

USDA-SCS - FORT WORTH, TEXAS



FLOODWATER RETARDING DAM NO.8 SANDERSON CANYON WATERSHED PROJECT

BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS

DRAINAGE AREA
TOTAL STORAGE
HEIGHT OF DAM
VOLUME OF FILL

2144 ACRES
740 AC. FT.
48 FEET

~~334,476 CU. YDS.~~
355,716

SPONSORED BY
RIO GRANDE-PECOS RIVER, BIG BEND AND TRANS-PECOS SOIL AND WATER CONSERVATION DISTRICTS
TERRELL, PECOS AND BREWSTER COUNTY COMMISSIONERS COURTS

COOPERATING WITH
SOIL CONSERVATION SERVICE
OF THE
U.S. DEPARTMENT OF AGRICULTURE
1977

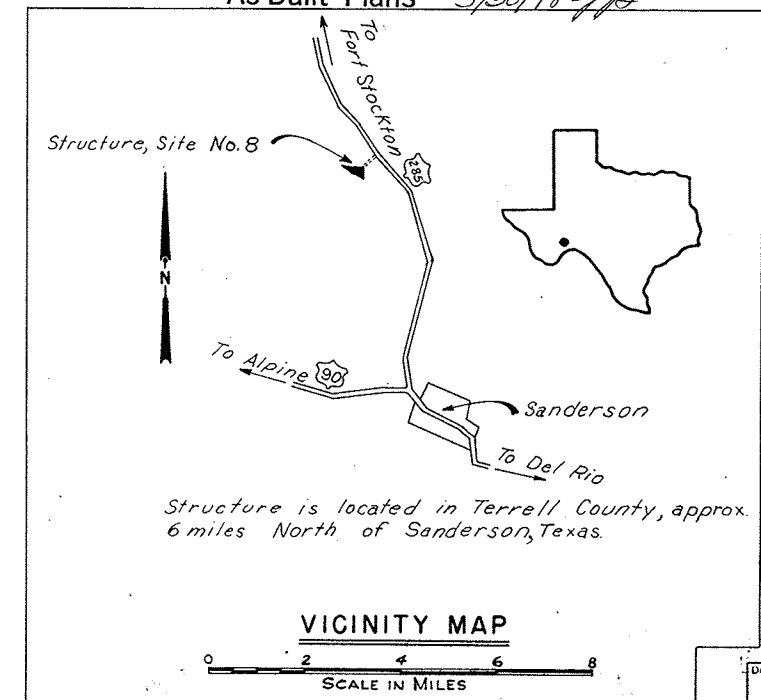
CONSTRUCTION DRAWINGS APPROVED

Emel Vittetoe *CHAS* 5-25-77
STATE CONSERVATION ENGINEER S. C. S. DATE
Jack W. Harris 5-28-77

INDEX OF DRAWINGS

SHEET NO.	TITLE
1	GENERAL PLAN OF RESERVOIR
2	EMBANKMENT PLAN AND PROFILE
3	PROFILE AND SECTIONS
4	EMBANKMENT FOUNDATION DRAIN
5-6	PRINCIPAL SPILLWAY - PLAN AND SECTION
7	PIPE DETAILS
8	PRINCIPAL SPILLWAY INLET
9-11	STEEL PLACEMENT - PRINCIPAL SPILLWAY INLET
12	TRASH RACK, SLIDE GATE, AND PIPE
13	CANTILEVER SUPPORT DETAILS
14	ENCASEMENT PIPE FOR WATERLINE
15-18	PRINCIPAL SPILLWAY INLET SCOUR APRON
	PLAN AND PROFILES FOR GEOLOGIC INVESTIGATIONS

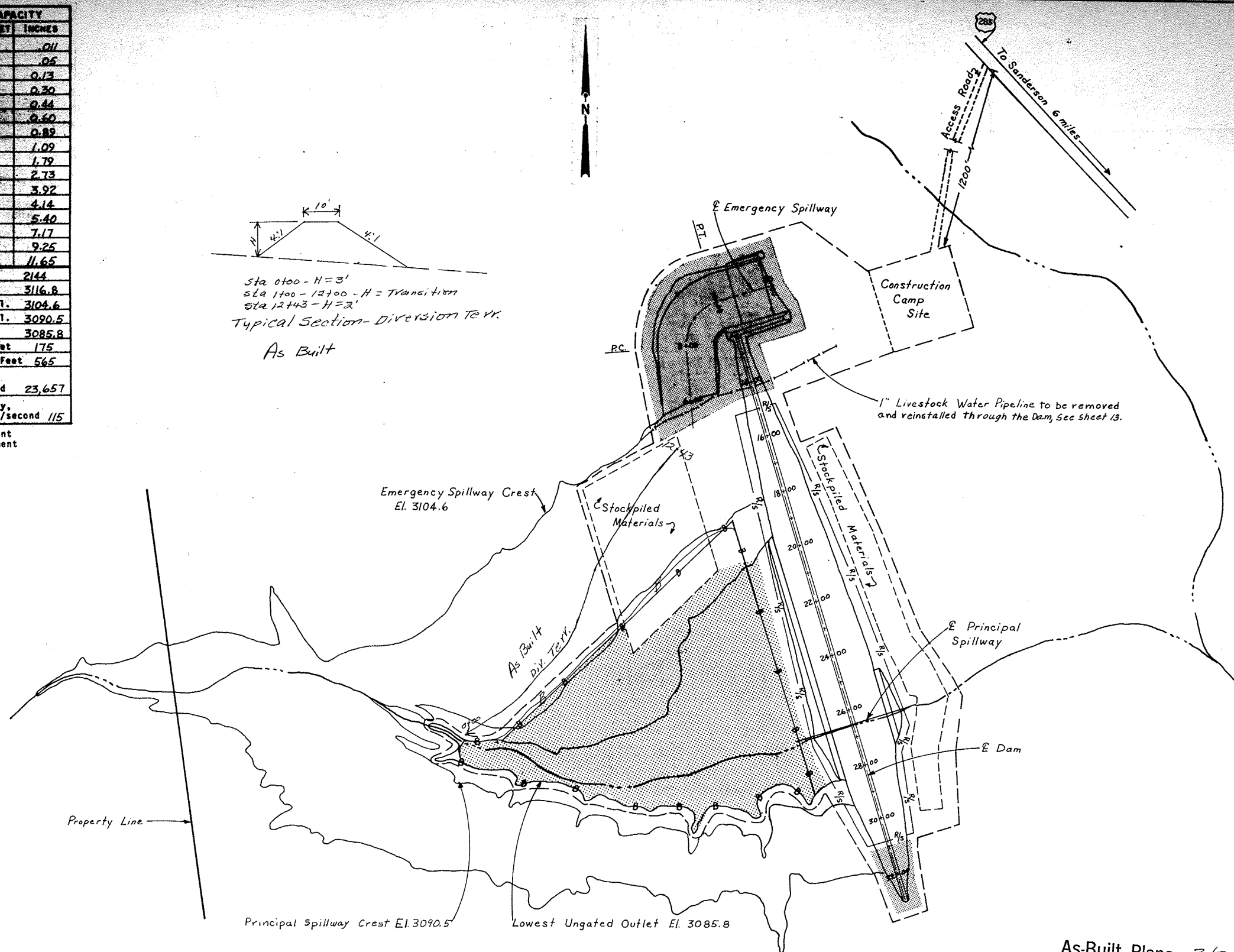
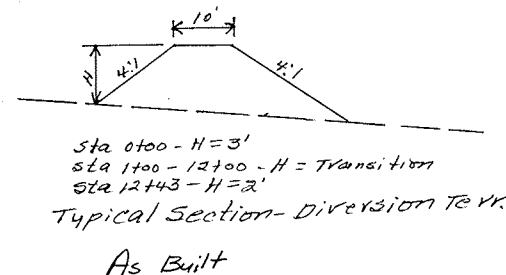
As-Built Plans 3/30/78 JFB



Drawing No.
4-E-35,901

ELEVATION	SURFACE ACRES	CAPACITY	
		ACRE FEET	INCHES
3072	1	2	.011
3076	2.5	9	.05
3080	5.0	24	0.13
3084	10.0	54	0.30
3088.8	15.0	79	0.44
3088	17.0	108	0.60
3090.5	22.0	159	0.89
3092	26.0	194	1.09
3096	36.5	319	1.79
3100	47.5	487	2.73
3104	59.5	701	3.92
3104.6	62.0	740	4.14
3108	72.5	965	5.40
3112	85.5	1281	7.17
3116	100	1652	9.25
3120	115	2082	11.65
Drainage Area, Acres		2144	
Top of Dam (effective) El.		3116.8	
Emergency Spillway Crest El.		3104.6	
Principal Spillway Crest El.		3090.5	
Lowest Ungated Outlet El.		3085.8	
Sediment Capacity, Acre Feet		175	
Floodwater Capacity, Acre Feet		565	
Maximum Emergency Spillway Capacity, cubic feet/second		23,657	
Principal Spillway Capacity, @ El. 3104.6, cubic feet/second		115	

1/ 50 yr. Submerged Sediment
2/ 100 yr. Submerged Sediment



LEGEND

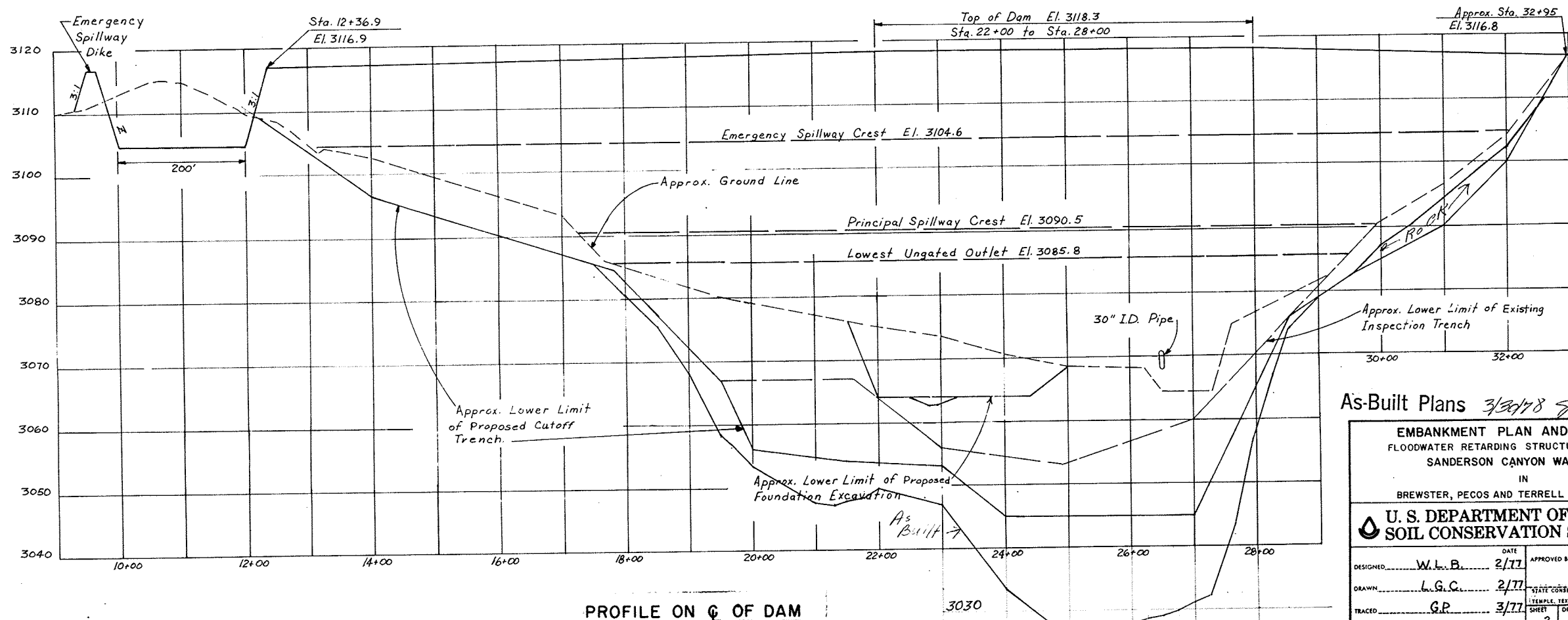
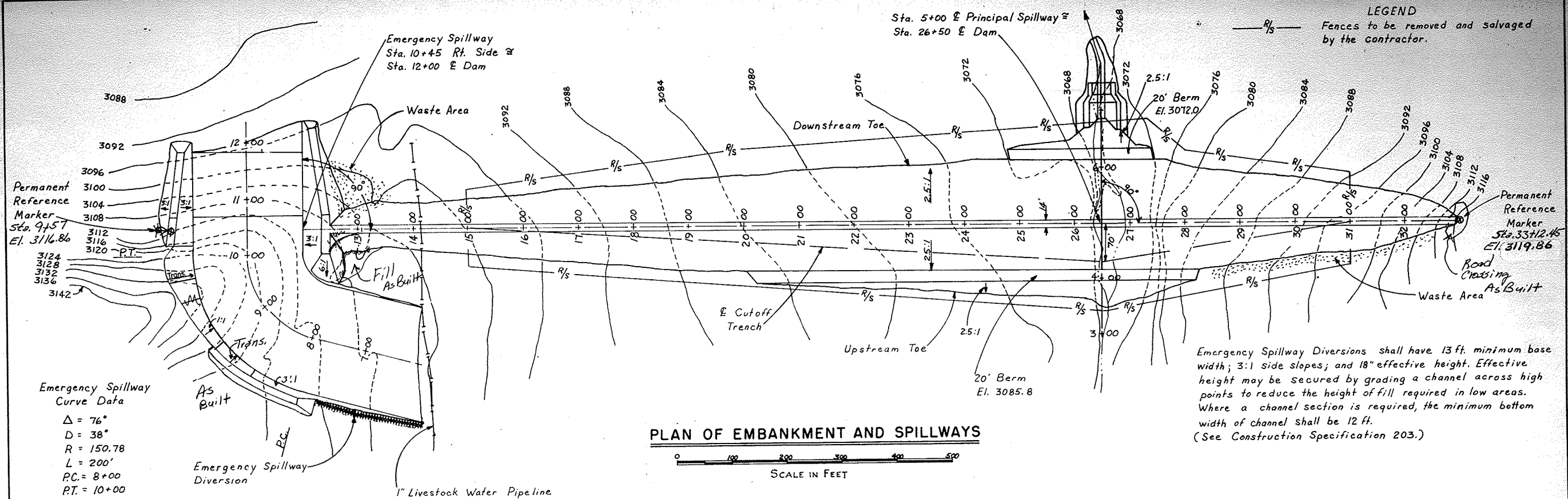
- LIMITS OF WORK AREA
- LIMITS OF CLEARING
- LIMITS OF CLEARING & GRUBBING
- PIPELINE
- LIMITS OF BORROW AREA
- FENCES TO BE REMOVED AND SALVAGED BY THE CONTRACTOR

GENERAL PLAN OF RESERVOIR



As-Built Plans 3/30/78 972

GENERAL PLAN OF RESERVOIR FLOODWATER RETARDING STRUCTURE SITE NO. 8 SANDERSON CANYON WATERSHED IN BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
DESIGNED	W.L.B.	DATE	2/77
DRAWN	W.L.B.	DATE	2/77
TRACED	G.P.	DATE	3/77
CHECKED	R.L.K.	DATE	3/77
APPROVED BY		[Signature]	
STATE CONSERVATION ENGINEER S.C.S.		DRAWING NO.	
SHEET		4-E-35,901	
No. 1 of 8			



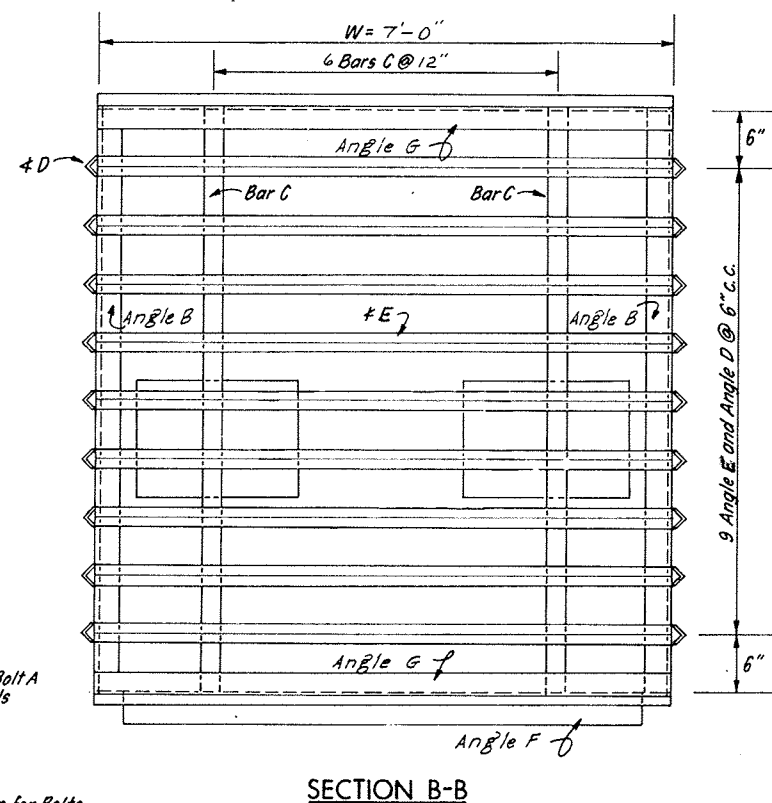
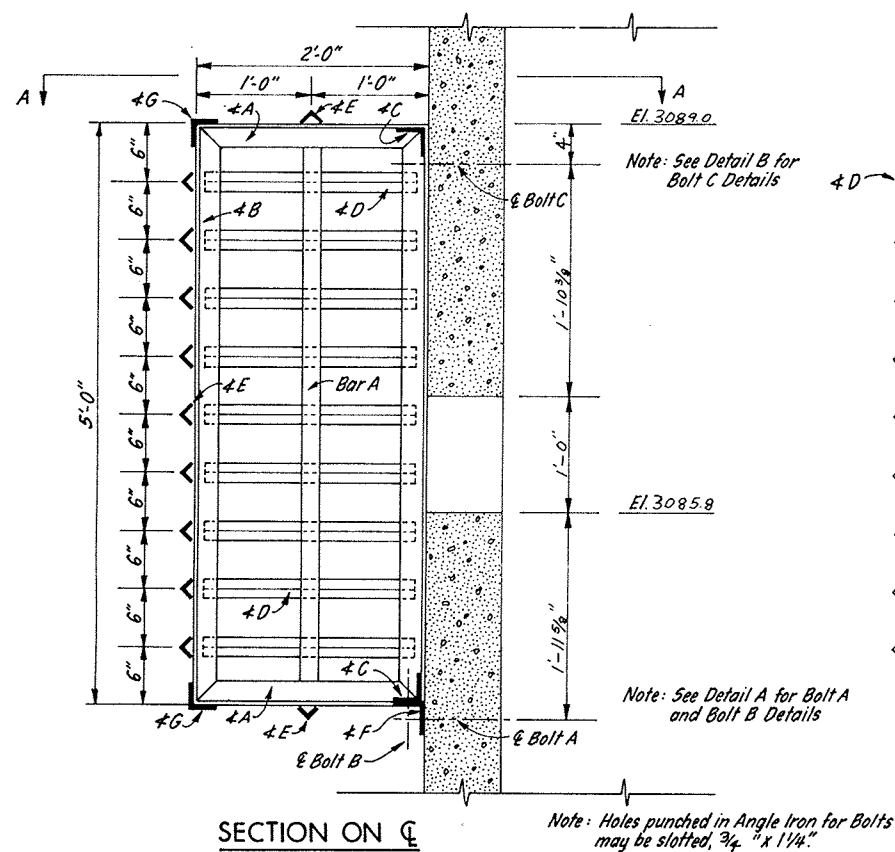
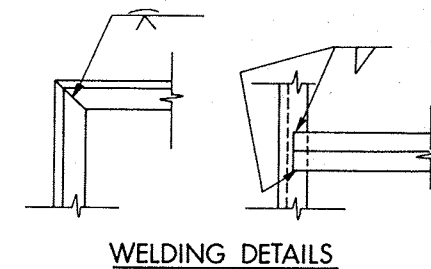
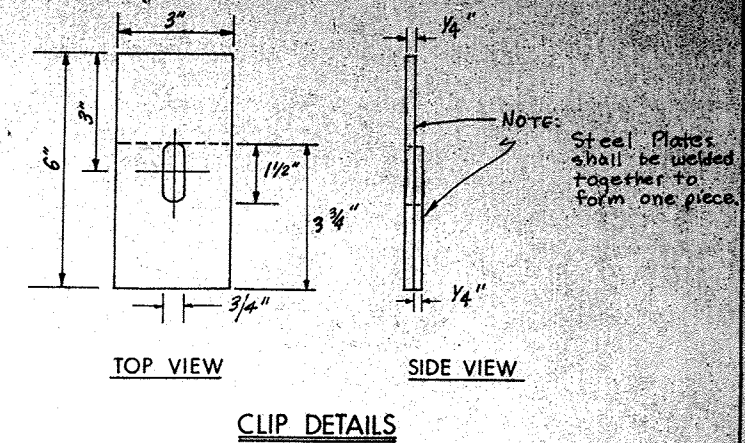
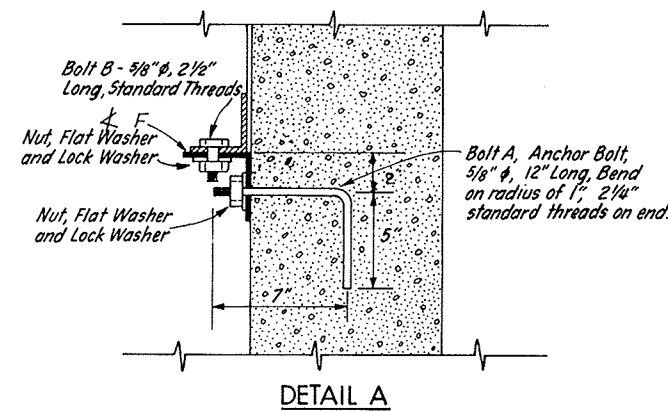
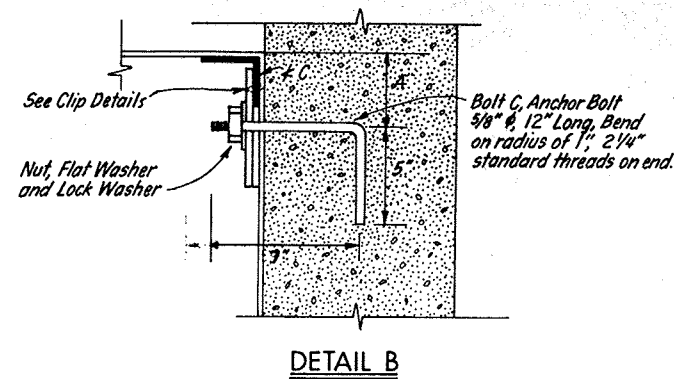
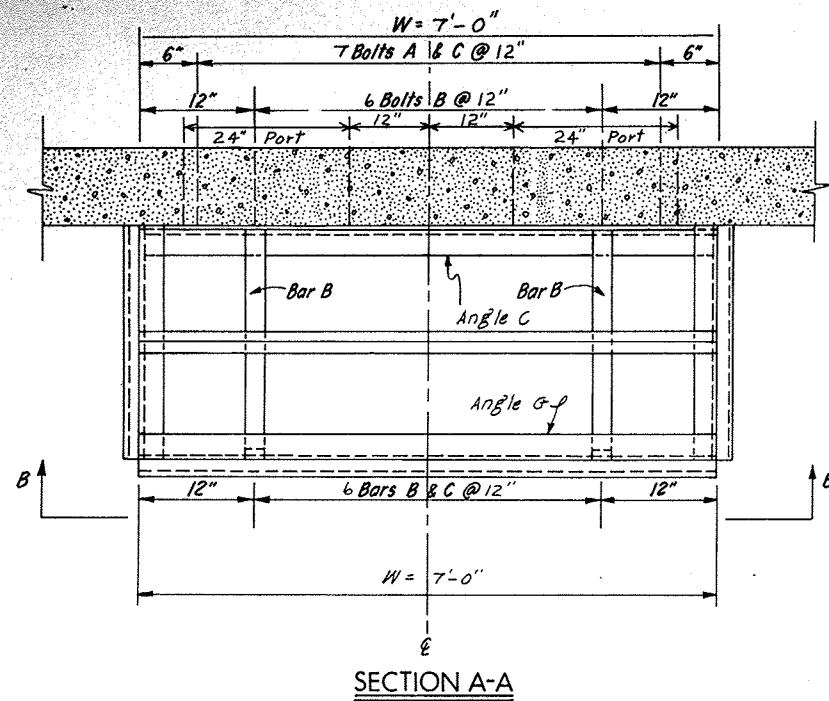
As-Built Plans 3/30/78 JTB

EMBANKMENT PLAN AND PROFILE
 FLOODWATER RETARDING STRUCTURE SITE NO. 8
 SANDERSON CANYON WATERSHED
 IN
 BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DESIGNED	W.L.B.	DATE	2/77	APPROVED BY	JTB
DRAWN	L.G.C.	DATE	2/77	STATE CONSERVATION ENGINEER, E.C.S.	
TRACED	G.P.	DATE	3/77	TEMPLE, TEXAS	
CHECKED	R.L.K.	DATE	3/77	SHEET	2
				DRAWING NO.	4-E-35,901

SCS-ENG-314 (Rev. 7-72)



SCHEDULE OF MATERIALS REQUIRED FOR ONE RACK		
QUANTITY	ITEM	DESCRIPTION
4	Angle A	2½" x 2½" x ¼" x 2'0" Cut and weld
4	Angle B	2½" x 2½" x ¼" x 5'0" Cut and weld
2	Angle C*	3" x 3" x ¼" x 6' - 11½" Weld
18	Angle D	1½" x 1½" x ¼" x 1'11" Weld
11	Angle E	1½" x 1½" x ¼" x 7'-0" Weld
1	Angle F*	3½" x 3½" x ¼" x 6'-6"
2	Angle G	2½" x 2½" x ¼" x 7'-0" Weld
2	Bar A	¼" x 2" x 4'7" Weld
12	Bar B	¼" x 2" x 2'0" Weld
6	Bar C	¼" x 2" x 4'11¼" Weld
7	Bolt A	5/8" Ø Anchor Bolt, See Detail A
6	Bolt B	5/8" Ø, See Detail A
7	Bolt C	5/8" Ø, Anchor Bolt, See Detail B
7	Clip	See Clip Details
20	Nuts, Flat & Lock Washers	See Detail A and Detail B

*Angle C and Angle F shall have slots punched to allow Bolts A, B and C to pass through.

Trash Rack shall be galvanized after Fabrication.

Number of Racks Required: 2

All bolts, nuts, washers and other parts of the trash rack shall be galvanized.

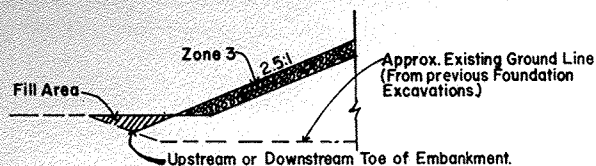
NO CHANGES IN CONSTRUCTION

As-Built Plans 3/30/78 *778*

PORT TRASH RACK
FLOODWATER RETARDING STRUCTURE SITE NO. 8
SANDERSON CANYON WATERSHED
IN
BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS

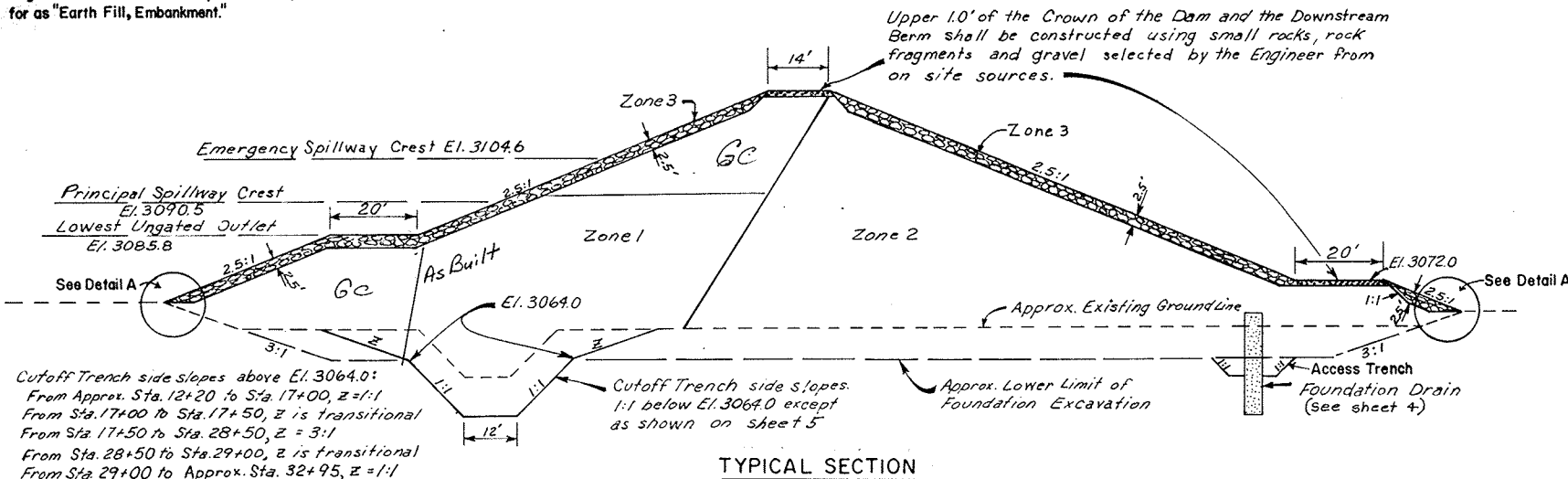
 U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DESIGNED	W.L.B.	7-77	APPROVED BY	<i>G.C.V.</i>
DRAWN	W.L.B.	7-77	STATE CONSERVATION ENGINEER, A.C.T.	
TRACED	L.G.C.	7-77	TEMPLE TARIK	
CHECKED	A.V.T.	7-77	DIRECTOR	DRAVING HQ.
			No. <i>12</i>	4-E-35,901
			<i>118</i>	



DETAIL A

Where the toe of the embankment falls inside previous foundation excavations Fill Areas shall be required as shown above. The actual limits of Fill Areas will be as staked by the Engineer. Fill Areas shall be placed and paid for as "Earth Fill, Embankment."



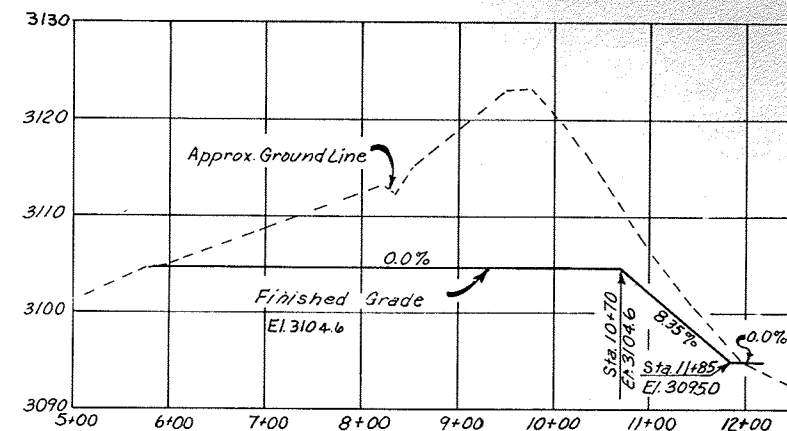
TYPICAL SECTION

MATERIALS PLACEMENT DATA									
Embankment Zone No. 1/	Type or Unified Classification	Field Control Test		Placement and Compaction Requirements					
		ASTM TEST		Max. Allowable Particle Size	Max. Uncompacted Layer Thickness	Specified Compaction Class	Moist. Dry Density, Percent of Field Test Max. Dry Density	Moisture Limits, Relative to Field Test Optimum %	
		Number	Method					From	To
1	SC: Clayey Sand, Moderately Plastic	D-698	A or B	6"	9"	A	95	Opt.	Up
1	CL: Gravelly, Sandy Clay, Moderately Plastic	D-698	A or B	6"	9"	A	95	Opt.	Up
1	CL: Silty, Sandy Clay, Moderately Plastic	D-698	A or B	6"	9"	A	95	Opt.	Up
2	SC: Gravelly, Clayey Sand, Moderately Plastic	D-698	A or B	6"	9"	A	95	Opt.	Up
2	GC: Sandy, Clayey Gravel, Slightly Plastic	(Moisture Only) D-698	A or B	6"	9"	C-2	—	Opt.	Up
3	Rock 2/	-	-	24"	36"	-	-	-	-

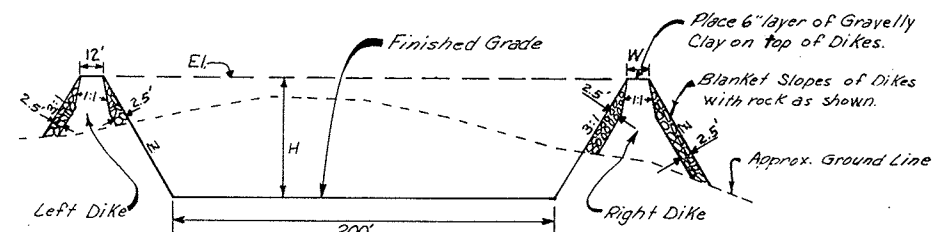
* Use in outer portion of Zone 2, See sheet 4 for additional restrictions for use of this material.

- The zone boundaries shown in the typical section are approximate. They may be varied as permitted by the Engineer, to allow the use of all suitable and needed materials from the required excavations.
- Rock shall be reasonably well graded from a maximum particle size of 24" down to the 6" size with not less than 50% by weight larger than 9". Sizing of oversized rock materials from the required excavations to meet the specified gradation will be required.
- Class C compaction shall be accomplished by a minimum of 4 complete passes per layer of tamping roller weighing not less than 1200 pounds per foot of roller width at a towing or traveling speed of 2 mph or greater.

ZONED EMBANKMENT DATA



PROFILE ON C OF EMERGENCY SPILLWAY



Left Dike: Sta. 7+80 to Sta. 8+00, Emergency Spillway Diversion is transitional to Dike Transition Dike from El. 3116.0 at Sta. 8+00 to El. 3123.0 at Sta. 9+00. Sta. 10+20 to Sta. 10+70, El. 3116.9. Sta. 10+70 to Sta. 11+50, Transition Section. Sta. 11+50 to Approx. Sta. 11+85, H=5.0'. As Built

Left Side Slope: Approx. Sta. 9+00 to 9+75, Z=1:1. Sta. 5+69 to Sta. 8+50. Sta. 9+75 to Sta. 10+20, Transition Section. 3:1 Sta. 8+50 to 9+00. Sta. 10+20 to Approx. Sta. 11+85, Z=3:1. Transition.

Right Dike: Sta. 10+00 to Embankment, El. 3116.9, Z=2.5:1, W=14'. Embankment to Sta. 10+70, El. 3116.9, Z=2.5:1, W=14'. Sta. 10+70 to Sta. 11+50, Transition Section. Sta. 11+50 to Approx. Sta. 12+40, H=5.0, Z=3:1, W=12'.

Note: Areas of Emergency Spillway Floor where durable rock is not exposed at grade shall be overexcavated a minimum of 1.0' and brought back to grade with gravelly and rocky materials selected by the Engineer. This gravelly and rocky material shall be placed and paid for as "Earth Fill, Embankment."

Material forming dikes and transitional sections shall be placed and paid for as "Earth Fill, Embankment."

TYPICAL SECTION - EMERGENCY SPILLWAY

As-Built Plans 3/30/78

PROFILE AND SECTIONS			
FLOODWATER RETARDING STRUCTURE SITE No. 8			
SANDERSON CANYON WATERSHED			
IN			
BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS			
U. S. DEPARTMENT OF AGRICULTURE			
SOIL CONSERVATION SERVICE			
DESIGNED: W.L.B.	DATE: 2-77	APPROVED BY:	
DRAWN: W.L.B.	DATE: 2-77	TITLE: STATE CONSERVATION ENGINEER'S OFFICE	
TRACED: C.W.B.	DATE: 3-77	SHEET: 3	DRAWING NO. 4-E-35,901
CHECKED: R.L.K.	DATE: 3-77	BY: 1/8	

950' of 6" Perforated Asbestos Cement Pipe encased in Filter Material.

70' of 6" Non-perforated Asbestos Cement Pipe in each outfall line (not encased in filter material.) Inv. El. 306.30 at outfall end. Install rodent guard on each outfall end.

350' of 6" Perforated Asbestos Cement Pipe encased in Filter Material.

Where the ground line is lower than the top of the Trench Drain, earth fill shall be filled to the top grade of the trench before trench excavation for placement of drain fill. The earth fill shall be placed and paid for as "Earth Fill, Embankment."

An Access Trench shall be excavated for the Trench Drain. This Access Trench shall have 1:1 side slopes and 120" bottom width. Access Trench Excavation shall be measured and paid for as "Excavation, Common, Foundation."

Excavations for the Trench Drain shall have vertical sides and be 4.0' wide as shown in the Typical Section. (See Construction Specification 24.)

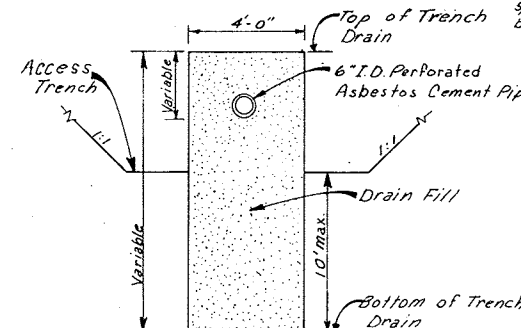
Initial backfill of the access trench and fill immediately above (2ft min. thickness) and adjacent to the top of the trench drain shall be of relatively pervious site materials selected by the Engineer. This fill to be placed and paid for as "Earth Fill, Embankment." Stock piling of these materials may be required if directed by the Engineer.

DRAIN FILL REQUIREMENTS

Installation and materials quality shall comply with the requirements of Construction Specification 24 and Materials Specification 521.

The drain fill shall consist of a mixture of 3 parts of ASTM-C-33 Coarse Aggregate, Size No. 467 and 1 part of ASTM-C-33 Fine Concrete Aggregate or any other aggregate that will grade within the following limits:

Sieve Size	% Passing by Weight
3"	100
1 1/2"	85 - 100
3/4"	60 - 100
3/8"	30 - 86
No. 4	10 - 70
No. 10	0 - 40
No. 20	0 - 20
No. 40	0 - 12
No. 200	0 - 5



The last section of each outfall pipe shall be fastened to the pipe cantilever support with a strap and 2 bolts as shown. Each of the last two sections in each outfall line shall be a minimum 10ft in length. 1 strap and 2 bolts are required for each outfall line. The straps and bolts shall be galvanized. The end of the drain pipe will extend approx. 4 ft. beyond the E of the pipe cantilever support. (See Construction Specification 44.)

SECTION A-A

NOTE: All Asbestos-Cement Pipe and Couplings shall be Class 100 Pressure Pipe and shall conform to the requirements of Materials Specification 545.

The bedding of perforated pipe installed in filter material shall be ordinary bedding providing uniform and continuous bedding contact throughout the entire line. Joining shall be in accordance with the manufacturer's recommendations. Tamping of the filter material under and on the sides and top of the pipe will be required only to the extent necessary to eliminate voids or empty pockets.

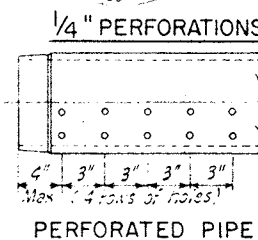
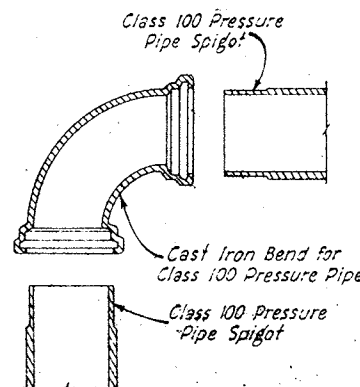
The installation of the non-perforated pipe shall be with ordinary bedding that provides uniform and continuous bedding contact throughout the entire line. Joining shall be in accordance with the manufacturer's recommendations. Backfill and compaction shall be as specified in Construction Specification 23A.

NOTE: Bends shall be 90°, 45°, 22 1/2°, or 11 1/4° as designated on the PLAN and shall comply with the requirements of Material Specification 545.

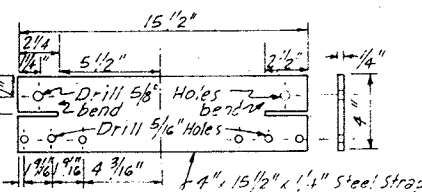
For changes in horizontal or vertical alignment which are less than 100' or which differ from the standard bends mentioned above, the alignment change not taken up by the standard bend, shall be made by deflection of an equal number of pipe sections on either side of the point of intersection of the alignment shown. No angle of deflection for a single pipe joint shall exceed 40° or 7'.

Tees, Crosses, Wyes and Reducers, if required, shall be the same as specified for Bends. Deflection of pipe sections, if required to complete alignment changes, shall be the same as specified for Bends.

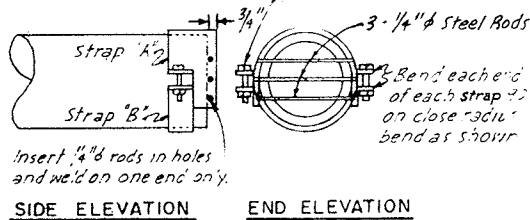
DETAILS-PIPE FITTINGS (Other than Straight Couplings)



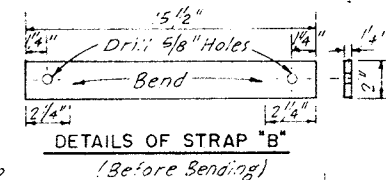
RODENT GUARD DETAILS



DETAILS OF STRAP "A" (Before Bending)

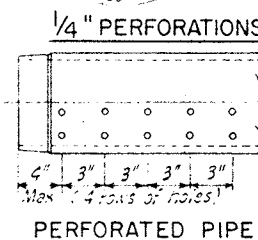
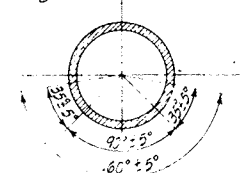


Note: Bend straps A and B on a radius 1/4" larger than the outside diameter of the asbestos-cement pipe. Cut off tapered end of asbestos-cement pipe and install the rodent guard so that the asbestos-cement pipe has full wall thickness at point of installation. Install with rods horizontal. All materials shall be galvanized after fabrication.

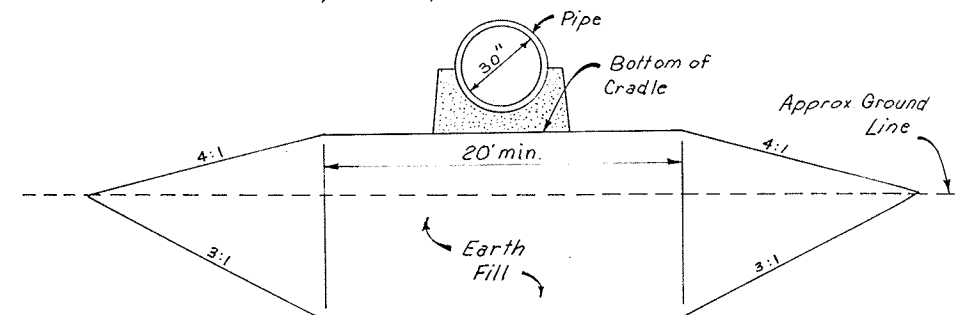
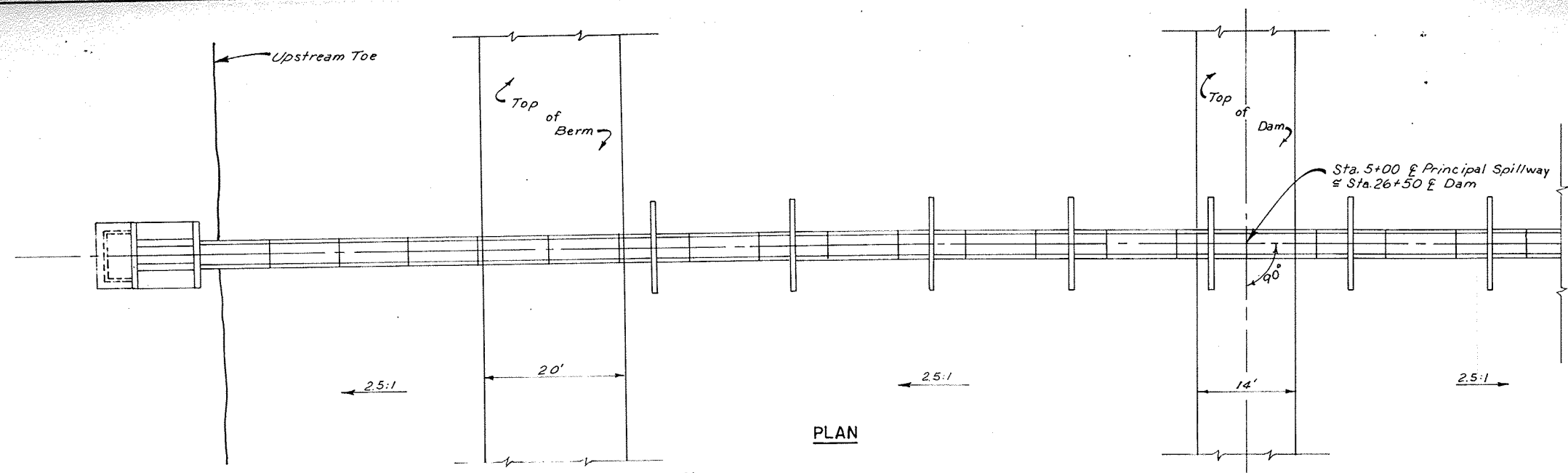


DETAILS OF STRAP "B" (Before Bending)

1/2" x 2" Galv. machine bolts w/ flat washers, lock washers and nuts.

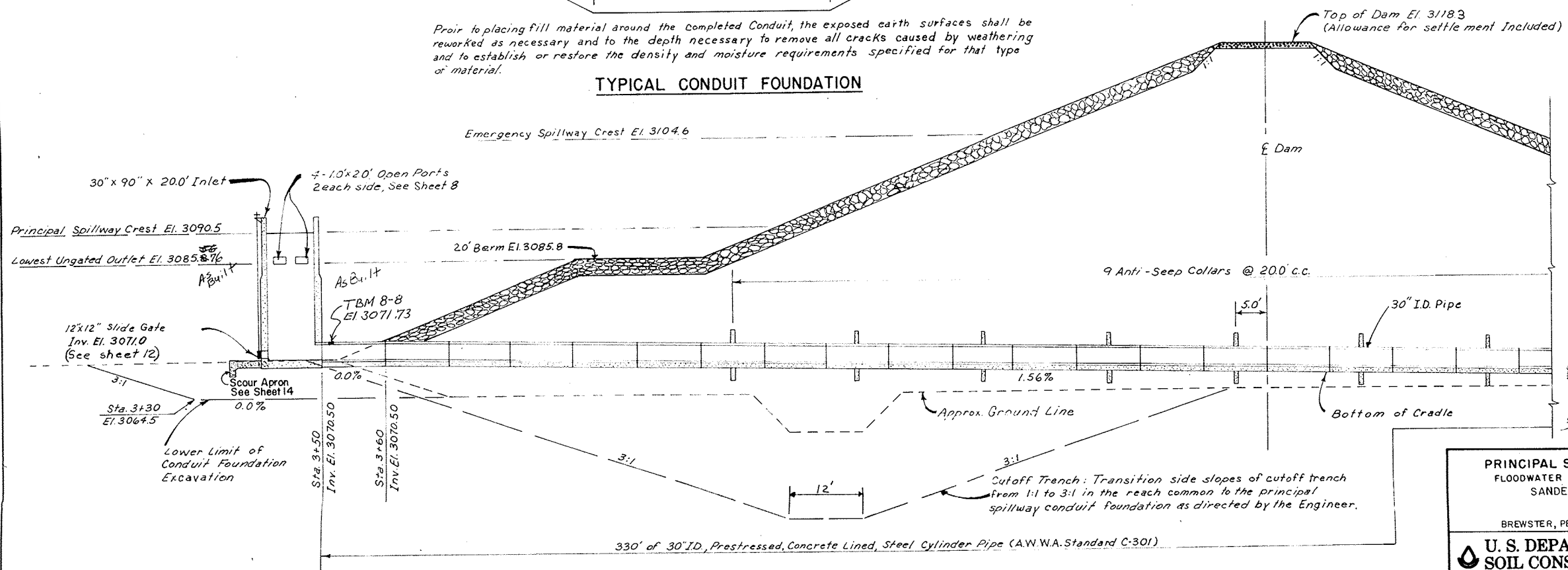


EMBANKMENT FOUNDATION DRAIN FLOODWATER RETARDING STRUCTURE SITE No. 8 SANDERSON CANYON WATERSHED IN BREWSTER, PECOS, AND TERRELL COUNTIES, TEXAS			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designed W.L.B.	Date 2-77	By B.C.T.	
Drawn W.L.B.	Date 2-77	STATE CONSERVATION ENGINEER'S OFFICE	
Traced C.B.	Date 3-77	SHEET 4 OF 18	
Checked R.L.K.	Date 3-77	Drawing No. 4-E-35,901	



Prior to placing fill material around the completed Conduit, the exposed earth surfaces shall be reworked as necessary and to the depth necessary to remove all cracks caused by weathering and to establish or restore the density and moisture requirements specified for that type of material.

TYPICAL CONDUIT FOUNDATION



SECTION
PRINCIPAL SPILLWAY

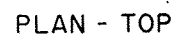
NO CHANGES IN CONSTRUCTION

As-Built Plans
3/30/78 JTB

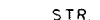
PRINCIPAL SPILLWAY—PLAN AND SECTION
FLOODWATER RETARDING STRUCTURE SITE No. 8
SANDERSON CANYON WATERSHED
IN
BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DESIGNED <u>W.L.B.</u>	DATE <u>2-77</u>	APPROVED BY <u>[Signature]</u>
DRAWN <u>W.L.B.</u>	DATE <u>2-77</u>	TITLE <u>PRINCIPAL SPILLWAY</u>
TRACED <u>C.B.</u>	DATE <u>3-77</u>	SHEET <u>5</u> OF <u>18</u>
CHECKED <u>R.L.K.</u>	DATE <u>3-77</u>	DRAWING NO. <u>4-E-35,901</u>



BAR : TYPES



TYPE

TYPE 19

TYPE 2

Notes:

1. Bar dimensions are out to out of bar.
2. Radius of bends equals 3 bar diameters for sizes equal to or less than #7.
3. The 2" and 3" dimensions from face of concrete to steel are clear distances.

As-Built Plans
3/30/78 *775*

0 2 4 6
Scale in Feet

QUANTITIES

Steel:

# 4 Bars	319-0	Lin. Ft.	213.00	Lbs.
# 5 Bars	2,204-10	Lin. Ft.	2,299.64	Lbs.
# 6 Bars	319-3	Lin. Ft.	1,230.51	Lbs.
# 7 Bars	314-6	Lin. Ft.	643.00	Lbs.
Total			4,386.15	Lbs.

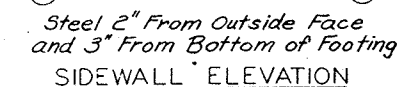
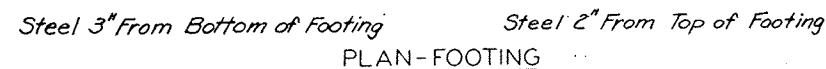
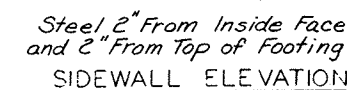
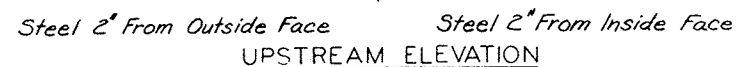
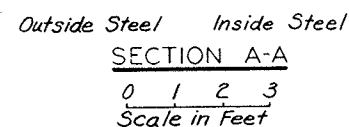
Length of #5 Bars = (1338 - 0) + (Length of Bars R1, R3, R4, and R5).
Length of #6 Bars = (700 - 3) + (Length of Bars R2).

$\text{Total Concrete} = (18.03) + (0.89V) = \underline{\hspace{2cm}} \boxed{22.48} \text{ Cu. Yds.}$

Notes:

1. For Spigot Wall Fitting, See Detail Sheet 7
2. For Trash Rack, Gratings, Sleeves and Bolts, See Detail Sheet 12
3. For Construction Joints, See Detail Sheet 12
4. For Slide Gate Details, See Sheet 12
5. For Concrete Apron Details, See Sheet 14

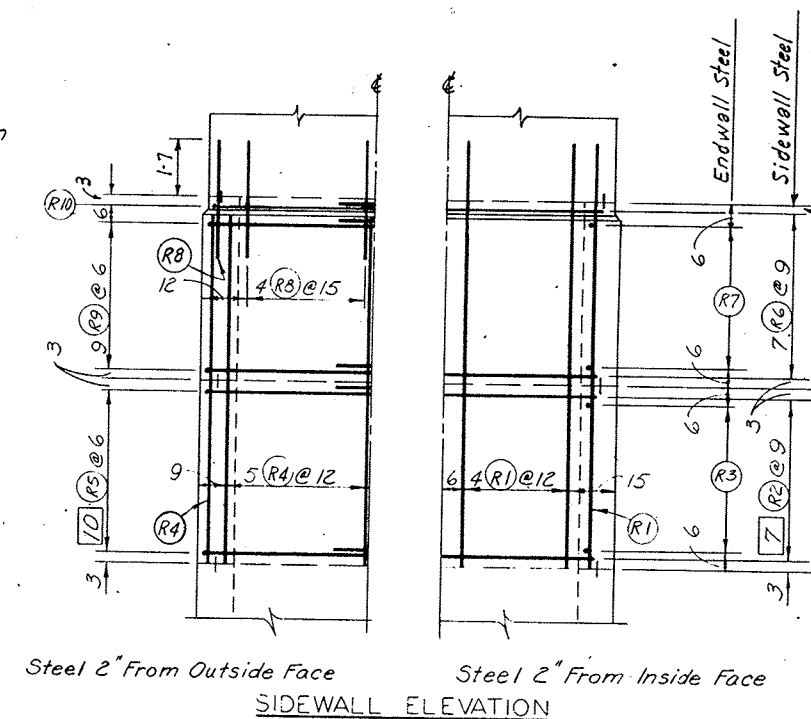
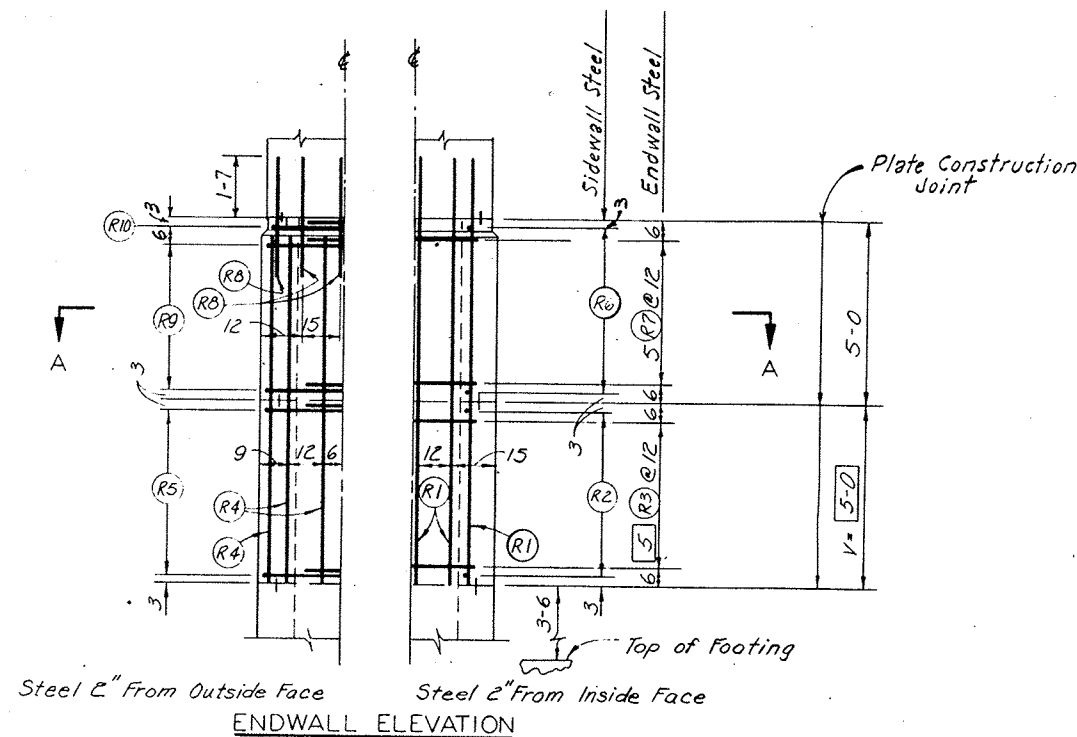
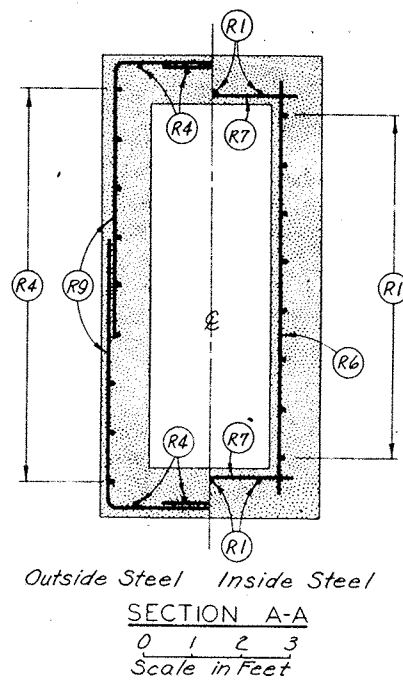
<p align="center">PRINCIPAL SPILLWAY INLET FLOODWATER RETARDING STRUCTURE SITE NO. 8 SANDERS CANYON WATERSHED IN BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS</p>	
<p align="center">U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE</p>	
<p>Designed <i>W.L.B.</i> <i>5-76</i></p> <p>Drawn <i>K.C.P.</i> <i>5-76</i></p> <p>Traced <i>K.C.P.</i> <i>5-76</i></p> <p>Checked <i>R.L.K.</i> <i>3-77</i></p>	<p>Date <i>5-76</i></p> <p>Approved by <i>LEO. BASTENHORN & WATKINS PLANNING CO.</i> Title <i>FOOT WORTH, TEXAS</i></p> <p><i>4771</i></p> <p>Title <i>STATE CONSERVATION ENGINEER, S. C. S.</i> <i>TERRELL, TEXAS</i></p> <p>Sheet <i>Drawing No.</i></p> <p>No. <i>8</i> of <i>18</i></p> <p align="right">4-E-35,901</p>



0 2 4
Scale in Feet
Unless Otherwise Shown

NO CHANGES IN CONSTRUCTION

© 1999 Blackwell Science Ltd *Journal of Internal Medicine* 245: 141–148

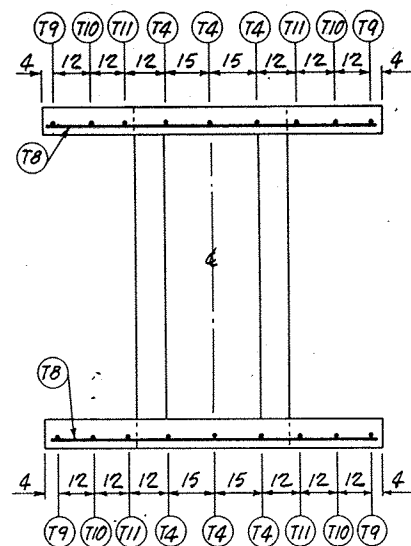


STANDARD OPEN RISER	
STANDARD DWG. NO. ES-3130-2020 R	
DATE 3-67	SHEET 3 OF 4
ADAPTED FROM	
STANDARD COVERED RISER	
DESIGN CONSTANTS $f'_c = 4000$ psi $f'_c = 1600$ psi $n = 8$ $f_s = 20,000$ psi	
STANDARD DWG. NO. ES-3030-2520 R	
DATE 5-65	SHEET 3 OF 4

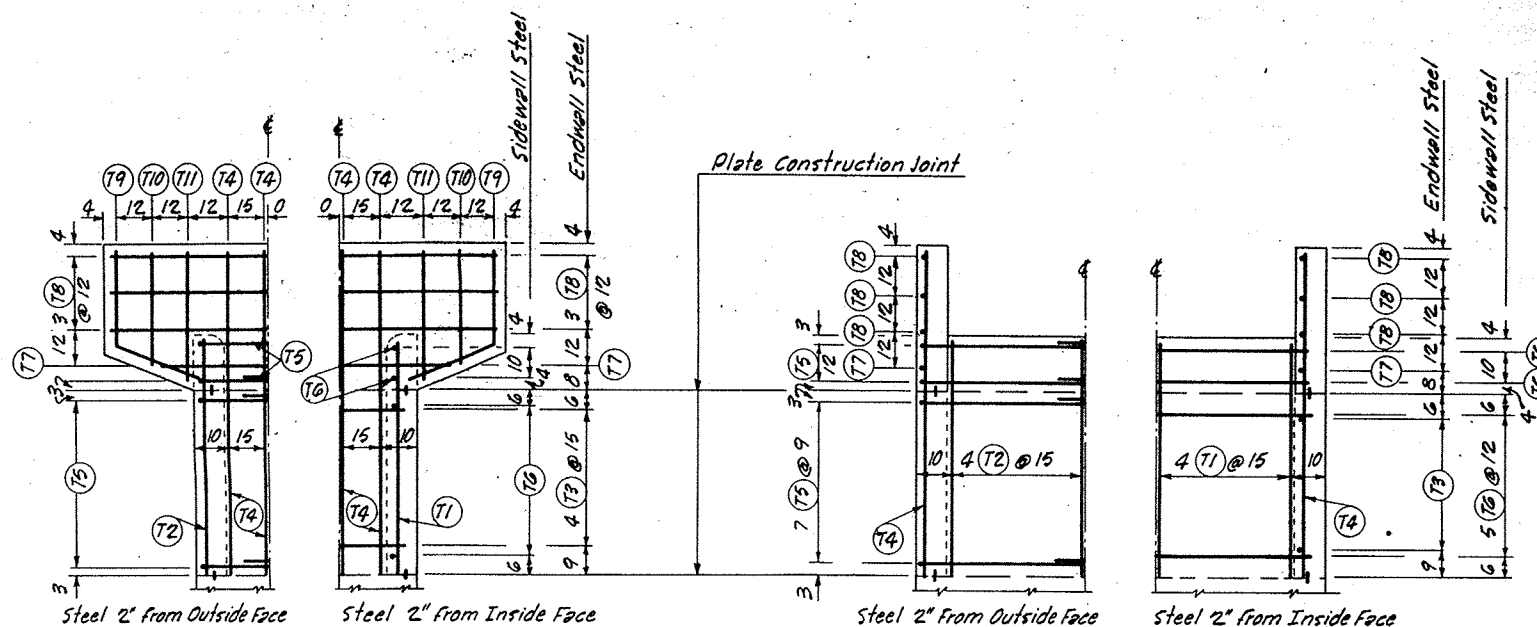
As-Built Plans
NO CHANGES IN CONSTRUCTION
3/20/78 JTB

0 2 4
Scale in Feet
Unless Otherwise Shown

STEEL PLACEMENT-PRINCIPAL SPILLWAY INLET FLOODWATER RETARDING STRUCTURE SITE NO. 8 SANDERSON CANYON WATERSHED IN BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Designed <u>W. L. B.</u> 5-76	Approved by <u>HEAD, ENGINEERING & WATERWAYS PLANNING UNIT, TULSA DISTRICT, TEXAS</u>
Drawn <u>K. C. P.</u> 5-76	Title <u>STATE CONSERVATION ENGINEER, S.C.S., TEXAS</u>
Traced <u>K. C. P.</u> 5-76	Sheet <u>10</u>
Checked <u>R. L. K.</u> 3-77	Drawing No. <u>4-E-35,901</u>



PLAN-TOP



ENDWALL ELEVATION

SIDEWALL ELEVATION

Cut or shift steel where necessary to clear the Open Ports 2"

0 1 2 3 4 5
Scale in Feet

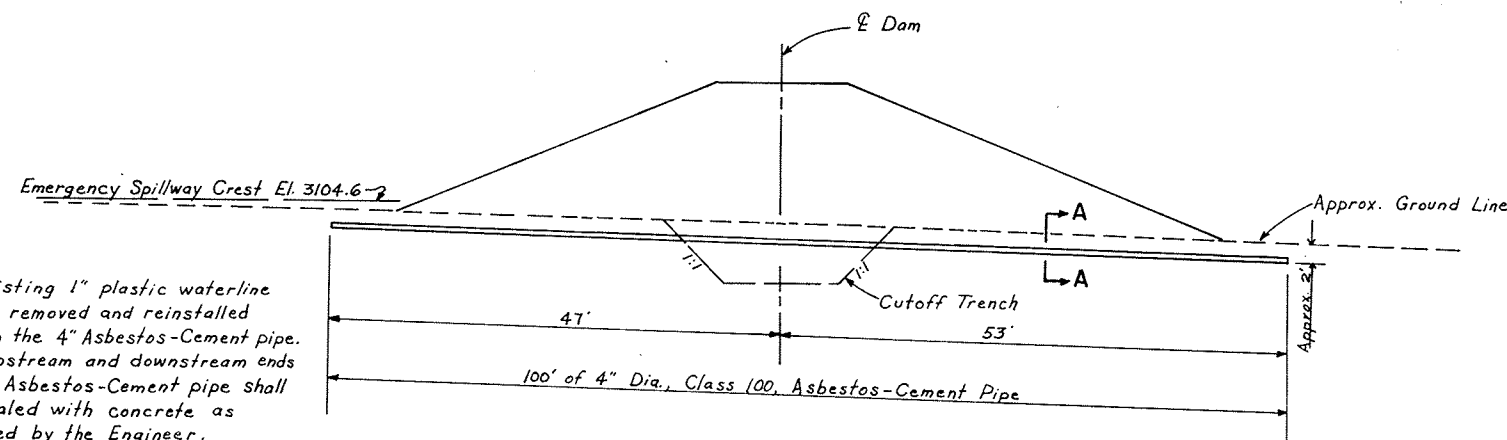
As-Built Plans

NO CHANGES IN CONSTRUCTION

3/30/78

STANDARD OPEN RISER		
DESIGN CONSTANTS	$f'_c = 4000$ psi	$f_c = 1600$ psi
	$n = 8$	$f_s = 20,000$ psi
STANDARD DWG. NO.	ES-3130-2020R	
DATE	SHEET 4 OF 4	

STEEL PLACEMENT - PRINCIPAL SPILLWAY INLET			
FLOODWATER RETARDING STRUCTURE SITE NO. 8			
SANDERS CANYON WATERWHEEL			
IN			
THE WATERWHEEL AND TAILRACE, TEXAS			
U. S. DEPARTMENT OF AGRICULTURE			
SOIL CONSERVATION SERVICE			
Designed	W.L.B.	5-76	Approved by
Drawn	K.C.P.	5-76	HEAD, ENGINEERING & WATERWAYS PLANNING UNIT,
Traced	K.C.P.	5-76	FORT WORTH, TEXAS
Checked	R.L.K.	3-77	STATE CONSERVATION ENGINEER, TEXAS
SHEET			4-E-35,901
No. 11			
of 18			



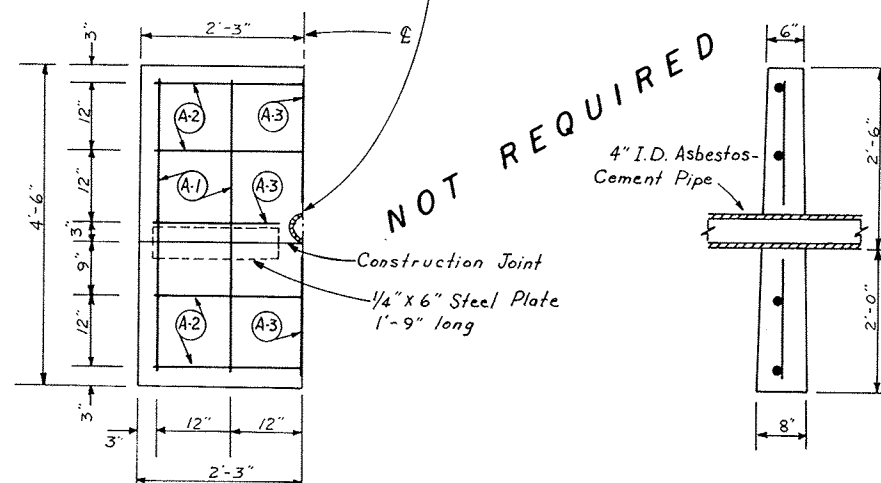
The existing 1" plastic waterline shall be removed and reinstalled through the 4" Asbestos-Cement pipe. The upstream and downstream ends of the Asbestos-Cement pipe shall be sealed with concrete as directed by the Engineer.

SECTION

ENCASEMENT PIPE FOR WATERLINE

(Approx. Sta. 14+10 & Dam)

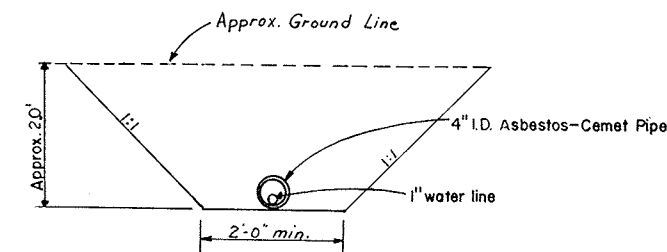
2 layers of 8" wide, heavy, smooth surface roofing felt to extend over the surface of the pipe. Approx. Weight - 55 lbs. per square. Seal any joints, laps or splices with asphaltic mastic.



ANTI-SEEP COLLAR

For Typical Bar Types Refer To A.C.I. Standard 315

Bar No.	Qty.	Lgth.	Total Length	Size	Type	A	B	C	D	E	F	G	H	J	O
A-1	4	4'-2"	16'-8"	4	Str.										
A-2	4	4'-2"	16'-8"	4	Str.										
A-3	4	1'-8"	6'-8"	4	Str.										
Total Steel in One Anti-Seep Collar (Size 4) = 40'-0" = 26.72 lbs.															
Total Reinforced Concrete in One Anti-Seep Collar = 0.44 cu. yds.															



SECTION A-A

Note:

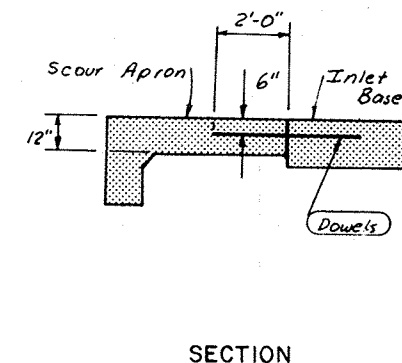
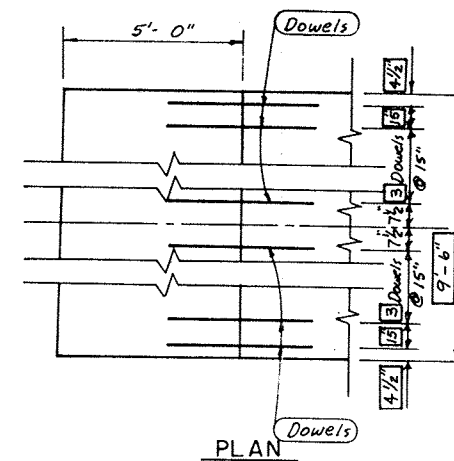
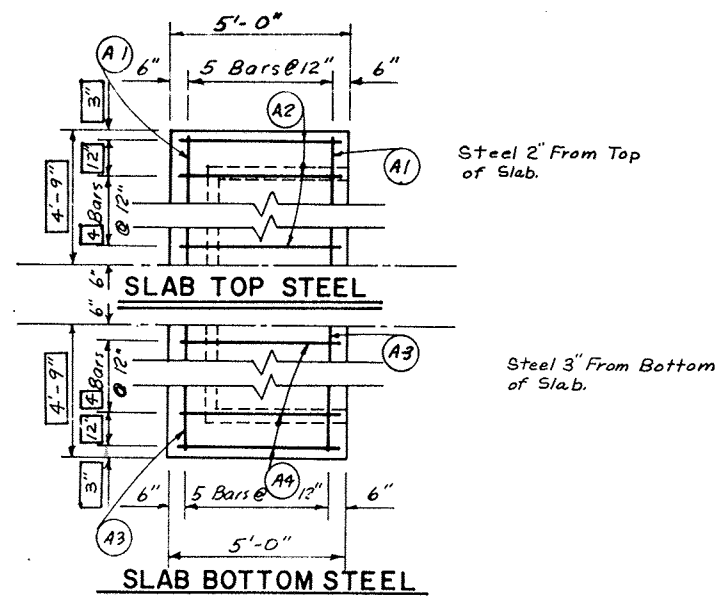
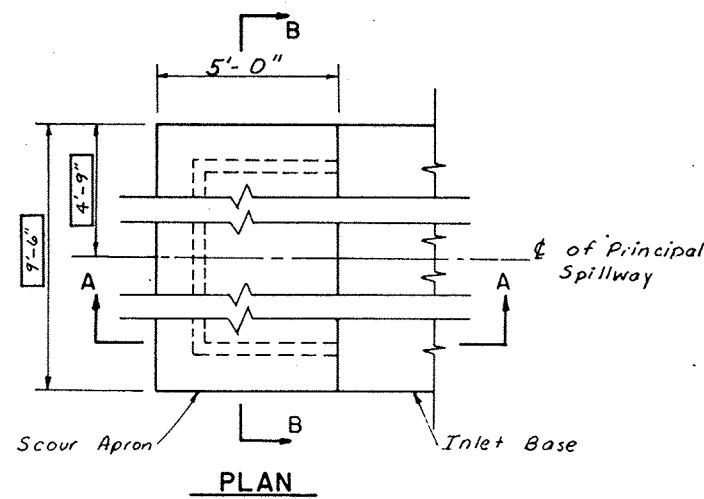
All Asbestos-Cement Pipe and Couplings shall be Class 100, Pressure Pipe and shall conform to the requirements of Materials Specification 545.

The installation of the pipe shall be with ordinary bedding that provides uniform and continuous bedding contact throughout the entire line. Joining shall be in accordance with the manufacturers recommendations. Backfill and compaction shall be as specified in Construction Specification 23A.

NO CHANGES IN CONSTRUCTION

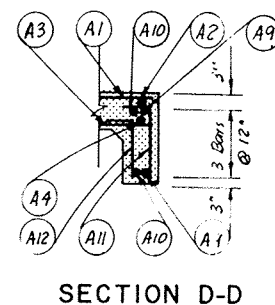
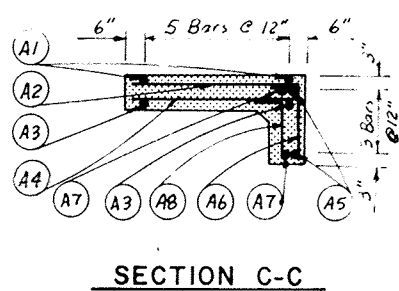
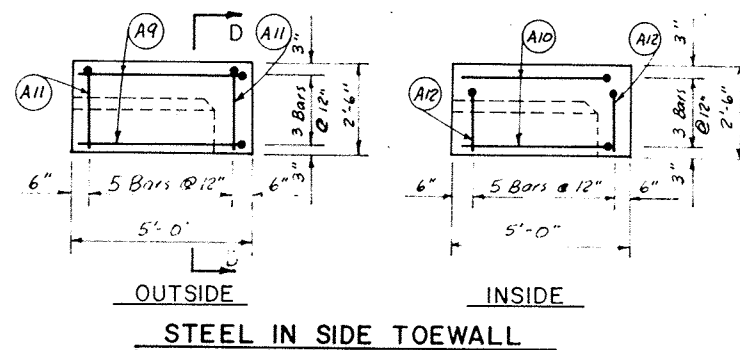
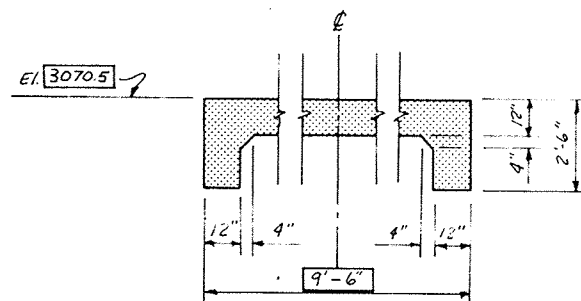
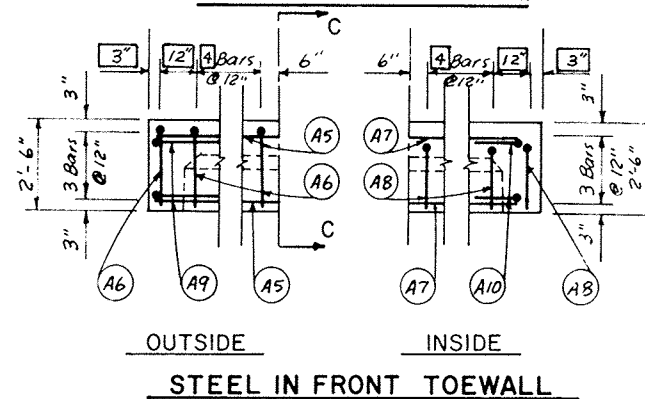
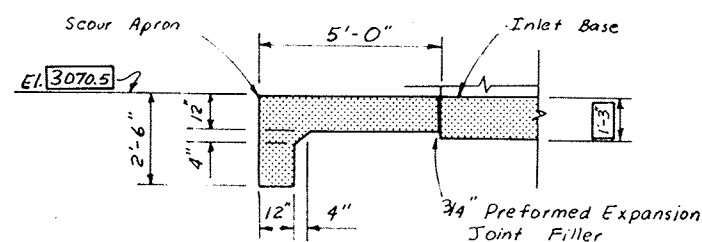
As-Built Plans 3/20/78 873

ENCASEMENT PIPE FOR WATERLINE FLOODWATER RETARDING STRUCTURE SITE NO. 8 SANDERSON CANYON WATERSHED	
IN BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
DESIGNED: W. L. B.	DATE: 3-77
DRAWN: W. L. B.	DATE: 3-77
TRACED: GP	DATE: 3-77
CHECKED: R. L. K.	DATE: 3-77
APPROVED BY: [Signature]	
STATE CONSERVATION ENGINEER S. C. S.	
DRAWING NO. 4-E-35,901	



DOWEL BAR DETAILS

Note: The scour apron shall be fastened to the inlet base with dowels of No. 6 deformed reinforcing steel, 4 feet long.
8 dowels required.



BAR TYPES

STEEL SCHEDULE							
Mark	Size	Quantity	Length	Type	B	C	Total Length
A1	5	5	9-0	str.			45-0
A2	5	10	4-7	str.			45-10
A3	4	5	9-0	str.			45-0
A4	4	10	4-7	str.			45-10
A5	5	3	9-0	str.			27-0
A6	5	10	2-10	17	2-0	0-10	28-4
A7	4	3	9-0	str.			27-0
A8	4	10	2-2	17	1-6	0-8	21-8
A9	5	6	6-3	17	1-8	4-7	37-6
A10	4	6	5-4	17	1-3	4-1	32-0
A11	5	10	2-10	17	2-0	0-10	28-4
A12	4	10	2-2	17	1-6	0-8	21-8
Total Steel in Scour Apron (Size No. 5) = 212'-0"							
= 221.1 lbs.							
Total Steel in Scour Apron (Size No. 4) = 193'-2"							
= 129.0 lbs.							
Total Steel = 350.1 lbs.							
Total Reinforced Concrete in Scour Apron = 2.77 Cu Yds.							

Note: All Concrete shall equal or exceed Class 4000.

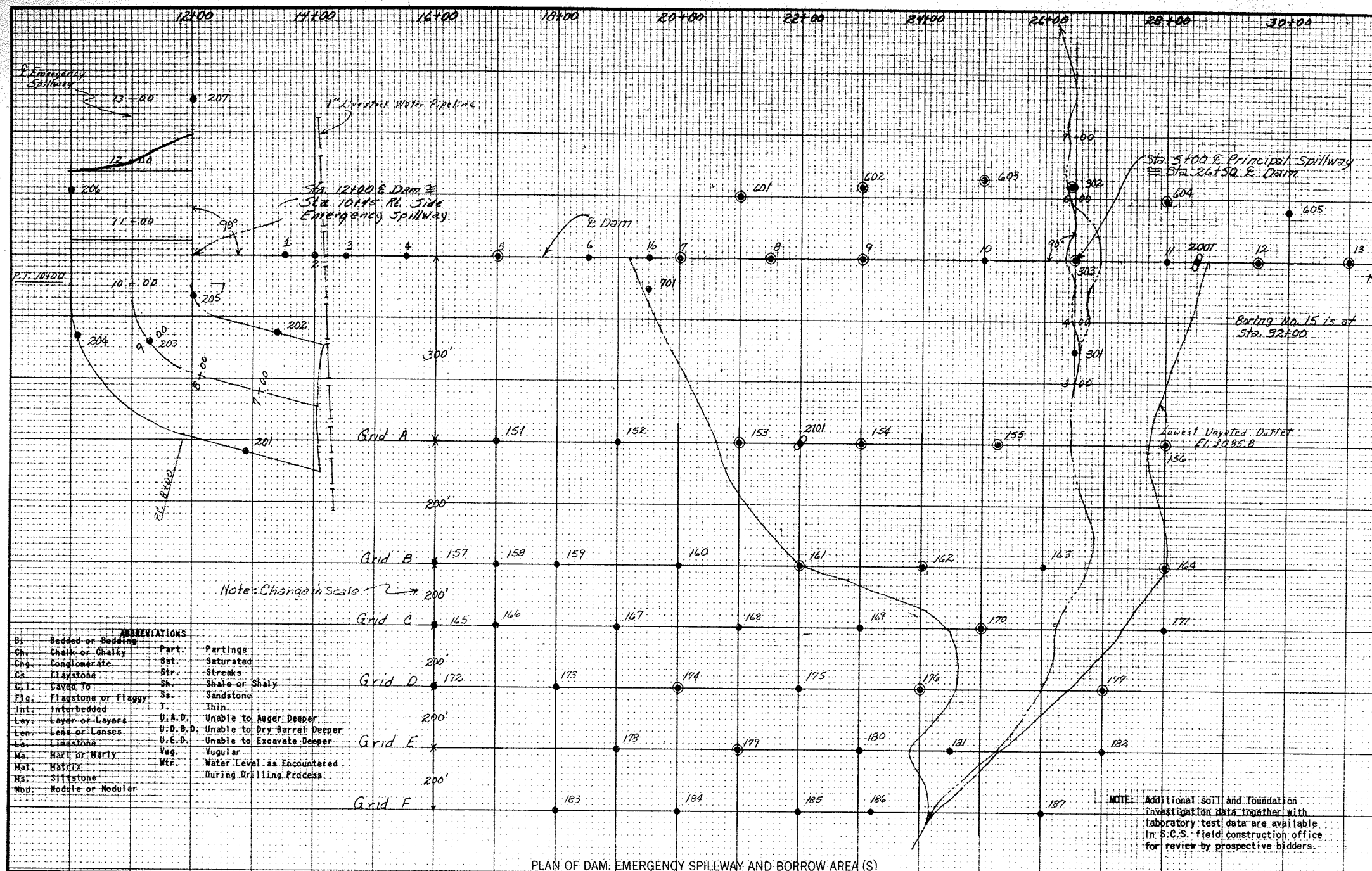
Cubic Yards of Concrete in Scour Apron =
 $0.460 + (0.185)(\text{width in feet}) + (0.058)(\text{width in feet})$

As-Built Plans

NO CHANGES IN CONSTRUCTION

3/30/78 JTB

PRINCIPAL SPILLWAY INLET SCOUR APRON FLOODWATER RETARDING STRUCTURE SITE NO. 8 SANDERSON CANYON WATERSHED IN BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
DESIGNED BY W. L. B.	DATE 5-77	APPROVED BY [Signature]	
DRAWN BY L. G. C.	DATE 5-77	CHECKED BY [Signature]	
TRACED BY L. G. C.	DATE 5-77	SHEET 4	DRAWING NO. 4-E-35, 901
CHECKED BY A. V. T.	DATE 5-77	of 18	



ABBREVIATIONS

Bs. Bedded or Bedding	Part. Partings
Ch. Chalk or Chalky	Sat. Saturated
Cng. Conglomerate	Str. Streaks
Cl. Claystone	Sh. Shale or Shaly
U.I. LAYED TO	Ss. Sandstone
Flg. Flagstone or flaggy	I. Thin
Int. Interbedded	U.A.D. Unable to Auger Deeper
Lay. Layer or Layers	U.O.B.D. Unable to Dry Barrel Deeper
Len. Lens or Lenses	U.E.D. Unable to Excavate Deeper
Lo. Limestone	Veg. Vulgar
Ma. Marl or Marly	Wtr. Water Level as Encountered
Mat. Matrix	
Ms. Siltstone	
Mod. Mottled or Modular	

LEGEND

SYMBOLS

UNCONSOLIDATED MATERIAL

gravel	sand	silt	clay	cobbles, boulders
gravel, sandy	sand, gravelly	silt, gravelly	clay, gravelly	peat or muck
gravel, silty	sand, silty	silt, sandy	clay, sandy	
gravel, clayey	sand, clayey	silt, clayey	clay, silty	

CONSOLIDATED MATERIAL

Sedimentary Rocks

Conglomerate	shale	limestone	coal
Cng.	sh.	ls.	
breccia	siltstone	dolomite	gypsum
br.	Ms.	dol.	gyp.
sandstone	marl	chalk	chert
ss.		ch.	cht.

Metamorphic Rocks

gneiss	schist
quartzite	slate
marble	soapstone
	talc
	serpentine

Igneous Rocks

intrusive	extrusive
pyroclastic	
undifferentiated	

Other Symbols

- hole logged only
- ⊙ hole sampled
- strike and dip
- pit or trench

ABBREVIATIONS

ang. angular	lam. laminated	G gravel, gravelly
bld. boulders (> 12")	lse. loose	S sand, sandy
calc. calcareous	mas. massive	M silt, silty
cali. caliche	med. medium	C clay, clayey
cav. cavities	mic. micaceous	O organic
cmt. cemented	mod. moderately	W well graded
cbl. cobbles (3"-12")	n. r. no recovery	P poorly graded
cpt. Compact	per. permeable	
con. concretions	po. poorly	
crn. crystalline	rdd. rounded	
ds. dense	sl. soft	
dip. dipping	sft. some	
d.s. downstream	sl. slowly	
fn. fine	stf. stiff	
frm. firm	t.b. thin-bedded	
frac. fractured	tuff. tufaceous	
frg. fragments	u.s. upstream	
fri. friable	var. variable	
grn. grain	vl. very	
gyp. gypseous	w. with	
hd. hard	wea. weathered	
h. highly	w.l. (date) static water level	

TEST HOLE NUMBERING SYSTEM

Centerline of dam	1 - 99	Stream channel	401 - 499
Borrow area	101 - 199	Relief wells	501 - 599
Emergency spillway	201 - 299		601 - 699
Centerline of outlet structure	301 - 399		701 - 799

UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOLS

GW	Well graded gravels; gravel-sand mixtures
GP	Poorly graded gravels
GM	Silty gravels; gravel-sand-silt mixtures
GC	Clayey gravels; gravel-sand-clay mixtures
SW	Well graded sands; sand-gravel mixtures
SP	Poorly graded sands
SM	Silty sand
SC	Clayey sands; sand-clay mixtures
ML	Silts with liquid limit of 50 or less
MH	Silts with liquid limit above 50
CL	Clays with liquid limit of 50 or less
CH	Clays with liquid limit above 50
OL	Organic silts and clays with liquid limit of 50 or less
OH	Organic silts and clays with liquid limit above 50

PLAN AND PROFILES FOR GEOLOGIC INVESTIGATIONS

FLOODWATER RETARDING STRUCTURE SITE No. 8

SANDERSON CANYON WATERSHED

IN

BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

Investigated by G. Evans Date 4-76

Title _____

Checked by _____

Plotted by K.C.P. 4-76 Sheet 15 Drawing No. 4-E-35,901

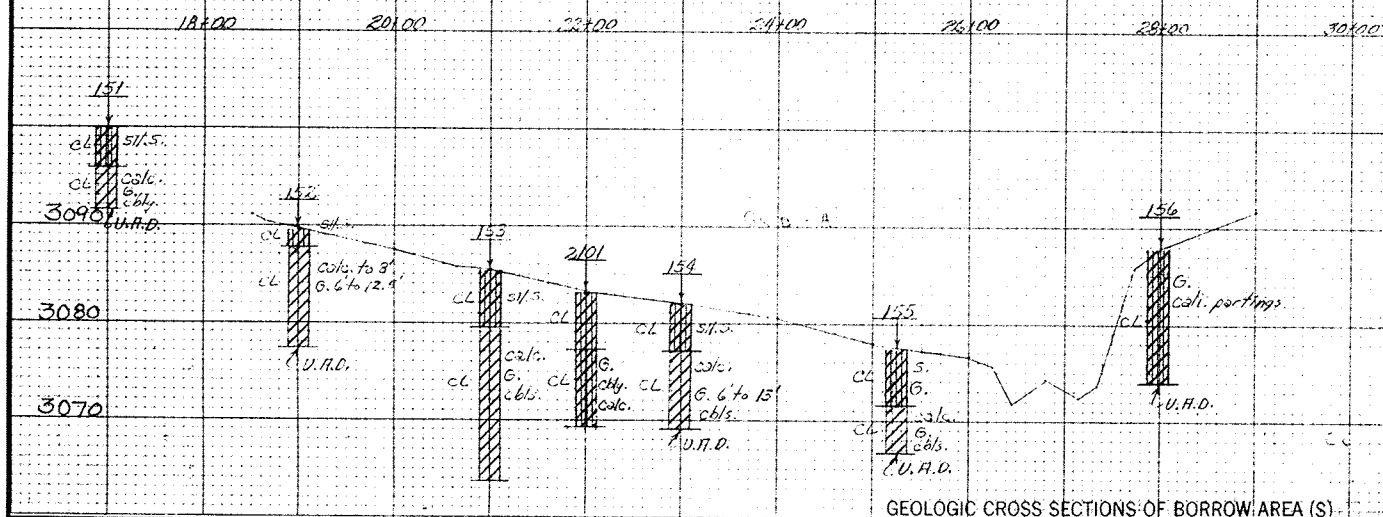
Checked by F.W.G. 4-76 e/18

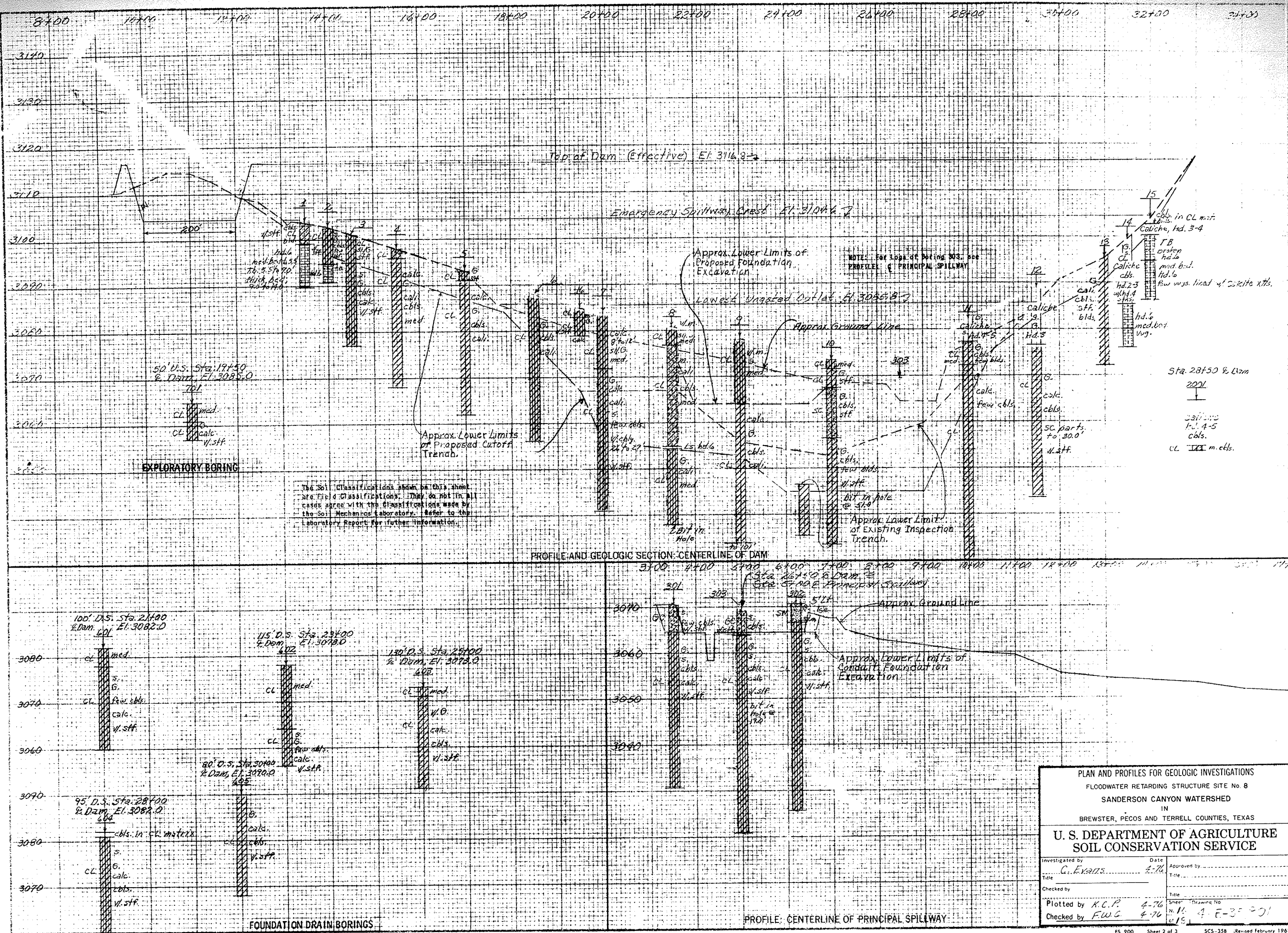
TEST HOLE NUMBERING SYSTEM

	Combina- tion Rig	Power Auger	Hand Borings	Trench or Pit Excava- tions	Natural Outcrops, Streambanks, and Gullies
Centerline of Dam	1-49	51-99	100-1099	2001-2099	3001-3099
Borrow Area	101-149	151-199	1101-1199	2101-2199	3101-3199
Emergency Spillway	201-249	251-299	1201-1299	2201-2299	3201-3299
Principal Spillway	301-349	351-399	1301-1399	2301-2399	3301-3399
Stream Channels	401-449	451-499	1401-1499	2401-2499	3401-3499
Exploratory Borings	501-549	551-599	1501-1599		
Foundation Drain	601-649	651-699	1601-1699	2501-2599	3501-3599
Miscellaneous	701-749	751-799	1701-1799	2701-2799	3701-3799

The Soil Classifications shown on this sheet are Field Classifications. They do not in all cases agree with the classifications made by the Soil Mechanics Laboratory. Refer to the Laboratory Report for further information.

GEOLOGIC CROSS SECTIONS OF BORROW AREA (S)





PLAN AND PROFILES FOR GEOLOGIC INVESTIGATIONS

FLOODWATER RETARDING STRUCTURE SITE No. 8

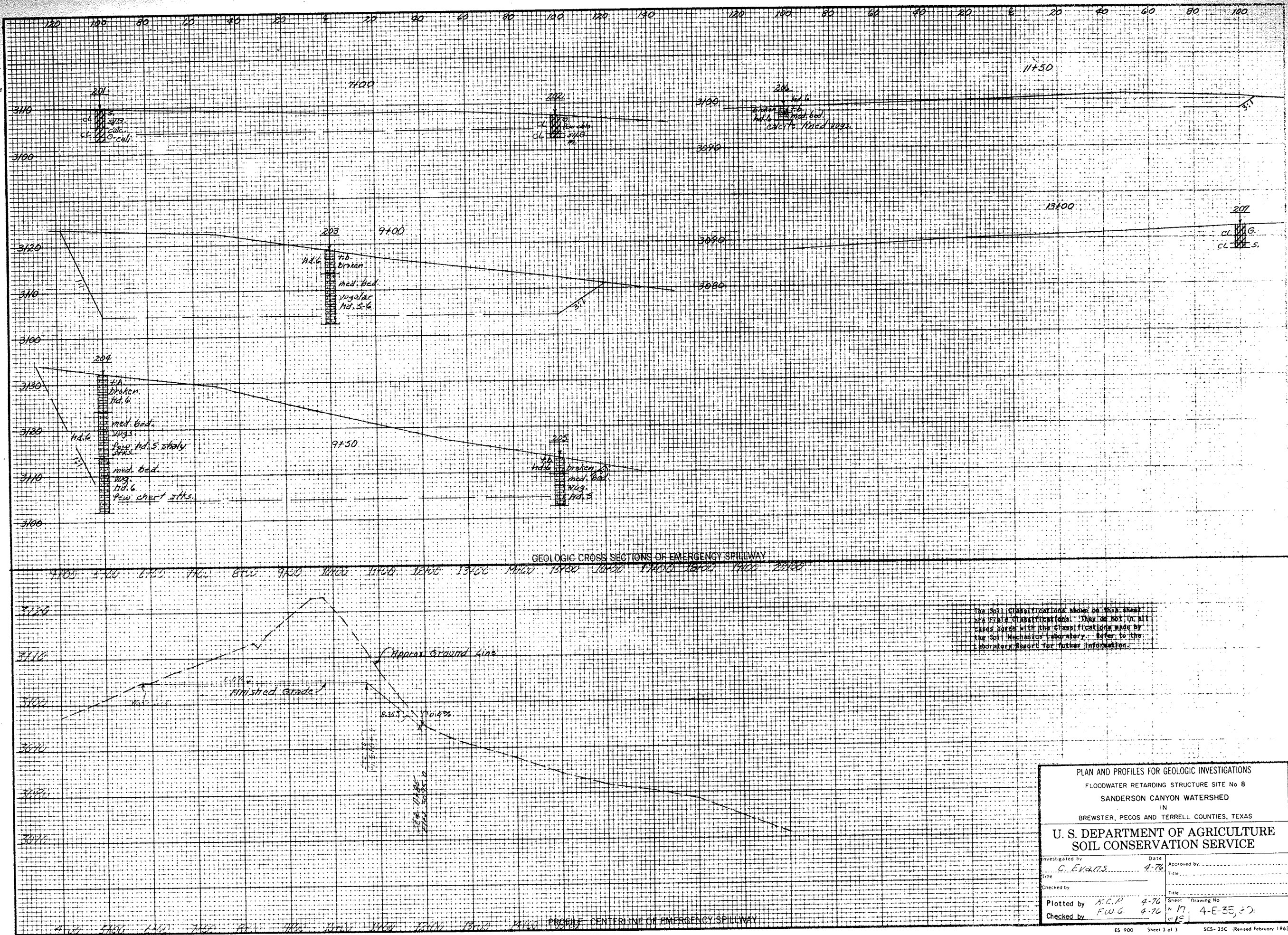
SANDERSON CANYON WATERSHED

IN

BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

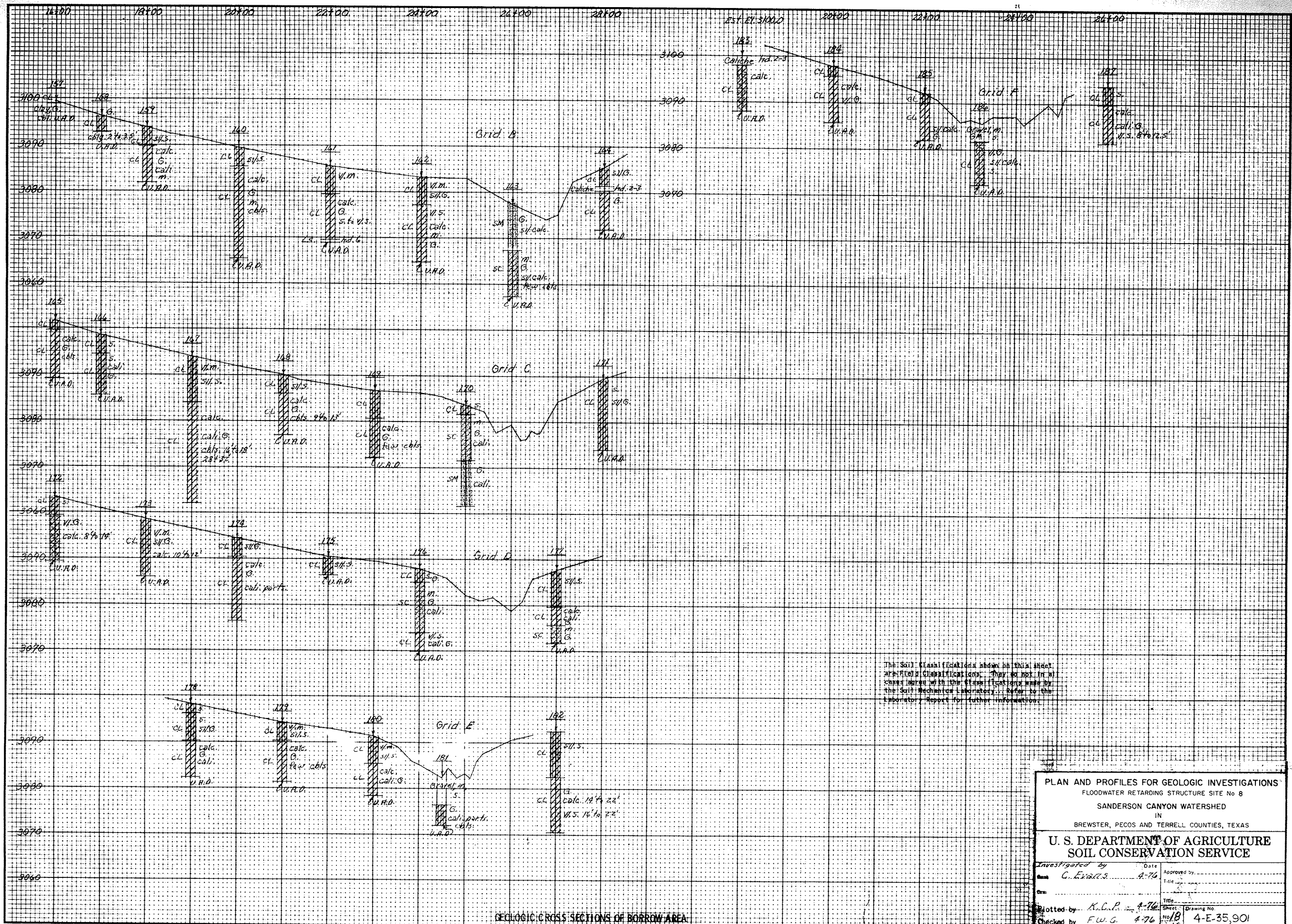
Investigated by <i>G. Evans</i>	Date <i>4-76</i>	Approved by _____
Title _____	_____	_____
Checked by _____	_____	_____
Plotted by <i>K.C.P.</i>	<i>4-76</i>	Sheet Drawing No. <i>N. 11 4-E-35 301</i>
Checked by <i>F.W.C.</i>	<i>4-76</i>	<i>15</i>



PLAN AND PROFILES FOR GEOLOGIC INVESTIGATIONS
FLOODWATER RETARDING STRUCTURE SITE No 8
SANDERSON CANYON WATERSHED
IN
BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Investigated by C. E. V. A. S.	Date 4-76	Approved by Title
Checked by	Title	
Plotted by K. C. P.	4-76	Sheet N 17
Checked by F. W. G.	4-76	Drawing No. 4-E-35, 20



GEOLOGIC CROSS SECTIONS OF BORROW AREA

PLAN AND PROFILES FOR GEOLOGIC INVESTIGATIONS
FLOODWATER RETARDING STRUCTURE SITE No 8
SANDERSON CANYON WATERSHED
IN
BREWSTER, PECOS AND TERRELL COUNTIES, TEXAS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Investigated by _____ Date _____
Checked by C. E. HALLS 4-76
Plotted by K. L. P. 4-76
Checked by F. W. G. 4-76
Approved by _____
Title _____
Drawing No. 4-E-35,901
Sheet 18 of 18