

THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

CONTRACTOR SHALL CONTACT DIG-TESS AT 1-800-DIG-TESS A MINIMUM OF 48 HOURS PRIOR TO ANY CONSTRUCTION ACTIVITY

Present Conditions	By-Pass Areaage	New Areaage
Catchment	0.183	0.543
A =	0.726	
C =	0.36	
T ₀ =	30	
I _{max} =	3.3	
Q _{max} =	2.10609	
Future Conditions	By-Pass Q cfs	New Attributed
C =	0.9	0.49977
T ₀ =	10	
I _{max} =	0.6	
Q _{max} =	0.40332	

Flow for Storm Durations			
Table	L	C	Q
10 min	9.6	0.8	4.78086
15 min	9	0.9	4.39852
20 min	8.3	0.9	4.08621
30 min	6.9	0.9	3.27209
40 min	5.6	0.9	2.63449
50 min	5	0.9	2.4426
60 min	4.6	0.9	2.19916
70 min	4.1	0.9	2.00377
80 min	3.9	0.9	1.90993
90 min	3.8	0.9	1.79822
100 min	3.4	0.9	1.65126
110 min	2.8	0.8	1.38836

Storage Calculations				
10 min	Inflow	2873.856	Storage	2276.674
	Outflow	256.982		
15 min	Inflow	3958.47	Storage	3587.243
	Outflow	371.2375		
20 min	Inflow	4467.492	Storage	4421.979
	Outflow	445.473		
30 min	Inflow	5008.654	Storage	5475.69
	Outflow	593.954		
40 min	Inflow	6862.704	Storage	6086.249
	Outflow	742.456		
50 min	Inflow	7380.5	Storage	6438.564
	Outflow	880.946		
60 min	Inflow	7916.94	Storage	6877.503
	Outflow	1039.437		
70 min	Inflow	8115.414	Storage	7227.406
	Outflow	1187.928		
80 min	Inflow	9146.464	Storage	7612.045
	Outflow	1306.419		
90 min	Inflow	9903.328	Storage	8015.416
	Outflow	1466.91		
100 min	Inflow	9989.46	Storage	8336.078
	Outflow	1633.401		
110 min	Inflow	8210.16	Storage	6428.208
	Outflow	1781.892		

DETENTION POND DESIGN:
2670 LF OF 24" HDPE (0.5% MIN SLOPE)
VOLUME AVAILABLE = (PI^2*D^4/4)*L = 8,387 CF STORAGE

CONTROL STRUCTURE DESIGN:
STEEL PLATE BETWEEN INFLOW AND OUTFLOW WITH V-NOTCH WEIR
FL = 92.35
TOP OF WEIR = 95.76
7/2" WEIR ANGLE

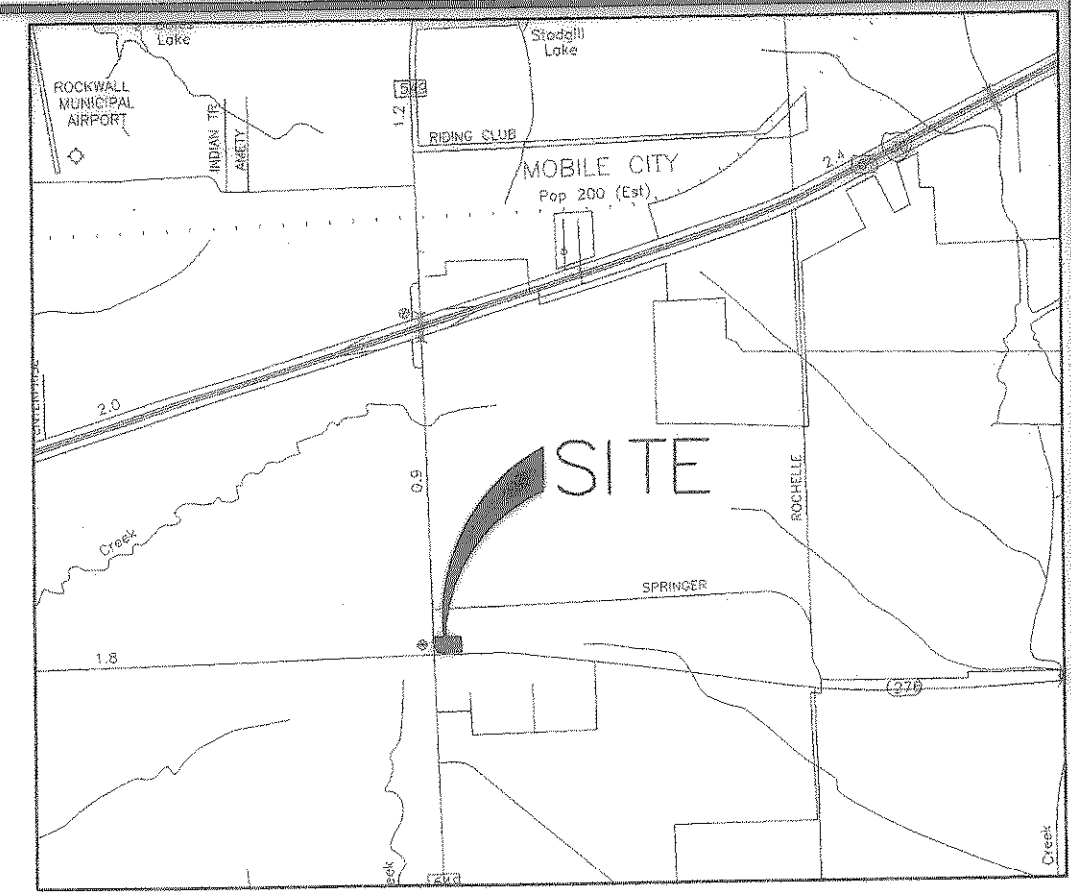
THIS DESIGN ASSUMES THE FOLLOWING:

- EVEN THOUGH THE DETENTION PIPE SYSTEM HAS SOME SLOPE TO FACILITATE DRAINAGE, THE DESIGN VOLUME IS CONSIDERED AS IF THE PIPE SYSTEM IS FLAT.
- THE WEIR COEFFICIENT PRESUMED TO BE 0.61 PER THE CIVIL ENGINEERING REFERENCE MANUAL, 9TH ED.
- THE WEIR SHALL BE OPEN TO THE BOTTOM AND THE TOP SHALL BE AT 95.76.
- WEIR SHALL BE CONSTRUCTED OF GALVANIZED STEEL PLATE WELDED TO THE SIDES AND BOTTOM OF THE CONTROL STRUCTURE IN SUCH A WAY AS TO PREVENT DAMAGE OR MOVEMENT UNDER USE AND SHALL BE OPEN FOR MAINTENANCE.

DEPTH AT REQUIRED VOLUME	WEIR Q	VOLUME
2 YEAR	0.07	2084
5 YEAR	0.13	3584
10 YEAR	0.17	4168
20 YEAR	0.27	5585
50 YEAR	0.33	6460
100 YEAR	0.47	8336

ELEVATION NOTE:

ALL ELEVATIONS ARE ASSUMED BASED ON THE RECORD DRAWINGS FOR THE ADJACENT CONVENIENCE STORE AND ARE ASSUMED TO THE LISTED ELEVATION + 500



LEGEND

- PROPERTY LINE
- ADJOINED PROPERTY
- EXISTING 1' CONTOUR
- PROPOSED 1' CONTOUR
- DRAINAGE AREA BASIN
- EXISTING WATER LINE
- PROPOSED CURB
- DRAINAGE AREA ID
- INLET ID

100 YEAR DRAINAGE CALCULATION

BASIN	AREA	Tc	C	I	100-YR Q	NOTE
A	0.069 AC	10 MIN.	0.90	9.8	0.61 CFS	DRAINS TO GRATE INLET A
B	0.065 AC	10 MIN.	0.90	9.8	0.58 CFS	DRAINS TO GRATE INLET B
C	0.092 AC	10 MIN.	0.90	9.8	0.81 CFS	DRAINS TO GRATE INLET C
D	0.209 AC	10 MIN.	0.90	9.8	1.84 CFS	DRAINS TO GRATE INLETS D
E	0.100 AC	10 MIN.	0.90	9.8	0.88 CFS	DRAINS TO TRENCH DRAIN E
F	0.124 AC	10 MIN.	0.90	9.8	1.09 CFS	DRAINS TO EXISTING INLET
G	0.059 AC	10 MIN.	0.90	9.8	0.52 CFS	DRAINS OFFSITE TO NORTH

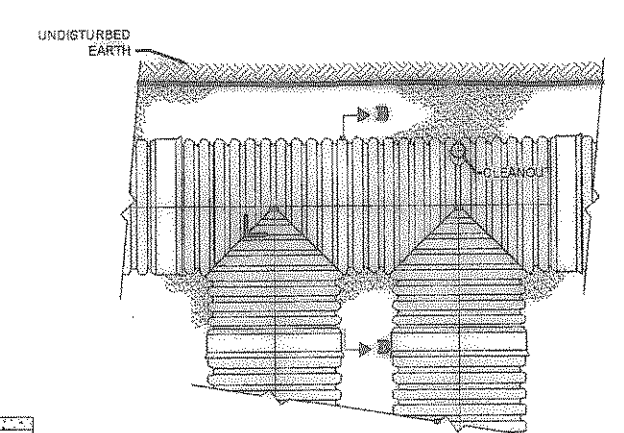
RATIONAL FORMULA
Q=KIA
C= WHERE
I= RAIN INTENSITY
A= AREA

RECORD DRAWINGS

THE DRAWINGS CONTAINED IN THIS SET ARE "RECORD DRAWINGS". THE INFORMATION SHOWN ON THESE SHEETS, WHERE IT DIFFERS FROM THE PERMITTED SET, IS TAKEN FROM FIELD OBSERVATIONS AND NOTES PROVIDED BY THE GENERAL CONTRACTOR, NOT FROM SURVEYED DATA OR FROM FIELD OBSERVATIONS BY MA ENGINEERING & CONSTRUCTION EMPLOYEES.

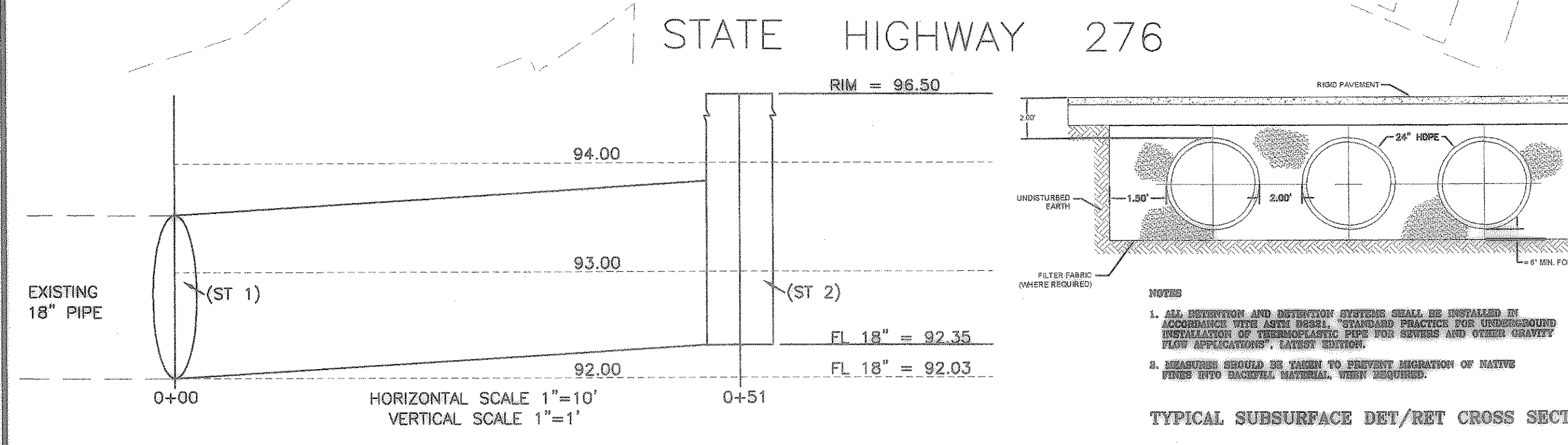
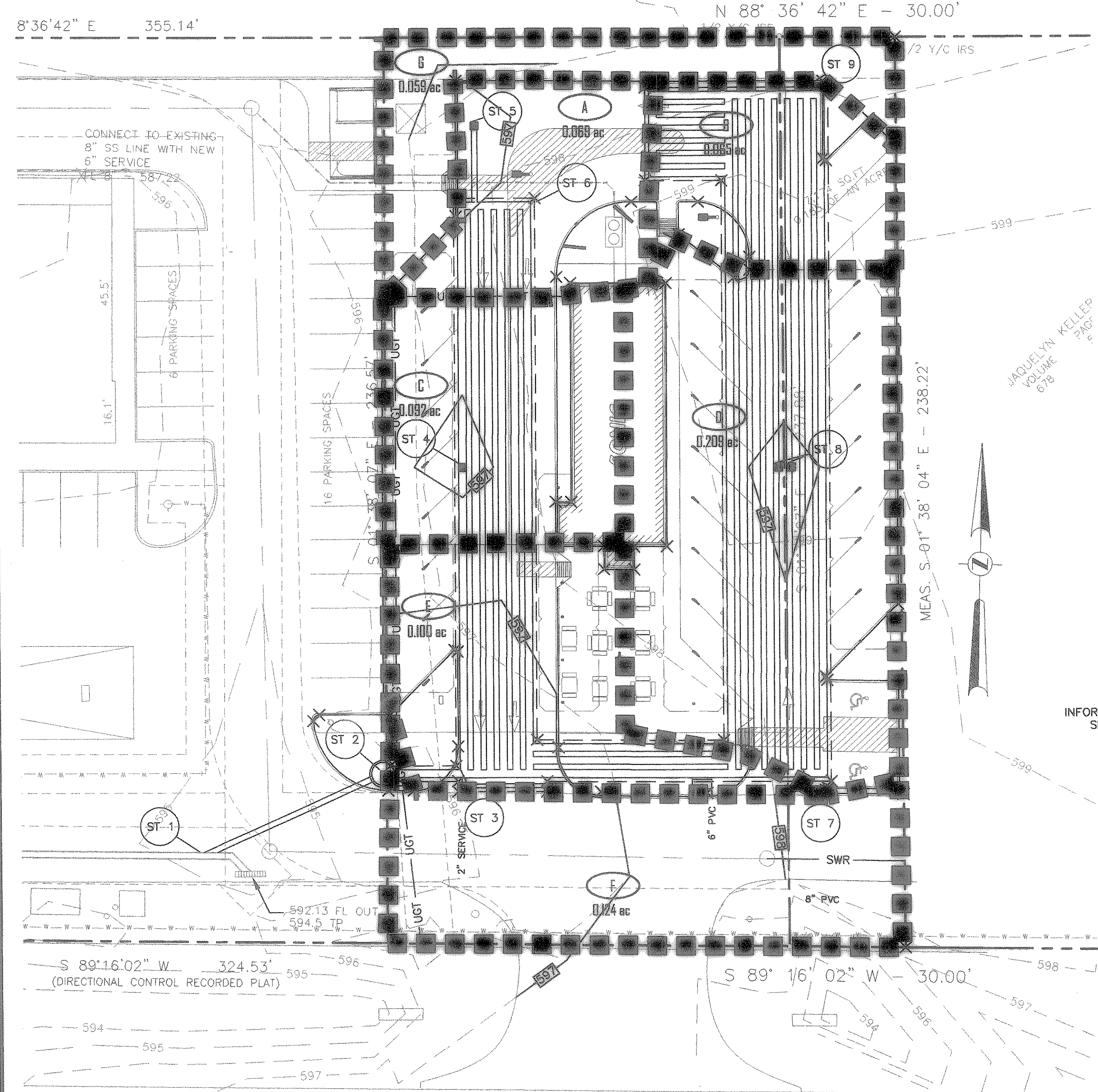
STORM DRAIN NOTES:

- ST 1 - CONNECT TO EXISTING 18" STORM PIPE
FL EX 18" = 91.63
INSTALL 51 LF OF 18" RCP AT 0.63%
- ST 2 - INSTALL 6' STORM MANHOLE WITH CONTROL STRUCTURE
SEE STRUCTURE DESIGN NOTES THIS SHEET.
RIM = 96.50
FL = 91.95
INSTALL 21 LF OF 24" HDPE DETENTION PIPE AT 0.5%
- ST 3 - INSTALL 6 BARRELS OF 24" HDPE DETENTION PIPE AT 0.5% TO THE NORTH (146 LF EACH), CONNECT WITH 24" HEADER PIPE, CONNECT 24 LF OF TRENCH DRAIN TO STORM SYSTEM
INSTALL 78 LF OF 24" HDPE DETENTION PIPE AT 0.5% TO THE EAST
FL = 92.05 AT JUNCTION
- ST 4 - INSTALL ONE GRATE INLET (PRIVATE)
RIM = MATCH PROPOSED GRADE
FL = 92.45
- ST 5 - INSTALL 20 LF OF 24" HDPE DETENTION PIPE AT 0.5% (PRIVATE)
INSTALL GRATE INLET (PRIVATE)
RIM = MATCH PROPOSED GRADE
FL = 92.85
- ST 6 - INSTALL CLEAN OUT
FL = 92.65
- ST 7 - INSTALL 8 BARRELS OF 24" HDPE DETENTION PIPE AT 0.5% TO THE NORTH (175 LF EACH), CONNECT WITH 24" HEADER PIPE
FL = 92.50
- ST 8 - INSTALL ONE GRATE INLET (PRIVATE)
RIM = MATCH PROPOSED GRADE
FL = 92.90
- ST 9 - INSTALL 8 LF OF 24" HDPE DETENTION PIPE AT 0.5% (PRIVATE)
INSTALL GRATE INLET (PRIVATE)
RIM = MATCH PROPOSED GRADE
FL = 93.46

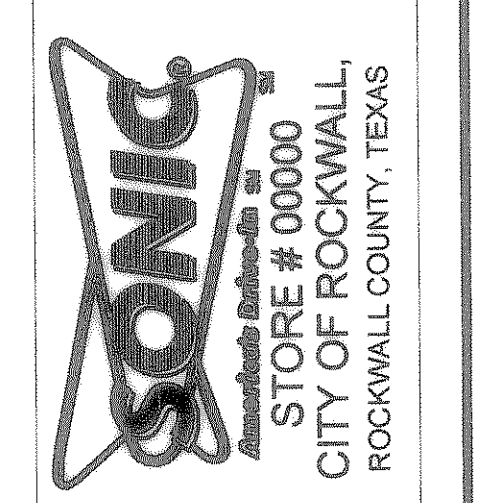
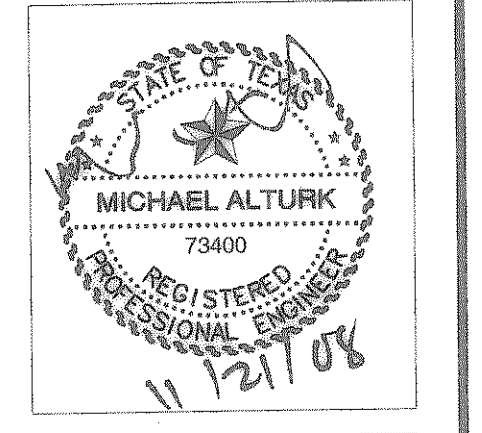


TYPICAL SUBSURFACE DET/RET CROSS SECTION

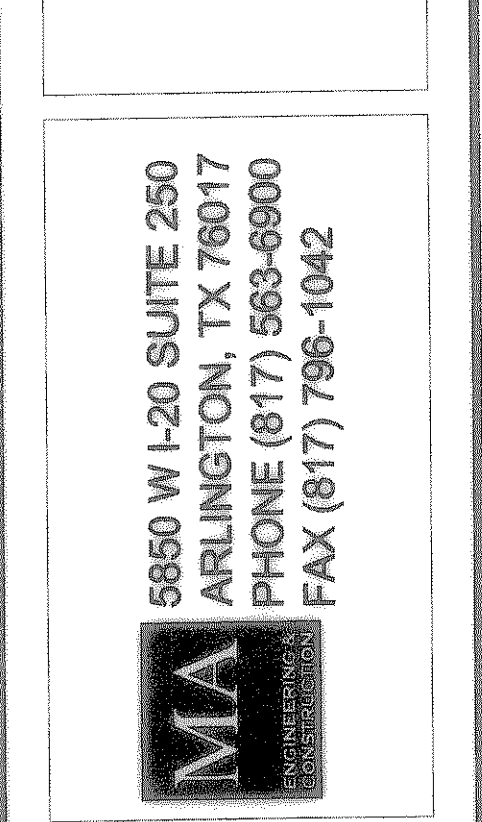
- NOTES**
- ALL DETENTION AND RETENTION SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH BEST PRACTICES. STANDARD PRACTICES FOR THE PROPER INSTALLATION OF THERMOPLASTIC PIPE FOR STORMS AND OTHER GRAVITY FLOW APPLICATIONS. LATEST EDITION.
 - MANHOLE SHALL BE OPEN TO PERMIT INSPECTION OF NESTING POINTS INTO TRENCHES MATERIAL, WHEN NECESSARY.



NO.	DESCRIPTION	DATE	SCALE
1	ISSUED TO THE CITY OF REVIEW	3-11-08	1" = 20'
2	ISSUED TO THE CITY OF REVIEW	6-15-08	1" = 20'
3	ISSUED TO THE CITY OF REVIEW	6-19-08	1" = 20'
4	ISSUED TO THE CITY OF REVIEW	6-29-08	1" = 20'
5	ISSUED FOR CONSTRUCTION	7-21-08	1" = 20'
	RECORD SET	11-21-08	



DRAINAGE AREA MAP



SHEET
C-4.1