unloading of a production anchor to accurately verify that the design load may be safely carried, that the free length is as specified, and that the residual movement is within tolerable limits. As a minimum, the first two production anchors installed should be Performance tested. Do not wait until many anchors are installed before testing the first two anchors. The purpose of these tests is to verify the installation procedure selected by the Contractor before a large number of anchors are installed. Each load increment or decrement shall be held constant for at least one minute or until measured deflection is negligible. The maximum load should generally be held for one hour to determine long-term creep susceptibility. As was stated earlier, the contract plans and/or Special Provisions should specify the number of Performance tests be performed at each location.

Testing

The following is a general description of the required tests.

Proof Tests

A Proof test involves incrementally loading a production anchor to verify that the design capacity can be safely carried and that the free length is as specified. The Proof test is a single cycle test where the load is applied in increments until the maximum load value is reached. Each load shall be held constant for at least one minute or until measured deflection is negligible.

Pull-out Tests

A pullout test consists of incrementally loading the test anchor assembly to the maximum test load or the failure point, whichever occurs first. The failure point is the point where the movement of the test anchor continues without an increase in the load or when the anchor creep rate exceeds 0.08 inch between 6 and 60 minutes. Movement of the anchor end shall be measured and recorded to the nearest 0.001 inch at each increment of load, including the ending alignment load, relative to an independent fixed reference point. The pullout test measuring the test load is applied to the test soil nail and measures the test soil nail end movement at each load. Each increment of load shall be applied in less than one minute and held for at least one minute but not more than two minutes. During the 10

minute load hold, the movement of the end of the anchor shall be measured at 1, 2, 3, 4, 5, 6, and 10 minutes. After the 0.08 inch creep rate is established, the load is reduced to the final alignment load, and then the anchor is unloaded. If a test anchor fails to obtain the maximum test load, one or all of the following procedures may be performed:

(1) install and test additional test anchor if the initial test results are believed to be in error, (2) determine if the cause is due to a variation of the rock/soil conditions, installation procedure or materials, or (3) reevaluate the rock properties if differing conditions are encountered and redesign the anchors if necessary. Any changes necessitated by failing tests shall be approved by the Project Designer.

STRUCTURAL NOTES - CONCRETE STRUCTURES

DESIGN CODE: UNIFORM BUILDING CODE - 1997 EDITION

GENERAL

- UNLESS OTHERWISE NOTED, ALL MATERIAL AND DESIGN SPECIFICATIONS CITED HEREIN SHALL CONFORM TO THE MOST RECENTLY ADOPTED SPECIFICATION OR CODE.
- THESE STRUCTURAL NOTES SUPPLEMENT THE SPECIFICATIONS. ANY DISCREPANCY FOUND AMONG THE DRAWINGS, SPECIFICATIONS, THESE NOTES, AND ANY SITE CONDITIONS SHALL BE REPORTED IN A TIMELY MANNER TO THE ENGINEER DESIGN TEAM WHO SHALL CORRECT ANY DISCREPANCY IN WRITING. ANY WORK DONE BY THE CONTRACTOR AFTER DISCOVERY OF SUCH DISCREPANCY SHALL BE DONE AT THE CONTRACTORS' RISK.
- THE CONTRACTOR SHALL VERIFY AND COORDINATE THE DIMENSIONS AMONG ALL DRAWINGS PRIOR TO PROCEEDING WITH ANY WORK OR FABRICATION.
- THE CONTRACTOR IS RESPONSIBLE FOR ALL DEMOLITION AND CONSTRUCTION METHODS, TECHNIQUES, SEQUENCING, AND SAFETY REQUIRED FOR THE WORK.
- SEE SUBMITTAL KEY FOR REQUIRED SHOP DRAWING SUBMITTALS. UNLESS STATED OTHERWISE IN THE SPECIFICATIONS, SUBMIT 2 PRINTS FOR APPROVAL OR CORRECTIONS.
- ALL FEATURES OF CONSTRUCTION NOT FULLY SHOWN SHALL BE OF THE SAME TYPE AND CHARACTER AS SHOWN FOR SIMILAR CONDITIONS SUBJECT TO REVIEW BY THE ARCHITECT AND ENGINEER.
- ALL PRODUCTS AND MATERIALS USED BY THE CONTRACTOR SHALL BE APPLIED, PLACED, ERECTED OR INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

FOUNDATIONS

- FOUNDATION SIZES ARE BASED ON A TOTAL LOAD BEARING SOIL PRESSURE OF 10,000 PSF FOR BEARING ON SOLID BEDROCK.
- ALL FOOTINGS SHALL BE FOUNDED ON SOLID MASSIVE BEDROCK.

CONCRETE - CAST-IN-PLACE

- ALL CONCRETE SHALL BE NORMAL WEIGHT AND SHALL DEVELOP A MINIMUM 28 DAY LABORATORY CURED COMPRESSIVE-CYLINDER STRENGTH OF: 4000 PSI FOR SLABS, AND WALLS MAX W/C RATIO 0.45)
- A MINIMUM OF 5 CONCRETE TEST CYLINDERS SHALL BE PROVIDED FOR EACH 100 CU. YARDS OF EACH CONCRETE STRENGTH. CYLINDERS SHALL BE TESTED AS FOLLOWS: 1 @ 7 DAYS; 2 @ 28 DAYS AND 1 SITE CURED CYLINDER PRIOR TO REMOVAL OF FORMS FOR SLABS AND BEAMS.
- CONCRETE CYLINDER SAMPLING AND TESTING SHALL CONFORM WITH ASTM SPECIFICATIONS.
- CONCRETE, FORMS, MIXING, PLACING AND CURING SHALL CONFORM TO THE ACI MANUAL OF CONCRETE PRACTICE AND ITS SPECIFICATIONS.
- SLEEVES THROUGH BEAMS, WALLS AND SLABS FOR MECHANICAL LINES SHALL BE FABRICATED FROM STANDARD WEIGHT STEEL PIPE WITH ANCHORS AS APPROVED BY THE ENGINEER UNLESS OTHERWISE NOTED.
- ALL CONCRETE JOINTS FOR CAST-IN-PLACE BEAMS, WALLS, FOUNDATIONS AND SLABS NOT ON GRADE SHALL BE ROUGH TEXTURED WITH KEYS AT CENTER. CONTRACTOR SHALL OBTAIN ENGINEER'S REVIEW ON DETAILS OF ALL CONSTRUCTION JOINTS PRIOR TO CONSTRUCTION.

CONCRETE REINFORCING STEEL

- ALL REINFORCING STEEL SHALL CONFORM TO ASTM A-615 GRADE 60. ASTM A615 GRADE 40 FOR BEAMS, STIRRUPS, COLUMN TIES AND AS NOTED. SEE PLANS FOR AREAS OF HIGH-STRENGTH 75 KSI BAR DOWELS.
- WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.
- ALL WELDED REINFORCING STEEL SHALL BE A706, METAL INSERTS AND CONNECTIONS SHALL CONFORM TO U.B.C. STANDARD NO. 19-2.
- REINFORCING (MINIMUM UNLESS OTHERWISE SHOWN ON PLANS)
 - REINFORCING FOR WALLS
 - 6" - VERTICAL #4 @ 12" O.C. HORIZONTAL #4 @ 12" O.C.
 - 8" - VERTICAL #5 @ 12" O.C. HORIZONTAL #5 @ 12" O.C
 - 10" - VERTICAL & HORIZONTAL #4 @ 16" O.C.E.F.
 - 12" - VERTICAL & HORIZONTAL #4 @ 12" O.C.E.F.
 - PLACE 2-#5 X CONTINUOUS AT DISCONTINUOUS ENDS OF ALL FOUNDATIONS AND WALLS. PLACE 2'-0" X 2'-0" BARS AT CORNERS AND INTERSECTIONS OF WALLS AND FOUNDATIONS EQUAL IN SIZE AND NUMBER TO HORIZONTAL REINFORCING. PLACE 2-#5 X OPENING DIMENSIONS PLUS 4'-0" EACH SIDE OF ALL OPENINGS. PLACE 2-#5 X 4'-0" DIAGONAL BARS AT EACH CORNER OF ALL SLAB OPENINGS GREATER THAN 1'-6" IN DIMENSION.
- ALL REINFORCING STEEL SHALL BE DETAILED, FABRICATED AND PLACED IN ACCORDANCE WITH ACI DETAILING MANUAL 315. ALL REINFORCING STEEL SHALL BE ACCURATELY AND SECURELY PLACED. REINFORCING SHALL NOT BE SENT OR DISPLACED FOR THE CONVENIENCE OF OTHER TRADES UNLESS APPROVED BY THE STRUCTURAL ENGINEER. SPLAY, REINFORCING STEEL AROUND OPENINGS WITH 1" IN 10" SPLAY UNLESS OTHERWISE SHOWN.
- LOOSE MILL AND RUST SCALE, OIL, DIRT AND COATINGS OF ANY MANNER THAT WILL REDUCE BOND SHALL BE REMOVED PRIOR TO CONCRETE POUR.
- ALL REINFORCEMENT IS CONTINUOUS WITH ADEQUATE LAPS. REINFORCEMENT SHALL BE SECURED IN FORMS WITH SUITABLE TIES AND ANCHORAGE TO PREVENT DISPLACEMENT. BARS ADJACENT TO EARTH SHALL BE SUPPORTED BY CEMENT MORTAR CUBES.
- MINIMUM COVER FROM CONCRETE SURFACES TO REINFORCING STEEL SHALL BE:
 - 3" +- 1/2" TO BOTTOM OF FOOTING.
 - 2" +- 1/4" TO EARTH FACE OF WALL
 - 1" +- 1/4" TO INSIDE FACE OF WALL
- UNLESS OTHERWISE NOTED, DOWEL CONCRETE WALLS TO FOOTING WITH BARS OF SAME SIZE & SPACING AS WALL REINFORCEMENT.
- SLAB TOP REINFORCING BARS THAT TERMINATE IN A WALL OR COLUMN SHALL HAVE A STANDARD 90 DEGREE HOOK, UNLESS OTHERWISE DETAILED. BEAM, JOIST OR SLAB BOTTOM BARS THAT TERMINATE IN A COLUMN OR WALL SHALL EXTEND TO WITHIN 2" OF OPPOSITE FACE OF COLUMN OR WALL, UNLESS DETAILED OTHERWISE.
- LAP ALL BARS A MINIMUM OF 48 DIAMETERS EXCEPT AS OTHERWISE NOTED.

STRUCTURAL STEEL AND MISCELLANEOUS IRON

- STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING:

ROLLED WIDE FLANGE SHAPES	ASTM A-992 (Fy=50 KSI)
MISC. PLATE, BAR, ANGLE, CHANNEL	ASTM A-36 (Fy=36 KSI)
TUBING	ASTM A-500, GRADE B (Fy=46 KSI)
PIPE	ASTM A-53, TYPE E OR S,(Fy=35 KSI)
- ALL FABRICATION, ERECTION AND IDENTIFICATION AND PAINTING OF STRUCTURAL STEEL SHALL CONFORM TO AISC SPECIFICATIONS - DIVISION

- VIII (LRFD) OR DIVISION IX (ASD) AND U.B.C. STANDARDS NO. 22-1.
- ALL WELDING SHALL CONFORM TO AWS SPECIFICATIONS. ALL WELDERS SHALL BE CERTIFIED UNDER AWS SPECIFICATIONS. WELDS SHALL BE MADE WITH E70 SERIES ELECTRODES UNLESS OTHERWISE NOTED. WELD TESTING AND INSPECTION SHALL CONFORM TO THE MINIMUM REQUIREMENTS OF THE AWS D1.1 AND AISC.
- DRILLED-IN ANCHORS SHALL BE "RAWL-STUD" BY RAWL INC.,OR APPROVED EQUAL, CONTRACTOR TO SUBMIT ICBO REPORTS TO ENGINEER.
- ANCHOR BOLTS SHALL CONFORM TO ASTM A307, (Fy=36 KSI MIN.)
- HIGH STRENGTH (H.S.) BOLTS SHALL CONFORM TO ASTM A325-SC WHERE NOTED.
- PROVIDE TENSION INDICATING FASTENERS (LOAD INDICATING WASHER OR TWIST OFF BOLT) AT ALL H. S. BOLTS, TYPICAL, UNLESS INDICATED OTHERWISE.
- ALL STEEL EXPOSED TO WEATHER, MOSTURE, SOIL, OR AS NOTED SHALL BE HOT DIP GALVANIZED A-123.
- ALL BOLTS TO BE A325(X), UNLESS OTHERWISE NOTED.
- SHOP PAINTING: SEE SPECIFICATIONS

METAL DECKING:

- ALL METAL DECKING SHALL CONFORM TO THE SPECIFICATIONS OF METAL STEEL DECK INSTITUTE.
- METAL ROOF DECKING SHALL BE W3 X 20 GAGE, GALVANIZED 36" WIDE DECKING OF TYPES INDICATED IN THE DRAWINGS.
- DECKING SHALL BE CONTINUOUS ON 2 OR MORE SUPPORTS.
- CONNECT DECKING TO SUPPORTING MEMBERS WITH 1/2" DIA. PUDDLE WELDS, 8" WELDS PER SHEET THROUGH <> GAGE, STANDARD WELDING WASHERS.
- DECK SIDE LAPS SHALL BE CONNECTED WITH 1.5 SEAM WELD AT 8" O/C OR 14 GAGE X SELF TAPPING METAL SCREWS AT 8" O/C.
- WELDERS SHALL BE AWS CERTIFIED FOR LIGHT GAGE METAL WELDING.

SPECIAL INSPECTION

- INSPECTOR IS TO BE CONTRACTED BY OWNER, ENGINEER OR ARCHITECT PER UBC CODE REQUIREMENTS, AND LOCAL ORDINANCES. A PRE-CONSTRUCTION MEETING SHALL TAKE PLACE PRIOR TO FOUNDATION INSTALLATION. THE CONTRACTOR, ARCHITECT, ENGINEER AND INSPECTOR SHALL ATTEND.

SPECIAL INSPECTIONS SHALL BE PERFORMED ON THE FOLLOWING WORK:

- CONCRETE:
 - PLACEMENT OF CONCRETE (CONTINUOUS)
 - TAKING OF TEST SPECIMENS-AIR, STRENGTH AND SLUMP (CONTINUOUS)
 - PLACEMENT OF REINFORCING STEEL (PERIODIC)
- STEEL:
 - SINGLE PASS FILLET WELDS NOT EXCEEDING 5/16" (PERIODIC)
 - HIGH STRENGTH BOLTING - UBC SECTION 1701.6 (PERIODIC)
 - EPOXY OR MECHANICALLY FASTENED ANCHOR BOLTS (PERIODIC)

DEFERRED SUBMITTALS

SUBMITTAL DOCUMENTS FOR DEFERRED ITEMS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW.

ITEM	ENGINEER OF RECORD
------	-----------------------

STRUCTURAL STEEL SHOP DRAWINGS	X
REINFORCING STEEL SHOP DRAWINGS	X
CONCRETE MIX DESIGN	X

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

- Footings.
- Foundation walls.
- Slabs-on-grade.
- Suspended slabs.
- Building walls.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

Delete first paragraph and subparagraph below if not required.
Coordinate paragraph below with qualification requirements in Division 1 Section "Quality Requirements" and as supplemented in "Quality Assurance" Article.

Delete paragraph and subparagraph below if material test reports are not required.

D. Material Certificates: For each of the following, signed by manufacturers:

Edit list to suit Project.

- Cementitious materials.

2. Admixtures.

Retain paragraph below if Contractor engages testing agency for measuring floor surface flatness and levelness.

Delete paragraph below if no preinstallation conference.

1.3 QUALITY ASSURANCE

Delete first paragraph below if not required. See Division 1 Section "Quality Requirements" for general installer qualifications. Verify availability of qualified personnel with a local ACI chapter or concrete contractors. These desirable programs may have limited grass-roots penetration.

Retain paragraph below if Contractor or manufacturer selects testing agency for concrete mixture design, material test reports, or field quality control. Retain option if field quality-control testing agency employed by Contractor must be approved by authorities having jurisdiction.

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents: Retain second option in first subparagraph below if ACI 301, Section 7, for structural lightweight concrete is applicable.

- ACI 301, "Specification for Structural Concrete"

B. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

Preinstallation conference below, which is desirable for major concrete installations, helps minimize misunderstandings and reviews Project conditions that might lead to significant problems. Delete paragraph and subparagraphs if Work of this Section is not extensive or complex enough to justify a preinstallation conference. If retaining, coordinate with Division 1.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

Retain subparagraph and associated subparagraphs below if warranted by complexity of design mixtures and quality control of concrete materials.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

- Contractor's superintendent.
- Independent testing agency responsible for concrete design mixtures.

CAST IN PLACE CONCRETE SPECS CONT ON SHEET S-3

REVISIONS

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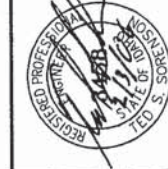
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APP'D

DATE

BY

MORA DROP HYDROELECTRIC PROJECT
RIVER SIDE INCORPORATED



SORENSEN ENGINEERING
CONSULTING ENGINEERS

IDAHO FALLS, IDAHO
GRAPEVIEW, WASHINGTON

SCALE
NOTED

DRAWING NO.
D05-0720

SHEET NO.
S-2

STRUCTURAL NOTES AND SPECIFICATIONS
FERC PROJECT NO. 3403

THIS DRAWING SHEET HAS
BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY

CAST IN PLACE CONCRETE CONT FROM SHEET S-1A

c. Ready-mix concrete manufacturer.
d. Concrete subcontractor.
1.4 DELIVERY, STORAGE, AND HANDLING
Retain option in first paragraph below if zinc- or epoxy-coated steel reinforcement is required.
A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

Delete or revise this Article to suit steel reinforcement requirements.
A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
Retain paragraph below for reinforcement that is welded or if added ductility is sought.
B. Low-Alloy-Steel Reinforcing Bars: (weldable rebar) ASTM A 706/A 706M, deformed.
Retain paragraph below for galvanized steel reinforcement. Select type of reinforcement from first set of options and zinc coating class from second set. Class I has at least 50 percent more zinc weight than Class II.
Retain paragraph below for epoxy-coated steel reinforcement. Select type of reinforcement from first set of options and epoxy-coated product from second set. ASTM A 775/A 775M bars are usually epoxy coated before fabrication; ASTM A 934/A 934M bars are epoxy coated after fabrication and should not be field bent or rebent.
C. Epoxy-Coated Reinforcing Bars: ASTM A 615 Grade 60 (Grade 420), ASTM A 706 deformed bars, ASTM A 934 epoxy coated, with less than 2 percent damaged coating in each 12-inch (300-mm) bar length.
Retain first paragraph below for stainless-steel reinforcement. Select one of two options for reinforcement type.

2.2 REINFORCEMENT ACCESSORIES

Add other products for dowels or dowel sleeves if required. These include circular and rectangular plastic dowel sleeves, square dowels, and plastic-surfaced or reinforced-paper-covered dowels.
A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacturer bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
Delete or revise three subparagraphs below to suit Project.
Add mechanical splices and connections for steel reinforcement here if required.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project.
Select type and color of portland cement from options in subparagraph below.
1. Portland Cement: ASTM C 150, Type I or II
Fly Ash: ASTM C 618, Class F.
Silica fume below is most often used in high-strength concrete and in special applications such as bridge decks to enhance durability by lowering permeability of concrete. ACI 301 identifies silica fume as a cementitious material.
Select class of aggregate from options in paragraph below or revise to suit Project. ASTM C 33 limits deleterious substances in coarse aggregate depending on climate severity and in-service location of concrete. Classes in first set of options are ASTM C 33 default classes for concrete exposed to weather for Severe, Moderate, and Negligible weathering regions, respectively. Revise first two options to Class 4S or 4M if concrete will be exposed to frequent wetting. Retain last option if damage caused by concrete expansion from alkali silica or alkali carbonate reactions is anticipated.
B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.
Select coarse-aggregate size from three options in subparagraph below; add gradation requirements if preferred. Aggregate size limits relate to spacing of steel reinforcement, depth of slab, or thickness of concrete member.
1. Maximum Coarse-Aggregate Size: 1-1/2 inches (38 mm) nominal
Retain first paragraph below if using lightweight aggregate for structural lightweight concrete. Select size limit from four options below.
C. Water: ASTM C 94/C 94M and potable.
2.4 ADMIXTURES

If subparagraphs titled "Available Products," "Products," "Available Manufacturers," or "Manufacturers" are retained in this Article, coordinate with Part 2 "Manufacturers" Article. Retain "Available" for nonproprietary and delete for semiproprietary specifications.
A. Air-Entraining Admixture: ASTM C 260.
B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
Select one or more chemical admixtures from six subparagraphs below.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

Retain paragraph and subparagraphs below if limiting percentage of cementitious material that can replace portland cement. Neither ACI 301 nor ACI 318 (ACI 318M) limit amount of cementitious material that can replace portland cement unless concrete is exposed to deicing chemicals. Identify parts of building or structure affected by these limits unless extending them to all concrete.
Retain appropriate option in first paragraph below for chloride limits. Identify portions of building with different limits if required. Percentages below repeat ACI 301 limits, respectively, for prestressed (post-tensioned) concrete, reinforced concrete exposed to chloride, reinforced concrete that will not be dry or protected from moisture, and reinforced concrete that will be dry or protected from moisture. ACI 301 and ACI 318 (ACI 318M) express this percentage by weight of cement, not cementitious material.

B. Admixtures: Use admixtures according to manufacturer's written instructions.
Delete or revise four subparagraphs below to suit Project.

1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

Add locations and dosage of corrosion-inhibiting admixture to subparagraph below if required.

2.6 CONCRETE MIXTURES FOR BUILDING ELEMENTS

This Article contains examples of building elements that often need different concrete mixtures. Revise, consolidate, or add other building elements if more concrete mixtures are required.
A. Footings, Walls & Mat foundation : Proportion normal-weight concrete mixture as follows:
Select strength from five options in subparagraph below or revise to suit Project. Coordinate compressive strength with water-cementitious materials ratio if concrete will be subject to special exposure conditions or sulfate exposure as identified in ACI 318 (ACI 318M).

1. Minimum Compressive Strength: 4000 psi (27.6 MPa) MPa) at 28 days.
Select water-cementitious materials ratio from three options in subparagraph below, revise to suit Project, or delete if in-service durability conditions are benign and limits on water-cementitious materials ratio are not required. Coordinate water-cementitious materials ratio with compressive strength. See Evaluations for discussion.
2. Maximum Water-Cementitious Materials Ratio: 0.55
3. Select slump limit from three options in subparagraph below or revise to suit Project.
4. Slump Limit: 5 inches (125 mm), plus or minus 1 inch (25 mm).
Percentages in options in two subparagraphs below are default air contents required by ACI 301 for severe exposure.
5. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.
Select strength from five options in subparagraph below or revise to suit Project.
Delete paragraph and subparagraphs below if normal-weight structural concrete is used. Coordinate requirements with lightweight aggregate supplier, structural engineer, and, if applicable, UL design limits.
- B. Suspended PT Slabs: Proportion structural concrete mixture as follows:
Select strength from five options in subparagraph below or revise to suit Project.

1. Minimum Compressive Strength: 5000 psi (34.5 MPa) at 28 days. 3000 psi at 3 day for stressing. Retain one of three options in subparagraph below or revise values or unit weight terminology.
"Calculated equilibrium unit weight" is the basis preferred by the Expanded Shale Clay and Slate Institute rather than "maximum air dry unit weight" included in ACI 301 for measuring unit weight.
Select slump limit from two options in subparagraph below or revise to suit Project.
2. Slump Limit: 5 inches (125 mm), plus or minus 1 inch (25 mm).
Retain one or more of three subparagraphs below. Percentages in first two subparagraphs are default air contents required by ACI 301 for lightweight concrete subject to freezing and thawing, severe weather, or deicer chemicals.
3. Air Content: 5-1/2 percent, plus or minus 2 percent at point of delivery for nominal maximum aggregate size greater than 3/8 inch (10 mm).
Air content below is maximum recommended by ACI 302.1R for trowel-finished floors.
Delete subparagraph below if no steel-fiber reinforcement. Indicate location, on Drawings, of concrete using steel fiber. Revise application rate to suit Project.

2.7 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.8 CONCRETE MIXING

Retain option in paragraph below if steel or synthetic fibers are required.
A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
Select surface classes, usually two or more, from two subparagraphs below. See discussion in "Formwork" Article in the Evaluations. Coordinate with rough- and smooth-form finishes in "Finishing Formed Surfaces" Article.
1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
2. Class B, 1/4 inch (6 mm) for rough-formed finished surfaces.
D. Construct forms tight enough to prevent loss of concrete mortar.
E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.
F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
Retain one of two options in first paragraph below. ACI 301 requires chamfers, unless otherwise specified.
G. Chamfer exterior corners and edges of permanently exposed concrete.
H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
J. Relighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

Specify embedded items and anchorage devices for other work attached to or supported by cast-in-place concrete. Add specific requirements for installing embedded items, if any, that are part of the Work.
A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISI's "Code of Standard Practice for Steel Buildings and Bridges."
Retain applicable subparagraphs below and add others if required. Revise to suit Project.

2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

Revise removal time in paragraph below if required. Period of 24 hours is halved to 12 hours in ACI 347R. Commentary in ACI 318 (ACI 318M) recognizes 12 hours for concrete using regular portland cement but advises that this period may be insufficient for concrete using Type II and Type V portland cements or ASTM C 595 blended hydraulic cements, concrete with retarding admixtures, and concrete using ice during mixing.

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.

Retain option in first subparagraph below if adopting recommendation of ACI 347R. ACI 301 requires concrete to reach its specified compressive strength.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength - or post-tensioning operations are complete.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

3.4 SHORES AND RESHORES

Review this Article with structural engineer and revise if required.

A. Comply with ACI 318 (ACI 318M) and ACI 301 for design, installation, and removal of shoring and reshoring.

3.5 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

Delete subparagraph below if welding is not permitted or required.

1. Weld reinforcing bars according to AWS D1.4, where indicated.
- Retain paragraph below if using epoxy-coated reinforcement.
- D. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.

Retain paragraph below if using zinc-coated reinforcement.

Delete paragraph below if no doweled contraction or expansion joints; revise if precoated dowels are required.

3.6 CONCRETE PLACEMENT

A. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
Retain paragraph above or first paragraph and subparagraph below. ACI 301 permits water to be added to concrete mixture on-site to adjust slump, up to amount allowed in design mixture.
B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete

embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
C. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
- D. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.7 MISCELLANEOUS CONCRETE ITEMS

This Article is an example only. Add, revise, or delete items to suit Project.
A. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.8 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
B. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
Select one or more curing methods from four subparagraphs and associated subparagraphs below. Delete methods or restrict use of curing methods to specific locations or types of surfaces if required.
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

Retain first three subparagraphs below as Contractor's options unless not suited for Project.

- a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
- Curing and sealing compound in subparagraph below is usually for floors and slabs and may act as a permanent surface finish.

3.9 FIELD QUALITY CONTROL

Retain one of first two paragraphs below.

Retain first option in paragraph below if authorities having jurisdiction require Owner to engage a special inspector. Retain last option if Owner engages testing agency, with or without a special inspector. See "Testing and Inspecting Considerations" Article in the Evaluations.

A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
Retain first paragraph below if Contractor engages testing agency.
B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:
Retain seven subparagraphs below if special inspections are required. Items below are examples of special inspections and are based on IBC requirements; revise to add other inspections or to suit requirements of other building codes.

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
Retain subparagraph above or below. Above is an example that produces more frequent testing than below, which is testing frequency required to comply with ACI 301.

2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.

Retain first subparagraph below with either subparagraph selected above.
a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample. Delete first subparagraph below if no structural lightweight concrete.

6. Compression Test Specimens: ASTM C 31/C 31M.

a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.

Field-cured specimens in subparagraph below may be required to verify adequacy of curing and protection of concrete, to verify strength for tilt-up concrete and post-tensioning concrete, or to verify strength for removal of shoring and reshoring in multistory construction. Revise number of test specimens if required.

b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
Coordinate number of compression test specimens in subparagraph and associated subparagraphs above with number of compressive-strength tests in subparagraph and associated subparagraphs below.

7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

Revise age at testing in first subparagraph below or delete if not required. Limit field testing to concrete in designated structural elements if not required throughout Project.

a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

Delete first subparagraph below if field-cured specimens are not required.

8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.

13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

14. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.

Retain paragraph below if measurements of floor flatness and levelness tolerances are required.

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AUGUST, 2005		SPB				
		SJB				
		TSS				
		LSHAKER				
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STRUCTURAL NOTES AND SPECIFICATIONS FERC PROJECT NO. 3403						
						
SORENSEN ENGINEERING CONSULTING ENGINEERS IDAHO FALLS, IDAHO GRAPEVIEW, WASHINGTON						
SCALE NOTED						
DRAWING NO. SHEET NO.						
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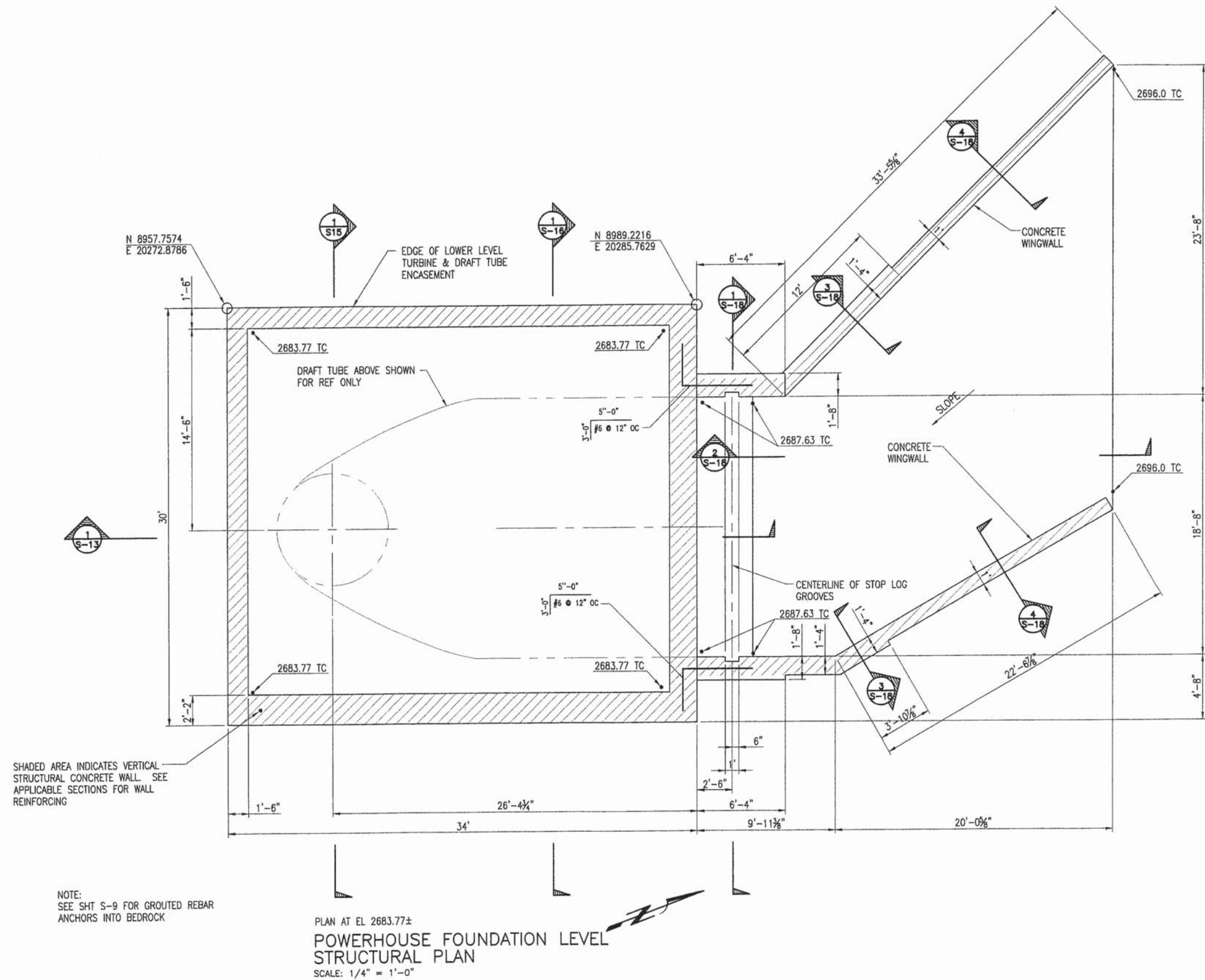


1. GROUT MATERIAL AND GROUT INSTALLATION: THE GROUT MIXTURE, THE GROUTING MATERIAL AND THE GROUT PUMPING SHALL BE IN ACCORDANCE WITH THE POST TENSIONING INSTITUTE MANUAL OF RECOMMENDATIONS AND PROCEDURES. OTHER PRESCRIBED METHODS FOR THE PLACEMENT OF THE GROUT SHALL NOT BE APPROVED UNLESS THE METHOD HAS BEEN REVIEWED AND ACCEPTED IN WRITING BY THE STRUCTURAL ENGINEER.
2. THE VERTICAL SPACE BETWEEN THE TOP OF BEDROCK AND THE BOTTOM OF THE STRUCTURAL CONCRETE SHALL BE FILLED WITH LEAN CONCRETE, $F_c = 1200$ MINIMUM. THE LEAN CONCRETE SHALL BE PLACED PRIOR TO THE DRILLING OF THE ROCKBOLTS.
3. THE EQUIPMENT SUPPLIERS SHALL PROVIDE THE SIZE, LAYOUT AND ETC TO THE ENGINEER AND INSTALLATION CONTRACTOR WITH THE FINAL APPROVED SHOP DRAWINGS.

② REBAR ROCK ANCHOR BOLT LOCATION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL THE ROCK BOLT FOR THE POWERHOUSE HOLD DOWN SYSTEM. SOIL TESTING AND DETERMINATION OF BEDROCK HAS NOT BEEN ACCOMPLISHED. THE CONTRACTOR SHALL PROVIDE A COST PER VERTICAL FOOT FOR ROCKBOLTS, THAT WILL INCLUDE THE DRILLING, SUPPLY, INSTALLATION AND GROUTING OF THE ROCKBOLTS. THE ROCKBOLTS SHALL BE 1" (#8) GRADE 60 PER ASTM A-706 WELDABLE REBAR ROCK ANCHOR TO BE PLACED IN THE ROCK ANCHOR PATTERN SHOWN ON THE STRUCTURAL DRAWING. THESE ARE TO BE DRILLED, PLACED AND GROUTED AFTER THE PLACEMENT OF THE LEAN CONCRETE FLOOR SLAB HAS BEEN PLACED FOR 7 DAYS. THE MIN EMBEDMENT IN BEDROCK SHALL NOT BE LESS THAN 8'-0" FROM THE TOP OF BEDROCK TO THE BOTTOM OF THE DRILL HOLE. THE MINIMUM EMBEDDED LENGTH OF THESE BOLTS SHALL BE MEASURED FROM THE TOP OF COMPETENT BEDROCK. THE GROUTING OF THESE ANCHORS SHALL BE ACCOMPLISHED WITH GROUT TUBES INSERTED TO THE FULL DEPTH OF THE HOLE SUCH THAT ALL VOIDS ARE FILLED AND WATER WILL BE EXPELLED FROM THE HOLE.

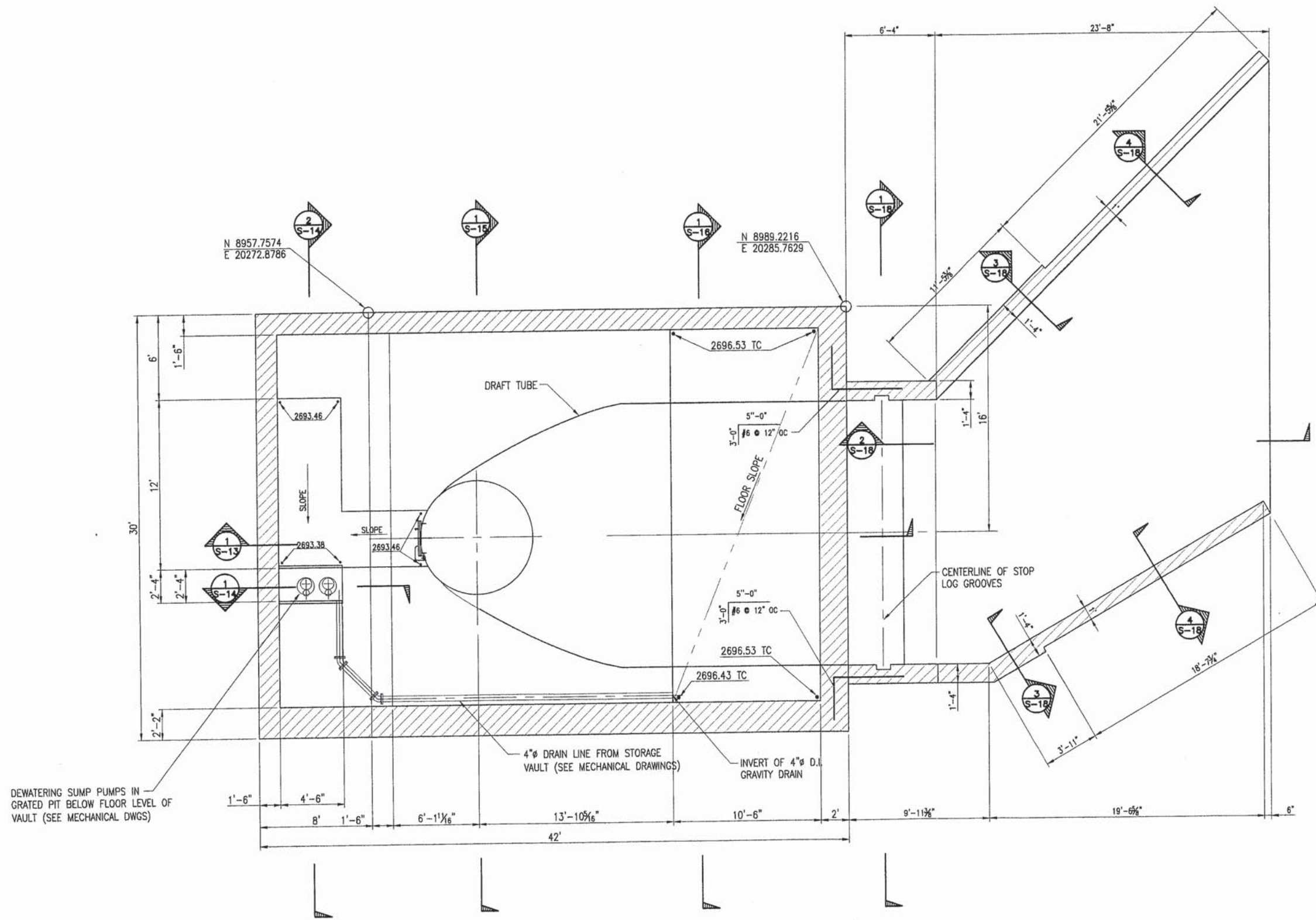
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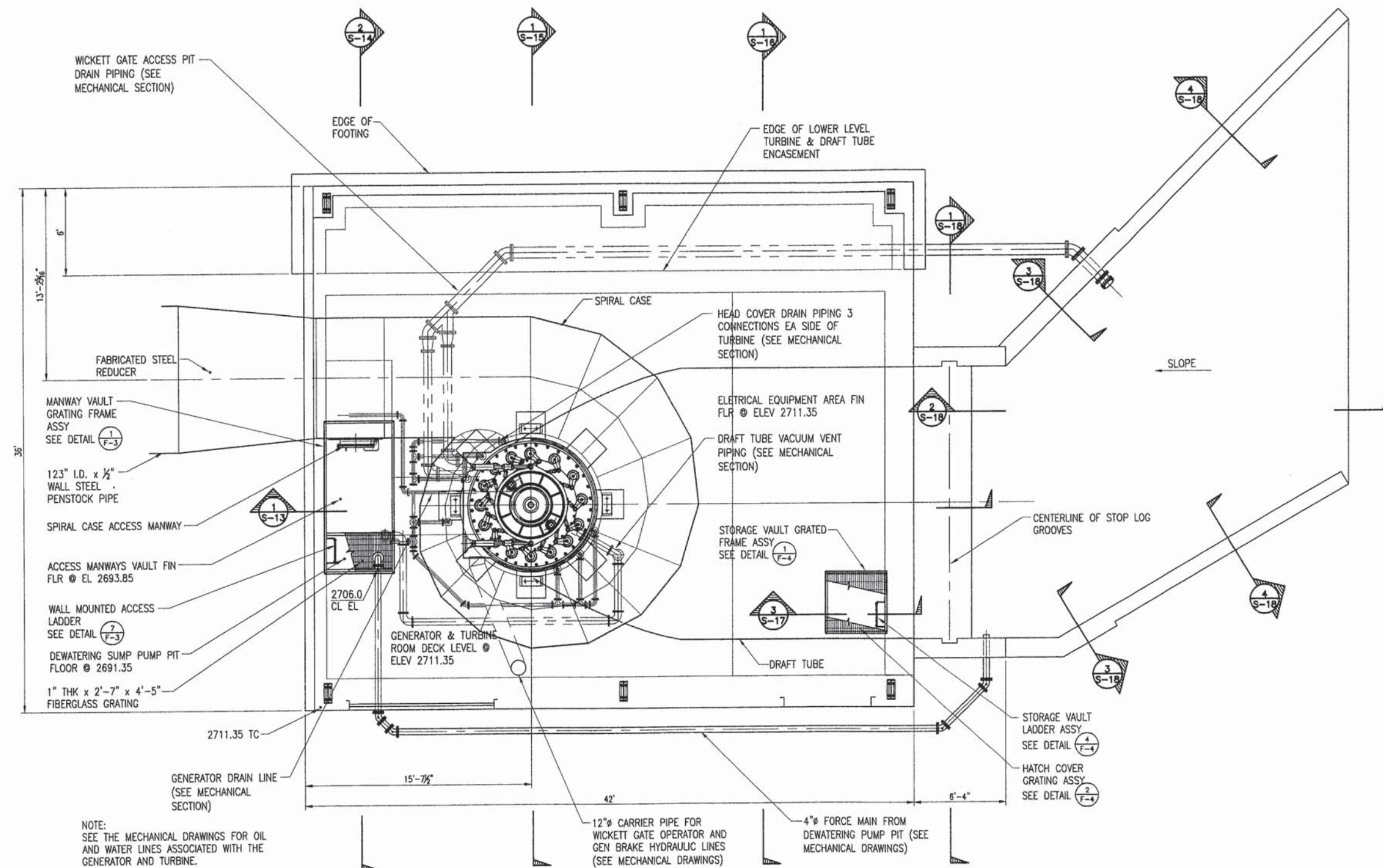
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PLAN AT EL 2700.9±
**POWERHOUSE GALLERY LEVEL
 STRUCTURAL PLAN**
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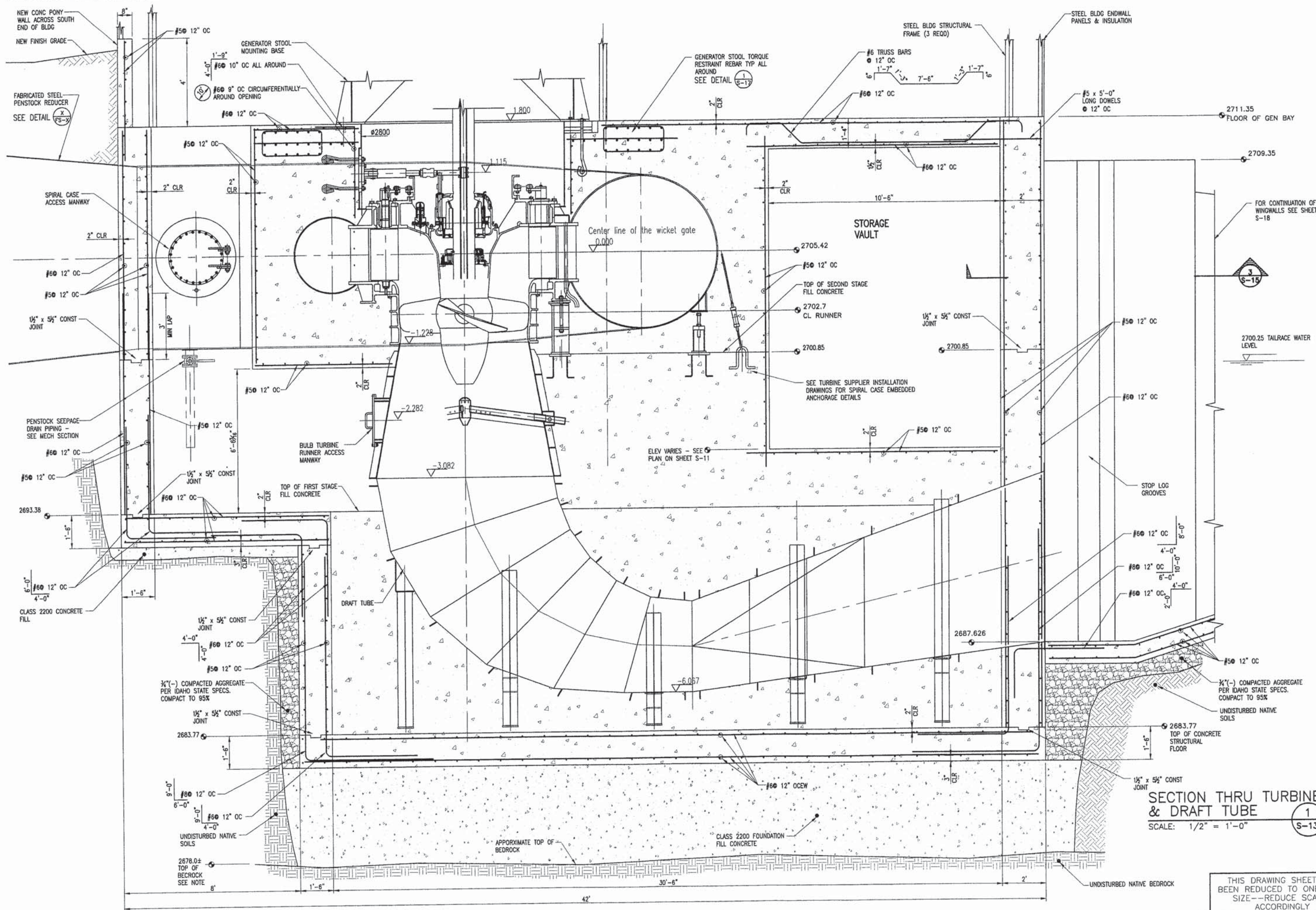
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POWERHOUSE UPPER LEVEL STRUCTURAL PLAN

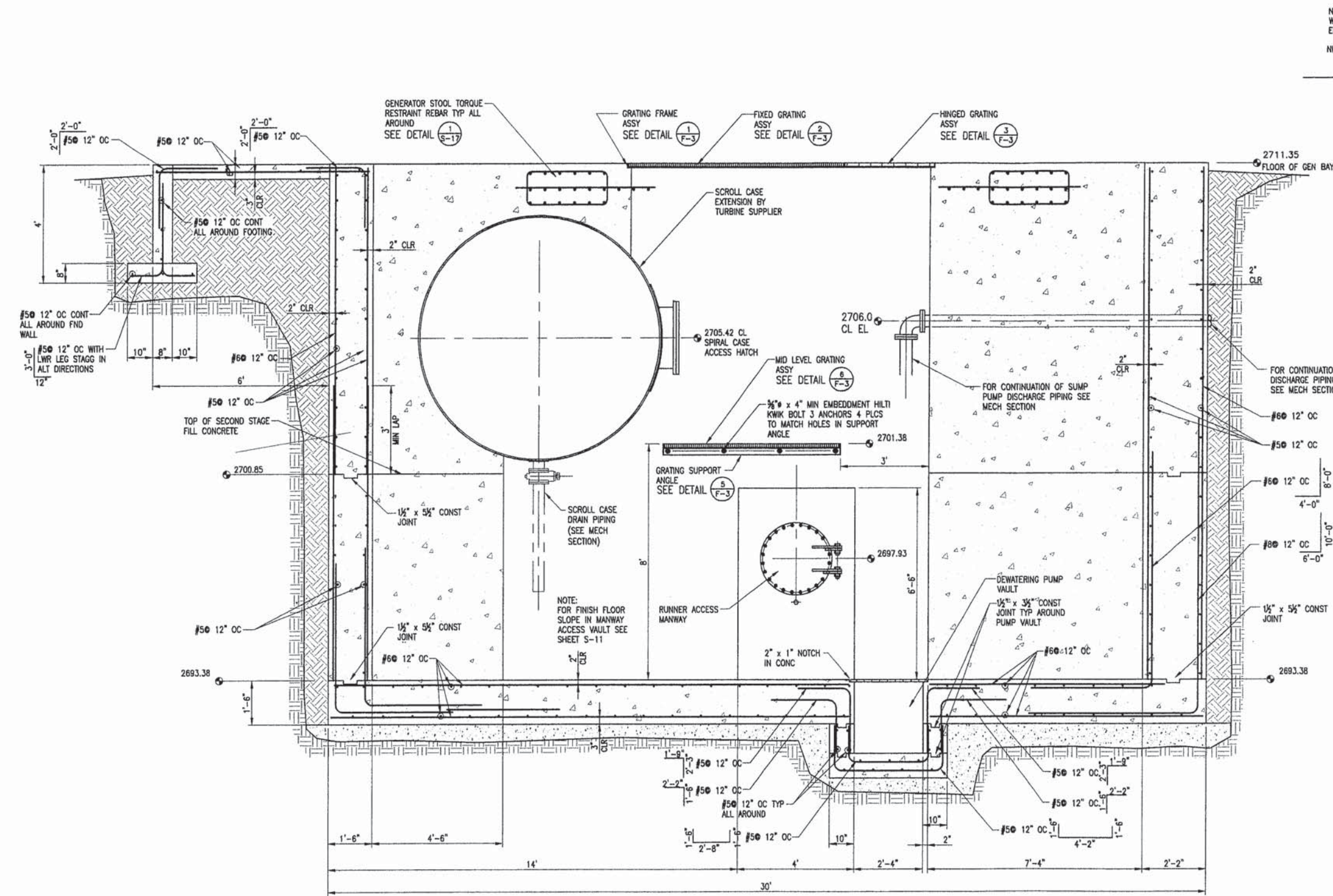
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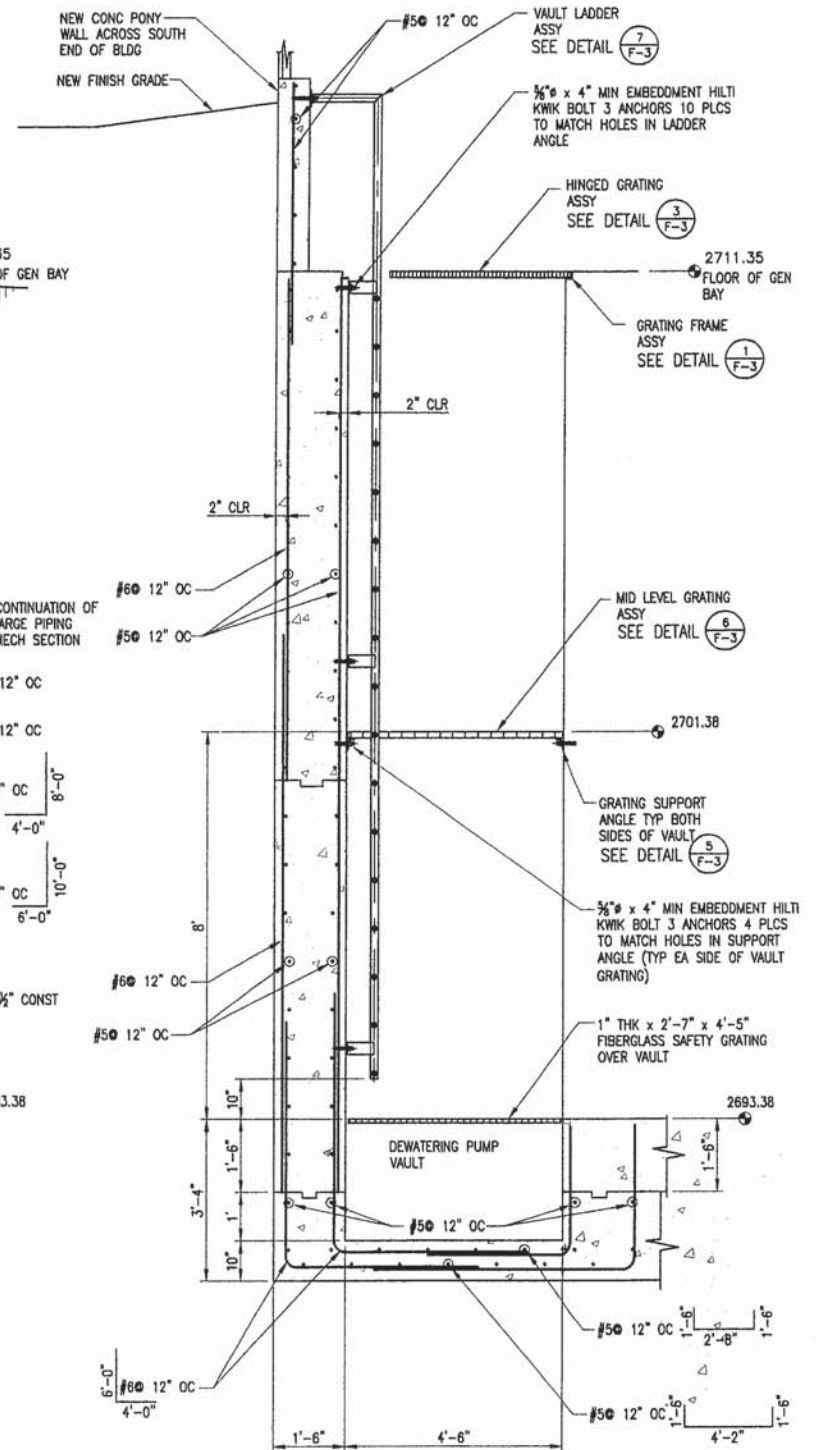
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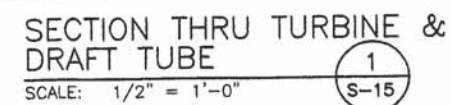
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VAULT
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SECTION THRU VAULT LADDER
& PUMP PIT
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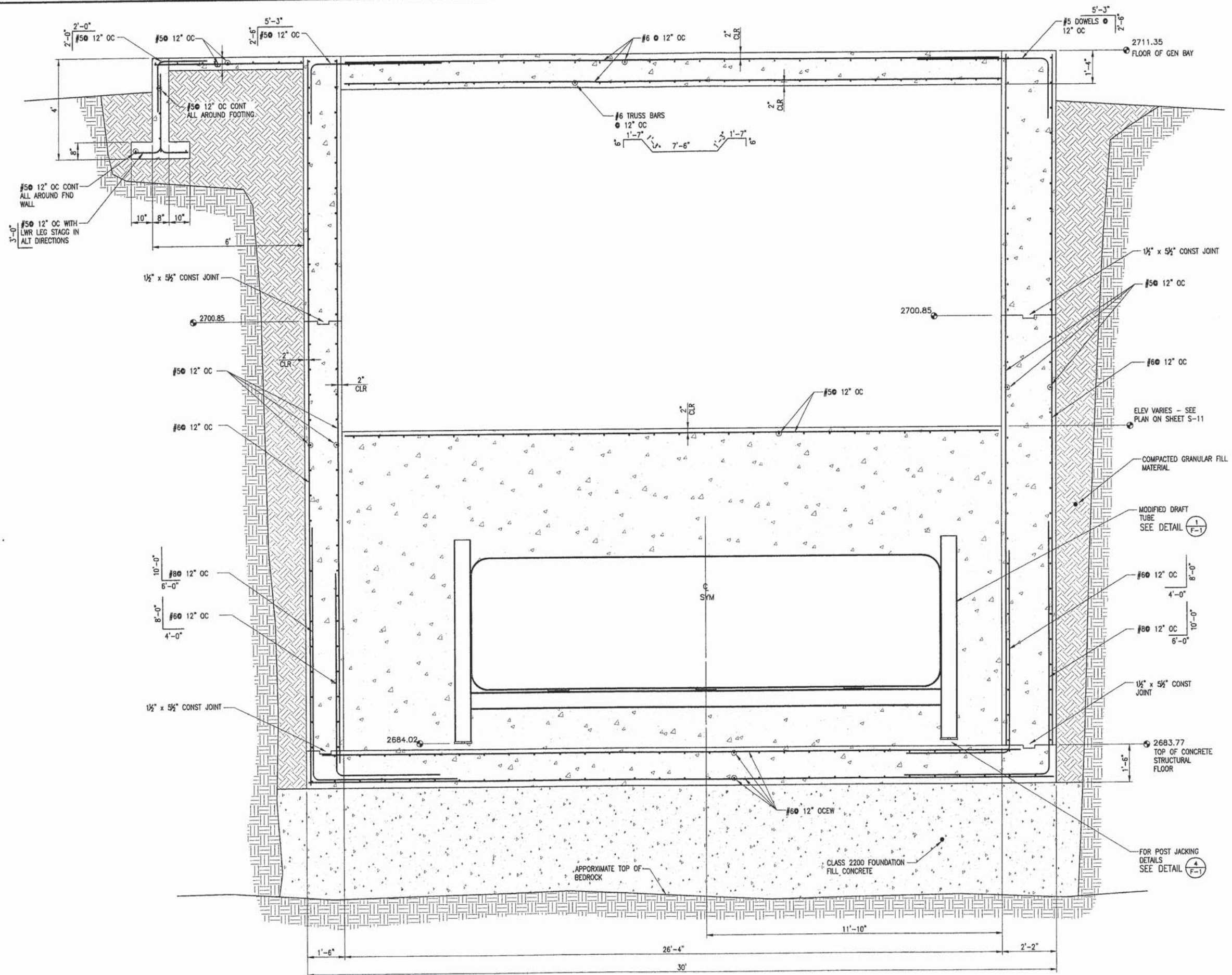
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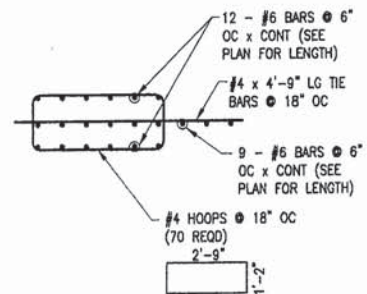
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SECTION THRU STORAGE
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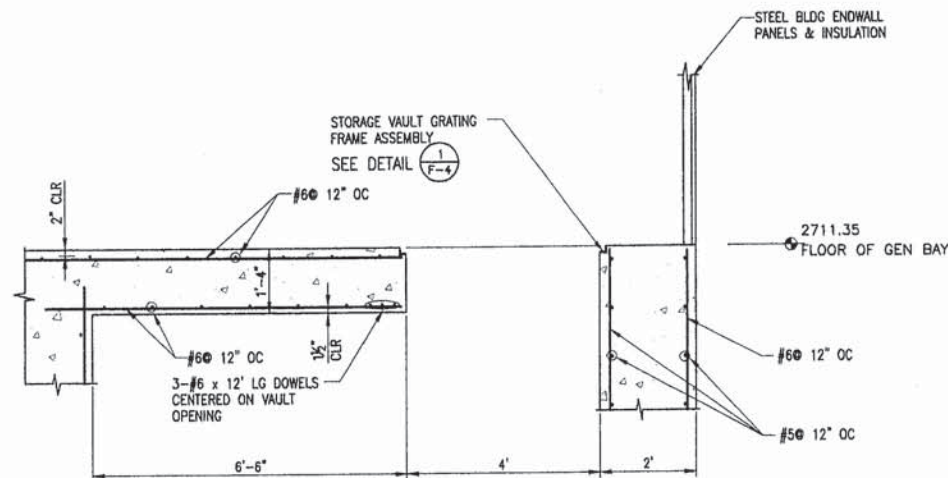
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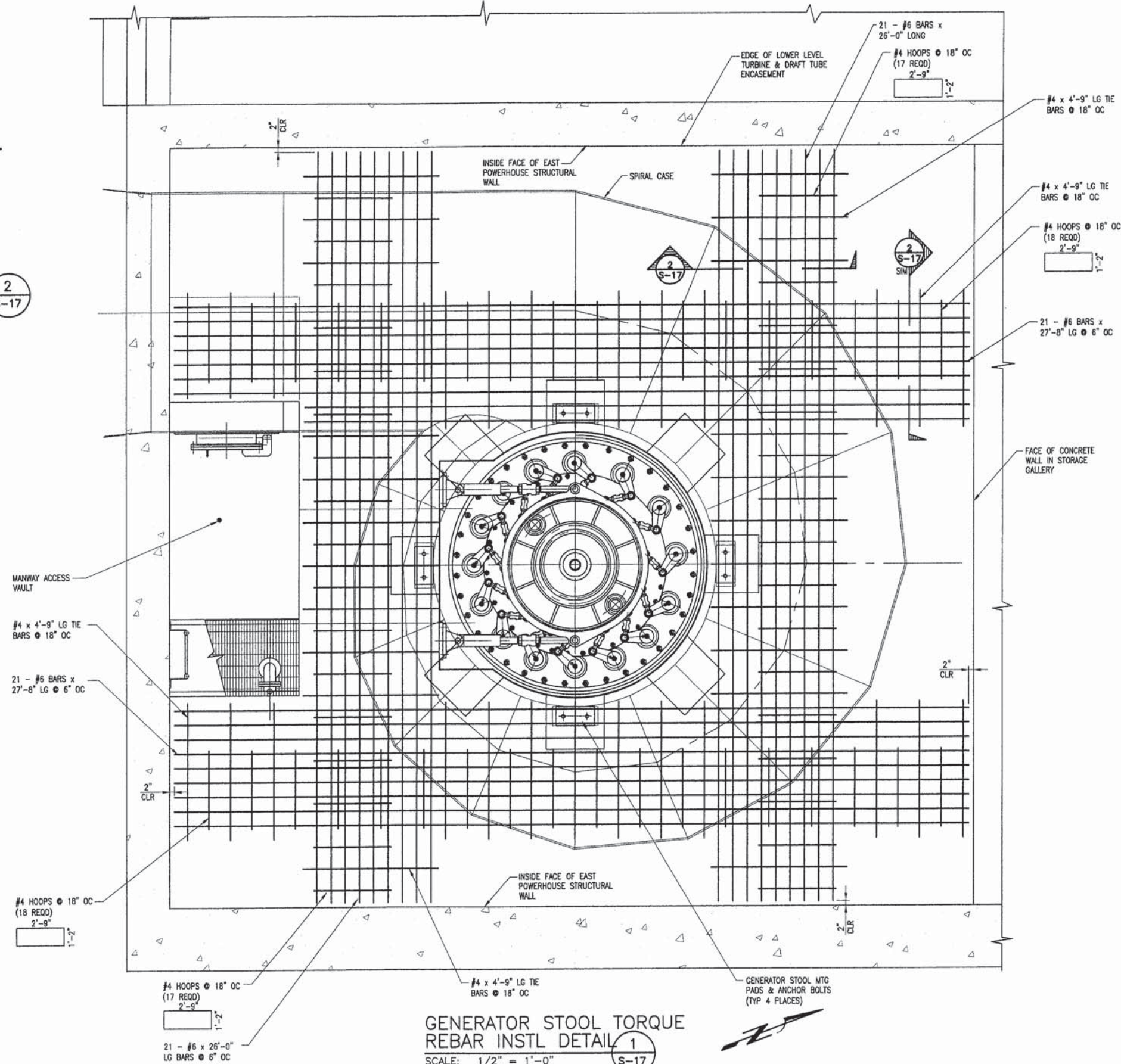
TORQUE RESTRAINT REBAR SECTION
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STORAGE VAULT ACCESS HATCH SECTION
SCALE: 1/2" = 1'-0"

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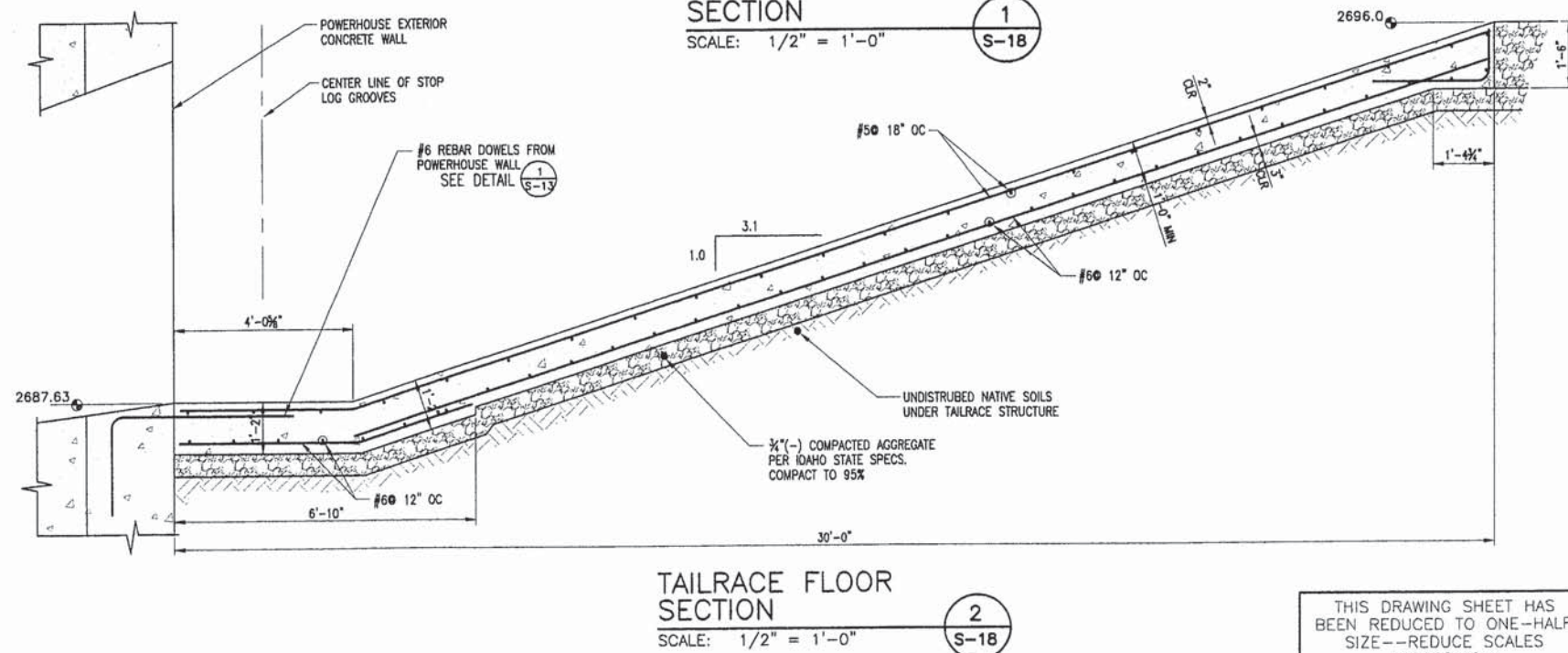
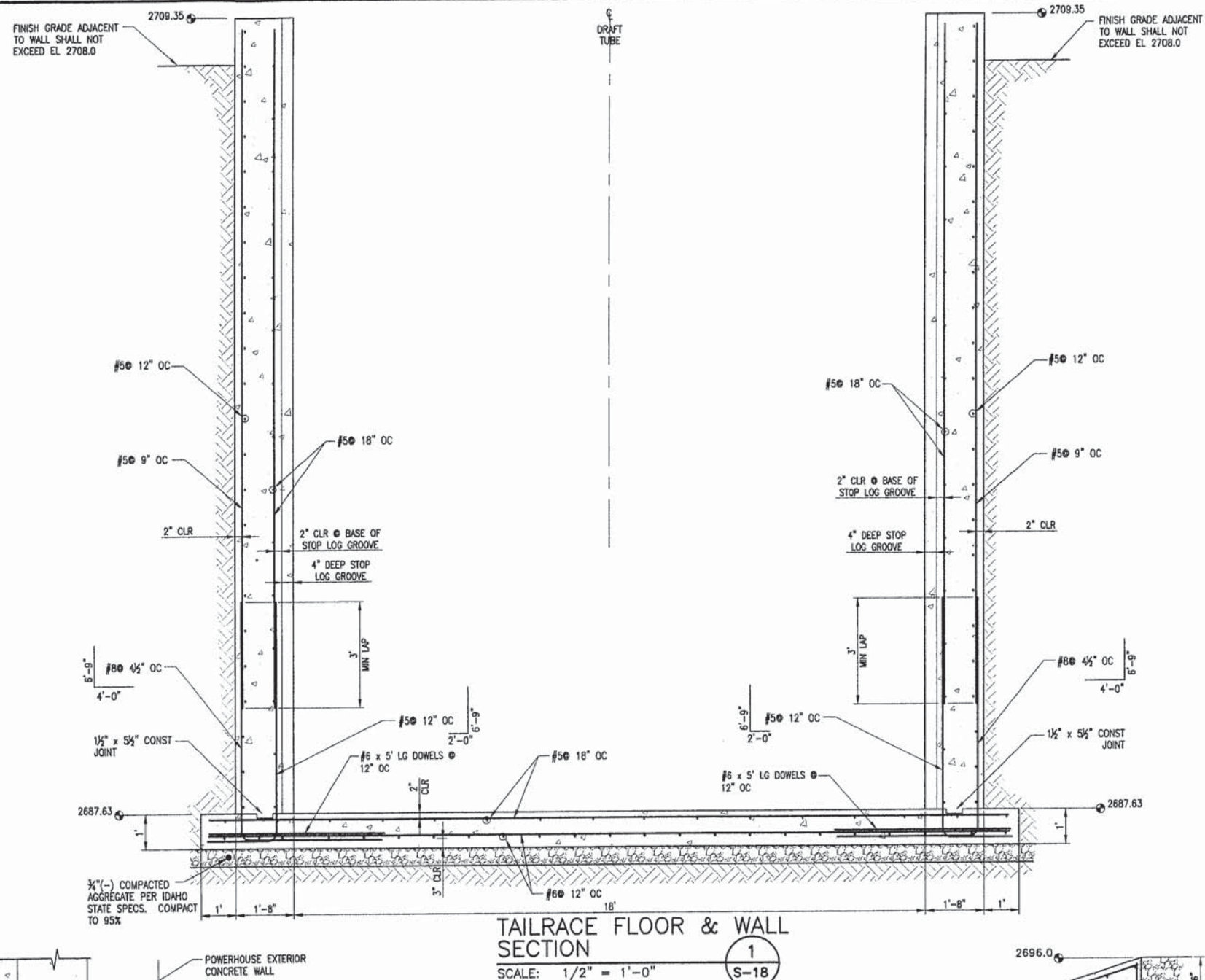
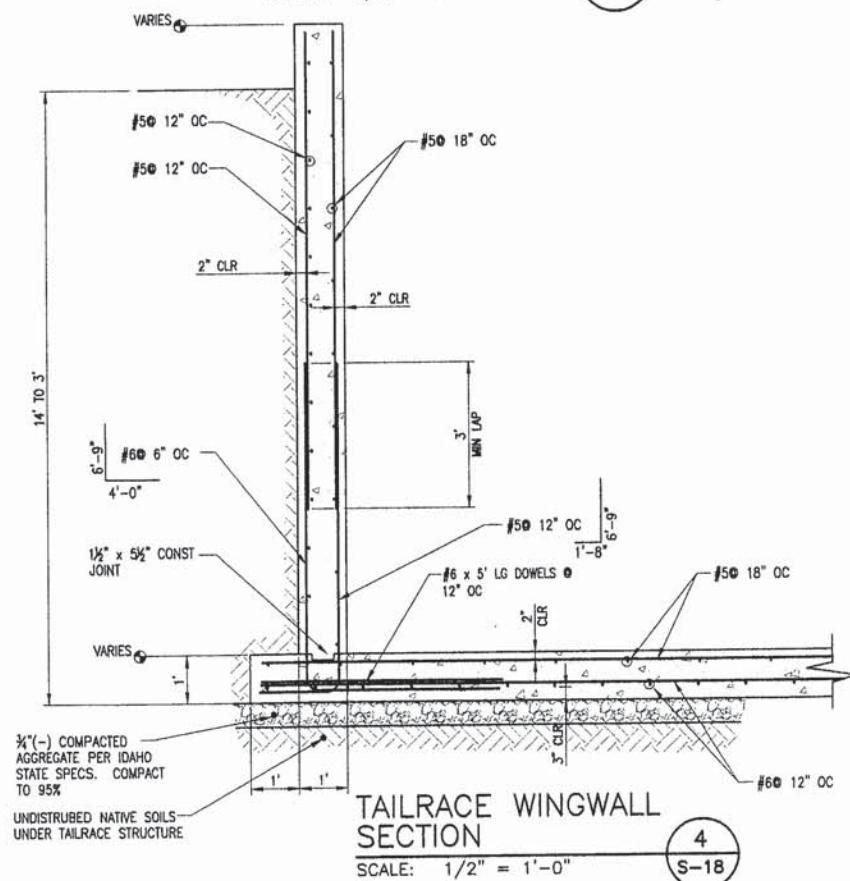
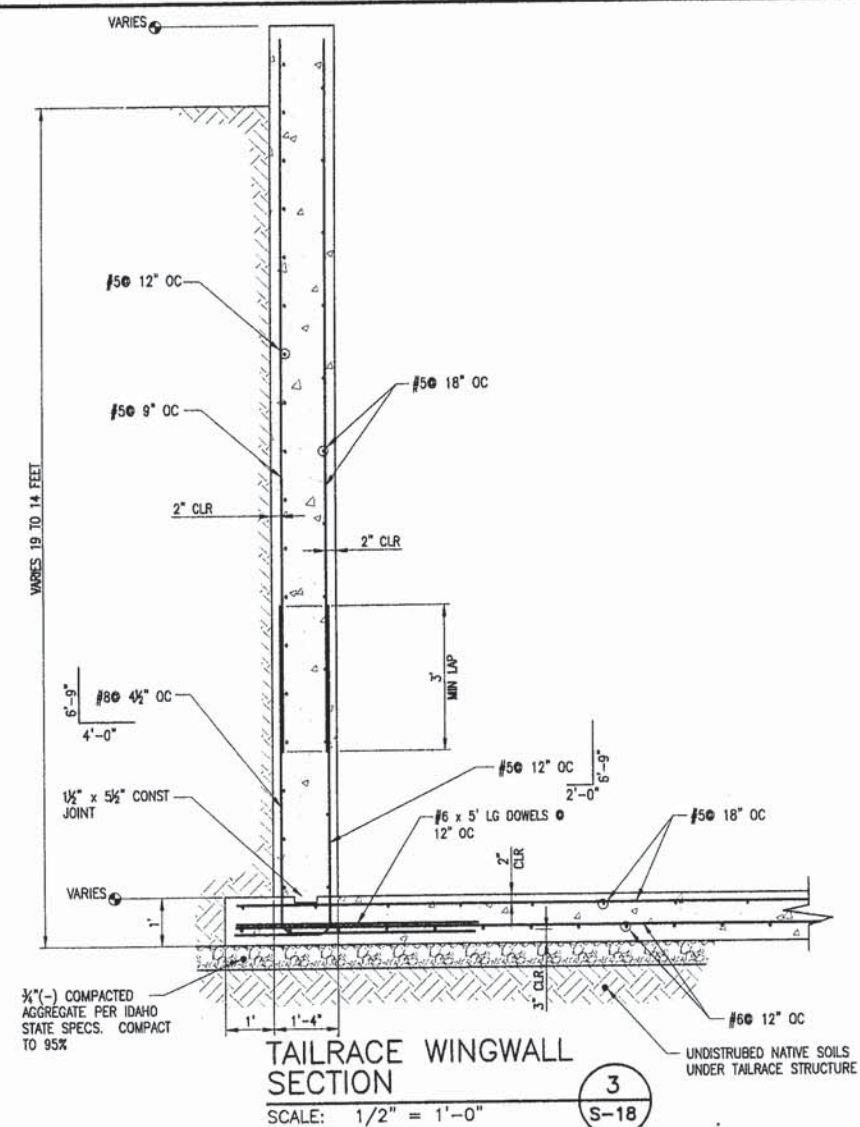


GENERATOR STOOL TORQUE REBAR INSTL DETAIL
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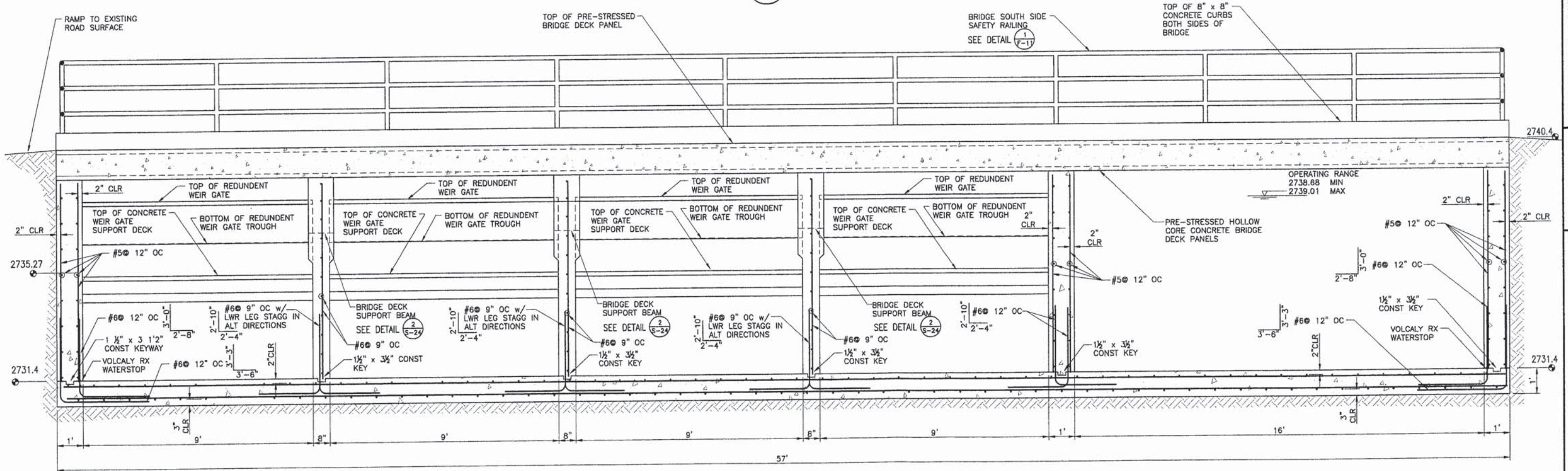
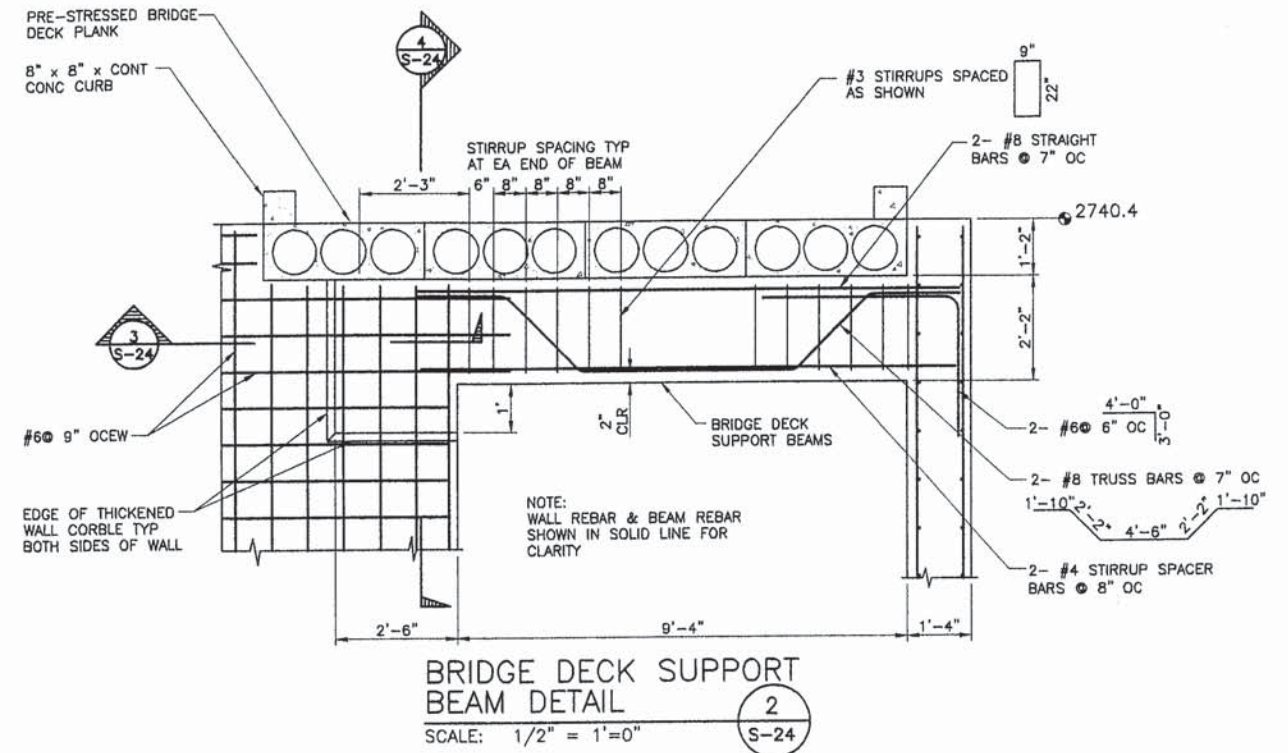
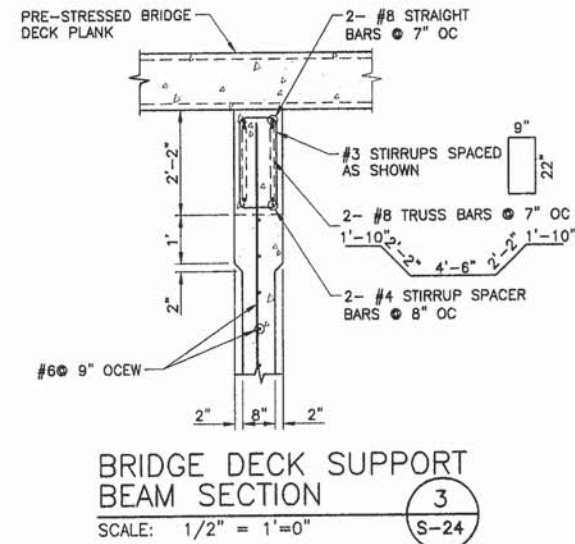
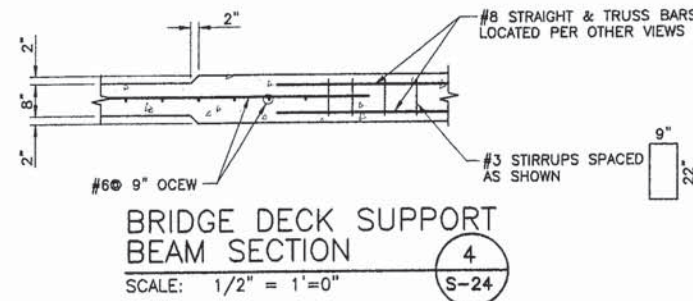
REV		REVISIONS		AS-BUILT 2007	
DATE	REV	BY	CHKD	APP'D	DESCRIPTION
SEPTEMBER, 2005	A	SPB	SUB	TSS	
MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED					
POWERHOUSE STRUCTURE GENERATOR STOOL TORQUE RESTRAINT REBAR FERC PROJECT NO. 3403					
SORENSEN ENGINEERING CONSULTING ENGINEERS IDAHO FALLS, IDAHO GRAPEVIEW, WASHINGTON					
SCALE: _____ DRAWING NO. D05-0720 SHEET NO. S-17					

THIS DRAWING SHEET HAS BEEN REDUCED TO ONE-HALF SIZE--REDUCE SCALES ACCORDINGLY



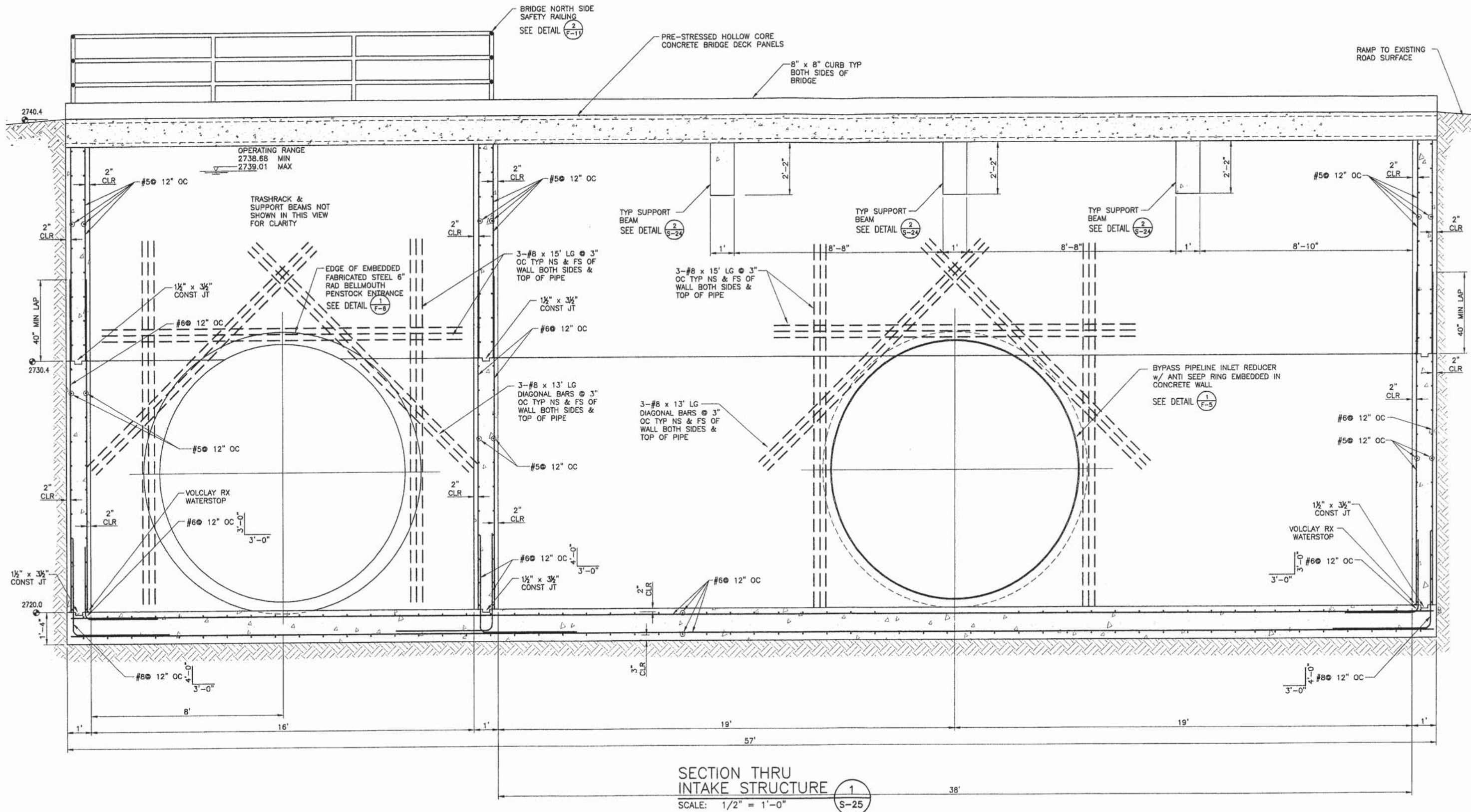
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BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY

SCALE	SORENSEN ENGINEERING CONSULTING ENGINEERS IDAHO FALLS, IDAHO GRAPEVIEW, WASHINGTON		MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED		DATE	NOVEMBER, 2005	REV	REVISIONS
					DRAWN	SPB	A	AS-BUILT 2007
					CHECKED	SJB	B	STRUCTURE 2007 AS-BUILT FOR 2007 AS-BUILT FOR 2007 AS-BUILT FOR
					APPROVED	TSS	C	UNDER 1500 SQ. FT. OF UNDER 1500 SQ. FT. OF UNDER 1500 SQ. FT. OF
					ENGINEER			FEBRUARY 3, 2006 1/2" = 1'
DRAWING NO. D05-0720	POWERHOUSE STRUCTURE TAILRACE STRUCTURAL DETAILS FERC PROJECT NO. 3403							
SHEET NO.	S-18							



REV LTR		DATE		BY		CHECKED		APPROVED		DESIGNED	
A		AUGUST 2005		SPB		SJB		TSS			
REVISIONS AS-BUILT 2007											
MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED INTAKE STRUCTURE MISCELLANEOUS SECTIONS PENSTOCK & BYPASS FERC PROJECT NO. 3403											
SORENSEN ENGINEERING CONSULTING ENGINEERS IDAHO FALLS, IDAHO GRAPEVIEW, WASHINGTON											
SCALE NOTED											
DRAWING NO. D05-0720											
SHEET NO. S-24											

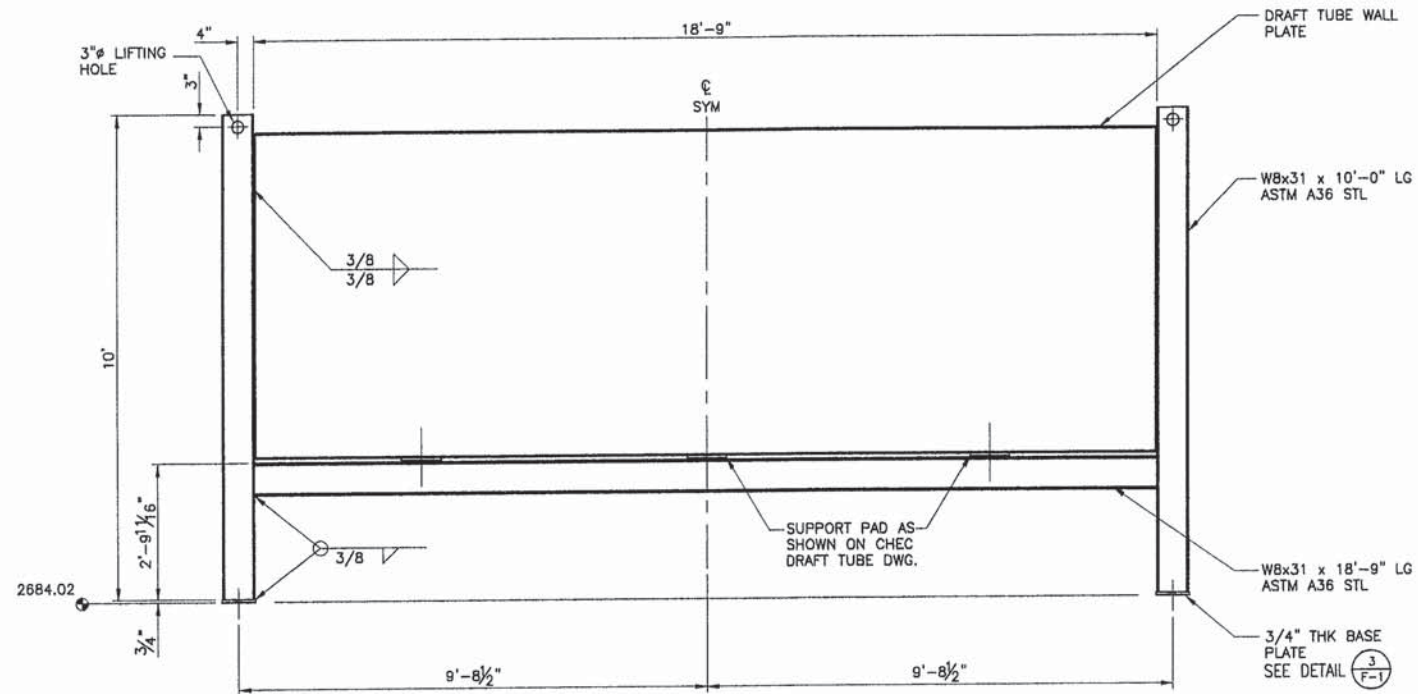
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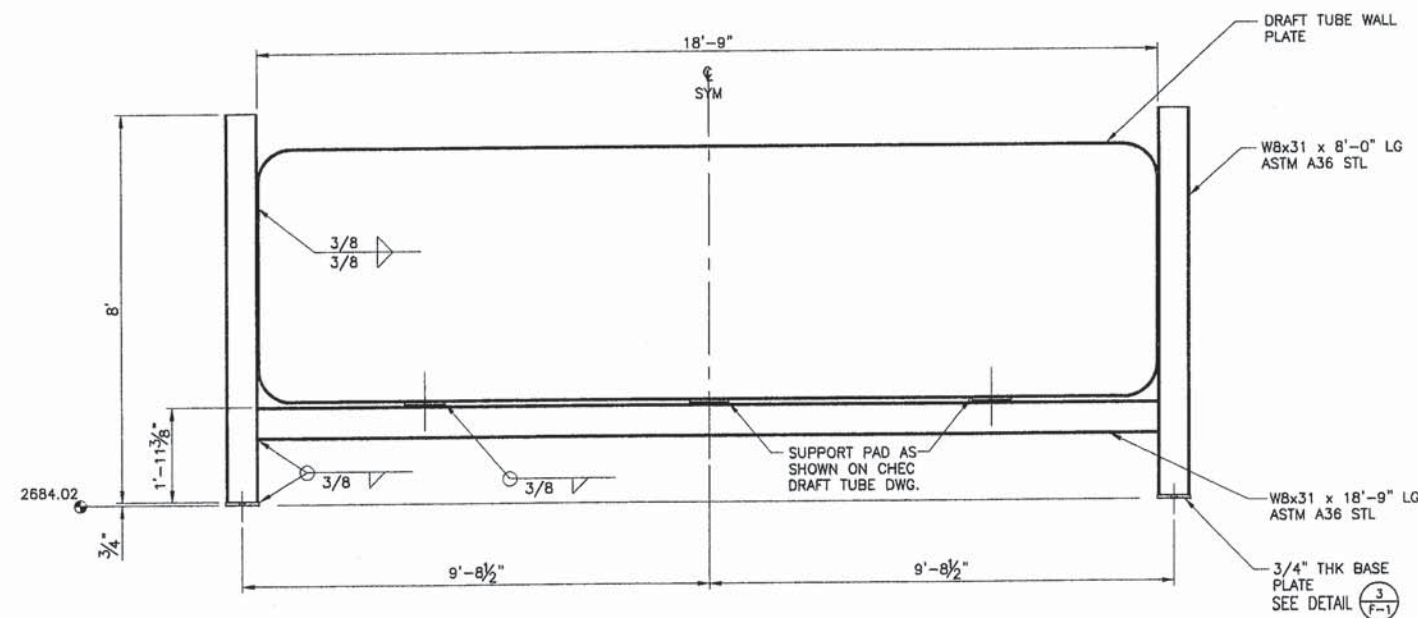
SECTION THRU
INTAKE STRUCTURE 1
SCALE: 1/2" = 1'-0" S-25

REV LTR		DATE	BY	CHKD	APPD	DESIGNED	NOTED	REVISIONS
A		AUGUST 2005	SPB	SJB	TSS			AS-BUILT 2007
MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED								
INTAKE STRUCTURE SECTION THRU STRUCTURE PENSTOCK & BYPASS FERC PROJECT NO. 340.3								
SORENSEN ENGINEERING CONSULTING ENGINEERS IDAHO FALLS, IDAHO GRAPEVIEW, WASHINGTON								
SCALE: NOTED DRAWING NO. D05-0720 SHEET NO. S-25								

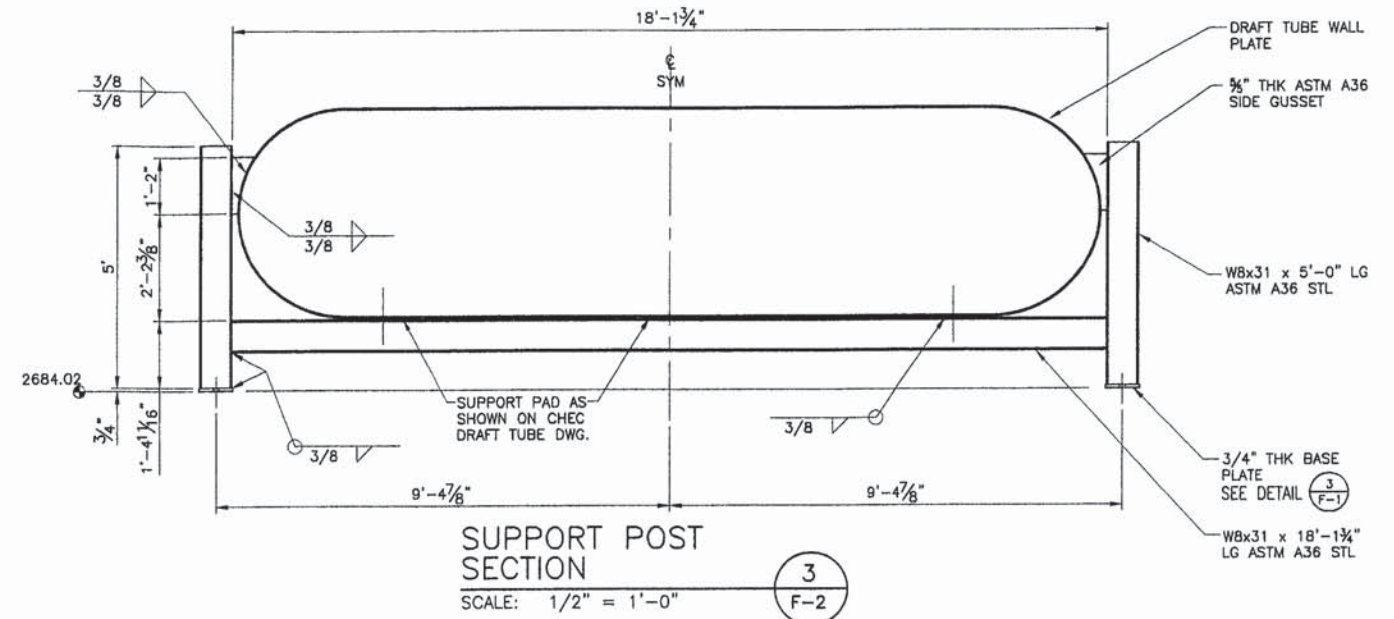
THIS DRAWING SHEET HAS
BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY



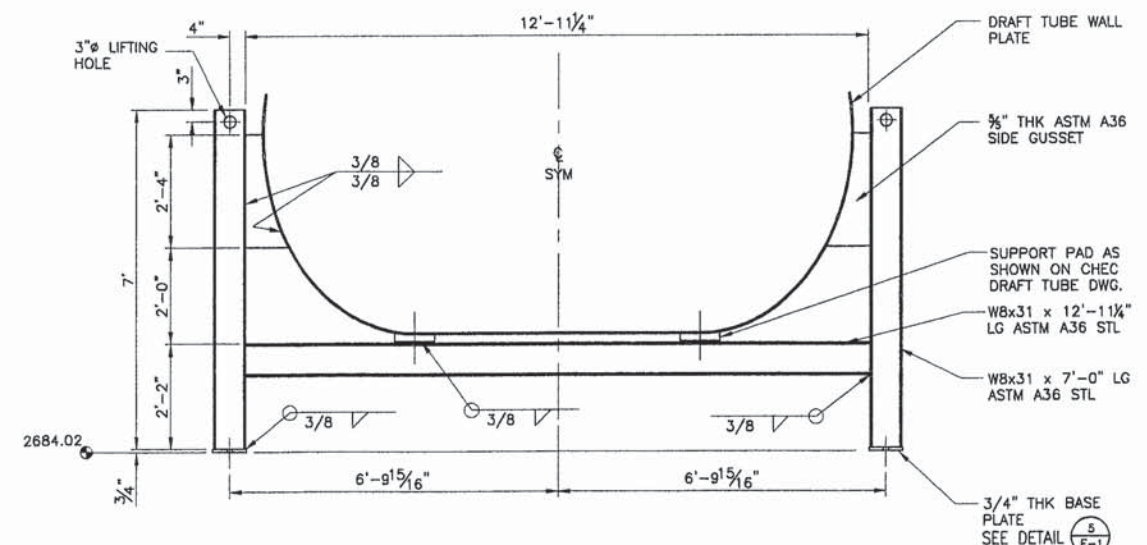
SUPPORT POST SECTION
SCALE: 1/2" = 1'-0"



SUPPORT POST SECTION
SCALE: 1/2" = 1'-0"



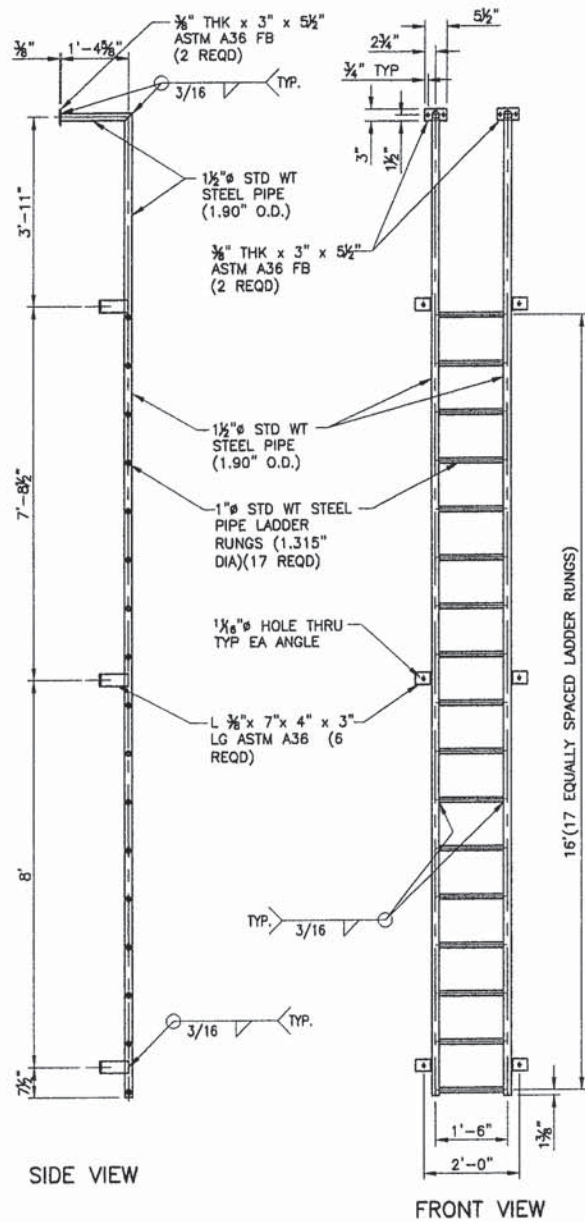
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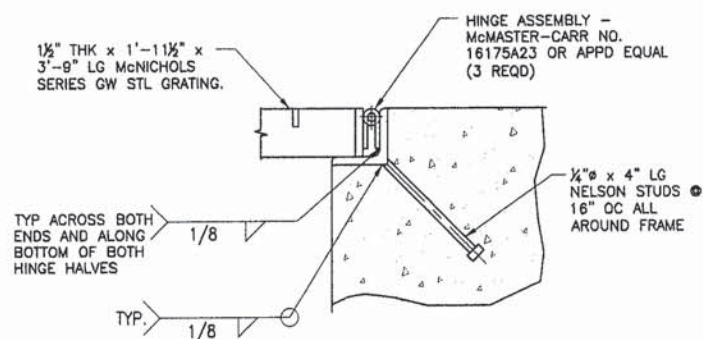
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SCALE: 1/2" = 1'-0"

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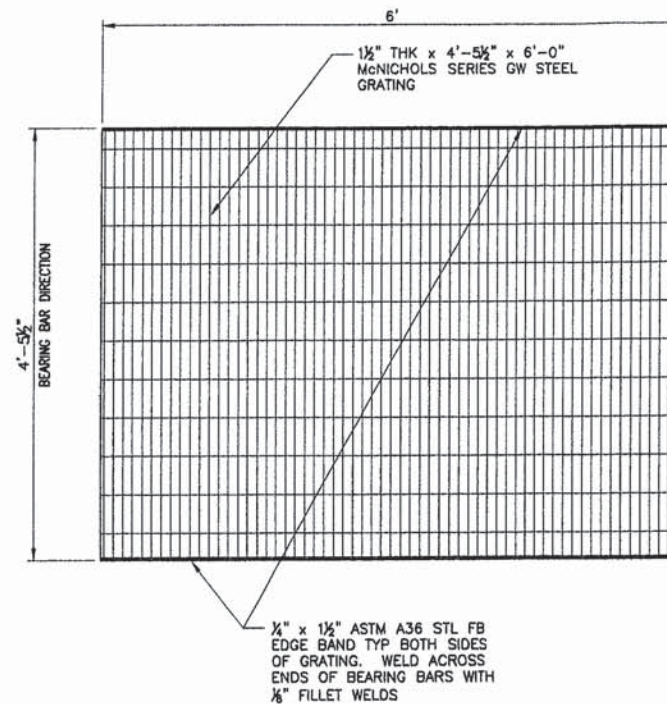
REVISIONS		AS-BUILT 2007	
REV	LTR	DATE	BY
1		AUGUST, 2005	SPB
2			SJB
3			TSS
4			
MORA DROP HYDROELECTRIC PROJECT			
RIVER SIDE INCORPORATED			
DRAFT TUBE SUPPORT DETAILS			
FERC PROJECT NO. 3403			
SORENSEN ENGINEERING CONSULTING ENGINEERS IDAHO FALLS, IDAHO GRAPEVIEW, WASHINGTON			
SCALE		NOTED	
DRAWING NO.		D05-0720	
SHEET NO.		F-2	



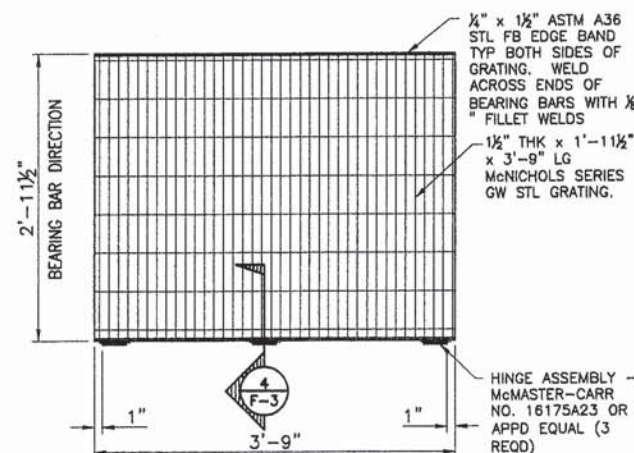
MANWAY VAULT LADDER ASSY
SCALE: 1/2" = 1'-0"



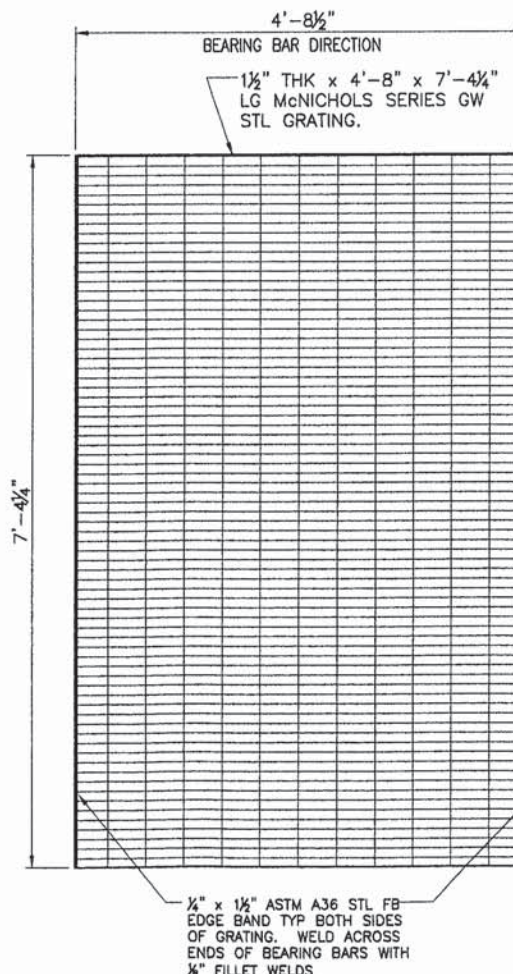
MANWAY VAULT HINGED ASSEMBLY DETAIL
SCALE: 4" = 1'-0"



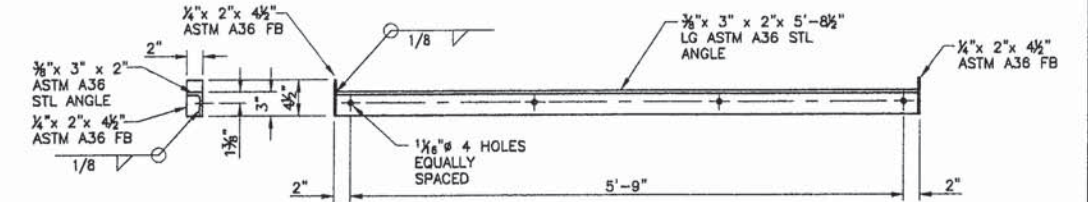
MANWAY VAULT MID LEVEL GRATING ASSEMBLY
SCALE: 1" = 1'-0"



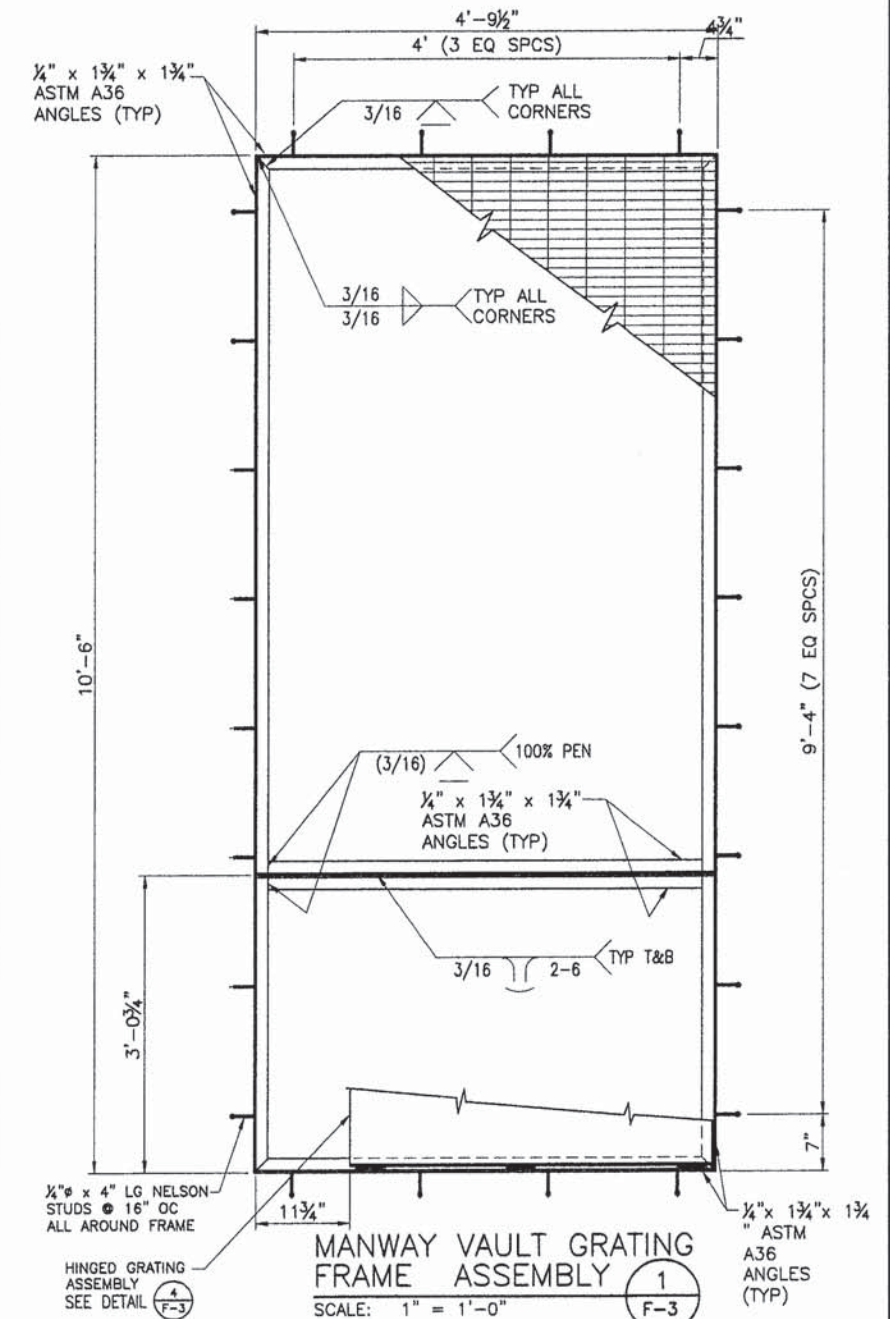
MANWAY VAULT HINGED GRATING ASSEMBLY
SCALE: 1" = 1'-0"



MANWAY VAULT FIXED GRATING ASSEMBLY
SCALE: 1" = 1'-0"



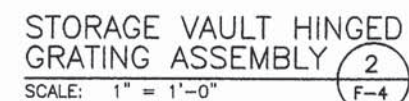
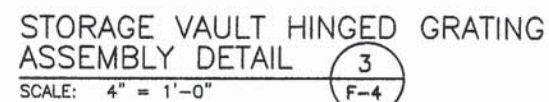
MANWAY VAULT GRATING SUPT ANGLE ASSY
SCALE: 1" = 1'-0"



MANWAY VAULT GRATING FRAME ASSEMBLY
SCALE: 1" = 1'-0"

THIS DRAWING SHEET HAS BEEN REDUCED TO ONE-HALF SIZE--REDUCE SCALES ACCORDINGLY

REVISIONS		AS-BUILT 2007	
REV	DATE	BY	APP'D
5	AUGUST, 2005	SPB	TSS
4			
3			
2			
1			
MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED			
POWERHOUSE MAN WAY VAULT FABRICATED STEEL DETAILS FERC PROJECT NO. 3403			
SORENSEN ENGINEERING CONSULTING ENGINEERS		IDAHO FALLS, IDAHO GRAPEVIEW, WASHINGTON	
DRAWING NO. D05-0720		SHEET NO. F-3	



SCALE

NOTED

DRAWING NO.
D05-0720

SHEET NO. **5**

F-4

SORENSEN ENGINEERING CONSULTING ENGINEERS IDAHO FALLS, IDAHO GRAPEVIEW, WASHINGTON		MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED		DATE: NOVEMBER, 2005 DESIGN: SPB CHECKED: SJB APPROVED: TSS FOUNDER:	REV LTR AS-BUILT 2007
SCALE: NOTED DRAWING NO. D05-0720 SHEET NO. F-4		POWERHOUSE STORAGE VAULT GRATED HATCH AND LADDER FABRICATED STEEL DETAILS FERC PROJECT NO. 3403			

1" x 1" x .125 WIRE
CLOTH TACK WELDED
ACROSS END OF
OPENING

18"Ø x 3/8" WALL x
20' LG ASTM-A36
STEEL PIPE

18"Ø x 3/8" WALL x
2'-8" LG ASTM-A36
STEEL PIPE

3/8" 100% PEN

18"Ø x 3/8" WALL x
20' LG ASTM-A36
STEEL PIPE

18"Ø VENT STACK ASSEMBLY

SCALE: 1/2" = 1'-0" (2 REQD)

4
F-5

1/2" THK STL PLATE ANTI
SEEP RING 1/4 SEGMENT

10'-4" MINOR AXIS OF ELLIPSE

3" TIP ALL
AROUND

123" I.D. x 1/2" WALL STEEL PIPE SUPPLIED BY OWNER

TRUE VIEW OF ANTI-SEEP RING

SCALE: 1/2" = 1'-0"

3
F-5

123" I.D. x 1/2" WALL STEEL PIPE SUPPLIED BY OWNER

1/2" THK STL PL ANTI SEEP RING

60°

60°

1/4

1/4

123" I.D. x 1/2" WALL STEEL PIPE SUPPLIED BY OWNER

1/2" THK STL PL ANTI SEEP RING

BYPASS PIPELINE INLET REDUCER PLAN

SCALE: 1/2" = 1'-0"

2
F-5

10'-3" I.D.

123" I.D. x 1/2" WALL STEEL PIPE SUPPLIED BY OWNER

BYPASS PIPELINE INLET REDUCER ELEVATION

SCALE: 1/2" = 1'-0"

1
F-5

1/2" THK ASTM A36 STL PLATE FABRICATED ECCENTRIC REDUCER

3/8" THK x 6" DBLR RING SEE DETAIL (F-6)

18" O.D. x 3/8" WALL ASTM A36 PIPE SPOOL

18" O.D. x 3/8" WALL ASTM A36 PIPE SPOOL

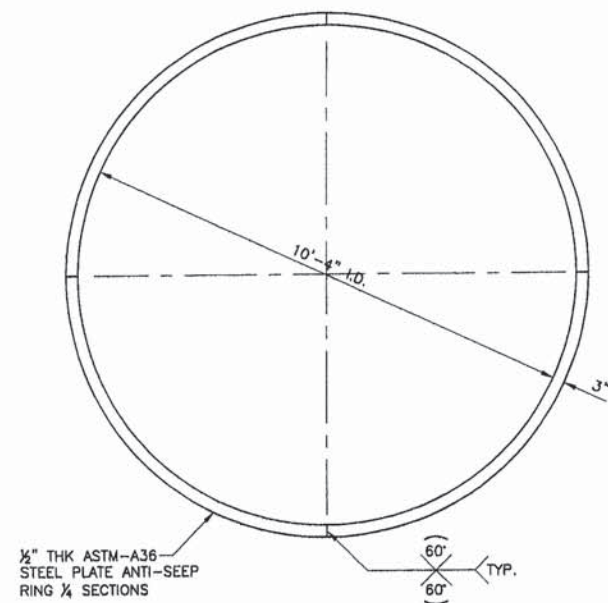
3/8" 100% PEN

1/2" THK ASTM A36 STL PLATE FABRICATED ECCENTRIC REDUCER

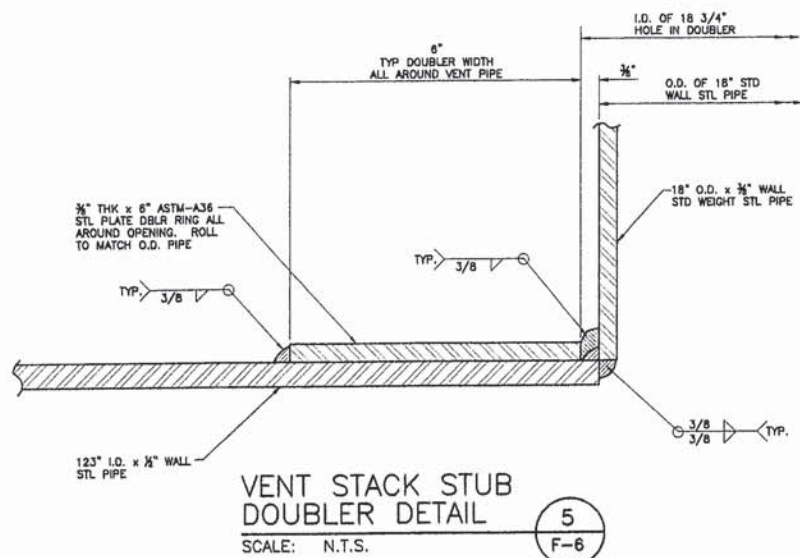
73" I.D. x 3/8" WALL STEEL PIPE SUPPLIED BY OWNER

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SIZE--REDUCE SCALES
ACCORDINGLY

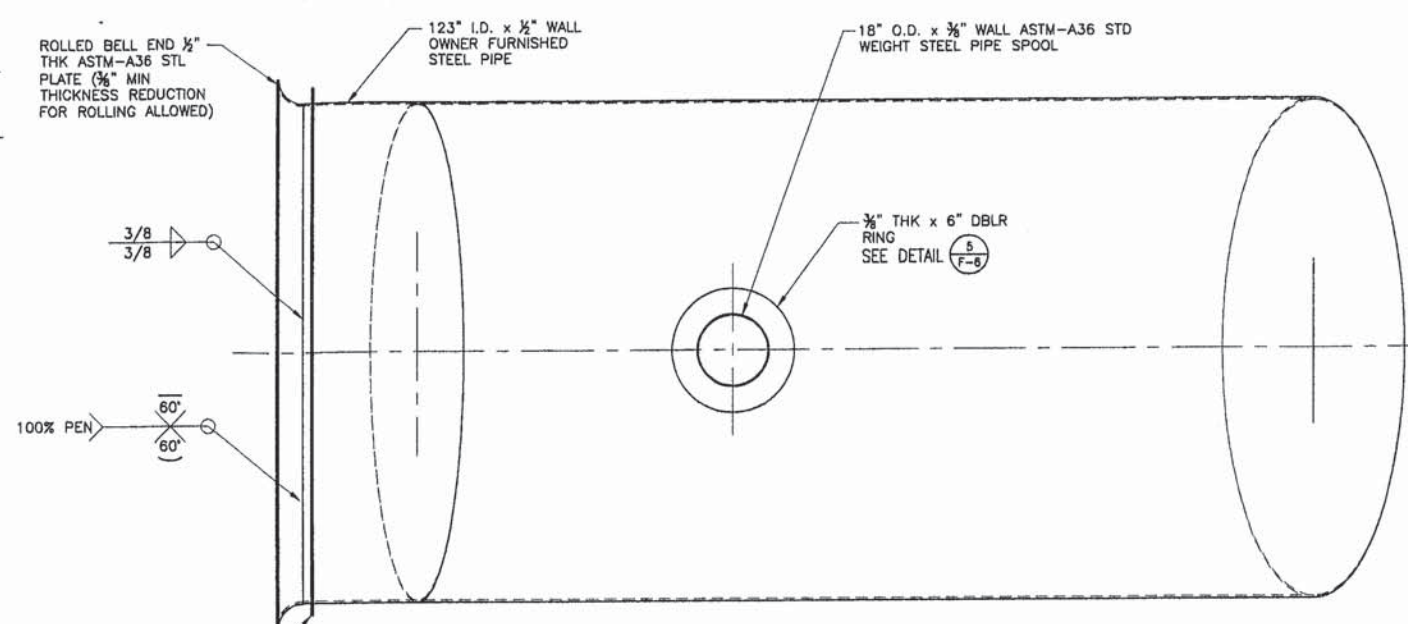
REV		LIT		NOVEMBER, 2005		SPB		SUB		TSS		ENGINEER	
MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED												REVISIONS	
BYPASS PIPELINE INLET REDUCER FABRICATED & ASSEMBLY DETAILS FERC PROJECT NO. 3403												AS-BUILT 2007	
SORENSEN ENGINEERING CONSULTING ENGINEERS IDAHO FALLS, IDAHO												NOTED	
GRAPEVIEW, WASHINGTON												D05-0720	
SHEET NO.												F-5	



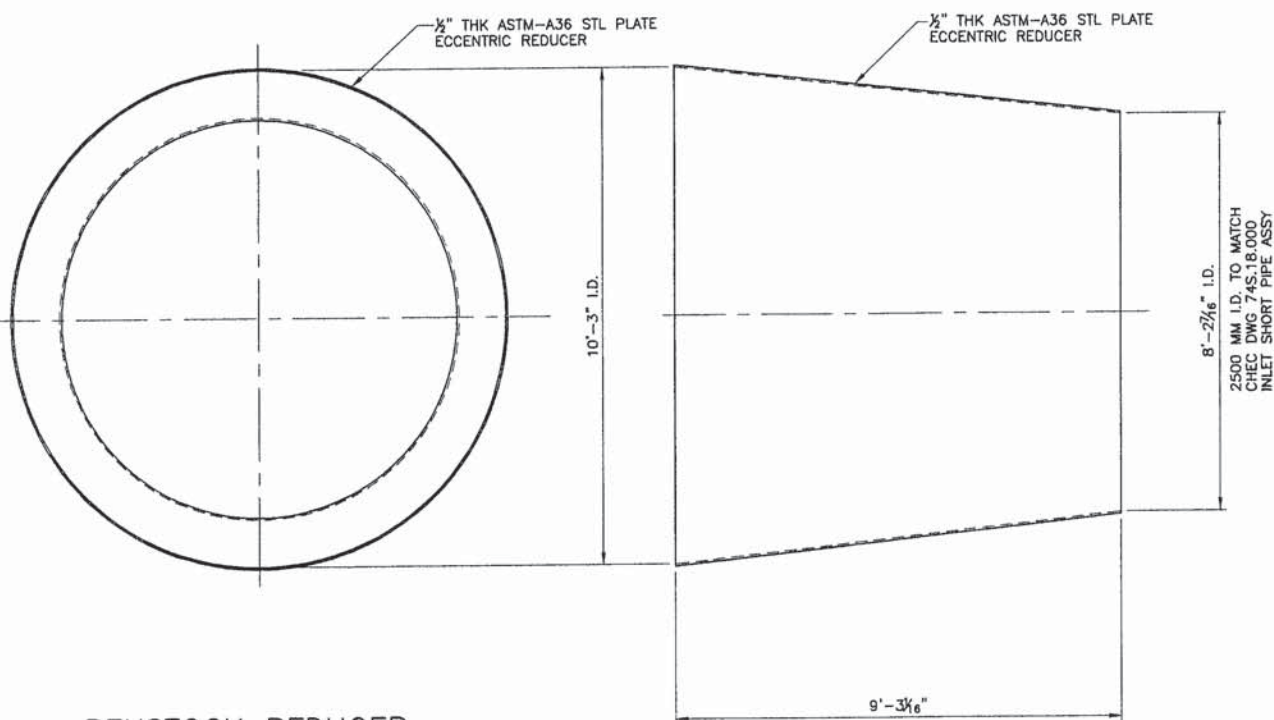
ANTI-SEEP RING
DETAIL
SCALE: 1/2" = 1'-0" (6 F-6)



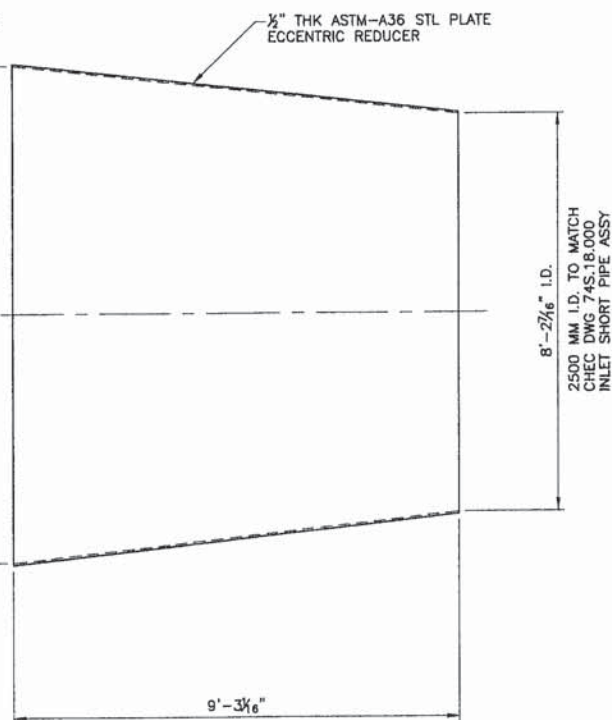
VENT STACK STUB
DOUBLER DETAIL
SCALE: N.T.S. (5 F-6)



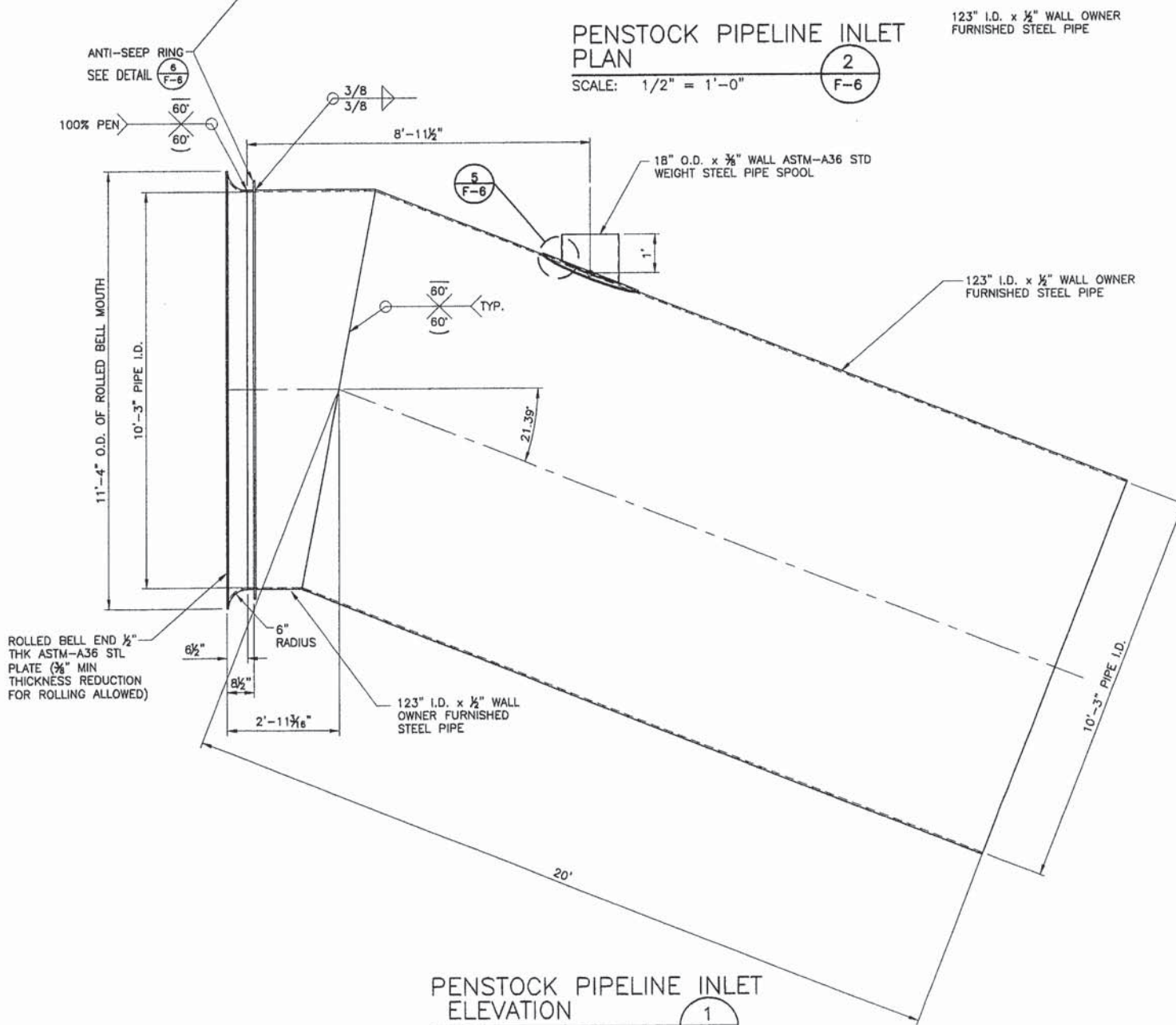
PENSTOCK PIPELINE INLET
PLAN
SCALE: 1/2" = 1'-0" (2 F-6)



PENSTOCK REDUCER
END VIEW
SCALE: 1/2" = 1'-0" (4 F-6)



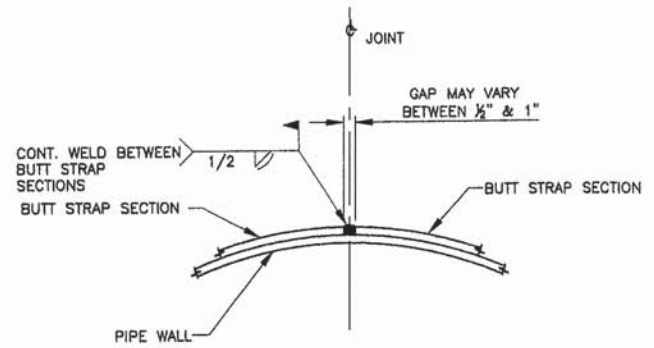
PENSTOCK REDUCER
ELEVATION
SCALE: 1/2" = 1'-0" (3 F-6)



PENSTOCK PIPELINE INLET
ELEVATION
SCALE: 1/2" = 1'-0" (1 F-6)

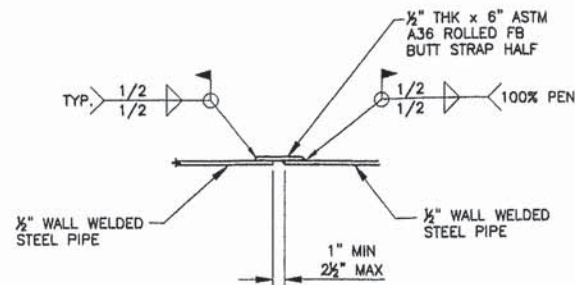
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BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY

REVISEMENTS		NOVEMBER, 2005	AS-BUILT 2007
REV	DATE	BY	APP
1	NOVEMBER, 2005	SPB	AS-BUILT 2007
2		SJB	
3		TSS	
4		ENGINEER	
MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED			
PENSTOCK PIPELINE INLET PIPE, ROLLED BELL END AND REDUCER ASSEMBLIES FERC PROJECT NO. 3403			
SORENSEN ENGINEERING CONSULTING ENGINEERS		GRAPEVIEW, WASHINGTON IDAHO FALLS, IDAHO	
SCALE		NOTED	
DRAWING NO.		D05-0720	
SHEET NO.		F-6	

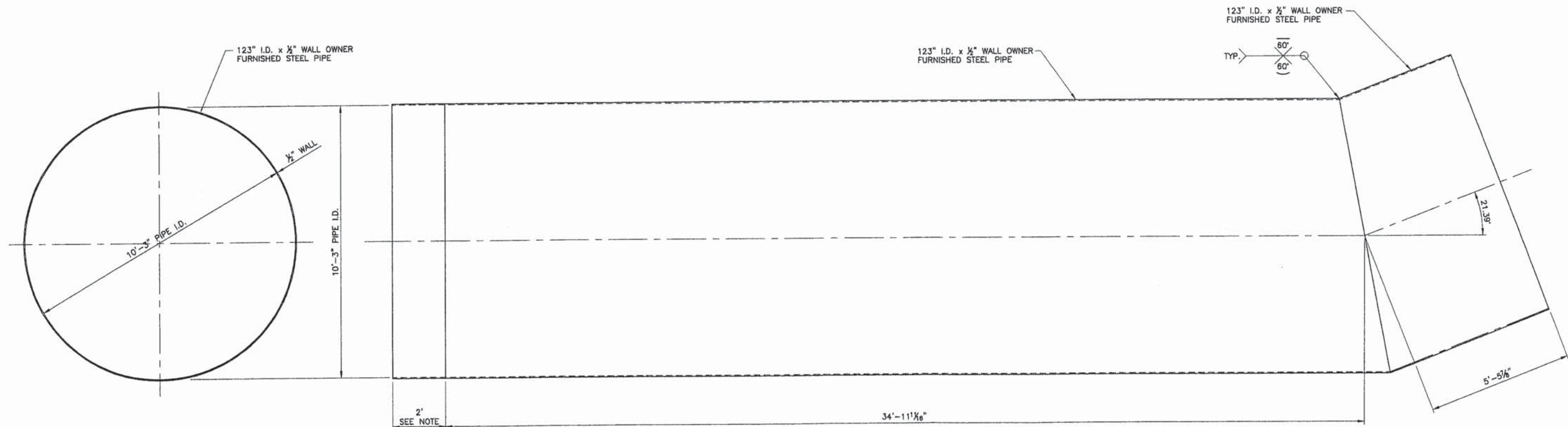
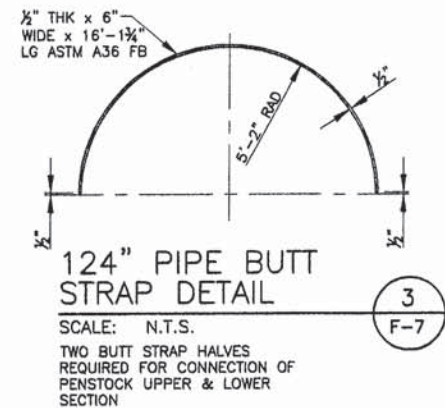


NOTE:
BUTT STRAP JOINT MAY NOT ALWAYS BE
LOCATED ON THE VERTICAL OR HORIZONTAL
CENTERLINE OF THE PIPE.

**BUTT STRAP TO BUTT
STRAP WELD DETAIL** 5
SCALE: N.T.S. F-7



124\"/>



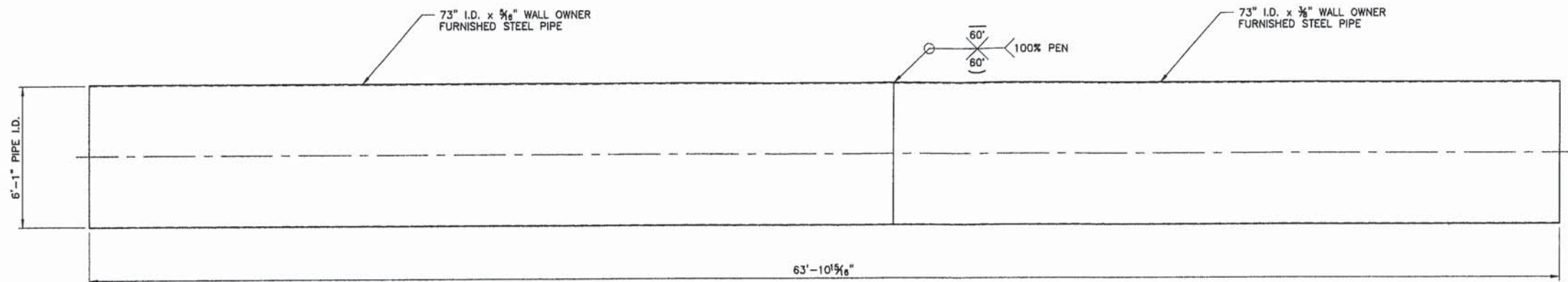
**PENSTOCK PIPE
END VIEW** 2
SCALE: 1/2\"/>

NOTE:
FABRICATOR MAY ELECT TO ADD AN
ADDITIONAL 2'-FEET OF PIPE LENGTH TO
THIS ASSEMBLY TO ALLOW FOR ON-SITE
FIELDS CUT OFF FOR REQUIRED LENGTH.

**PENSTOCK PIPE LOWER
END SEGMENT** 1
SCALE: 1/2\"/>

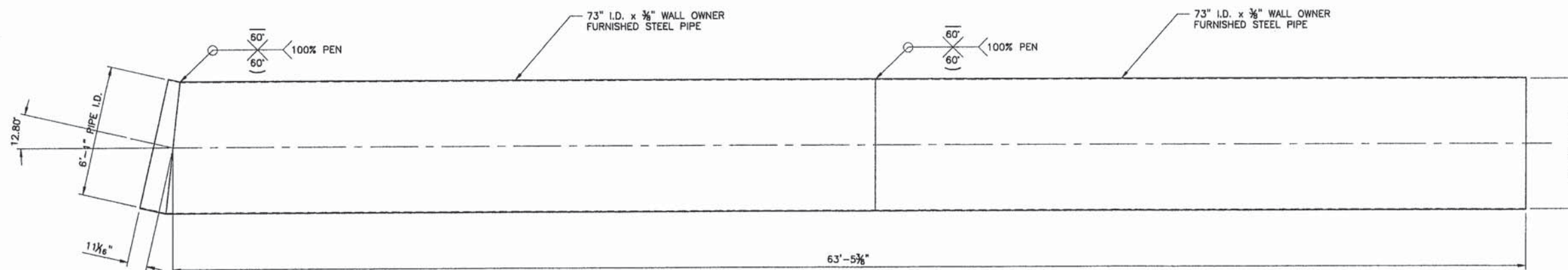
REVISIONS		AS-BUILT 2007			
REV	LTR	DATE	BY	CHKD	APP'D
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MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED PENSTOCK PIPELINE LOWER END SEGMENT AND BUTT-STRAP DETAILS FERC PROJECT NO. 3403					
SORENSEN ENGINEERING CONSULTING ENGINEERS IDAHO FALLS, IDAHO GRAPEVIEW, WASHINGTON					
SCALE		NOTED			
DRAWING NO.		D05-0720			
SHEET NO.		F-7			

THIS DRAWING SHEET HAS
BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY



NOTE:
THE 3/8" WALL PIPE SHALL BE USED FOR THE UPPER END OF THE BYPASS LINE UPPER PIPE SEGMENT. A 6" PORTION OF THE 3/8" WALL PIPE WILL BE USED FOR THE OUTLET END OF THE BYPASS PIPELINE INLET REDUCER SHOWN ON SHEET F-5. WELDING THE PIPE SEGMENTS TOGETHER IN THE FABRICATION SHOP CAN BE ACCOMPLISHED WITHOUT BUTT-STRAPS. ALL SHOP WELDING SHALL BE 100% PENETRATION.

**BYPASS LINE UPPER
PIPE SEGMENT**
SCALE: 3/8" = 1'-0"
1
F-8



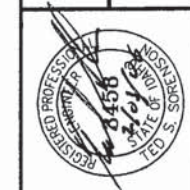
**BYPASS LINE LOWER
PIPE SEGMENT**
SCALE: 3/8" = 1'-0"
2
F-8

REV	LTR	DATE	BY	CHKD	APP'D	REVISIONS
1		NOVEMBER, 2005	SPB	SJB	TSS	AS-BUILT 2007

**MORA DROP HYDROELECTRIC PROJECT
RIVER SIDE INCORPORATED**

**BYPASS PIPELINE LOWER AND UPPER
END PIPE SEGMENTS**

FERC PROJECT NO. 3403



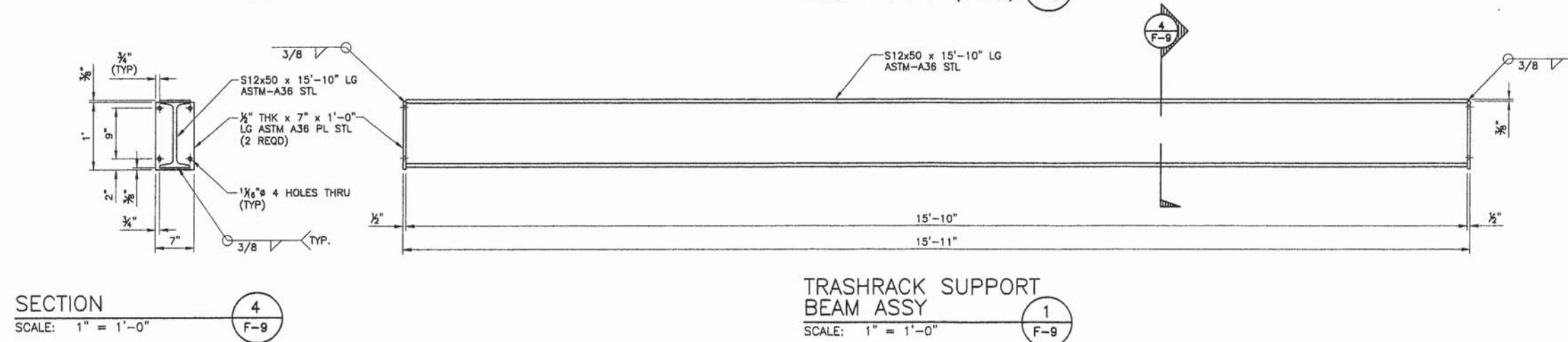
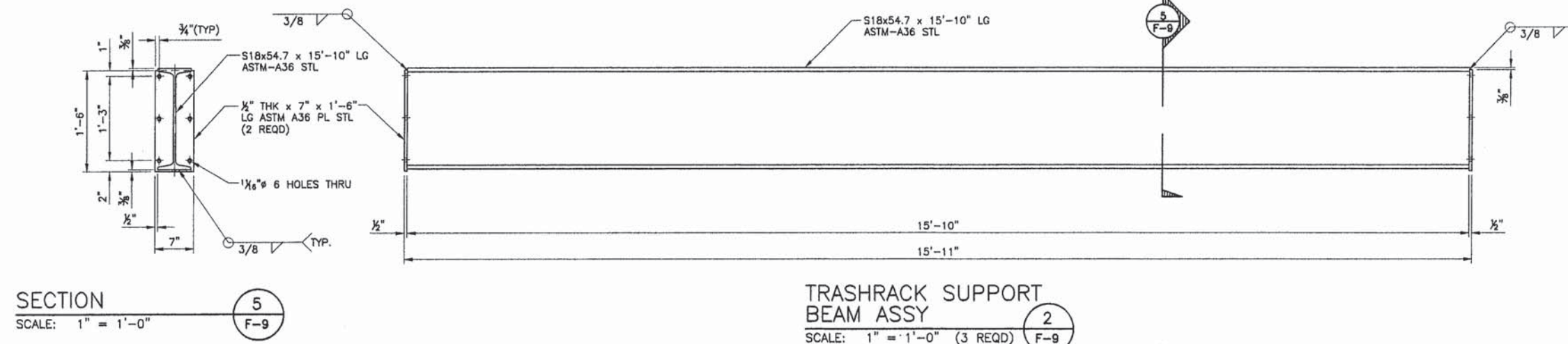
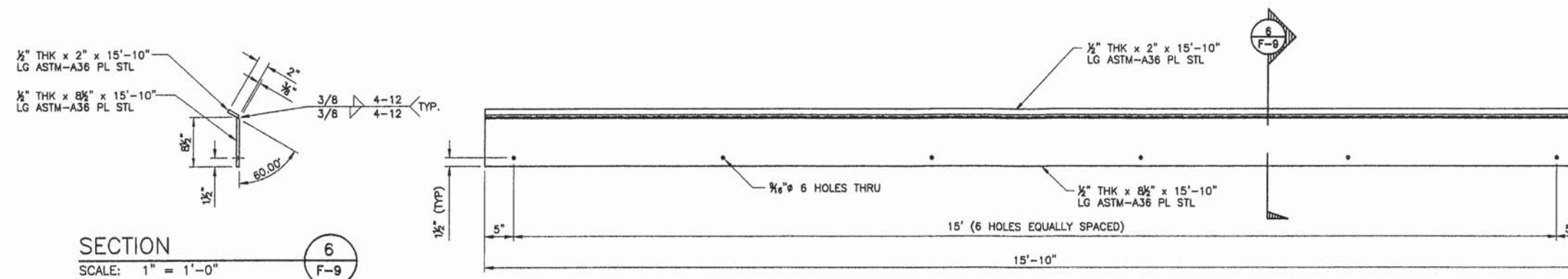
**SORENSON ENGINEERING
CONSULTING ENGINEERS**

IDAHO FALLS, IDAHO

GRAPEVIEW, WASHINGTON

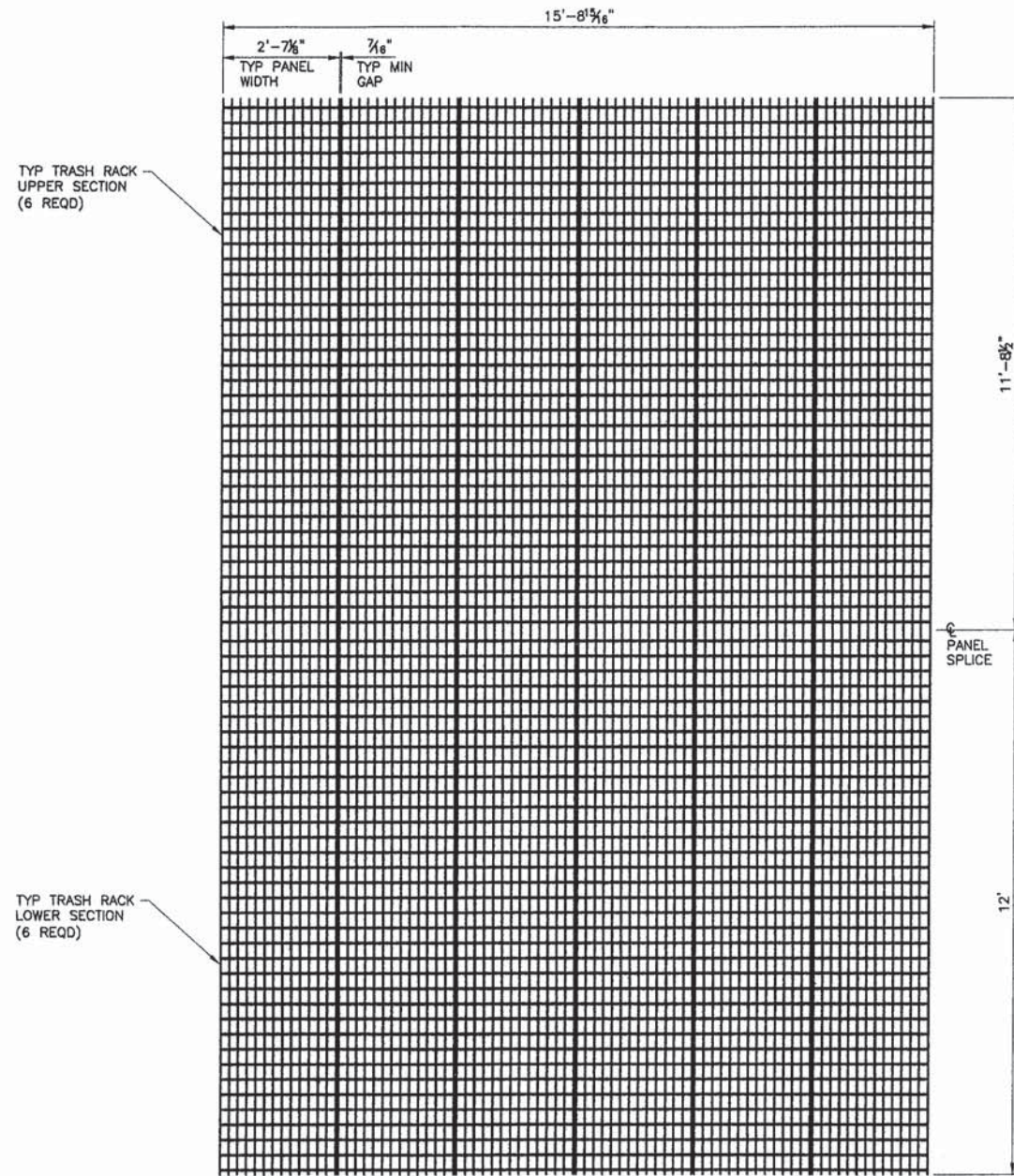
SCALE	NOTED
DRAWING NO.	D05-0720
SHEET NO.	F-8

THIS DRAWING SHEET HAS
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SIZE--REDUCE SCALES
ACCORDINGLY

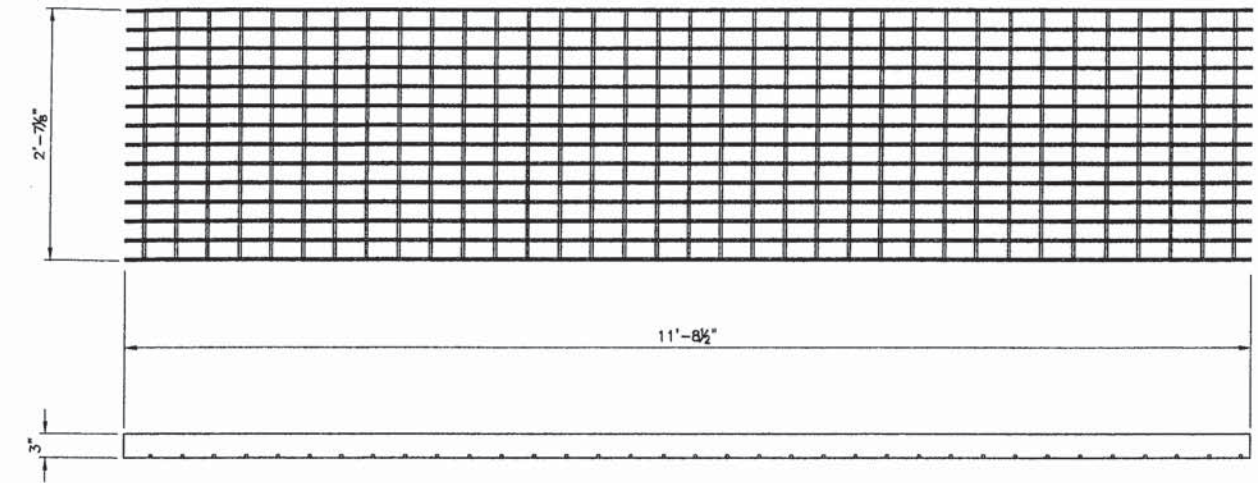


THIS DRAWING SHEET HAS
BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY

SCALE		NOTED		D05-0720		F-9	
DRAWING NO.		SHEET NO.		3-558		3-558	
SORENSEN ENGINEERING		CONSULTING ENGINEERS		IDAHO FALLS, IDAHO		GRAPEVIEW, WASHINGTON	
		MORA DROP HYDROELECTRIC PROJECT					
		RIVER SIDE INCORPORATED					
		INTAKE STRUCTURE TRASH					
		RACK SUPPORT BEAM DETAILS					
		FERC PROJECT NO. 3403					
DATE		NOVEMBER, 2005		REV		LTR	
DRAWN		SPB					
CHECKED		SIB					
APPROVED		TSS					
ENGINEER							
						AS-BUILT 2007	
						REVISIONS	

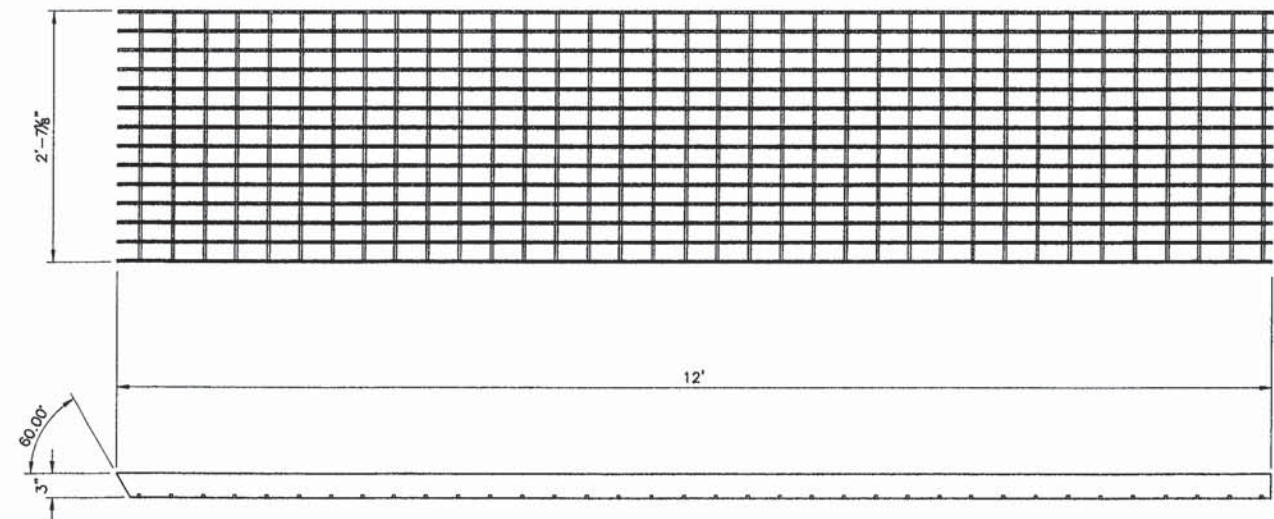


TRASH RACK LOWER & UPPER PNL LAYOUT
SCALE: 1/2" = 1'-0"
3
F-10



MAKE FROM McNICHOLS HWE 3 INCH THICK HEAVY WELDED STEEL BAR GRATING w/ 1/4" THK x 3" BEARING BARS AT 2 3/8" ON CENTER SPACING AND SUPPORT BARS AT 4" ON CENTER SPACING AS MANUFACTURED BY McNICHOLS CO., (800) 237-3820 OR APPROVED EQUAL.

TRASH RACK UPPER SECTION DETAIL
SCALE: 1" = 1'-0"
2
F-10



MAKE FROM McNICHOLS HWE 3 INCH THICK HEAVY WELDED STEEL BAR GRATING w/ 1/4" THK x 3" BEARING BARS AT 2 3/8" ON CENTER SPACING AND SUPPORT BARS AT 4" ON CENTER SPACING AS MANUFACTURED BY McNICHOLS CO., (800) 237-3820 OR APPROVED EQUAL.

TRASH RACK LOWER SECTION DETAIL
SCALE: 1" = 1'-0"
1
F-10

THIS DRAWING SHEET HAS BEEN REDUCED TO ONE-HALF SIZE--REDUCE SCALES ACCORDINGLY

MORA DROP HYDROELECTRIC PROJECT
RIVER SIDE INCORPORATED

INTAKE STRUCTURE TRASH RACK GRATING DETAILS
FERC PROJECT NO. 3403



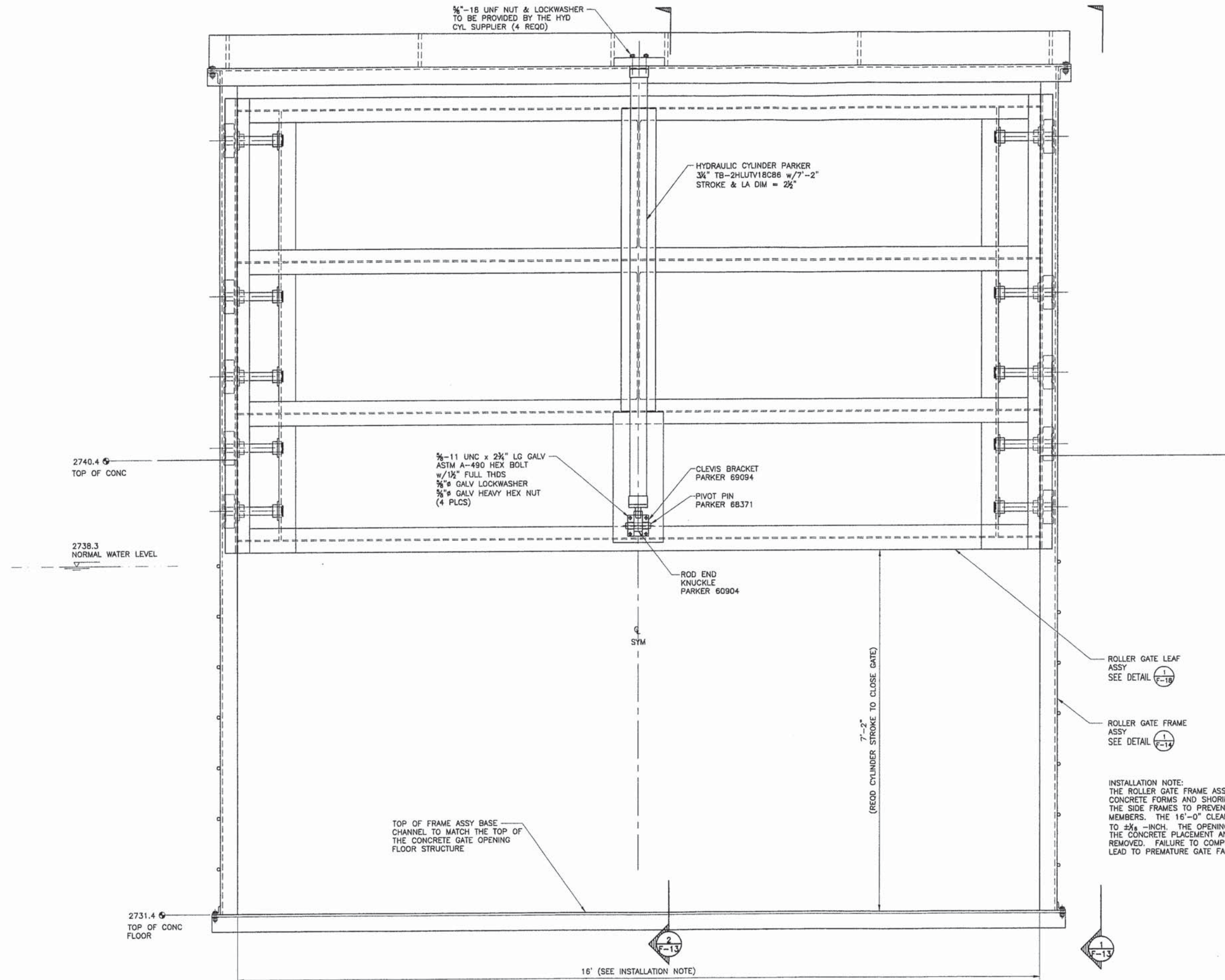
SORENSEN ENGINEERING
CONSULTING ENGINEERS
IDAHO FALLS, IDAHO
GRAPEVIEW, WASHINGTON

NOTED

DRAWING NO.
D05-0720
SHEET NO.
F-10

REVISIONS
AS-BUILT 2007

DATE: NOVEMBER, 2005
DRAWN: SPB
CHECKED: SUB
APPROVED: TSS
INCHES: 1/8"

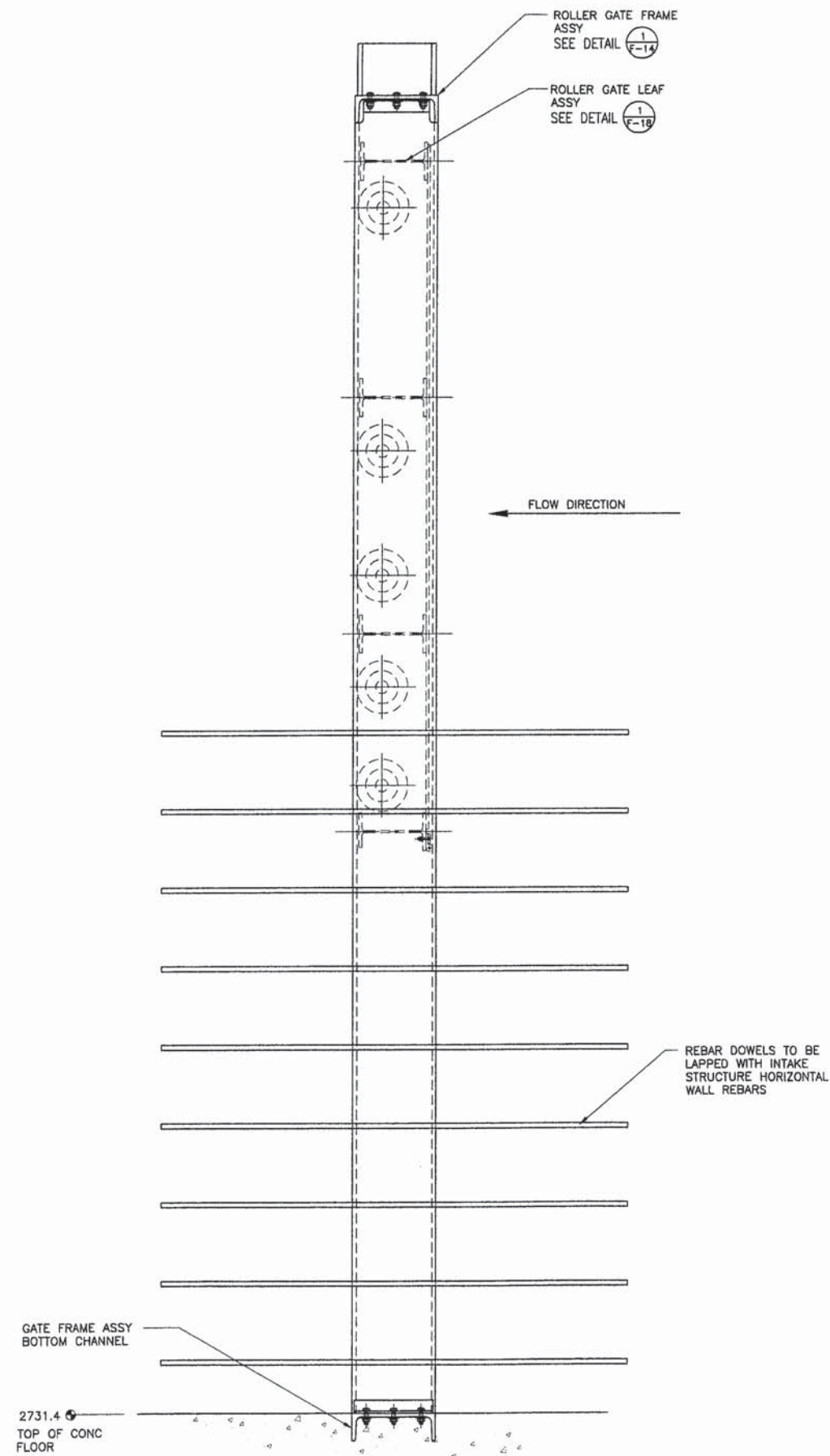


ROLLER GATE INSTALLATION
DOWN STREAM VIEW
SCALE: 1" = 1'-0"

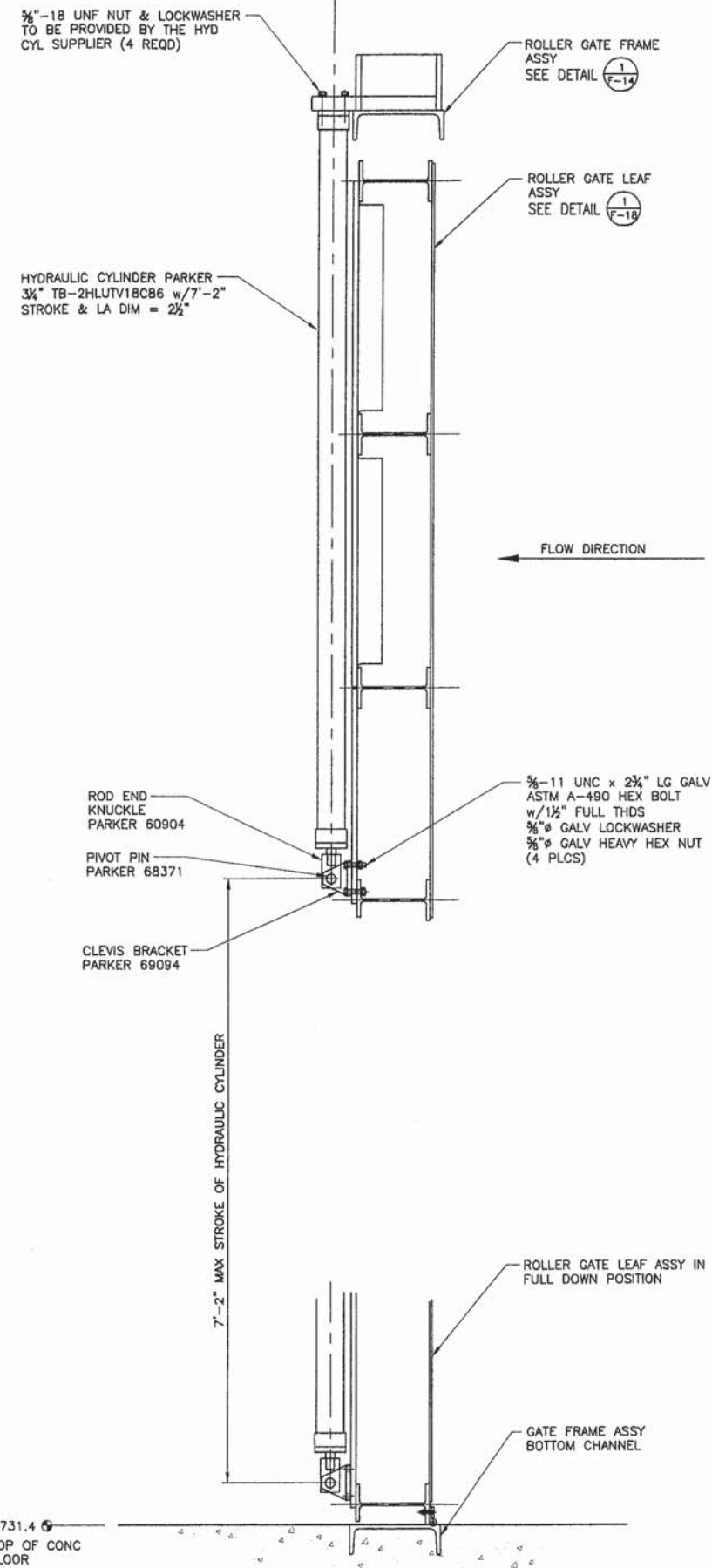
INSTALLATION NOTE:
THE ROLLER GATE FRAME ASSEMBLY SHALL BE PLACED IN THE CONCRETE FORMS AND SHORING SHALL BE PROVIDED BETWEEN THE SIDE FRAMES TO PREVENT BOWING OF THE SIDE FRAME MEMBERS. THE 16'-0" CLEAR OPENING SHALL BE MAINTAINED TO $\pm 1/8$ " -INCH. THE OPENING SHALL BE MEASURED PRIOR TO THE CONCRETE PLACEMENT AND AFTER THE FORMS HAVE BEEN REMOVED. FAILURE TO COMPLY WITH THIS INSTRUCTION MAY LEAD TO PREMATURE GATE FAILURE.

REVISIONS AS-BUILT 2007	
DATE: JANUARY 2006 DRAWN: SPB CHECKED: SUB APPROVED: TSS TICKETS:	MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED INTAKE STRUCTURE ROLLER GATE INSTALLATION FERC PROJECT NO. 3403
SORENSON ENGINEERING CONSULTING ENGINEERS IDAHO FALLS, IDAHO GRAPEVIEW, WASHINGTON	
SCALE: NOTED	DRAWING NO. D05-0720 SHEET NO. F-12

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ROLLER GATE INSTALLATION
END VIEW
SCALE: 1" = 1'-0" (1/F-13)



ROLLER GATE INSTALLATION
SECTION
SCALE: 1" = 1'-0" (2/F-13)

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REVISIONS		AS-BUILT 2007	
REV	DATE	BY	CHKD
1	JANUARY 2006	SPB	SJB
2			TSS
MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED		INTAKE STRUCTURE ROLLER GATE INSTALLATION DETAILS FERC PROJECT NO. 3403	
SORENSEN ENGINEERING CONSULTING ENGINEERS		IDaho FALLS, IDAHO GRAPEVIEW, WASHINGTON	
SCALE		NOTED	
DRAWING NO.		D05-0720	
SHEET NO.		F-13	

3/4"-10 UNC x 2 1/4" LG
ASTM A-490 GALV BOLT
w/ 1 1/4" FULL THREADS
3/4" CAD PLATED
LOCKWASHER
3/4"-10 UNC HEAVY HEX
NUT
(3 PLCS)

ROLLER GATE SIDE
FRAME ASSEMBLY
SEE DETAIL (1)
F-15

3/8"-11 UNC x 2" LG ASTM
A-490 GALV BOLT w/ 1 1/2"
FULL THREADS
3/8" CAD PLATED
LOCKWASHER
3/8"-11 UNC HEAVY HEX
NUT
(3 PLCS)

3/4"-10 UNC x 2 1/4" LG
ASTM A-490 GALV BOLT
w/ 1 1/4" FULL THREADS
3/4" CAD PLATED
LOCKWASHER
3/4"-10 UNC HEAVY HEX
NUT
(3 PLCS)

ROLLER GATE TOP
TORQUE BOX
ASSEMBLY
SEE DETAIL (1)
F-16

16'-0" ± 1/2"
HOLES IN THE ROLLER GATE
TOP TORQUE BOX ASSY AND
THE ROLLER GATE BASE
CHANNEL MAY BE SLOTTED
AS REQD TO MAINTAIN THIS
DIMENSION

ROLLER GATE SIDE
FRAME ASSEMBLY
SEE DETAIL (1)
F-15

ROLLER GATE BASE
CHANNEL
SEE DETAIL (1)
F-16

3/8"-11 UNC x 2" LG ASTM
A-490 GALV BOLT w/ 1 1/2"
FULL THREADS
3/8" CAD PLATED
LOCKWASHER
3/8"-11 UNC HEAVY HEX
NUT
(3 PLCS)

ROLLER GATE FRAME ASSEMBLY

SCALE: 1" = 1'-0"

(1)
F-14

MORA DROP HYDROELECTRIC PROJECT
RIVER SIDE INCORPORATED

INTAKE STRUCTURE
ROLLER GATE EMBEDDED FRAME ASSEMBLY
FERC PROJECT NO. 3403

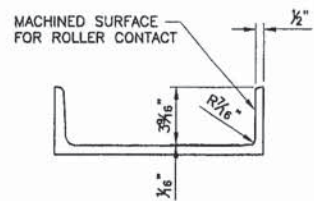


SORENSEN ENGINEERING
CONSULTING ENGINEERS
IDAHO FALLS, IDAHO
GRAPEVIEW, WASHINGTON

SCALE
NOTED

DRAWING NO.
D05-0720
SHEET NO.
F-14

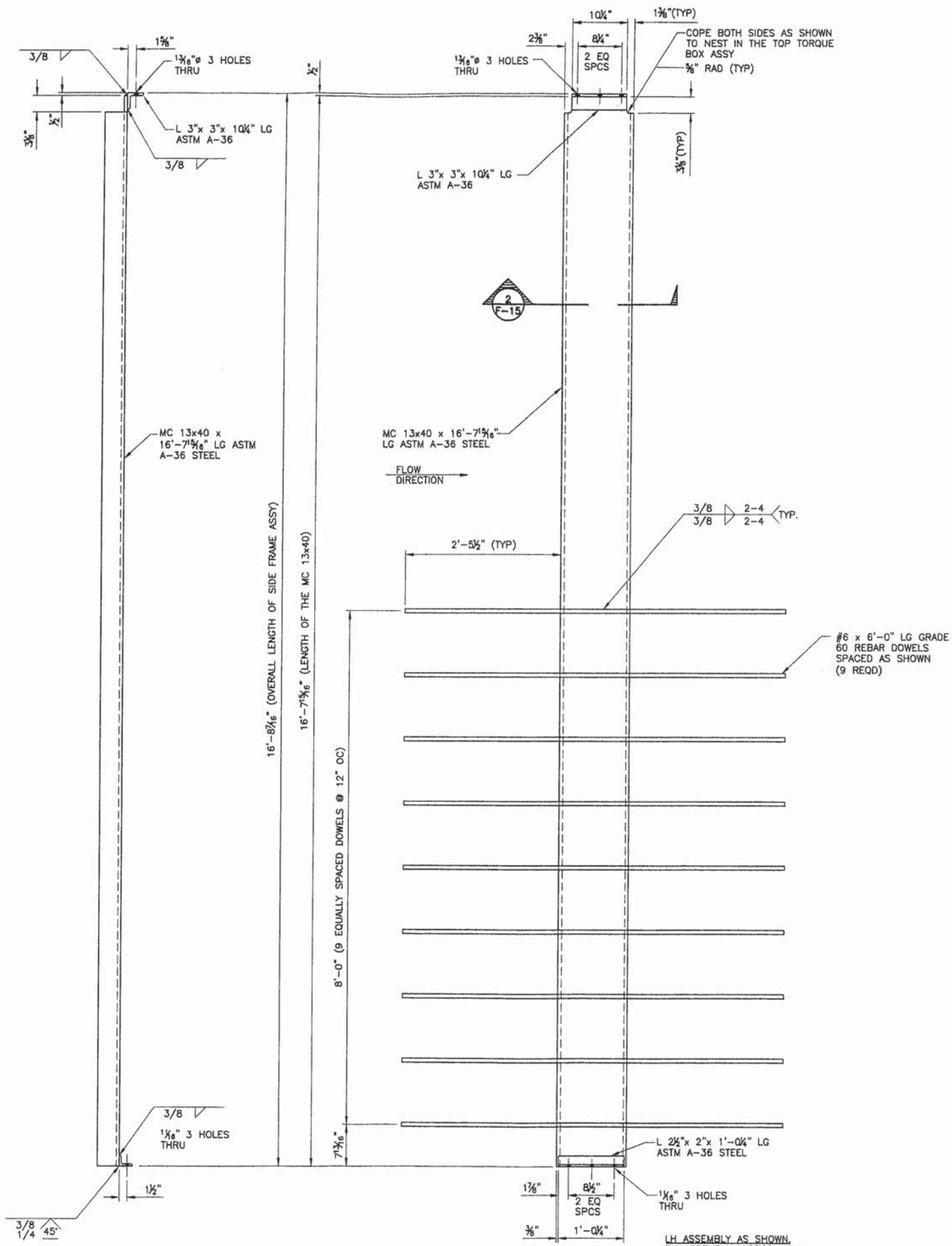
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BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY



ROLLER GATE SIDE
FRAME DETAIL

SCALE: 2" = 1'-0"

2
F-15



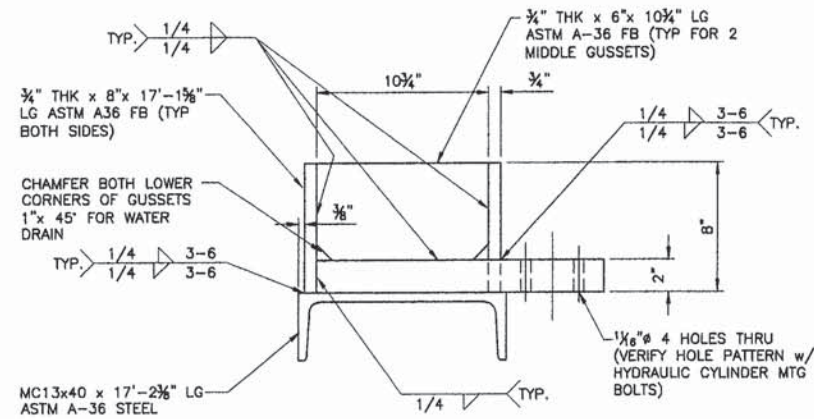
ROLLER GATE SIDE
FRAME ASSY

SCALE: 1" = 1'-0"

1
F-15

THIS DRAWING SHEET HAS
BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY

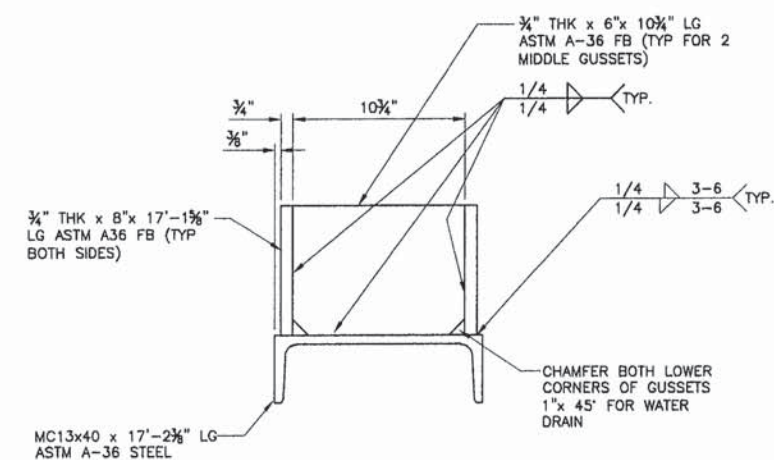
SORENSEN ENGINEERING CONSULTING ENGINEERS IDAHO FALLS, IDAHO GRAPEVIEW, WASHINGTON				MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED INTAKE STRUCTURE ROLLER GATE FRAME ASSEMBLY DETAILS FERC PROJECT NO. 3403		DATE	JANUARY 2006	REV LTR	REVISIONS
SCALE NOTED						DRAWN	SPB		AS-BUILT 2007
						CHECKED	SJB		
						APPROVED	TSS		
						ENGINEER			
DRAWING NO. D05-0720									
SHEET NO. F-15									



SECTION

SCALE: 2" = 1'-0"

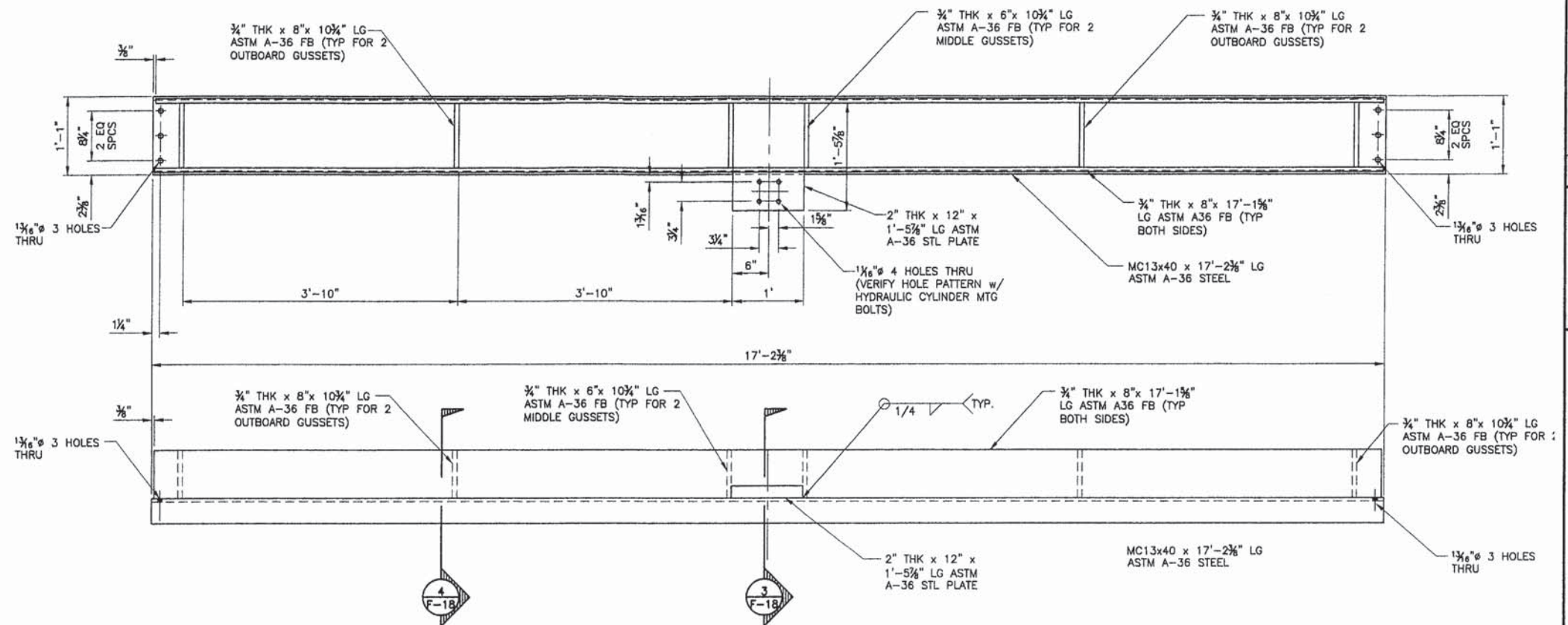
3
F-16



SECTION

SCALE: 2" = 1'-0"

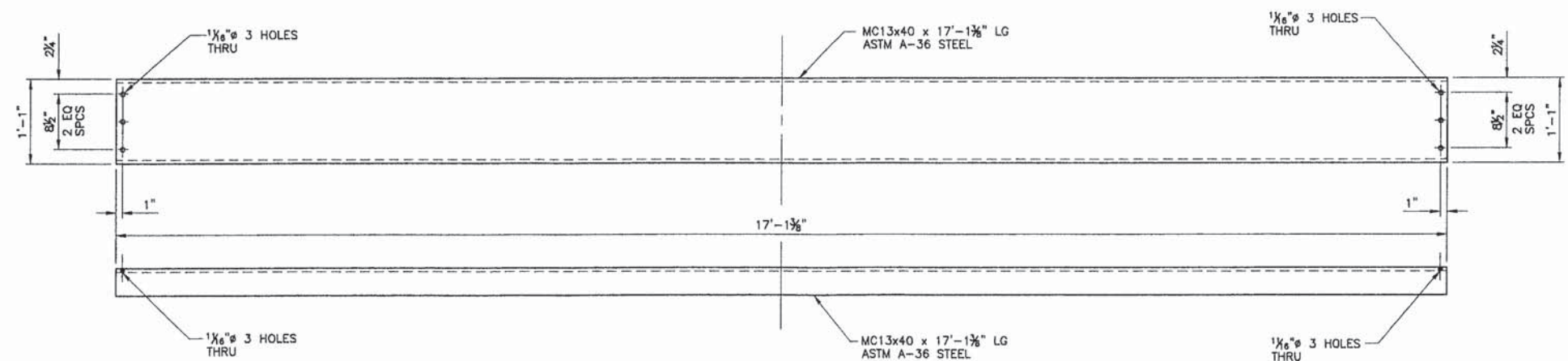
4
F-16



TOP TORQUE BOX
ASSEMBLY

SCALE: 1" = 1'-0"

1
F-17



BASE CHANNEL
DETAIL

SCALE: 1" = 1'-0"

2
F-17

REVISIONS
AS-BUILT 2007

REV	DATE	BY	CHKD	APP'D	DESCRIPTION
1	JANUARY 2006	SPB	SJB	TSS	FOR 2

MORA DROP HYDROELECTRIC PROJECT
RIVER SIDE INCORPORATED

INTAKE STRUCTURE
ROLLER GATE FRAME ASSEMBLY DETAILS
FERC PROJECT NO. 3403

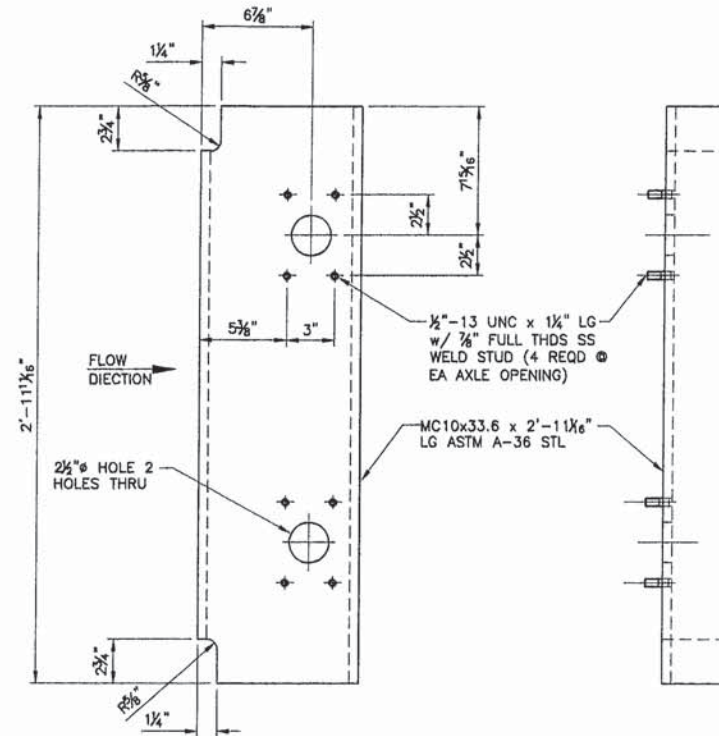


SORENSON ENGINEERING
CONSULTING ENGINEERS
IDAHO FALLS, IDAHO
GRAPEVIEW, WASHINGTON

NOTED

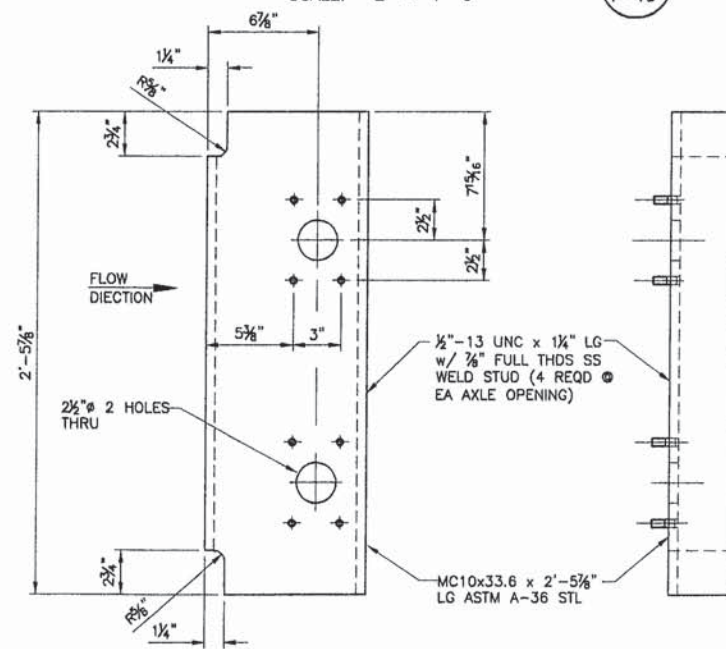
DRAWING NO.
D05-0720
SHEET NO.
F-16

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SIZE--REDUCE SCALES
ACCORDINGLY



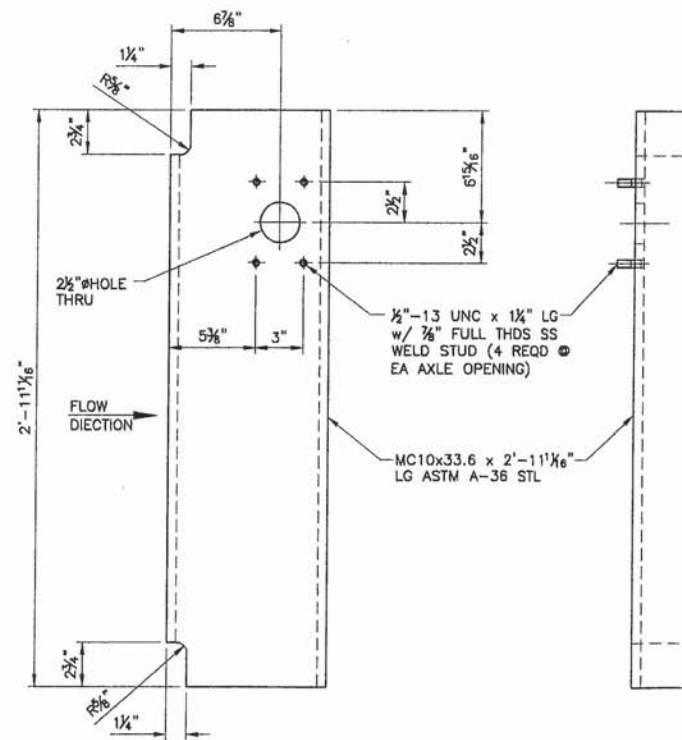
LH ASSEMBLY SHOWN, RH ASSEMBLY MIRROR IMAGE

LH INBD VERT FRAME MID
SECTION ASSEMBLY 3
SCALE: 2" = 1'-0" F-19



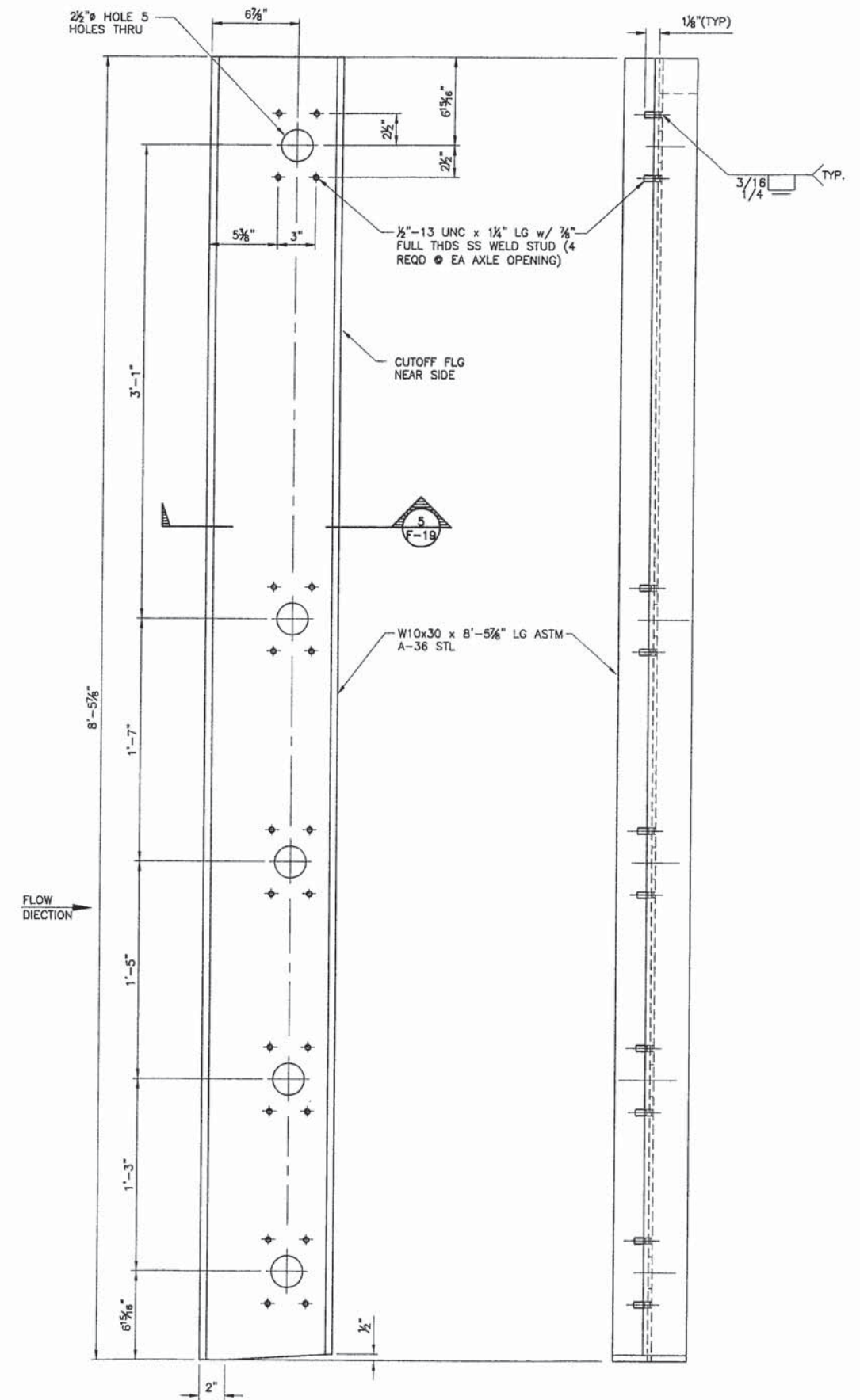
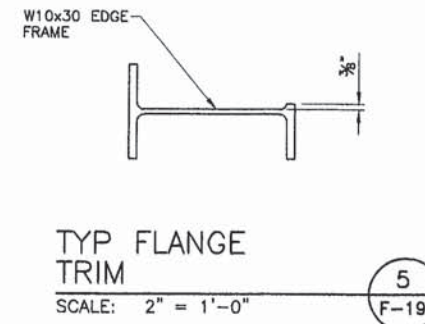
LH ASSEMBLY SHOWN, RH ASSEMBLY MIRROR IMAGE

LH INBD VERT FRAME LWR
SECTION ASSEMBLY 4
SCALE: 2" = 1'-0" F-19



LH ASSEMBLY SHOWN, RH ASSEMBLY MIRROR IMAGE

LH INBD VERT FRAME UPPER
SECTION ASSEMBLY 2
SCALE: 2" = 1'-0" F-19

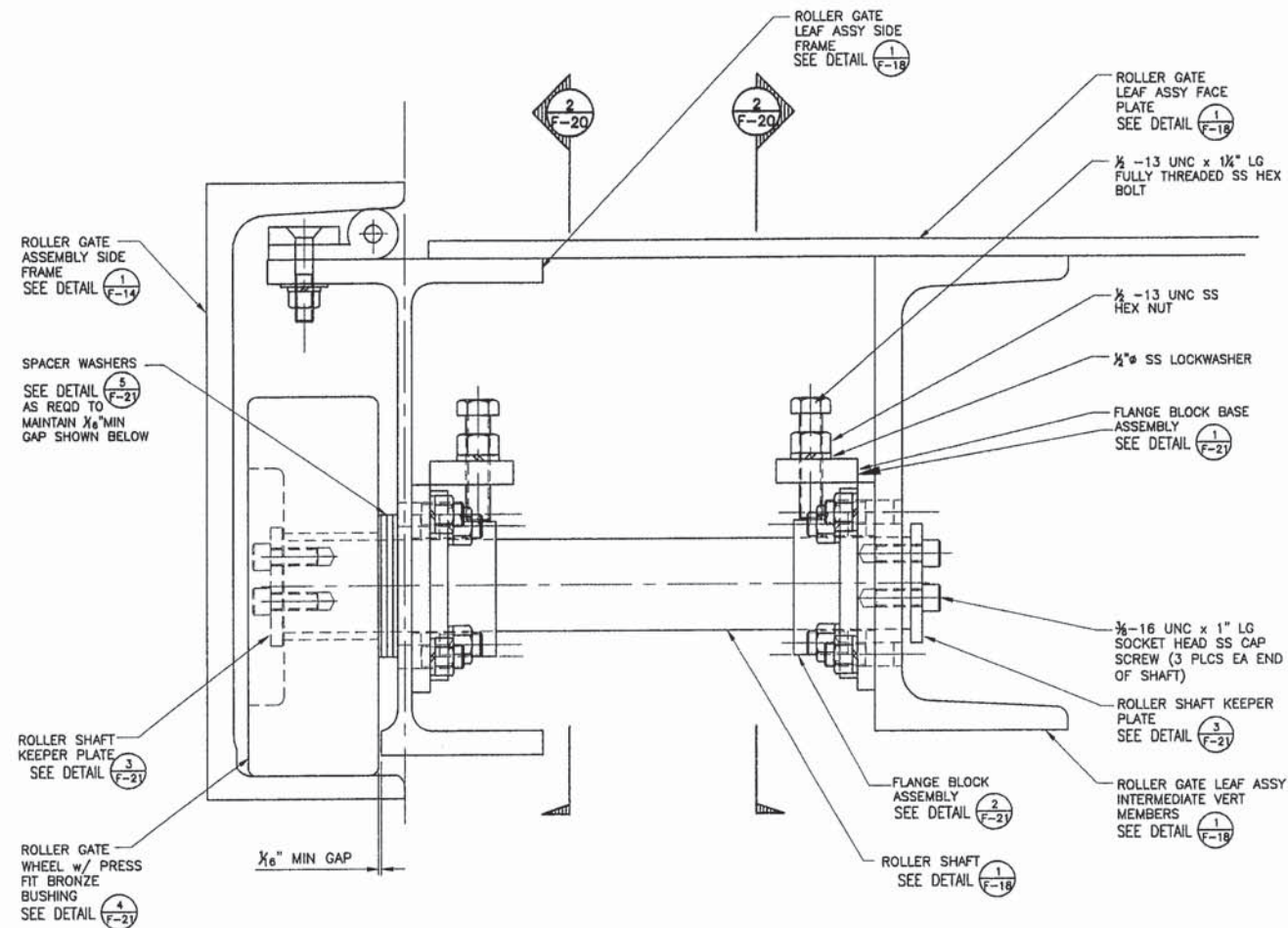


LH ASSEMBLY SHOWN, RH ASSEMBLY MIRROR IMAGE

LH OUTBD EDGE FRAME
ASSEMBLY 1
SCALE: 2" = 1'-0" F-19

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BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY

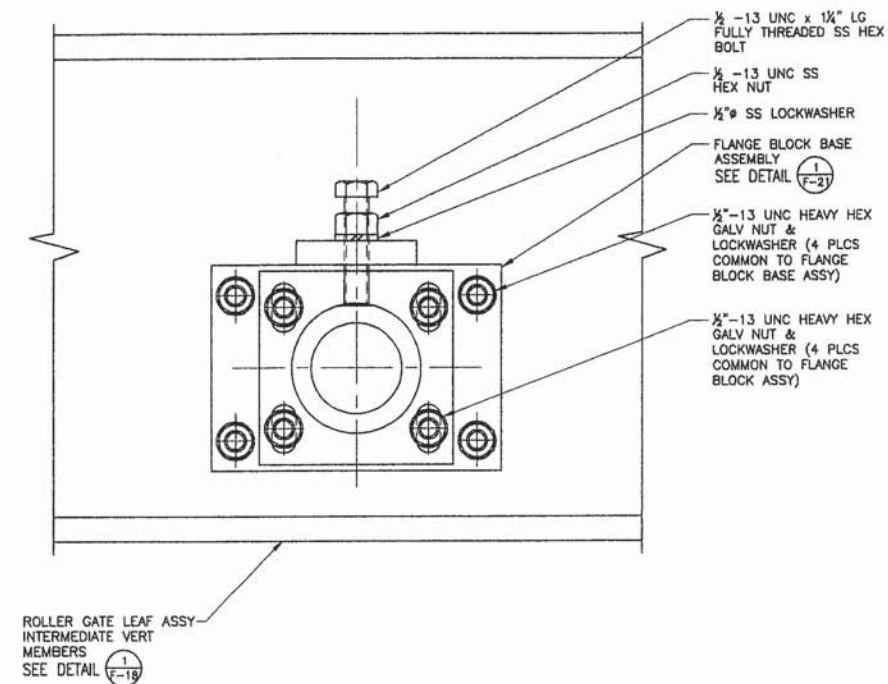
REVISIONS		AS-BUILT 2007	
REV	DATE	BY	CHKD
1	JANUARY 2006	SPB	SJB
2		TSS	
MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED		INTAKE STRUCTURE ROLLER GATE INBD & OUTBD SIDE ASSEMBLIES FERC PROJECT NO. 3403	
SORENSEN ENGINEERING CONSULTING ENGINEERS		IDAHO FALLS, IDAHO GRAPEVIEW, WASHINGTON	
SCALE		NOTED	
DRAWING NO.		D05-0720	
SHEET NO.		F-19	



GATE LEAF ROLLER
INSTALLATION

SCALE: 1/2" = 1"

1
F-20



SECTION

SCALE: 1/2" = 1"

2
F-20

SORENSEN ENGINEERING
CONSULTING ENGINEERS

IDAHO FALLS, IDAHO
GRAPEVIEW, WASHINGTON

MORA DROP HYDROELECTRIC PROJECT
RIVER SIDE INCORPORATED

INTAKE STRUCTURE
ROLLER GATE SIDE FRAME ROLLER INSTALLATION
FERC PROJECT NO. 3403



NOTED

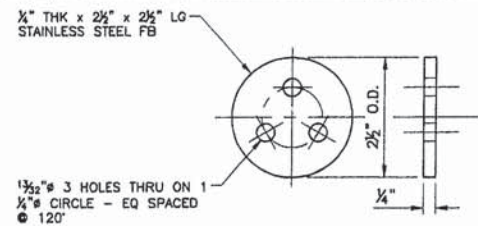
DRAWING NO. **D05-0720**

SHEET NO. **F-20**

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BEEN REDUCED TO ONE-HALF
SIZE--REDUCE SCALES
ACCORDINGLY

REVISIONS
AS-BUILT 2007

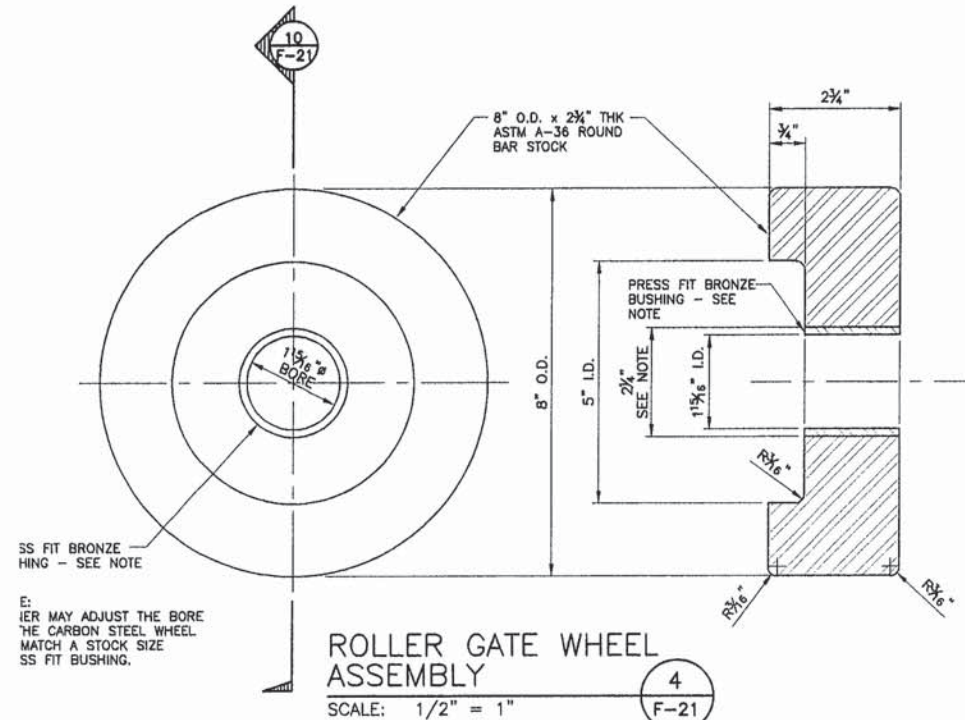
DATE	BY	CHKD	APPD	CHKD
JANUARY 2006	SPB	SJB	TSS	



KEEPER PLATE

SCALE: 1/2" = 1"

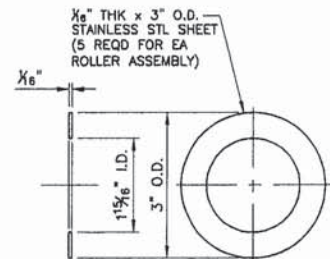
3
F-21



ROLLER GATE WHEEL ASSEMBLY

SCALE: 1/2" = 1"

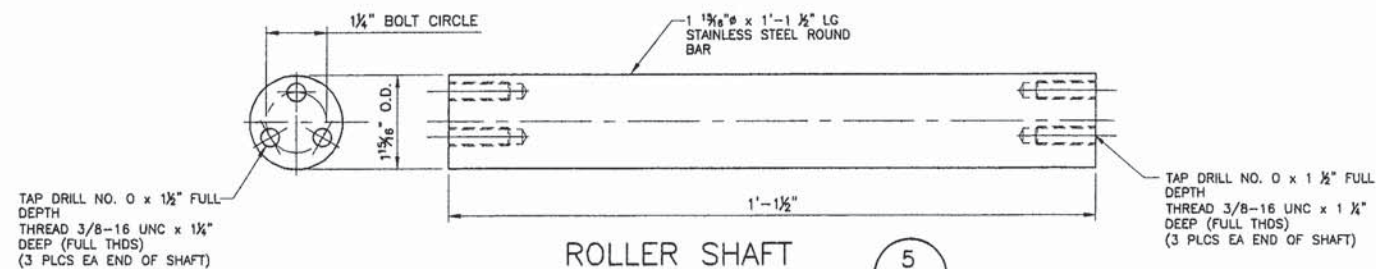
4
F-21



SPACER WASHER

SCALE: 1/2" = 1"

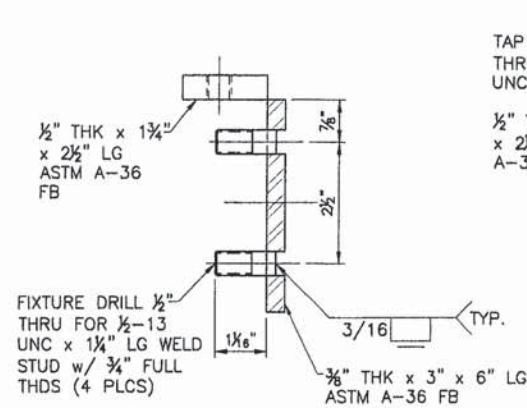
6
F-21



ROLLER SHAFT

SCALE: 1/2" = 1"

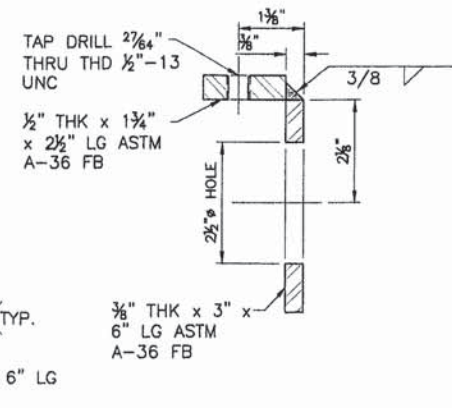
5
F-21



SECTION

SCALE: 1/2" = 1"

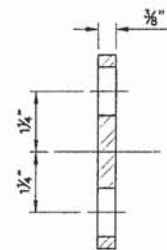
8
F-21



SECTION

SCALE: 1/2" = 1"

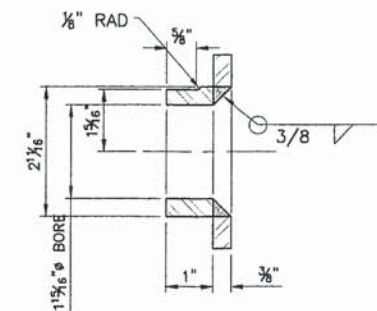
7
F-21



SECTION

SCALE: 1/2" = 1"

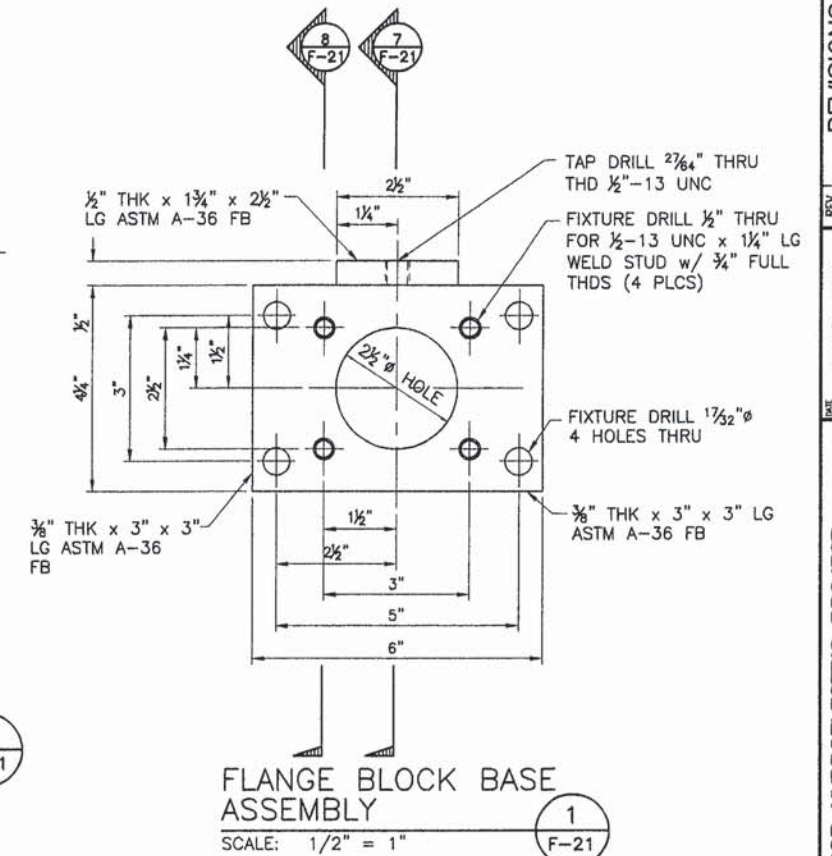
10
F-21



SECTION

SCALE: 1/2" = 1"

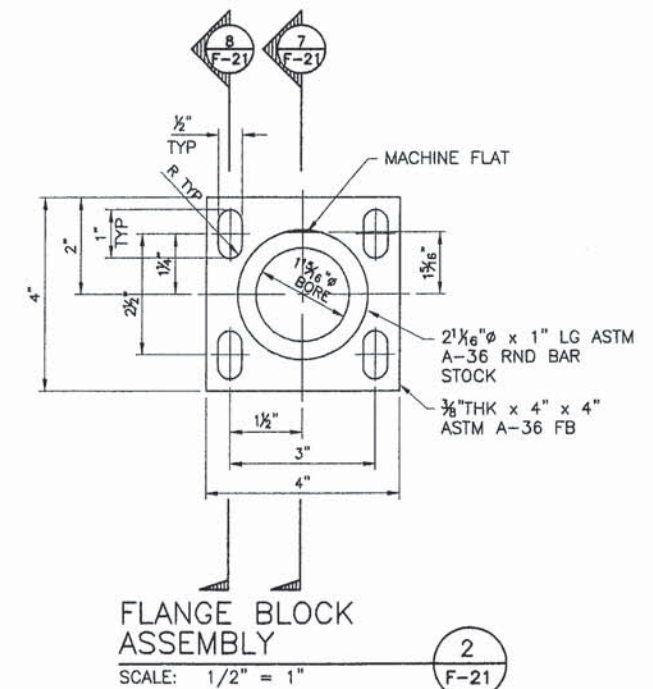
9
F-21



FLANGE BLOCK BASE ASSEMBLY

SCALE: 1/2" = 1"

1
F-21



FLANGE BLOCK ASSEMBLY

SCALE: 1/2" = 1"

2
F-21

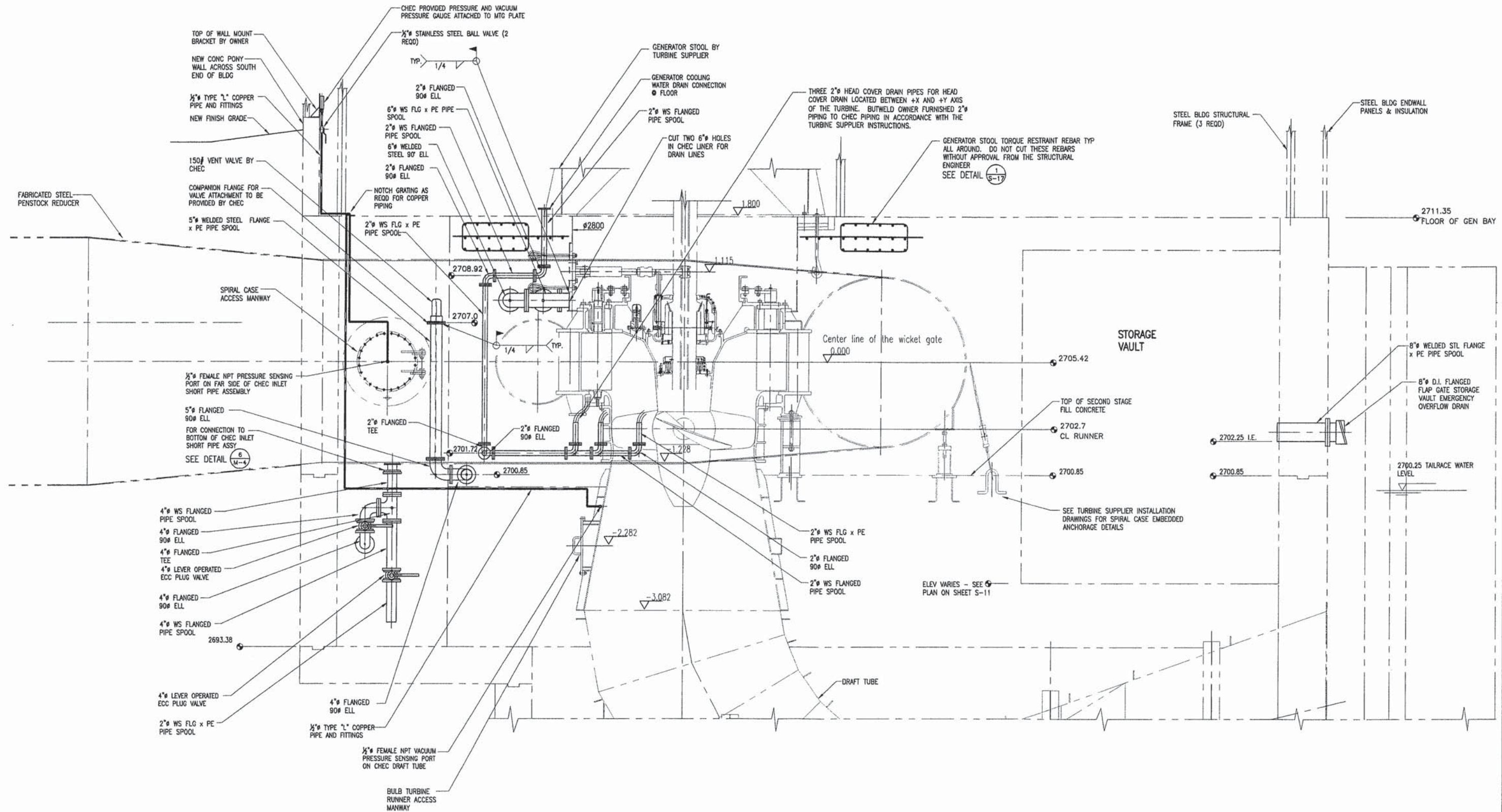
REVISIONS		AS-BUILT 2007	
REV	LTR	DATE	BY
1		JANUARY 2006	SPB
2			SUB
3			TSS
4			WJW

MORA DROP HYDROELECTRIC PROJECT		INTAKE STRUCTURE	
RIVER SIDE INCORPORATED		ROLLER GATE SIDE FRAME ROLLER ASSEMBLY DETAILS	
		FERC PROJECT NO. 3403	

SORENSEN ENGINEERING		IDAHO FALLS, IDAHO	
CONSULTING ENGINEERS		GRAPEVIEW, WASHINGTON	

SCALE	NOTED
DRAWING NO.	D05-0720
SHEET NO.	F-21

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SECTION THRU TURBINE
& DRAFT TUBE
SCALE: 1/2" = 1'-0"

1
M-2

REVISONS		A AS-BUILT 2007	
REV	DATE	BY	CHKD
1	AUGUST 2005	SPB	SJB
		APPROVED	TSS
		OWNER	

MORA DROP HYDROELECTRIC PROJECT
RIVER SIDE INCORPORATED

POWERHOUSE MECHANICAL
ELEVATION
FERC PROJECT NO. 3403

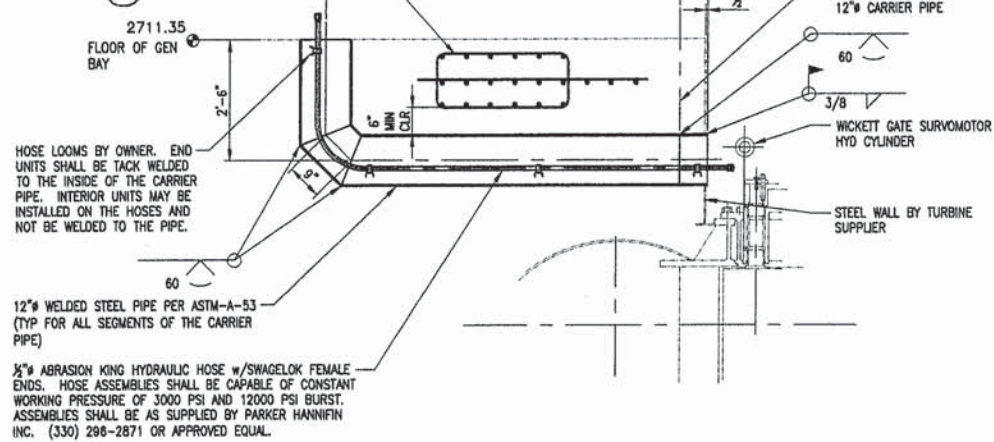
SORENSEN ENGINEERING
CONSULTING ENGINEERS
IDAHO FALLS, IDAHO
GRAPEVIEW, WASHINGTON

DRAWING NO.
D05-0720
SHEET NO.
M-2

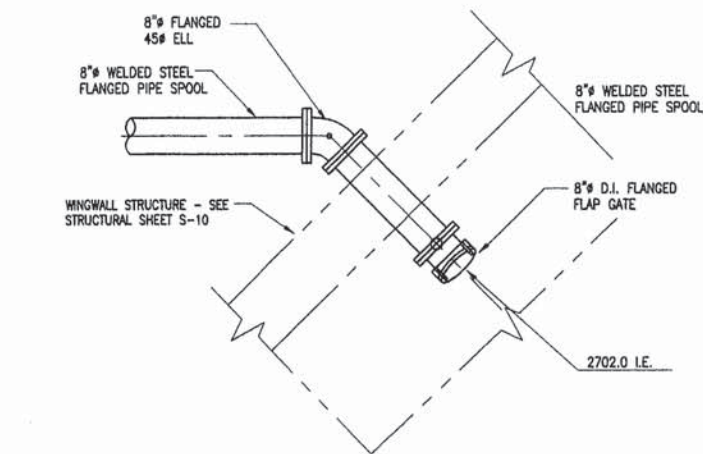


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SIZE--REDUCE SCALES
ACCORDINGLY

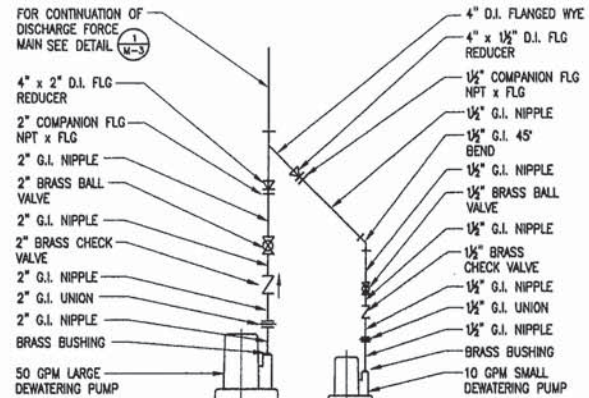
GENERATOR STOOL TORQUE RESTRAINT REBAR TYP ALL AROUND. DO NOT CUT THESE REBARS WITHOUT APPROVAL FROM THE STRUCTURAL ENGINEER
SEE DETAIL 1
8-17



HYDRAULIC SYST CARRIER PIPE ELEVATION
SCALE: 1/2" = 1'-0"
5
M-4

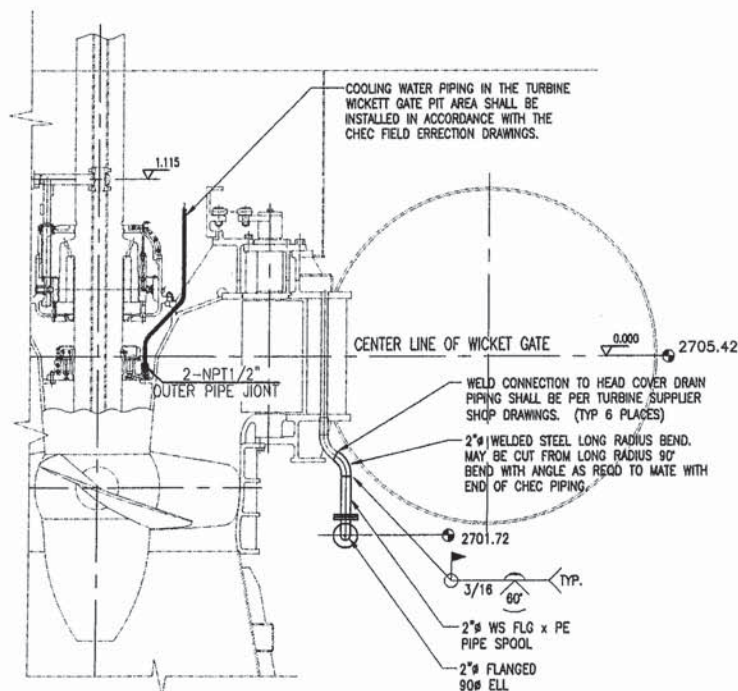


TURBINE WICKETT GATE PIT DRAIN DISCHG DET
SCALE: 1/2" = 1'-0"
3
M-4

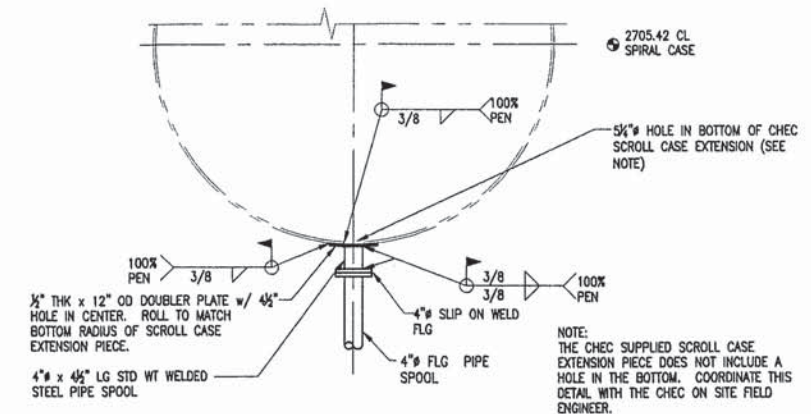


NOTE: BOTH THE SMALL AND LARGE PUMPS SHALL BE 208V SINGLE-PHASE. THE TOTAL DYNAMIC HEAD ON THE PUMPS SHALL BE 12.25 FEET IF INSTALLED PER THE MECHANICAL SHEETS. THE PUMPS SHALL BE CONTROLLED BY A FLOAT SWITCH SYSTEM THAT WILL INCLUDE:
PUMPS OFF
LEAD PUMP ON (SMALL PUMP)
LAG PUMP ON (LARGE PUMP)
HIGH LEVEL ALARM

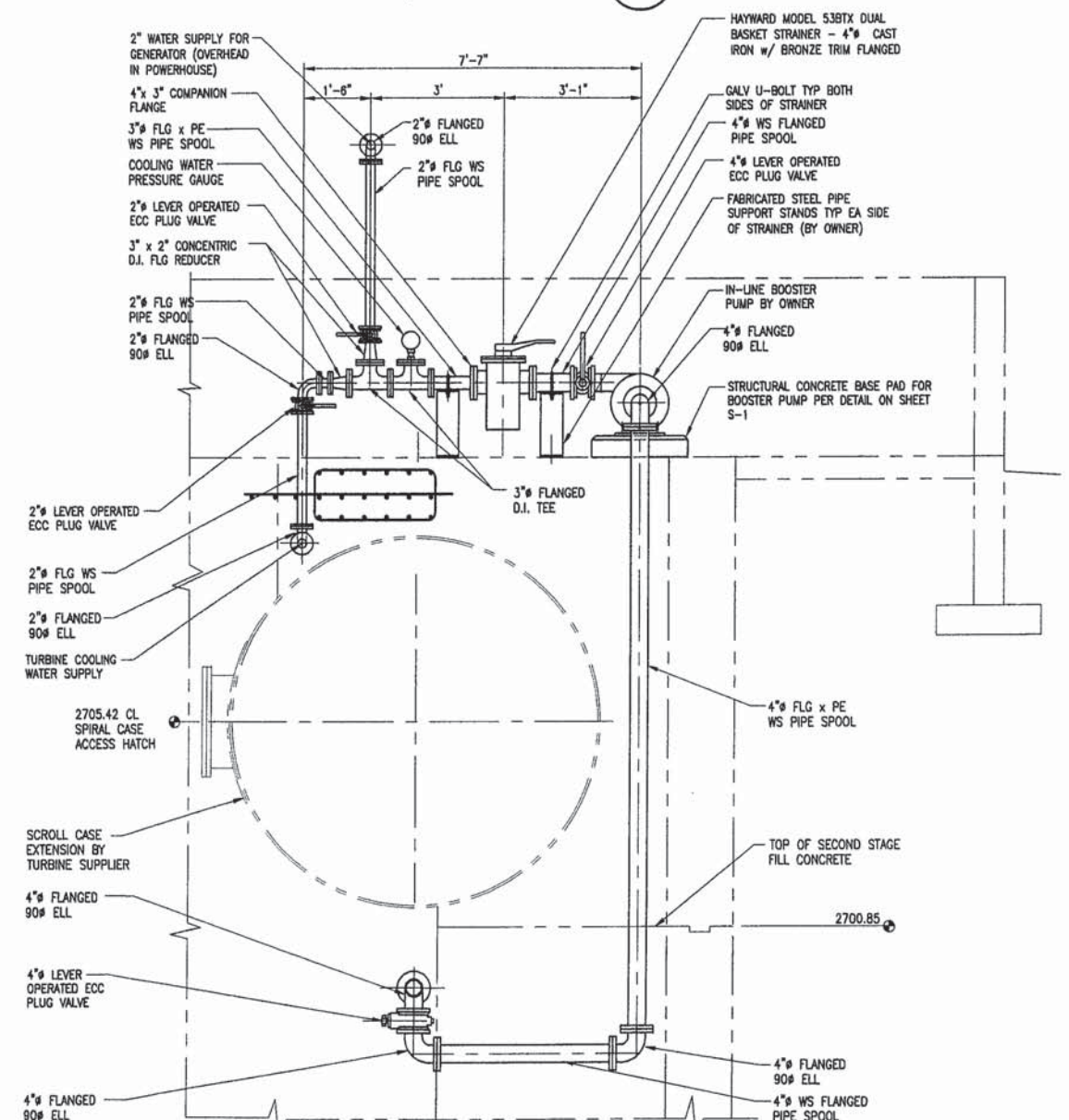
DEWATERING PUMP PIPING SCHEMATIC
SCALE: N.T.S.
4
M-4



HEAD COVER WATER DRAIN & SUPPLY PIPING DET
SCALE: 1/2" = 1'-0"
2
M-4



SCROLL CASE DRAIN PIPE DETAIL
SCALE: 1/2" = 1'-0"
6
M-4



SECTION THRU WATER SUPPLY PUMP & FILTER
SCALE: 1/2" = 1'-0"
1
M-4

REV LTR		DATE	BY	CHKD	APP'D	REVISIONS
A		AUGUST 2005	SPB	SJB	TSS	AS-BUILT 2007
B						

MORA DROP HYDROELECTRIC PROJECT RIVER SIDE INCORPORATED		POWERHOUSE MECHANICAL DETAILS	
SORENSEN ENGINEERING CONSULTING ENGINEERS		IDAHO FALLS, IDAHO GRAPEVIEW, WASHINGTON	
D05-0720		M-4	

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