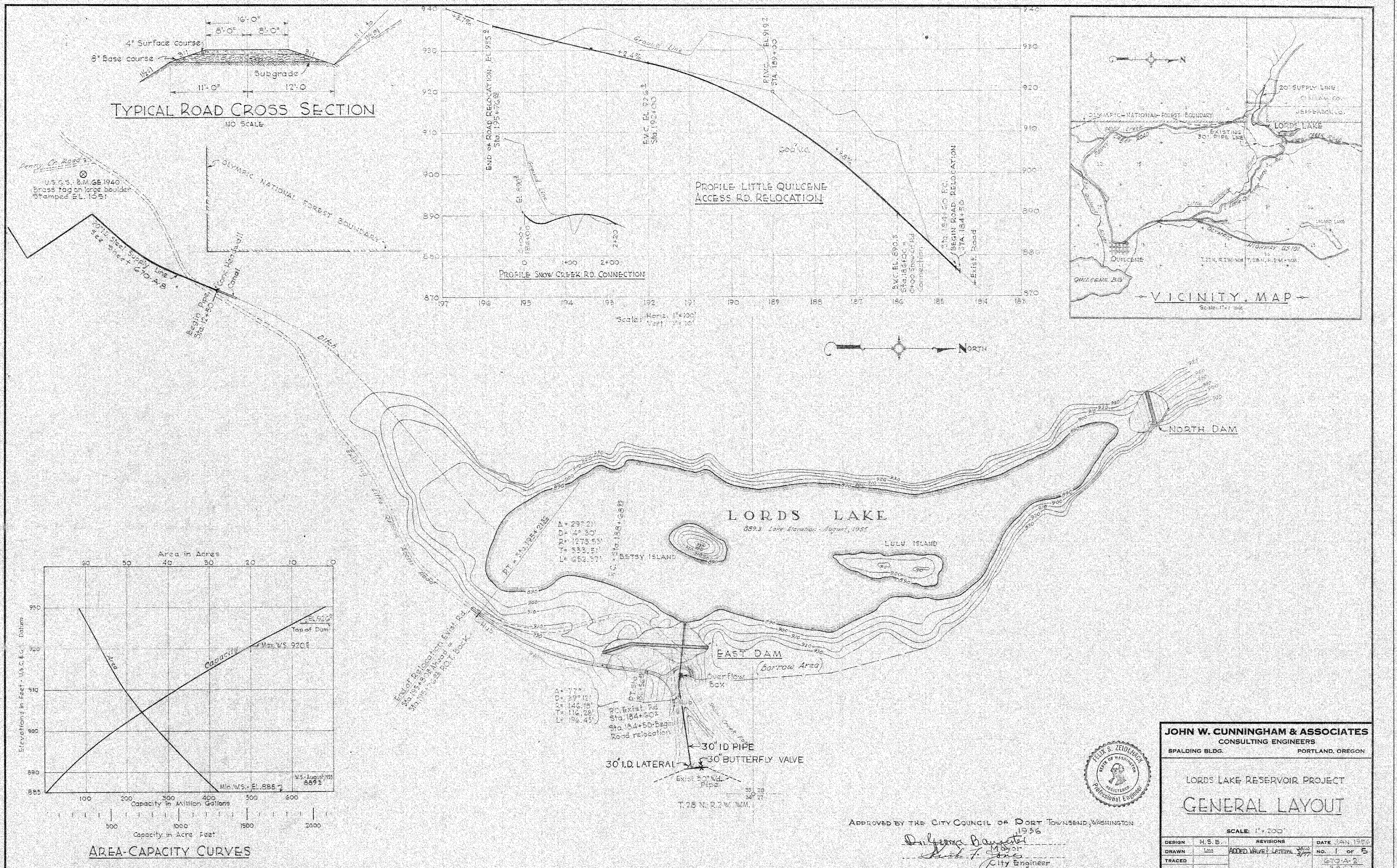
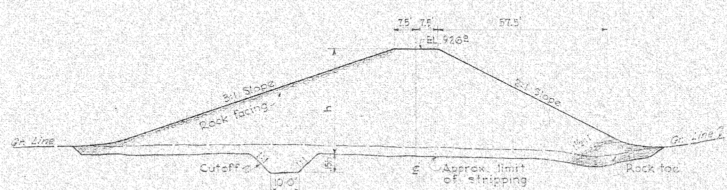

TYPICAL ROAD CROSS SECTION
NO SCALE
4" Surface course
8" Base course
16'-0"
8'-0"
8'-0"
Subgrade
11'-0"
12'-0"
U.S.G.S. B.M. GE 1940
Brass tag on large boulder
Stamped EL. 1051
Penny Cr. Road
OLYMPIC NATIONAL FOREST BOUNDARY
20" Steel Supply Line
See Sheet 670-A-8
Begin Pipe
Conc. Headwall
Canal
Ditch
Existing Little Quilcene Access Road
PROFILE LITTLE QUILCENE
ACCESS RD. RELOCATION
PROFILE SNOW CREEK RD. CONNECTION
End of Road Relocation
Sta. 195+76.8
E.V.C. EL. 926.8
Sta. 192+00
P.I.V.C.
EL. 919.2
Sta. 189+00
B.V.C. EL. 890.3
Sta. 184+00
Begin Road Relocation
Sta. 184+50
Exist. Road
Ground Line
+2.4%
+9.8%
-3.7%
600' V.C.
Scale: Horiz. 1"=100'
Vert. 1"=10'
VICINITY MAP
20" SUPPLY LINE
CLALLAM CO.
JEFFERSON CO.
OLYMPIC NATIONAL FOREST BOUNDARY
LORDS LAKE
EXISTING 30" PIPE LINE
QUILCENE
QUILCENE BAY
Highway US 101
NORTH
LORDS LAKE
889.3 Lake Elevation - August, 1955
LULU ISLAND
BETSY ISLAND
NORTH DAM
EAST DAM
(Borrow Area)
Overflow Box
30" ID PIPE
30" BUTTERFLY VALVE
30" I.D. LATERAL
Exist. 30" W.S. Pipe
T. 28 N., R. 2 W., W.M.
Δ = 29° 21'
D = 4° 30'
R = 1273.55'
T = 333.51'
L = 652.37'
Δ = 77°
D = 39° 12'
R = 146.18'
T = 116.28'
L = 196.45'
P.C. Exist. Rd.
Sta. 184+90
Sta. 184+50 Begin Road relocation
End of Relocation Exist. Rd.
AREA-CAPACITY CURVES
Area in Acres
Elevations in Feet - U.S.C.&G. Datum
Capacity in Million Gallons
Capacity in Acre Feet
Area
Capacity
EL. 926 Top of Dam
Max. W.S. 920.6
Min. W.S. - EL. 885
W.S. - August 1955 889.3
APPROVED BY THE CITY COUNCIL OF PORT TOWNSEND, WASHINGTON
1956
Mayor
City Engineer
FELIX G. ZEIDLHACK
STATE OF WASHINGTON
REGISTERED
Professional Engineer
JOHN W. CUNNINGHAM & ASSOCIATES
CONSULTING ENGINEERS
SPALDING BLDG.
PORTLAND, OREGON
LORDS LAKE RESERVOIR PROJECT
GENERAL LAYOUT
SCALE: 1" = 200'
DESIGN H.S.B.
DRAWN
TRACED
CHECKED
REVISIONS
ADDED VALVE, LATERAL
DATE JAN. 1956
NO. 1 OF 5
670-A-2



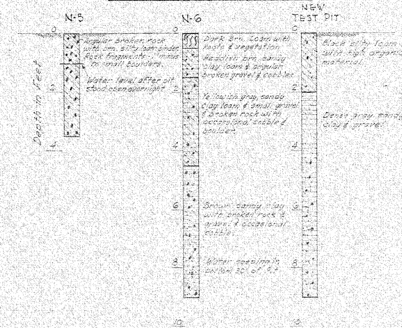
TYPICAL CROSS SECTION

Scale: 1" = 20'

PLAN

Scale: 1" = 20'

LOG OF TEST PITS



NOTE

1. Locations of Test Pits as shown on this drawing and their relation to the Dam are only approximate. Actual location of the Dam Crest has been designated on the ground.

2. Topography shown on this drawing is of the original ground which has subsequently been disturbed by exploratory work, partial stripping and providing access. Contractors shall carefully examine the site and arrange their bids so that they may not be adversely affected by the changes.

Approved by the City Council of Port Townsend, Washington 1956 Dr. George Baumgarten Mayor
Keith L. Jones City Engineer

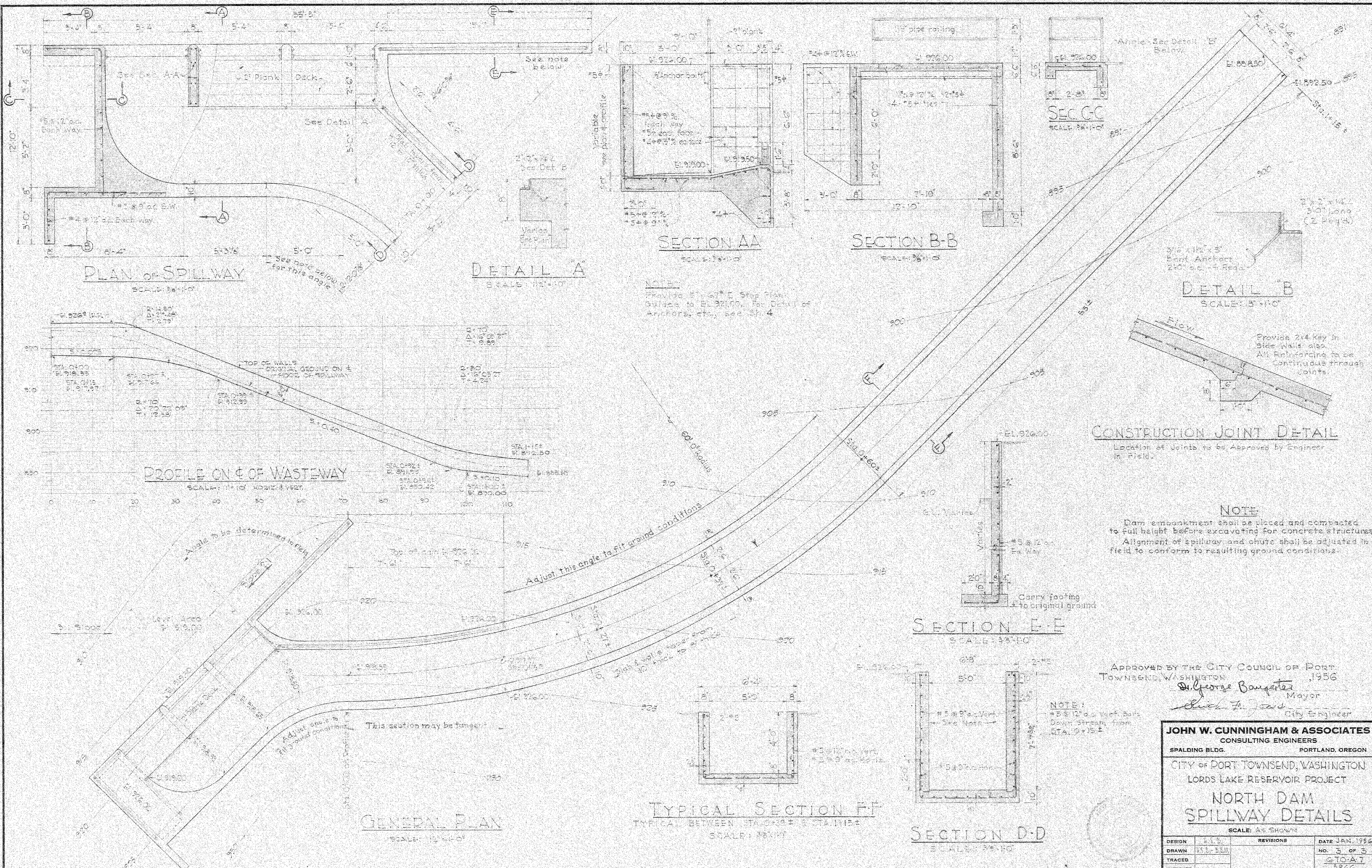
JOHN W. CUNNINGHAM & ASSOCIATES
CONSULTING ENGINEERS
SPALDING BLDG. PORTLAND, OREGON

CITY OF PORT TOWNSEND, WASHINGTON
LORDS LAKE RESERVOIR PROJECT

NORTH DAM

SCALE: AS SHOWN

DESIGN	H.S.S.	REVISIONS	DATE
DRAWN			NO. 2 OF 3
TRACED			670-A-11
CHECKED			3970



NOTE

Dam embankment shall be placed and compacted to full height before excavating for concrete structures. Alignment of spillway and chute shall be adjusted in field to conform to resulting ground conditions.

APPROVED BY THE CITY COUNCIL OF PORT TOWNSEND, WASHINGTON, 1956

W. George Bangerter — Mayor

[signature] — City Engineer

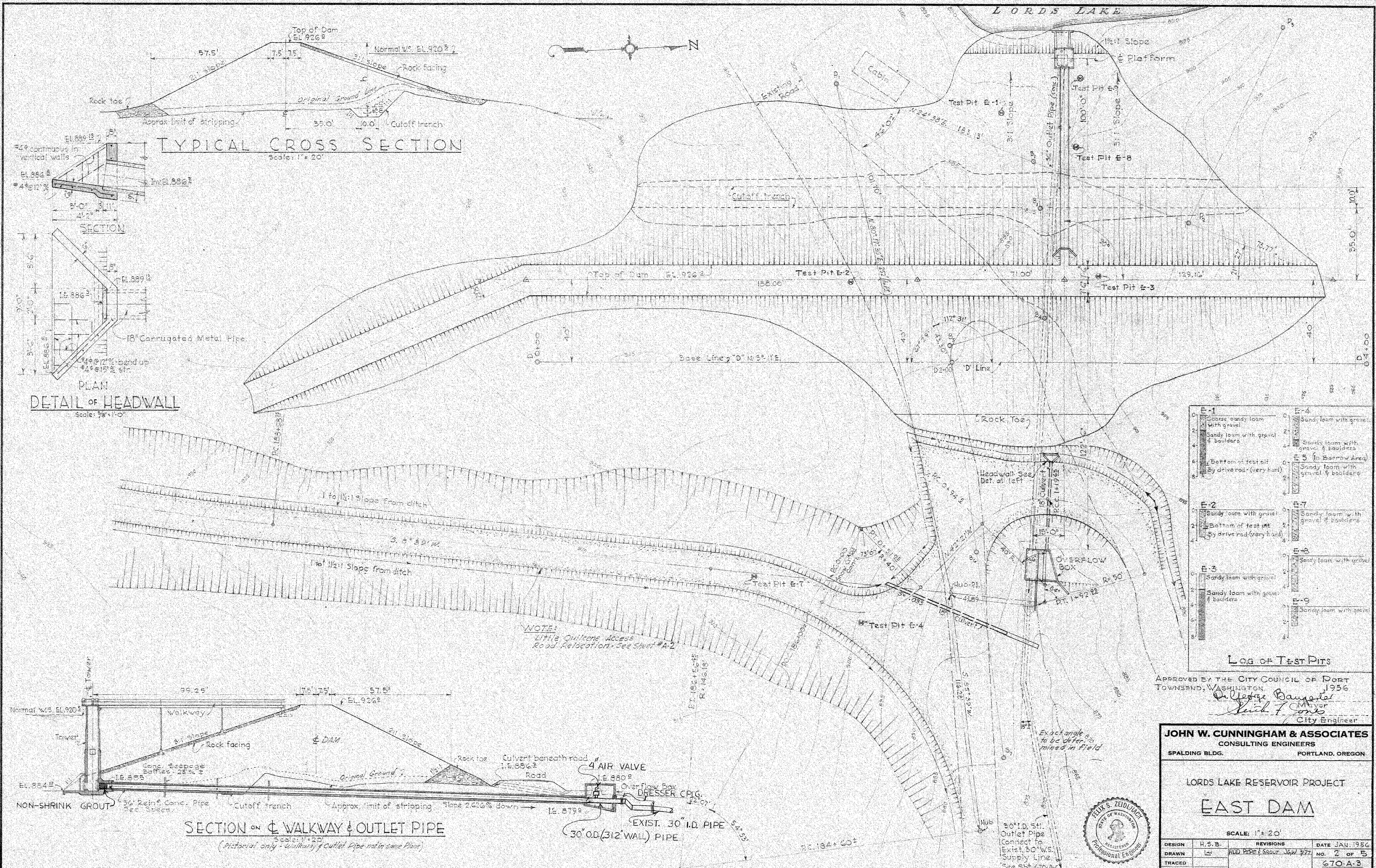
JOHN W. CUNNINGHAM & ASSOCIATES
CONSULTING ENGINEERS
SPALDING BLDG. — PORTLAND, OREGON

CITY OF PORT TOWNSEND, WASHINGTON
LORDS LAKE RESERVOIR PROJECT

NORTH DAM SPILLWAY DETAILS

SCALE: AS SHOWN

DESIGN		REVISIONS	DATE JAN. 1956
DRAWN			NO. 3 OF 3
TRACED			G70-A-7
CHECKED			3966



Approved by the City Council of Port Townsend, Washington. 1956

[signature] Mayor

[signature] City Engineer

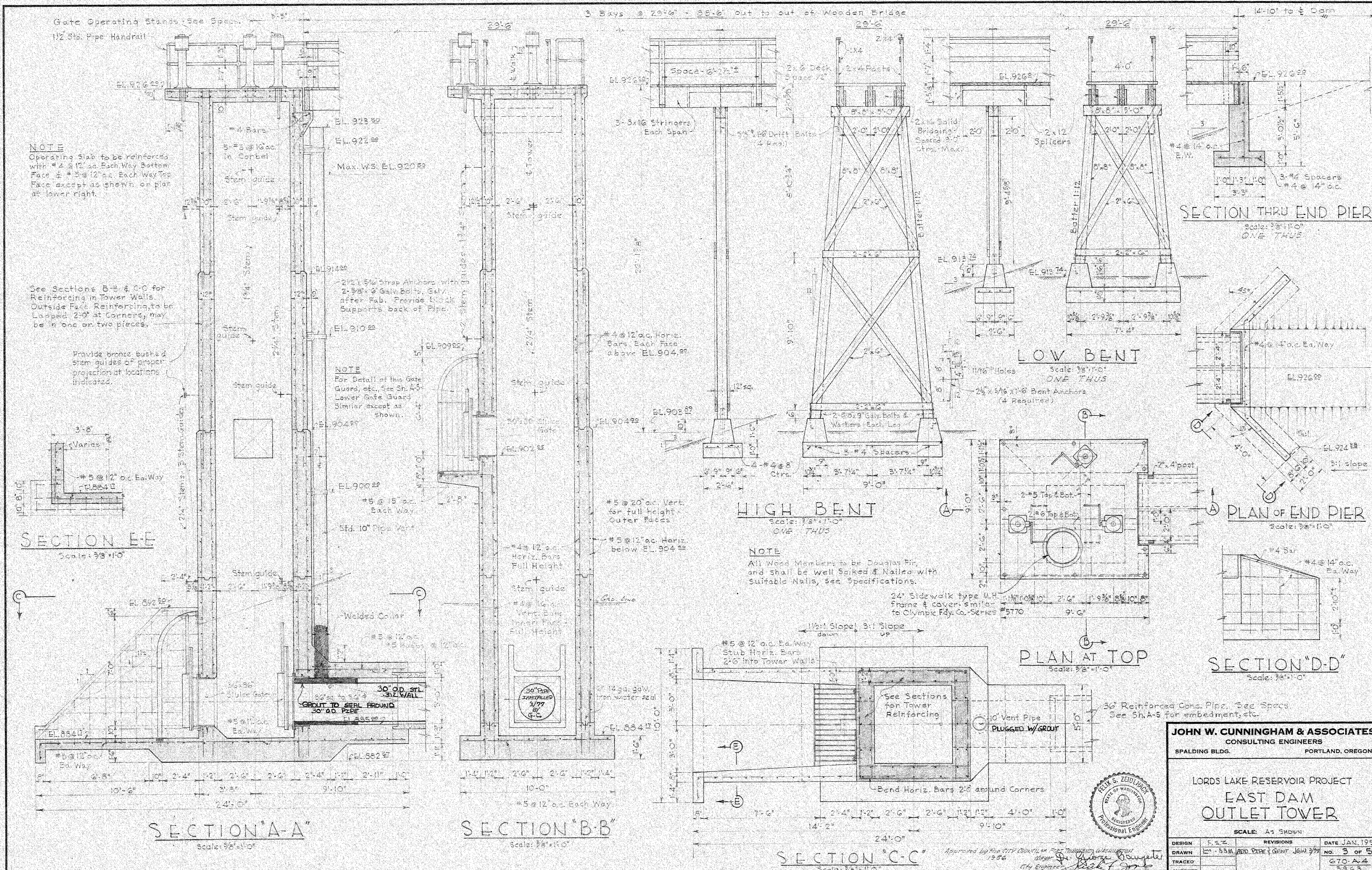
JOHN W. CUNNINGHAM & ASSOCIATES
CONSULTING ENGINEERS
SPALDING BLDG. PORTLAND, OREGON

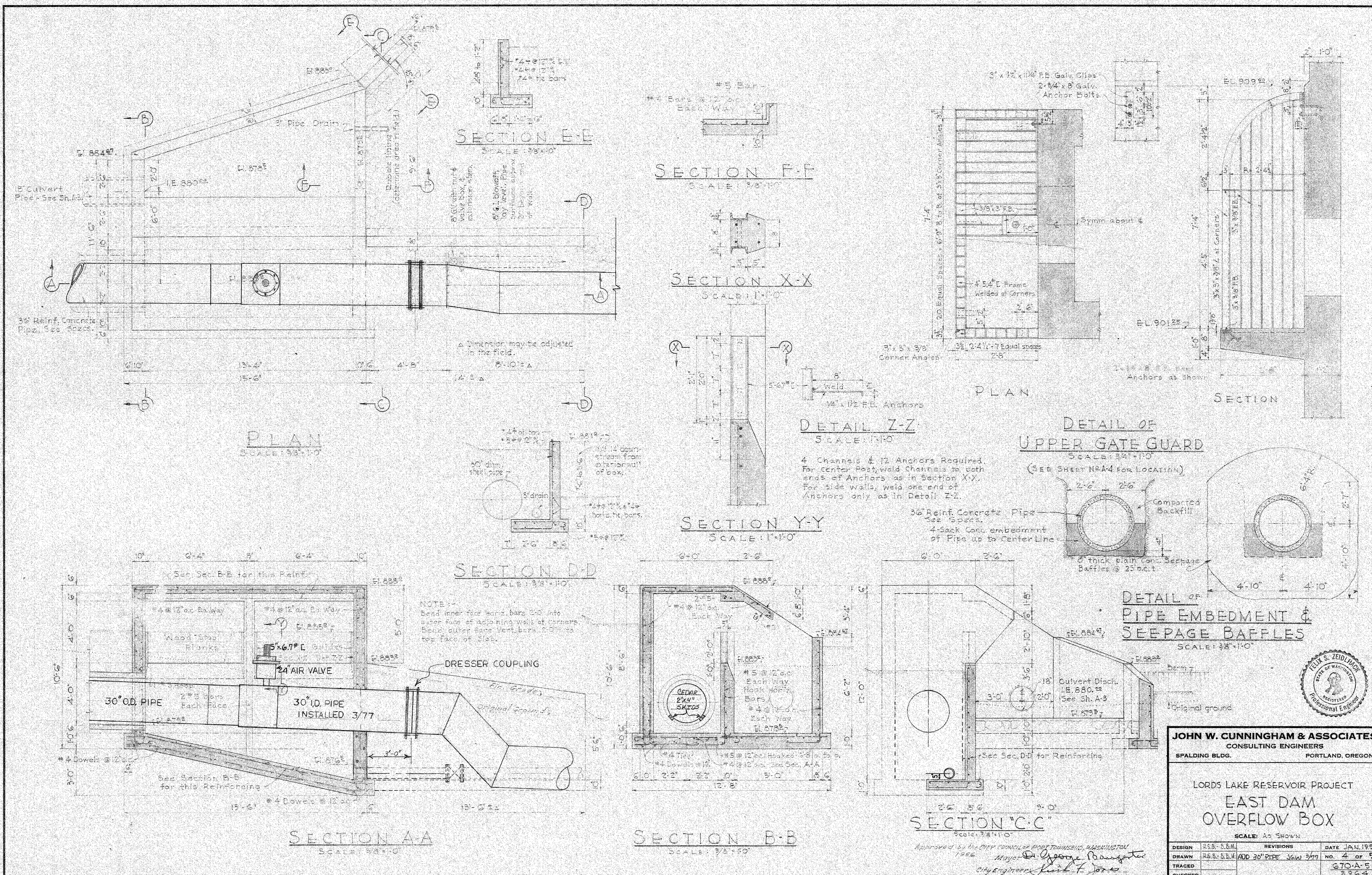
LORDS LAKE RESERVOIR PROJECT

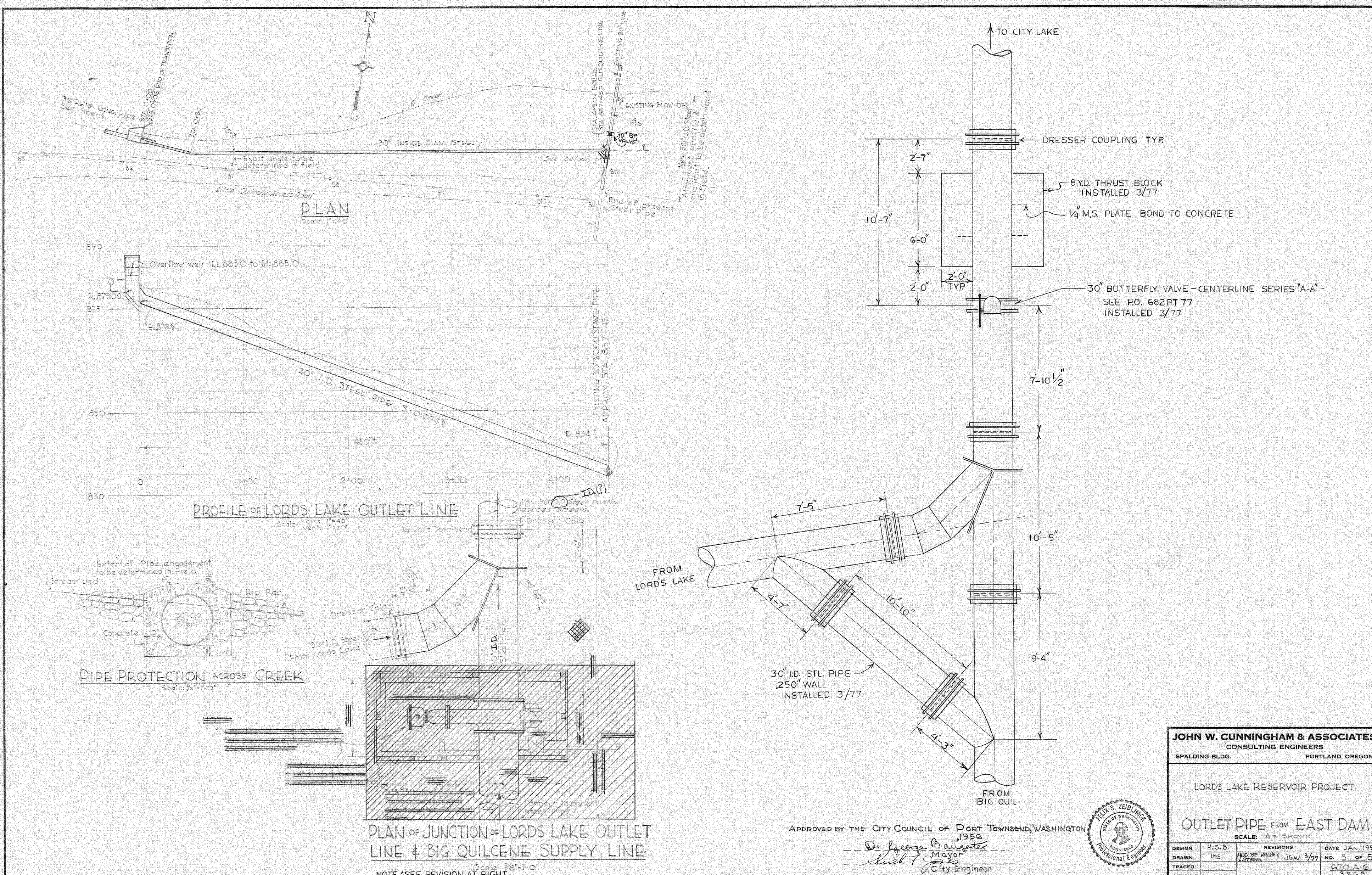
EAST DAM

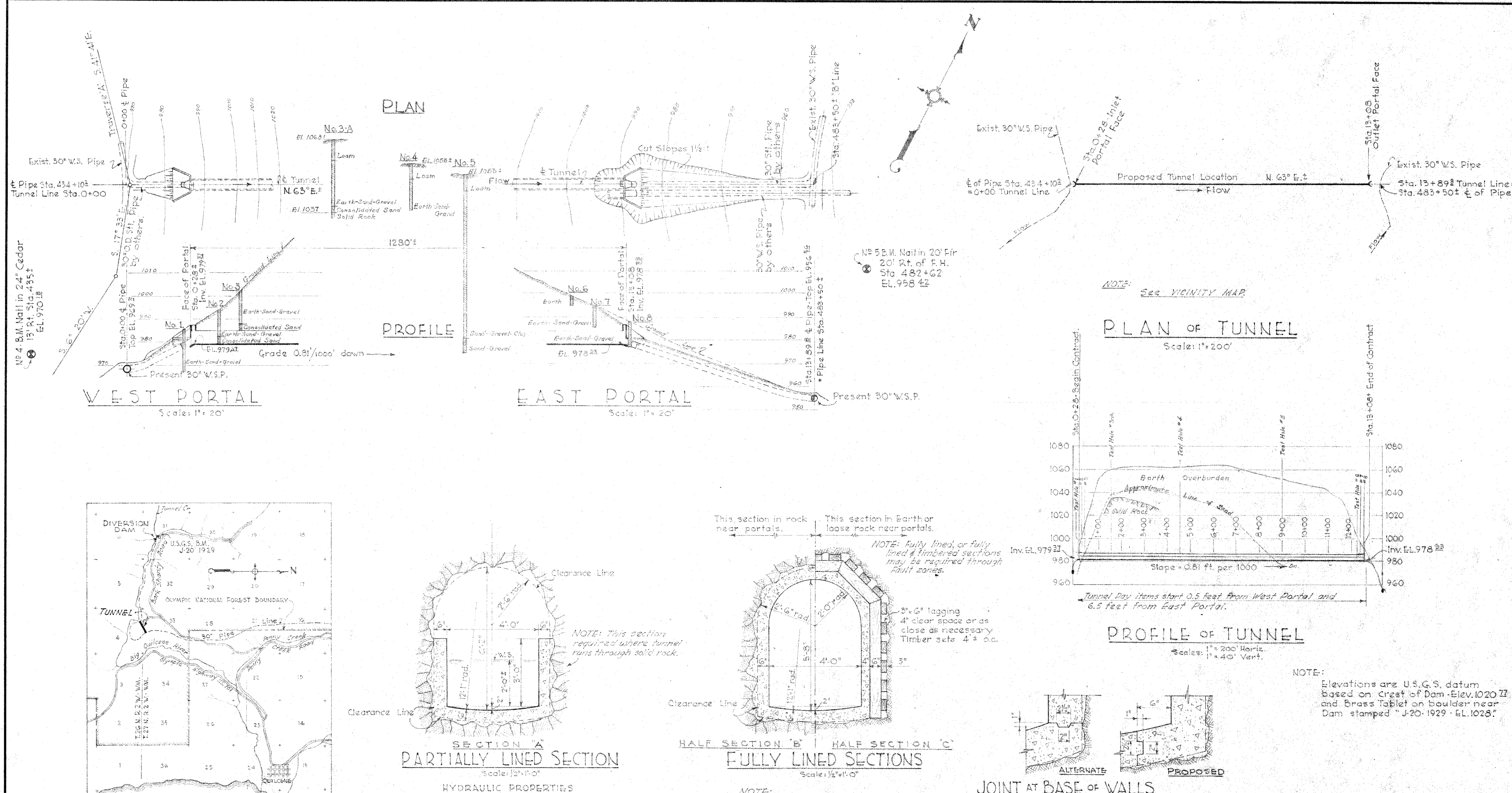
SCALE: 1" = 20'

		REVISIONS	
DESIGN	H.S.B.		DATE JAN. 1956
DRAWN	L	ADD PIPE & GROUT JGW 3/77	NO. 2 OF 5
TRACED			670-A-3
CHECKED			3962


Gate Operating Stands - See Specs.
1½ Std. Pipe Handrail
3 Bays @ 29'-6" = 88'-6" out to out of Wooden Bridge
14'-10" to ℄ Dam
NOTE
Operating Slab to be reinforced with #4 @ 12" o.c. Each Way Bottom Face & #5 @ 12" o.c. Each Way Top Face except as shown on plan at lower right.
See Sections B-B & C-C for Reinforcing in Tower Walls. Outside Face Reinforcing to be Lapped 2'-0" at Corners, may be in one or two pieces.
Provide bronze bushed stem guides of proper projection at locations indicated.
NOTE
For Detail of this Gate Guard, etc., See Sh. A-5 - Lower Gate Guard Similar except as shown.
2½ x ⅜ Strap Anchors with 2-⅝" x 4" Galv. Bolts, Galv. after Fab. Provide 1½ x 4 Supports back of Pipe.
Max. W.S. EL. 920.00
Std. 10" Pipe Vent
Welded Collar
30" O.D. STL. .312 WALL
GROUT TO SEAL AROUND 30" O.D. PIPE
SECTION E-E
Scale: ⅜" = 1'-0"
SECTION "A-A"
Scale: ⅜" = 1'-0"
SECTION "B-B"
Scale: ⅜" = 1'-0"
30" PIPE INSTALLED 3/77
HIGH BENT
Scale: ⅜" = 1'-0"
ONE THUS
NOTE
All Wood Members to be Douglas Fir, and shall be well Spiked & Nailed with Suitable Nails, See Specifications.
LOW BENT
Scale: ⅜" = 1'-0"
ONE THUS
SECTION THRU END PIER
Scale: ⅜" = 1'-0"
ONE THUS
PLAN OF END PIER
Scale: ⅜" = 1'-0"
SECTION "D-D"
Scale: ⅜" = 1'-0"
PLAN AT TOP
Scale: ⅜" = 1'-0"
24" Sidewalk type M.H. frame & cover: similar to Olympic Fdy. Co. - Series #5770
SECTION "C-C"
Scale: ⅜" = 1'-0"
36" Reinforced Conc. Pipe. See Specs. See Sh. A-5 for embedment, etc.
10" Vent Pipe PLUGGED W/GROUT
See Sections for Tower Reinforcing
Bend Horiz. Bars 2'-0" around Corners
Approved by the CITY COUNCIL of PORT TOWNSEND, WASHINGTON 1956
Mayor
City Engineer
FELIX S. ZEIDLHACK
STATE OF WASHINGTON
REGISTERED
Professional Engineer
JOHN W. CUNNINGHAM & ASSOCIATES
CONSULTING ENGINEERS
SPALDING BLDG.
PORTLAND, OREGON
LORDS LAKE RESERVOIR PROJECT
EAST DAM
OUTLET TOWER
SCALE: AS SHOWN
DESIGN
DRAWN
TRACED
CHECKED
REVISIONS
ADD PIPE & GROUT
DATE JAN. 1956
NO. 3 OF 5
670-A-4
3963


PLAN
SCALE: 3/8"=1'-0"
SECTION E-E
SCALE: 3/8"=1'-0"
SECTION F-F
SCALE: 3/8"=1'-0"
SECTION X-X
SCALE: 1"=1'-0"
SECTION Y-Y
SCALE: 1"=1'-0"
DETAIL Z-Z
SCALE: 1"=1'-0"
4 Channels & 12 Anchors Required. For center Post, weld Channels to both ends of Anchors as in Section X-X. For side walls, weld one end of Anchors only as in Detail Z-Z.
PLAN
SECTION
DETAIL OF UPPER GATE GUARD
SCALE: 3/4"=1'-0"
(SEE SHEET No A-4 FOR LOCATION)
3'x 1/2"x 11 1/4" F.B. Galv. Clips
2-3/4"x 8" Galv. Anchor Bolts
Symm. about ℄
4"x 4"x 1/4" ∠ Frame Welded at Corners
20 Equal Spaces = 6'-9" B. to B. of 3x3 Corner Angles
3"x 3"x 3/8" Corner Angles
Anchors as Shown
DETAIL OF PIPE EMBEDMENT & SEEPAGE BAFFLES
SCALE: 3/8"=1'-0"
36" Reinf. Concrete Pipe See Specs.
4-Sack Conc. embedment of Pipe up to Center Line
Compacted Backfill
8" thick plain conc. Seepage Baffles @ 25' o.c.
SECTION D-D
SCALE: 3/8"=1'-0"
NOTE:- Bend inner face Horiz. bars 2'-0" into outer face of adjoining walls at corners. Bend outer face Vert. bars 2'-0" to top face of Slab.
SECTION A-A
SCALE: 3/8"=1'-0"
30" O.D. PIPE
30" I.D. PIPE INSTALLED 3/77
24" AIR VALVE
DRESSER COUPLING
Original Ground
Fin. Grade
See Section B-B for this Reinforcing
#4 Dowels @ 12" o.c.
SECTION B-B
SCALE: 3/8"=1'-0"
SECTION "C-C"
SCALE: 3/8"=1'-0"
Culvert Disch. I.E. 880.12 See Sh. A-3
See Sec. D-D for Reinforcing
Approved by the CITY COUNCIL of PORT TOWNSEND, WASHINGTON 1956
Mayor
City Engineer
FELIX S. ZEIDLHACK
STATE OF WASHINGTON
REGISTERED
Professional Engineer
JOHN W. CUNNINGHAM & ASSOCIATES
CONSULTING ENGINEERS
SPALDING BLDG.
PORTLAND, OREGON
LORDS LAKE RESERVOIR PROJECT
EAST DAM
OVERFLOW BOX
SCALE: As Shown
DESIGN H.S.B.-S.B.M.
DRAWN H.S.B.-S.B.M.
TRACED
CHECKED
REVISIONS
ADD 30" PIPE JGW 3/77
DATE JAN. 1956
NO. 4 OF 5
670-A-5
3964

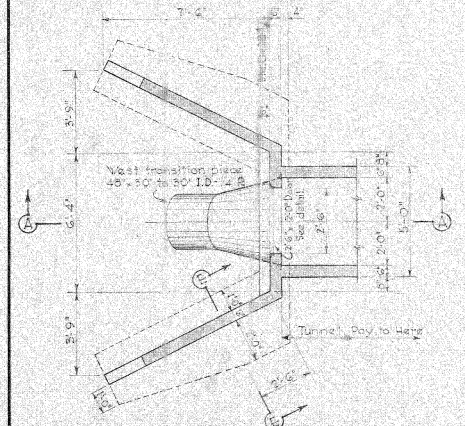

PLAN
PROFILE OF LORDS LAKE OUTLET LINE
30" I.D. STEEL PIPE
Overflow weir El.863.0 to El.865.0
EXISTING 30" WOOD STAVE PIPE APPROX. STA. 837+45
30" Inside Diam. Steel
PIPE PROTECTION ACROSS CREEK
Concrete
Stream bed
Rip Rap
PLAN OF JUNCTION OF LORDS LAKE OUTLET LINE & BIG QUILCENE SUPPLY LINE
NOTE: SEE REVISION AT RIGHT
TO CITY LAKE
DRESSER COUPLING TYP.
8 YD. THRUST BLOCK INSTALLED 3/77
1/4" M.S. PLATE BOND TO CONCRETE
30" BUTTERFLY VALVE - CENTERLINE SERIES "A-A" - SEE P.O. 682 PT 77 INSTALLED 3/77
2'-7"
6'-0"
2'-0"
2'-0" TYP
10'-7"
7'-10 1/2"
10'-5"
9'-4"
7'-5"
10'-10"
4'-7"
4'-3"
30" I.D. STL. PIPE .250" WALL INSTALLED 3/77
FROM LORD'S LAKE
FROM BIG QUIL
APPROVED BY THE CITY COUNCIL OF PORT TOWNSEND, WASHINGTON 1956
Mayor
City Engineer
FELIX S. ZEIDLHACK
STATE OF WASHINGTON
REGISTERED
Professional Engineer
JOHN W. CUNNINGHAM & ASSOCIATES
CONSULTING ENGINEERS
SPALDING BLDG.
PORTLAND, OREGON
LORDS LAKE RESERVOIR PROJECT
OUTLET PIPE FROM EAST DAM
SCALE: AS SHOWN
DESIGN H.S.B.
DRAWN
TRACED
CHECKED
REVISIONS
DATE JAN. 1956
NO. 5 OF 5
G70-A-6
3965



JOHN W. CUNNINGHAM & ASSOCIATES
CONSULTING ENGINEERS
SPALDING BLDG. PORTLAND, OREGON

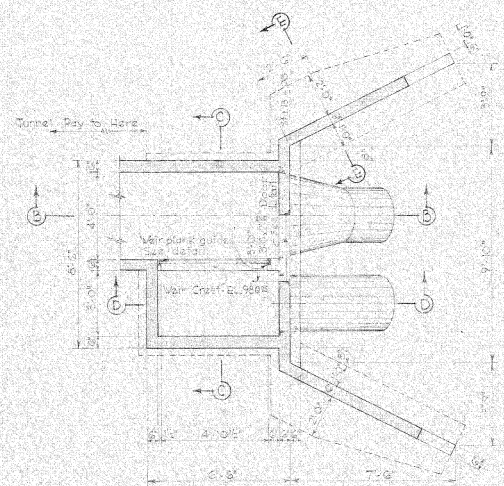
PORT TOWNSEND PIPE LINE PROJECT
TUNNEL
PLAN & SECTIONS
SCALE: AS SHOWN

DESIGN	J.H.C.	REVISIONS	DATE	JAN. 1956
DRAWN			NO.	1 OF 2
TRACED				G70-A-12
CHECKED				3971



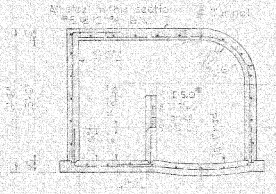
PLAN OF WEST PORTAL

Scale: 3/8"=1'0"

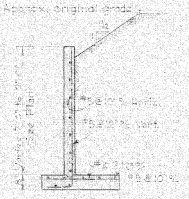


PLAN OF EAST PORTAL

Scale: 3/8"=1'0"

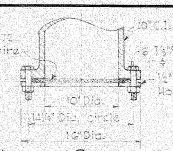


SECTION "C-C"



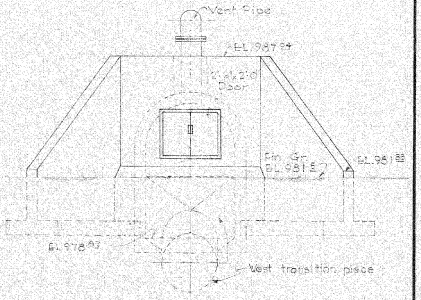
SECTION "E-E"

Scale: 3/4"=1'0"



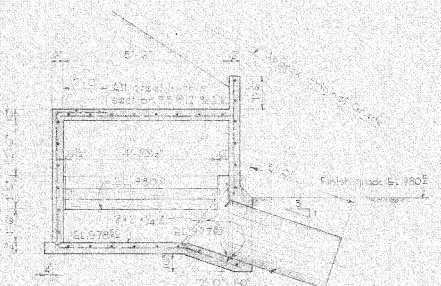
VENT SCREEN

Scale: 3/4"=1'0"
2-Req'd.

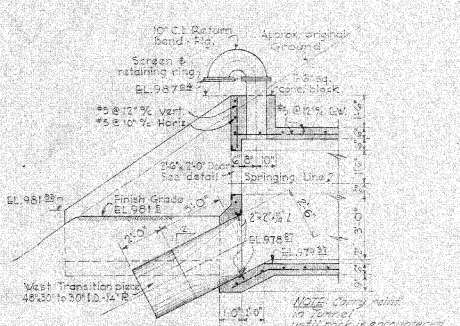


ELEVATION OF WEST PORTAL

Scale: 3/8"=1'0"

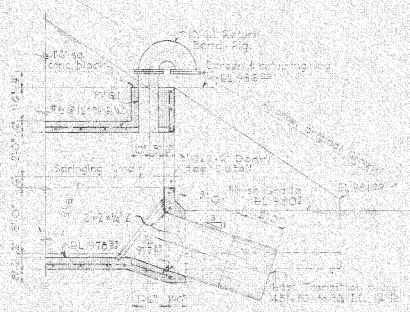


SECTION "D-D"



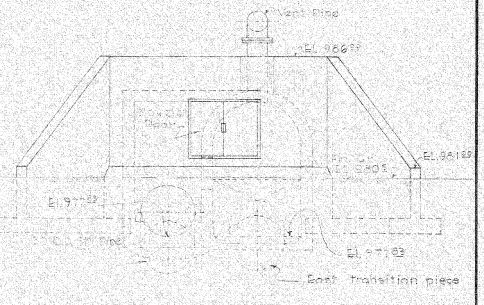
SECTION "A-A"

Scale: 3/8"=1'0"



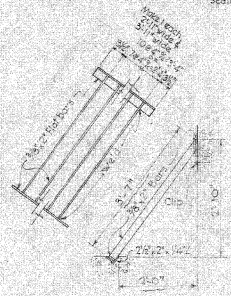
SECTION "B-B"

Scale: 3/8"=1'0"



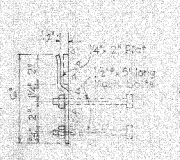
ELEVATION OF EAST PORTAL

Scale: 3/8"=1'0"



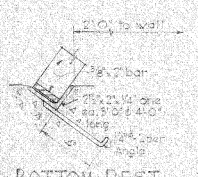
BAR SCREENS

Scale: 3/4"=1'0"



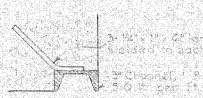
DETAIL OF CLIP

Scale: 1½"=1'0"
4 Req'd.



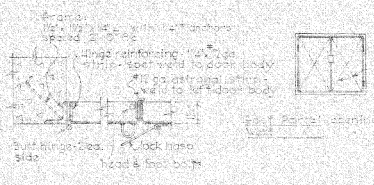
BOTTOM REST

Scale: 3"=1'0"



WEIR PLANK GUIDE

Scale: 3"=1'0"



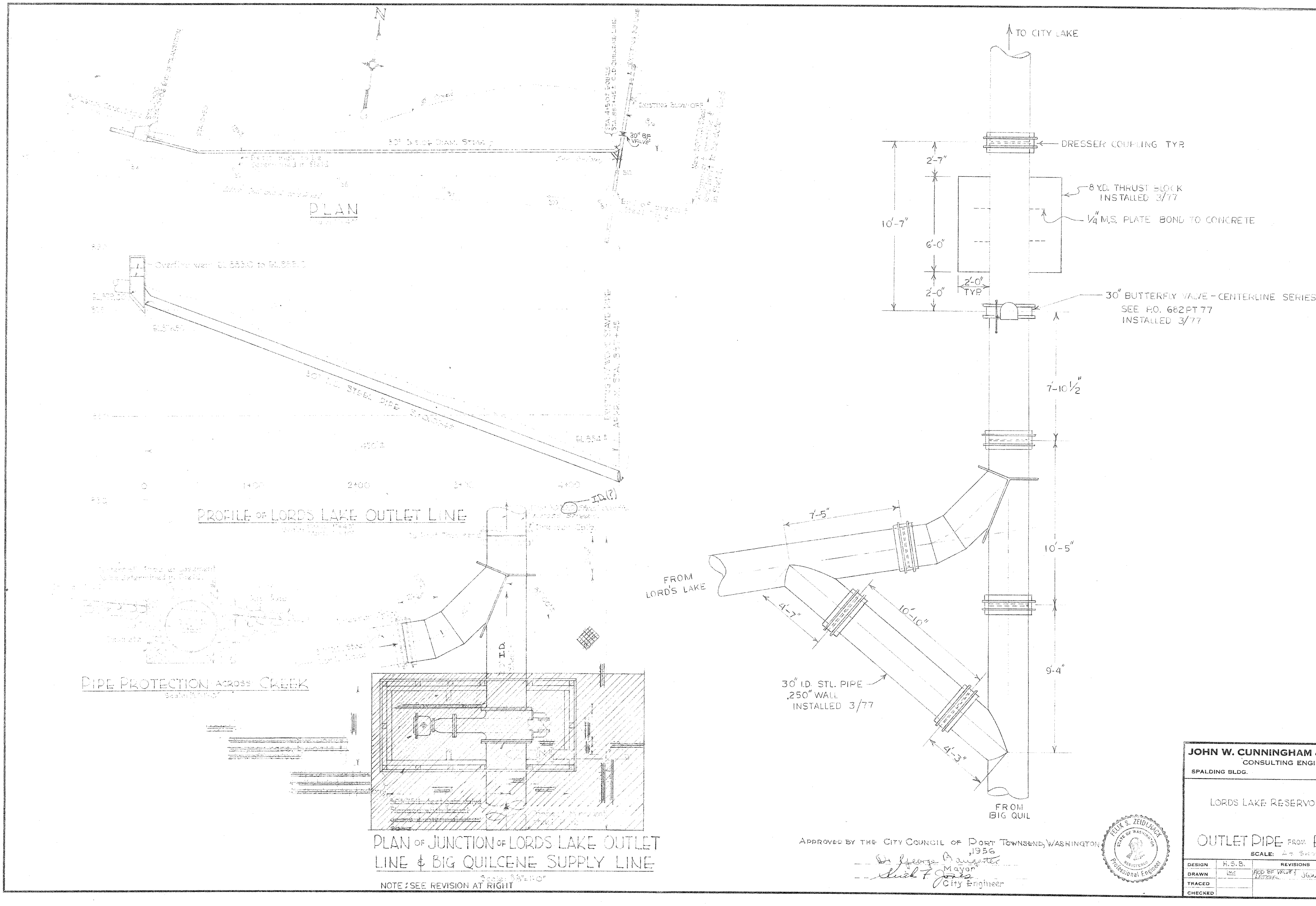
DETAIL OF DOOR & HINGE

Dr. George Bancroft
Chick F. Jones

JOHN W. CUNNINGHAM & ASSOCIATES
CONSULTING ENGINEERS
SPALDING BLDG. PORTLAND, OREGON

PORT TOWNSEND PIPE LINE PROJECT
TUNNEL
PORTAL DETAILS
SCALE: As Shown

DESIGN	J.R.C.	REVISIONS	DATE JAN. 1936
DRAWN			NO. 2 OF 2
TRACED			G70-A-13
CHECKED			8972



APPROVED BY THE CITY COUNCIL OF PORT TOWNSEND, WASHINGTON
1956

Mayor

City Engineer

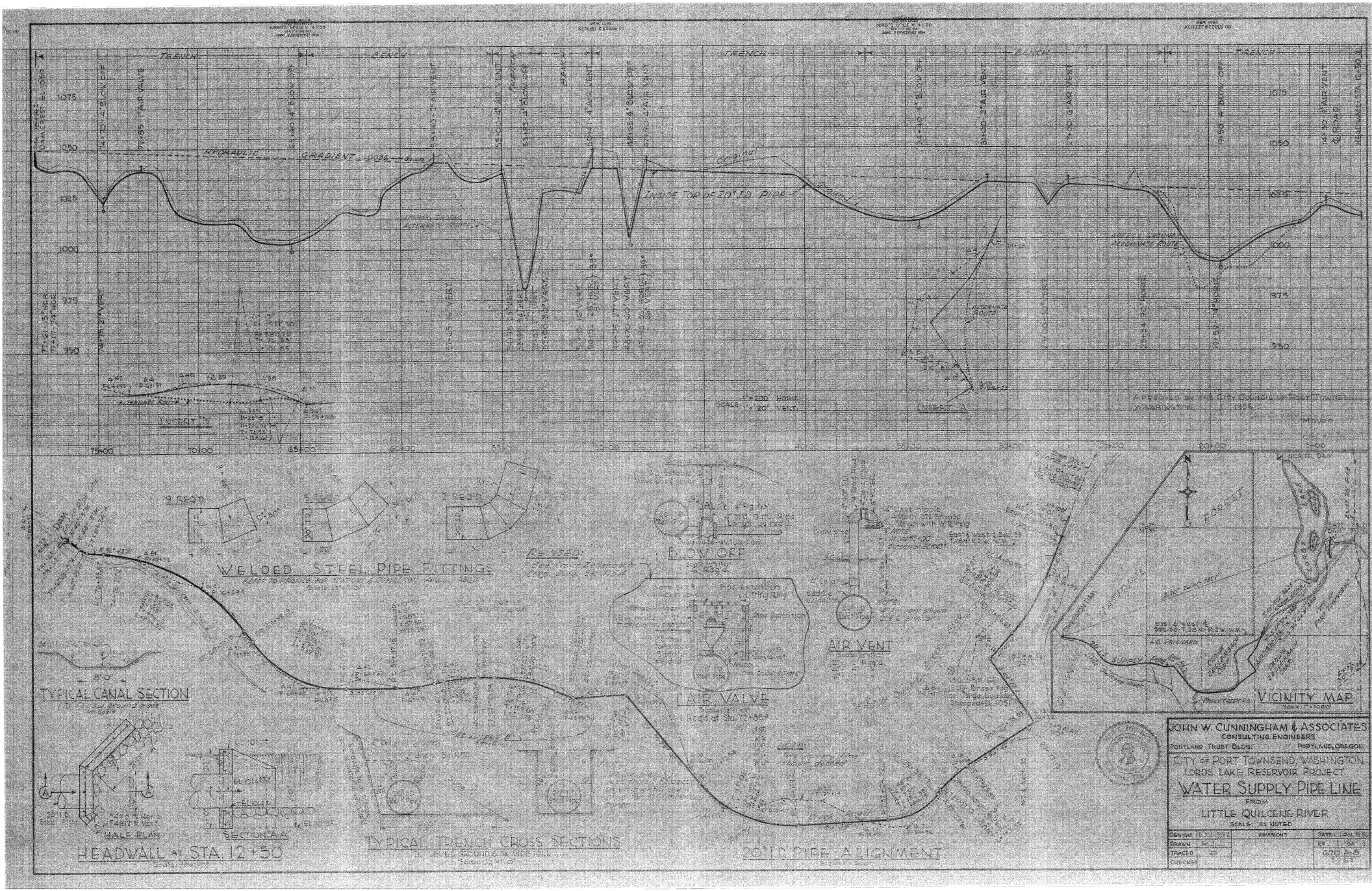
FELIX S. ZEIDLHACK
STATE OF WASHINGTON
REGISTERED
Professional Engineer

JOHN W. CUNNINGHAM & ASSOCIATES
CONSULTING ENGINEERS
SPALDING BLDG. PORTLAND, OREGON

LORDS LAKE RESERVOIR PROJECT

OUTLET PIPE FROM EAST DAM
SCALE: AS SHOWN

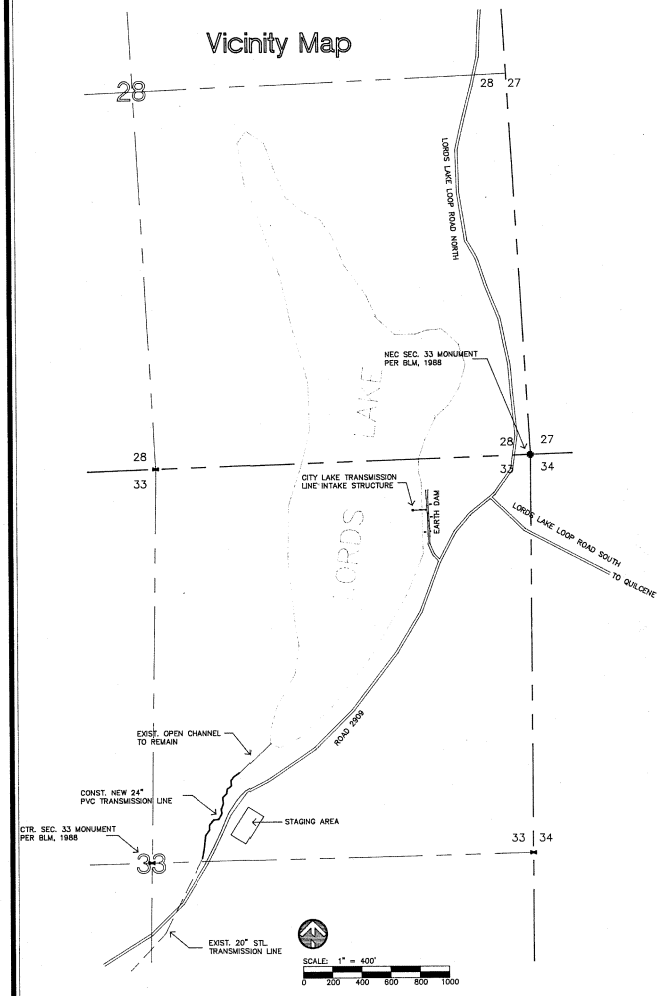
DESIGN	H.S.B.	REVISIONS	DATE JAN. 1956
DRAWN	LMC	ADD BF VALVE & REVISAL JGW 3/77	NO. 5 OF 5
TRACED			670-A-6
CHECKED			3965


HYDRAULIC GRADIENT - 1026 - down
INSIDE TOP OF 20" I.D. PIPE
ALTERNATE ROUTE
INSERT A
INSERT B
1" = 200' HOR.
1" = 20' VERT.
WELDED STEEL PIPE FITTINGS
BLOW OFF
AIR VENT
AIR VALVE
TYPICAL CANAL SECTION
HEADWALL AT STA. 12+50
TYPICAL TRENCH CROSS SECTIONS
20" I.D. PIPE - ALIGNMENT
VICINITY MAP
JOHN W. CUNNINGHAM & ASSOCIATES
CONSULTING ENGINEERS
PORTLAND, OREGON
CITY OF PORT TOWNSEND, WASHINGTON
LORDS LAKE RESERVOIR PROJECT
WATER SUPPLY PIPE LINE
FROM
LITTLE QUILCENE RIVER
SCALE: AS NOTED

IMPROVEMENT PLANS
LORDS LAKE TRANSMISSION LINE EXTENSION

City of Port Townsend
Jefferson County, Washington

Vicinity Map



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Legend

SECTION LINE
SECTION SUBDIVISION LINE
EXIST. TRANSMISSION LINE
NEW TRANSMISSION LINE
EXIST. ROCK ROAD
FLOWLINE
ROCK RIP-RAP
EXISTING GRADE

Sheet Index

CALL BEFORE YOU DIG
1-800-424-5555
FOR UNDERGROUND UTILITY LOCATION SERVICE

MICHAEL S SEATLAND
STATE OF WASHINGTON
21606
REGISTERED PROFESSIONAL ENGINEER

EXPIRES: 6/29/94

General Notes

1) Contractor shall be responsible for location and protection of all existing underground utilities. Location service shall be contacted to mark locations by calling 1-800-424-5555 prior to construction. Pothole to verify elevations of utilities where elevation may affect installation or construction.

2) All construction shall be in accordance with the requirements of the Standard Specifications for Road, Bridge, and Municipal Construction (1991 Ed.), and as directed by the Engineer.

3) Benchmark: Invert of exist. 20" Stl. pipe @ sta. 0+2.11. Elevation = 1016.17 (Local).

4) Transmission line construction shall conform to the requirements of Section 7-01 through Section 7-05 of the Standard Specifications and Manufacturer's Specifications. Materials shall be as follows:

   Transmission Line — ADS N-12 double wall polyethelyene drain pipe conforming to AASHTO M294, or approved equal.

5) Rock Rip-Rap revetment shall be in accordance with the requirements of Section 9-13 of the Standard Specifications.

6) Construction will be limited to within 10' of the existing channel for the length of the pipeline, and within marked construction limits for the remainder of the project. Contractor to use area south of service road as indicated for staging area.

7) Contractor to coordinate closure of the existing transmission line with the City of Port Townsend. All channel excavated by the Contractor shall have pipe installed and covered daily. Temporary energy dissipator and erosion control measures will be required to be in place prior to restarting existing transmission line each night. See Sheet 3 for temporary erosion control device detail.

8) Erosion control devices required at the end of construction. See Sheet 3 for details.

9) Temporary erosion control devices may be required during construction by either the Engineer or the City Inspector.

10) Construction may be interrupted during periods of high water demand or emergency. City Inspector shall give Contractor 24 hours notification for water demand shutdown. No advance notification may be given during times of emergencies.

CONCRETE NOTES

1. Concrete shall be a commercially available transit- mix properly proportioned and deliverec to the site in ready-mix trucks. Aggregate size shall be a maximum of 1-1/2". Slump shall not exceed 4".

2. All cement shall conform to ASTM Standard C-150. All aggregates shall conform to ASTM Standard C-33. All reinforcing bars shall conform to ASTM Standard A-615 (Grade 40 unless specified otherwise).

3. Concrete shall have a minimum 28-day compressive strength of 2500 psi. and shall not contain less than 5 sacks of cement per cubic yard. Provide 5% entrained air in concrete.

4. Splices in continuous reinforcement shall lap a minimum of 32 bar diameters or as noted.

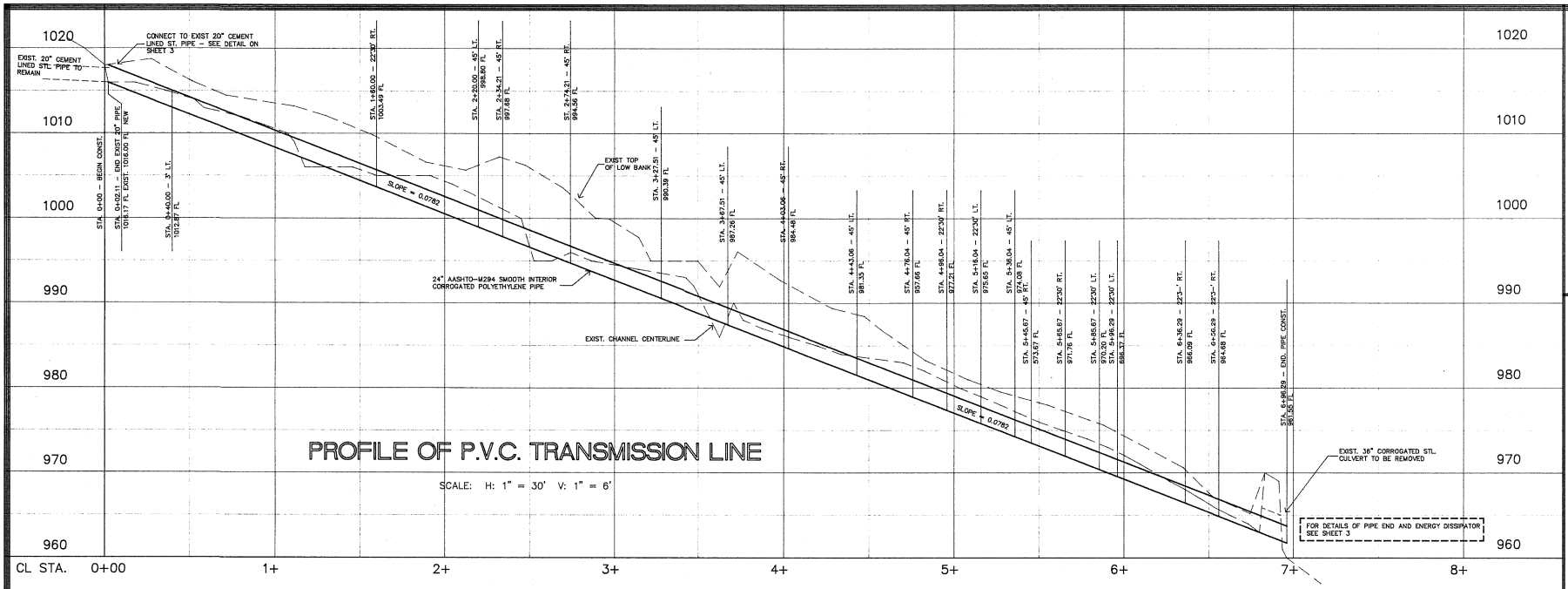
REVISIONS:

DATE	MARK	NOTE

TITLE: WATER TRANSMISSION LINE EXTENSION
TITLE SHEET

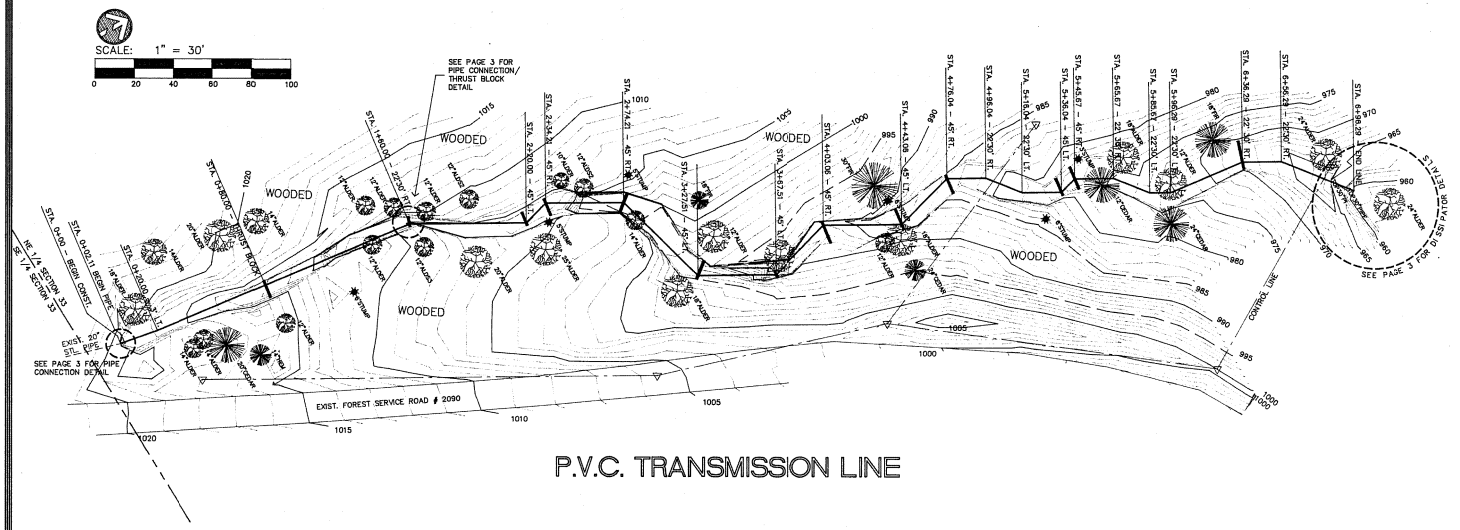
CLIENT: City of Port Townsend
5210 Kuhn Street
Port Townsend, WA 98368

Polaris
Polaris Engineering & Surveying, Inc.
1141 Tyler St. ☆ Suite 10 ☆ Port Angeles ☆ Washington 98362 ☆ (206) 452-5383



PROFILE OF P.V.C. TRANSMISSION LINE

SCALE: H: 1" = 30' V: 1" = 6'



P.V.C. TRANSMISSION LINE

EXPIRES: 6/29/94

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JUNE 13, 1994

REVISIONS:

DATE	MARK	NOTE

TITLE: **WATER TRANSMISSION LINE EXTENSION**
WATER TRANSMISSION LINE

CLIENT City of Port Townsend
5210 Kuhn Street
Port Townsend, WA 98368

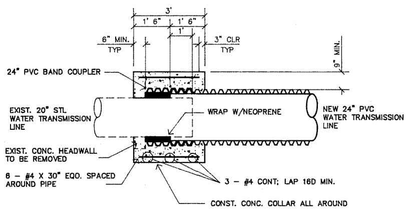
Polaris
Polaris Engineering & Surveying, Inc.
206 S. Lincoln St. ☆ Suite 201 ☆ Port Angeles ☆ Washington 98362 ☆ (206) 452-5383

SHEET 2 OF 3

JOB NO. 94075

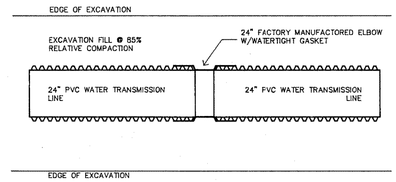
Tie Into Existing 20' Steel Waterline

N.T.S.



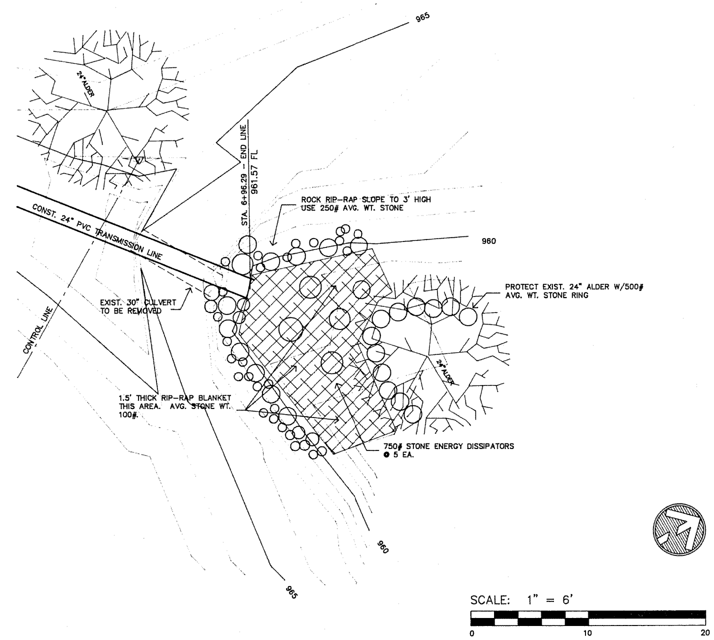
FOR TRENCH & PIPE BEDDING DETAIL – SEE BELOW

Pipe Connection Detail



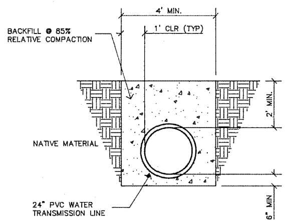
PIPE CONNECTION TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS

Erosion Control & Energy Dissipator



Pipe Bedding & Trench Detail

N.T.S.

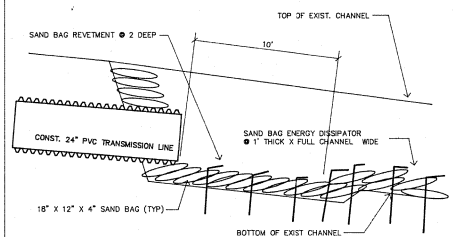


NOTE: EXISTING TRENCH VARIES FROM 4' TO 12' IN WIDTH. ADDITIONAL IMPORTED BACKFILL MATERIAL WILL BE REQUIRED TO BRING EXCAVATION TO COMPLETED GRADE. ALL TRENCH WORK IS TO BE ACCOMPLISHED WITHIN THE DESIGNATED WORKING AREA. THE CITY OF PORT TOWNSEND MAY MAKE A BORROW AREA AVAILABLE FOR THE SOURCE OF FILL.

MAXIMUM DRY DENSITY TO BE DETERMINED PER ASTM 698.

Temporary Erosion Control

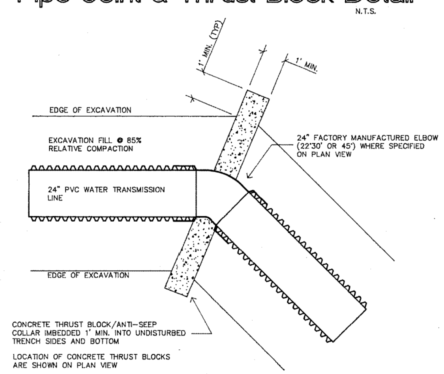
N.T.S.



ENERGY DISSIPATOR TO BE INSTALLED AT END OF CONSTRUCTION EACH DAY TO ALLOW WATER FLOW TO LORDS LAKE DURING EVENING AND NIGHT. SAND BAG REVETMENT TO BE FULL CHANNEL WIDTH. TOP COURSE TO BE ANCHORED WITH #4 REBAR PEGS W/TOP 6" BENT @ 90°.

Pipe Joint & Thrust Block Detail

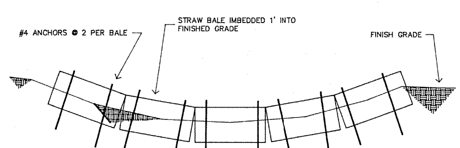
N.T.S.



LOCATION OF CONCRETE THRUST BLOCKS ARE SHOWN ON PLAN VIEW

Channel Erosion Control

N.T.S.



CONSTRUCT STRAW BALE EROSION CONTROL DEVICE @ 50' INTERVALS FOR LENGTH OF CHANNEL CONSTRUCTION.

EXPIRES: 6/29/94

JUNE 13, 1994

94075\lord3.dwg

REVISIONS:		
DATE	MARK	NOTE

TITLE: WATER TRANSMISSION LINE EXTENSION DETAILS

CLIENT: City of Port Townsend
5210 Kuhn Street
Port Townsend, WA 98368

Polaris
Polaris Engineering & Surveying, Inc.
206 S. Lincoln St. ☆Suite 201☆ Port Angeles ☆ Washington 98362 ☆ (206) 452–5393

SHEET 3 OF 3

JOB NO. 94075