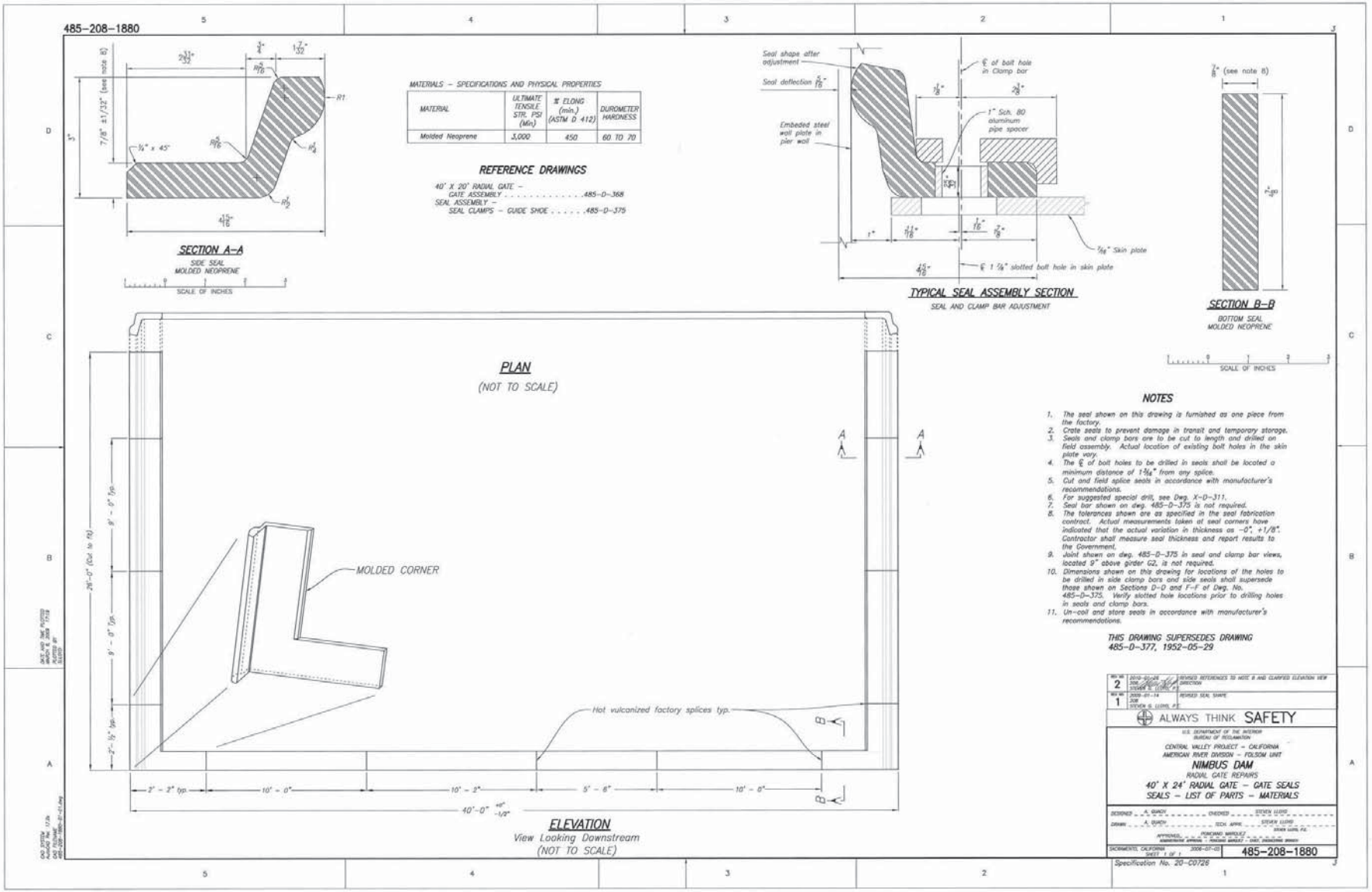
APPENDICES

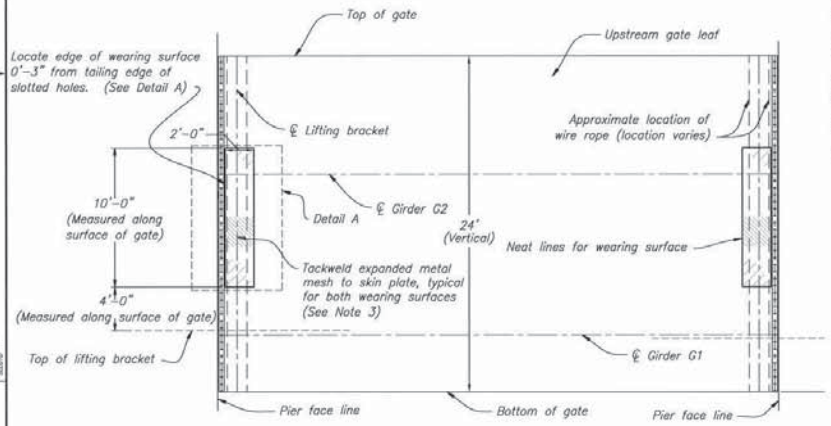
APPENDIX A

SPECIFICATION DRAWINGS

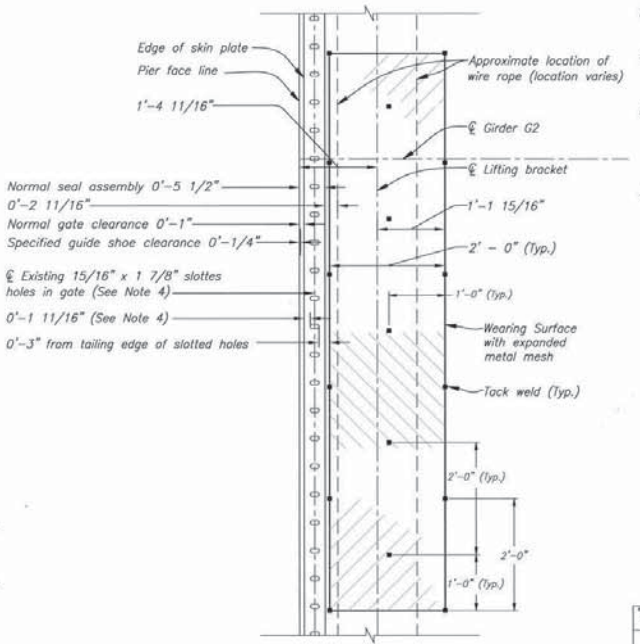
SHEET 3


485-208-1880
SECTION A-A
SIDE SEAL
MOLDED NEOPRENE
SCALE OF INCHES
MATERIALS - SPECIFICATIONS AND PHYSICAL PROPERTIES
MATERIAL | ULTIMATE TENSILE STR. PSI (Min) | % ELONG (min.) (ASTM D 412) | DUROMETER HARDNESS
Molded Neoprene | 3,000 | 450 | 60 TO 70
REFERENCE DRAWINGS
40' X 20' RADIAL GATE - GATE ASSEMBLY 485-D-368
SEAL ASSEMBLY - SEAL CLAMPS - GUIDE SHOE 485-D-375
Seal shape after adjustment
Seal deflection
Embeded steel wall plate in pier wall
℄ of bolt hole in Clamp bar
1" Sch. 80 aluminum pipe spacer
7/16" Skin plate
℄ 1 1/8" slotted bolt hole in skin plate
TYPICAL SEAL ASSEMBLY SECTION
SEAL AND CLAMP BAR ADJUSTMENT
(see note 8)
SECTION B-B
BOTTOM SEAL
MOLDED NEOPRENE
SCALE OF INCHES
PLAN
(NOT TO SCALE)
MOLDED CORNER
Hot vulcanized factory splices typ.
ELEVATION
View Looking Downstream
(NOT TO SCALE)
NOTES
1. The seal shown on this drawing is furnished as one piece from the factory.
2. Crate seals to prevent damage in transit and temporary storage.
3. Seals and clamp bars are to be cut to length and drilled on field assembly. Actual location of existing bolt holes in the skin plate vary.
4. The ℄ of bolt holes to be drilled in seals shall be located a minimum distance of 1 3/16" from any splice.
5. Cut and field splice seals in accordance with manufacturer's recommendations.
6. For suggested special drill, see Dwg. X-D-311.
7. Seal bar shown on dwg. 485-D-375 is not required.
8. The tolerances shown are as specified in the seal fabrication contract. Actual measurements taken at seal corners have indicated that the actual variation in thickness as -0", +1/8". Contractor shall measure seal thickness and report results to the Government.
9. Joint shown on dwg. 485-D-375 in seal and clamp bar views, located 9" above girder G2, is not required.
10. Dimensions shown on this drawing for locations of the holes to be drilled in side clamp bars and side seals shall supersede those shown on Sections D-D and F-F of Dwg. No. 485-D-375. Verify slotted hole locations prior to drilling holes in seals and clamp bars.
11. Un-coil and store seals in accordance with manufacturer's recommendations.
THIS DRAWING SUPERSEDES DRAWING 485-D-377, 1952-05-29
REV. NO. 2 2010-02-08 REVISED REFERENCES TO NOTE 8 AND CLARIFIED ELEVATION VIEW DIRECTION
REV. NO. 1 2009-01-14 REVISED SEAL SHAPE
ALWAYS THINK SAFETY
U.S. DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION
CENTRAL VALLEY PROJECT - CALIFORNIA
AMERICAN RIVER DIVISION - FOLSOM UNIT
NIMBUS DAM
RADIAL GATE REPAIRS
40' X 24' RADIAL GATE - GATE SEALS
SEALS - LIST OF PARTS - MATERIALS
DESIGNED A. IGNOV CHECKED STEVEN LLOYD
DRAWN A. IGNOV TECH. APPR. STEVEN LLOYD
APPROVED FOREMAN, MARQUEZ
SACRAMENTO, CALIFORNIA 2008-07-02
SHEET 1 OF 1
485-208-1880
Specification No. 20-C0726

485-208-1881



ELEVATION – UPSTREAM GATE SURFACE
NO SCALE



DETAIL A
NO SCALE

NOTES

1. Inspect gate and notify COR of wear or corrosion.
2. Verify contact areas of wire ropes on gate surface lie within the area of the wearing surface.
3. Expanded metal mesh shall be securely anchored to gate by tack welds as shown on Detail A. The Contractor may elect to deviate from the given weld pattern, with prior approval from the COR.
4. The Contractor shall verify the exact dimensions and locations of the existing slotted holes in the gate leaf.

REV NO	DATE	DESCRIPTION
1	2009-02-05	Revised dimensions and locations of wearing surfaces. Added notes.

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CENTRAL VALLEY PROJECT – CALIFORNIA
AMERICAN RIVER DIVISION – FOLSOM UNIT

NIMBUS DAM
RADIAL GATE REPAIRS
TYPICAL WEARING SURFACE LOCATION

DESIGNED A. QUACH CHECKED STEVEN LLOYD
DRAWN A. QUACH TECH. APPR. STEVEN LLOYD
APPROVED PONCIANO MARQUEZ
ADMINISTRATIVE APPROVAL – YONGHAO MARQUEZ – CHIEF, ENGINEERING BRANCH

SACRAMENTO, CA SHEET 1 OF 1 2008-07-08

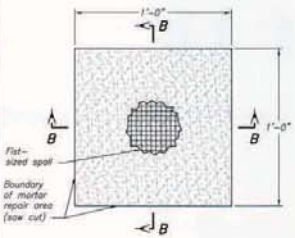
485-208-1881

Spec. No. 20-C0726

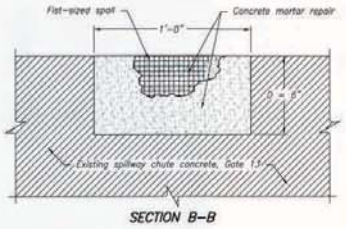
SHEET 5

TABLE – CONCRETE REPAIRS

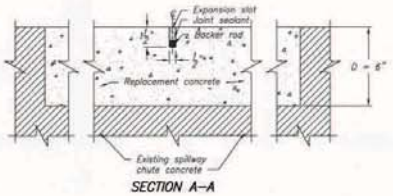
SITE NUMBER	GATE	PHOTO NUMBER	REPAIR TYPE	DESCRIPTION	APPROXIMATE DIMENSIONS OF REPAIR AREA (FEET) LENGTH, L	WIDTH, W	DEPTH, D	REFERENCE SPECIFICATIONS SECTIONS	REFERENCE DRAWINGS
1	9	1 AND 2	REPLACEMENT CONCRETE, WITH EXPANSION SLOT	SPALLED AND DELAMINATED CONCRETE ALONG SPILLWAY CHUTE	14	4	0.5	03 90 11, 03 15 12	485-D-394, -396
2	13	–	MORTAR	TWO FIST-SIZED SPALLS IN FLOOR OF SPILLWAY CHUTE, APPROXIMATELY 30 FEET DOWNSTREAM FROM GATE, VISIBLE WHEN STANDING AT HOIST DECK GUARDRAILING.	1	1	0.5	03 90 10	485-D-394, -396
3	1	3	MORTAR	SPALLED/CRACKED CONCRETE WITH EXPOSED METALWORK (BELOW LEFT SIDE TRUNNION)	1.5	1	VARIES, SEE TYPICAL ELEVATION	03 90 10	485-D-362, -365, -396
4	1	4	MORTAR	SPALLED/CRACKED CONCRETE WITH EXPOSED AND CORRODED METALWORK (BELOW RIGHT SIDE TRUNNION)	1.25	1	VARIES, SEE TYPICAL ELEVATION	03 90 10	485-D-362, -365, -396
5	7	5	MORTAR	SPALLED/CRACKED CONCRETE WITH EXPOSED AND CORRODED METALWORK (BELOW RIGHT SIDE TRUNNION)	3.5	1	VARIES, SEE TYPICAL ELEVATION	03 90 10	485-D-362, -365, -396
6	15	6	MORTAR	SPALLED/CRACKED CONCRETE WITH EXPOSED AND CORRODED METALWORK (BELOW RIGHT SIDE TRUNNION)	3.5	1	VARIES, SEE TYPICAL ELEVATION	03 90 10	485-D-362, -365, -396
7	16	7	MORTAR	SPALLED/CRACKED CONCRETE WITH EXPOSED AND CORRODED METALWORK (BELOW RIGHT SIDE TRUNNION)	3.5	1	VARIES, SEE TYPICAL ELEVATION	03 90 10	485-D-362, -365, -396
8	13	8	MORTAR	TWO SMALL SPALLS ON UNDERSIDE OF HOIST EQUIPMENT DECK NEAR RIGHT SIDE HOIST CABLES	VERIFY IN FIELD			03 90 10	485-D-406, 407



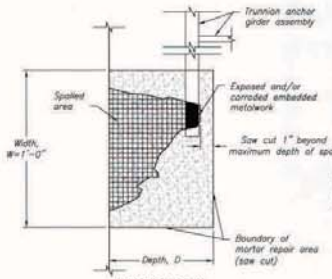
SITE NO. 2 – PLAN
(Typical, each spall location)



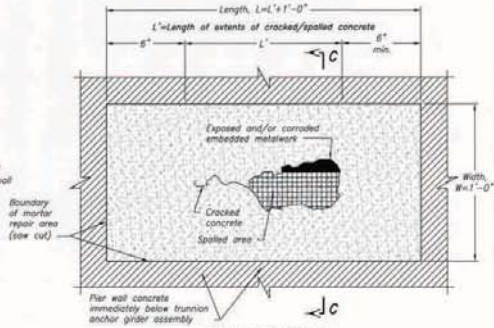
SECTION B–B



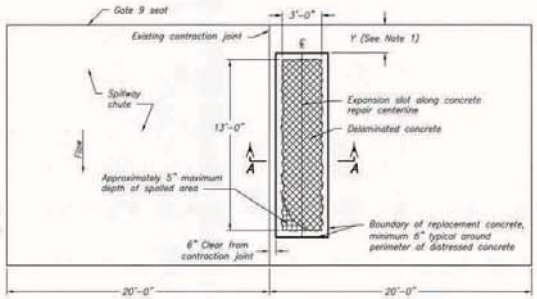
SECTION A–A



SECTION C–C



TYPICAL ELEVATION
Site nos. 3 through 7
(Typical pier wall repairs, trunnions not shown)



SITE NO. 1 – PLAN

LEGEND

New concrete | Spalled concrete | Concrete repair mortar
Existing concrete | Delaminated concrete

NOTES

1. Dimensions shown for spalled and delaminated areas are approximate, and are based on information and photos obtained during the climb inspection held April 23–27, 2007. Dimensions are subject to adjustment in the field.
2. Dimension "Y" defining exact location of repair area at Site No. 1 shall be determined in the field.
3. No reinforcement is anticipated to be encountered at Site No. 1 and Site No. 2.
4. See Attachment No. 3 in Section J for photographs of repair areas.
5. "Left" and "right" are looking downstream in the direction of flow.
6. Additional concrete repair areas with mortar may be required as determined in the field. General criteria is to repair those spalled/eroded areas where the loss of material from the surface of the feature is approximately 1 inch or more, and/or where reinforcing steel is exposed.

RECLAMATION
Managing Water in the West

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CENTRAL VALLEY PROJECT – CALIFORNIA
AMERICAN RIVER DIVISION – FOLSOM UNIT

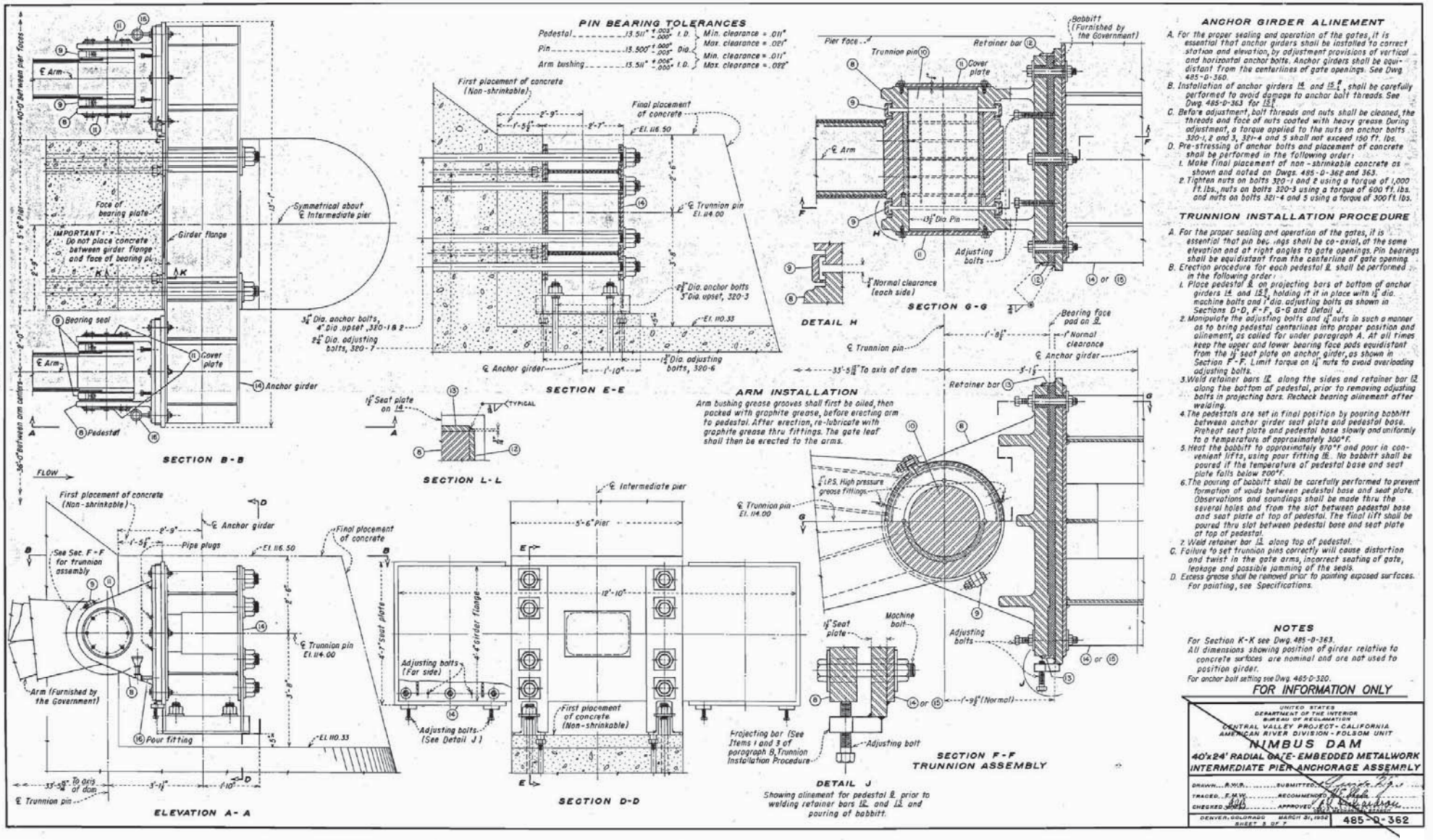
NIMBUS DAM
RADIAL GATE REPAIRS – PHASE III
TABLE AND DETAILS

Dan Pasek
DESIGNED
Ernesto Segura/Kasey Nunes
DRAWN
CHECKED
TECH. SERVICE
JOANIE JAMIESON
ALEX VARGAS
CHIEF, TECHNICAL SERVICES BRANCH
SACRAMENTO, CALIFORNIA 2013-08-07

SPILLWAY AND PIER WALL CONCRETE REPAIRS

485-208-2813

SHEET 1 OF 1



ANCHOR GIRDER ALINEMENT

A. For the proper sealing and operation of the gates, it is essential that anchor girders shall be installed to correct station and elevation, by adjustment provisions of vertical and horizontal anchor bolts. Anchor girders shall be equidistant from the centerlines of gate openings. See Dwg. 485-D-350.

B. Installation of anchor girders ⑭ and ⑮ shall be carefully performed to avoid damage to anchor bolt threads. See Dwg. 485-D-363 for ⑮.

C. Before adjustment, bolt threads and nuts shall be cleaned, the threads and face of nuts coated with heavy grease. During adjustment, a torque applied to the nuts on anchor bolts 320-1, 2 and 3, 321-4 and 5 shall not exceed 150 ft. lbs.

D. Pre-stressing of anchor bolts and placement of concrete shall be performed in the following order:
1. Make final placement of non-shrinkable concrete as shown and noted on Dwgs. 485-D-362 and 363.
2. Tighten nuts on bolts 320-1 and 2 using a torque of 1,000 ft. lbs., nuts on bolts 320-3 using a torque of 600 ft. lbs. and nuts on bolts 321-4 and 5 using a torque of 300 ft. lbs.

TRUNNION INSTALLATION PROCEDURE

A. For the proper sealing and operation of the gates, it is essential that pin bearings shall be co-axial, at the same elevation and at right angles to gate openings. Pin bearings shall be equidistant from the centerline of gate opening.

B. Erection procedure for each pedestal ⑧ shall be performed in the following order:
1. Place pedestal ⑧ on projecting bars at bottom of anchor girders ⑭ and ⑮, holding it in place with 1¼" dia. machine bolts and 1" dia. adjusting bolts as shown in Sections D-D, F-F, G-G and Detail J.
2. Manipulate the adjusting bolts and 4½" nuts in such a manner as to bring pedestal centerlines into proper position and alinement, as called for under paragraph A. At all times keep the upper and lower bearing face pads equidistant from the 2½" seat plate on anchor girder, as shown in Section F-F. Limit torque on 1¼" nuts to avoid overloading adjusting bolts.
3. Weld retainer bars ⑫ along the sides and retainer bar ⑬ along the bottom of pedestal, prior to removing adjusting bolts in projecting bars. Recheck bearing alinement after welding.
4. The pedestals are set in final position by pouring babbitt between anchor girder seat plate and pedestal base. Preheat seat plate and pedestal base slowly and uniformly to a temperature of approximately 300°F.
5. Heat the babbitt to approximately 670°F and pour in convenient lifts, using pour fitting ⑯. No babbitt shall be poured if the temperature of pedestal base and seat plate falls below 200°F.
6. The pouring of babbitt shall be carefully performed to prevent formation of voids between pedestal base and seat plate. Observations and soundings shall be made thru the several holes and from the slot between pedestal base and seat plate at top of pedestal. The final lift shall be poured thru slot between pedestal base and seat plate at top of pedestal.
7. Weld retainer bar ⑫ along top of pedestal.

C. Failure to set trunnion pins correctly will cause distortion and twist in the gate arms, incorrect seating of gate, leakage and possible jamming of the seals.

D. Excess grease shall be removed prior to painting exposed surfaces. For painting, see Specifications.

NOTES

For Section K-K see Dwg. 485-D-363.
All dimensions showing position of girder relative to concrete surfaces are nominal and are not used to position girder.
For anchor bolt setting see Dwg. 485-D-350.

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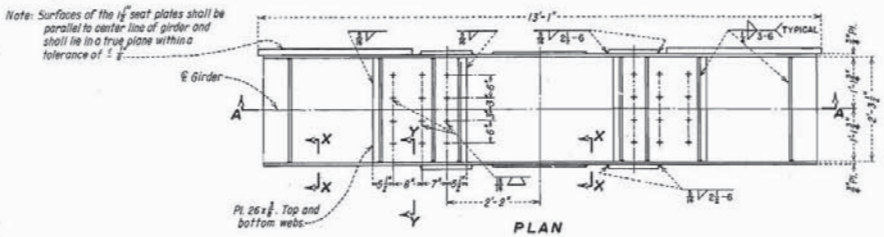
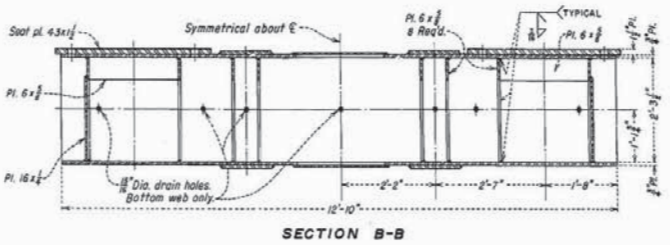
AMERICAN RIVER DIVISION - FOLSOM UNIT

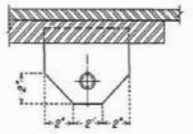
NIMBUS DAM

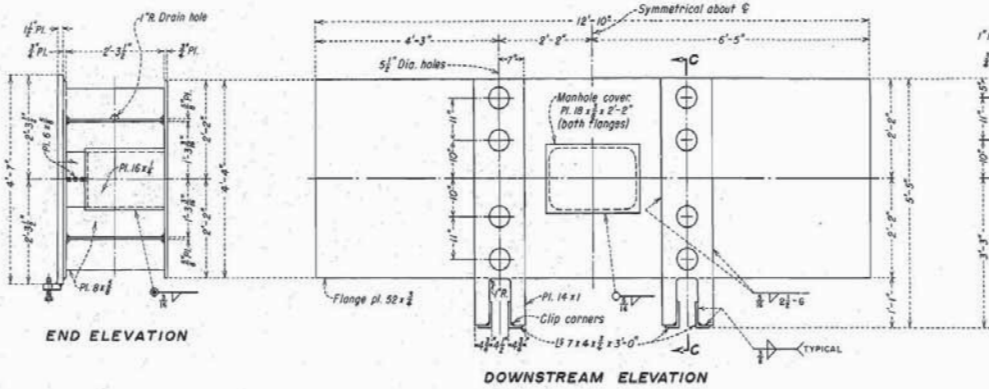
40'x24' RADIAL GATE-EMBEDDED METALWORK INTERMEDIATE PIER ANCHORAGE ASSEMBLY

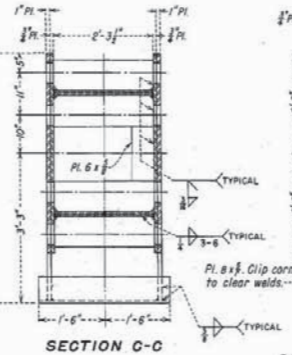
DRAWN R.W.B. SUBMITTED
TRACED F.M.W. RECOMMENDED
CHECKED APPROVED
DENVER, COLORADO MARCH 31, 1952
SHEET 3 OF 7
485-D-362

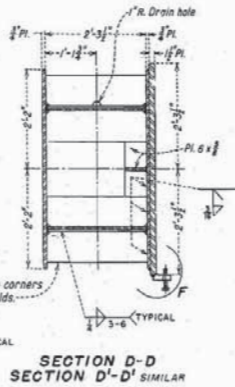


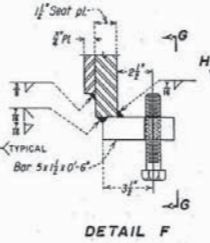


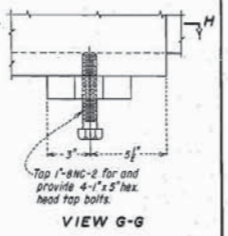


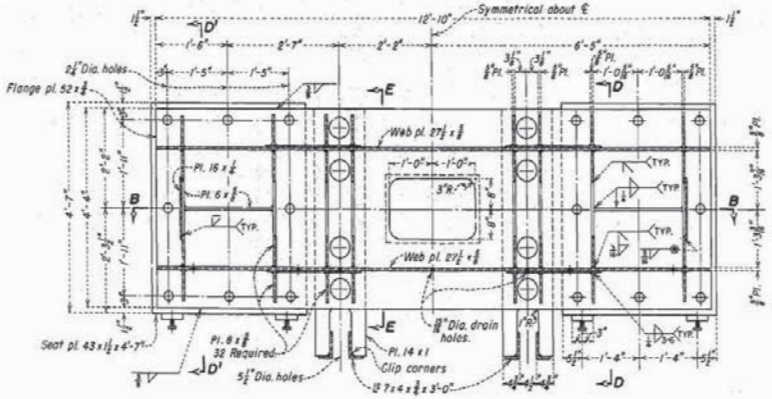




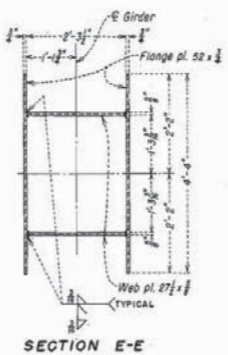


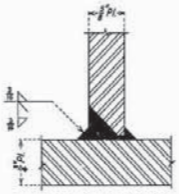


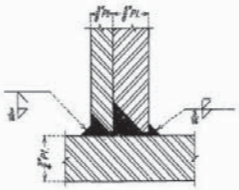




(14)
ANCHOR GIRDER
STEEL A 55
17 REQUIRED-MARK 362-14







NOTES

Quantities called for on this sheet are for 18 gates.
For materials-specifications and minimum physical properties see Dwg. 485-D-366.
Welding symbols apply to the joints of all members of the same identification.
For fusion welding symbols see "American Welding Society Symbols."
The center line of pier shall be established on all girders with punch marks. These marks shall be indicated with a painted circle and suitably designated so as to be easily identified by field erectors.
Mark and match-mark all parts for field assembly.

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CENTRAL VALLEY PROJECT- CALIFORNIA
AMERICAN RIVER DIVISION- FOLSOM UNIT

NIMBUS DAM

40'x 24' RADIAL GATE-EMBEDDED METALWORK
INTERMEDIATE PIER ANCHOR GIRDER

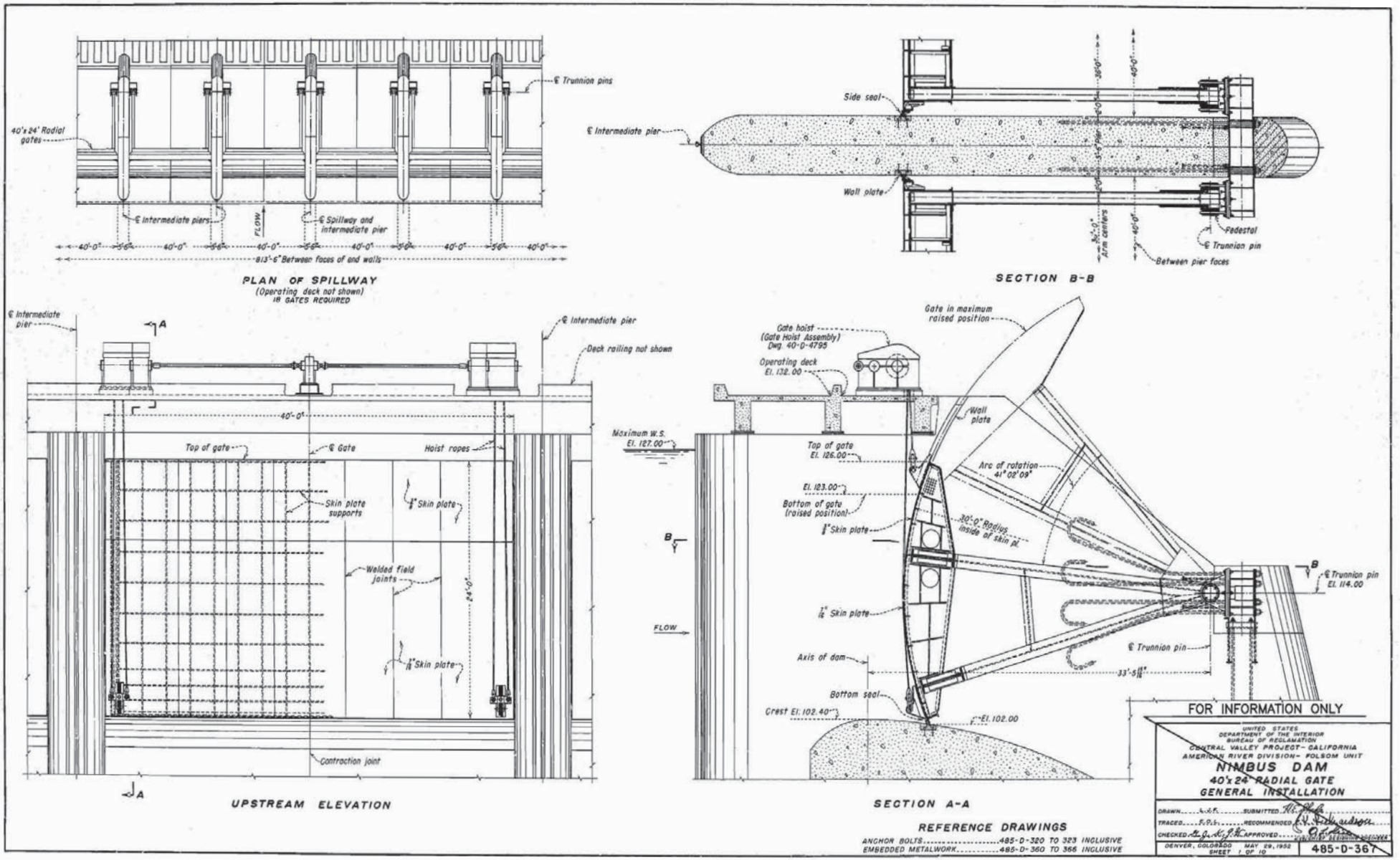
DRAWN	E.G.S.	SUBMITTED	
TRACED	E.O.L.	RECOMMENDED	
CHECKED		APPROVED	CHIEF, MECHANICAL BRANCH

DENVER, COLORADO MARCH 31, 1955
SHEET 6 OF 7

485-D-365

REV. 6-29-55

SHEET 14


℄ Trunnion pins
40'x 24' Radial gates
℄ Intermediate piers
FLOW
℄ Spillway and intermediate pier
40'-0"
5'-6"
813'-6" Between faces of end walls
PLAN OF SPILLWAY
(Operating deck not shown)
18 GATES REQUIRED
Side seal
℄ Intermediate pier
Wall plate
36'-0"
40'-0"
5'-9" Arm centers
Pedestal
℄ Trunnion pin
Between pier faces
SECTION B-B
℄ Intermediate pier
Deck railing not shown
A
40'-0"
Top of gate
℄ Gate
Hoist ropes
Skin plate supports
1/2" Skin plate
Welded field joints
24'-0"
Contraction joint
UPSTREAM ELEVATION
Gate in maximum raised position
Gate hoist (Gate Hoist Assembly) Dwg. 40-D-4795
Operating deck El. 132.00
Wall plate
Maximum W.S. El. 127.00
Top of gate El. 126.00
Arc of rotation 41° 02' 09"
El. 123.00
Bottom of gate (raised position)
30'-0" Radius inside of skin pl
FLOW
Axis of dam
Bottom seal
Crest El. 102.40
El. 102.00
℄ Trunnion pin El. 114.00
33'-5 1/2"
SECTION A-A
REFERENCE DRAWINGS
ANCHOR BOLTS.....485-D-320 TO 323 INCLUSIVE
EMBEDDED METALWORK.....485-D-360 TO 366 INCLUSIVE
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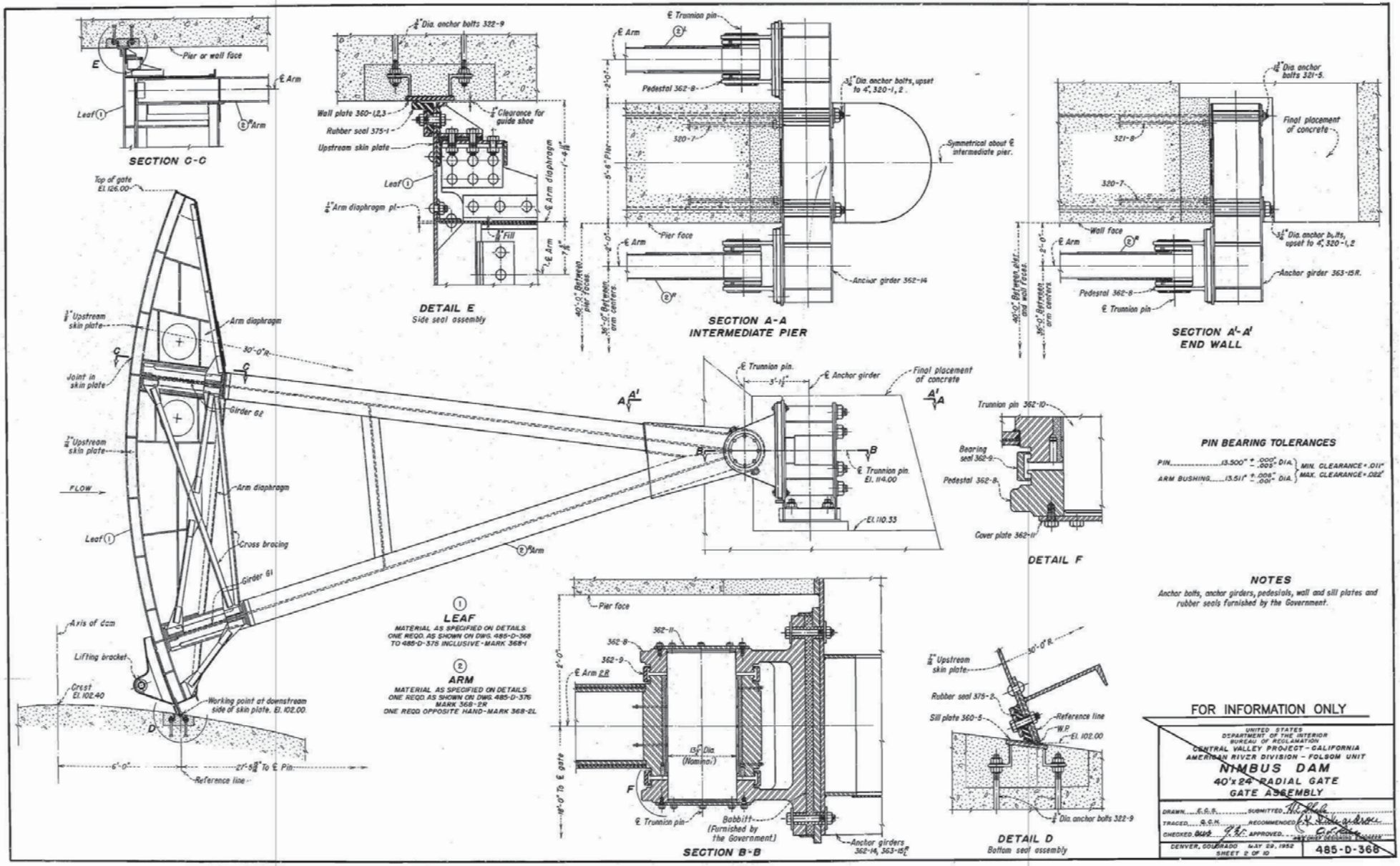
CENTRAL VALLEY PROJECT- CALIFORNIA
AMERICAN RIVER DIVISION- FOLSOM UNIT
NIMBUS DAM
40'x 24' RADIAL GATE
GENERAL INSTALLATION
DRAWN.....SUBMITTED.....
TRACED.....RECOMMENDED.....
CHECKED.....APPROVED.....
DENVER, COLORADO MAY 29, 1952
SHEET 1 OF 10
485-D-367


SECTION C-C
DETAIL E
Side seal assembly
SECTION A-A
INTERMEDIATE PIER
SECTION A'-A'
END WALL
DETAIL F
PIN BEARING TOLERANCES
PIN 13.500" +.000 -.005 DIA. MIN. CLEARANCE = .011"
ARM BUSHING 13.511" +.008 -.001 DIA. MAX. CLEARANCE = .022"
NOTES
Anchor bolts, anchor girders, pedestals, wall and sill plates and rubber seals furnished by the Government.
① LEAF
MATERIAL AS SPECIFIED ON DETAILS
ONE REQD. AS SHOWN ON DWG. 485-D-368
TO 485-D-375 INCLUSIVE - MARK 368-1
② ARM
MATERIAL AS SPECIFIED ON DETAILS
ONE REQD. AS SHOWN ON DWG. 485-D-376
MARK 368-2R
ONE REQD. OPPOSITE HAND - MARK 368-2L
SECTION B-B
DETAIL D
Bottom seal assembly
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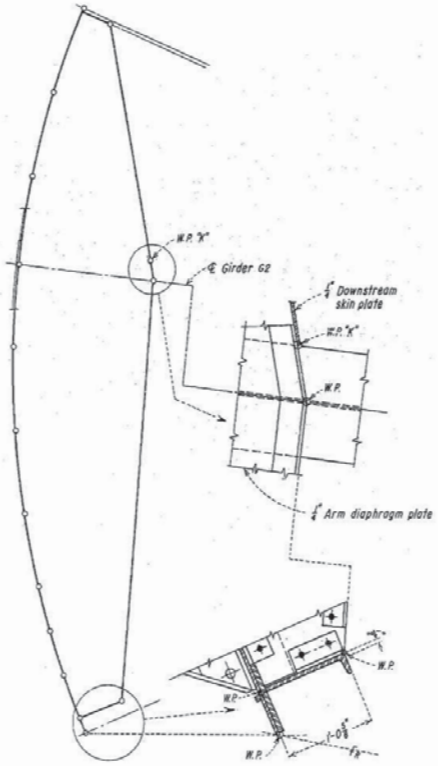
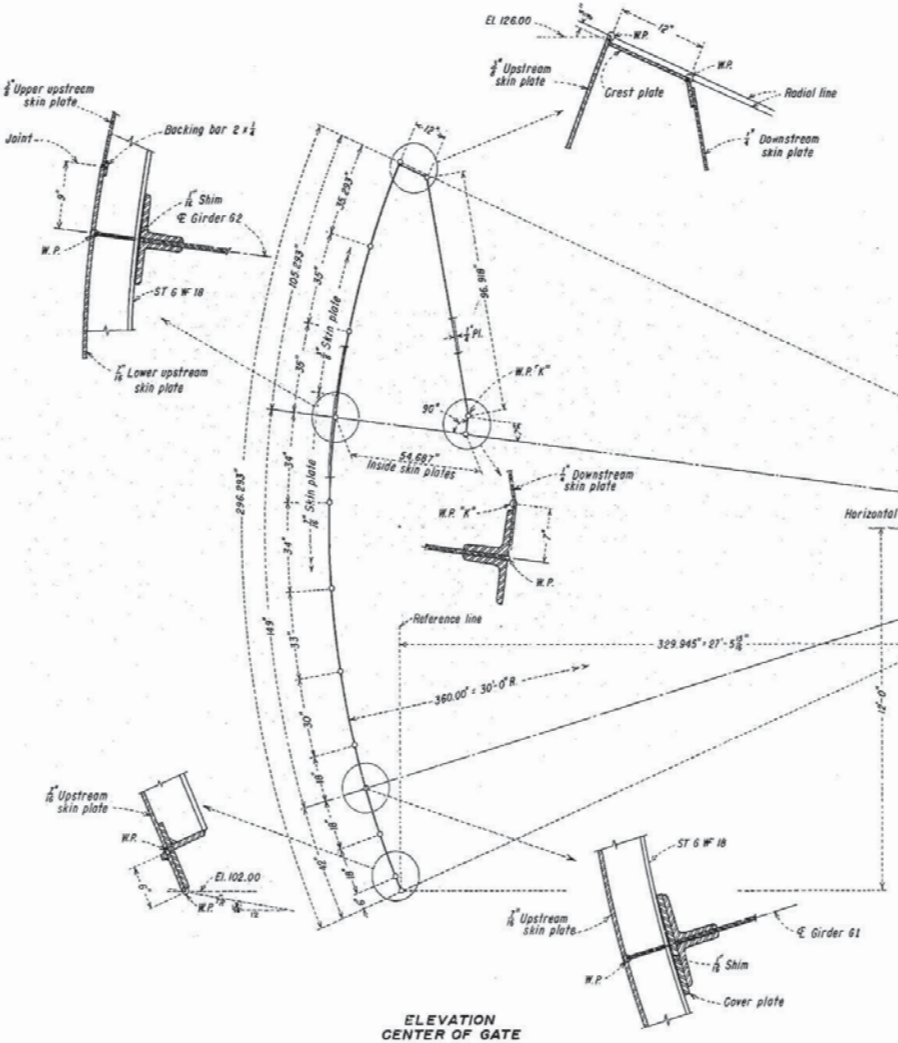
CENTRAL VALLEY PROJECT - CALIFORNIA
AMERICAN RIVER DIVISION - FOLSOM UNIT
NIMBUS DAM
40'x24' RADIAL GATE
GATE ASSEMBLY
DENVER, COLORADO MAY 29, 1952
SHEET 2 OF 10
485-D-368



ELEVATION
ARM DIAPHRAGM

For dimensions not shown see Elevation - center of gate.



ELEVATION
CENTER OF GATE

NOTE

All working points are located on inside face of skin plates.

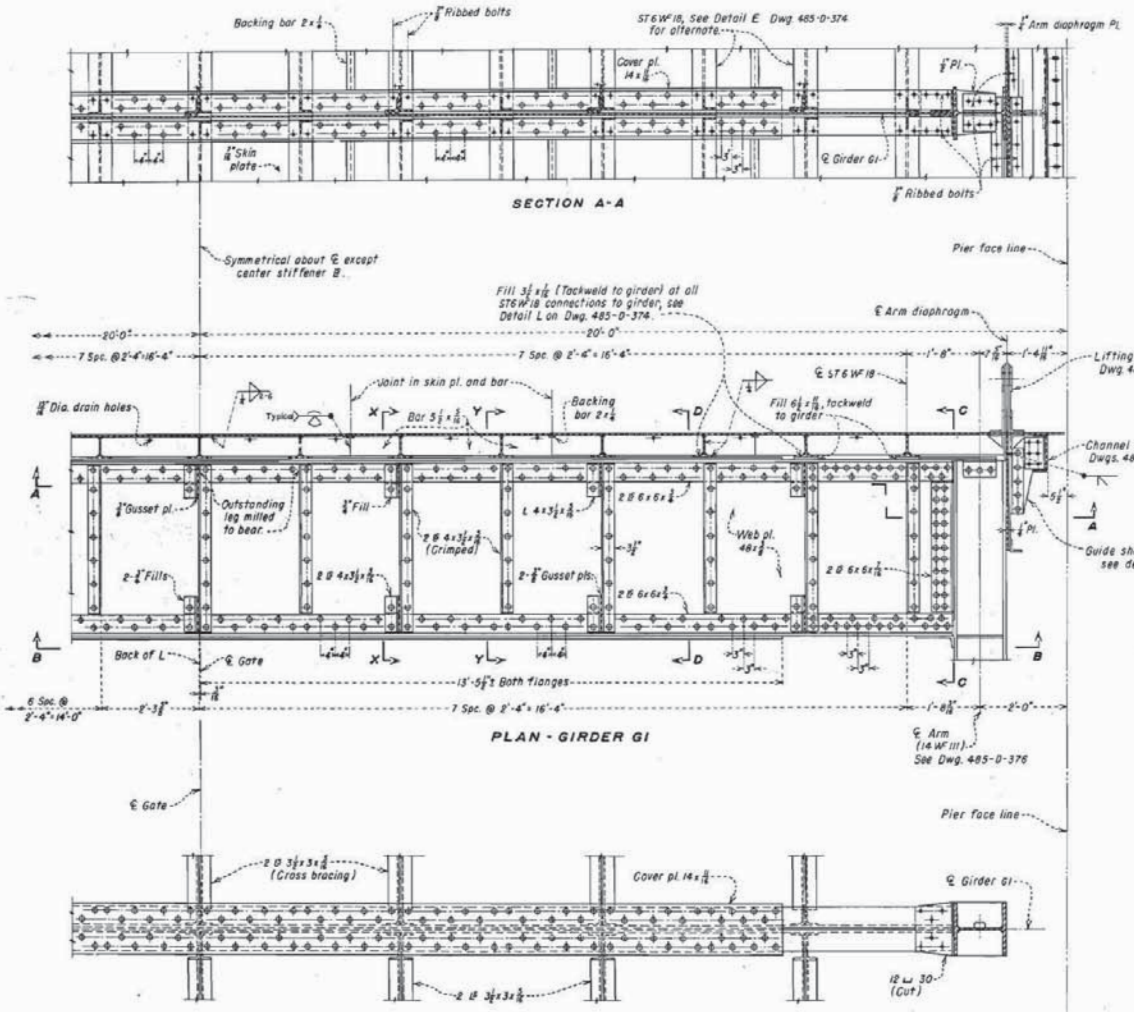
FOR INFORMATION ONLY

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL VALLEY PROJECT - CALIFORNIA
AMERICAN RIVER DIVISION - FOLSOM UNIT

NIMBUS DAM
40'x 24' RADIAL GATE
WORKING POINTS

DRAWN ... S.J.S. ... SUBMITTED ...
TRACED ... S.M.S. ... RECOMMENDED ...
CHECKED RHC ... APPROVED ...
DENVER, COLORADO MAY 29, 1952
SHEET 3 OF 10

485-D-369



NOTES

For Sections X-X and Y-Y, see Dwg. 485-D-374.
All holes 13/16" dia. unless otherwise noted.
All rivets 1" dia.
For subpunching, drilling and reaming, see Specifications.
Rivet and bolt requirements shown on all drawings are minimum and shall not be diminished.
Prepare edges in shop for field welding.
For materials - specifications and minimum physical properties see Dwg. 485-D-376.
For fusion welding symbols see "American Welding Society Symbols."
Welding symbols apply to the joints of all members of the same identification.
All calk welds to have 1/4" minimum fillet, must be continuous and watertight.
Provide cap screws, machine bolts and ribbed bolts 3% in excess of requirements.
Mark and matchmark all parts for field assembly.

FOR INFORMATION ONLY

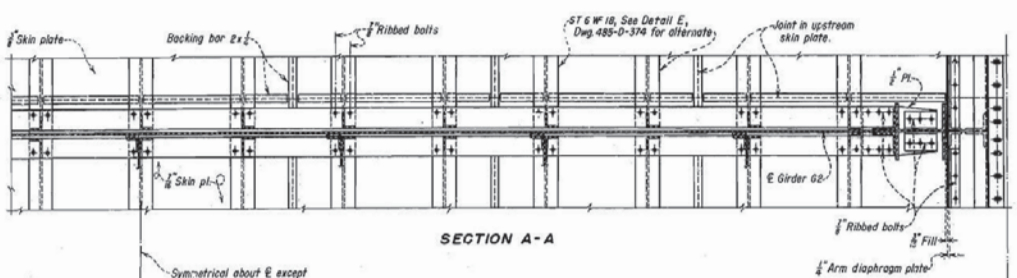
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
GENERAL VALLEY PROJECT - CALIFORNIA
AMERICAN RIVER DIVISION - FOLSOM UNIT

NIMBUS DAM
40'x 24' RADIAL GATE
GIRDER G1

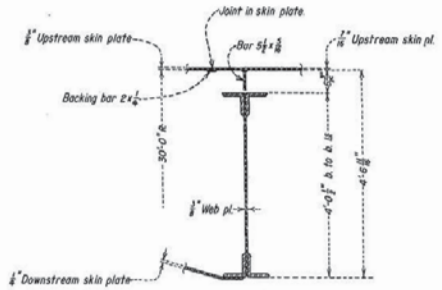
DRAWN	L.A.C.	SUBMITTED	
TRACED	E.M.W.	RECOMMENDED	
CHECKED	G.P.C.	APPROVED	For Director

DENVER, COLORADO, MAY 29, 1952
SHEET 4 OF 10

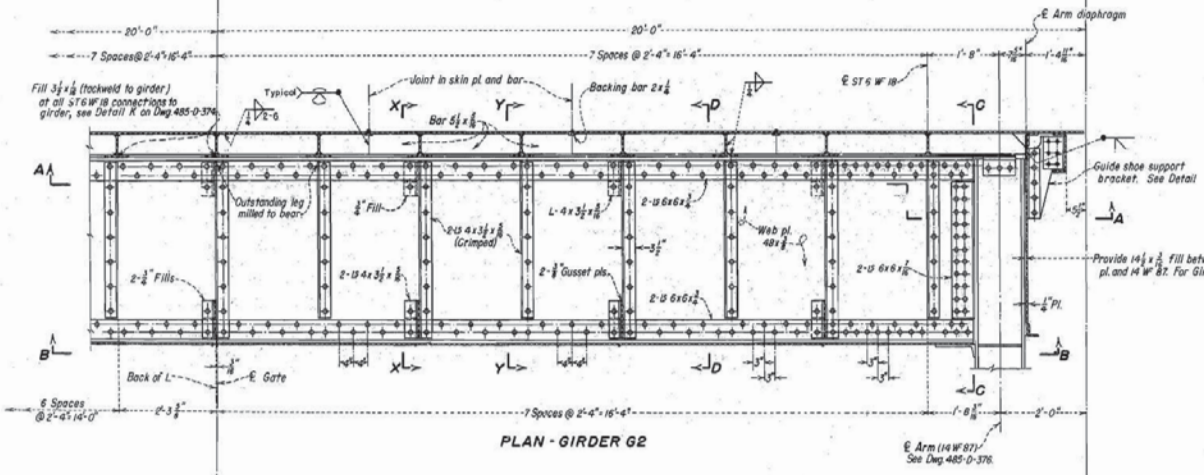
485-D-370



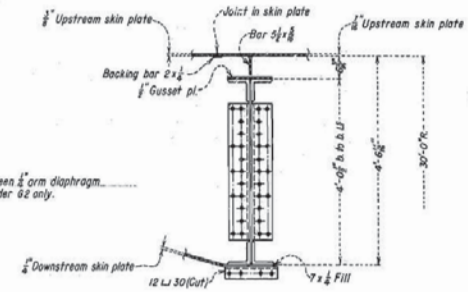
SECTION A-A



SECTION D-D



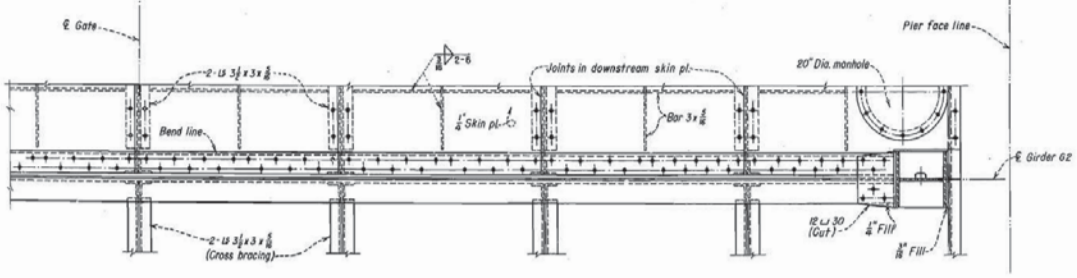
PLAN - GIRDER G2



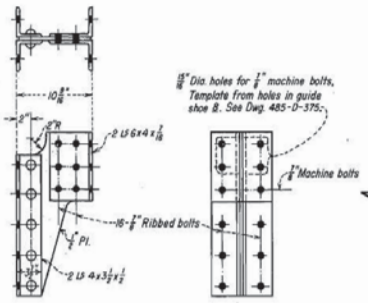
SECTION C-C

NOTES

For Sections X-X and Y-Y see Dwg. 485-D-374.
For other notes see Dwg. 485-D-370.



DOWNSTREAM ELEVATION



GUIDE SHOE SUPPORT BRACKET

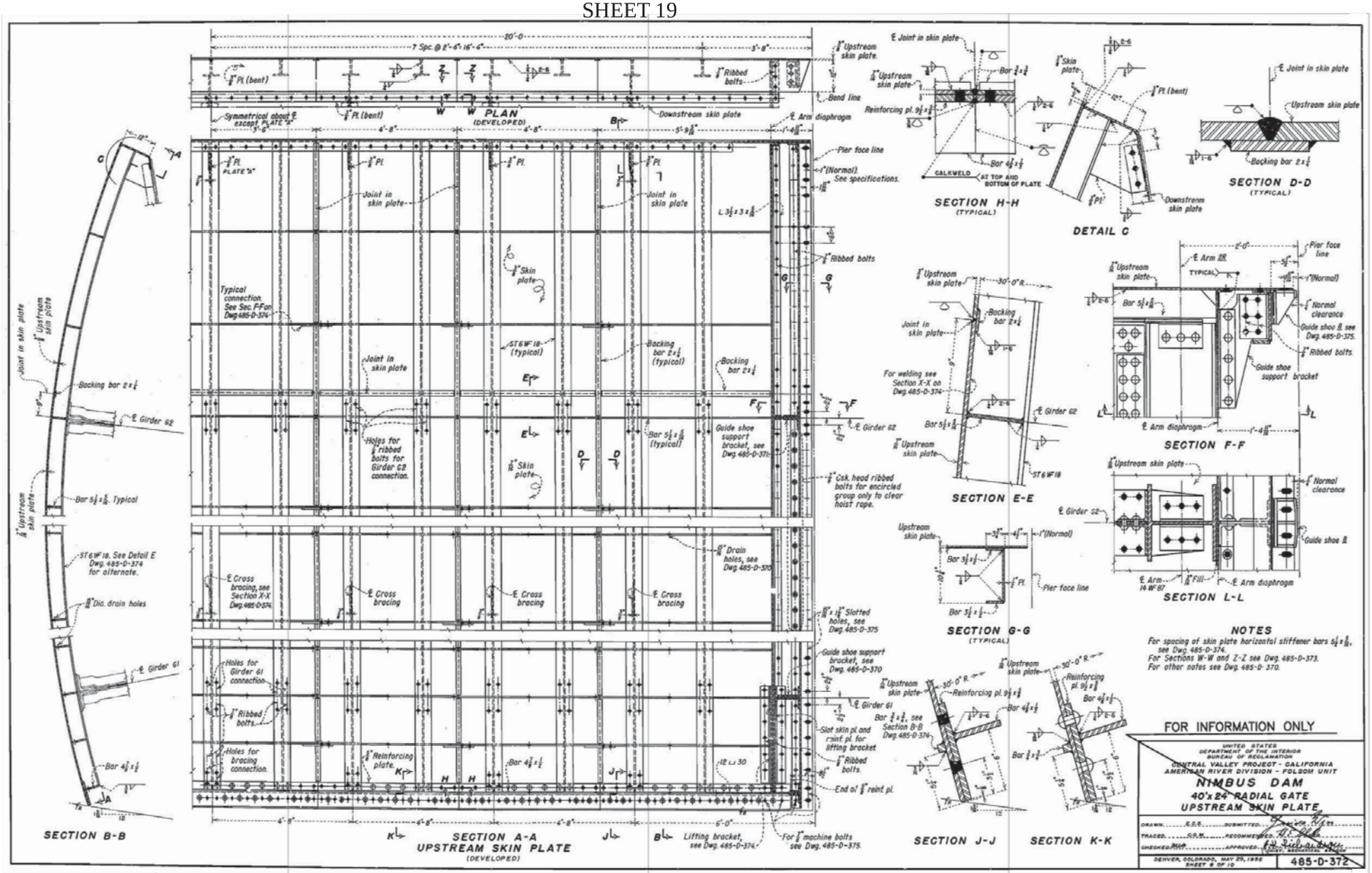
FOR INFORMATION ONLY

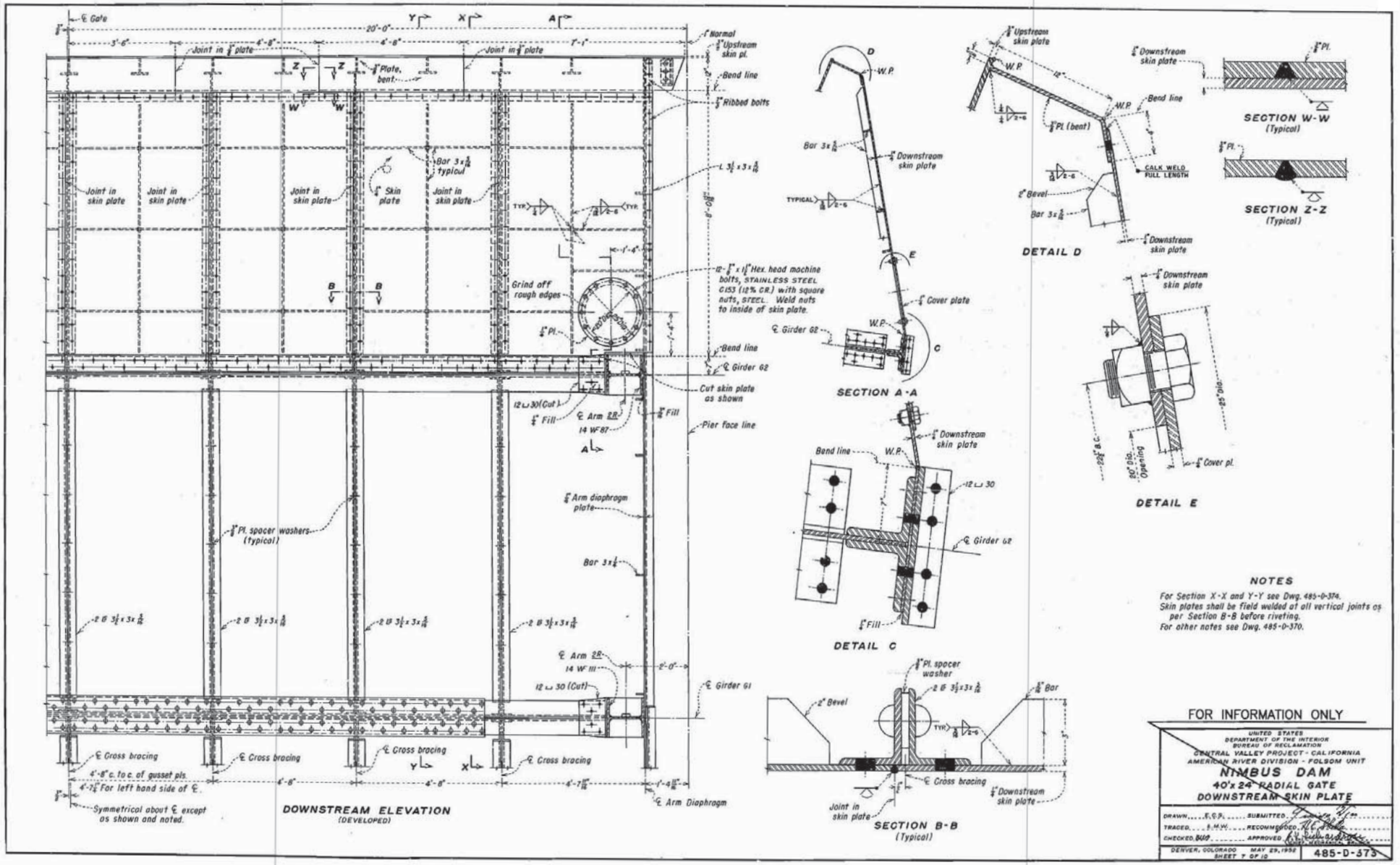
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL VALLEY PROJECT - CALIFORNIA
AMERICAN RIVER DIVISION - FOLSOM UNIT

NIMBUS DAM
40' x 24' RADIAL GATE
GIRDER G2

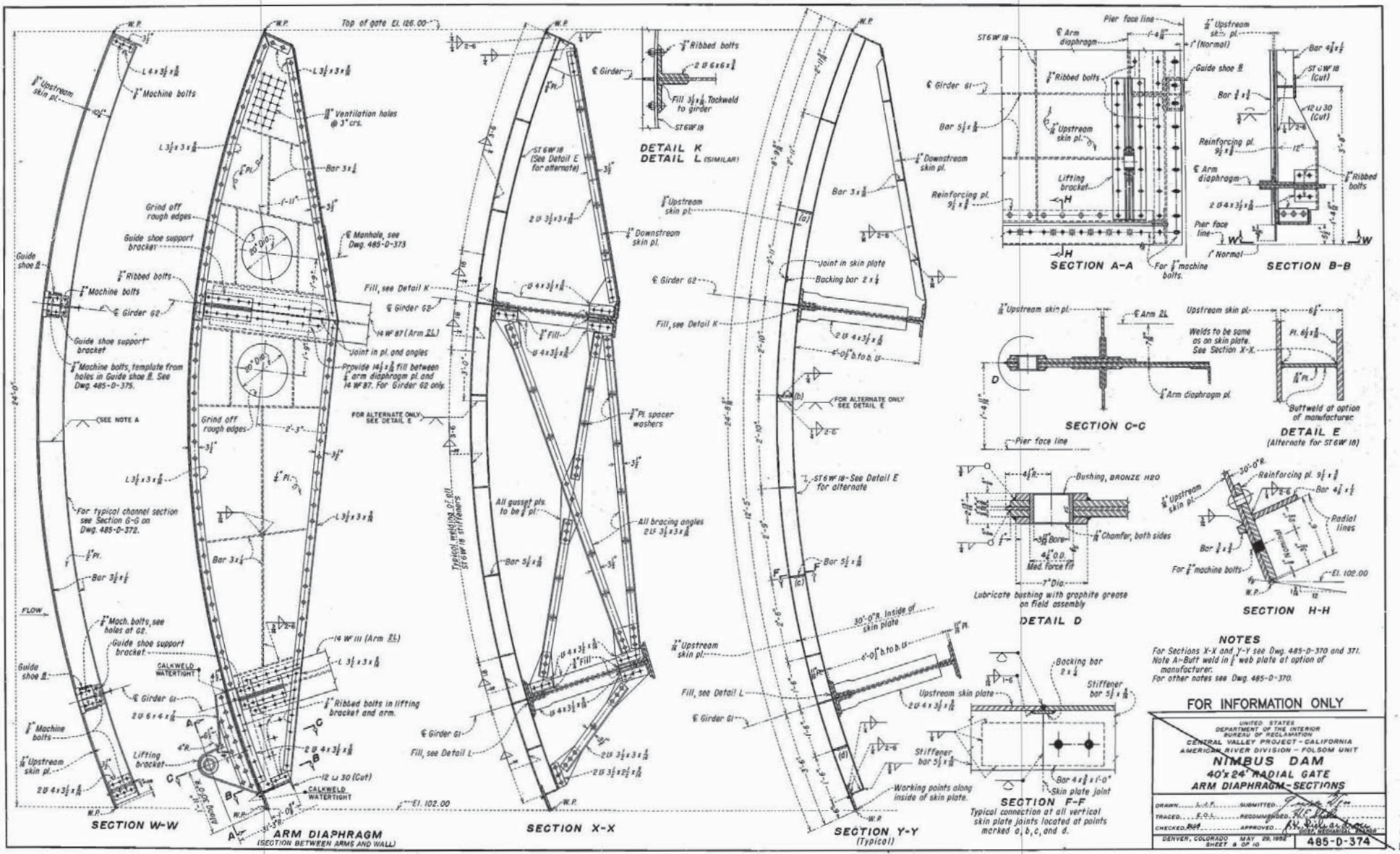
DRAWN L.J.C. SUBMITTED
TRACED G.G.H. RECOMMENDED
CHECKED APPROVED
DENVER, COLORADO MAY 29, 1952
SHEET 5 OF 10

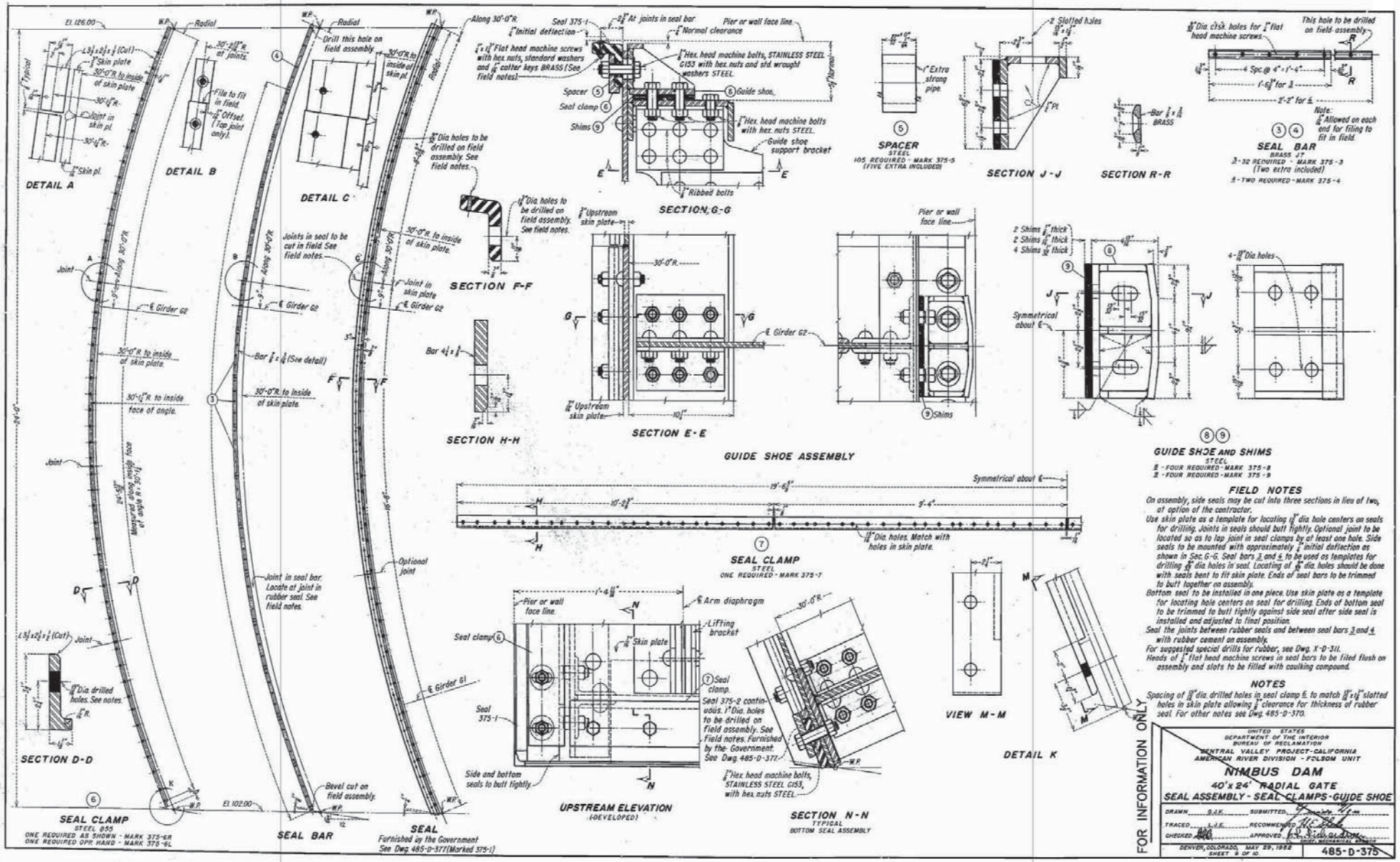
485-D-371


PLAN
(DEVELOPED)
SECTION A-A
UPSTREAM SKIN PLATE
(DEVELOPED)
SECTION B-B
SECTION H-H
(TYPICAL)
DETAIL C
SECTION D-D
(TYPICAL)
SECTION E-E
SECTION F-F
SECTION G-G
(TYPICAL)
SECTION L-L
SECTION J-J
SECTION K-K
NOTES
For spacing of skin plate horizontal stiffener bars 5½ x ⅝, see Dwg. 485-D-374.
For Sections W-W and Z-Z see Dwg. 485-D-373.
For other notes see Dwg. 485-D- 370.
FOR INFORMATION ONLY
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL VALLEY PROJECT - CALIFORNIA
AMERICAN RIVER DIVISION - FOLSOM UNIT
NIMBUS DAM
40'x 24' RADIAL GATE
UPSTREAM SKIN PLATE
DENVER, COLORADO, MAY 29, 1952
SHEET 5 OF 10
485-D-372


DOWNSTREAM ELEVATION
(DEVELOPED)
SECTION A-A
DETAIL C
DETAIL D
DETAIL E
SECTION W-W
(Typical)
SECTION Z-Z
(Typical)
SECTION B-B
(Typical)
NOTES
For Section X-X and Y-Y see Dwg. 485-D-374.
Skin plates shall be field welded at all vertical joints as per Section B-B before riveting.
For other notes see Dwg. 485-D-370.
FOR INFORMATION ONLY
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL VALLEY PROJECT - CALIFORNIA
AMERICAN RIVER DIVISION - FOLSOM UNIT
NIMBUS DAM
40'x 24' RADIAL GATE
DOWNSTREAM SKIN PLATE
DRAWN E.G.S.
TRACED E.M.W.
CHECKED BHP
SUBMITTED
RECOMMENDED
APPROVED
DENVER, COLORADO MAY 29, 1952
SHEET 7 OF 10
485-D-373

SHEET 21


SECTION W-W
ARM DIAPHRAGM
(SECTION BETWEEN ARMS AND WALL)
SECTION X-X
SECTION Y-Y
(Typical)
DETAIL K
DETAIL L (SIMILAR)
SECTION A-A
SECTION B-B
SECTION C-C
DETAIL E
(Alternate for ST 6WF18)
DETAIL D
SECTION H-H
SECTION F-F
Typical connection at all vertical skin plate joints located at points marked a, b, c, and d.
NOTES
For Sections X-X and Y-Y see Dwg. 485-D-370 and 371.
Note A-Butt weld in ½" web plate at option of manufacturer.
For other notes see Dwg. 485-D-370.
FOR INFORMATION ONLY
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL VALLEY PROJECT - CALIFORNIA
AMERICAN RIVER DIVISION - FOLSOM UNIT
NIMBUS DAM
40'x24' RADIAL GATE
ARM DIAPHRAGM-SECTIONS
DRAWN J.C.F.
TRACED E.O.L.
CHECKED R.H.H.
SUBMITTED
RECOMMENDED
APPROVED
DENVER, COLORADO MAY 29, 1952
SHEET 8 OF 10
485-D-374



FIELD NOTES

On assembly, side seals may be cut into three sections in lieu of two, at option of the contractor.

Use skin plate as a template for locating 13/16" dia. hole centers on seals for drilling. Joints in seals should butt tightly. Optional joint to be located so as to lap joint in seal clamps by at least one hole. Side seals to be mounted with approximately 1/4" initial deflection as shown in Sec. G-G. Seal bars 3 and 4 to be used as templates for drilling 7/8" dia. holes in seal. Locating of 7/8" dia. holes should be done with seals bent to fit skin plate. Ends of seal bars to be trimmed to butt together on assembly.

Bottom seal to be installed in one piece. Use skin plate as a template for locating hole centers on seal for drilling. Ends of bottom seal to be trimmed to butt tightly against side seal after side seal is installed and adjusted to final position.

Seal the joints between rubber seals and between seal bars 3 and 4 with rubber cement on assembly.

For suggested special drills for rubber, see Dwg. X-D-311.

Heads of 1/4" flat head machine screws in seal bars to be filed flush on assembly and slots to be filled with caulking compound.

NOTES

Spacing of 13/16" dia. drilled holes in seal clamp 6 to match 13/16" x 1 1/4" slotted holes in skin plate allowing 1/4" clearance for thickness of rubber seal. For other notes see Dwg. 485-D-370.

FOR INFORMATION ONLY

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL VALLEY PROJECT - CALIFORNIA
AMERICAN RIVER DIVISION - FOLSOM UNIT

NIMBUS DAM
40' x 24' RADIAL GATE
SEAL ASSEMBLY - SEAL CLAMPS - GUIDE SHOE

DRAWN S.A.K. SUBMITTED
TRACED L.J.E. RECOMMENDED
CHECKED APPROVED
CHIEF, MECHANICAL DESIGN

DENVER, COLORADO, MAY 29, 1952
SHEET 9 OF 10.

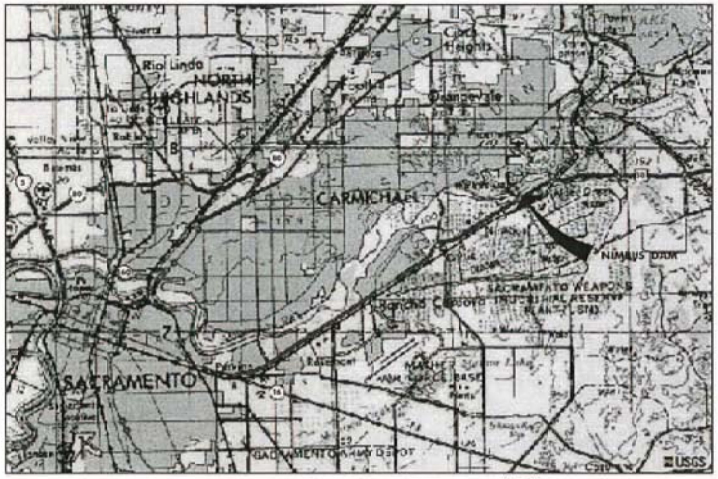
485-D-375

485-208-2250

NIMBUS DAM FLOATING BULKHEAD
US BUREAU OF RECLAMATION
SACRAMENTO, CALIFORNIA

AUGUST 2005

VICINITY MAP
NOT TO SCALE



LOCATION MAP

NORTH

LEGEND:

- SECTION NUMBER / SHEET WHERE DRAWN
- DETAIL OR PLAN NUMBER / SHEET WHERE DRAWN
- NUMBER OF DRAWING ON THAT SHEET

1 PLAN, DETAIL OR SECTION
1" = 100'

DRAWING INDEX

DWG NO	SHT NO	DESCRIPTION
		GENERAL
S1.1	1	VICINITY, LOCATION MAPS, ABBREVIATION & DRAWING INDEX
		FLOATING BULKHEAD PROCUREMENT
S1.2	2	BULKHEAD ARRANGEMENT
S1.3	3	TYPICAL CAISSONS NO. 2 - 11
S1.4	4	TYPICAL CAISSONS NO. 2 - 11, SECTIONS
S1.5	5	CAISSON DETAILS
S1.6	6	BOTTOM CAISSON NO. 1
S1.7	7	TOP CAISSON NO. 11 PLAN AND SECTIONS
S1.8	8	AIR & WATER MANIFOLD DETAILS
S1.9	9	PIER NOSE & ABUTMENT ANCHOR EYE DETAILS

ABBREVIATIONS:

AB	ANCHOR BOLT	BRK	BRICK	CPLG	COUPLING	EL	ELEVATION	FTG	FOOTING	INL	INLET	MH	MANHOLE	PKG	PARKING	REQD	REQUIRED	SY	SQUARE YARD	W	WEST
ABV	ABOVE	BS	BACK OF SIDEWALK	CRS	COURSE	ELB	ELBOW	FUT	FUTURE	INSUL	INSULATION	MIN	MINIMUM	PL	PLATE	REV	REVISED	SYS	SYSTEM	W/	WITH
ADJ	ADJUST	BTM	BOTTOM	CSP	CORRUGATED STEEL PIPE	ELEC	ELECTRICAL			INT	INTERIOR	MISC	MISCELLANEOUS	PL	PLACE	RM	ROOM			W/O	WITHOUT
AFF	ABOVE FINISHED FLOOR	BV	BALL VALVE	CTG	CASTING	EQ	EQUAL	G	GAS	INV	INVERT	MJ	MECHANICAL JOINT	PL. R.	PROPERTY LINE	RR	RAILROAD	T & B	TOP & BOTTOM	WD	WIDTH
AL	ALUMINUM	B	BASELINE	CTH	COUNTY TRUNK HIGHWAY	EQUIP	EQUIPMENT	GA	GAGE	IP	IRON PIPE	MTL	MATERIAL	PP	POWER POLE	RT	RIGHT	TC	TOP OF CURB	WM	WATER MAIN
ALT	ALTERNATE with	BO	BOTTOM OF	CULV	CULVERT	ER	END OF RADIUS	GAR	GARAGE	IPS	IRON PIPE SIZE			PSF	POUNDS PER SQUARE FOOT	RW	RIGHT OF WAY	TELE	TELEPHONE	WS	WATER SURFACE
ALT/	ALTERNATE			CV	CHECK VALVE	EST	ESTIMATE	GEN	GENERAL			N	NORTH	PSI	POUNDS PER SQUARE INCH			THK	THICKNESS	WTP	WATER TREATMENT PLANT
APPROX	APPROXIMATE	C & G	CURB AND GUTTER	CW	COLD WATER	EW	EACH WAY	GRD	GRADE, GROUND	JT	JOINT	NF	NEAR FACE	PT	POINT OF TANGENCY	S	SOUTH	THRU	THROUGH	WTR	WATER
ASPH	ASPHALT	CB	CATCH BASIN	CY	CUBIC YARD	EWC	ELECTRIC WATER COOLER	GV	GATE VALVE			NC	NOT IN CONTRACT	PV	PLUG VALVE	SAN	SANITARY	TP	TELEPHONE POLE	WWF	WELDED WIRE FABRIC
AUTO	AUTOMATIC	CF	CUBIC FOOT			EXG	EXISTING	GVL	GRAVEL	KGV	KNIFE GATE VALVE	NO	NUMBER	PVC	POLYVINYL CHLORIDE	SCH	SCHEDULE	TYP	TYPICAL	WWM	WOVEN WIRE MESH
AVE	AVENUE	CHKR	CHECKERED PLATE	DEFL	DEFLECTION	EXH	EXHAUST	GW	GROUNDWATER			NPW	NON-POTABLE WATER	PWMT	PAVEMENT	SEC	SECTION	T/	TOP OF	WWTP	WASTEWATER TREATMENT PLANT
@	AT	CI	CAST IRON	DF	DRAWING FOUNDATION	EXP	EXPANSION			LAB	LABORATORY	NTS	NOT TO SCALE	PW	POTABLE WATER	SF	SQUARE FOOT				
		CJ	CONTROL JOINT	DI	DUCTILE IRON	EXT	EXTERIOR			LAV	LAVATORY			%	PERCENT	SHT	SHEET	UG	UNDERGROUND GAS		
B CRS	BASE COURSE	CL	CENTERLINE	DIA or ø	DIAMETER			HD	HOSE BIB	LC	LENGTH OF CURVE	OC	ON CENTER			SIM	SIMILAR	UE	UNDERGROUND ELECTRICAL		
BC	BACK OF CURB	CL	CHLORINE	DIM	DIMENSION	FD	FLOOR DRAIN	HDR2	HORIZONTAL	LF	LINEAL FEET	OD	OUTSIDE DIAMETER	QTY	QUANTITY	SL	SLOPE	UNEXC	UNEXCAVATED		
BD	BOARD	CLG	CEILING	DISCH	DISCHARGE	FDN	FOUNDATION	HSE	HOUSE	LG	LENGTH	OE	OVERHEAD ELECTRIC			SPEC	SPECIFICATION	UNO	UNLESS NOTED OTHERWISE		
BEL	BEL OW	CLR	CLEAR	DN	DOWN	FERT	FERTILIZER	HT	HEIGHT	LOC	LOCATION	OF	OUTSIDE FACE	RAD	RADIUS	SQ	SQUARE	USH	UNITED STATES HIGHWAY		
BETWN	BETWEEN	CMP	CORRUGATED METAL PIPE	DP	DEPTH	FF	FAIR FACE	HW	HOT WATER	LP	LIGHT POLE	OH	OVERHEAD	RCP	REINFORCED CONCRETE PIPE	SS	STAINLESS STEEL	UT	UNDERGROUND TELEPHONE		
BF	BACK FACE	CNU	CONCRETE MASONRY UNIT	DR	DOOR	FGL	FIBERGLASS	HWR	HOT WATER RETURN	LR	LONG RADIUS	OPG	OPENING	RD	ROAD	ST	STREET	UV	UNDERGROUND VIDEO		
BFV	BUTTERFLY VALVE	CO	CLEANOUT	DTL	DETAIL	FIN	FINISHED	HYD	HYDRANT	LS	LUMP SUM	OT	OVERHEAD TELEPHONE	RD	ROOF DRAIN	STD	STANDARD				
BIT	BITUMINOUS	CONC	CONCRETE	DW	DRIVEWAY	FL	FLOWLINE			LT	LEFT			REWY	ROADWAY	STH	STATE TRUNK HIGHWAY				
BLD	BLIND	CONN	CONNECTION	DWG	DRAWING	FLG	FLANGED	ID	INSIDE DIAMETER			PC	POINT OF CURVE	RED	REDUCER	STL	STEEL	V	VALVE		
BLDG	BUILDING	CONST	CONSTRUCTION			FLR	FLOOR	IF	INSIDE FACE			PI	POINT OF INTERSECTION	REF	REFERENCE	STM	STORM	VAR	VARIABLE		
BLK	BLOCK	CONT JT	CONSTRUCTION JOINT	E	EAST	FM	FORCE MAIN	IN FT	INCHES	MAS	MASONRY	PP	PRIVATE ENTRANCE	REINF	REINFORCING	STP	SEWAGE TREATMENT PLANT	VER	VERTICAL		
BLKG	BLOCKING	CONT	CONTINUOUS	EA	EACH	FN	FENCE	INCL	INCLUDE	MAX	MAXIMUM	PED	PEDESTAL	REM	REMOVE	SURF	SURFACE	VC	VERTICAL CURVE		
BLVD	BOULEVARD	CONTR	CONTRACTOR	EF	EACH FACE	FT or '	FOOT	INF	INFLUENT	MEC	MECHANICAL	PERF	PERFORATE	REPL	REPLACE	SW	SIDEWALK				
BM	BENCHMARK	CONTR JT	CONTRACTION JOINT	EFF	EFFLUENT					MFG	MANUFACTURER	PI	POINT OF INTERSECTION			SWR	SEWER				
BRG	BEARING	COR	CORNER	EJ	EXPANSION JOINT																

DR. BY	RJF	BOOK NO.					
CHK. BY	T. RUDD, PE	JOB NO.	26.0281.02				
DATE	AUG. 2005	SCALE	AS SHOWN	NO.	DATE	REVISION	
				1	10/21/05	SECTION 3 & 5 TITLES DWG. SLT	

CONTRACT NO. 03CC201008
RSN 24.2

NIMBUS DAM FLOATING BULKHEAD
STORAGE RAMP & LAUNCHING CARRIAGE
US BUREAU OF RECLAMATION
SACRAMENTO, CALIFORNIA

AYRES ASSOCIATES
Eau Claire, Wisconsin

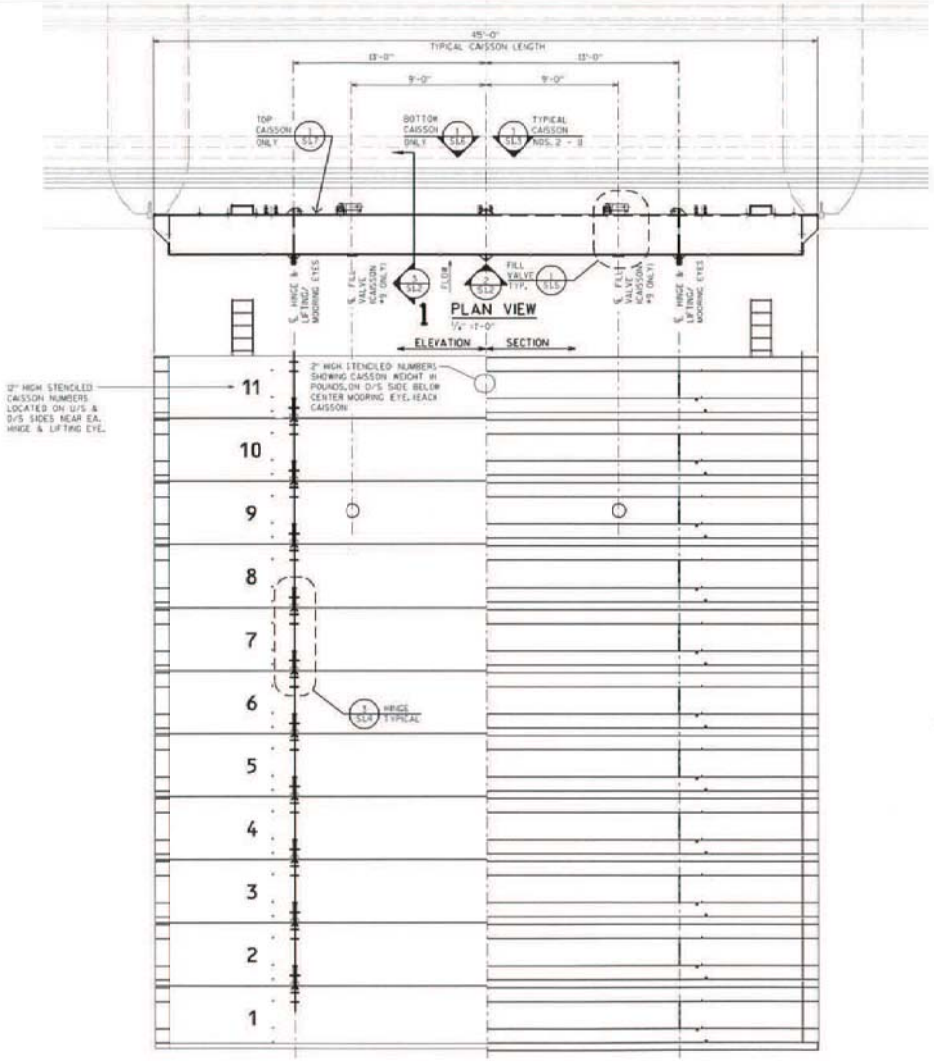
GENERAL
VICINITY, LOCATION MAPS, ABBREV. & DRAWING INDEX
DRAWING REDUCED TO ONE-HALF ORIGINAL SCALE

DRAWING NO. S1.1
SHEET NO. 1

10/21/2005
P:\Nimbus\Final\
J:\WATER\NIMBUS\DAM\26028300_001.dgn

485-208-2250

485-208-2251



2 UPSTREAM ELEVATION
1/4" = 1'-0"

GENERAL NOTES:

1. OWNER AND ENGINEER RESERVE THE RIGHT OF FREE ACCESS TO SHOP FOR INSPECTION AND TESTING DURING FABRICATION.
2. COAT THREADS OF ALL FASTENERS WITH A SUITABLE COMMERCIAL GRADE WATER-REPELLENT ANTI-SEIZE COMPOUND BEFORE INSTALLATION. REFER TO SPECIFICATIONS.
3. CHECK TOLERANCE OF HINGE PINS DURING SHOP ASSEMBLY. PIN IS NOT TO BEAR ON MATED HINGE. CAISSON 'D' BEAR ON SEAL CLAMPING PLATE AND RODS WITHOUT BINDING HINGE PINS.
4. PIER EMBEDMENTS NOT SHOWN FOR CLARITY.

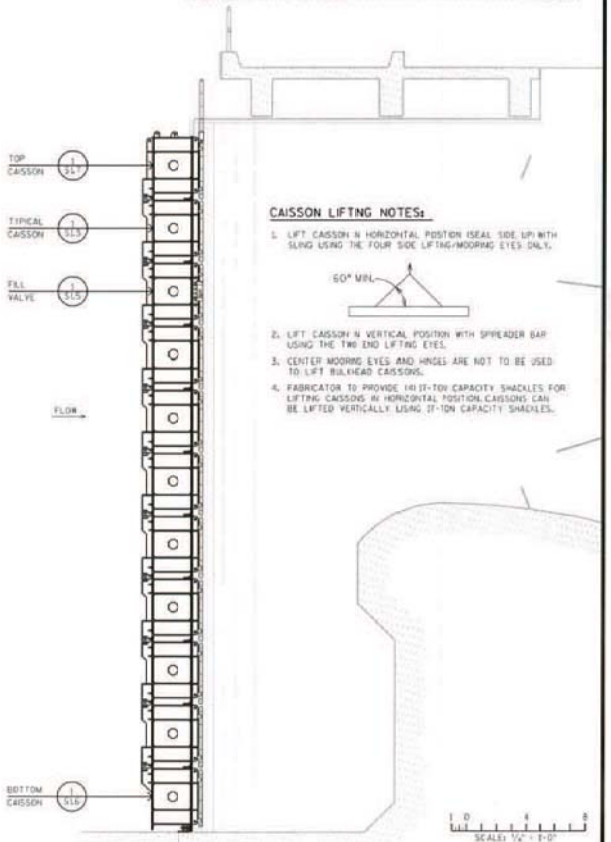
BULKHEAD CAISSON DATA

CAISSON WEIGHT, EMPTY	25,800 TO 26,400 LBS
CAISSON WEIGHT, FULL	32,200 TO 32,700 LBS
CAISSON WEIGHT, EMPTY, SUBMERGED	+3,280 TO +2,360 LBS
CAISSON WEIGHT, FULL, SUBMERGED	3,010 TO 4,190 LBS
CAISSON HEIGHT ABOVE WATER FLOATING ON SIDE	2.5 TO 3.7 IN.
CAISSON HEIGHT ABOVE WATER FLOATING UPRIGHT	3.5 TO 5.3 IN.

WATER FILLED

CAISSONS 1-11

% WATER IN BOTTOM CHAMBER TO SINK CAISSON	14 TO 52%
TOTAL VOLUME OF BOTTOM CHAMBER	10.8 CU. FT.



CAISSON LIFTING NOTES:

1. LIFT CAISSON IN HORIZONTAL POSITION (SEAL SIDE UP) WITH SLING USING THE FOUR SIDE LIFTING/MOORING EYES ONLY.

2. LIFT CAISSON IN VERTICAL POSITION WITH SPREADER BAR USING THE TWO END LIFTING EYES.
3. CENTER MOORING EYES AND HINGES ARE NOT TO BE USED TO LIFT BULKHEAD CAISSONS.
4. FABRICATOR TO PROVIDE (4) 17-TON CAPACITY SHACKLES FOR LIFTING CAISSONS IN HORIZONTAL POSITION. CAISSONS CAN BE LIFTED VERTICALLY USING (2) 17-TON CAPACITY SHACKLES.

3 SECTION
1/4" = 1'-0"

02/2/2005
I:\WATER\KAMB\SOAM\260B300.02BA.DGN

DR. BY R.F.MAGEL	BOOK NO.		CONTRACT NO. 03CC201008	NIMBUS DAM FLOATING BULKHEAD	FLOATING BULKHEAD PROCUREMENT
CH. BY T. FLOOD, PE	JOB NO. 260B3.02		RSN 21a.3	US BUREAU OF RECLAMATION	BULKHEAD ARRANGEMENT
DATE AUG. 2005	SCALE AS SHOWN	NO. DATE REVISION		SACRAMENTO, CALIFORNIA	DRAWING REDUCED TO ONE-HALF ORIGINAL SCALE

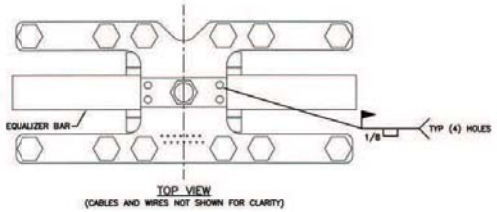
AYRES ASSOCIATES Eau Claire, Wisconsin

DRAWING NO. S1.2
SHEET NO. 2

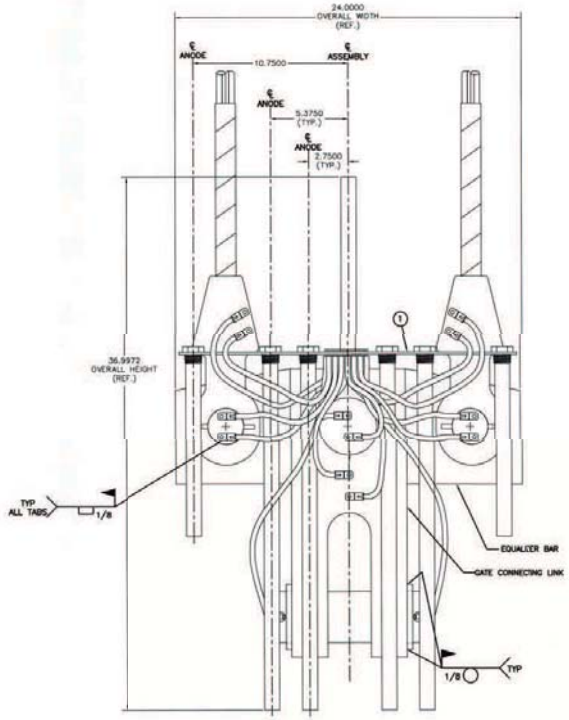
485-208-2251

MATERIALS LIST: FOR (1) ASSEMBLY				
ITEM	PART NO.	DESCRIPTION	QTY	VENDOR
1	E09-382-05	CP SYSTEM ASSEMBLY	1	MESA
2	–	DENSYL PETROLATUM TAPE (46mils THICK) 2" WIDTH	AS REQ'D	DENSYL

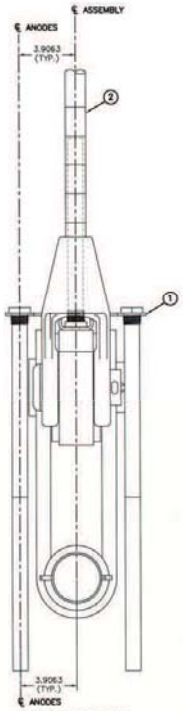
NOTES:
1. ALL DIMENSIONS ARE IN FEET AND INCHES.
2. WRAP AND ENCAPSULATE WIRE ROPE CABLES WITH ITEM #2, DENSYL PETROLATUM TAPE, 1'-0" MIN. UP FROM TOP OF OPEN SPELTER SPROCKETS.
3. USE ITEM #2, DENSYL PETROLATUM TAPE, TO PREVENT CATHODIC DISBONDMENT OF THE COATING SYSTEM BY THE ANODE MATERIAL IF NECESSARY.
4. USE ITEM #2 TO COVER WELDS AND ANY OTHER EXPOSED METAL SURFACE.
5. SEAL GAP BETWEEN ANODE MOUNT BRACKET AND EQUALIZER BAR BY PLACING 2-3/8" STRIP OF ITEM #2 BETWEEN COMPONENTS PRIOR TO WELDING.



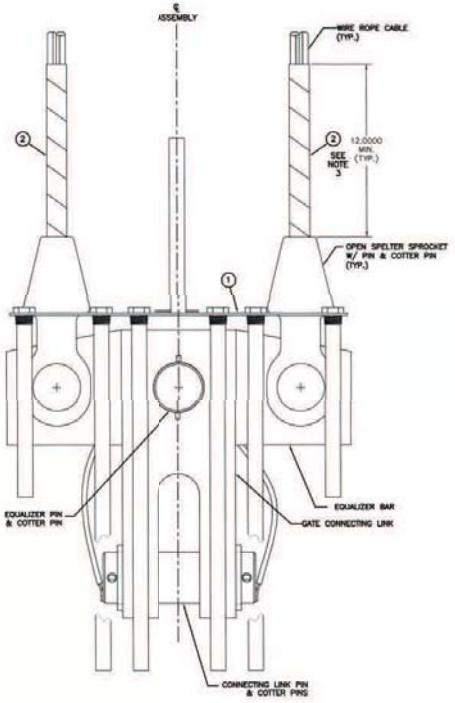
TOP VIEW
(CABLES AND WIRES NOT SHOWN FOR CLARITY)



FRONT ELEVATION VIEW



RIGHT SIDE VIEW
(WIRES NOT SHOWN FOR CLARITY)



REAR ELEVATION VIEW

FOR INFORMATION ONLY

RECLAMATION
Managing Water in the West

MESA
4445 S. 74th E. AVE.
TULSA, OK 74145-4732

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

CENTRAL VALLEY PROJECT – CALIFORNIA
AMERICAN RIVER DIVISION – FOLSOM UNIT

NIMBUS DAM
CATHODIC PROTECTION SYSTEM
VIEWS

Contractor

DRAWN

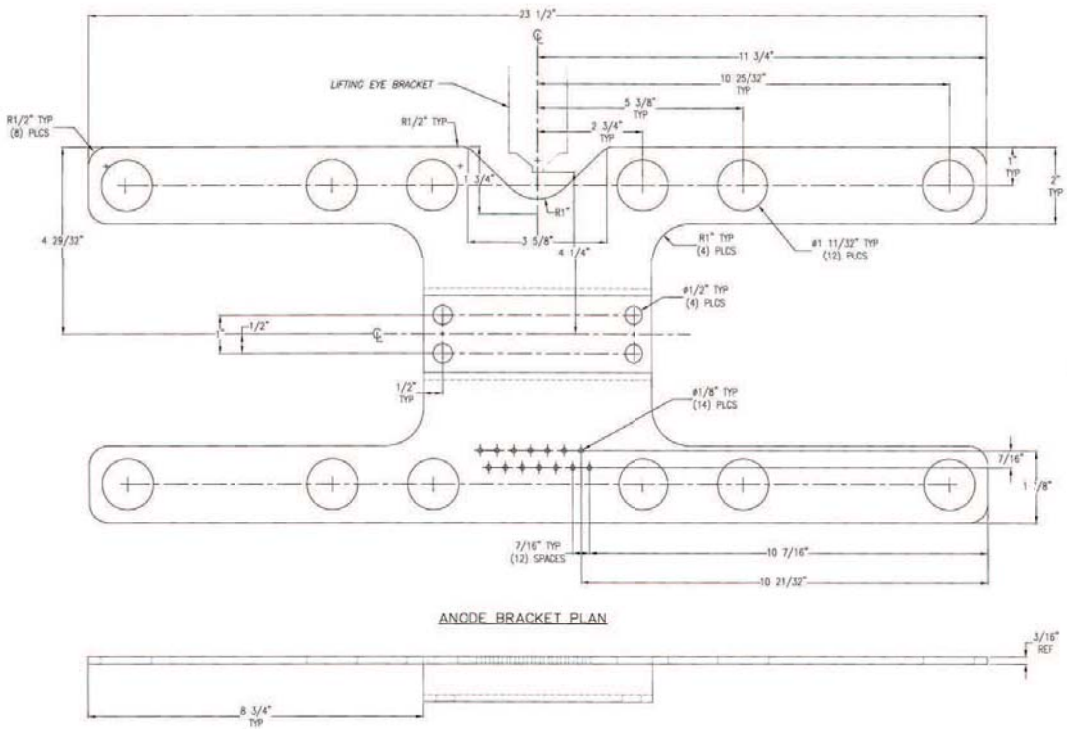
RECOMMENDED FOR APPROVAL
FOR THE CVP OPERATIONS BRANCH

SACRAMENTO, CALIFORNIA 2013-08-07

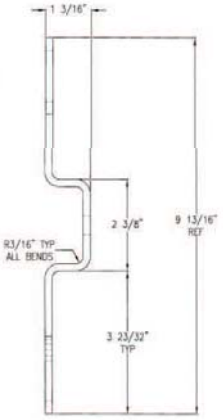
CATHODIC PROTECTION SYSTEM VIEWS

485-208-2810

SHEET 1 OF 1

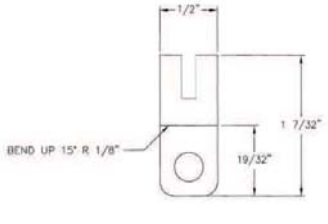


ANODE BRACKET PLAN



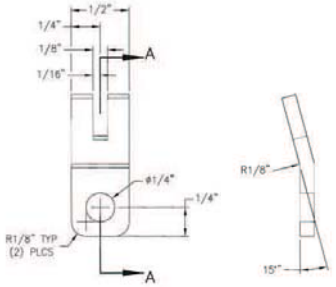
END VIEW

ANODE BRACKET FRONT ELEVATION
MATERIAL: 3/16" STEEL, A36 M1020
(6) TOTAL REQUIRED



FLAT PATTERN

SECTION A–A



TAB DETAIL
MATERIAL: 1/8" STEEL, A36 M1020
(90) TOTAL REQUIRED

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BUREAU OF RECLAMATION

NIMBUS DAM SYSTEM
CATHODIC PROTECTION SYSTEM
DETAILS AND SECTION

FOR INFORMATION ONLY

Contractor
DRAWN

ACCEPTED
FRED HELE P.E.
CHIEF, CVO, ENGINEERING BRANCH

SACRAMENTO, CALIFORNIA 2013-08-07

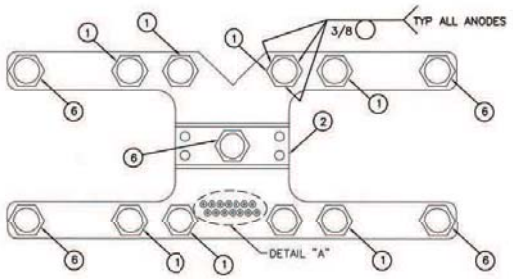
CATHODIC PROTECTION SYSTEM
DETAILS AND SECTION

485-208-2811

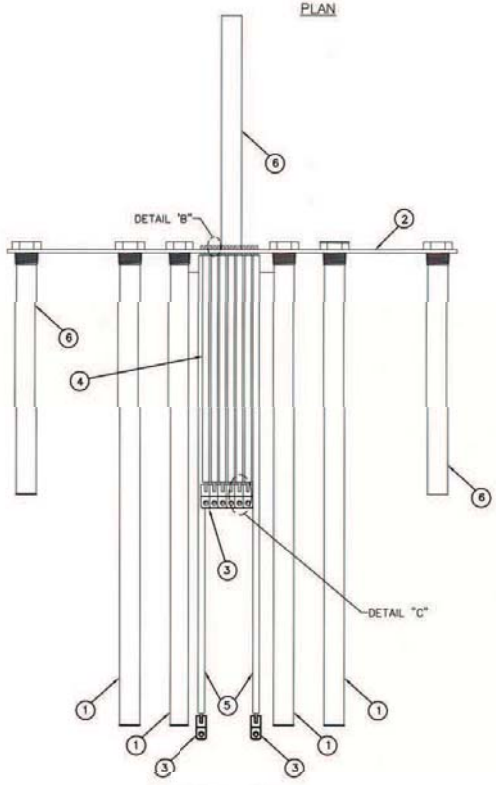
SHEET 1 OF 1

SHEET 82

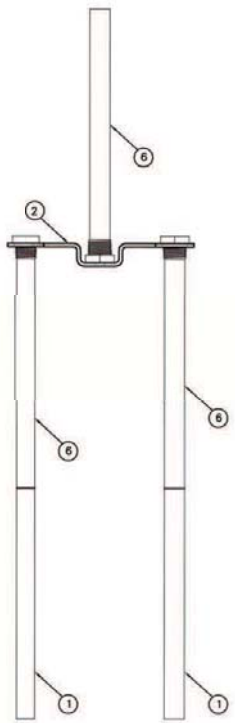
MATERIALS LIST: FOR (1) ASSEMBLY				
ITEM	PART NO.	DESCRIPTION	QTY	VENDOR
1	–	1.050 DIA. X 24" LG. EXTRUDED ROD MAGNESIUM ANODE	8	MESA
2	E09-382-04	ANODE MOUNT BRACKET	1	MESA
3	E09-382-04	WIRE TAB, STEEL	14	MESA
4	–	#10AWG, HMWPE CABLE, 12" LONG	12	MESA
5	–	#10AWG, HMWPE CABLE, 24" LONG	2	MESA
6	–	1.050 DIA. X 12" LG. EXTRUDED ROD MAGNESIUM ANODE	5	MESA



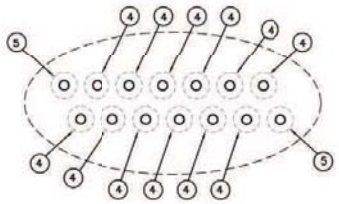
PLAN



FRONT ELEVATION

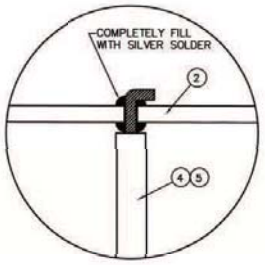


SIDE ELEVATION

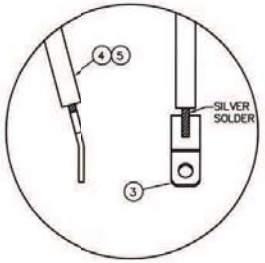


DETAIL "A"

NOTES:
1. SILVER SOLDER ALL WIRE CONNECTION USING HIGH SILVER ALLOY SOLDER, 45% SILVER.
2. COAT EXPOSED STEEL & COPPER CONNECTION AREA WITH FLEXIBLE RUBBER COATING, LOCTITE COLORGUARD (BLACK) OR EQUAL, MINIMUM .050" THICKNESS



DETAIL "B"



DETAIL "C"

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MESA
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TULSA, OK 74145-4732

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CENTRAL VALLEY PROJECT - CALIFORNIA
AMERICAN RIVER DIVISION - FOLSOM UNIT

NIMBUS DAM
CATHODIC PROTECTION SYSTEM
PLAN, ELEVATION AND DETAILS

REV	DESCRIPTION	DATE	BY	CHK
2	ADDED FIELD NOTCH TO CLEAR HITCH BLOCK	5/19/10	WA	
1	ADDED ITEM #5, TURNED ALL ITEM #1 WIRES TO POINT DOWNWARD, REVISED ITEM #2, ANODE MOUNT BRACKET	2/24/10	WA	TM
0	ISSUED FOR APPROVAL	2/12/10	WA	TM

Contractor

DESIGN

ACCEPTED FOR THE BUREAU OF RECLAMATION
FRED WILL P.E.
CHIEF, CVO, ENGINEERING BRANCH

SACRAMENTO, CALIFORNIA 2013-08-07

CATHODIC PROTECTION SYSTEM
PLAN, ELEVATION & DETAILS

485-208-2812

SHEET 1 OF 1

APPENDIX B

WATER REMOVAL PLAN

United States Department of the Interior

BUREAU OF RECLAMATION
MP CONSTRUCTION OFFICE
1140 West Wood Street
P.O. Box 988
WILLOWS, CALIFORNIA 95988-0988

IN REPLY
REFER TO:

MPCO-211
PRJ-8.10

NOV 1 4 2014

ELECTRONIC TRANSMITTAL ONLY

AllTech Engineering Corporation
Attn: Rick Mollenhoff, Project Manager
2515 Pilot Knob Road
Mendota Heights, MN 55120-1135

Subject: Required Submittal No. (RSN) 01 35 26-1-1 – Water Removal, Approval Plans – Nimbus Dam Radial Gate Repairs, Phase III – Specifications No. 20-C0816 – Contract No. R14PC00096 – American River Division, Central Valley Project, California

Dear Mr. Mollenhoff:

We have reviewed your submittal, dated and received October 29, 2014. The submittal is approved.

A copy of your submittal marked "Approved" is enclosed. Approval is not intended to direct your work, and shall not relieve you of your responsibility for the accuracy, completeness, and correctness of details, nor of complying with the contract requirements. Approval shall not relieve you of your responsibility for compliance with Federal Acquisition Regulation 52.236-21, Specifications and Drawings for Construction.

This completes all the requirements under this submittal. Proposed changes to approved submittals must be submitted and approved before being implemented.

If you wish to discuss this with us, please contact Mr. Ryan Hennigan at 530-934-1379. Please direct all correspondence regarding this matter to the Construction Engineer, Bureau of Reclamation, MP Construction Office.

Sincerely,

Randy L Wyatt

FOR Richard A. Welsh
Construction Engineer

Enclosure

Submittal 01 35 26-1-1

Nimbus Dam Radial Gate Repairs, Phase III
USBR Mid Pacific

RECLAMATION

Approval Plans

Type: Approval

Submitted : 10/29/2014
Submitted To: US Bureau of Reclamation
Status: Pending
Priority: Low
Due Date: 11/19/2014
Pending On Org: US Bureau of Reclamation

Created By: Alltech Engineering Corp., Rick Molenhoff
Created: 10/29/2014

Date Received: 10/29/2014
Exceptions:

Description:
Clause or Section: Water Removal
Responsible Code: CE
Due Date: At least 25 days before commencing construction activities

Files

013526-1 Water Removal Plans.pdf	128.80 KB

MP Construction Office
APPROVED

Name — Contract Manager (Title) — 11/14/14 (Date)

Approval is not intended to direct your work, and shall not relieve you of your responsibility for the accuracy, completeness, and correctness of details, or complying with the contract requirements. Approval shall not relieve you of responsibility for compliance with FAR 52.236-21 - Specifications and Drawings for Construction

ALLTECH ENGINEERING CORP
2515 PILOT KNOB ROAD
MENDOTA HEIGHTS, MN 55120
(651) 452-7893 FAX (651) 452-5592
WWW.ALLTECHENGINEERING.COM

October 29, 2014

CONSTRUCTION ENGINEER
BUREAU OF RECLAMATION
MP Construction Office
1140 West Wood Street
Willows, CA 95988-2615

RE: Transmittal of RSN 01 35 26-1
Radial Gate Repairs Phase III
Nimbus Dam, CA
Contract No. R14PC00096

Ladies and Gentlemen:

The following RSN is transmitted for your review:

RSN 01 35 26-1	Initial Submittal:	Water Removal Approval Plans
	Responsibility Code:	CE
	Number of Sets:	1 to CE
	CDMS Posted	

Sincerely,

ALLTECH ENGINEERING CORP.

Rick Mollenhoff
Project Manager

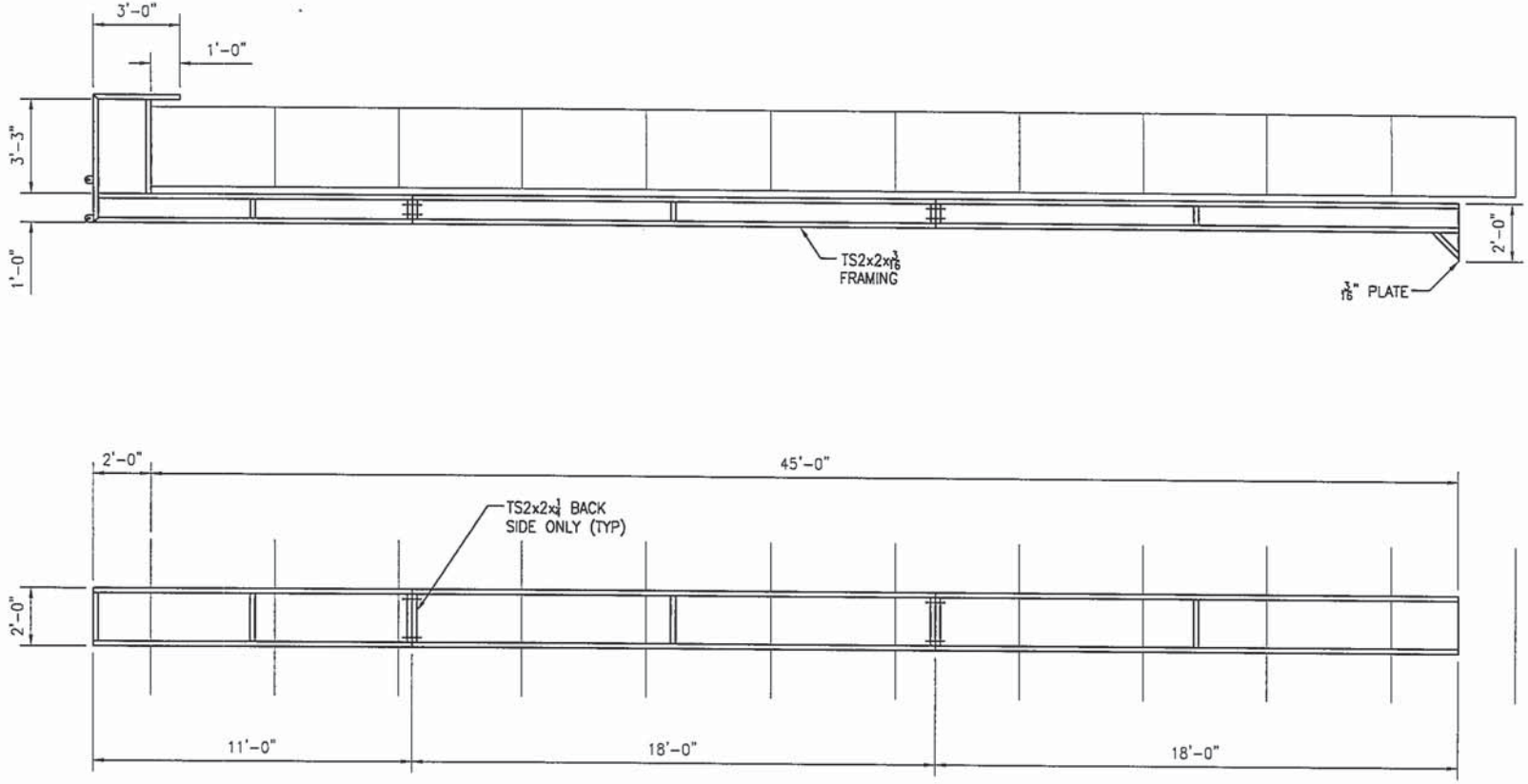
Enclosure:

ALLTECH ENGINEERING CORP
2515 PILOT KNOB ROAD
MENDOTA HEIGHTS, MN 55120
(651) 452-7893 FAX (651) 452-5592
WWW.ALLTECHENGINEERING.COM

Radial Gate Repairs – Phase III
Nimbus Dam, CA
Contract No. R14PC00096
RSN 01 35 26-1

WATER REMOVAL PLAN:

After the bulkhead and pier braces have been installed, the radial gate will be opened to allow full head pressure on the bulkhead.
Divers will be utilized to plug leaks around the bulkhead with wood pellets and/or other environmental friendly material to keep the bulkhead leakage to a minimum.
A six inch submersible pump will be placed in the pocket on the downstream side of the bulkhead to initially lower the water below the gate sill area.
A steel support frame (see attached shop drawings) will be built to hold the six inch pump and the PVC discharge piping. The support frame will extend vertically up the downstream side of the bulkhead and hook over the top of the bulkhead. The PVC discharge pipe will be attached to the support frame and discharged upstream of the bulkhead into the lake.
Two 1.5 inch electric pumps equipped with on/off float systems will be installed on the downstream side of the bulkhead. The pump discharge hoses will be run from the pumps across the sill area and down the gate bay about 20 feet. These pumps will be used to maintain the water level so water won't passe over the spillway crest or under the scaffolding and containment areas.
In the case of power outages a portable generator will be used to operate the pumps.
Spare pumps will be readably available at the jobsite in the event of pump failure.



PUMP STAND – QTY: ONE

REV	DATE	DESCRIPTION OF REVISION	BY
△			

ALLTECH ENGINEERING CORP.
2515 Pilot Knob Road, Mendota Heights, Minnesota 55120
Phone (651) 452-7893 Fax (651) 452-5592

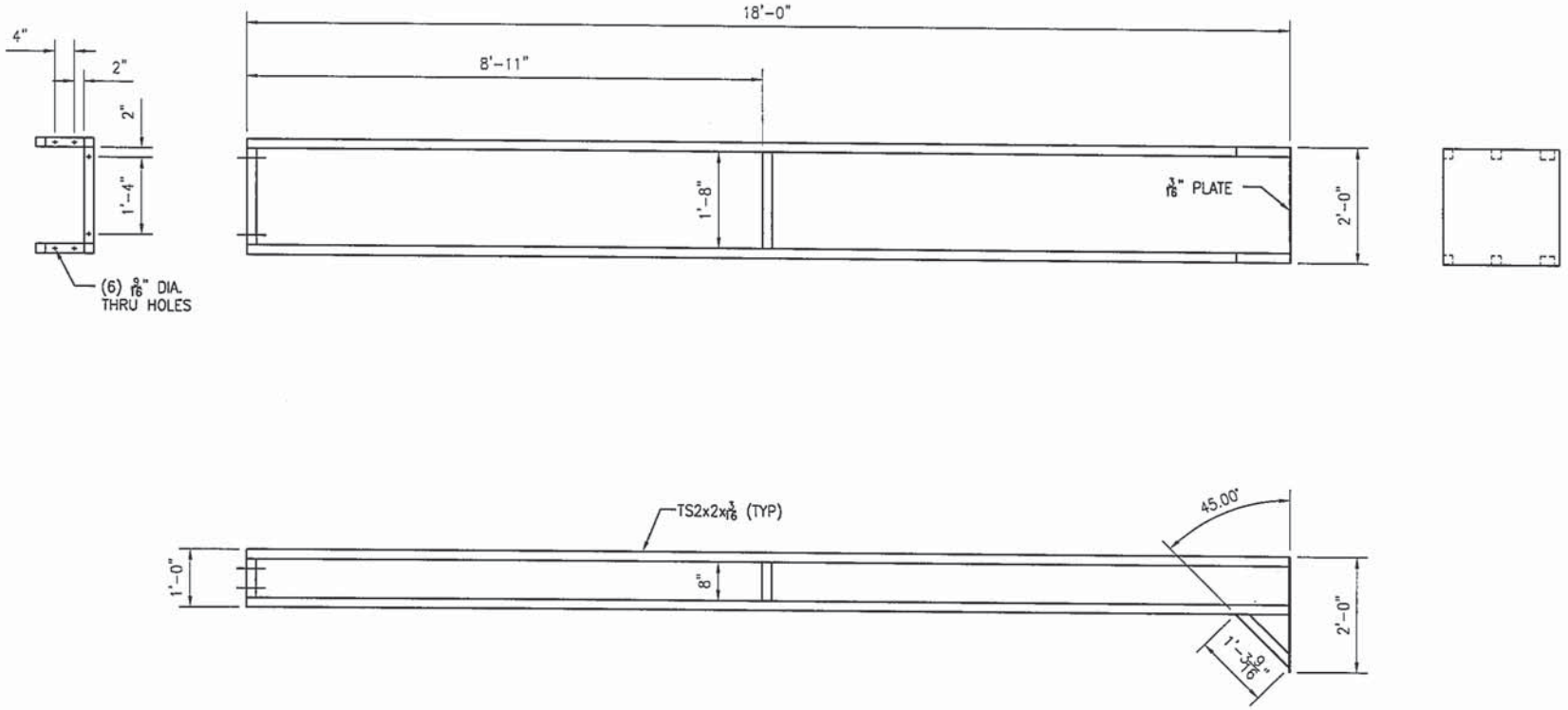
TITLE 6" PUMP STAND
NIMBUS DAM

JOB NO 17450

DRAWN BY JML | DATE 10/29/14

CHK'D BY | DATE

REV △ | DRAWING **PH1**



LOWER PUMP STAND FRAME – QTY: ONE

REV	DATE	DESCRIPTION OF REVISION	BY
△			

ALLTECH ENGINEERING CORP.
2515 Pilot Knob Road, Mendota Heights, Minnesota 55120
Phone (651) 452-7893 Fax (651) 452-5592

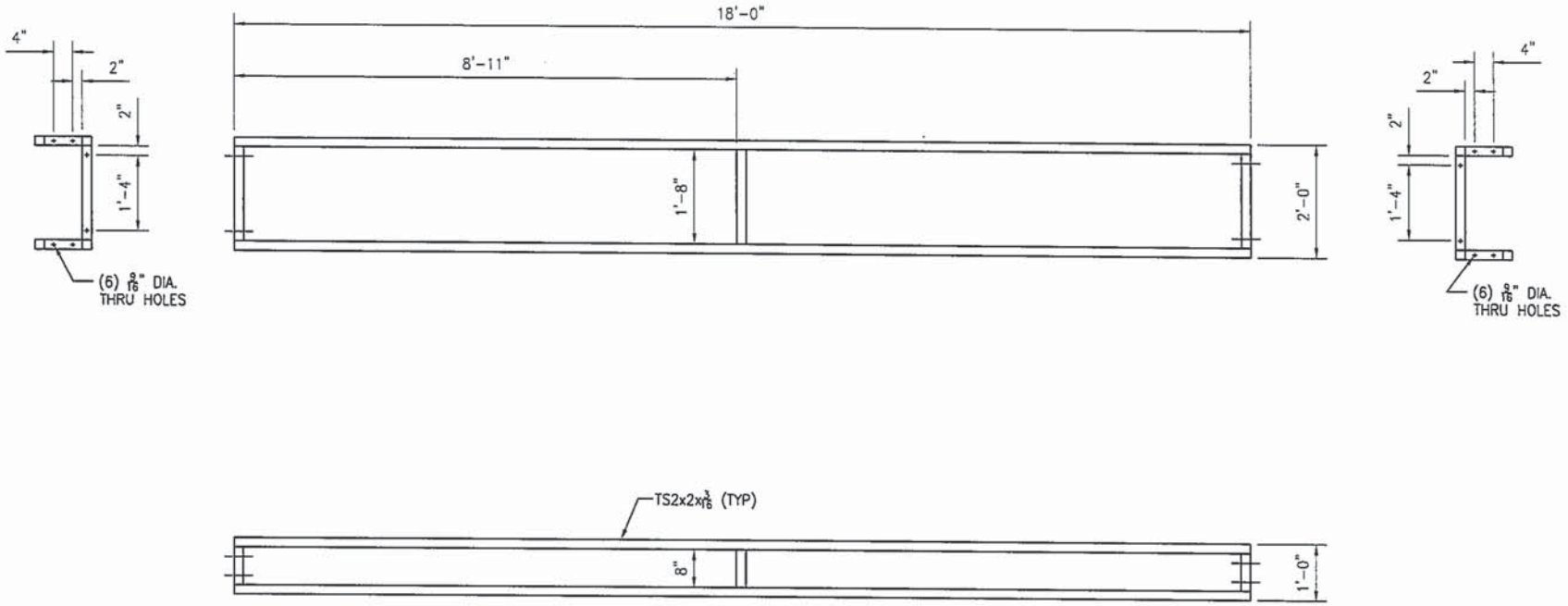
TITLE 6" PUMP STAND
NIMBUS DAM

JOB NO 17450

DRAWN BY JML | DATE 10/29/14

CHK'D BY | DATE

REV △ | DRAWING PH2



MIDDLE PUMP STAND FRAME - QTY: ONE

BY	DESCRIPTION OF REVISION	DATE	REV
			△

ALLTECH ENGINEERING CORP.
2515 Pilot Knob Road, Mendota Heights, Minnesota 55120
Phone (651) 452-7893 Fax (651) 452-5592

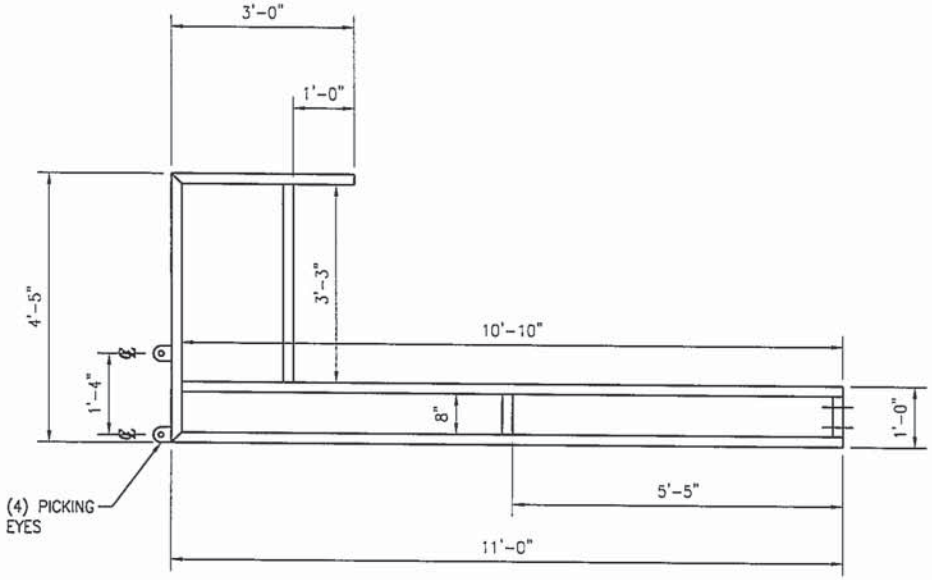
TITLE 6" PUMP STAND
NIMBUS DAM

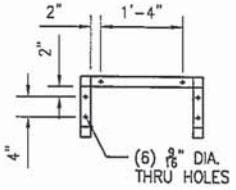
JOB NO 17450

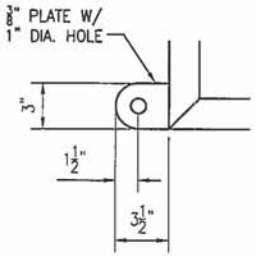
DRAWN BY JML | DATE 10/29/14

CHK'D BY | DATE

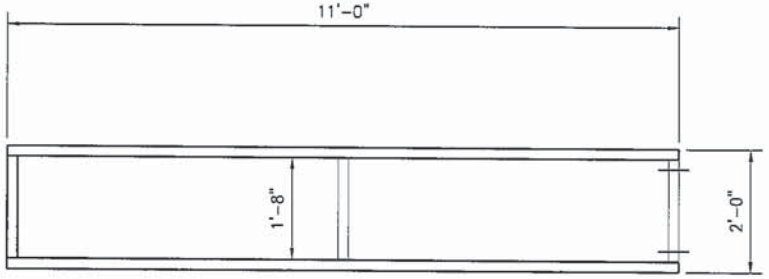
REV △ | DRAWING PH3







PICKING EYE DETAIL



TOP PUMP STAND FRAME - QTY: ONE

REV	DESCRIPTION OF REVISION	DATE	BY
△			

ALLTECH ENGINEERING CORP.
2515 Pilot Knob Road, Mendota Heights, Minnesota 55120
Phone (651) 452-7893 Fax (651) 452-5592

TITLE 6" PUMP STAND
NIMBUS DAM

JOB NO 17450

DRAWN BY JML | DATE 10/29/14

CHK'D BY | DATE

REV △ | DRAWING PH4

APPENDIX C

CONTAINMENT SYSTEM PLAN/LEAD AND HEAVY METALS WORK PLAN

ALLTECH ENGINEERING CORP
2515 PILOT KNOB ROAD
MENDOTA HEIGHTS, MN 55120
(651) 452-7893 FAX (651) 452-5592
WWW.ALLTECHENGINEERING.COM

February 17, 2015

CONSTRUCTION ENGINEER
BUREAU OF RECLAMATION
MP Construction Office
1140 West Wood Street
Willows, CA 95988-2615

RE: Transmittal of RSN 02 83 30-3
Radial Gate Repairs Phase III
Nimbus Dam, CA
Contract No. R14PC00096

Ladies and Gentlemen:

The following RSN is transmitted for your review:

RSN 02 83 30-3	Initial Submittal:	Containment System Plan
	Responsibility Code:	CE
	Number of Sets:	1 to CE
	CDMS Posted	

Sincerely,

ALLTECH ENGINEERING CORP.

Rick Mollenhoff
Project Manager

Enclosure:

ENGINEERING **DURING** CONSTRUCTION

Zenith Engineers
22320 Foothill Blvd, Suite 322
Hayward, CA 94541
Phone – 925 640 4500
Email – spuliyadi@zenithengineeers.com
www.zenithengineers.com

PROJECT: Nimbus Dam – Air Circulation Design Inside Scaffolding

LOCATION: Near Sacramento, CA

Date: 2/16/2015

CLIENT: FD Thomas

PREPARED BY: Rick Furnace, M.E.

REVIEWED BY: Senthil Puliyadi, MS., M.Eng., PE

Revision: 0

TABLE OF CONTENTS

FIND: FUGITIVE EMISSION CONTAINMENT FLOW RATE AND EXHAUST SYSTEM PRESSURE LOSS FOR NIMBUS DAM RADIAL GATE RE-SURFACING

GIVEN: SCAFFOLDING CONTAINMENT CHAMBER DESIGN, SEE FIGURE 1
SCAFFOLDING CONTAINMENT CHAMBER DIMENSIONS

CHAMBER	HEIGHT, FT	DEPTH, FT	WIDTH, FT
A1	30	20	8
A2	30	19	8
B1	35	20	12
B2	35	19	12
C1	30	5	26
C2	30	5	26

MINIMUM DOWNWARD CONTAINMENT VELOCITY 60 FPM
MINIMUM HORIZONTAL CONTAINMENT VELOCITY 100 FPM

EACH CHAMBER WILL BE CONNECTED TO AN EXHAUST FAN VIA A DUCT SYSTEM
AIR WILL ENTER THE TOP OF EACH CHAMBER AND EXHAUST DOWN TO AN EXHAUST HOOD
THEN THROUGH A FABRIC FILTER AND THEN UP TO THE EXHAUST FAN VIA FLEXIBLE DUCTING

DUCT LENGTHS

CHAMBER	DUCT LENGTH FROM CHAMBER EXIT TO EXHAUST FAN INLET
A1 AND A2	50 FT
B1 AND B2	75 FT
C1 AND C2	110 FT

INLET TO EXHAUST FAN IS A FABRIC FILTER WITH A PRESSURE DROP OF 4 " W.G.

SOLUTION METHOD:

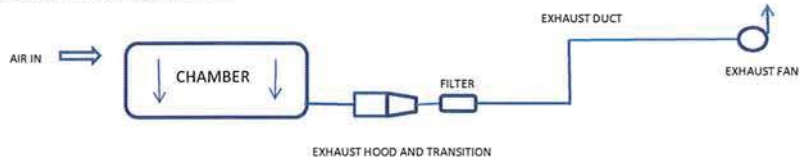
CALCULATE CONTAINEMENT AIR FLOW REQUIRED THROUGH EACH CHAMBER
CALCULATE PRESSURE DROP THROUGH EACH CHAMBER EXHAUST DUCT SYSTEM
USE PRESSURE DROP CALCULATION METHOD DESCRIBED IN:
REFERENCE: "INDUSTRIAL VENTILATION, A MANUAL OF PRACTICE" 23rd EDITION, BY AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

CONTAINMENT AIR FLOW:

DOWNWARD VELOCITY Vc = 60 FPM
CHAMBER CROSS-SECTIONAL AREAS

CHAMBER	X-SEC DIM		X-SEC AREA	AIR FLOW
	DEPTH, FT	WIDTH, FT	FT^2	A x Vc, CFM
A1 (AND A2)	20	8	160	9600
B1 (AND B2)	20	12	240	14400
C1 (AND C2)	5	26	130	7800

EXHAUST SYSTEM SCHEMATIC:



EXHAUST HOOD	4 FT x 4 FT INLET, SIMPLE HOOD DESIGN
TRANSITION	SQUARE TO ROUND, 90 DEGREE TRANSITION
EXHAUST DUCT	FLEXIBLE FABRIC WITH COVERED WIRES
ELBOWS	90 DEGREE, GALVANIZED STEEL, BEND RADIUS = 2.0
FILTER	FABRIC TYPE
EXHAUST FAN	ENGINE DRIVEN, CENTRIFUGAL TYPE SIMILAR TO INDUSTRIAL AIR TECHNOLOGY FAN, MODELBISW-270, CLASS 4. SEE ATTACHED VENDOR DATA SHEET

EXHAUST SYSTEM FRICTION LOSS:

h_{tot} = $h_{en} + h_d + h_{el} + h_{fil} + h_{ex}$ in, W. G. REF. PAGE NO.

hen, DUCT ENTRY LOSS, = Fd (VPd) + (VPd), in WG (HOOD ENTRY LOSS NIL) PG. 3-16
Fd, HOOD TRANSITION LOSS Fd = 0.25 PG. 5-40
VPd, DUCT VELOCITY PRESSURE VPd = $(Vd/4005)^2$, in WG PG. 1-3

hd, DUCT LOSS, = Hf * L * (VPd), in WG PG. 1-9
L, DUCT LENGTH, FT
Hf, DUCT FRICTION FACTOR, = a* $(Vd)^b/Q^c$
a = 0.0311
b = 0.604
c = 0.639
VALUES FOR FABRIC DUCT W/COVERED WIRES PER REFERENCE
Vd, DUCT VELOCITY, FPM
Q, FLOW RATE, CFM

hel, ELBOW LOSS, = Fel * (VPd), in WG PG. 5-41
Fel, ELBOW LOSS FACTOR Fel = 0.19 5 PC. MITER EL, BEND RADIUS = 2

hfil, FILTER LOSS, = 4.0 in WG

hex, EXIT LOSS TO FAN, = (VPd), in wg EST.

DUCT DIAMETER:

MINIMUM DUCT VELOCITY TO KEEP PARTICLES ENTRAINED
Vd = 4000 FPM PG. 3-19

CHAMBER	Q, CFM	Vd	A = Q/Vd, FT^2	A, IN^2	d, IN
A1	9600	4000	2.4	346	21.0
B1	14400	4000	3.6	518	25.7
C1	7800	4000	1.95	281	18.9

VALUES FOR CHAMBERS A2, B2, AND C2 THE SAME

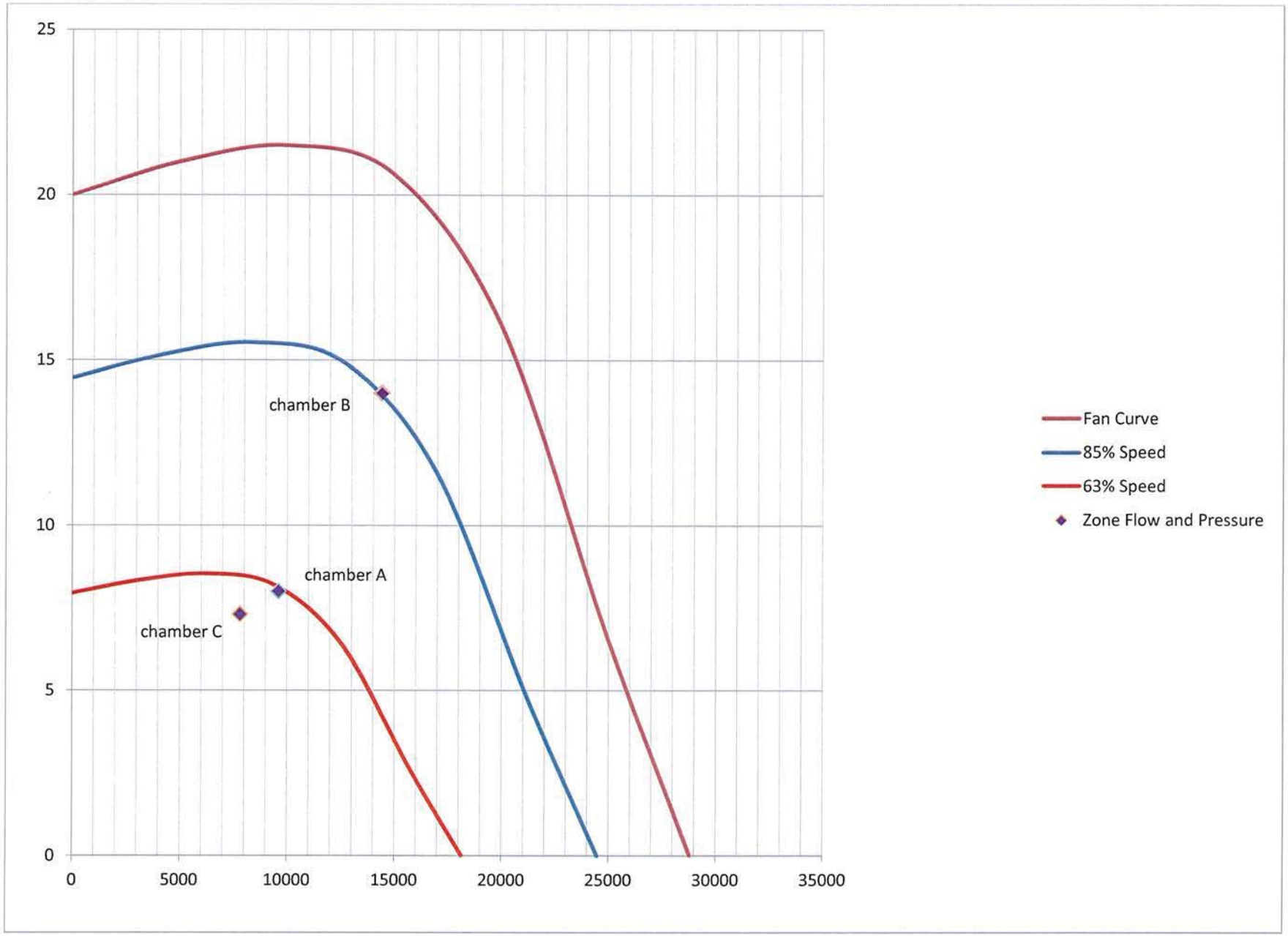
USE NOMINAL DUCT DIAMETER, d = 20 IN
FOR ALL CHAMBERS

DUCT VELOCITY FOR CHAMBERS C1 AND C2 WILL BE 3,575 FPM, EA. WITH 20 IN DUCT. FAN CAN BE RUN FASTER TO INCREASE DUCT VELOCITY, SEE ATTACHED FAN CURVE. INCREASING DUCT VELOCITY FROM 3,575FPM TO 4,000 FPM WILL INCREASE DOWNWARD CONTAINMENT AIR VELOCITY IN EACH CHAMBER FROM 60 FPM, MINIMUM, TO 67 FPM. APPROX. 10% INCREASE.

DUCT LOSS CALCULATION:

DUCT CROSS-SETIONAL AREA d = 20 in, DIA A= 2.18 FT^2

CHAMBER	Q	Vd	VPd	hen	hd	hel	hfil	hex	**htot, in WG**
A	9600	4400	1.21	1.51	0.85	0.46	4.0	1.21	**8.0**
B	14400	6600	2.72	3.40	2.83	1.03	4.0	2.72	**14.0**
C	7800	3575	0.80	1.00	1.24	0.30	4.0	0.80	**7.3**


25
20
15
10
5
0
0
5000
10000
15000
20000
25000
30000
35000
chamber B
chamber A
chamber C
Fan Curve
85% Speed
63% Speed
Zone Flow and Pressure

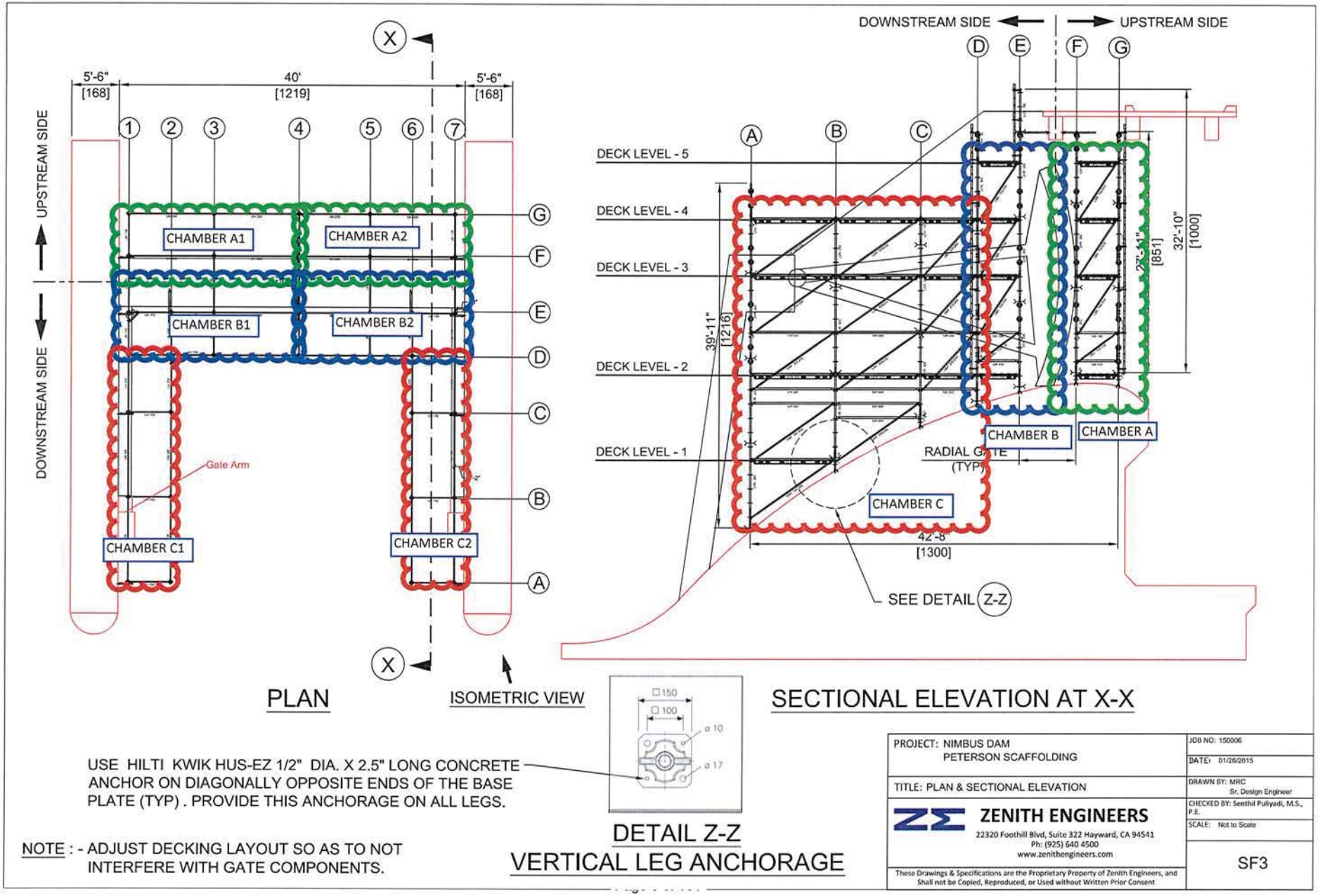

X
5'-6" [168]
40' [1219]
5'-6" [168]
1 2 3 4 5 6 7
UPSTREAM SIDE
DOWNSTREAM SIDE
CHAMBER A1
CHAMBER A2
CHAMBER B1
CHAMBER B2
CHAMBER C1
CHAMBER C2
Gate Arm
G F E D C B A
X
PLAN
ISOMETRIC VIEW
DOWNSTREAM SIDE
UPSTREAM SIDE
D E F G
A B C
DECK LEVEL - 5
DECK LEVEL - 4
DECK LEVEL - 3
DECK LEVEL - 2
DECK LEVEL - 1
39'-11" [1216]
27'-11" [851]
32'-10" [1000]
CHAMBER B
CHAMBER A
RADIAL GATE (TYP)
CHAMBER C
42'-8" [1300]
SEE DETAIL Z-Z
SECTIONAL ELEVATION AT X-X
USE HILTI KWIK HUS-EZ 1/2" DIA. X 2.5" LONG CONCRETE ANCHOR ON DIAGONALLY OPPOSITE ENDS OF THE BASE PLATE (TYP) . PROVIDE THIS ANCHORAGE ON ALL LEGS.
□150
□100
ø 10
ø 17
DETAIL Z-Z
VERTICAL LEG ANCHORAGE
NOTE : - ADJUST DECKING LAYOUT SO AS TO NOT INTERFERE WITH GATE COMPONENTS.
PROJECT: NIMBUS DAM
PETERSON SCAFFOLDING
JOB NO: 150006
DATE: 01/26/2015
TITLE: PLAN & SECTIONAL ELEVATION
DRAWN BY: MRC
Sr. Design Engineer
CHECKED BY: Senthil Puliyadi, M.S., P.E.
SCALE: Not to Scale
ZENITH ENGINEERS
22320 Foothill Blvd, Suite 322 Hayward, CA 94541
Ph: (925) 640 4500
www.zenithengineers.com
SF3
These Drawings & Specifications are the Proprietary Property of Zenith Engineers, and Shall not be Copied, Reproduced, or Used without Written Prior Consent

FIGURE 1

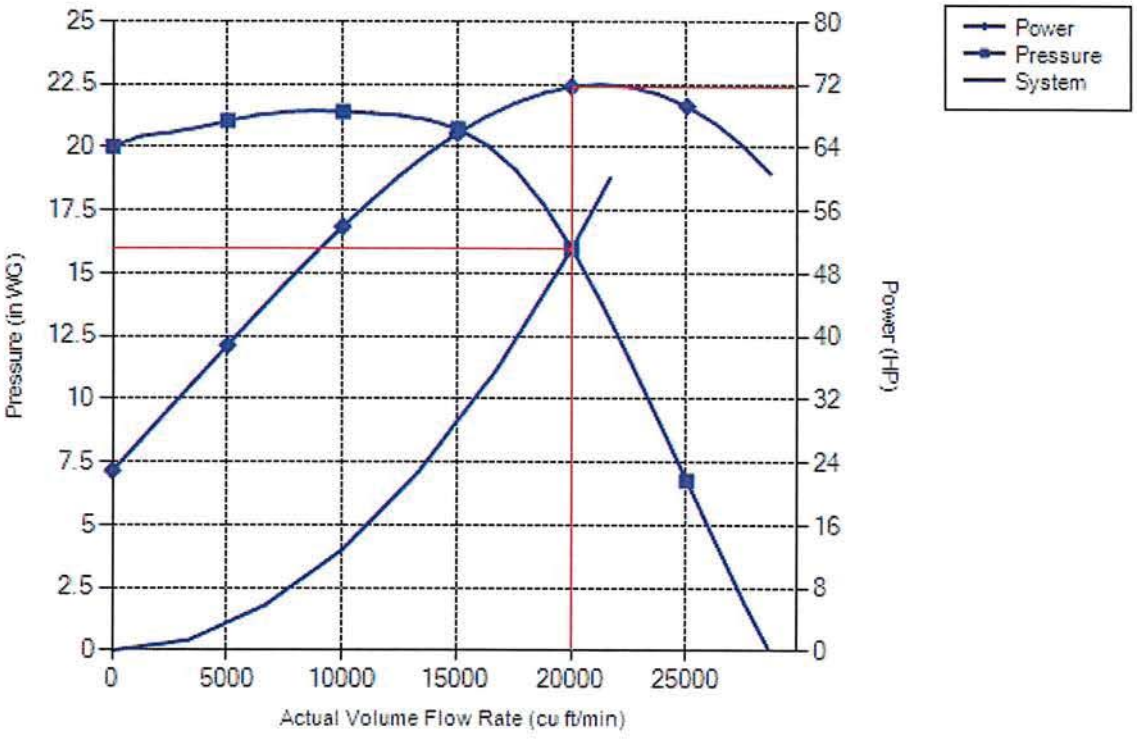
Industrial Air Technology Corp.

P.O. Box 2317 Gaylord, MI 49735
Phone: (989) 731-5840, Fax: (989) 732-1641

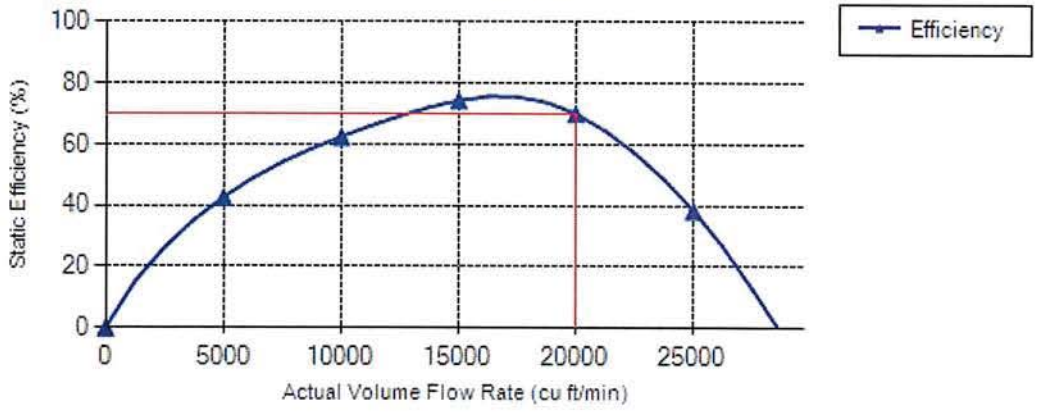
☑ Show system curve
☐ Show additional speed curves

Fan Data
BISW-270; Class 4; Arrangement 1; Wheel Width: 100%; Wheel Diameter: 100%
20K @ 16"

Performance Curves



Efficiency Curve



Fan performance has been determined by using installation type B: Free inlet, ducted outlet.

Air performance has been modified to include losses from indicated accessories to aid in selection and applications of the product. Power (bHP) calculations exclude drive losses.

Industrial Air Technology Corp.

P.O. Box 2317 Gaylord, MI 49735317 Gaylord, MI 49735
Phone: (989) 731-5840, Fax: (989) 732-1641

Fan Data
BISW-270; Class 4; Arrangement 1; Wheel Width: 100%; Wheel Diameter: 100%
20K @ 16"

General Information			
Product Type:	BISW	**Customer Name:**	Advanced Recycling
Product Size:	270	**Tag:**	20K @ 16"
Wheel % Diameter:	100%	**Info Provided by:**	Gus Lyras
Wheel % Width:	100%	**Date:**	10/14/2013
Construction Class:	4		
Arrangement:	1		
Max HP (per Arr.):	[none]		
Percent of Peak:	74.7%		
Fan Criteria			
Actual Volume Flow Rate:	20000 ft³/min	**Outlet Velocity:**	4859 ft./min.
Static Pressure:	16 in. WG	**Static Pressure @ 0.075 lbs/ft³:**	16.64 in. WG
Airstream:	Clean Air	**Static Efficiency:**	70.2%
Max Design Temp:	200°F	**Mechanical Efficiency:**	76.4%
Impeller Material:	Standard Construction	**Fan Speed:**	2704 RPM
Shaft Material:	1045 (Standard)	**Fan Speed Specified:**	[none]
Inlet Accessory:	[none]	**Maximum Speed:**	2774 RPM
Outlet Accessory:	[none]	**Notifications:**	Within 5% of Max Speed
Density Data			
Operating Temperature:	70°F	**Airstream Moisture:**	0 lbm H20/lbm
Elevation:	0 ft.	**Operating Density Calc:**	0.0721 lbs/ft³
Inlet Pressure:	-16 in. WG	**Operating Density Specified:**	
Power / Motor Data			
Motor Frequency:	60 hz	**HP @ 0.075 lbs/ft³:**	74.6 HP
Motor Voltage:	460V (or less)	**HP at Operating Conditions:**	71.7 HP
Ambient Temperature:	70°F	**Cold Start (70°F & 0 ft.):**	71.6 HP
Operating Cost Data			
Hours per Day:	8	**Annual Operating Period:**	2080 hrs
Days per Week:	5	**Annual Operating Cost:**	$8367
Power Cost:	$0.075 /kW hr		
Sound Data			
Ducted In & Out:	No	**Estimated Sound:**	99 dBA
Directivity:	Q = 2	**Sound Power Levels (Lw)**	...
Distance to Acoustic Center:	5 ft.	**1:** 104 dB **3:** 108 dB	**5:** 104 dB **7:** 97 dB
		2: 106 dB **4:** 110 dB	**6:** 100 dB **8:** 92 dB
Contact Data			
IATC Contact:	Gary Arseneault	**IATC Reference Number:**	20848

Fan performance has been determined by using installation type B: Free inlet, ducted outlet.

Air performance has been modified to include losses from indicated accessories to aid in selection and applications of the product. Power (bHP) calculations exclude drive losses.

9 - LEAD & HEAVY METALS WORK PLAN

JOB NO: **273**

JOB NAME: **Alltech - Nimbus Dam**

DATE PLAN PREPARED: **2/19/2015**

COMPETENT PERSON TO SUPERVISE THIS PLAN: **Stan Davis**

COMPETENT PERSON

The above named will be on-site and will act as the Competent Person for occupational health and safety issues. The Competent Person will conduct inspections of the work areas on a daily basis to ensure that control measures, work practices, personal protective equipment, and hygiene facilities are used as prescribed in this document.

INSTRUCTIONS

This Lead Protection Compliance Program has been developed to comply with OSHA Construction Industry Lead Standard 29 CFR 1926.62. It is approved for use by F.D. Thomas, Inc. It is reviewed and revised at least every six months. The F.D. Thomas, Inc. competent person assigned to the project has the complete authority to implement this program. Additional information is found in the F.D. Thomas, Inc. Corporate Worker Lead Protection Program. This plan meets Cal/OSHA standards as listed in the Title 8 C.C.R. section 1532.1. F.D. Thomas, Inc. also complies with sections 5194, 3202 and 5144 of Title 8; please refer to other sections of F.D. Thomas Corporate Safety and Health Program.

I. AUTHORIZATION

PREPARED BY:

NAME: Felix Saldivar

TITLE: Manager of EHS

SIGNATURE: _____ DATE: _____

REVIEWED BY:

NAME: JODI SMITH, CIH, CSP

TITLE: FD THOMAS, INC. CIH

SIGNATURE: _____ DATE: _____

APPROVED BY:

NAME: Jeff Jones

TITLE: FD Thomas, Inc. Superintendent

SIGNATURE: _____ DATE: _____

II. PROJECT

BRIEF DESCRIPTION OF JOB:

Lead containing paint removal from various Nimbus Dam Radial Gate structures, accessed by shrink wrapped self supporting scaffolding. Paint removal will be by abrasive blasting, Trigger Task Level III, within a HEPA filtered negative air enclosure. Small area lead containing paint removal, Trigger Task Level I, performed by the use of power tools with HEPA filter equipped vacuum shrouded local exhaust systems.

9 - LEAD & HEAVY METALS WORK PLAN

JOB NO: 273
JOB NAME: Alltech - Nimbus Dam
DATE PLAN PREPARED: 2/19/2015
COMPETENT PERSON TO SUPERVISE THIS PLAN: Stan Davis

III. EQUIPMENT

EQUIPMENT TO BE USED ON THIS JOB:

PERSONAL PROTECTIVE EQUIPMENT	CONTAINMENT	PAINT REMOVAL
• Standard PPE, (gloves, boots, long sleeves, eye protection, hard hats, respiratory protection, and hearing protection) • Type CE, continuous air fed respirator during abrasive blasting for all workers within that environment. • HEPA filtered full face respirators while handling spent abrasive containers and while HEPA vacuum power-tool use within the negative air containment. • HEPA filtered half face respirators may also be used while handling spent abrasive containers • Adjust level of protection based on initial task personnel air monitoring results as required	• Containment for abrasive blasting shall be within a negative air containment made of air impenetrable material, with continuous HEPA filtered ventilation during work sequences.. • This containment shall remain in place during lead containing paint removal and debris clean-up until surfaces have been coated. • Containment for vacuum shrouded power tooling shall be by HEPA filtered local exhaust. This work will be performed within the negative air containment.	• The use of: • HEPA vacuum equipped power tools for spot paint removal and surface preparation. • Abrasive blasting within negative air containments for full paint removal on gate structures. • We believe that by implementing these methods we will be able to minimize any potential exposures to personnel and to the surrounding environment.

OTHER EQUIPMENT:

- Air compressors and abrasive blast pots
- 20,000 cfm HEPA dust collector
- Forklift
- Access Ladders and Scaffolds
- Showers (for decontamination)
- Connex storage container
- Hand Wash Station
- HEPA equipped power tools
- Portable HEPA Vacuums
- Pick-up truck
- 3 Stage filtered Grade D air monitors
- general task related hand tools

IV. SCHEDULE

This project is to start: April 2015 and end: June 2017 This compliance plan will take effect immediately upon project start-up. Work is scheduled to proceed according to the following schedule:

Week 1 through 2

Initial set-up and site mobilization (Describe other tasks):

SET UP ACCESS SCAFFOLD AND CONTAINMENT, COLLECT PRE-JOB SOIL SAMPLES IF PRACTICAL. BEGIN ABRASIVE BLAST PAINT REMOVAL. PERFORM SPOT POWER TOOLING PAINT REMOVAL. PERFORM RESPECTIVE PERSONAL AND AREA AIR MONITORING. COLLECT AND CLEAN OUT RESULTANT DEBRIS DAILY.

Week 3 through END OF JOB

CONTINUE PAINT REMOVAL ACTIVITIES. ADJUST ENGINEERING CONTROLS AND PPE PER AIR MONITORING RESULTS IF NEEDED. SAMPLE DEBRIS AND WASTE FOR CHARACTERIZATION. CONTINUE AS ABOVE AS THE JOB PROGRESSES.

CLEAN AND REMOVE CONTAINMENTS.
DECONTAMINATE EQUIPMENT PRIOR TO DE-MOBILIZATION.
TRANSPORT WASTE APPROPRIATELY AS PER SAMPLE ANALYSIS RESULTS.

GENERAL

PRIMING SHALL OCCUR THE SAME DAY OF SURFACE PREPARATION. FINISH COATS TO FOLLOW.

WASTE SHALL BE STORED, ANALYSED AND TRANSPORTED APPROPRIATELY. SEE WASTE MANAGEMENT PLAN

9 - LEAD & HEAVY METALS WORK PLAN

JOB NO: 273

JOB NAME: Alltech - Nimbus Dam

DATE PLAN PREPARED: 2/19/2015

COMPETENT PERSON TO SUPERVISE THIS PLAN: Stan Davis

V. EXPOSURE ACTIVITIES

ACTIVITIES THAT MAY RESULT IN LEAD EXPOSURE AND SHALL BE SAMPLED:

- ABRASIVE BLASTING WITHIN A NEGATIVE AIR ENCLOSURE
- MANUAL & VACUUM SPENT ABRASIVE MIXED/LEAD CONTAINING PAINT DEBRIS REMOVAL AND CLEAN-UP
- CONTAINMENT REMOVAL AND CLEAN-UP
- CONTAMINATED BLAST HOSE HANDLING
- HEPA FILTER EQUIPPED LOCAL EXHAUST SHROUDED POWER TOOLING
- OPERATION OF HEPA EQUIPPED DUST COLLECTION EQUIPMENT
- DECONTAMINATION OF LEAD WORK ASSOCIATED EQUIPMENT

NOTE: WORKER ACTIVITIES FOR AN AVERAGE DAY MAY INCLUDE ANY COMBINATION OF THESE TASKS

NOTE: SIGNS WILL BE POSTED IN ALL AREAS THAT EXCEED THE ACTION LEVEL:
LEAD CLOTHING AND EQUIPMENT CONTAMINATED WITH LEAD. MAY DAMAGE FERTILITY OR THE UNBORN CHILD. CAUSES DAMAGE TO THE CENTRAL NERVOUS SYSTEM. DO NOT EAT, DRINK OR SMOKE WHEN HANDLING. DO NOT REMOVE DUST BY BLOWING OR SHAKING. DISPOSE OF LEAD CONTAMINATED WASH WATER IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, OR FEDERAL REGULATIONS.

VI. CREW

SUPERVISOR(S) FOR CREW: Stan Davis

SUPERVISOR 2: N/A

Crew 1:	**Stan Davis**	Task 1:	ABRASIVE BLAST
Crew 2:		Task 2:	POWER TOOL
Crew 3:		Task 3:	SPRAY APPLICATION OF COATINGS

WORKERS:

YET TO TO BE DETERMINED

VII. ENGINEERING CONTROLS

THE PRIMARY ENGINEERING CONTROL METHODS FOR THE PROJECT ARE:

- ☑ CONTAINMENT
- ☑ GENERAL VENTILATION
- ☐ WET METHODS
- ☑ LOCAL EXHAUST VENTILATION
- ☑ HEPA VACUUM
- ☑ OTHER (DESCRIBE): NEGATIVE AIR ENCLOSURE

A BRIEF DESCRIPTION OF THE ENGINEERING CONTROLS ARE OUTLINED BELOW (i.e. type and size of dust collector, SSPC classification of containment, description of containment, ventilation components).

- AIR IMPENETRABLE NEGATIVE AIR ENCLOSURE SUPPORTED BY SELF SUPPORTED SCAFFOLD
- 20,000 CFM DUST COLLECTION SYSTEM CONSISTING OF DUCT FAN, DUCTING AND HEPA FILTERS
- LOCAL EXHAUST EQUIPPED POWER TOOLS WITH HEPA EQUIPPED VACUUMS
- BLASTOX ABRASIVE MEDIA ADDITIVE TO STABILIZE LEAD WASTE

EMPLOYEE JOB RESPONSIBILITIES WITH REGARD TO MAINTAINING CONTROLS INCLUDE (i.e. ventilation inspections, air velocity measurements, work practices, etc.)

Stan Davis WILL PERFORM TWO DAILY INSPECTIONS, DOCUMENTED ON THE FDT LEAD JOBSITE INSPECTION AND MECHANICAL VENTILATION EVALUATION FORMS.

WHERE DEFICIENCIES ARE FOUND, THEY SHALL BE CORRECTED IMMEDIATELY. WORK SHALL CEASE IF SO DEEMED NECESSARY BY THE NATURE OF DEFICIENCY DISCOVERED.

9 - LEAD & HEAVY METALS WORK PLAN

JOB NO: 273

JOB NAME: Alltech - Nimbus Dam

DATE PLAN PREPARED: 2/19/2015

COMPETENT PERSON TO SUPERVISE THIS PLAN: Stan Davis

VIII. TECHNOLOGY

TECHNOLOGY CONSIDERED IN MEETING THE PERMISSIBLE EXPOSURE LIMIT

The OSHA standards, other publications (e.g. SSPC 93-02 Industrial Lead Paint Removal Handbook) and past project experience have been used to determine the following appropriate engineering controls to be used on the project.

THE CONTAINMENT SYSTEM CLASSIFICATIONS TO BE EMPLOYED, PER SSPC GUIDE 6, ARE:

- **1A** FOR AREAS TO BE FULLY CLEANED BY ABRASIVE BLAST METHODS
- **1P** FOR AREAS WHERE THE SPOT REMOVAL OF PAINT WILL BE DONE BY HEPA EQUIPPED POWER TOOL METHODS, WHICH WILL CAPTURE DEBRIS RESULTING FROM OCCASIONAL LOCAL EXHAUST LEAKS.

THIS COMBINATION OF CONTAINMENT SYSTEMS BEST FIT PROJECT LOGISTICS.

IX. RESPIRATORS

Respirators are provided in the context of the FD Thomas, Inc. respiratory protection program.
Types of Respirators to be used on this project include:

AIR PURIFYING RESPIRATOR WITH HEPA CARTRIDGE	ACCEPTABLE FOR USE WHILE:
☑ HALF FACE →	Handling spent waste containers, blast hoses, or hand tooling
☑ FULL FACE →	Vacuuming debris within Containment (not during blast), Power Tooling, Vacuum Blasting.
☐ POWERED AIR-PURIFYING	

SUPPLIED AIR		ACCEPTABLE FOR USE WHILE:
☑ TYPE CE ABRASIVE BLAST HELMET →		Abrasive Blasting, Working Within Containment During Blast
☐ TYPE C FULL FACE PRESSURE DEMAND		Any other tasks requiring respiratory protection
☑ OTHER (describe):	HF, FF / Multi-Contaminant Filter	Paint mixing and spray application (see resp protection plan)

X. PROTECTIVE CLOTHING

PROTECTIVE CLOTHING PROVIDED TO EMPLOYEES WHO MAY BE EXPOSED TO LEAD IN EXCESS OF THE PEL INCLUDES:
Cloth and Disposable Coveralls, Leather Gloves, Head Covering.

REUSABLE LAUNDRY WILL BE LAUNDERED AS FOLLOWS:

☐ OUTSIDE LAUNDRY
NAME:
ADDRESS:
PHONE NO:
NOTE: This laundry has been approved for accepting lead-contaminated clothing

☐ LAUNDERING WILL BE ACCOMPLISHED ON SITE

☐ OTHER:

DISPOSABLE COVERALLS WILL:

☑ BE USED ON THIS PROJECT

☐ ALLOWED FOR INSPECTION PERSONNEL ONLY

☑ OTHER: Coveralls will be disposed of by Safety Kleen when required by sample analysis results.

9 - LEAD & HEAVY METALS WORK PLAN

JOB NO: **273**

JOB NAME: **Alltech - Nimbus Dam**

DATE PLAN PREPARED: **2/19/2015**

COMPETENT PERSON TO SUPERVISE THIS PLAN: **Stan Davis**

XI. AIR MONITORING

THE TESING FIRM USED:

FORENSIC ANALYTICAL LABORATORIES, INC. (LAB ID# 101762)
3777 DEPOT ROAD, SUITE 409
HAYWARD, CA 94545
(800) 827-3274 ELAP accredited by the State of California and ELLAP certified by AIHA

Exposure results are reported on the FDT Sample Form and the results will be reported to employees on the Employee Notification Form.

XII. HYGIENE FACILITIES

HYGIENE FACILITIES ARE PROVIDED BY:

- ☑ F.D. THOMAS, INC.
- ☐ FACILITY OWNER
- ☐ GENERAL CONTRACTOR
- ☐ OTHER (Identify):

THE FOLLOWING WASH AND/OR SHOWER FACILITIES WILL BE USED TO DECONTAMINATE WORKERS AND WILL CONSIST OF:

Shower Facilities (to be provided if sample analysis results determine the requirement; exposures over the PEL of 50 µg/m3)
Hand Wash Station(s) logically placed for worker access near to lead containing paint disturbing work

THE WASH AND/OR SHOWER FACILITIES WILL BE LOCATED AT:

Nearest to abatement activities as feasible based upon site space availability and layout

SHOWER FACILITIES SHALL HAVE RUNNING HOT AND COLD WATER, SOAP, AND TOWELS. HANDS AND FACE WILL BE WASHED BEFORE ALL BREAKS AND AT THE END OF EACH DAY.

THE GENERAL DECONTAMINATION ACTION WILL TAKE PLACE BEFORE:

☑ BEGINNING OF SHIFT:

DON DISPOSABLE COVERALLS AND RESPIRATORY PROTECTION

☑ BREAKS:

- AFTER POWER TOOL CLEANING - VACUUM OFF WORK CLOTHES OF DUST AT THE AIR WASH AREA OF THE CONTAINMENT WITH THE RESPIRATOR REMAINING ON.
- AFTER WASTE DEBRIS COLLECTION - VACUUM OFF WORK CLOTHES OF DUST AT THE AIR WASH AREA OF THE NEGATIVE AIR CONTAINMENT WITH THE RESPIRATOR REMAINING ON.
- AFTER ABRASIVE BLASTING - VACUUM OFF WORK CLOTHES OF DUST AT THE AIR WASH AREA OF THE NEGATIVE AIR CONTAINMENT WITH THE RESPIRATOR REMAINING ON.

EXIT, REMOVE OUTER DISPOSABLE COVERALLS, INSPECT FOR BREACHES, REPAIR OR DISPOSE OF.
GO DIRECTLY TO HANDWASH STATION, REMOVE RESPIRATOR, CLEAN, STOW IN BAG, WASH HANDS AND FACE.

☑ LUNCH:

- SAME AS BREAKS

☑ END OF SHIFT:

- SAME AS BREAKS

ADDITIONALLY FOR END OF SHIFT; IF AIR SAMPLE ANALYSIS RESULTS INDICATE EXPOSURE LEVELS AT OR ABOVE THE PEL of 50 µg/m3 , SHOWER FACILITIES SHALL BE USED:

- DON CLEAN DISPOSABLE COVERALLS, DON HEPA FILTERED HF APR, WALK TO SHOWER TRAILER
- ENTER "DIRTY SIDE" OF SHOWER, DISROBE, HANG WORK CLOTHES, REMOVE APR, TAKE A SHOWER
- MOVE TO CLEAN SIDE OF SHOWER FACILITY, DON STREET CLOTHES

WASTEWATER (Wash and/or laundry if accomplished on site) WILL BE:

- ☑ COLLECTED AND FILTERED ON-SITE (describe process): SAMPLE, SUBMIT FOR ANALYSIS, TRANSPORT APPROPRIATELY
- ☐ DISPOSED OF IN ACCORDANCE WITH PRIOR ARRANGEMENT MADE WITH: (name of local water and sewage authority)
- ☐ CONTAINERIZED FOR TESTING AND DISPOSAL WITHOUT FILTRATION
- ☐ CONTROLLED BY OWNER OR GENERAL CONTRACTOR

9 - LEAD & HEAVY METALS WORK PLAN

JOB NO: 273

JOB NAME: Alltech - Nimbus Dam

DATE PLAN PREPARED: 2/19/2015

COMPETENT PERSON TO SUPERVISE THIS PLAN: Stan Davis

XIII. ADMINISTRATIVE

ADMINISTRATIVE JOB ROTATION PLANS:

Job rotation may be used on this project to reduce worker exposures to lead on a given day. The job rotation schedule will be as follows (complete if applicable):

JOB ROTATION IS NOT ANTICIPATED BASED UPON PRIOR EXPERIENCE WITH SIMILAR CONDITIONS, ENGINEERING CONTROLS AND WORK PRACTICES THAT MINIMIZE EXPOSURE TO WORKERS.

XIV. MEDICAL SURVEILLANCE

A Medical Surveillance Program is in place for employees assigned to this project who are exposed to lead above the action level of 30 µg/m3.

The physician or firm conducting blood lead and ZPP testing is:

US HealthWorks 4700 Northgate Blvd #100, Sacramento, CA 95834 (916) 929-6161	OR	On-Site Health and Safety Services Services Provided On-Site (866) 998-2750

Worker blood levels are measured initially before the onset of work. Blood lead testing is reported at the following frequency:

EVERY 2 MONTHS FOR ONGOING WORK, AT THE END OF PROJECT, AS SYMPTOMS ARISE

Results are reported to employees on the Employee Notification Form.

Employees assigned to this project are removed from exposures above the Action Level, if blood lead levels greater than 50 µg/dl occur, or upon recommendation by the examining physician. Their seniority and benefits are protected during the removal period. They are returned to exposures above the Action Level only after 2 consecutive blood lead results are 40 µg/dl or lower, or when the physician indicates that the risk due to exposure no longer exists (in the case of removal for reasons other than blood lead).

XV. MULTI EMPLOYER

MULTI-EMPLOYER SITE ARRANGEMENTS:

The following arrangements will be made on-site to inform other contractors of the potential exposures to lead and of their respective responsibilities:

- SITE SPECIFIC SAFETY AND LEAD PLAN ON SITE
- SDS ON HAND
- APPROPRIATE BARRICADES AND SIGNAGE IN PLACE
- DAILY COMMUNICATION WITH OTHER CRAFTS INFORMING THEM OF OUR PLANNED TASKS AND ACTIVITIES THAT MAY HAVE RELEVANT IMPACT

XVI. TRAINING

All workers who will be exposed to lead above the Action Level of 30 µg/m3 have been trained in accordance with all the requirements found in paragraph (1) of 29 CFR 1926.62. The names of the employees trained, the training provider, and the training dates are documented on the Safety Training Report.

9 - LEAD & HEAVY METALS WORK PLAN

JOB NO: **273**

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XVII. NOTES

TRIGGER TASK DEFINITIONS, BY LEVEL:

I	Spray painting, manual demolition, manual scraping, sanding, use of heat gun, power tool cleaning with dust collection system.
II	Using lead-containing mortar, lead burning, rivet busting, power tool cleaning without dust collection system, clean-up activities using dry expendable abrasives, abrasive blast enclosure movement or removal.
III	Abrasive blasting, welding, cutting, or torch burning on structures where lead-containing coatings or materials are present.

CAL/OSHA shall be notified at least 24 hours before beginning any lead based paint disturbing work that exceeds 100 square feet or 100 linear feet, as per CCR Title 8 Section 1532.1.(p)

Sacramento District Office

2424 Arden Way, Ste. 165, Sacramento, CA 95825 (916) 263-2800 (Off) (916) 263-2798 (Fax)

Disposal Service for Lead Containing Paint Debris:

Safety-Kleen Systems

6000 88TH STREET, SACRAMENTO, CA 95828 (916) 386-4999 (Off)

Disposal Analysis Lab:

Forensic Analytical Laboratory

3777 Depot Rd, Hayward, CA 94545 (510) 887-8828 (Off) (510) 887-4218 (Fax)

Disposal/Recycling Service for Spent Abrasives Containing Lead Paint Debris:

Kleen Industrial Services

50 Oak Court, Suite 210, Danville CA 94526 (925) 831-9800 (Off) (925) 831-9183 (Fax)

Disposal Analysis Lab for Spent Abrasives Containing Lead Paint Debris:

Enviro-Chem, Inc. Laboratories

1214 East Lexington Avenue, Pomona, CA 91766 (909) 590-5905 (Off) (909) 590-5907 (Fax)

ATTN: PROJECT LEADER; CALL THE CORPORATE SAFETY MANAGER BEFORE IMPLEMENTING THIS SITE SPECIFIC PLAN!

Stan Davis Review: DATE:

Plan Written By: **Felix Saldivar** DATE: **2/19/2015**

9 - LEAD & HEAVY METALS WORK PLAN

JOB NO: 273

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DATE PLAN PREPARED: 2/19/2015

COMPETENT PERSON TO SUPERVISE THIS PLAN: Stan Davis

ATTACHMENT

SSPC Guide 6 Combination of Containments - **Abrasive Blast Cleaning / Power Tool Cleaning**

	Containment System					Ventilation				
Containment Class	**5.3.1** Containment Materials	**5.3.2** Penetrability	**5.3.3** Support Structure	**5.3.4** Joints	**5.3.5** Entryway	**5.4.1** Air Make-up	**5.4.2** Input Air Flow	**5.4.3** Air Pressure	**5.4.4** Air Movement	**5.4.5** Exhaust Dust Filtration
Class 1A	Rigid	Air Impenetrable	Rigid	Full Seal	Resealable	Controlled	Forced	Visual Verification	Minimum Specified	Air Filtration
Class 1P	Flexible	Air Impenetrable	Rigid	Full Seal	Resealable	Controlled	Forced	Visual Verification	Minimum Specified	Air Filtration

NOTES:

• Regarding the surfaces where power tool cleaning is to be done with a HEPA vacuum system attachment. This will be done inside the 1P containment listed above. By using HEPA vacuum shrouded equipment and hanging tarps, the controls are equivalent to a Class 1P containment (reference: note 2 page 9-14 of SSPC Guide 6).