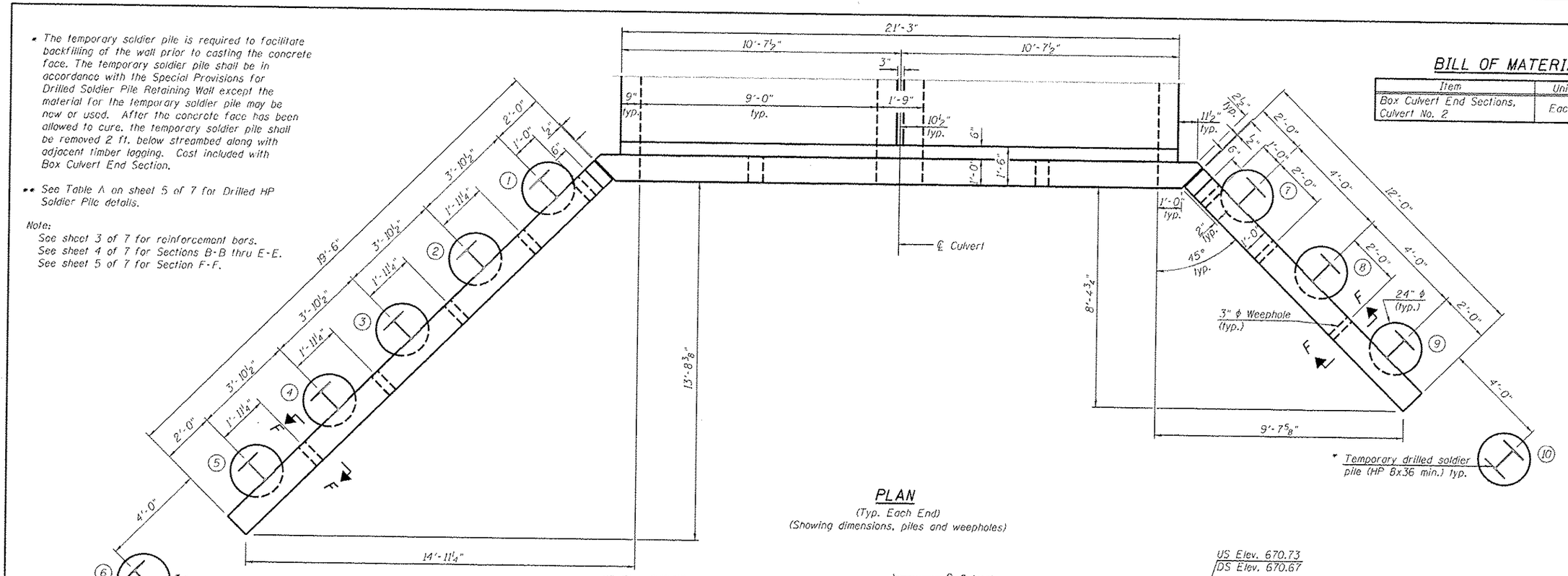
* The temporary soldier pile is required to facilitate backfilling of the wall prior to casting the concrete face. The temporary soldier pile shall be in accordance with the Special Provisions for Drilled Soldier Pile Retaining Wall except the material for the temporary soldier pile may be new or used. After the concrete face has been allowed to cure, the temporary soldier pile shall be removed 2 ft. below streambed along with adjacent timber lagging. Cost included with Box Culvert End Section.

** See Table A on sheet 5 of 7 for Drilled HP Soldier Pile details.

Note:
See sheet 3 of 7 for reinforcement bars.
See sheet 4 of 7 for Sections B-B thru E-E.
See sheet 5 of 7 for Section F-F.

BILL OF MATERIAL

Item	Unit	Total
Box Culvert End Sections, Culvert No. 2	Each	2



PLAN
(Typ. Each End)
(Showing dimensions, piles and weepholes)

END ELEVATION
(Showing dimensions, piles and weepholes)

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DEPARTMENT OF TRANSPORTATION

BOX CULVERT END SECTION DETAILS
STRUCTURE NO. 050-2056
SHEET NO. 2 OF 7 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
786	(110) BR-3	LASALLE	69	35
		CONTRACT NO. 66B19		
	ILLINOIS FED. AID PROJECT			

Δ Added Sheet 1-3-14

GENERAL NOTES

Layout of slope [illegible] may be varied to suit ground conditions in the field as directed by the Engineer.

The design fill height for this structure is maximum 2.27 feet and minimum 2.00 feet at edge of shoulder. The precast concrete box culvert sections shall conform to the requirements of ASTM C1577.

Areas of the precast box culvert in contact with cast-in-place concrete shall be sand blasted, cleaned, and wetted prior to placing concrete in the field according to Article 503.09(b) of the Standard Specifications.

In order to minimize excessive deflection and/or stresses in the soldier piles, compaction equipment used within 4 feet of the back face of the timber lagging shall be limited to lightweight mechanical tampers, rollers, or vibratory systems.

Build top of headwalls parallel to the grade lines.

All construction joints shall be bonded according to Article 503.09 of the Standard Specifications.

End Sections will be paid for at the contract unit price each for BOX CULVERT END SECTIONS, Culvert No. 2 as outlined in Section 540 of the Standard Specifications.

The box culvert end section shall be built in the field and a precast option is not allowed. Class SI concrete shall be used for the concrete cast in the field for the cutoff walls, portions of the end sections being cast onto the end of the precast box sections, and the concrete facing for the walls.

Concrete, rebar, and welded wire fabric quantities and lengths calculated for the end sections may vary based upon the precast box culverts supplied.

The ends of the precast box sections adjacent to the end sections shall be formed without the tongue and groove shapes specified in Article 8.1 of ASTM C1577.

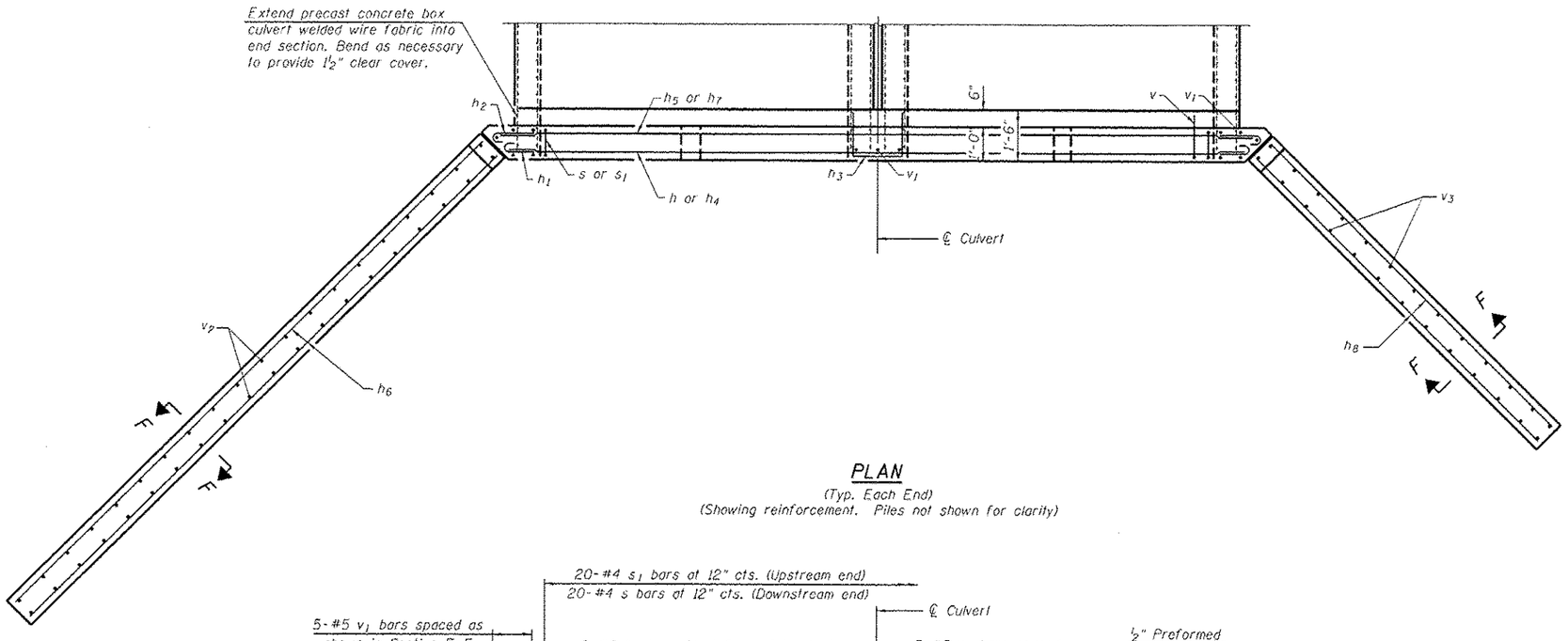
The longitudinal reinforcement of the welded wire fabric extending from the precast boxes into the end sections shall have a minimum area of 0.20 in²/ft. Substitution of reinforcement bars for welded wire fabric is not allowed.

The joints between precast box sections shall be seated and all voids filled with a mastic joint sealer. In addition, the joints shall be externally sealed on all four sides with a 13 inch wide external sealing band. The seal shall be centered over the joint, secured in place, and protected during the backfilling process.

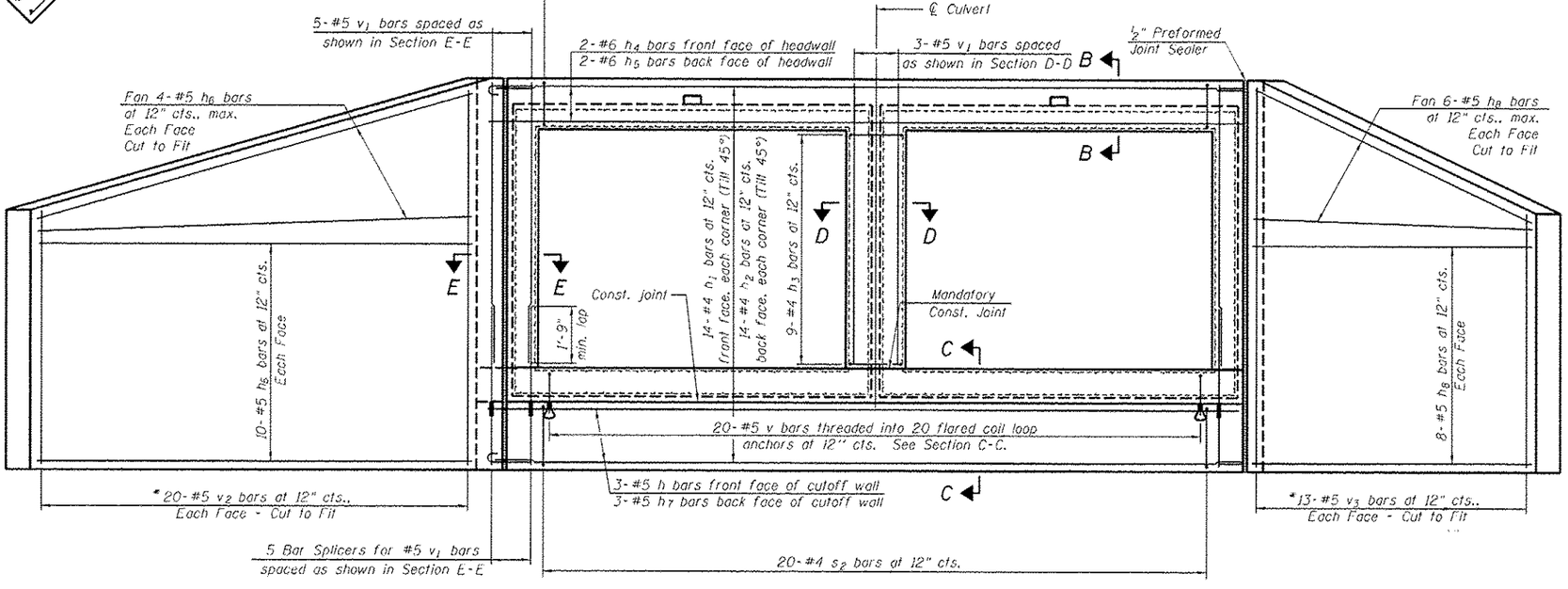
Contractor shall excavate behind existing abutments prior to removal of superstructure to balance front and back soil pressure.

Due to low fill, provide Membrane Waterproofing for Culverts over the top of the culvert. See Special Provisions.

Note:
See sheet 2 of 7 for dimensions, piles and weepholes.
See sheet 4 of 7 for Sections B-B thru E-E.
See sheet 5 of 7 for Section F-F.



PLAN
(Typ. Each End)
(Showing reinforcement. Piles not shown for clarity)



END ELEVATION
(Showing reinforcement. Piles not shown for clarity)

* See sheet 4 of 7 for Field Cutting Diagram..

Δ Added Sheet 1-3-14

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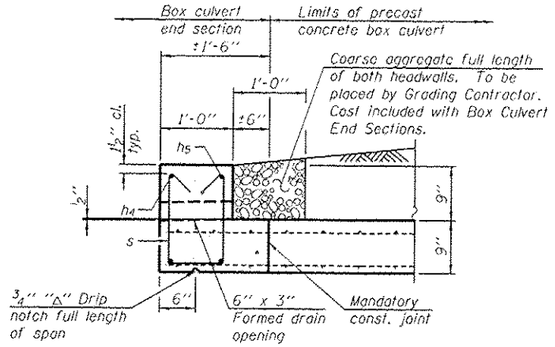
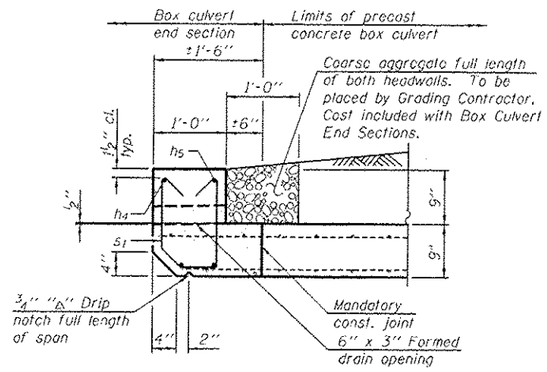
DEPARTMENT OF TRANSPORTATION

BOX CULVERT END SECTION DETAILS
STRUCTURE NO. 050-2056
SHEET NO. 3 OF 7 SHEETS

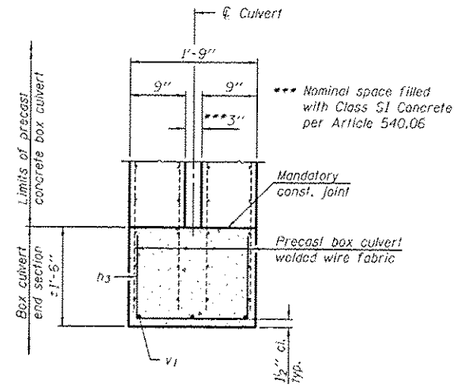
F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
786	(110) BR-3	LASALLE	69	36
		CONTRACT NO. 66B19		
	ILLINOIS FED. AID PROJECT			



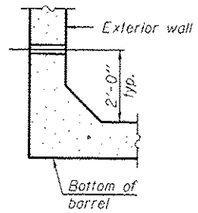
SECTION B-B
(Downstream Section)



SECTION B-B
(Upstream Section)

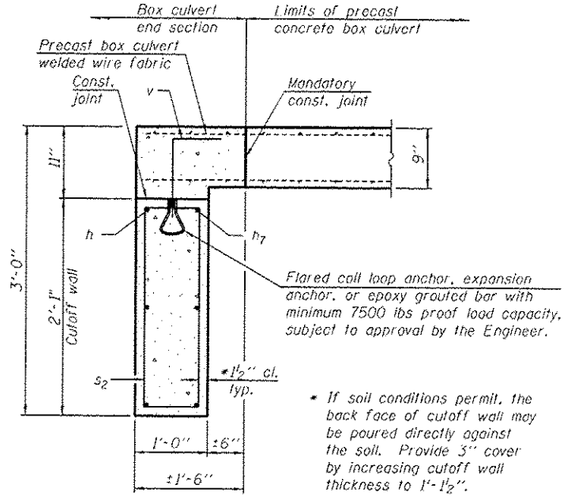


SECTION D-D
(Typ. Both Ends)

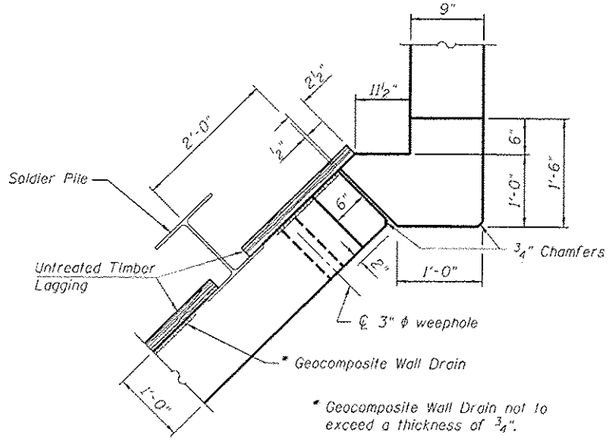


DRAIN DETAIL

Provide 3" ϕ drain holes in exterior walls at ±8' cts. See Article 503.11 of the Standard Specifications.

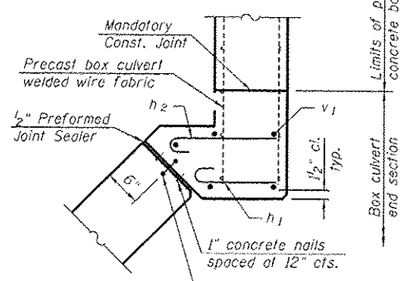


SECTION C-C

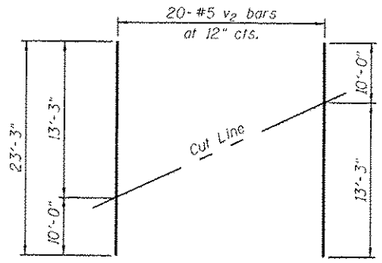


* Geocomposite Wall Drain not to exceed a thickness of ¾".

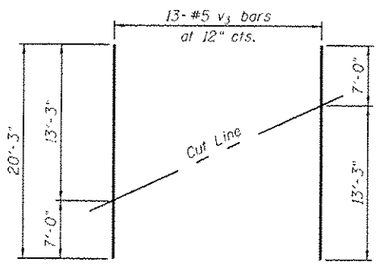
SECTION E-E
(Showing dimensions, wall drain, and weephole)



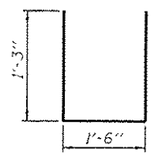
SECTION E-E
(Showing reinforcement and seal)



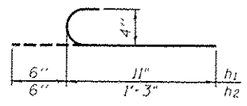
FIELD CUTTING DIAGRAM
Order v_2 bars full length. Cut to fit and use remainder of bar in opposite face.



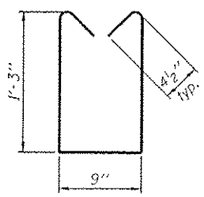
FIELD CUTTING DIAGRAM
Order v_3 bars full length. Cut to fit and use remainder of bar in opposite face.



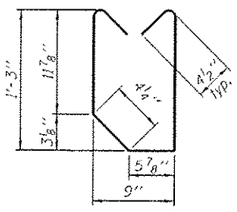
BAR h_3



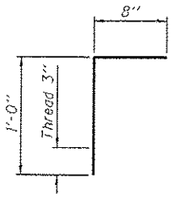
BARS h_1 and h_2



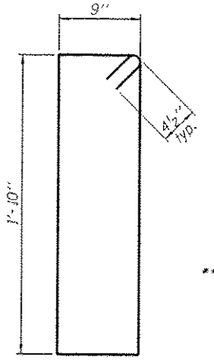
BAR s



BAR s_1



BAR v



BAR s_2

ONE END SECTION BILL OF MATERIAL
(For information only)

Bar	No.	Size	Length	Shape
h	3	#5	21'-6"	
h_1	28	#4	1'-5"	C
h_2	28	#4	1'-9"	C
h_3	9	#4	4'-0"	
h_4	2	#6	21'-6"	
h_5	2	#6	22'-10"	
h_6	28	#5	19'-3"	
h_7	3	#5	22'-10"	
h_8	28	#5	11'-9"	
** s	20	#4	4'-0"	
** s_1	20	#4	3'-10"	
s_2	20	#4	5'-11"	
v	20	#5	1'-8"	
v_1	13	#5	10'-4"	
v_2	20	#5	23'-3"	
v_3	13	#5	20'-3"	
Concrete Structures	Cu. Yd.	13.2		
Stud Shear Connectors	Each	91		
Reinforcement Bars	Pound	2,330		
Bar Splicers	Each	10		
Furnishing Soldier Piles (HP Section)	Foot	248		
Drilling and Setting Soldier Piles (in soil)	Cu. Ft.	456		
Untreated Timber Lagging	Sq. Ft.	346		
Concrete Box Culverts	Cu. Yd.	5.7		
Geocomposite Wall Drain	Sq. Yd.	10		

** Only s or s_1 bars are required for each end section.

The above pay items will not be measured for payment but shall be included in the contract unit price each for Box Culvert End Sections of the culvert number specified.

Δ Added Sheet 1-3-14

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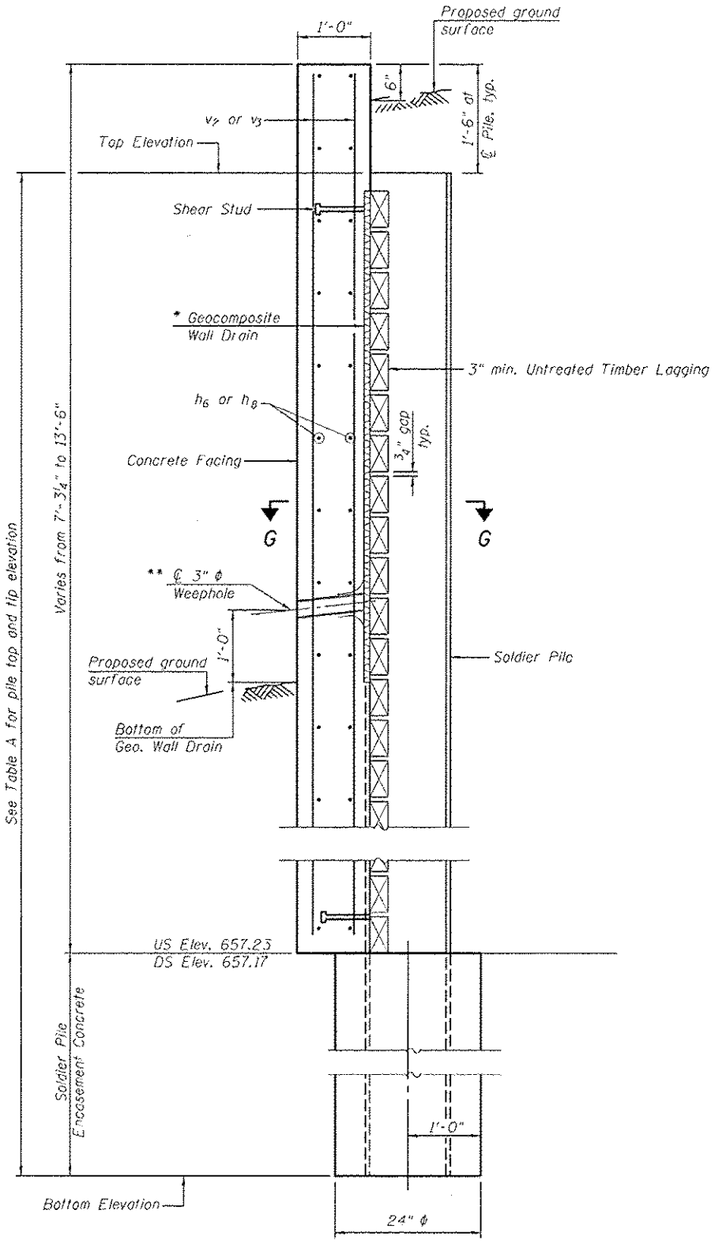
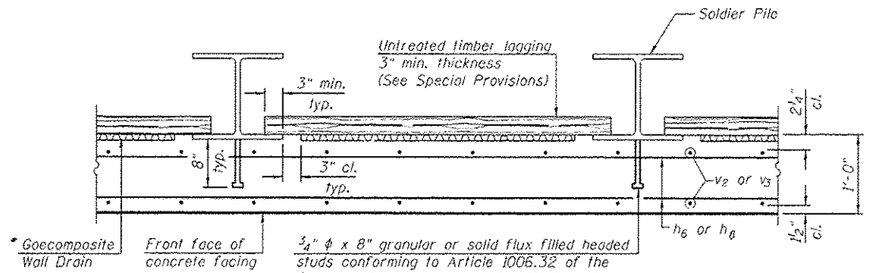
DEPARTMENT OF TRANSPORTATION

BOX CULVERT END SECTION DETAILS
STRUCTURE NO. 050-2056
SHEET NO. 4 OF 7 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
786	(110) BR-3	LASALLE	69	37
		CONTRACT NO. 66B19		
		ILLINOIS FED. AID PROJECT		

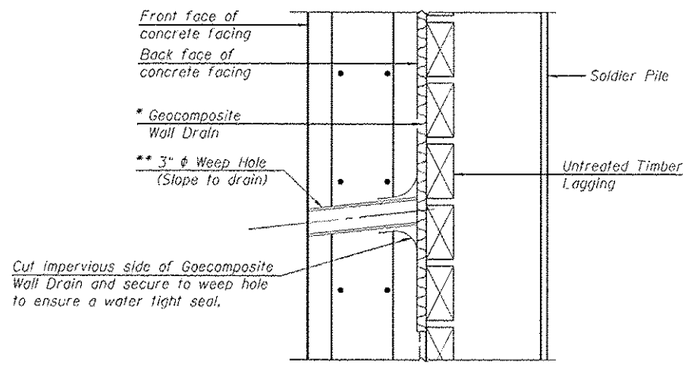


SECTION F-F



* Geocomposite Wall Drain not to exceed thickness of ¾".

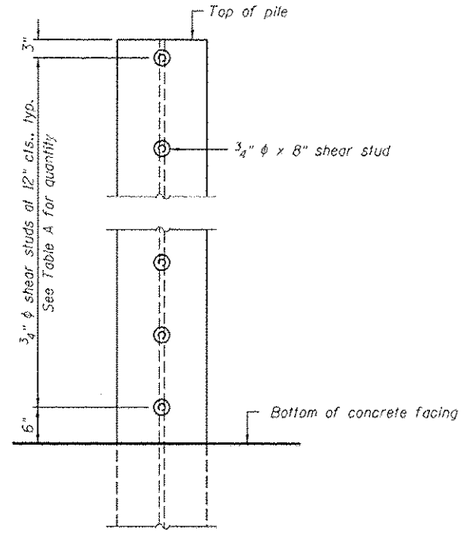
SECTION G-G



WEEP HOLE DRAIN DETAIL

** Cost of the weep hole drain and the connection to the geocomposite wall drain are included with Box Culvert End Sections.

Note:
The Contractor is responsible for the design and performance of the lagging using no less than a 3 in. nominal rough-sawn thickness and timber with a minimum allowable bending stress of 1000 psi.



SHEAR STUD DETAIL
(Elevation of Pile Shown)

TABLE A
(Upstream)

Soldier Pile	Pile Size	Top Elevation (ft.)	Bottom Elevation (ft.)	Total Height (ft.)	Number of Shear Studs
1	HP 14 x 117	668.98	641.7	27.28	12
2	HP 14 x 117	668.32	641.7	26.62	12
3	HP 14 x 117	667.66	641.7	25.96	11
4	HP 14 x 117	667.00	641.7	25.30	11
5	HP 14 x 117	666.34	641.7	24.64	10
6	HP 8x36 (min.)	665.32	647.6	17.72	—
7	HP 14 x 117	668.98	641.7	27.28	12
8	HP 14 x 117	668.30	641.7	26.59	12
9	HP 14 x 117	667.62	641.7	25.92	11
10	HP 8x36 (min.)	666.60	646.6	20.20	—

TABLE A
(Downstream)

Soldier Pile	Pile Size	Top Elevation (ft.)	Bottom Elevation (ft.)	Total Height (ft.)	Number of Shear Studs
1	HP 14 x 117	668.92	641.6	27.31	12
2	HP 14 x 117	668.26	641.6	26.66	12
3	HP 14 x 117	667.60	641.6	26.00	11
4	HP 14 x 117	666.94	641.6	25.34	11
5	HP 14 x 117	666.28	641.6	24.68	10
6	HP 8x36 (min.)	665.26	647.6	17.66	—
7	HP 14 x 117	668.92	641.6	27.31	12
8	HP 14 x 117	668.24	641.6	26.64	11
9	HP 14 x 117	667.56	641.6	25.96	11
10	HP 8x36 (min.)	666.54	646.3	20.24	—

Δ Added Sheet 1-3-14

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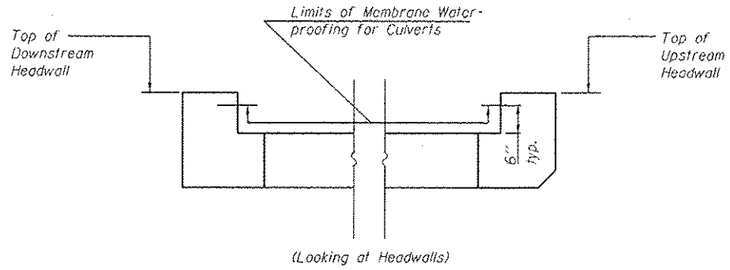
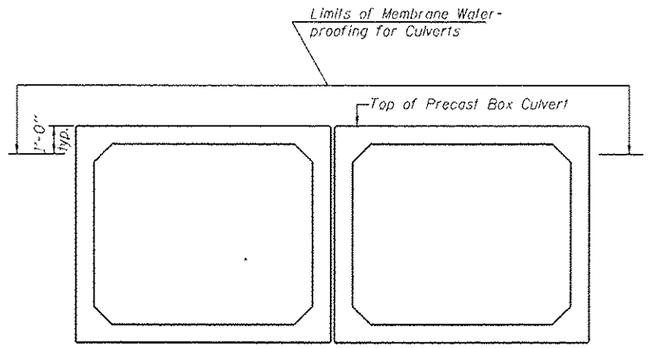
DEPARTMENT OF TRANSPORTATION

BOX CULVERT END SECTION DETAILS
STRUCTURE NO. 050-2056
SHEET NO. 5 OF 7 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
786	(110) BR-3	LASALLE	69	38
		CONTRACT NO. 66B19		
	ILLINOIS FED. AID PROJECT			

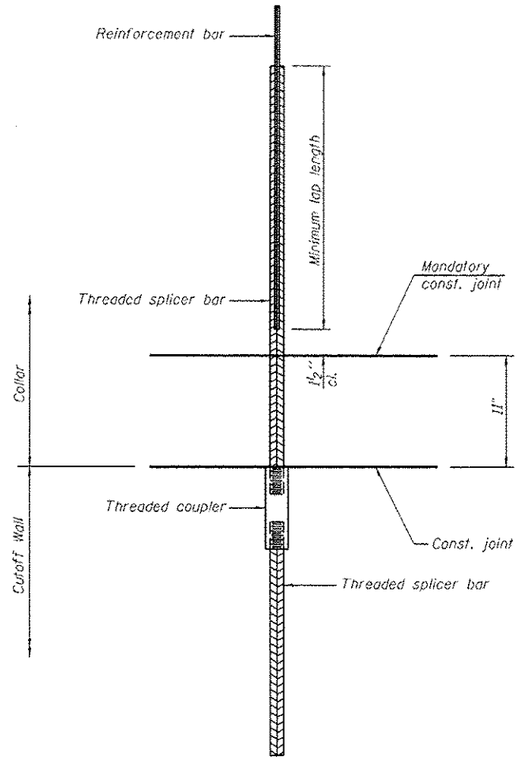




(Looking at Box Sections)

LIMITS OF MEMBRANE WATERPROOFING FOR CULVERTS

Note: Membrane Waterproofing for Culverts shall cover top of the top slab, top one foot of side walls, and 6 inches up inside face of the headwalls.



BAR SPLICER ASSEMBLY FOR BOX CULVERT END SECTION

Minimum Lap Lengths						
Bar size to be spliced	Table 1	Table 2	Table 3	Table 4	Table 5	Table 6
3, 4	1'-5"	1'-11"	2'-1"	2'-4"	2'-7"	2'-11"
5	1'-9"	2'-5"	2'-7"	2'-11"	3'-3"	3'-8"
6	2'-1"	2'-11"	3'-1"	3'-6"	3'-10"	4'-5"
7	2'-9"	3'-10"	4'-2"	4'-8"	5'-2"	5'-10"
8	3'-8"	5'-1"	5'-5"	6'-2"	6'-9"	7'-8"
9	4'-7"	6'-5"	6'-10"	7'-9"	8'-7"	9'-8"

Table 1: Black bar, 0.8 Class C
Table 2: Black bar, Top bar lap, 0.8 Class C
Table 3: Epoxy bar, 0.8 Class C
Table 4: Epoxy bar, Top bar lap, 0.8 Class C
Table 5: Epoxy bar, Class C
Table 6: Epoxy bar, Top bar top, Class C

Threaded splicer bar length = min. lap length + 1½" + thread length

Location	Bar size	No. assemblies required	Table for minimum lap length
* Cutoff Wall	5	10	1

* For one end section

NOTES

Splicer bars shall be deformed with threaded ends and have a minimum 60 ksi yield strength.

All reinforcement shall be lapped and tied to the splicer bars.

See approved list of bar splicer assemblies and mechanical splicers for alternatives.

Δ Added Sheet 1-3-14

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DEPARTMENT OF TRANSPORTATION

BAR SPLICER ASSEMBLY DETAILS AND WATERPROOFING LIMITS
STRUCTURE NO. 050-2056
SHEET NO. 6 OF 7 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
786	110BR-3	LASALLE	69	39
		CONTRACT NO. 66819		
	ILLINOIS FED. AID PROJECT			