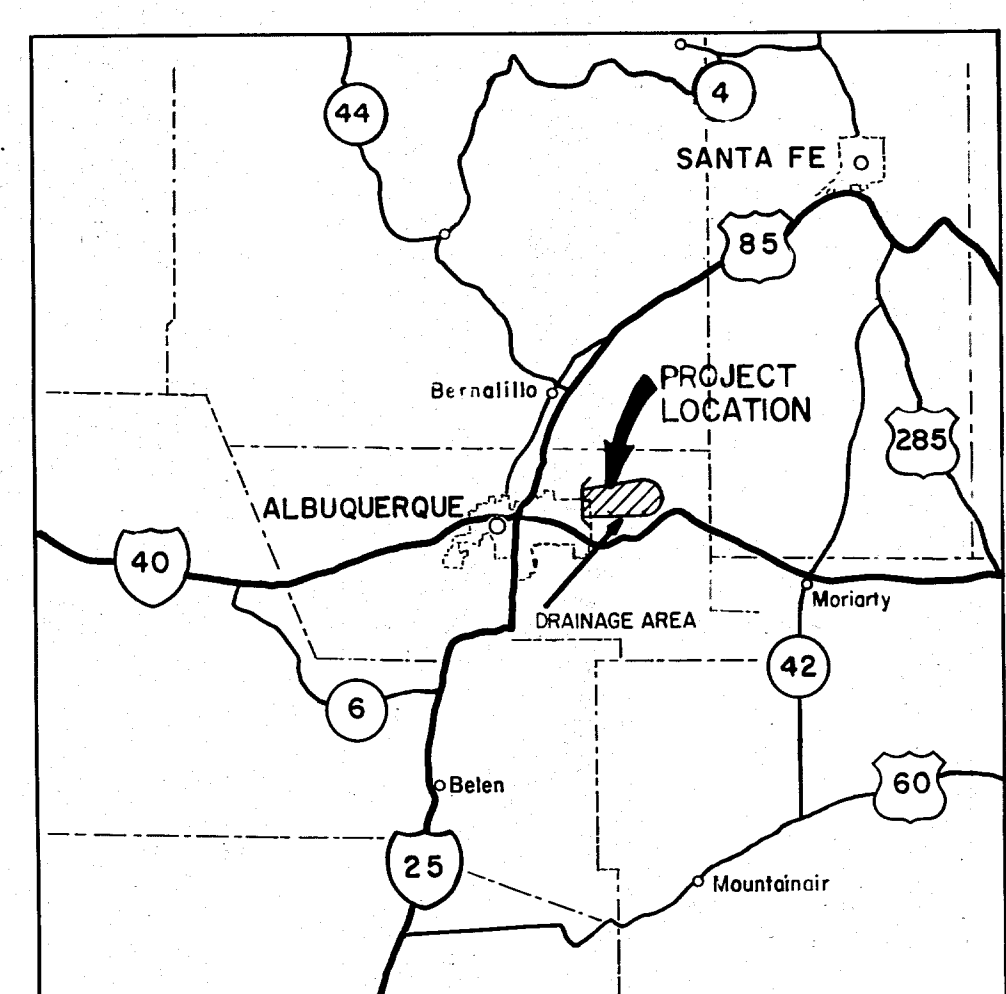
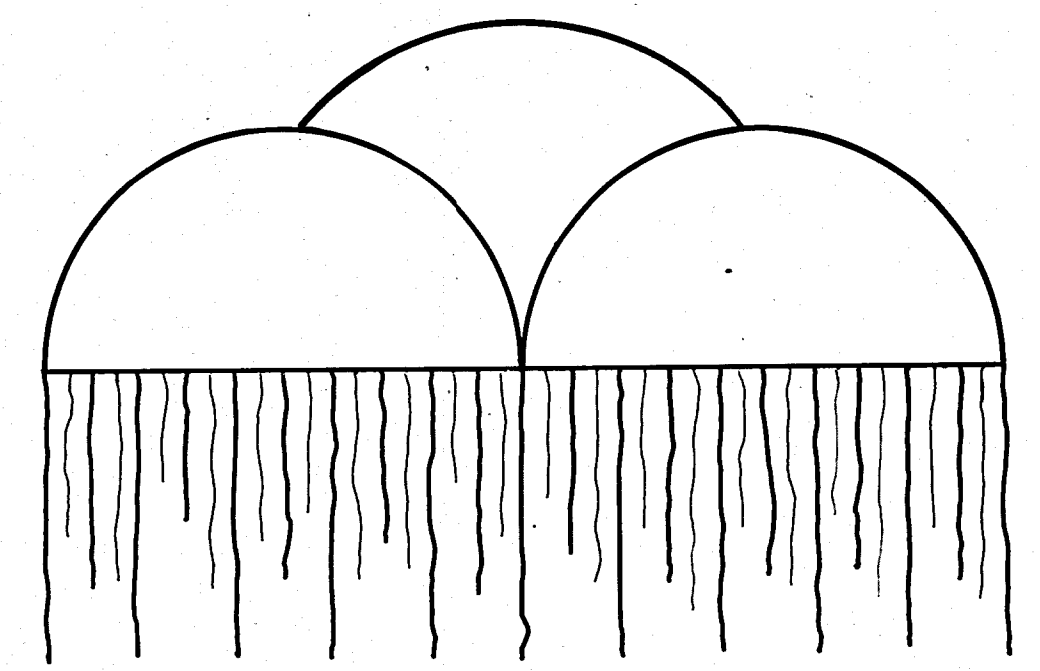


As BUILT

ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY



VICINITY MAP
SCALE 1"=22 MILES



TRAMWAY FLOODWATER RETAINING STRUCTURE

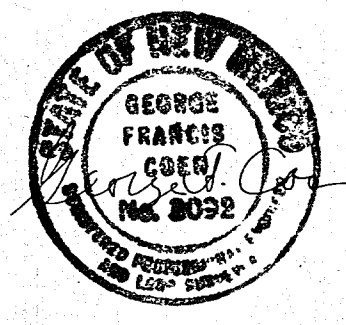
DRAWING INDEX	
SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	DRAINAGE AREA
3	LOCATION MAP
4	HYDROLOGY DESIGN INFORMATION
5	MAXIMUM SECTION
6	PRIMARY SPILLWAY OUTLET PIPE
7	SPILLWAY EROSION CHECK
8	STILLING BASIN & RIP RAP DETAILS
9	INLET STRUCTURE

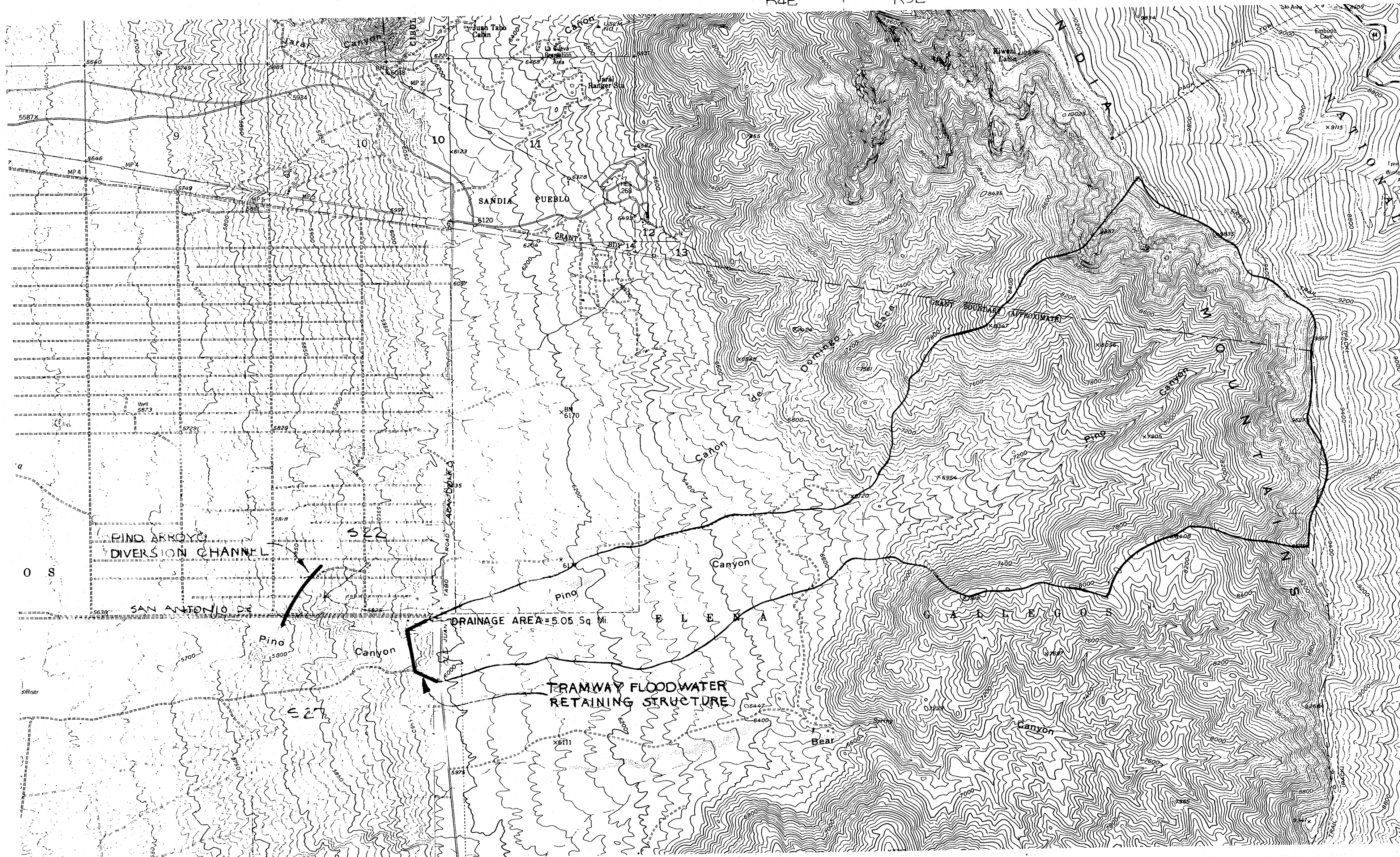
1 2 3 4 5 6 7 8 9 10 11 12
08 002 0080



BOVAY ENGINEERS, INC.

HOUSTON-SPOKANE
BATON ROUGE-AUSTIN
ALBUQUERQUE





MAP
of the
TRAMWAY FLOODWATER RETAINING STRUCTURE

State of New Mexico } ss.
County of Bernalillo }

I, J. Caldwell Wilson, hereby certify that the PROJECT DRAWINGS and the PROJECT MANUAL were prepared under my direction and that I am a duly registered Engineer/Land Surveyor under the laws of the State of New Mexico. Registration No. 516.

J. Caldwell Wilson
Signature

12-22-77
Date

Albuquerque Metropolitan Arroyo Flood Control Authority, Applicant
Located in Bernalillo County, State of New Mexico. All courses true. Scale of Map, 1 in. = 2,000 feet. The undersigned, Albuquerque Metropolitan Arroyo Flood Control Authority, claimant, whose post office address is P.O. Box 2585 Albuquerque, County of Bernalillo, State of New Mexico has caused to be located by a qualified registered engineer the Tramway Floodwater Retaining Structure as hereinafter described and indicated, hereby makes these several statements relative thereto and offers this map and statements for acceptance and filing in compliance with the laws of the State of New Mexico.

The outlet tower of the Detention Dam is situated in the Northeast quarter, Section 27, Township 11 North, Range 4 East, N.M.P.M., at a point whose State Plane Coordinate is x = 424,641.88, y = 1,512,347.90.

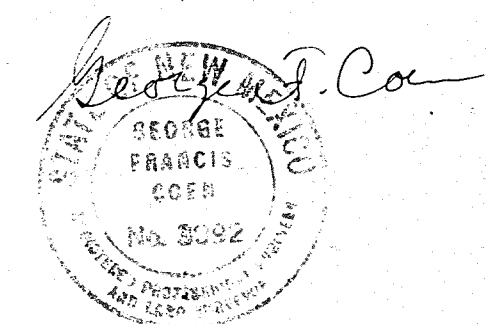
The Tramway Floodwater Retaining Structure has the following properties:

- Maximum height above foundation 58 ft.
- Length 2,100 ft.
- Maximum width at base 266 ft.
- Crest width 15 ft.
- Slope upstream face 2 1/2:1
- Slope downstream face 2:1
- Elevation at crest of dam 5,991
- Elevation at spillway crest 5,980
- Elevation of bottom tower outlet 5,940
- Elevation of flow line of outlet conduit at discharge end 5,926
- Freeboard 0.9 FT.
- Width of spillway 290 ft.
- Discharge capacity of spillway CFS at elev. 5990.5 32,009 cfs
- Outlet conduit type and size 36" Conc. Cylinder Pipe
- Outlet conduit capacity 218 cfs
- Outlet conduit uncontrolled96 hrs.
- Evacuation time - hours 5.05 hrs.
- Drainage areas 5.05 sq.mi.

State of New Mexico } ss.
County of Bernalillo }

I, George Francis Coen, being first duly sworn, upon my oath state that I am the registered professional engineer and land surveyor who made the map(s); that such maps consisting of 3 sheets were prepared from field notes of actual surveys made by me or under my direction and that the same are true and correct to the best of my knowledge and belief.

George F. Coen
Registered Professional Engineer and
Land Surveyor, New Mexico License No. 3092



1 2 3 4 5 6 7 8 9 10 11 12
08 002 0180

State of New Mexico } ss.
County of Bernalillo }

I, James D. Smith, being first duly sworn, upon my oath, state I am the Executive Engineer of the Albuquerque Metropolitan Arroyo Flood Control Authority, a political subdivision duly organized under the laws of the State of New Mexico, that the accompanying maps and statements were made under authority of the Board of Directors of said political subdivision, and that, in their behalf, I have read and examined the statements and representations thereon and state that the same are true to the best of my knowledge and belief.

ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY
Claimant

James D. Smith

Subscribed and sworn to before me this 5 day of

January, 1978.
E. G. Anderson
Notary Public

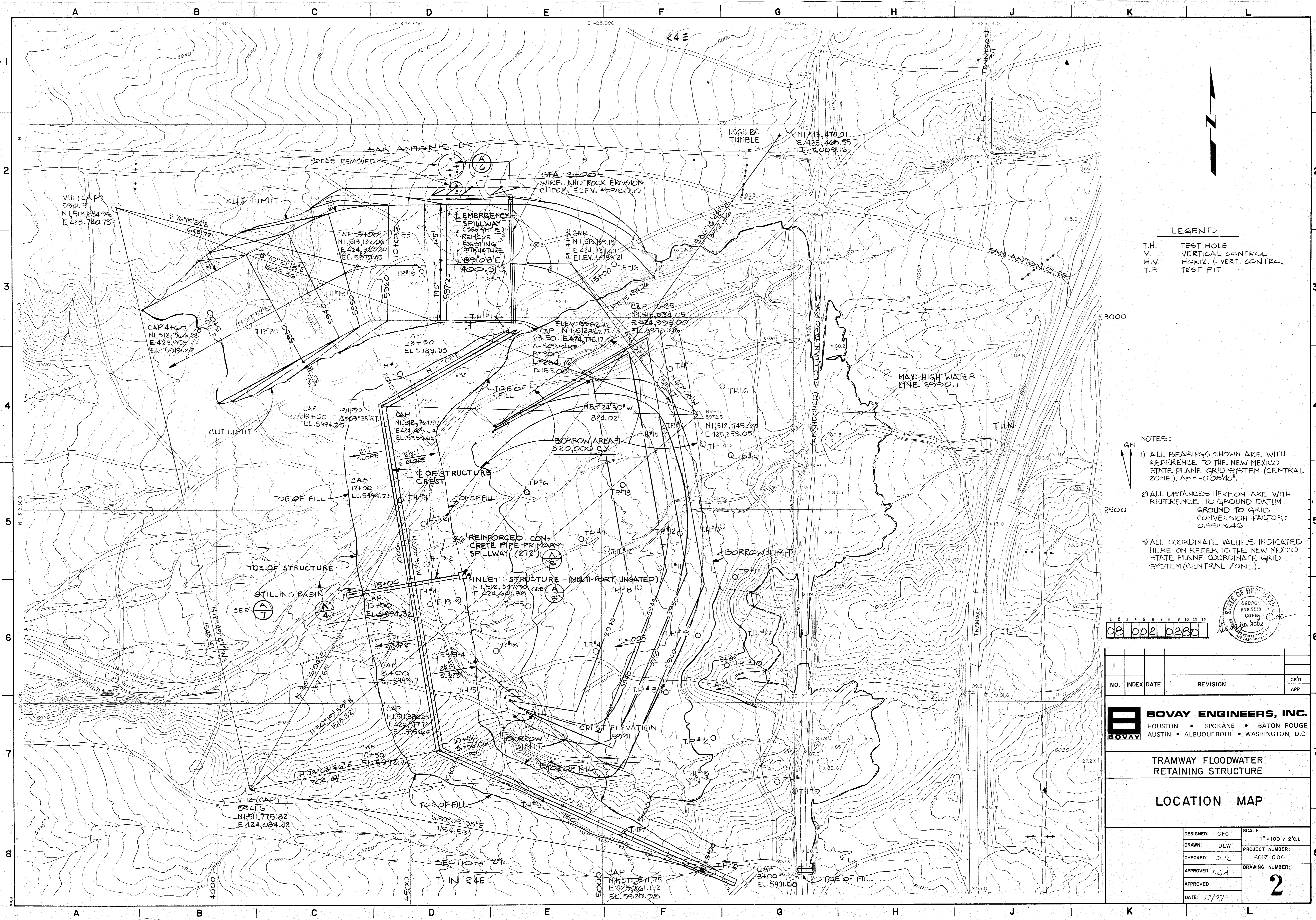
My commission expires My Commission Expires Jan. 12, 1981
(SEAL)

State of New Mexico } ss.
County of Santa Fe }

I hereby certify that the accompanying map(s) and statements have been examined by me and approved as to form and content, and were duly accepted for filing on the 6th day of January, 1978.

S.E. Reynolds
State Engineer
by: *William H. Smith*
Technical Director

1					
NO.	INDEX	DATE	REVISION	CK'D	APP
 BOVAY ENGINEERS, INC. HOUSTON • SPOKANE • BATON ROUGE AUSTIN • ALBUQUERQUE • WASHINGTON, D.C.					
TRAMWAY FLOODWATER RETAINING STRUCTURE					
DRAINAGE AREA					
DESIGNED: GFC				SCALE: 1" = 2000'	
DRAWN: DLW				PROJECT NUMBER: 6017-000	
CHECKED: DJL				DRAWING NUMBER: 1	
APPROVED: EGA					
APPROVED:					
DATE: 12/77					



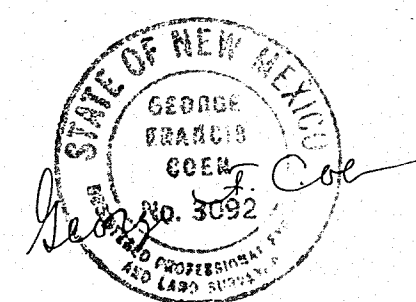
LEGEND

T.H. TEST HOLE
V.C. VERTICAL CONTROL
H.V. HORIZ. & VERT. CONTROL
T.P. TEST PIT

NOTES:

- 1) ALL BEARINGS SHOWN ARE WITH REFERENCE TO THE NEW MEXICO STATE PLANE GRID SYSTEM (CENTRAL ZONE). $\Delta = -0^{\circ}08'40''$.
- 2) ALL DISTANCES HEREON ARE WITH REFERENCE TO GROUND DATUM. GROUND TO GRID CONVERSION FACTOR: 0.999648
- 3) ALL COORDINATE VALUES INDICATED HEREON REFER TO THE NEW MEXICO STATE PLANE COORDINATE GRID SYSTEM (CENTRAL ZONE).

02 002 0260



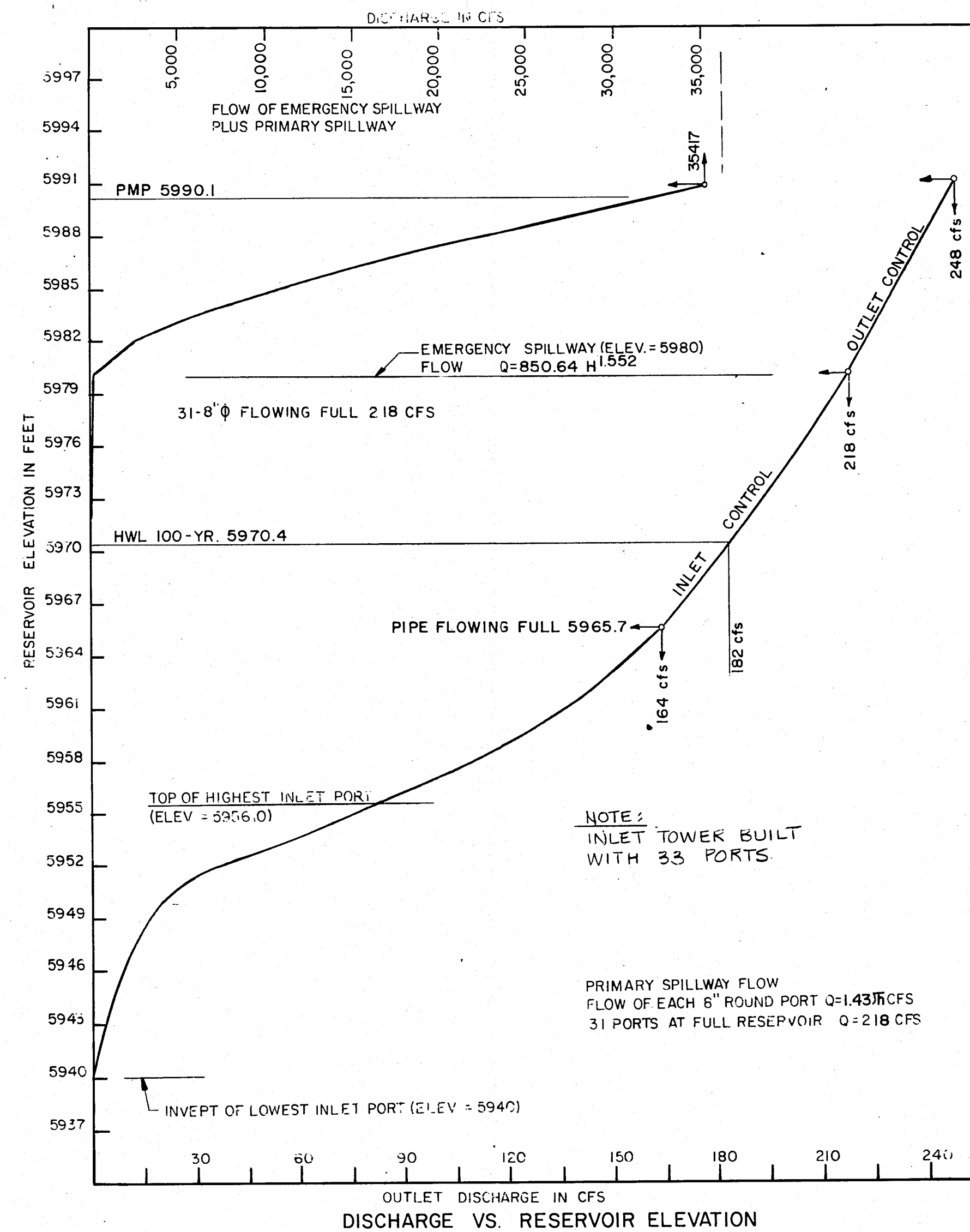
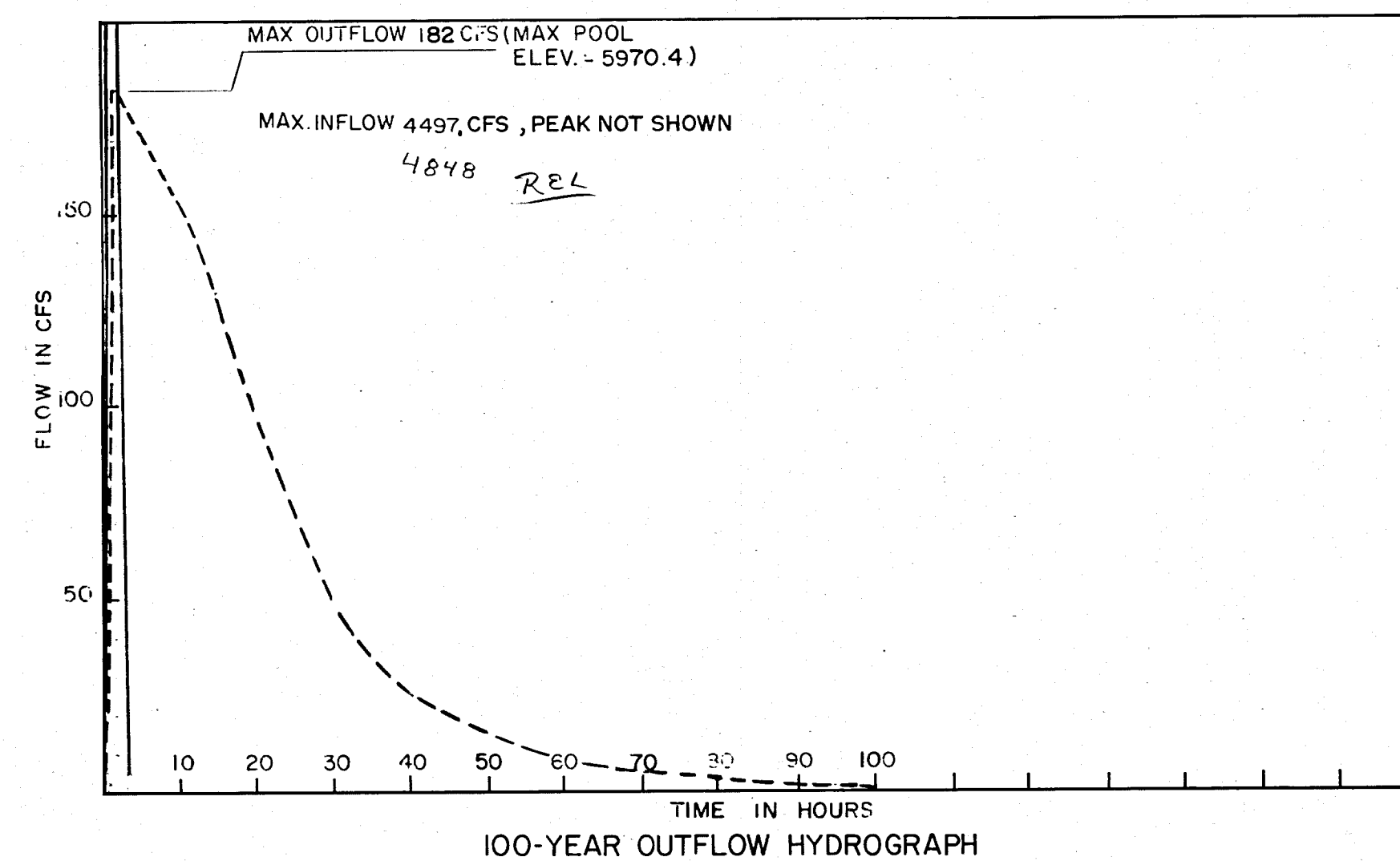
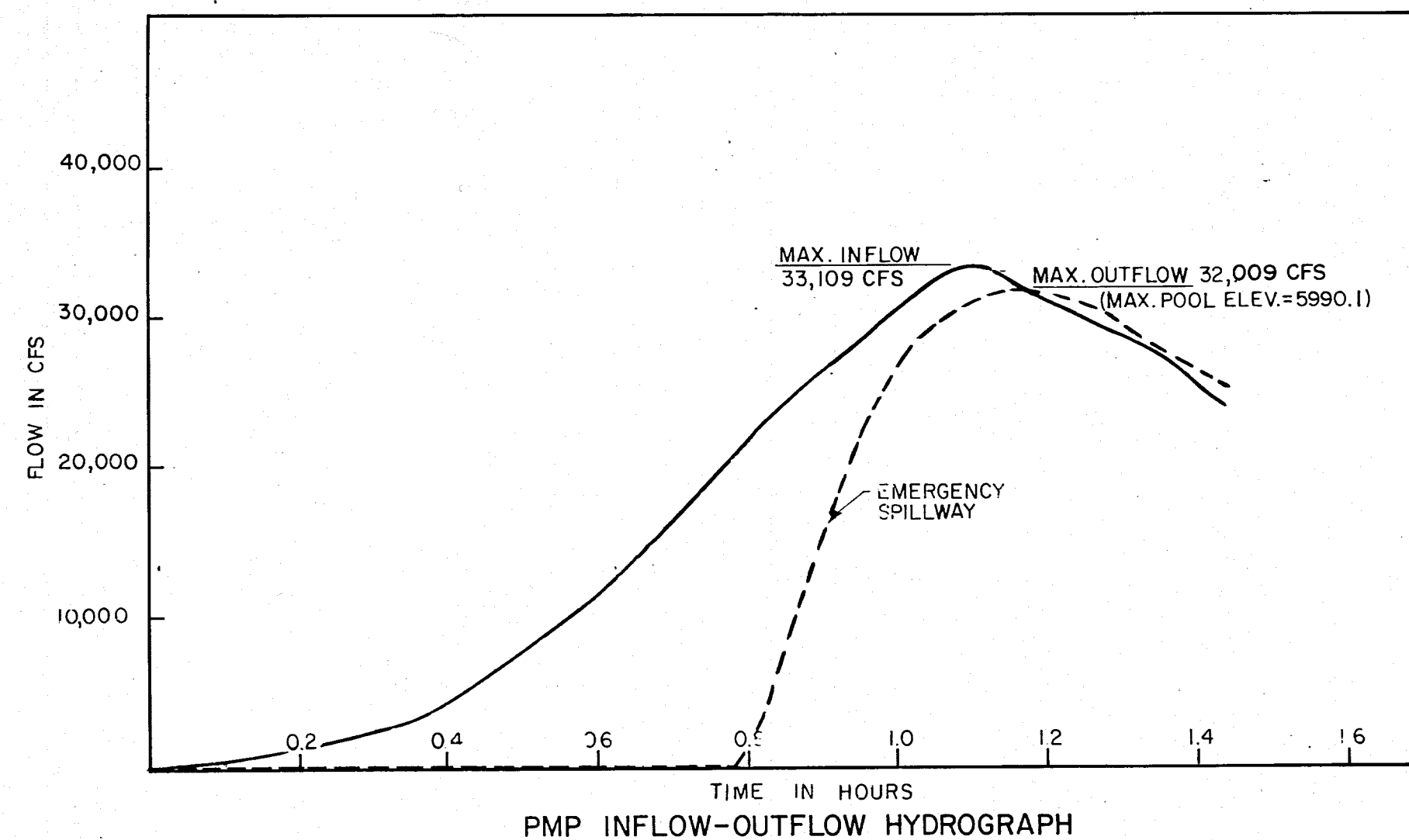
NO.	INDEX	DATE	REVISION	CK'D
				APP

BOVAY ENGINEERS, INC.
HOUSTON • SPOKANE • BATON ROUGE
AUSTIN • ALBUQUERQUE • WASHINGTON, D.C.

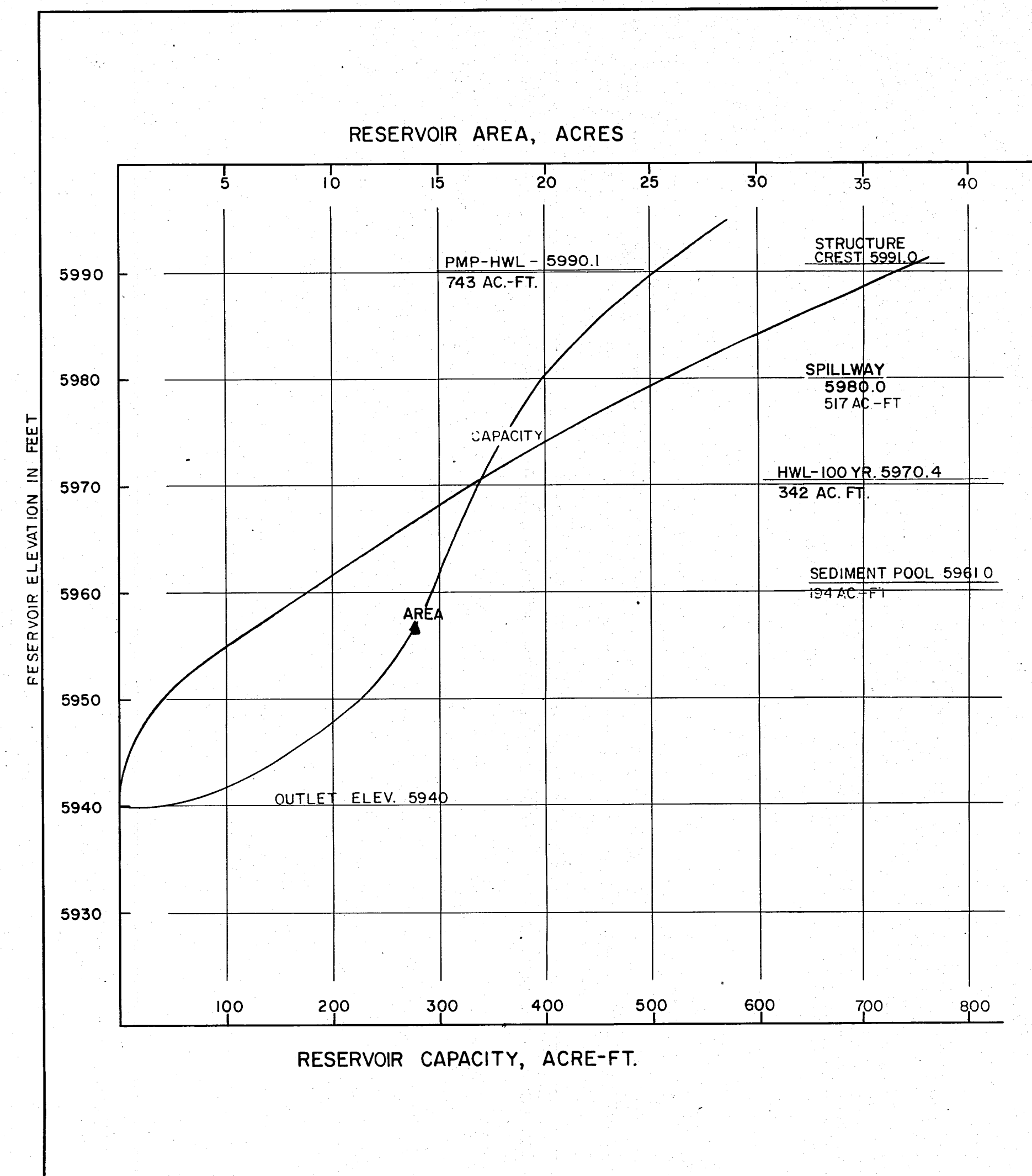
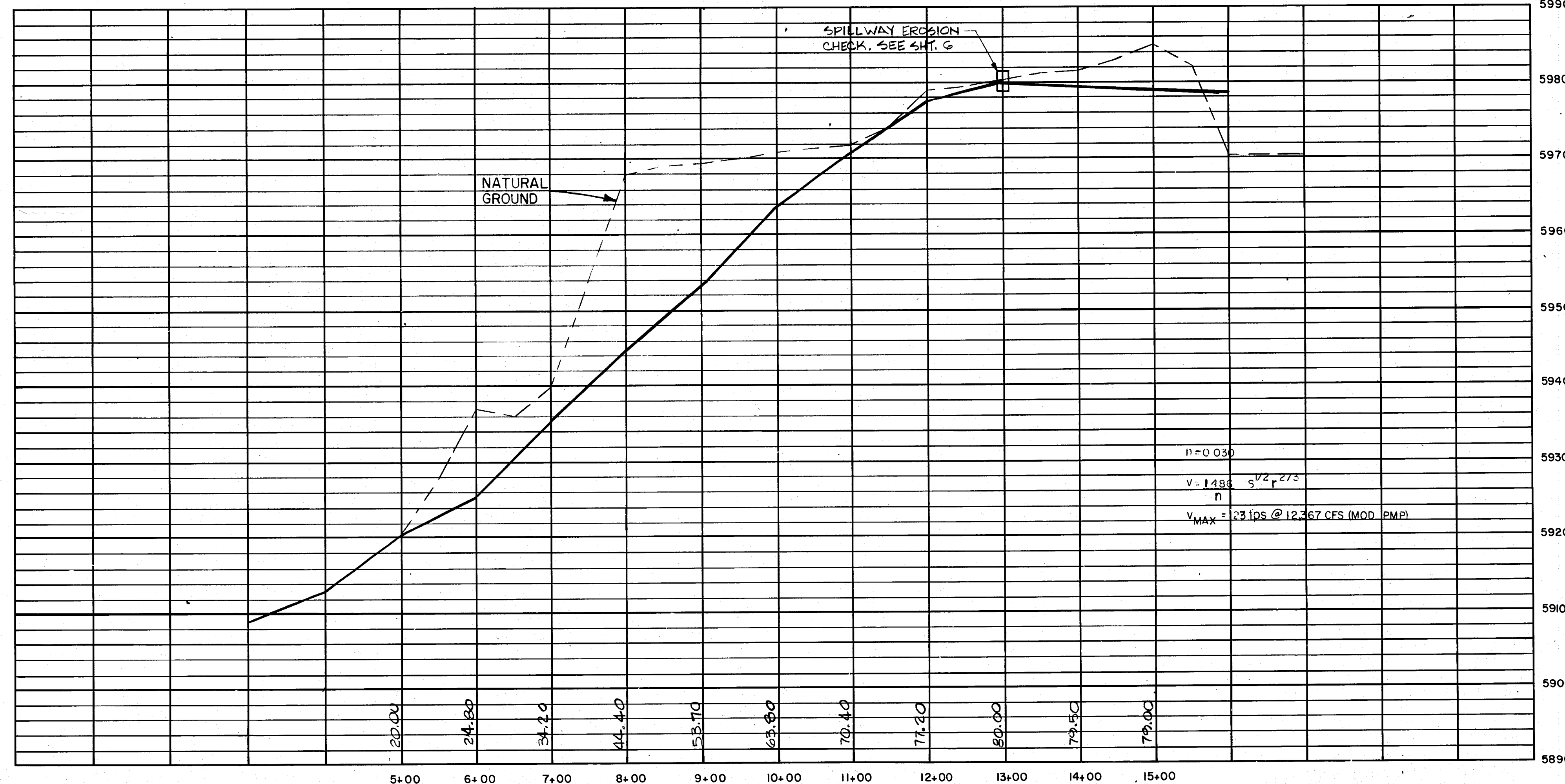
**TRAMWAY FLOODWATER
RETAINING STRUCTURE**

LOCATION MAP

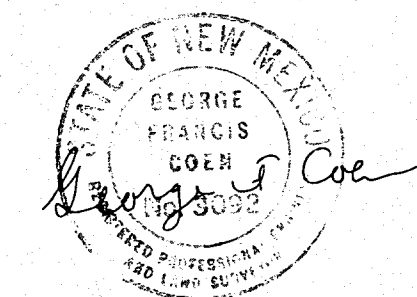
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DRAWN: DLW	PROJECT NUMBER: 6017-000
CHECKED: DJL	DRAWING NUMBER: 2
APPROVED: EGA	
DATE: 12/77	



EMERGENCY SPILLWAY PROFILE



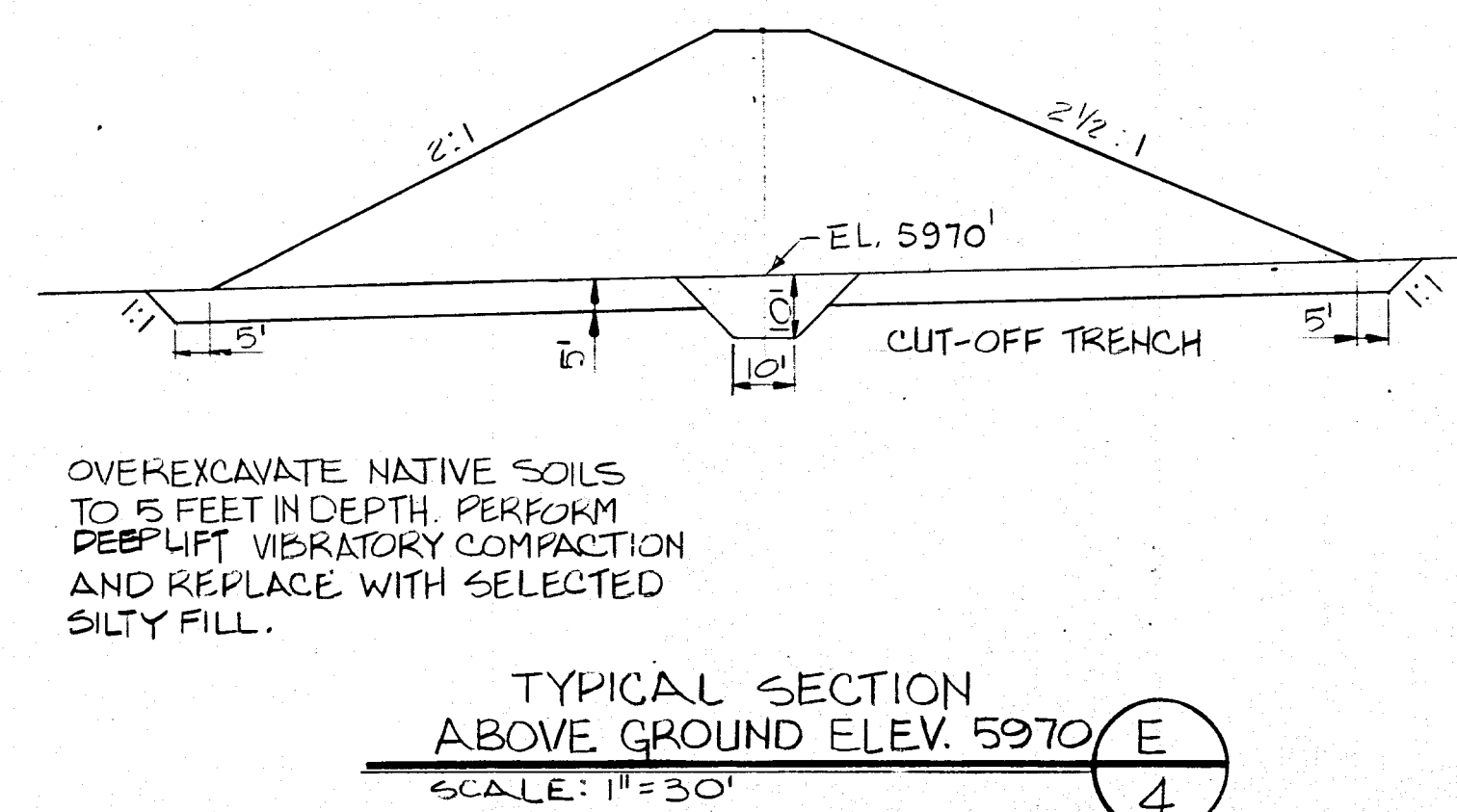
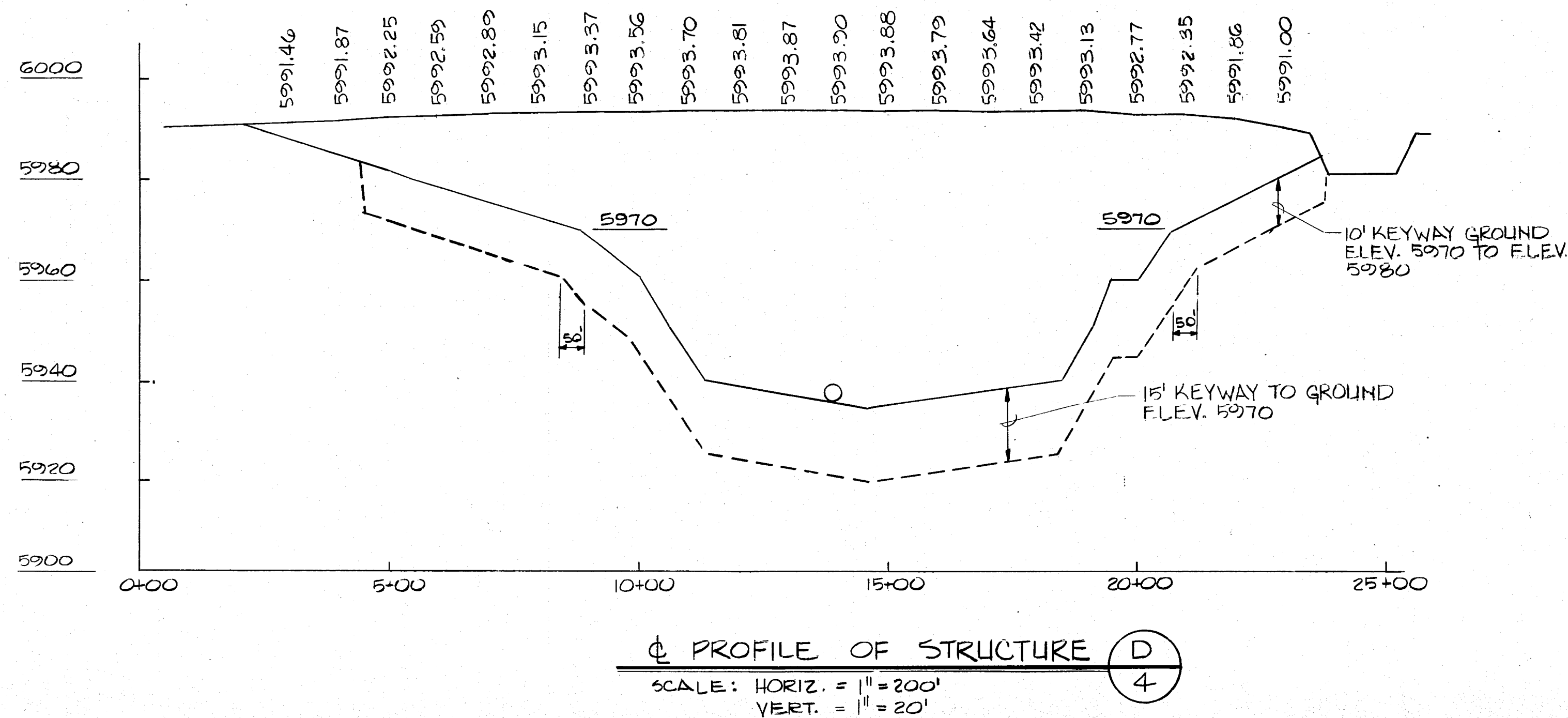
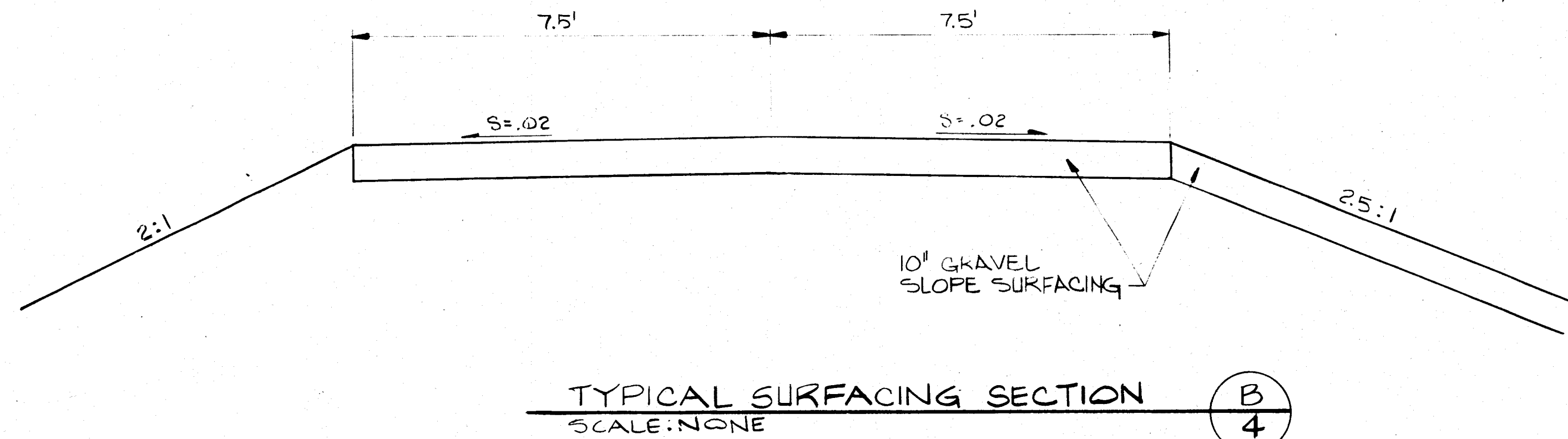
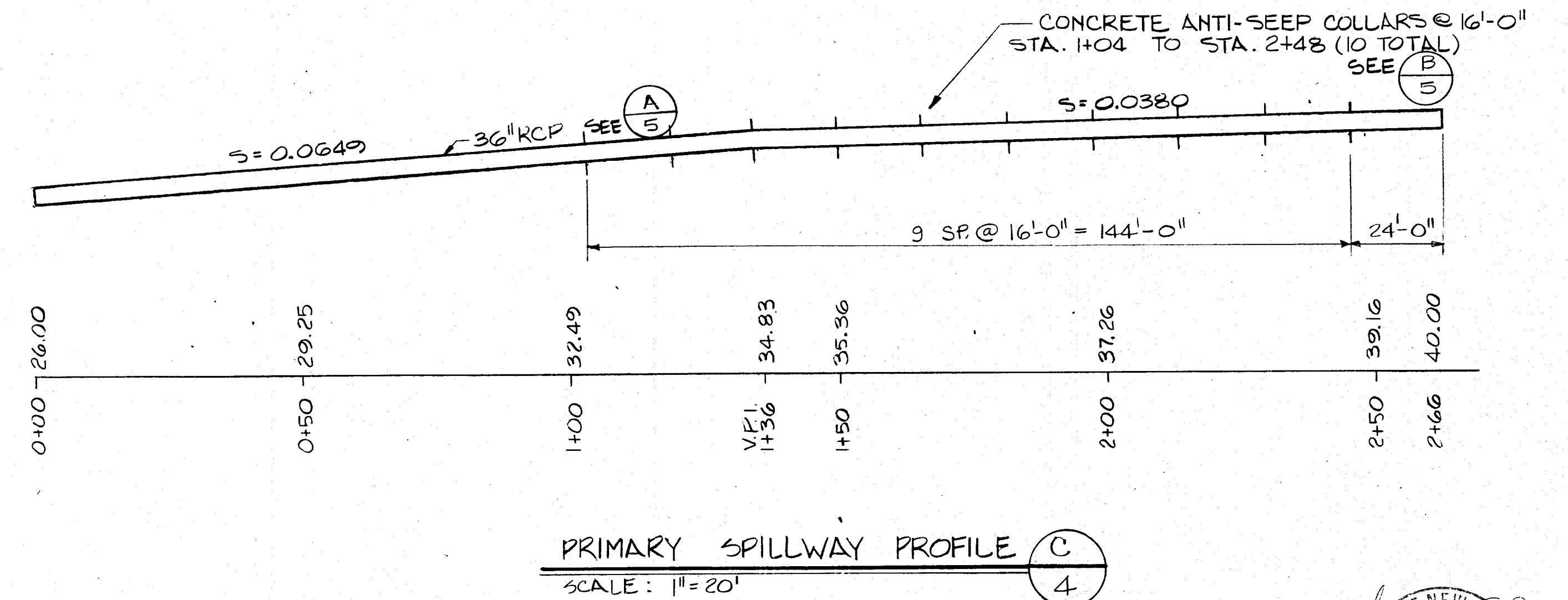
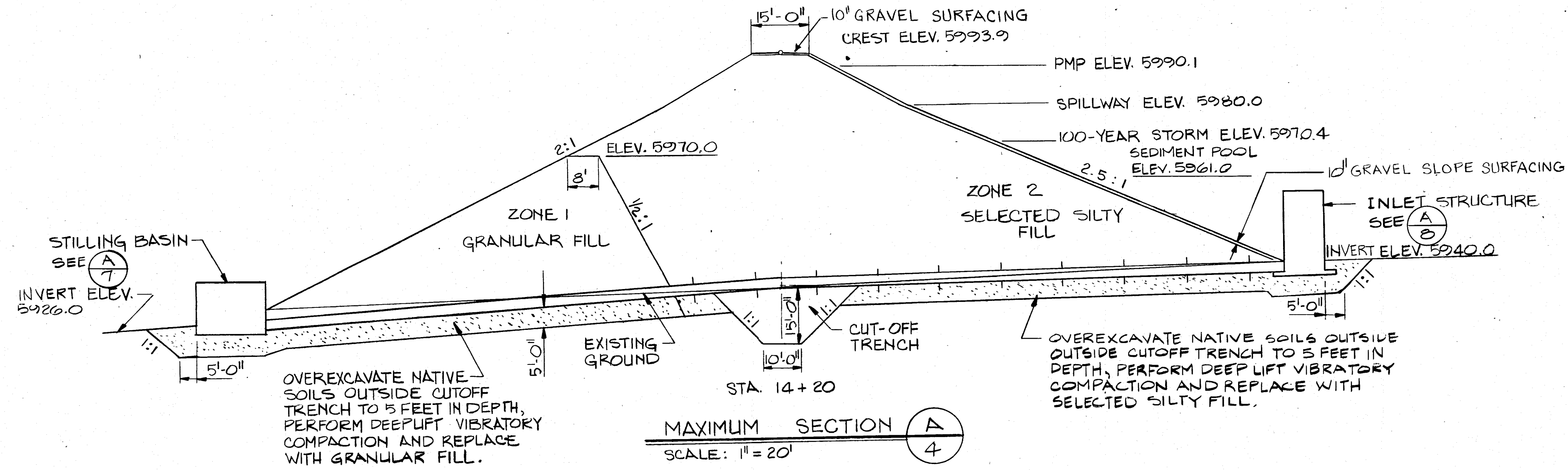
6-HR. PMP EFFECTIVE RAINFALL 17.32 INCHES.
6-HR. PMP PEAK FLOW 15,700 C.F.S.
1-HR. PMP EFFECTIVE RAINFALL 11.7 INCHES
1-HR. PMP PEAK FLOW 33,109 C.F.S
HAZARD CLASS, SCS, SYSTEM, CLASS C



NO.	INDEX	DATE	REVISION	CK'D	APP
BOVAY ENGINEERS, INC. HOUSTON • SPOKANE • BATON ROUGE AUSTIN • ALBUQUERQUE • WASHINGTON, D.C.					
TRAMWAY FLOODWATER RETAINING STRUCTURE					
HYDROLOGY DESIGN INFORMATION					
DESIGNED: GFC DRAWN: DLW CHECKED: P.J.L. APPROVED: EGA DATE: 12/77			SCALE: AS SHOWN PROJECT NUMBER: 6017-000 DRAWING NUMBER: 3		

HYDRAULICS OF OUTLET CONDUIT FOR 100-YEAR STORM

LENGTH =	272 FT.
$n =$	.012
$Q_{max.} =$	182 CFS
$V_{max.} =$	25.7 FPS
HEAD LOSS AT PIPE ENTRANCE =	2.4 FT.
HEAD LOSS AT PIPE EXIT =	9.0 FT.
SLOPE OF ENERGY GRADIENT =	.003
FRICTION HEAD LOSS =	17.2
HEAD LOSS AT PORT ENTRANCE =	2.2 FT.
HEAD LOSS AT PORT EXIT =	4.0 FT.
DROP WITHIN INTAKE STRUCTURE =	9.6 FT.
TOTAL HEAD LOSSES	44.4 FT.



08 002 0480

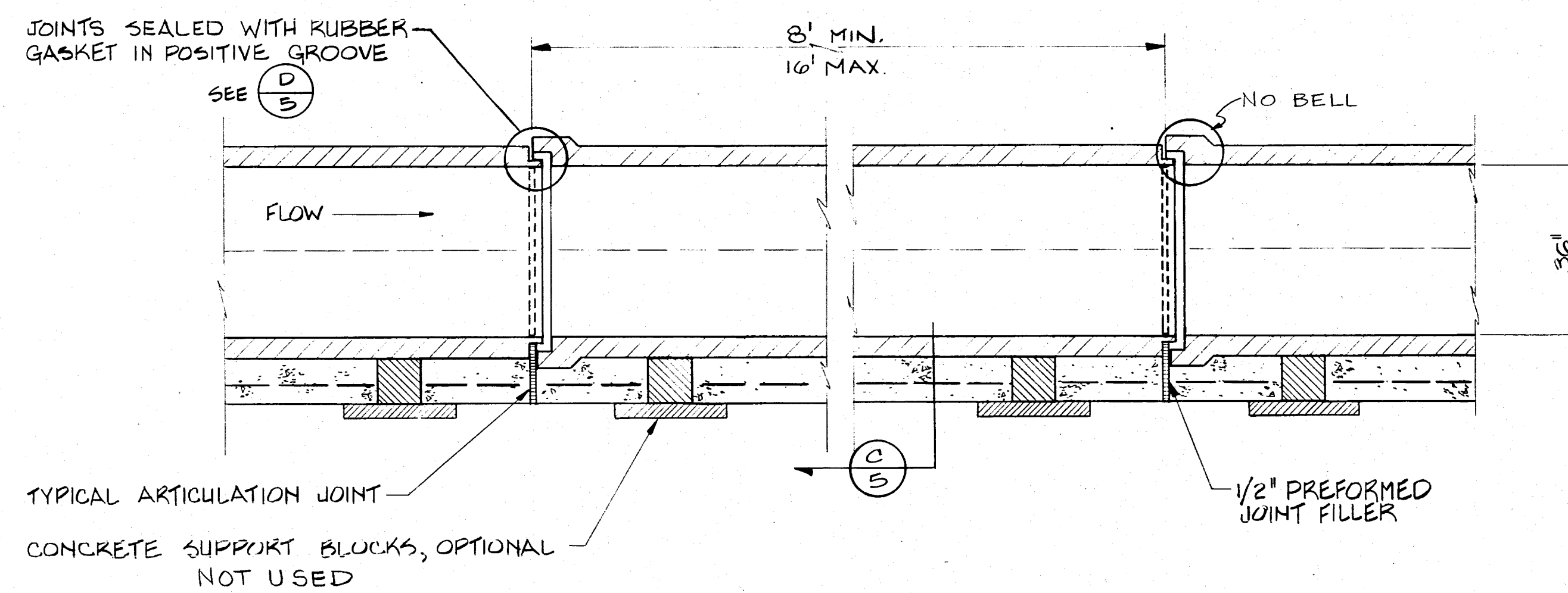
NO.	INDEX	DATE	REVISION	CK'D	APP

BOVAY ENGINEERS, INC.
 HOUSTON • SPOKANE • BATON ROUGE
 AUSTIN • ALBUQUERQUE • WASHINGTON, D.C.

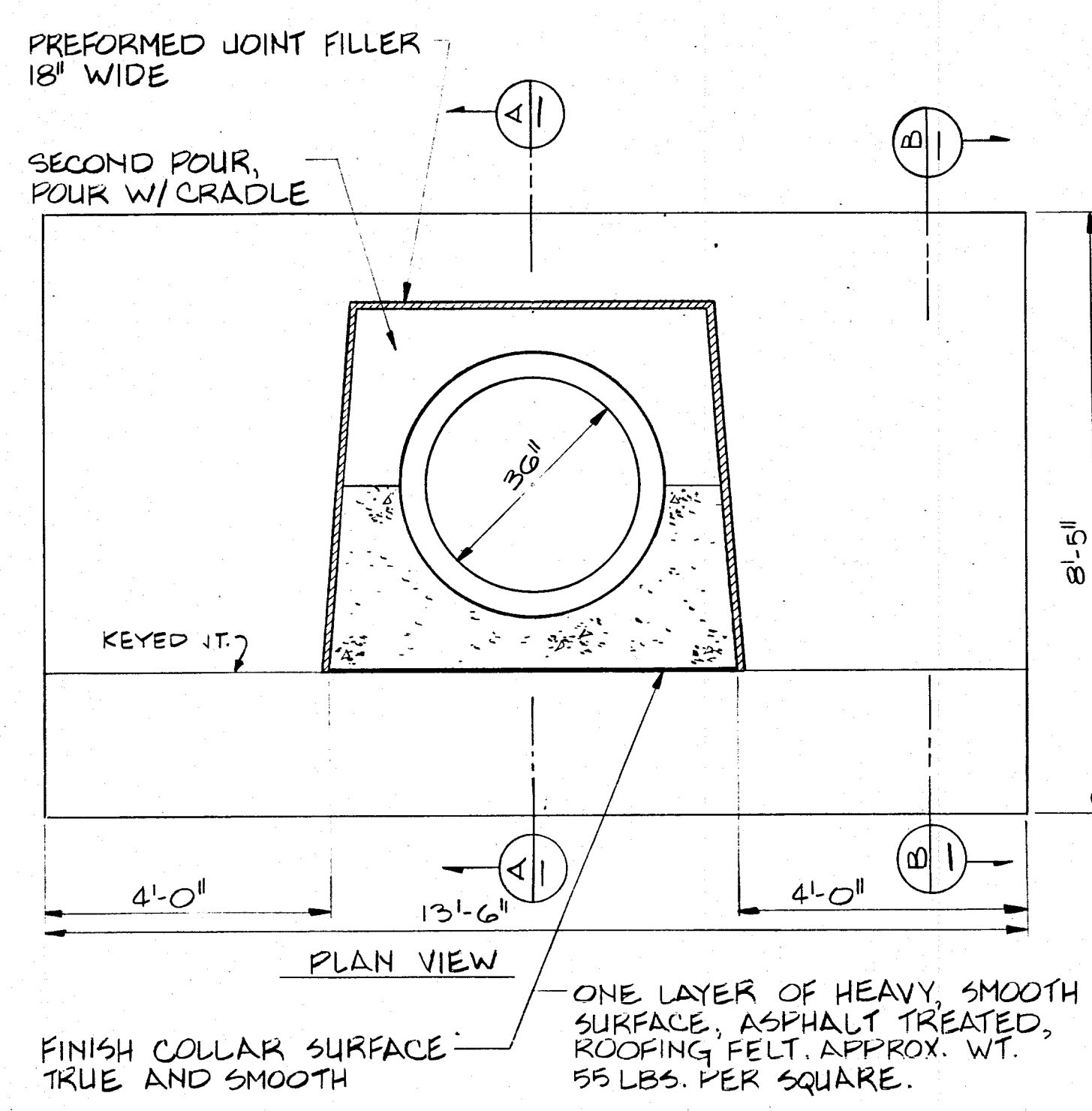
**TRAMWAY FLOODWATER
RETAINING STRUCTURE**

MAXIMUM SECTION

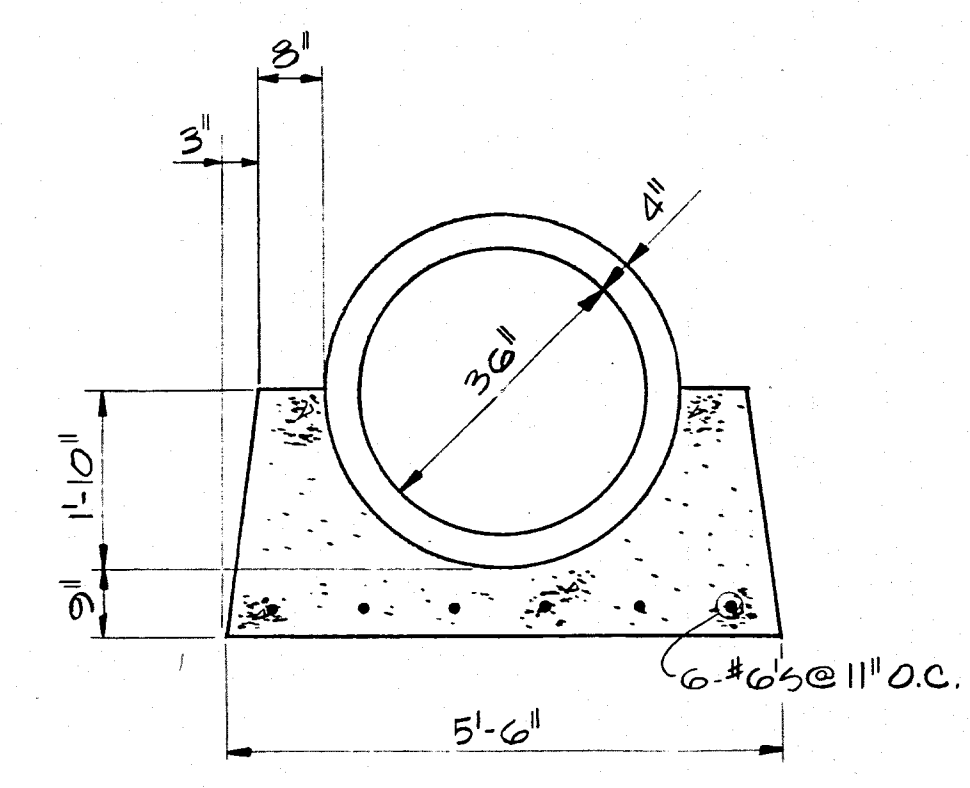
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CHECKED: DJL	DRAWING NUMBER: 4
APPROVED: EGA	
APPROVED:	
DATE: 12/77	



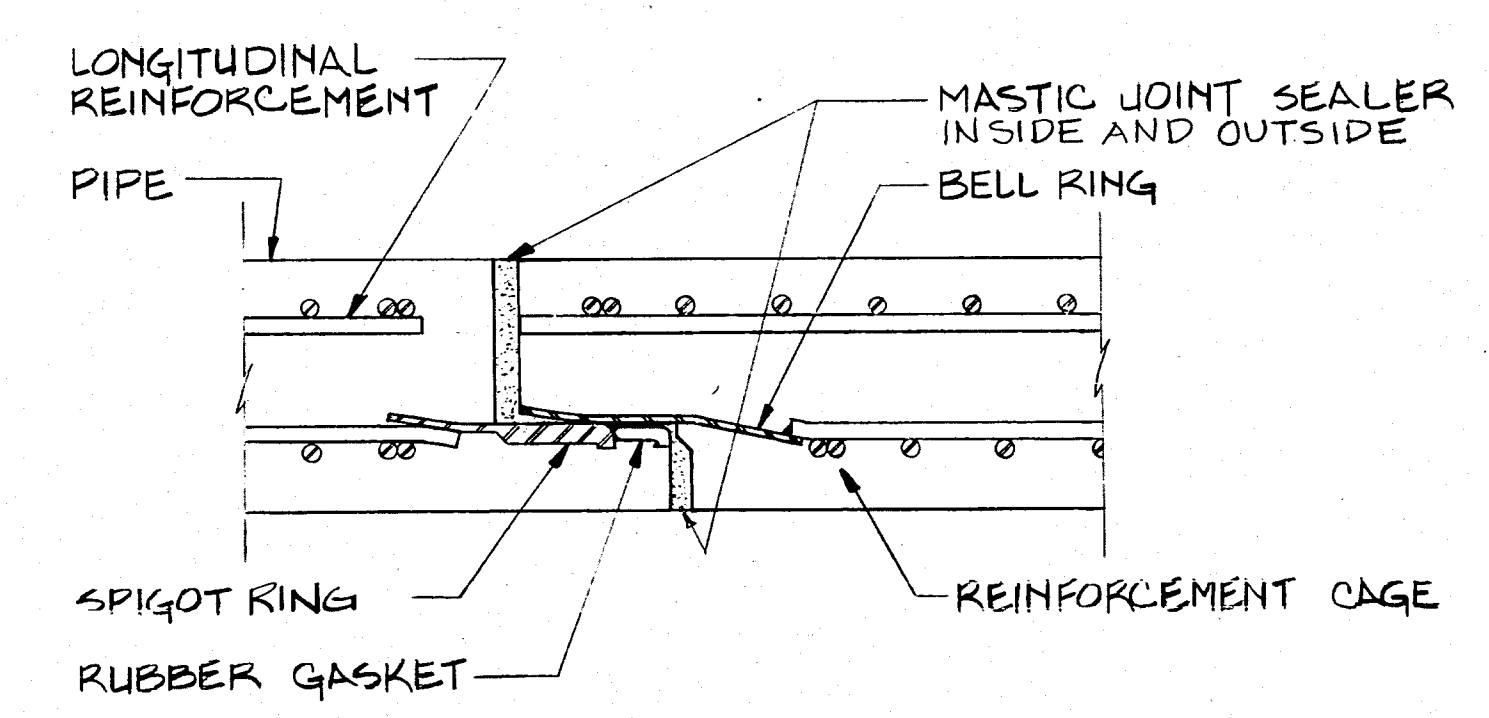
DETAIL OF PRIMARY SPILLWAY PIPE CONDUIT (A/5)
SCALE: 1/2" = 1'-0"



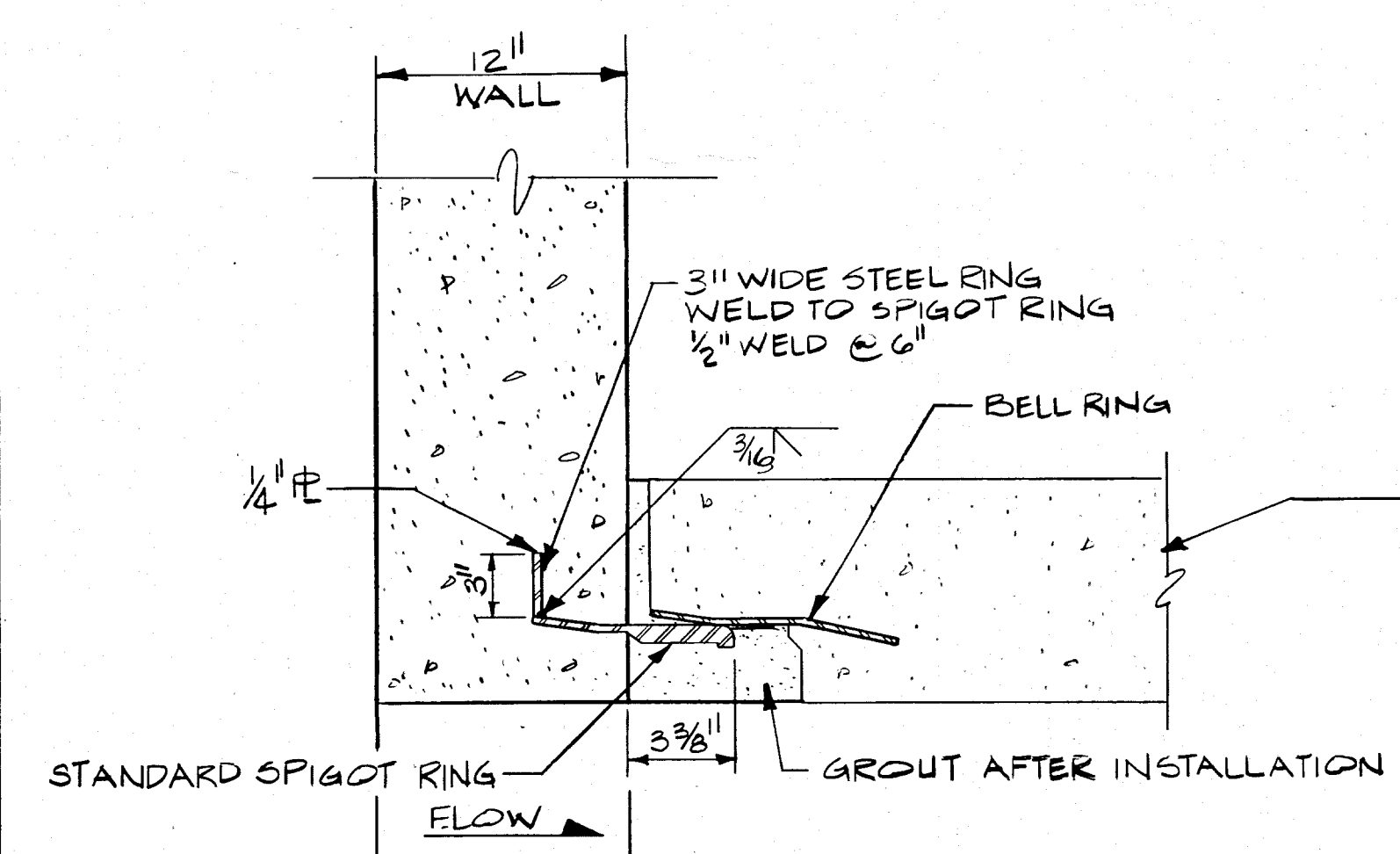
DETAIL OF ANTI-SEEP COLLAR (B/5)
SCALE: 1/2" = 1'-0"



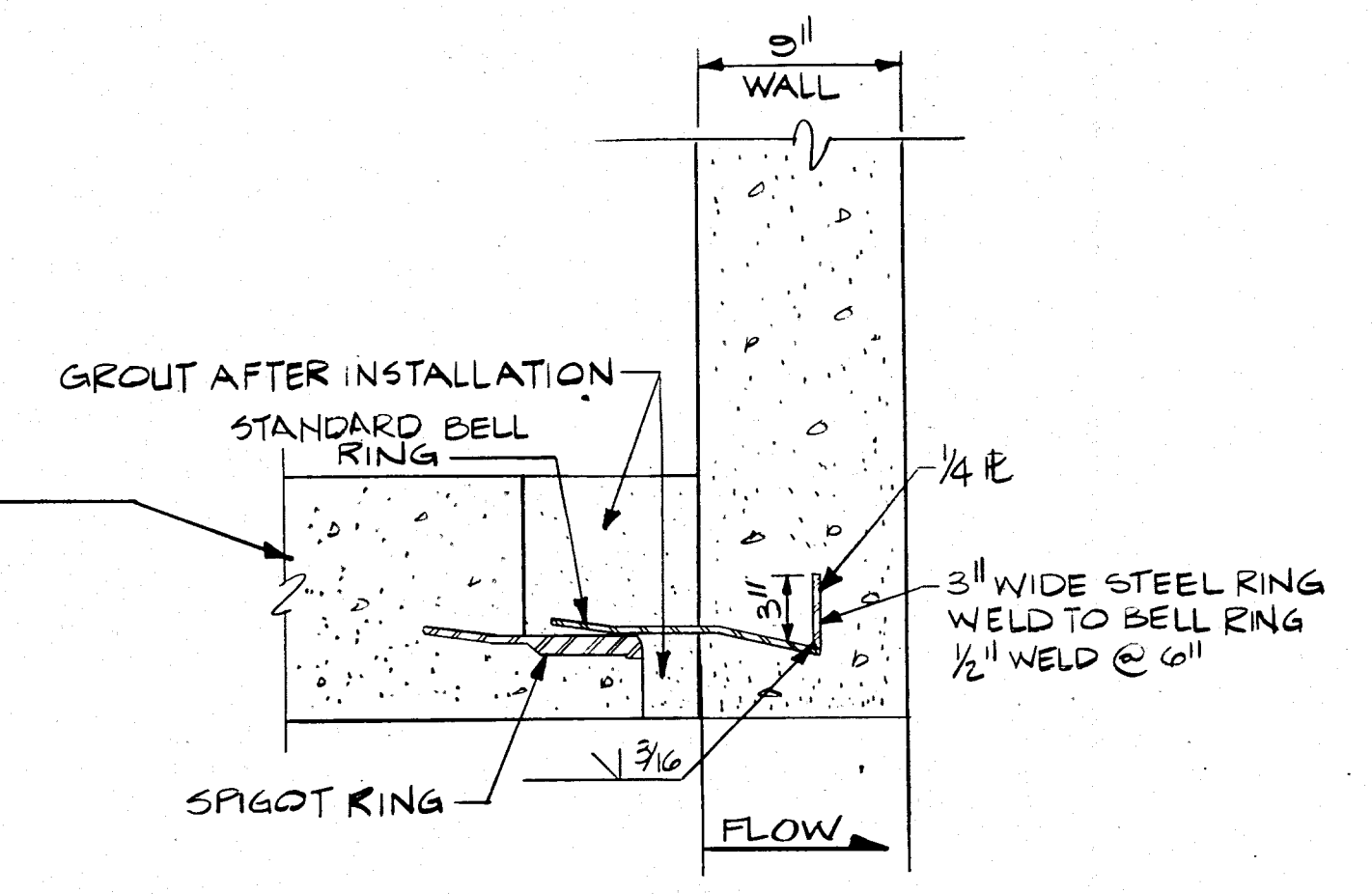
CONCRETE CRADLE (C/5)
SCALE: 1/2" = 1'-0"



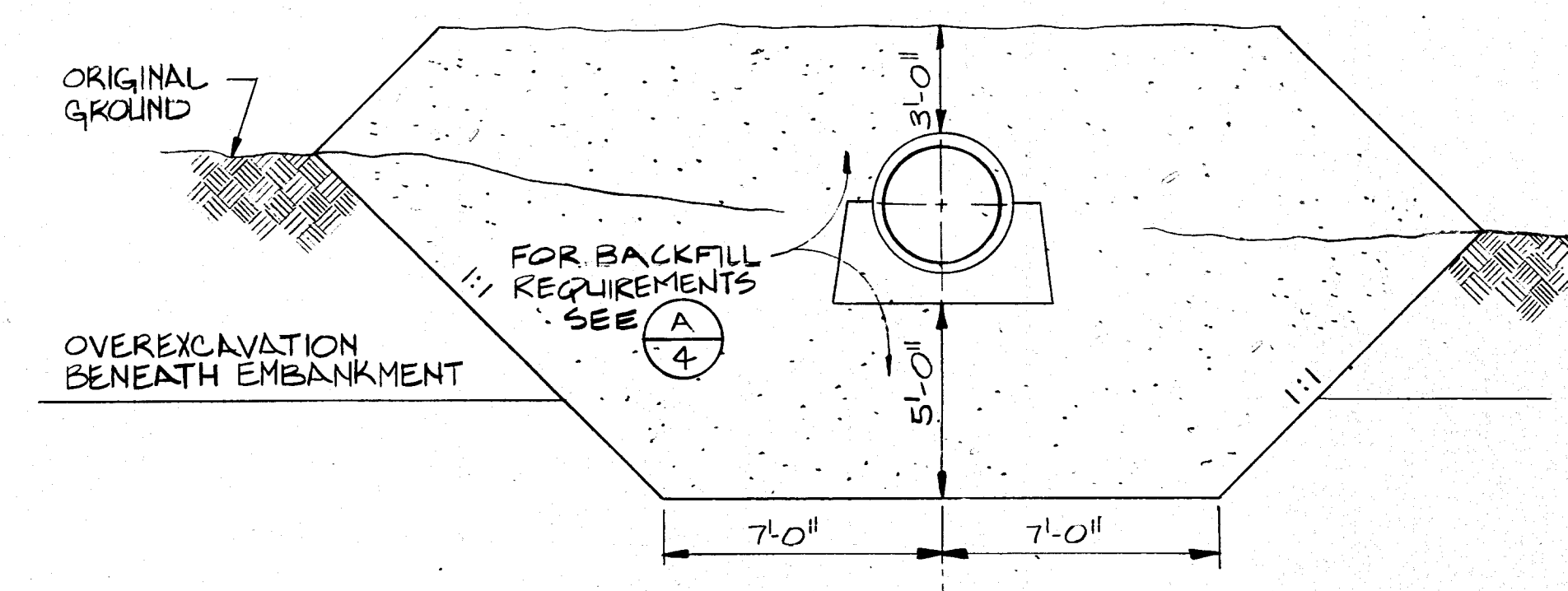
CONDUIT JOINT DETAIL (D/5)
SCALE: NONE



CONNECTION TO INLET TOWER (E/5)
SCALE: NONE

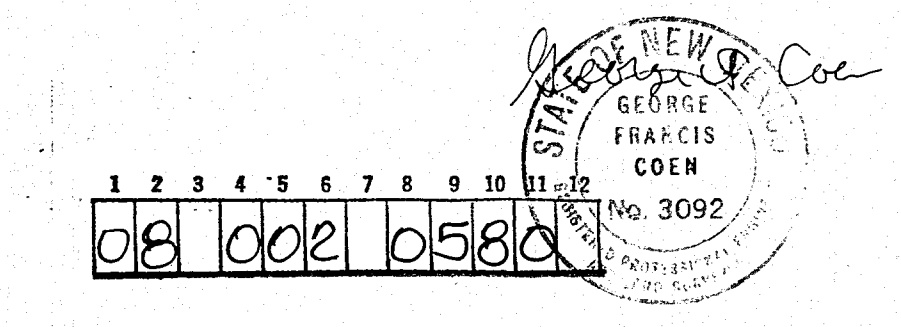


CONNECTION TO STILLING BASIN (F/5)
SCALE: NONE



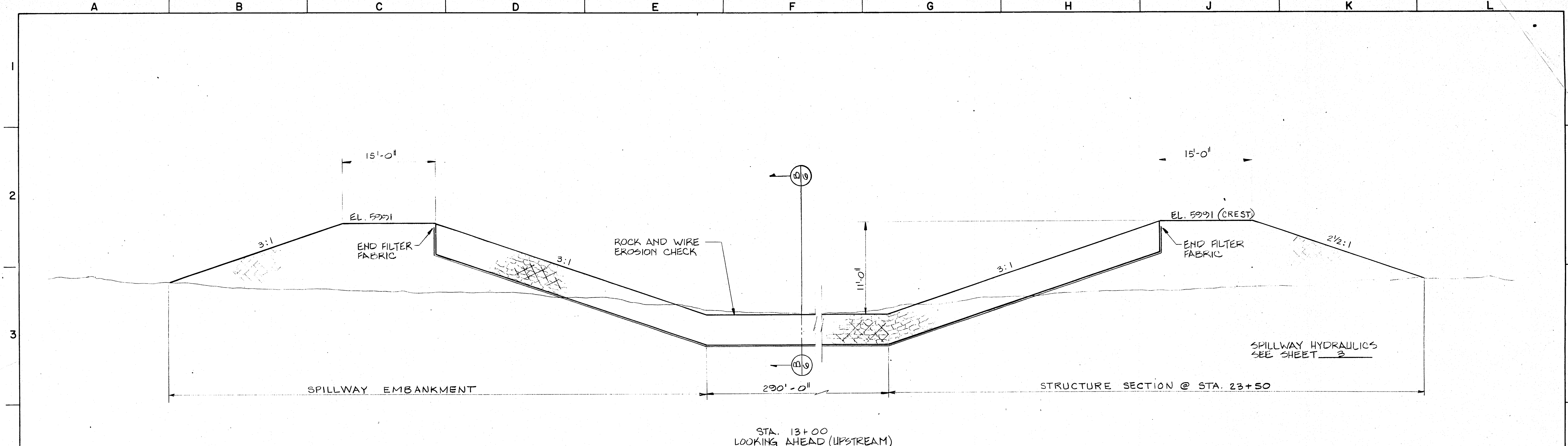
TYPICAL OVEREXCAVATION BENEATH CONDUIT AND CRADLE (G/5)
SCALE: 1/4" = 1'-0"

NOTE:
1. PIPE CONDUIT SHALL BE CLASS V WALL B, AASHTO M-170.

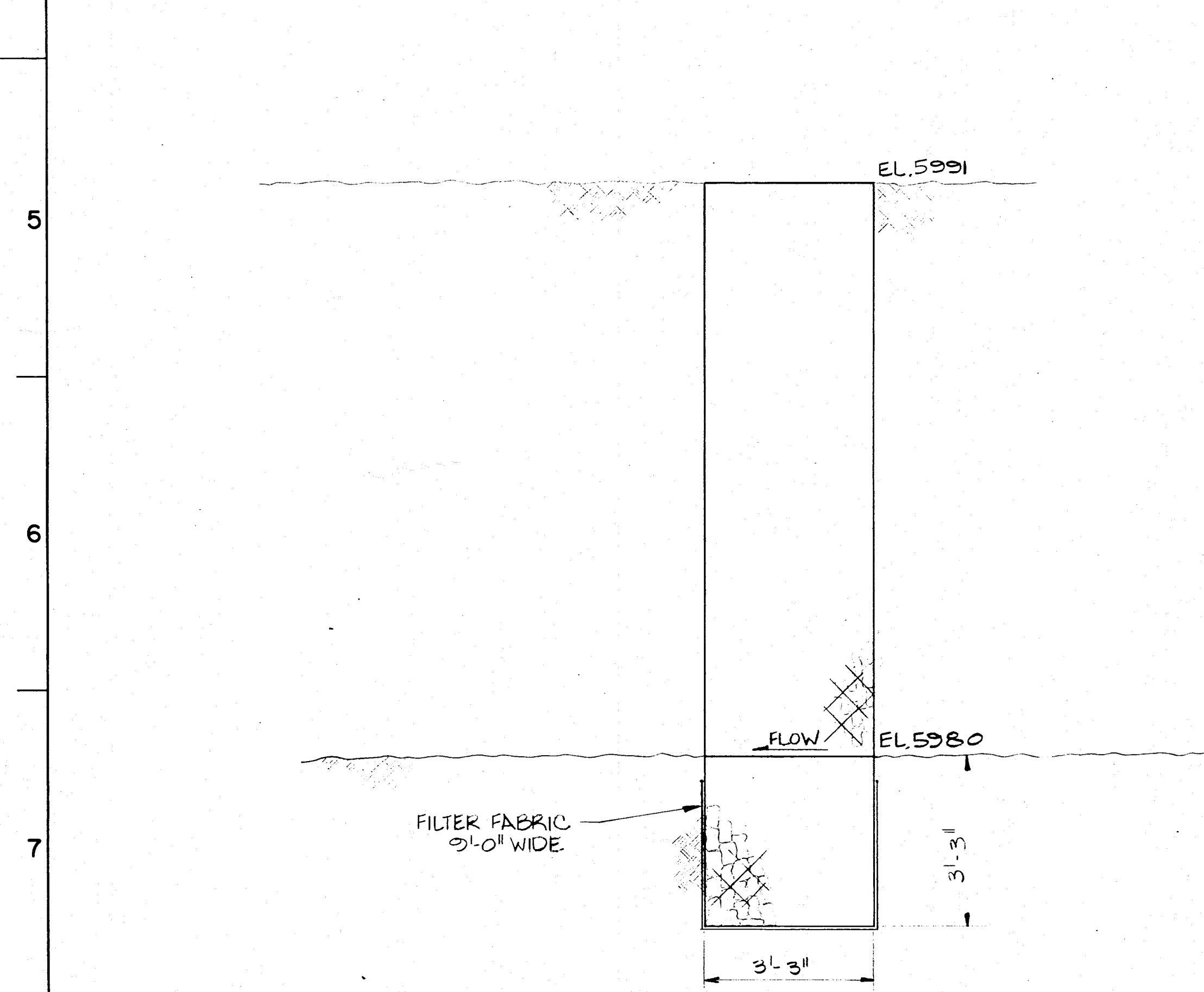


NO.	INDEX	DATE	REVISION	CK'D	APP
1					
2					
3					
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6					
7					
8					

BOVAY ENGINEERS, INC. HOUSTON • SPOKANE • BATON ROUGE AUSTIN • ALBUQUERQUE • WASHINGTON, D.C.	
TRAMWAY FLOODWATER RETAINING STRUCTURE	
PRIMARY SPILLWAY OUTLET PIPE	
DESIGNED: GFC	SCALE: AS SHOWN
DRAWN: PSM	PROJECT NUMBER: 6017-000
CHECKED: DJL	DRAWING NUMBER: 5
APPROVED: EGA	
APPROVED:	
DATE: 12/77	



SPILLWAY CONTROL ROCK AND WIRE EROSION CHECK
 SCALE: NTS



SPILLWAY EMBANKMENT SECTION AT POWER POLES
 STA 11+60 (APPROX.)
 SCALE: 1" = 5'-0"

ROCK AND WIRE EROSION CHECK
 SCALE: 1/2" = 1'-0"

08 1002 0480

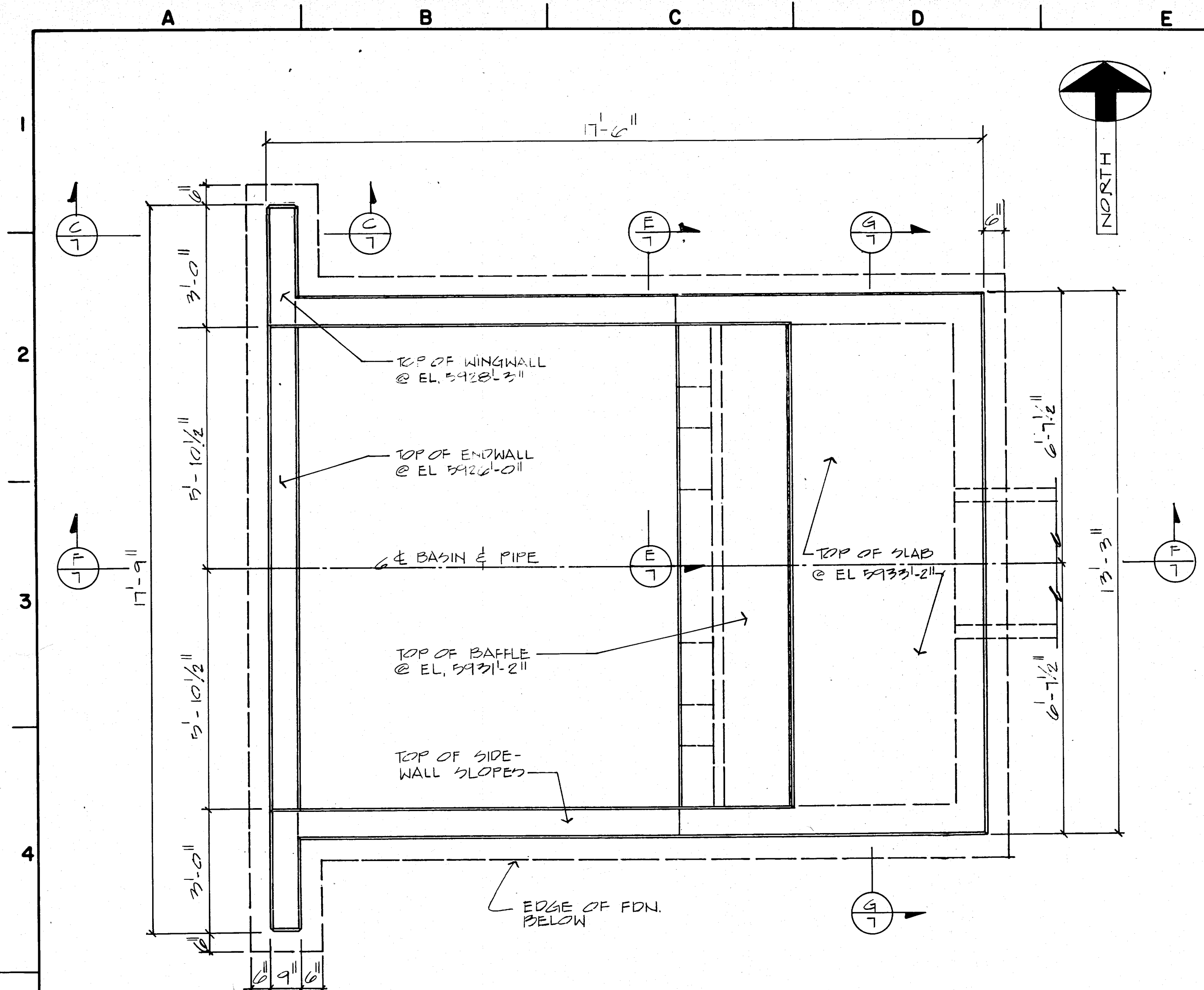
NO.	INDEX	DATE	REVISION	CK'D	APP

BOVAY ENGINEERS, INC.
 HOUSTON • SPOKANE • BATON ROUGE
 AUSTIN • ALBUQUERQUE • WASHINGTON, D.C.

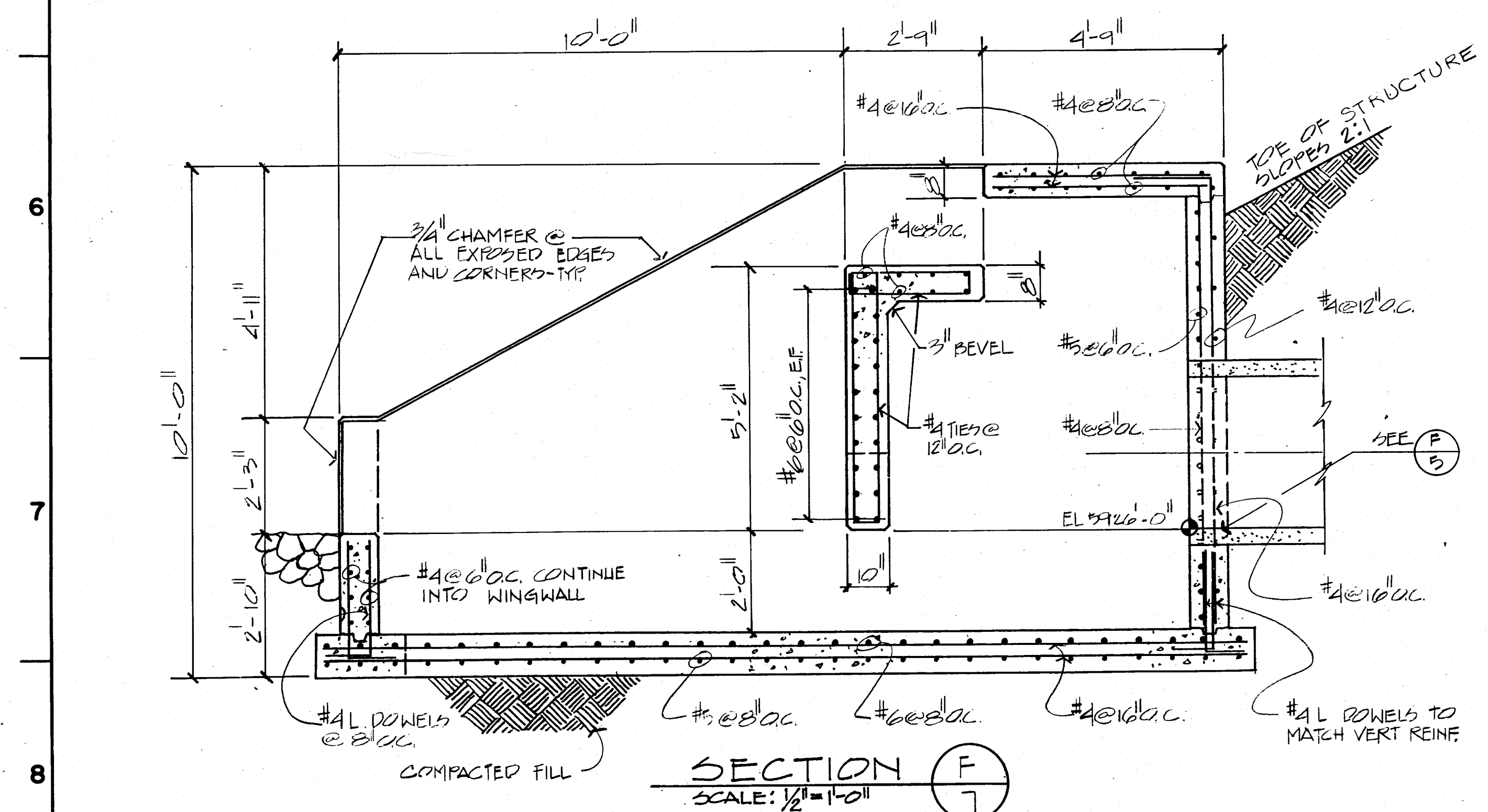
**TRAMWAY FLOODWATER
 RETAINING STRUCTURE**

SPILLWAY EROSION CHECK

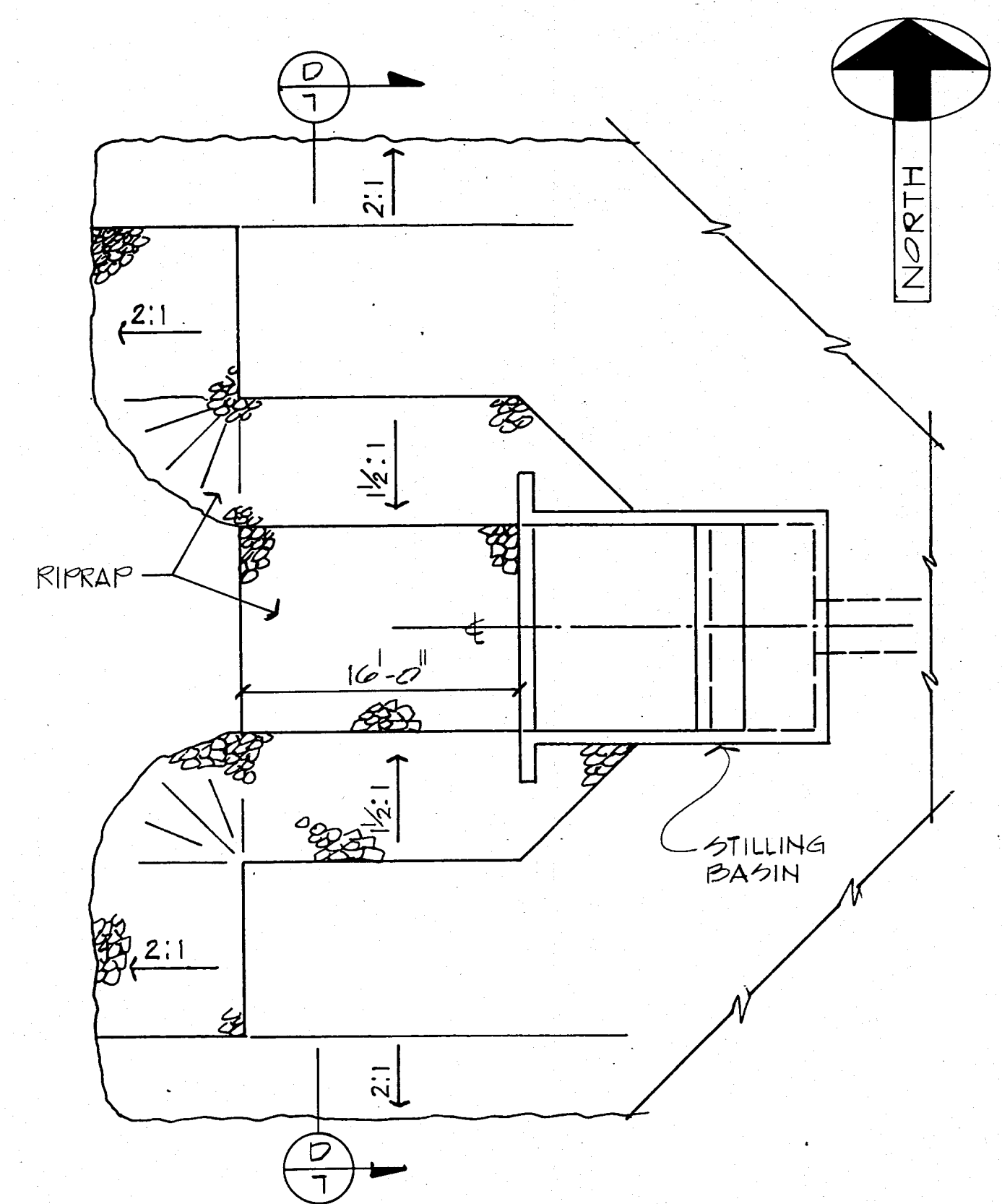
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CHECKED: DJL	DRAWING NUMBER: 6
APPROVED: EGA	
DATE: 12/77	



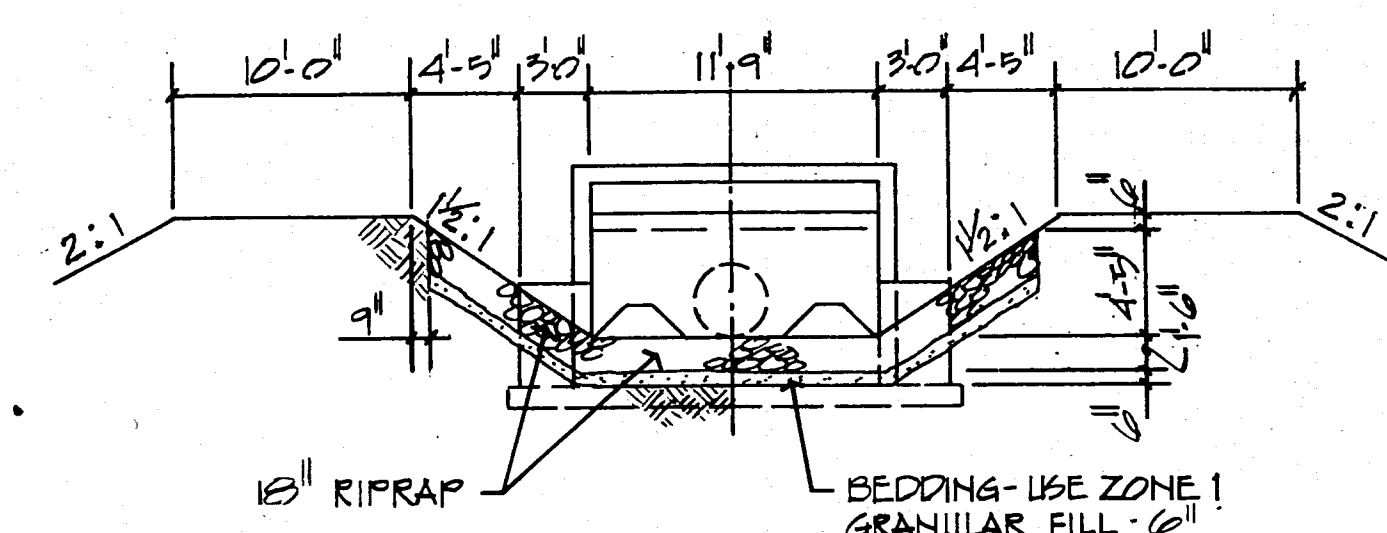
PLAN
SCALE: 1/2" = 1'-0"



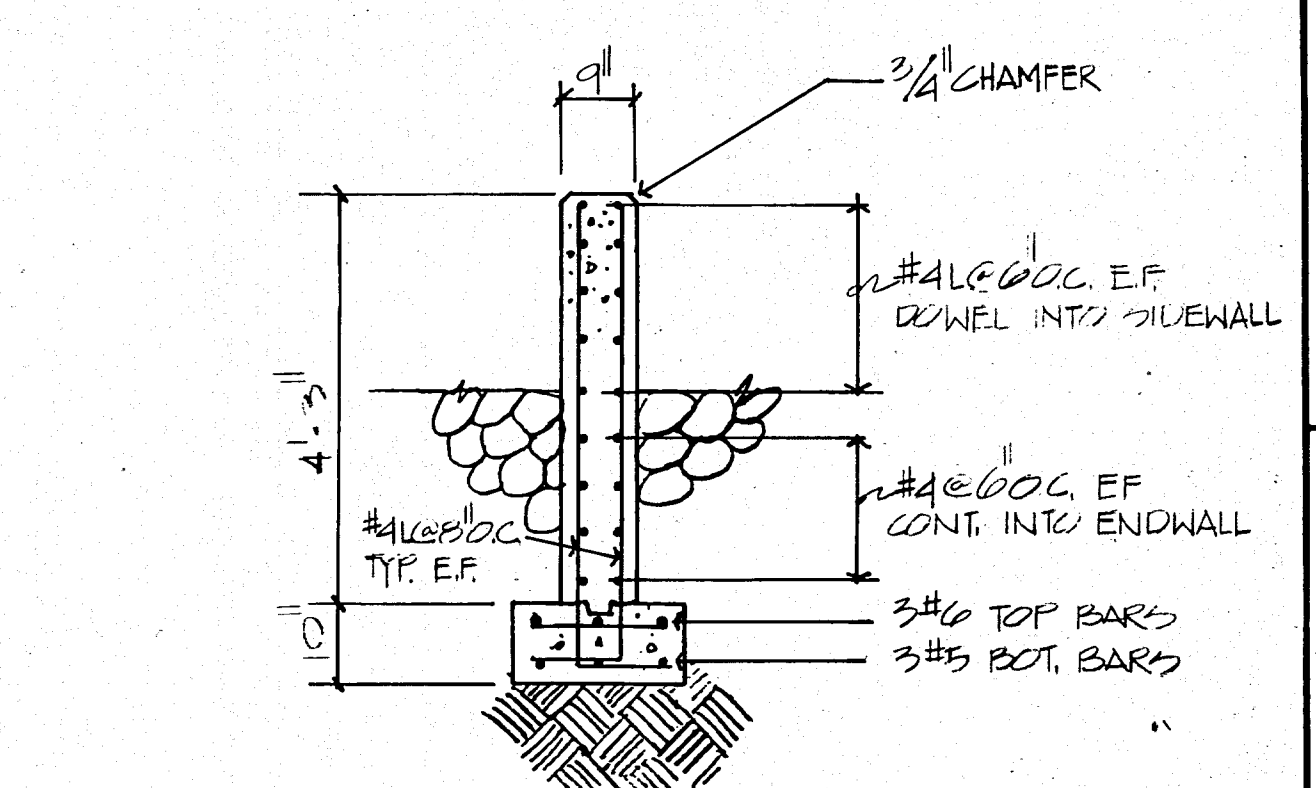
SECTION F
SCALE: 1/2" = 1'-0"



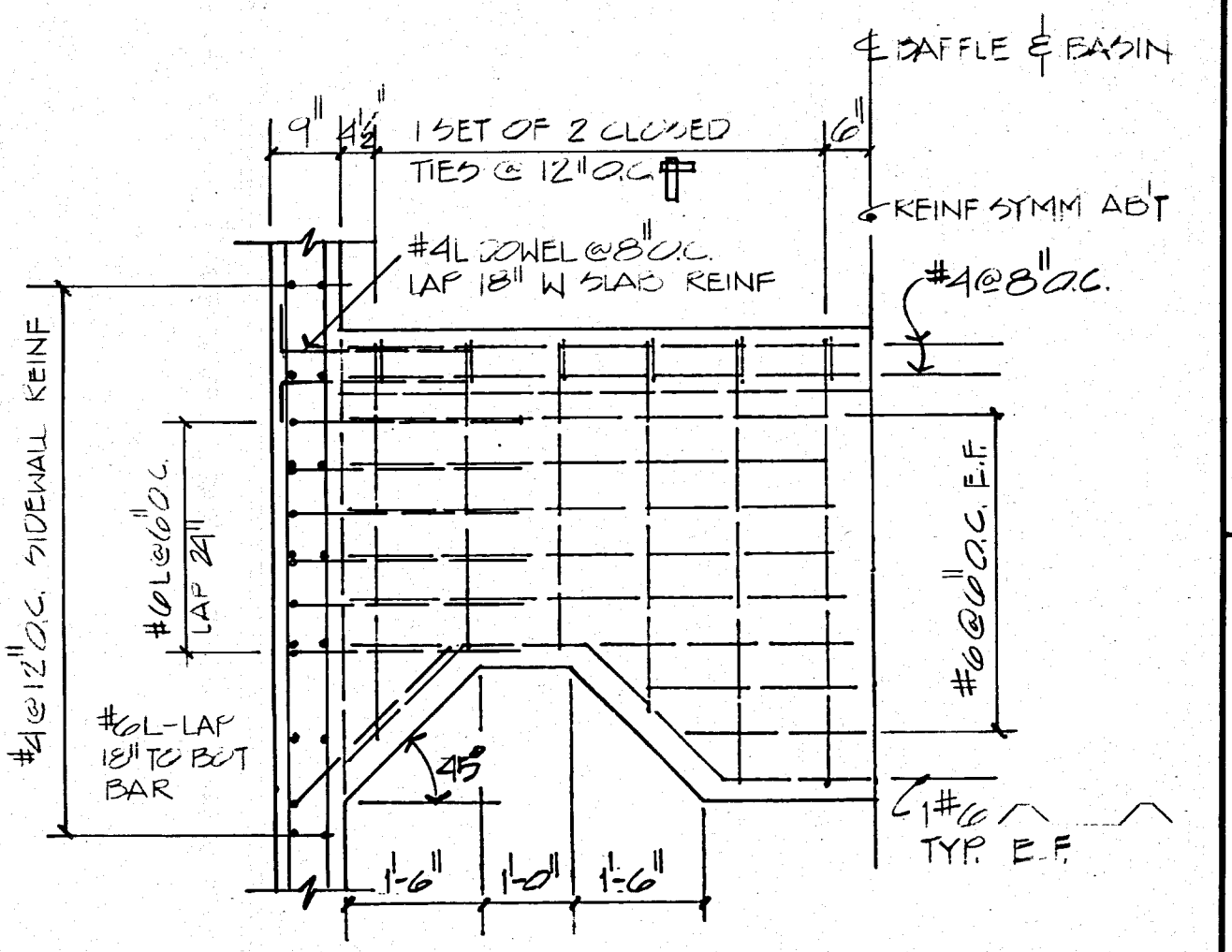
PLAN RIPRAP LIMITS
SCALE: 1/8" = 1'-0"



SECTION D
SCALE: 1/8" = 1'-0"

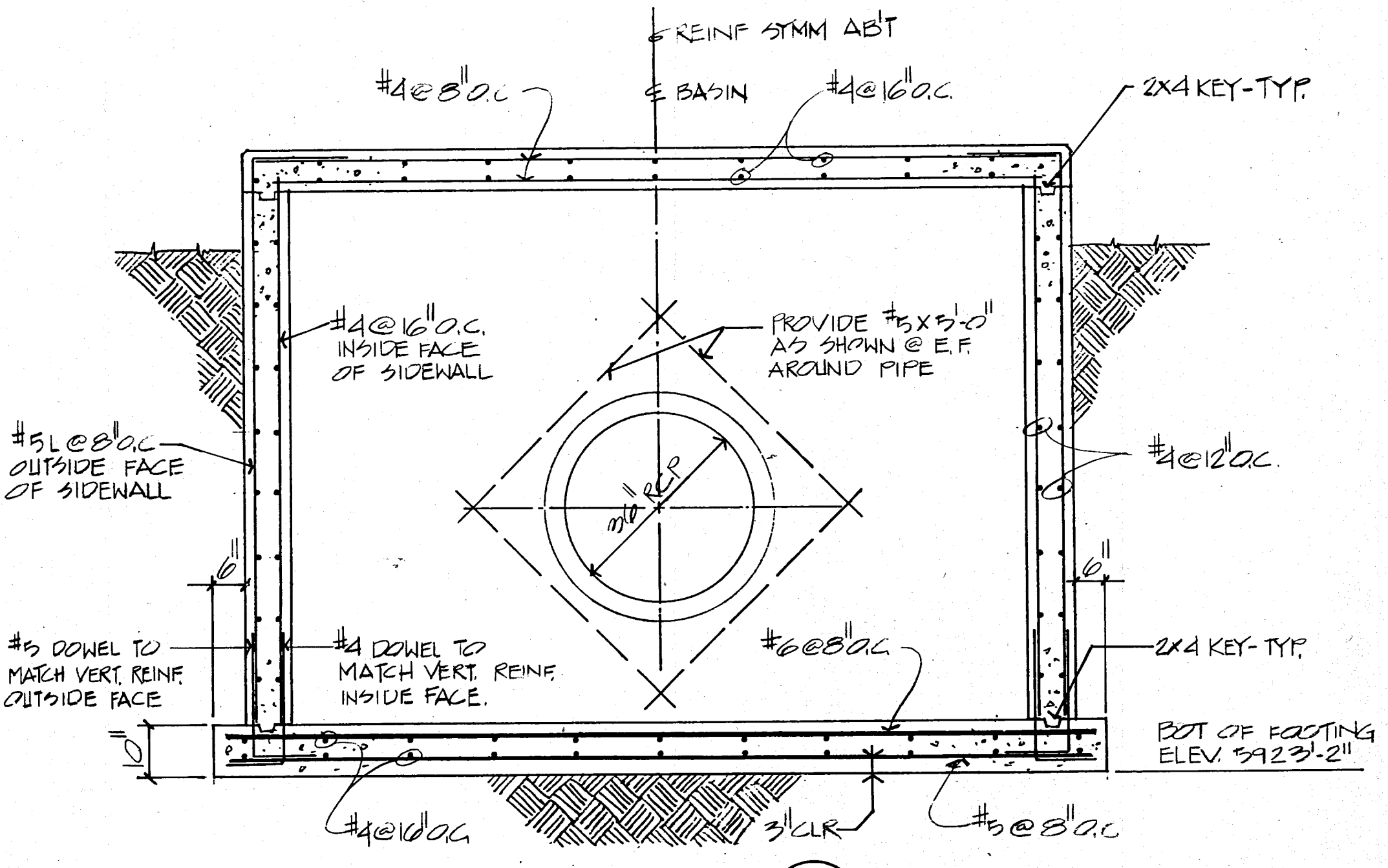


SECTION C
SCALE: 1/2" = 1'-0"



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

NOTE:
1. SEE DRAWING 8 FOR STRUCTURAL NOTES



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

George P. Co.

08 002 0780

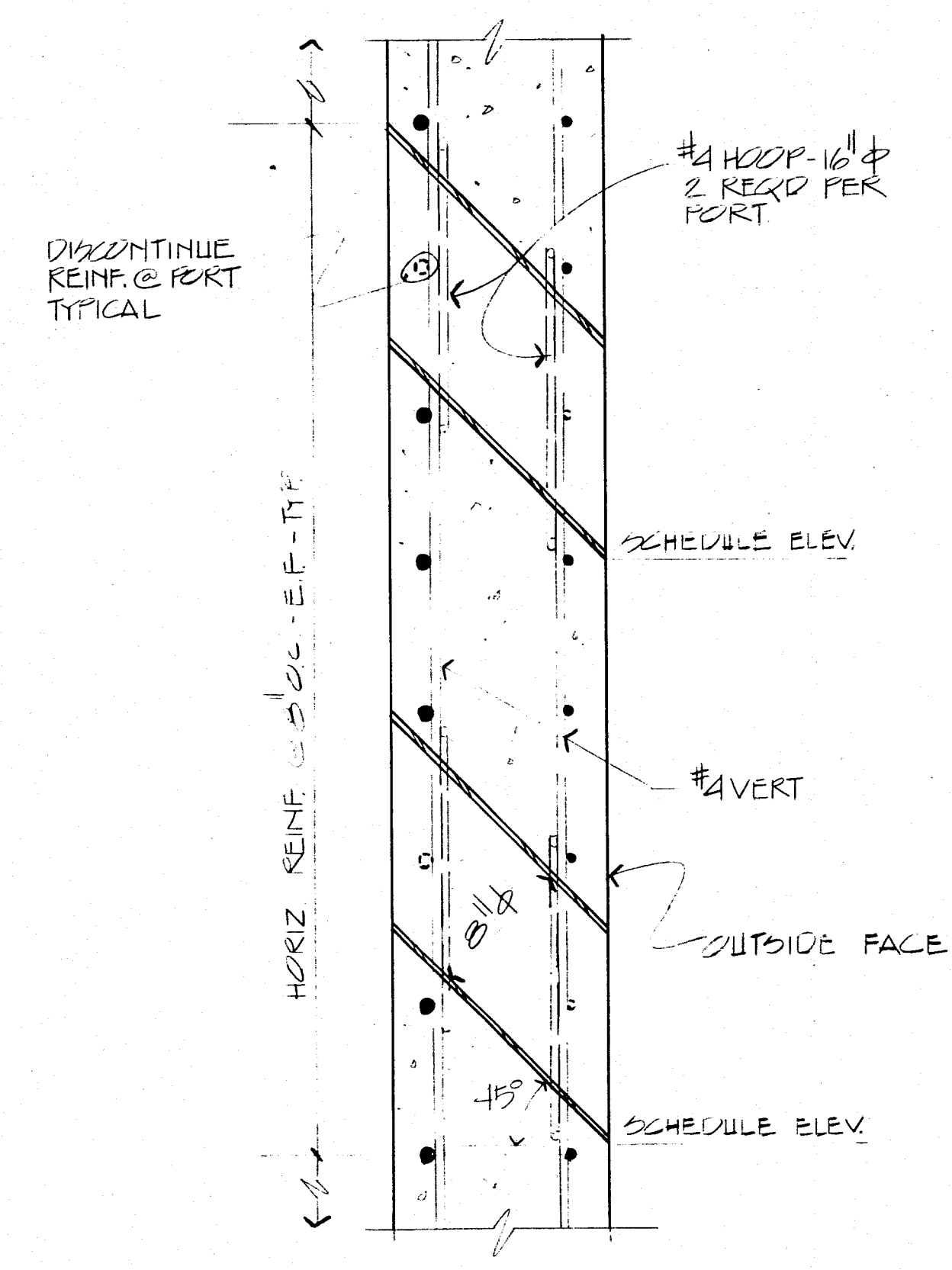
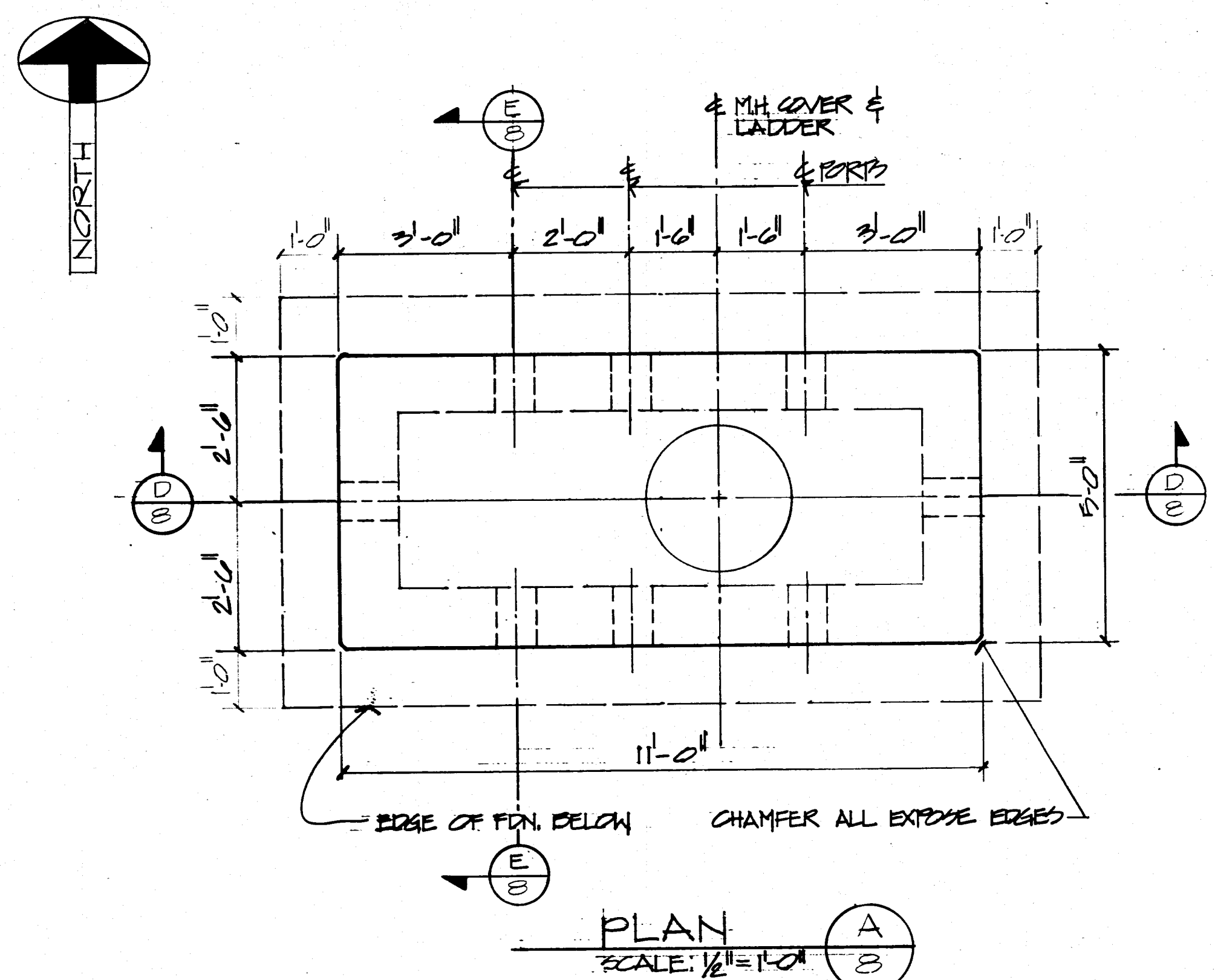
NO.	INDEX	DATE	REVISION	CK'D	APP
1					

BOVAY ENGINEERS, INC.
HOUSTON • SPOKANE • BATON ROUGE
AUSTIN • ALBUQUERQUE • WASHINGTON, D.C.

**TRAMWAY FLOODWATER
RETAINING STRUCTURE**

**STILLING BASIN &
RIPRAP DETAILS**

DESIGNED: MAZ.	SCALE: AS NOTED
DRAWN: MAZ.	PROJECT NUMBER: 6017-000
CHECKED: S.M.J.	DRAWING NUMBER: 7
APPROVED: EGA	
APPROVED:	
DATE: 12/77	

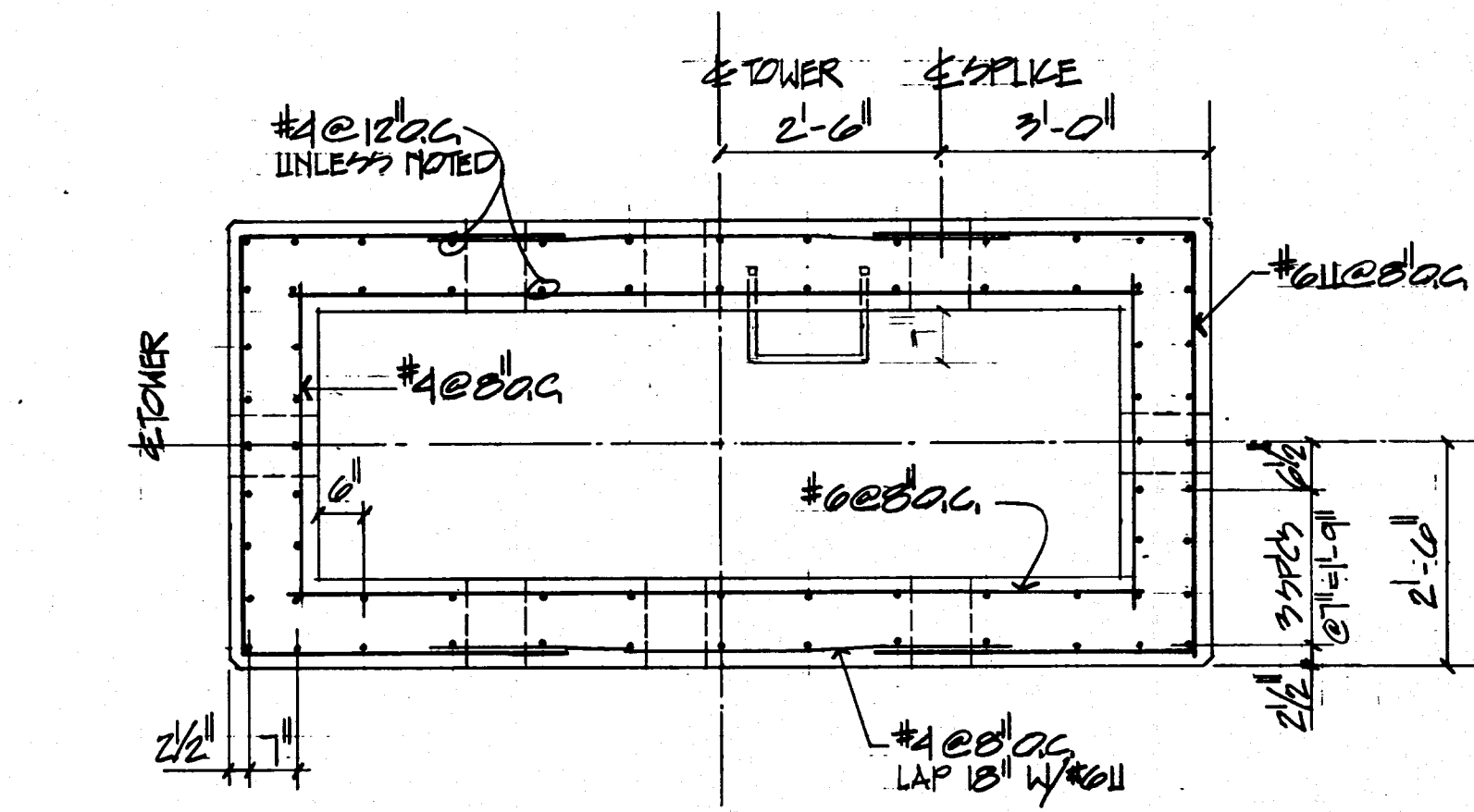
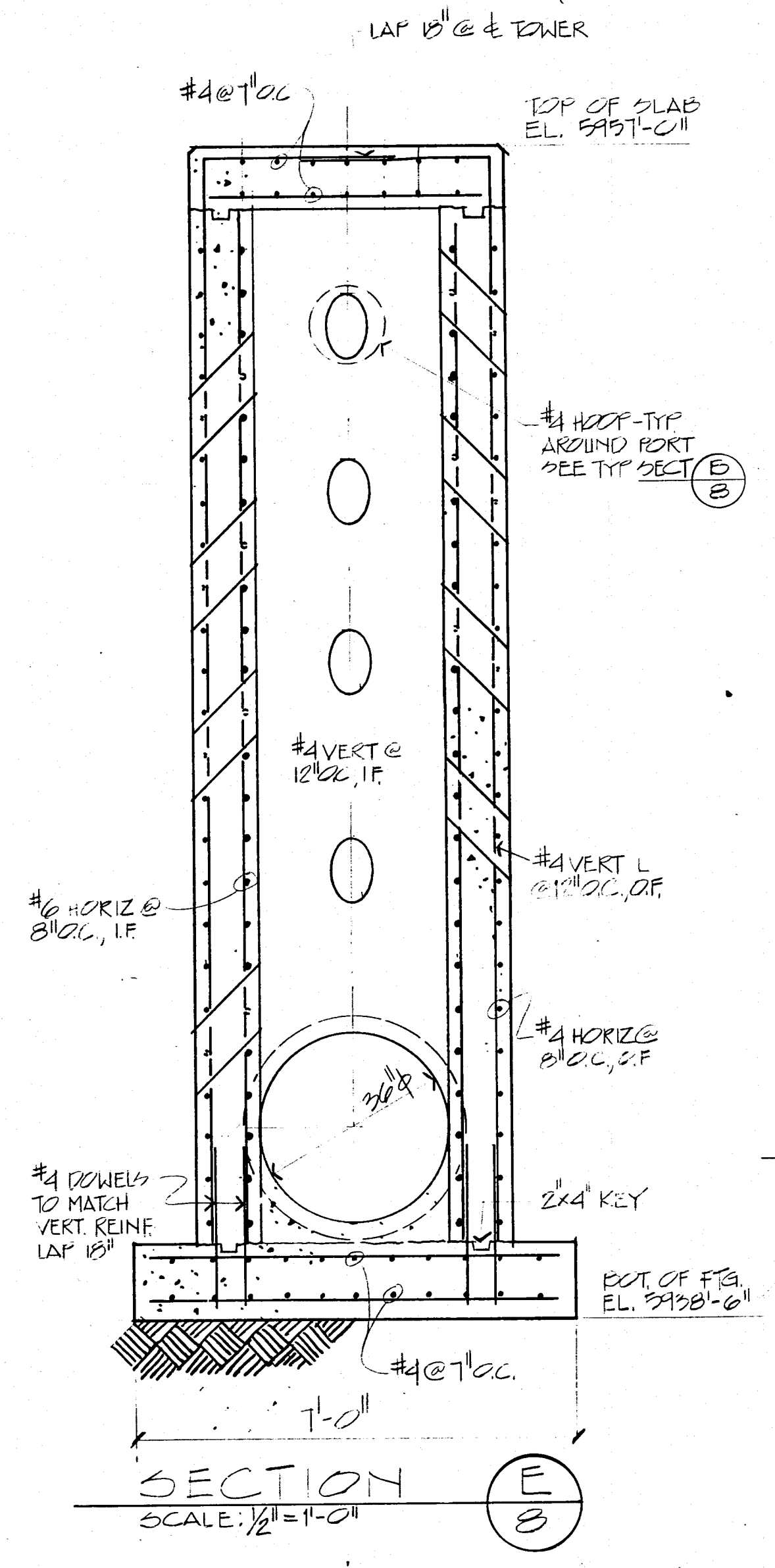
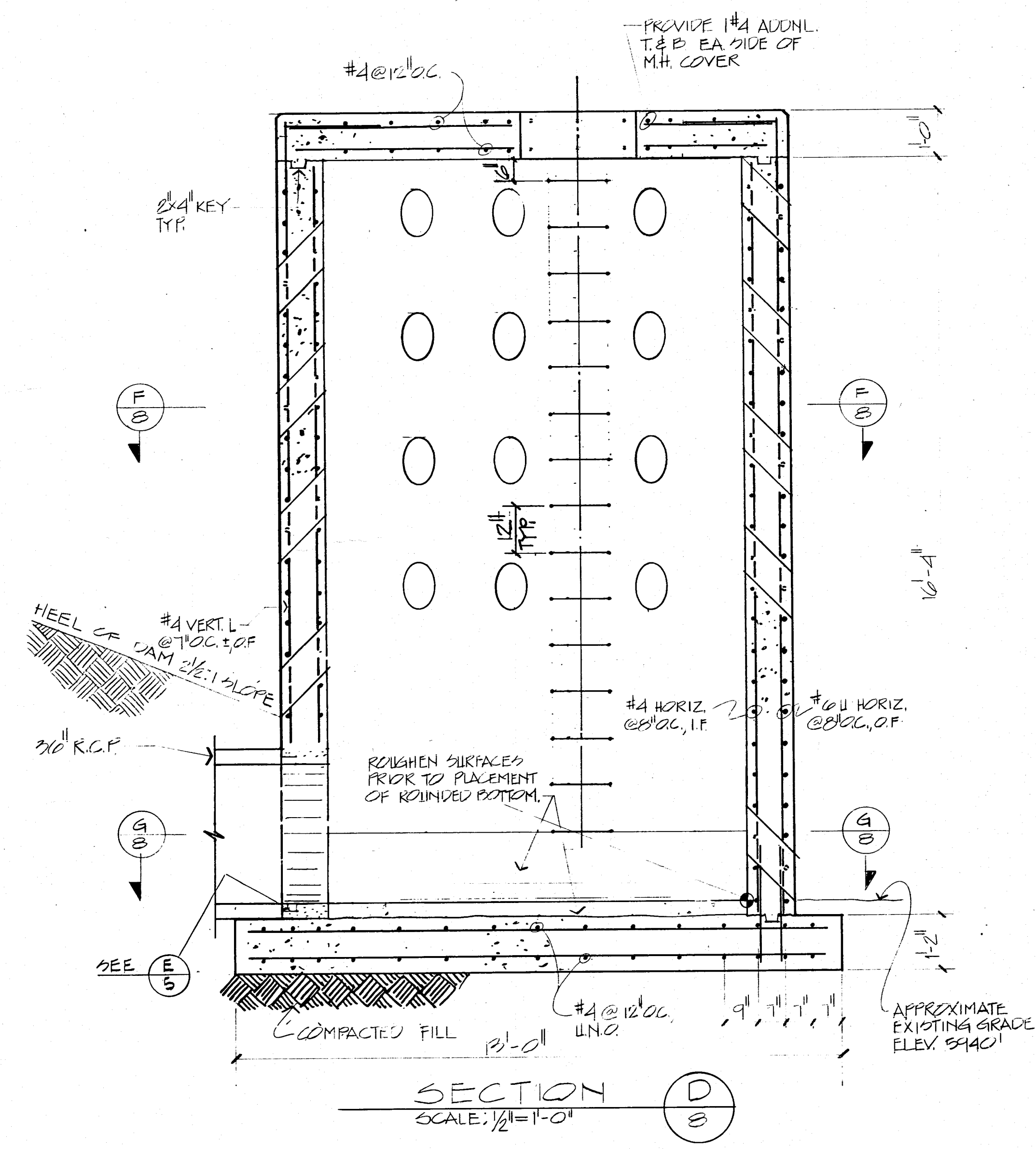


NO.	WALL LOCATION	ELEVATION
1.	EAST	5940'-0"
2.	SOUTH	5940'-0"
3.	WEST	5940'-0"
4.	NORTH	5940'-0"
5.	NORTH	5940'-0"
6.	NORTH	5940'-0"
7.	EAST	5940'-0"
8.	SOUTH	5940'-0"
9.	SOUTH	5940'-0"
10.	SOUTH	5940'-0"
11.	WEST	5940'-0"
12.	NORTH	5940'-0"
13.	NORTH	5940'-0"
14.	NORTH	5940'-0"
15.	EAST	5940'-0"
16.	SOUTH	5940'-0"
17.	SOUTH	5940'-0"
18.	SOUTH	5940'-0"
19.	WEST	5940'-0"
20.	NORTH	5940'-0"
21.	NORTH	5940'-0"
22.	NORTH	5940'-0"
23.	EAST	5940'-0"
24.	SOUTH	5940'-0"
25.	SOUTH	5940'-0"
26.	SOUTH	5940'-0"
27.	WEST	5940'-0"
28.	NORTH	5940'-0"
29.	NORTH	5940'-0"
30.	NORTH	5940'-0"
31.	EAST	5940'-0"

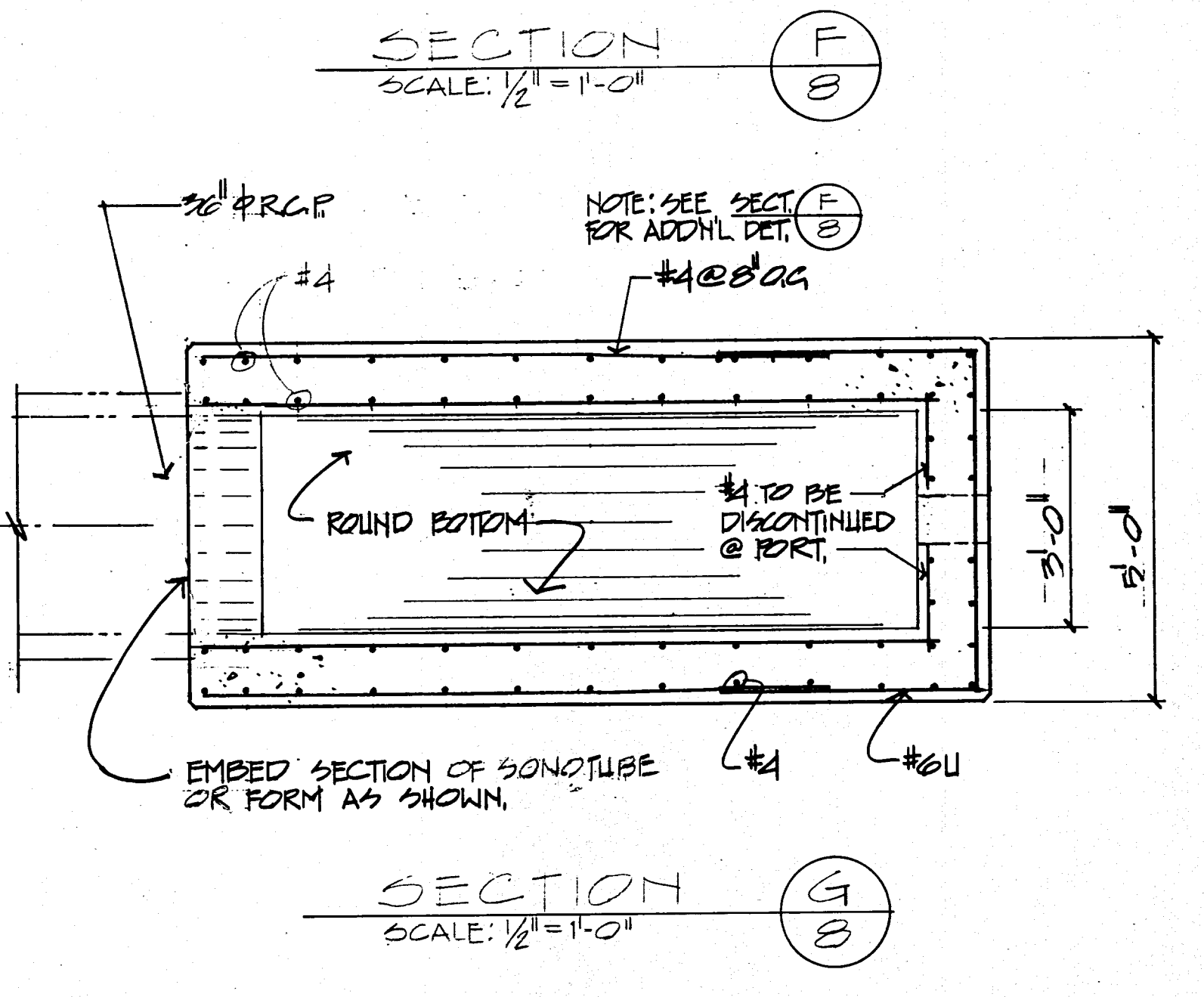
NOTE:
3 PORTS @ 5942' SOUTH.
TOTAL 33 PORTS

- NOTES:
1. NATIVE SOIL SHALL BE OVEREXCAVATED TO 5'-0" BELOW BOTTOM OF FOUNDATION AND CARRIED OUT TO 50' BEYOND THE PERIMETER OF THE FOUNDATION. REPLACE WITH SELECTED SILTY FILL BELOW THE INLET STRUCTURE AND WITH GRANULAR FILL BELOW THE STILLING BASIN AND PERFORM DEEP VIB. RYERY COMPACTION.
 2. ALLOWABLE BEARING CAPACITY = 5000 PSF
 3. CONCRETE SHALL BE CLASS A; SIZE OF COARSE AGGREGATE (1" - #4).
 4. ALL EXPOSED CONCRETE SLABS SHALL RECEIVE A CLASS 1 FINISH. SEE SPEC. 502.037(C) CHAMFER ALL EXPOSED CORNERS AND 5'-0" RADIUS.
 5. REINFORCEMENT SHALL CONFORM TO ASTM A615, GRADE 60.
 6. PORTS SHALL BE CONSTRUCTED BY EMBEDDING 8" Ø NOMINAL PVC PIPE OR SONOTUBE IN CONCRETE. A TOTAL OF 33 PORTS ARE REQUIRED.
 7. ABBREVIATIONS:
E.F. : EACH FACE
I.F. : INSIDE FACE
O.F. : OUTSIDE FACE
U.N.O. : UNLESS NOTED OTHERWISE
O.C. : ON CENTER
 8. MANHOLE COVER & KING SHALL BE A CITY OF ALBUQUERQUE STANDARD LOCKABLE CAST IRON TYPE HAVING A TOTAL WT. EQUAL TO 325 LBS.
 9. LADDER RUNGS SHALL BE DUCTILE IRON, CATALOG NO R-1982-1 AS MANUFACTURED BY THE NEENAH FOUNDRY CO. OR APPROVED EQUAL.

PORT SCHEDULE
NO SCALE



NOTE: REINF. SHOWN IS SYMM. APT. TO TOWER. REINF. SHALL BE DISCONTINUOUS @ PORTS. WALLS ARE 1'-0" THICK.



08 002 0880

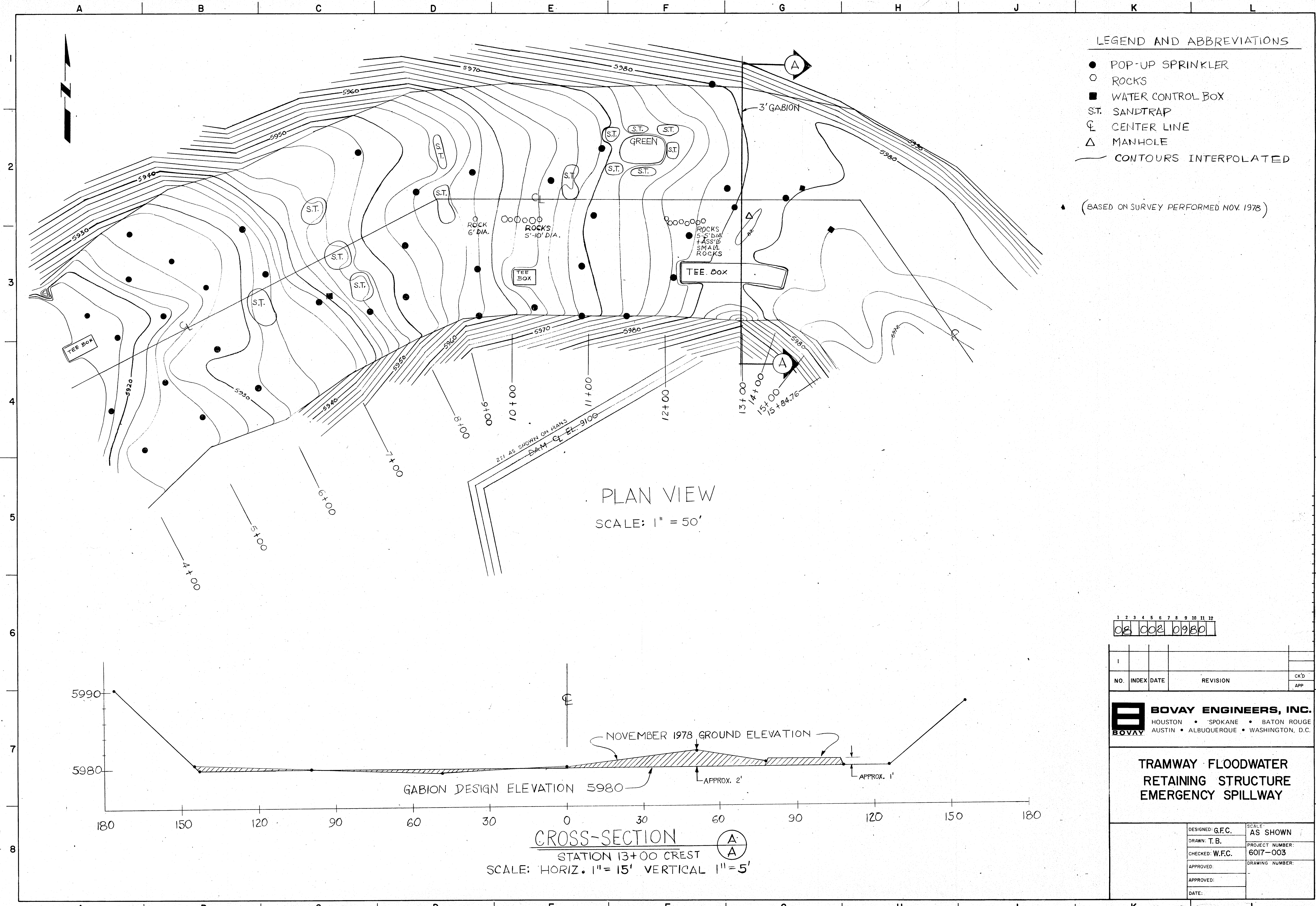
NO.	INDEX	DATE	REVISION	CK'D	APP
1					

BOVAY ENGINEERS, INC.
HOUSTON • SPOKANE • BATON ROUGE
AUSTIN • ALBUQUERQUE • WASHINGTON, D.C.

TRAMWAY FLOODWATER
RETAINING STRUCTURE

INLET STRUCTURE

DESIGNED: MAZ	SCALE: AS NOTED
DRAWN: MAZ	PROJECT NUMBER: 6017-000
CHECKED: SM.J.	DRAWING NUMBER: 8
APPROVED: EGA	
DATE: 12/77	



- LEGEND AND ABBREVIATIONS
- POP-UP SPRINKLER
 - ROCKS
 - WATER CONTROL BOX
 - S.T. SANDTRAP
 - ℄ CENTER LINE
 - △ MANHOLE
 - CONTOURS INTERPOLATED

(BASED ON SURVEY PERFORMED NOV. 1978)

1	2	3	4	5	6	7	8	9	10	11	12
08	002	0980									

NO.	INDEX	DATE	REVISION	CK'D	APP

BOVAY ENGINEERS, INC.
HOUSTON • SPOKANE • BATON ROUGE
AUSTIN • ALBUQUERQUE • WASHINGTON, D.C.

**TRAMWAY FLOODWATER
RETAINING STRUCTURE
EMERGENCY SPILLWAY**

DESIGNED: G.F.C.	SCALE: AS SHOWN
DRAWN: T.B.	PROJECT NUMBER: 6017-003
CHECKED: W.F.C.	DRAWING NUMBER:
APPROVED:	
APPROVED:	
DATE:	