MODIFIED RATIONAL METHOD (DETENTION VOLUME CALCULATIONS)

Rockwall, Texas FM 740

INPUT:

Area	0.647 acre
Duration	10 min
Runoff Coefficient	0.8
Peak Inflow	5.070 cfs
Max. Outflow	1.86 cfs

RAINFALL INTENSITIES (I):

(Storm Event (yr))	100
Duration (min)	Intensity (in/hr)
5	10.80
10	9.80
15	9.10
20	8.30
25	7.70
30	6.80
35	6.30
40	5.72
45	5.40
50	5.00
55	4.65
60	4.35
70	4.00
80	3.80
90	3.50

OUTPUT:

Interval	Duration (min)	Intensity (in/hr)	Qin (cfs)	Volume (in) (cf)	Volume (out) (cf)	Volume (storage) (cf)
1	5	10.80	5.6	1,677	846	831
2	10	9.80	5.1	3,043	1,128	1,915
3	15	9.10	4.7	4,239	1,410	2,829
4	20	8.30	4.3	5,155	1,692	3,463
5	25	7.70	4.0	5,978	1,974	4,004
6	30	6.80	3.5	6,335	2,256	4,079
7	35	6.30	3.3	6,848	2,538	4,310
8	40	5.72	3.0	7,106	2,820	4,286
9	45	5.40	2.8	7,547	3,102	4,445
10	50	5.00	2.6	7,764	3,384	4,380
11	55	4.65	2.4	7,943	3,666	4,277
12	60	4.35	2.3	8,106	3,948	4,158
13						
14						
15						

EXISTING CONDITIONS:

Q100 = 1.88 CFS
A = 0.647 acres
C = 0.35
I = 8.3 in/hr

PROPOSED CONDITIONS:

Q100 = 5.07 CFS
A = 0.647 acres
C = 0.80
I = 9.8 in/hr Tc = 10 min

MODIFIED RATIONAL DETENTION CALCULATIONS:

Volume Required: 4,776 Cubic Feet

Discharge Pipe Size: 6" Sch 40 Pvc

Height	Discharge
1.0'	0.94 cfs
1.5'	1.16 cfs
2.0'	1.33 cfs
2.5'	1.49 cfs
3.0'	1.64 cfs
3.5'	1.77 cfs
4.0'	1.88 cfs

Provided: 37' bw 96" ADS Detention Basin
4,776 Cubic Feet of Storage

System Weight

Pipe Dia. D (in)	Outside Dia. OD (ft)	C (ft)	Clr. Span S (ft)	Det. Area Factor (ft2/ft3)
12	1.20	1.75	1.10	2.86
15	1.46	2.00	1.07	2.07
18	1.77	2.36	1.19	1.66
24	2.32	2.97	1.57	1.23
30	2.93	4.04	2.23	1.05
36	3.48	4.52	2.09	0.79
42	3.98	5.44	2.92	0.65
42HC	3.90	4.95	2.10	0.64
48HC	4.39	5.45	2.11	0.53
60HC	5.46	5.91	2.67	0.43

Pipe OD= 3.48 Clear span (S)= 2.09 C= 4.52

A. If Width (W) Controls		
Number of Pipe Runs Required (Npr):	Npr=	7 pipe runs
Actual Width (Wact):	Wact=	36.9 ft
System Length (L):	L=	96 ft
Pipe Length Between Manifolds (Lp):	Lp=	86 ft
Estimated Storage Provided	Vp=	4776 ft3
Detention Surface Area Required (Ad):	Ad=	3542 ft2

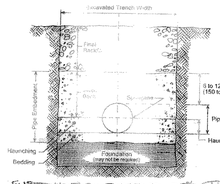
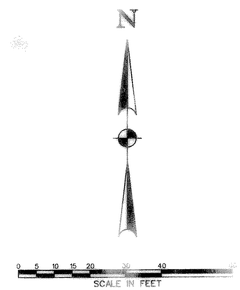


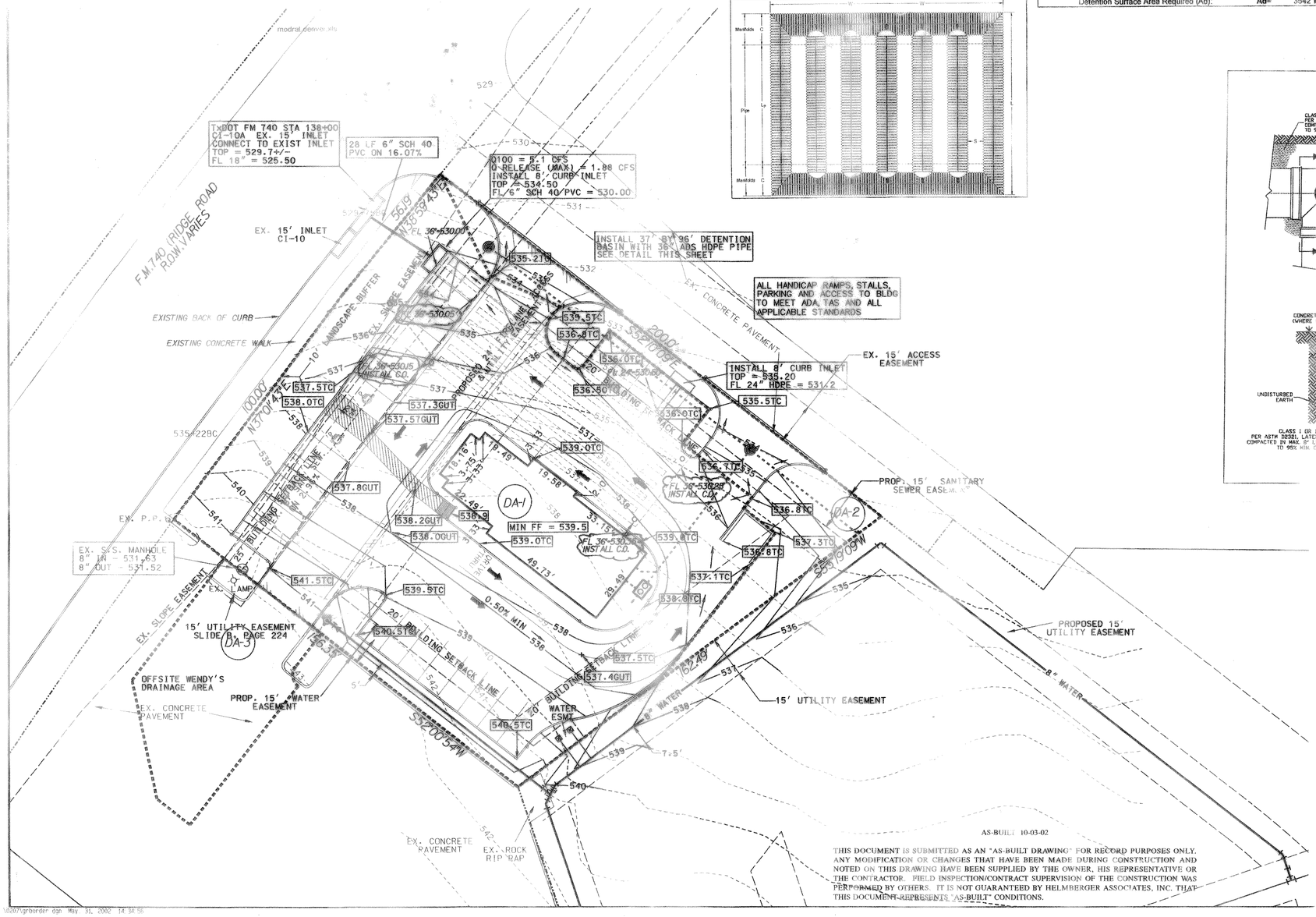
Figure 1. Trench Cross-Section Showing Terminology

ASTM D-2321 *

Class I – Angular crushed stone or rock, dense or open graded with little or no fines (¼ inch to 2½ inches in size)

Class II – (GW, GP, SW, SP, GW-GC, SP-SM) Clean, coarse grained materials, such as gravel, coarse sands and gravel/sand mixtures (1 ½ inches maximum size). (AASHTO classifications A1 & A3).





AS-BUILT 10-03-02

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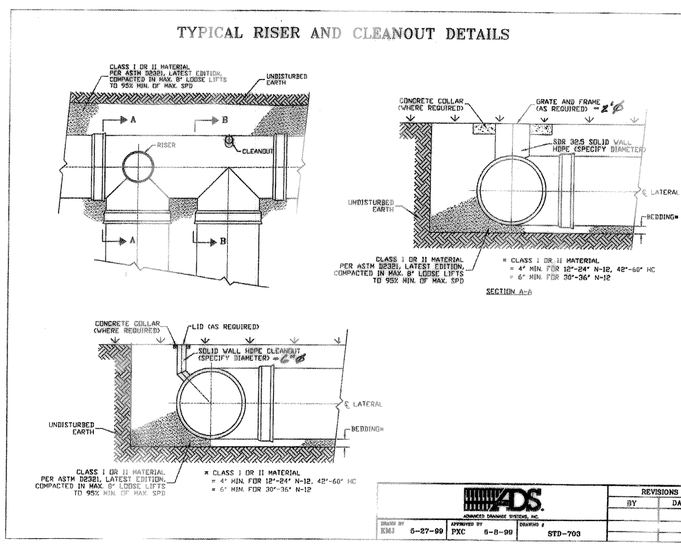
TYPICAL RISER AND CLEANOUT DETAILS



REVISIONS	
BY	DATE

ADS ADVANCED DRAINAGE SYSTEMS, INC.
DRAWN BY KMJ 6-27-99 APPROVED BY PXC 6-8-99 DRAWING # STD-703

STORMWATER RUNOFF CALCULATIONS				
LOCATION	I (100)	A (ACRES)	C	Q100
DA-1	9.8	0.54	0.9	4.76 CFS
DA-2	9.8	0.10	0.9	0.88 CFS
DA-3	9.8	0.08	0.9	0.70 CFS

6/11/02 REVISED TO CLOUD 36" FE ELEVATIONS

STATE OF TEXAS
STEPHEN A. HELMBERGER
82844
REGISTERED
PROFESSIONAL ENGINEER

5/30/02

GRADING AND DRAINAGE PLAN

POPEYES CHICKEN & BISCUITS

LOT 4R, BLOCK A, ROCKWALL TOWN CENTRE

ROCKWALL, TEXAS

HELMBERGER ASSOCIATES, INC.
CIVIL AND ENVIRONMENTAL ENGINEERS
124 HOOPER ROAD, WYLIE, TEXAS 75098 (972) 442-7459

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
HELM.	CADD	MAY 2002	1"=20'	grborder.dgn	0207	C3

\0207\grborder.dgn May 31, 2002 14:32:56