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TABLE OF DIMENSIONS & REINFORCING STEEL (Wings for One Structure End)

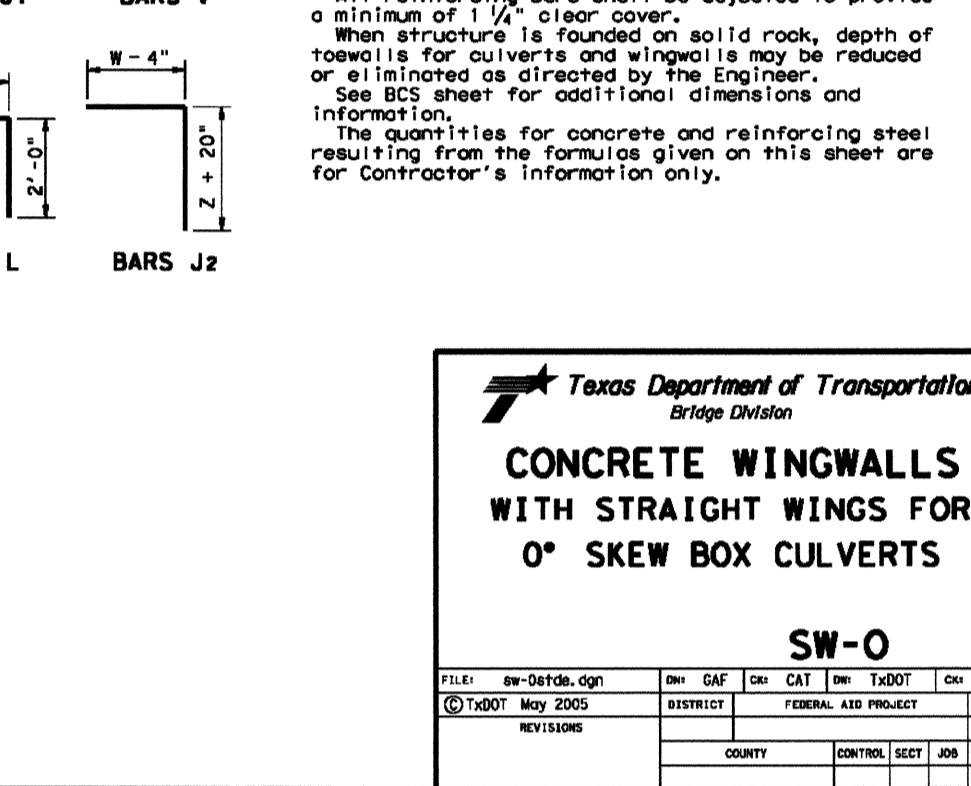
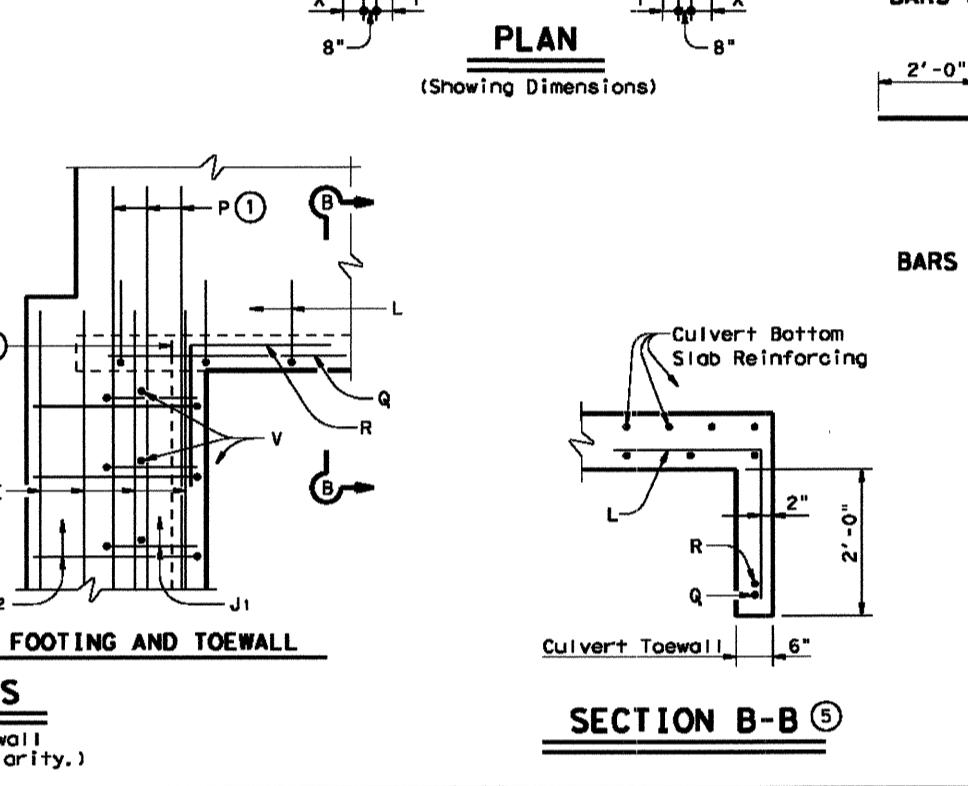
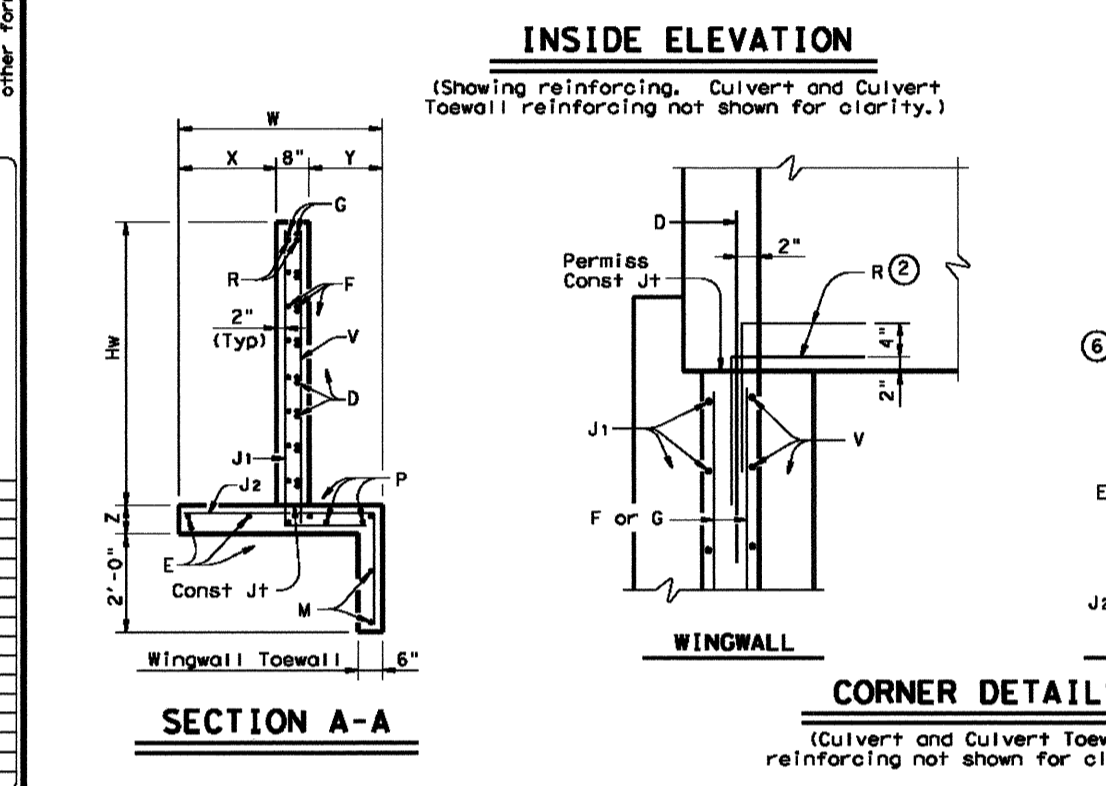
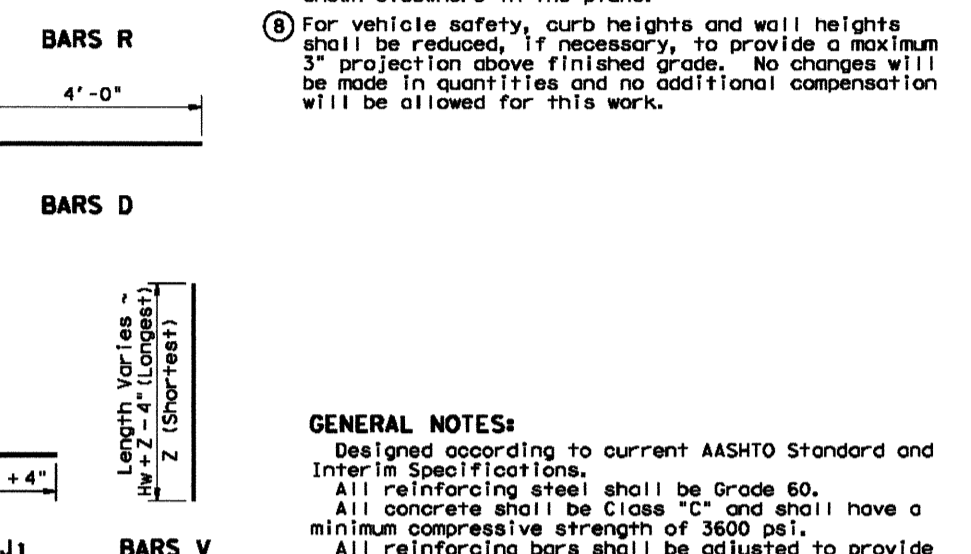
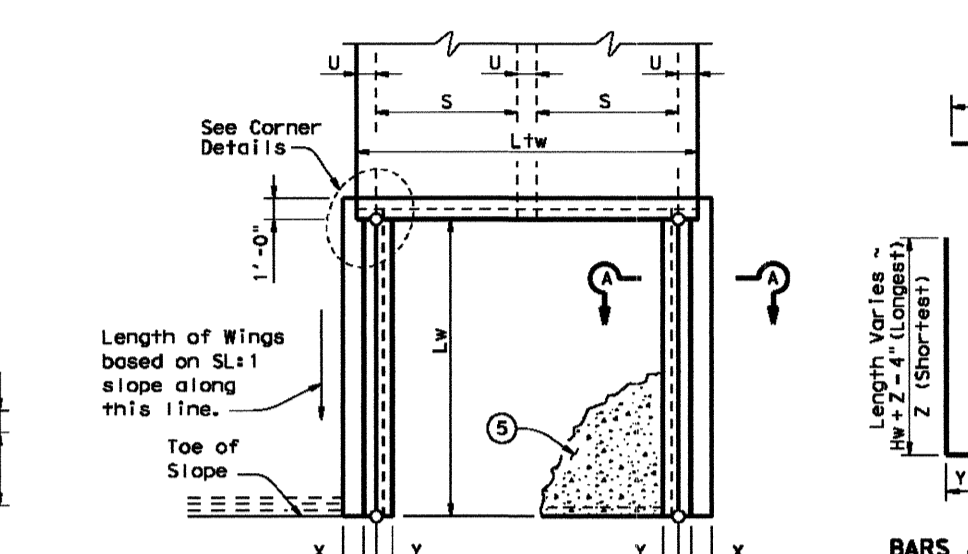
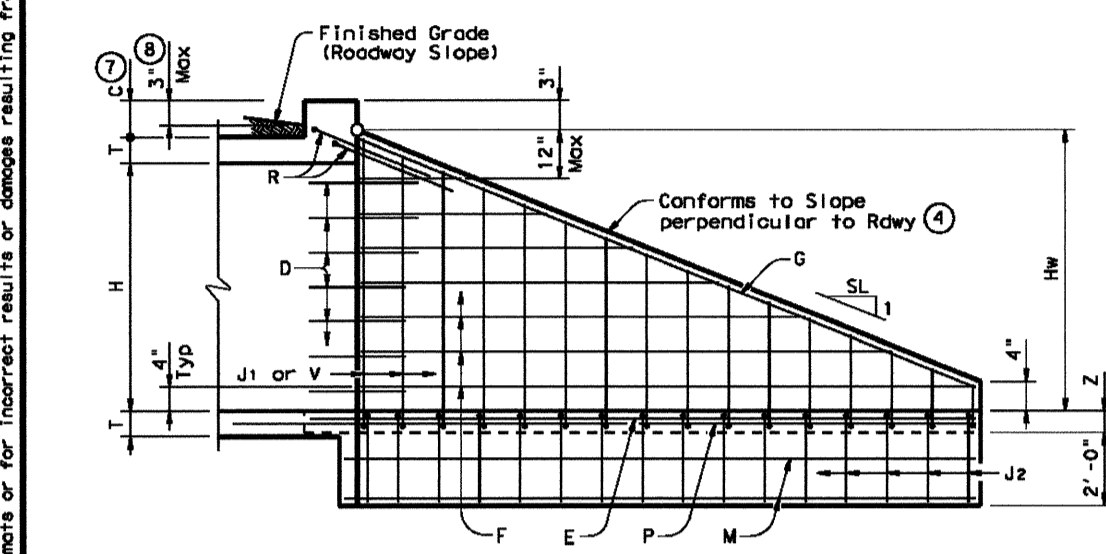
Dimensions	Top/Bottom Reinforcing		Estimated Quantities (2-Wings)
	Bars	Spa	
2'-6" x 2'-5" x 1'-0"	7 #4	11 #4	33.73, 0.248
3'-0" x 2'-5" x 1'-0"	7 #4	11 #4	37.07, 0.261
3'-6" x 2'-5" x 1'-0"	7 #4	11 #4	37.74, 0.273
4'-0" x 2'-5" x 1'-0"	7 #4	11 #4	38.41, 0.285
4'-6" x 2'-5" x 1'-0"	7 #4	11 #4	41.75, 0.330
5'-0" x 2'-5" x 1'-0"	7 #4	11 #4	45.09, 0.343
5'-6" x 2'-5" x 1'-0"	7 #4	11 #4	45.76, 0.355
6'-0" x 2'-5" x 1'-0"	7 #4	11 #4	46.42, 0.367
7'-0" x 2'-5" x 1'-0"	7 #4	11 #4	52.77, 0.414
8'-0" x 2'-5" x 1'-0"	8 #5	11 #4	60.19, 0.486
9'-0" x 2'-5" x 1'-0"	8 #5	11 #4	61.49, 0.535
10'-0" x 2'-5" x 1'-0"	8 #5	11 #4	67.25, 0.584
11'-0" x 2'-5" x 1'-0"	8 #5	11 #4	73.01, 0.633
12'-0" x 2'-5" x 1'-0"	8 #5	11 #4	78.77, 0.682
13'-0" x 2'-5" x 1'-0"	11 #7	11 #4	87.29, 0.721
14'-0" x 2'-5" x 1'-0"	11 #7	11 #4	93.05, 0.770
15'-0" x 2'-5" x 1'-0"	11 #7	11 #4	98.81, 0.819
16'-0" x 2'-5" x 1'-0"	11 #7	11 #4	104.57, 0.868

TABLE OF WINGWALL REINFORCING (2-Wings)

Bar Size	No.	Spa
D #5	4	1'-0"
E #4	4	1'-0"
F #4	4	1'-0"
G #6	4	1'-0"
H #4	4	1'-0"
I #4	4	1'-0"
J #4	4	1'-0"
K #4	4	1'-0"
L #4	4	1'-0"
M #4	4	1'-0"
N #4	4	1'-0"
O #4	4	1'-0"
P #4	4	1'-0"
Q #4	4	1'-0"
R #4	4	1'-0"
S #4	4	1'-0"
T #4	4	1'-0"
U #4	4	1'-0"
V #4	4	1'-0"
W #4	4	1'-0"
X #4	4	1'-0"
Y #4	4	1'-0"
Z #4	4	1'-0"

WING DIMENSION CALCULATIONS:
 Formulas: (All values are in Feet)
 $H_w = H + F + C = 0.250'$
 $L_w = (N_w - 0.333') (SL)$
 For Cast-in-place culverts:
 $L_w = (N_w) (S) + (N_w - 1) (0.5')$
 For Precast culverts:
 $L_w = (N_w) (S) + (N_w - 1) (0.5')$
 Total Wingwall Area (Two Wings) = $S \cdot F \cdot (H_w + 0.333') (L_w)$

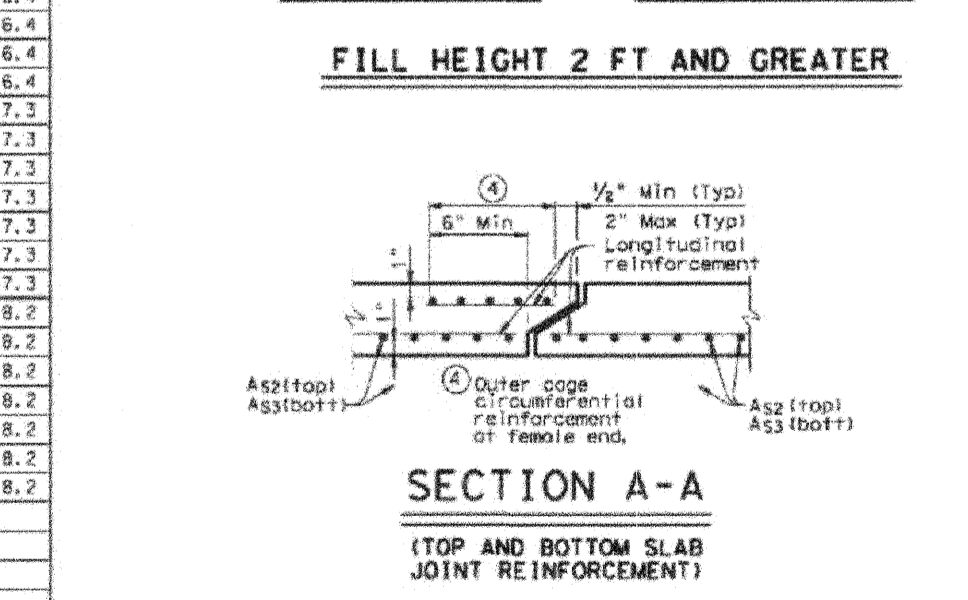
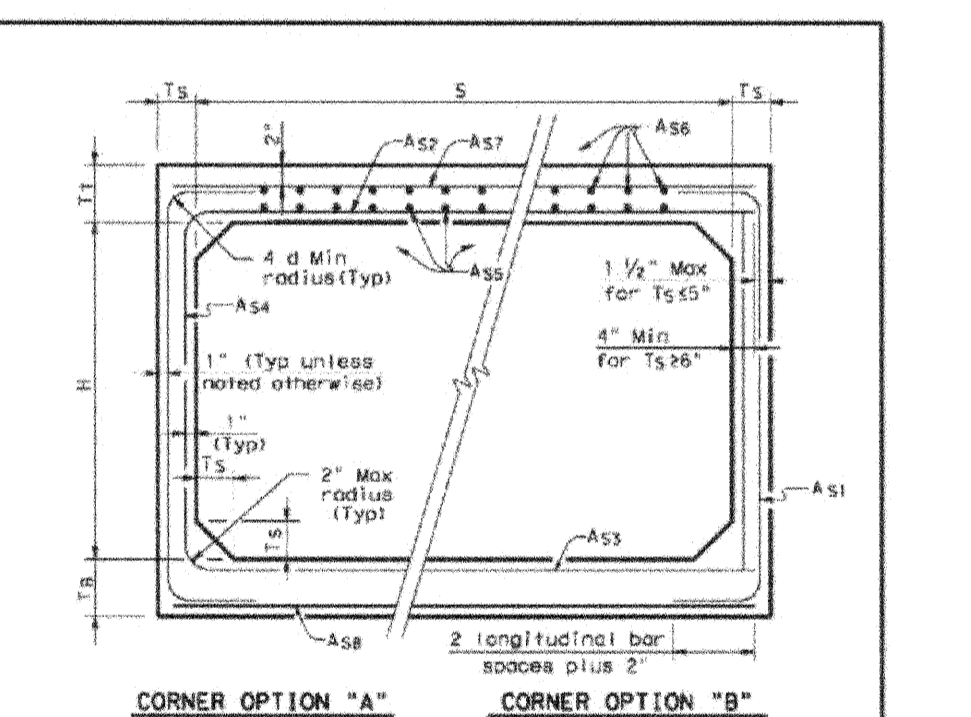
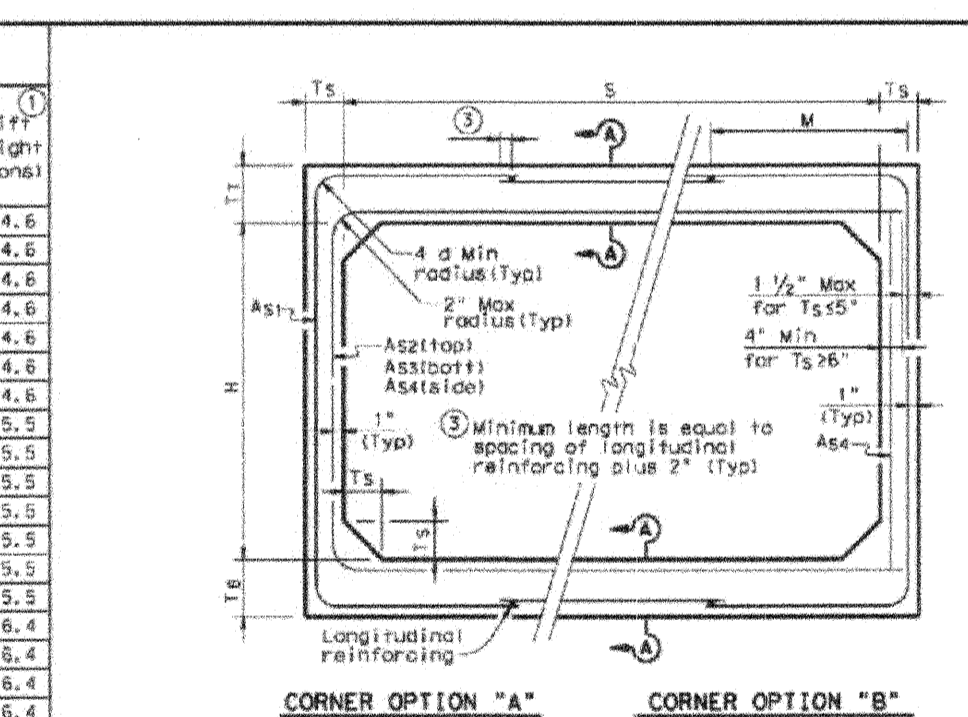
- Extend Bars P 3'-0" minimum into bottom slab of Box Culvert.
- Adjust to fit as necessary to maintain 1/4" clear cover and 4" minimum between bars.
- Quantities shown are based on average wing height for two wings (one structure end). To determine total quantities for two wings multiply the tabulated values by 2.
- Recommended values of Slope are: 2:1, 3:1, 4:1, & 6:1.
- When shown elsewhere on the plans, a 5" deep concrete riprap shall be constructed. Unless otherwise shown on the plans or directed by the Engineer, the riprap shall have a 6" wide by 1'-6" deep reinforced concrete toe wall along all edges adjacent to natural ground. The toe wall shall be reinforced by extending typical riprap reinforcing into the toe wall construction joints or grooved joints, oriented in the direction of flow, shall extend across the full distance of the riprap. An interval of approximately 20'. When such riprap is provided, the culvert toe wall shown in SECTION B-B will not be required. Payment for riprap shall be as required by Item 432.
- At Contractor's option, Culvert Toe wall may be ended flush with Wingwall Toe wall. Adjust reinforcing from that shown as necessary.
- 0' min to 5'-0" max. For 16 or 06 Rail, see 16-CM standard for additional details. For all other rail types, refer to the RAC standard. For curbs without rail and greater than 1'-0" high, see ECU standard for additional details. Estimated curb heights are shown elsewhere in the plans.
- For vehicle safety, curb heights and wall heights shall be reduced, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.



CONCRETE WINGWALLS WITH STRAIGHT WINGS FOR 0° SKEW BOX CULVERTS
 SW-0
 FILE: SW-Details.dwg
 DATE: 05/2007
 COUNTY: TARRANT
 SHEET: 1 OF 1

BOX DATA

SECTION DIMENSIONS	Fill Height (ft)	REINFORCING (in ² /ft)										Lift Height (ft)
		A ₁	A ₂	A ₃	A ₄	A ₅	A ₆	A ₇	A ₈	A ₉	A ₁₀	
9 5 9 9	9	42	0.29	0.53	0.25	0.22	0.22	0.22	0.22	0.22	0.22	14.6
9 5 9 9	9	24.3	0.29	0.41	0.27	0.22	-	-	-	-	-	14.6
9 5 9 9	9	3-5	49	0.27	0.28	0.28	0.22	-	-	-	-	14.6
9 5 9 9	9	10	49	0.29	0.38	0.38	0.22	-	-	-	-	14.6
9 5 9 9	9	15	44	0.40	0.51	0.52	0.22	-	-	-	-	14.6
9 5 9 9	9	20	44	0.51	0.65	0.67	0.22	-	-	-	-	14.6
9 5 9 9	9	25	44	0.62	0.80	0.81	0.22	-	-	-	-	14.6
9 6 9 9	9	42	0.27	0.58	0.27	0.22	0.22	0.22	0.22	0.22	0.22	15.5
9 6 9 9	9	24.3	59	0.28	0.44	0.30	0.22	-	-	-	-	15.5
9 6 9 9	9	3-5	54	0.22	0.27	0.28	0.22	-	-	-	-	15.5
9 6 9 9	9	10	49	0.27	0.39	0.41	0.22	-	-	-	-	15.5
9 6 9 9	9	15	44	0.35	0.54	0.56	0.22	-	-	-	-	15.5
9 6 9 9	9	20	44	0.46	0.69	0.71	0.22	-	-	-	-	15.5
9 6 9 9	9	25	44	0.58	0.84	0.86	0.22	-	-	-	-	15.5
9 7 9 9	9	42	0.25	0.58	0.29	0.22	0.22	0.22	0.22	0.22	0.22	16.4
9 7 9 9	9	24.3	59	0.25	0.46	0.32	0.22	-	-	-	-	16.4
9 7 9 9	9	3-5	54	0.22	0.28	0.30	0.22	-	-	-	-	16.4
9 7 9 9	9	10	49	0.25	0.41	0.43	0.22	-	-	-	-	16.4
9 7 9 9	9	15	44	0.34	0.58	0.59	0.22	-	-	-	-	16.4
9 7 9 9	9	20	44	0.42	0.72	0.74	0.22	-	-	-	-	16.4
9 7 9 9	9	25	44	0.51	0.88	0.90	0.22	-	-	-	-	16.4
9 8 9 9	9	42	0.23	0.60	0.32	0.22	0.22	0.22	0.22	0.22	0.22	17.3
9 8 9 9	9	24.3	72	0.23	0.48	0.34	0.22	-	-	-	-	17.3
9 8 9 9	9	3-5	59	0.22	0.30	0.32	0.22	-	-	-	-	17.3
9 8 9 9	9	10	54	0.23	0.42	0.45	0.22	-	-	-	-	17.3
9 8 9 9	9	15	44	0.31	0.58	0.61	0.22	-	-	-	-	17.3
9 8 9 9	9	20	44	0.39	0.74	0.77	0.22	-	-	-	-	17.3
9 9 9 9	9	10	49	0.30	0.59	0.63	0.22	-	-	-	-	18.2
9 9 9 9	9	15	44	0.48	0.90	0.93	0.22	-	-	-	-	18.2
9 9 9 9	9	20	49	0.37	0.75	0.79	0.22	-	-	-	-	18.2
9 9 9 9	9	25	44	0.45	0.92	0.96	0.22	-	-	-	-	18.2

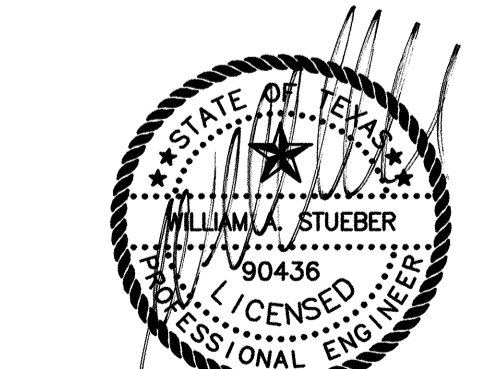


GENERAL NOTES:
 Designs shown conform to ASTM C1433. Refer to ASTM C1433 for information or details not shown.
 All concrete shall be Class "C" concrete with a minimum compressive strength of 3600 psi.
 See SCS-160 standard sheet for miscellaneous details and notes not shown.
 In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Shop plans for alternate designs shall be submitted in accordance with Item "Precast Concrete Structures".

HS20 LOADING
 Texas Department of Transportation
 Bridge Division
SINGLE BOX CULVERTS PRECAST
 9'-0" SPAN
SCP-9
 FILE: SCP9-Details.dwg
 DATE: 05/2007
 COUNTY: TARRANT
 SHEET: 1 OF 1

NOTE:
 1. REFER TO CITY OF ROCKWALL STANDARD DETAILS AND NCTCOG 3RD EDITION FOR ALL UTILITY AND STORM DRAINAGE DETAILS AND SPECIFICATIONS

RECORD DRAWING
 TO THE BEST OF OUR KNOWLEDGE CPH ENGINEERS, INC. HEREBY STATES THAT THIS PLAN IS A REPRESENTATION OF THE AS-BUILT CONDITIONS OF THE SUBJECT PROJECT. THE INFORMATION PRESENTED IS BASED ON INFORMATION PROVIDED BY THE CONTRACTOR ALONG WITH DATA PROVIDED BY THE PROJECT LAND SURVEYOR.



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY WILLIAM A. STUEBER, P.E. 90436 ON 05/04/2009. ALTERATION OF A SEALED DOCUMENT TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

"NOTICE"
 THE SIZE OF THIS PLAN MAY HAVE BEEN SLIGHTLY ALTERED BY REPRODUCTION PROCESSES. THIS MUST BE CONSIDERED WHEN SCALING ANY REPRODUCED PLAN FOR THE PURPOSE OF COLLECTING DATA.

STORM DRAINAGE DETAILS
ROCKWALL CENTRE CORNERS
 INTERSTATE HIGHWAY 30 AND S.H. 205
 CITY OF ROCKWALL, ROCKWALL COUNTY, TEXAS
 Sheet No.
C-21

DATE	BY	NO.	REVISION
05/04/09	WAS	1	PER AS-BUILTS
07/09/09	WAS	2	NO CHANGES THIS SHEET
11/08/08	WAS	3	NO CHANGES THIS SHEET
09/23/08	WAS	4	NO CHANGES THIS SHEET
08/04/08	WAS	5	NO CHANGES THIS SHEET
08/26/08	WAS	6	NO CHANGES THIS SHEET
06/03/08	WAS	7	NO CHANGES THIS SHEET
05/19/08	WAS	8	NO CHANGES THIS SHEET
03/07/08	WAS	9	NO CHANGES THIS SHEET
12/05/07	WAS	10	NO CHANGES THIS SHEET
10/19/07	WAS	11	PER CLIENTS NEW SITE LAYOUT