

Project:	Discount Tires - Willow Brook	DATE:	11-5-08
Job No:	0280-0706		
System:	Existing Storm Sewer System		
By:	VMN		

DETENTION BASIN SUMMARY:	
Total Site Drainage Area to Detention Basin:	= 7.00 ac.
Required Detention Storage Volume:	= 4.65 ac-ft
Total Storage Volume Provide @ Emergency Spillway:	= 4.66 ac-ft
Top of Bank Elevation:	= 117.00 ft.
Toe Elevation:	= 111.00 ft.
10-YR WSE:	= 114.00 ft.
Depth of Pond @ 10-yr WSE:	= 3.00 ft.
100-YR WSE:	= 116.48 ft.
Depth of Pond @ 100-yr WSE:	= 5.48 ft.

LOW LEVEL RESTRICTOR CALCULATIONS:	
(Primary Office @ Outfall Pipe Flow Line)	
Flow Line	= 108.19 ft.
Q <sub>10-YR Allowable</sub> (Per HCFCD Manual, Sec. 3.3)	= 8.40 cfs
SOLVE for D <sub>max</sub>	
Assump Pipe Size	= 10.00 in.
H (10-YR WSEL-Top of Pipe)	= 3.98 ft.
A (Q <sub>allowable</sub> / (10.8 * (64.4 * H) <sup>1/2</sup> ))	= 0.66 ft <sup>2</sup>
D (Q <sub>allowable</sub> ) <sup>1/2</sup> / (2.25H <sup>1/4</sup> )	= 10.95 in.
=> USE	= 10.00 in.
A (Actual Office Area)	= 0.55 ft <sup>2</sup>
Q (Actual Discharge)	= 6.98 cfs
(Primary Office @ 100-YR WSE)	
H (100-YR WSE - Top of Pipe)	= 4.65 ft.
Q <sub>T</sub> (Total Discharge from Low Level Restrictor)	= 7.55 cfs

HIGH LEVEL RESTRICTOR CALCULATIONS:	
(Secondary Office @ 10-YR WSE)	
Q <sub>T</sub> (Total Allowable Discharge Rate)	= 12.11 cfs
Q <sub>allowable</sub> → (12.11 - 7.55)	= 4.66 cfs
SOLVE for D <sub>max</sub>	
Assump Pipe Size	= 8.00 in.
H (100-YR WSE-Top of Pipe)	= 1.81 ft.
A (Q <sub>allowable</sub> / (10.8 * (64.4 * H) <sup>1/2</sup> ))	= 0.53 ft <sup>2</sup>
D (Q <sub>allowable</sub> ) <sup>1/2</sup> / (2.25H <sup>1/4</sup> )	= 9.82 in.
=> USE	= 8.00 in.
A (Actual Office Area)	= 0.35 ft <sup>2</sup>
Q <sub>T</sub> (Total Discharge from High Level Restrictor)	= 3.02 cfs

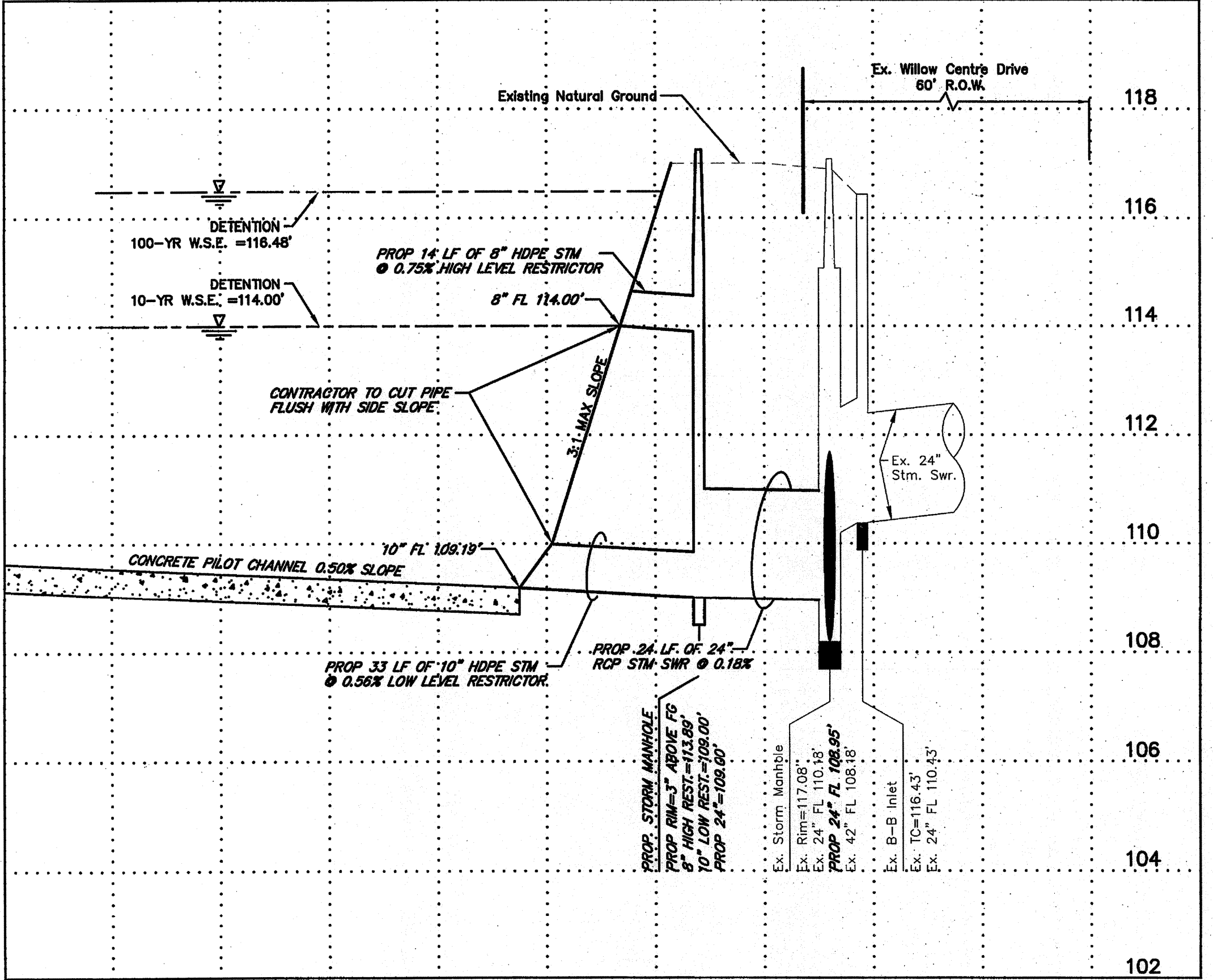
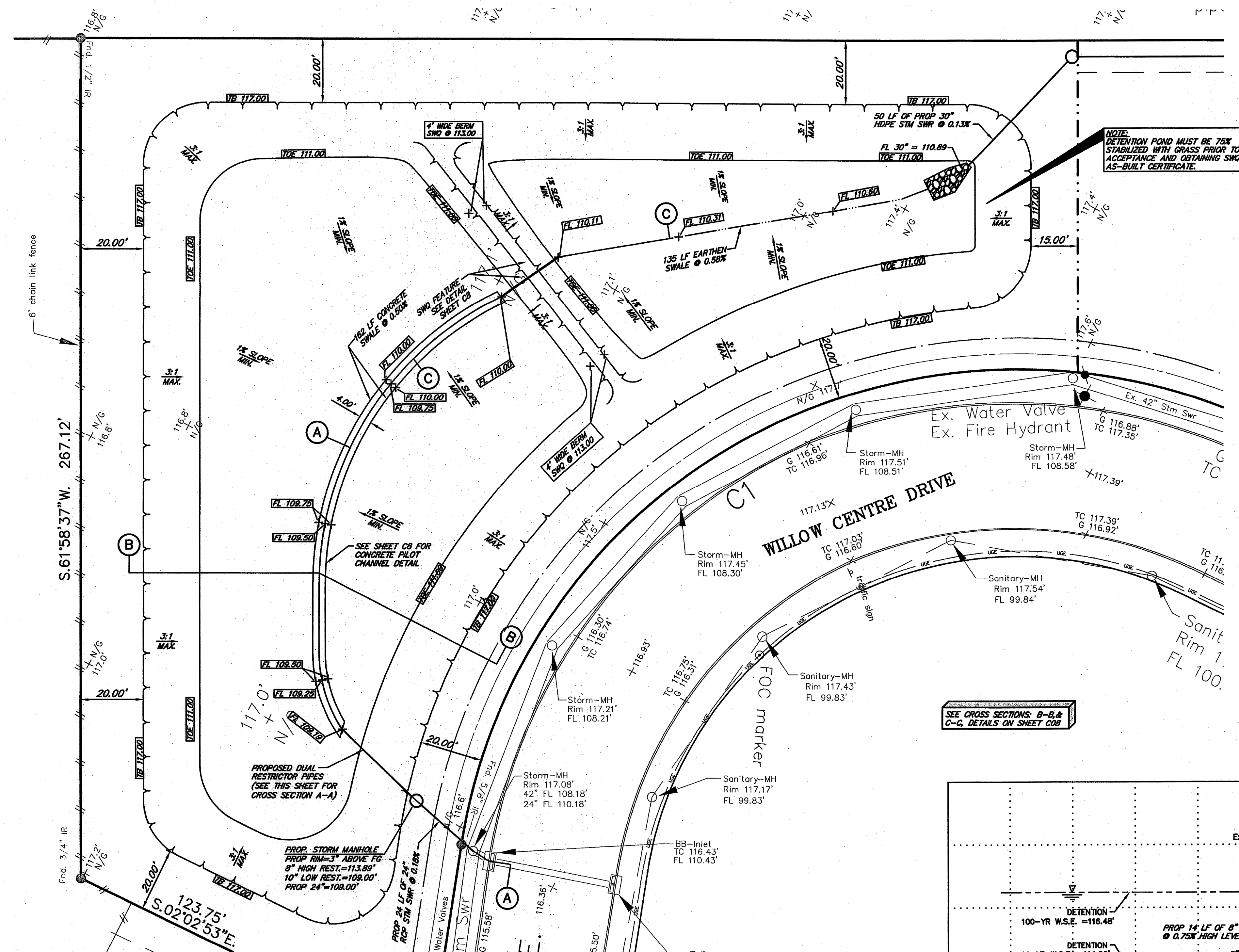
RESTRICTOR CALCULATION SUMMARY:	
Q <sub>T</sub> (Total Allowable Discharge Rate)	= 12.11 cfs
Q <sub>T</sub> (Actual Discharge Rate) → (3.02 + 7.55)	= 10.57 cfs
NET DIFFERENCE:	= 1.54 cfs

**FLOODPLAIN INFORMATION:**  
 ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP No. 4820100435 L, LAST REVISED JUNE 18, 2007, THE SUBJECT TRACT LIES WITHIN AN AREA DESIGNATED AS ZONE X (UNSHADED); DEFINED AS AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN, AND ZONE X (SHADED); DEFINED AS AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN ONE FOOT OR WITH DRAINAGE AREAS LESS THAN ONE SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD.

**BENCHMARK NOTE:**  
 PROJECT BENCHMARK:  
 FEMA RM 150770 LOCATED ON BRETON RIDGE DRIVE +/- 100' NORTH OF FM 1960. ELEV.=120.92' (NAVD88, 2001 ADJ.)  
 TBM A:  
 A "x" ON TOP OF BB-INLET ON WEST SIDE OF WILLOW CENTRE DR. +/- 875' SOUTH OF FM 1960.  
 ELEV.=116.37' ELEVATIONS BASED ON TSARP RM 150770 (NAVD88, 2001 ADJ.)

**LEGAL DESCRIPTION:**  
 A SUBDIVISION CONTAINING 7.0021 ACRES (305,011 S.F.) BEING ALL OF RESTRICTED RESERVE "D", OUT OF WILLOW CENTRE SUBDIVISION RESTRICTED RESERVE "D", SECTION ONE REPLAT, AS RECORDED IN FILM CODE NO. 360084 OF THE H.C.M.R., LOCATED IN THE G.W. CHILDRESS SURVEY, ABSTRACT NO. 217, IN HARRIS COUNTY, TEXAS.

**NOTE:**  
 Q ALLOWABLE IS BASED ON DRAINAGE AREA MAP TITLED, "CHAMPIONS CENTRE SECTION ONE AND WILLOW CENTRE SECTION ONE", WHICH IS BASED ON CURVE 3 OF THE FUGATE CURVE, TC = 10.5 MIN., AND CI = 1.73.  
 Q ALLOWABLE = 1.73 X 7 = 12.11 CFS



**DETENTION BASIN SECTION A-A**  
 HORIZONTAL 1" = 20'  
 VERTICAL 1" = 2'

STORAGE VOLUME REQUIRED: 7.00 AC. X 0.65 = 4.55 AC.-FT./AC.

Detention Basin (Volume Calculations)						
Elevation (ft.)	Area (sq. ft.)	Avg. Volume (cu. ft.)	Average Vol. (cu. yds.)	Accum. Vol. (cu. yds.)	Accum. Vol. (ac.ft.)	
109.15	0	0	0	0	0	0.00
110.00	10412	4425	164	164	4425	0.10
111.00	23825	17119	634	798	21544	0.49
112.00	27844	25834	957	1755	47378	1.09
113.00	30433	29138	1079	2834	76516	1.76
114.00	33080	31756	1176	4010	108273	2.49
115.00	35783	34431	1275	5285	142704	3.28
116.00	38543	37163	1376	6662	179867	4.13
116.48	39882	18822	697	7359	198689	4.56
117.00	41359	21123	782	8141	219811	5.05

**NOTE:**  
 CONTRACTOR TO CONSTRUCT DETENTION POND PER GEOTECHNICAL REPORT PREPARED BY TERRACON, DATED JULY 24, 2008, PROJECT NUMBER 92085242.  
 CONTRACTOR TO OVER EXCAVATE DETENTION POND BOTTOM AND SIDES IF SAND LAYERS ARE ENCOUNTERED.

REV. NO.	DESCRIPTION	DATE	APP.
<b>DISCOUNT TIRE (DISTRIBUTION) HOUSTON - WILLOWBROOK</b>			
<b>DETENTION &amp; STORM WATER QUALITY PLANS</b>			
<b>TERRA ASSOCIATES, INC. CONSULTING ENGINEERS</b>		3000 WILCREST - SUITE 200 HOUSTON, TEXAS ZIP 77042 PHONE: 713-993-0333 FAX: 713-993-0743	
DRAWN BY: DAB	SCALE: 1" = 20'	CONTRACT: 1	
CHECKED BY: KBP	DATE: NOVEMBER 2008	PROJECT No. 0280-0706	
FILE NAME: C7-DETENT.DWG	PLOT SCALE: 1:1	SHEET C7 OF 15	