LEGEND

	DRAINAGE AREA DIVIDE
	EXISTING STORM SEWER LINE & INLET
	FLOW ARROWS
1	DRAINAGE AREA
2.63ac	ACRES
7.64	Q_{100}

DRAINAGE AREA RUNOFF CALCULATIONS

DRAINAGE AREA NO.	AREA (ac)	C (coeff.)	tc (min)	I_{100} (in/hr)	Q_{100} (cfs)
1	2.63	0.35	20	8.3	7.64
To Outfall #1					7.64
2	5.46	0.35	20	8.3	15.86
To Outfall #2					15.86

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1 inch = 100 ft.

BENCHMARKS:

ROCKWALL MONUMENT R500–1: CONC. MONUMENT IN CENTER MEDIAN OF SUMMIT RIDGE DRIVE. WEST OF RIDGE RD.

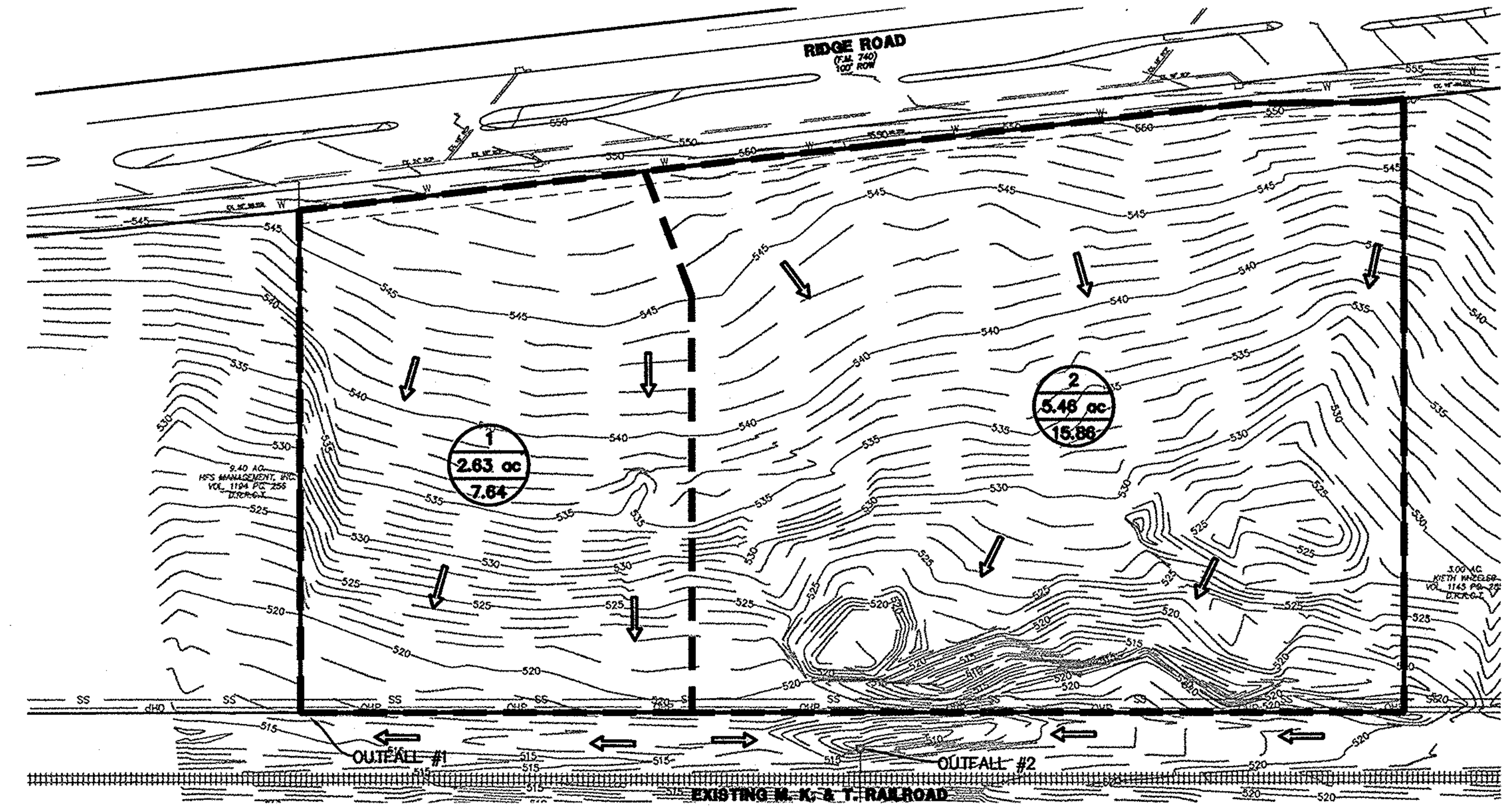
ELEV: 578.63

"⊔" SET IN MEDIAN NOSE RIDGE ROAD ±193 FEET SOUTH OF SW PROPERTY CORNER.

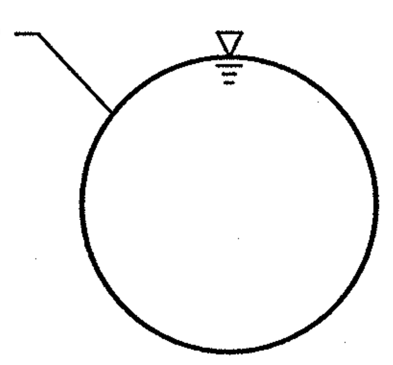
ELEV: 546.15

"⊔" SET ON INLET WEST CURB LINE RIDGE ROAD, ±155 SOUTH OF NW PROPERTY CORNER

ELEV: 553.07



EXISTING ON-SITE DRAINAGE AREA MAP



DETERMINATION OF STORAGE PROVIDED:
CROSS-SECTIONAL AREA OF 36" RCP = 7.069 SF
LENGTH OF PROPOSED DETENTION PIPE = 565 LF
STORAGE PROVIDED = 7.069 SF X 565 LF = 3900 CF

DETENTION SYSTEM "A" ANALYSIS (DRY DETENTION POND)

1. DETERMINATION OF RELEASE RATE FROM DETENTION SYSTEM "A" (100 YEAR)

ON-SITE EXISTING CONDITIONS (TO OUTFALL #1):
100 YEAR STORM EVENT
C=0.35
I_{100} = 8.30 IN/HR
Tc = 20 MINUTES
A = 2.63 ACRES
$Q_{E_{100}}$ = 7.64 CFS

ON-SITE PROPOSED CONDITIONS:
100 YEAR STORM EVENT
C=0.80
I_{100} = 9.80 IN/HR
Tc = 10 MINUTES
A_1 = 5.16 ACRES (DETAINED AREA FOR SYSTEM "A" SEE SHEET C–6)
A_2 = 0.23 ACRES (UNDETAINED AREAS TO OUTFALL #1 SEE SHEET C–6)
$Q_{1_{100}}$ = 40.48 CFS
$Q_{2_{100}}$ = 1.80 CFS

PROPOSED DETENTION POND PARAMETERS:
100 YEAR W.S.E. = 532.00
AVERAGE DEPTH OF POND IS 13.50 FEET
POND AREA = 5149 SQUARE FEET
POND VOLUME PROVIDED = 69500 CUBIC FEET
SYSTEM "A" WILL OVERDETAIN DOWN BY 2.84 CFS
TO MAXIMIZE THE PROVIDED POND VOLUME OF 69500 CF.

RELEASE RATE FROM SYSTEM "A":
$Q_{E_{100}} - Q_{2_{100}} = Q_R$ (ALLOWABLE RELEASE RATE FROM SYSTEM "A")
7.64 CFS – 1.80 CFS = 5.84 CFS
LESS OVERDETAINED AMOUNT:
5.84 CFS – 2.84 CFS = Q_R = 3.00 CFS

2. DETERMINATION OF REQUIRED STORAGE VOLUME FOR DETENTION SYSTEM "A" (100 YEAR)
$Q_{1_{100}}$ = 40.48 CFS (PROPOSED CONDITIONS)
Q_R = 3.00 CFS (RELEASE RATE)

DURATION (MIN.)	RAINFALL INTENSITY (IN/HR)	INFLOW RATE (CFS)	INFLOW VOLUME (CF)	OUTFLOW RATE (CFS)	OUTFLOW VOLUME (CF)	REQUIRED STORAGE (CF)
10	9.80	40.48	24,288	3.00	1,800	22,488
15	9.00	37.18	33,458	3.00	2,250	31,208
20	8.30	34.28	41,141	3.00	2,700	38,441
30	6.85	28.29	50,930	3.00	3,600	47,330
40	5.75	23.75	57,003	3.00	4,500	52,503
50	5.00	20.65	61,959	3.00	5,400	56,559
60	4.45	18.38	66,172	3.00	6,300	59,872
70	4.10	16.94	71,129	3.00	7,200	63,929
80	3.75	15.49	74,351	3.00	8,100	66,251
90	3.45	14.25	76,953	3.00	9,000	67,953
100	**3.20**	**13.22**	**79,308**	**3.00**	**9,900**	**69,408**
120	2.70	11.15	80,299	3.00	11,700	68,599

STORAGE VOLUME REQUIRED: 69,408 CF (100 YEAR)
STORAGE VOLUME PROVIDED: 69,500 CF (100 YEAR)

3. DEVELOPED RUNOFF, ALLOWABLE RELEASE, AND REQUIRED DETENTION STORAGE FOR EACH RETURN PERIOD

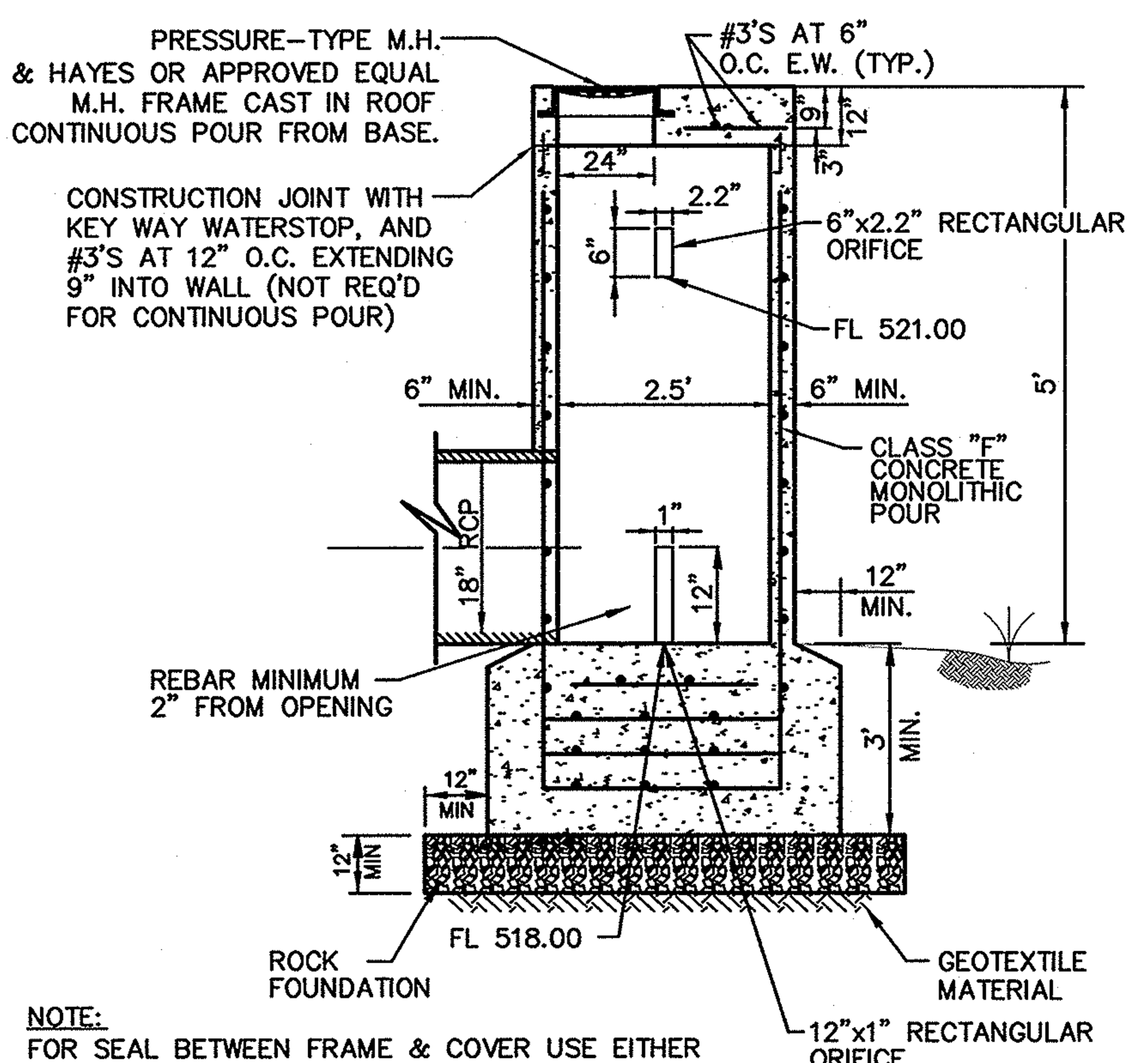
RETURN PERIOD	AGRICULTURAL RELEASE (CFS)	DEVELOPED RUNOFF (CFS)	STORAGE VOLUME (CF)	WATER SURFACE ELEVATION	ACTUAL RELEASE (CFS)
10 YEAR	2.09	30.15	47,627	528.20	2.39
25 YEAR	2.49	34.70	57,215	530.20	2.67
50 YEAR	2.67	37.18	63,367	531.40	2.81
100 YEAR	3.00	40.48	69,408	532.60	2.95

*CALCULATIONS FOR 10, 25, AND 50 YEAR STORM EVENTS AVAILABLE UPON REQUEST.

ORIFICE DETAIL AND ANALYSIS

NTS

ORIFICE EQUATION
Q = CA((2GH)^.5)
Q = ALLOWABLE RELEASE (CFS)
A = ORIFICE AREA
H = HEAD (FEET)
C = ORIFICE COEFFICIENT (0.60)
*CALCULATIONS AVAILABLE UPON REQUEST.



NOTE:
FOR SEAL BETWEEN FRAME & COVER USE EITHER A 1/16" COPPER GASKET OR A 1/4" DIA. NEOPRENE O-RING GASKET (LOCATION OF O-RING IS LEFT TO MFR., BUT SUBJECT TO APPROVAL BY CONST. ENGR.)

DETENTION SYSTEM "B" ANALYSIS (UNDERGROUND)

1. DETERMINATION OF RELEASE RATE FROM DETENTION SYSTEM "B" (100 YEAR)

ON-SITE EXISTING CONDITIONS (TO OUTFALL #2):
100 YEAR STORM EVENT
C=0.35
I_{100} = 8.30 IN/HR
Tc = 20 MINUTES
A = 5.46 ACRES
$Q_{E_{100}}$ = 15.86 CFS (TOTAL ALLOWABLE RELEASE TO OUTFALL #2)

ON-SITE PROPOSED CONDITIONS:
100 YEAR STORM EVENT
C=0.80
I_{100} = 9.80 IN/HR
Tc = 10 MINUTES
A_1 = 1.17 ACRES (DETAINED AREA FOR SYSTEM "B" SEE SHEET C–6)
A_2 = 1.57 ACRES (UNDETAINED AREA TO OUTFALL #2 SEE SHEET C–6)
$Q_{1_{100}}$ = 9.17 CFS
$Q_{2_{100}}$ = 12.32 CFS

RELEASE RATE FROM SYSTEM "A":
$Q_{E_{100}} - Q_{2_{100}} = Q_R$ (ALLOWABLE RELEASE RATE FROM SYSTEM "A")
15.86 CFS – 12.32 CFS = 3.54 CFS
PLUS OVERDETAINED AMOUNT FROM SYSTEM "A":
3.54 CFS + 2.84 CFS = Q_R = 6.38 CFS

2. DETERMINATION OF REQUIRED STORAGE VOLUME FOR DETENTION SYSTEM "B" (100 YEAR)
$Q_{1_{100}}$ = 9.17 CFS (PROPOSED CONDITIONS)
Q_R = 6.38 (RELEASE RATE)

DURATION (MIN.)	RAINFALL INTENSITY (IN/HR)	INFLOW RATE (CFS)	INFLOW VOLUME (CF)	OUTFLOW RATE (CFS)	OUTFLOW VOLUME (CF)	REQUIRED STORAGE (CF)
10	9.80	9.17	5,502	6.38	3,828	1,674
15	9.00	8.42	7,579	6.38	4,785	2,794
20	8.30	7.77	9,320	6.38	5,742	3,578
30	**6.85**	**6.41**	**11,537**	**6.38**	**7,656**	**3,881**
40	5.75	5.38	12,913	6.38	9,570	3,343
50	5.00	4.68	14,036	6.38	11,484	2,552
60	4.45	4.16	14,990	6.38	13,398	1,592
70	4.10	3.84	16,113	6.38	15,312	801
80	3.75	3.51	16,843	6.38	17,226	0
90	3.45	3.23	17,432	6.38	19,140	0
100	3.20	2.99	17.966	6.38	21,054	0
120	2.70	2.53	18,190	6.38	24,882	0

STORAGE VOLUME REQUIRED: 3,881 CF (100 YEAR)
STORAGE VOLUME PROVIDED: 3,881 CF (100 YEAR)

3. DEVELOPED RUNOFF, ALLOWABLE RELEASE, AND REQUIRED DETENTION STORAGE FOR EACH RETURN PERIOD

RETURN PERIOD	AGRICULTURAL RELEASE (CFS)	DEVELOPED RUNOFF (CFS)	STORAGE VOLUME (CF)	WATER SURFACE ELEV. UPSTREAM @ OUTFALL STRUCTURE
10 YEAR	4.47	6.83	2,892	519.68
25 YEAR	5.31	7.86	3,063	519.78
50 YEAR	5.70	8.42	3,606	520.13
100 YEAR	6.38	9.17	3,881	520.63

*CALCULATIONS FOR 10, 25, AND 50 YEAR STORM EVENTS AVAILABLE UPON REQUEST.

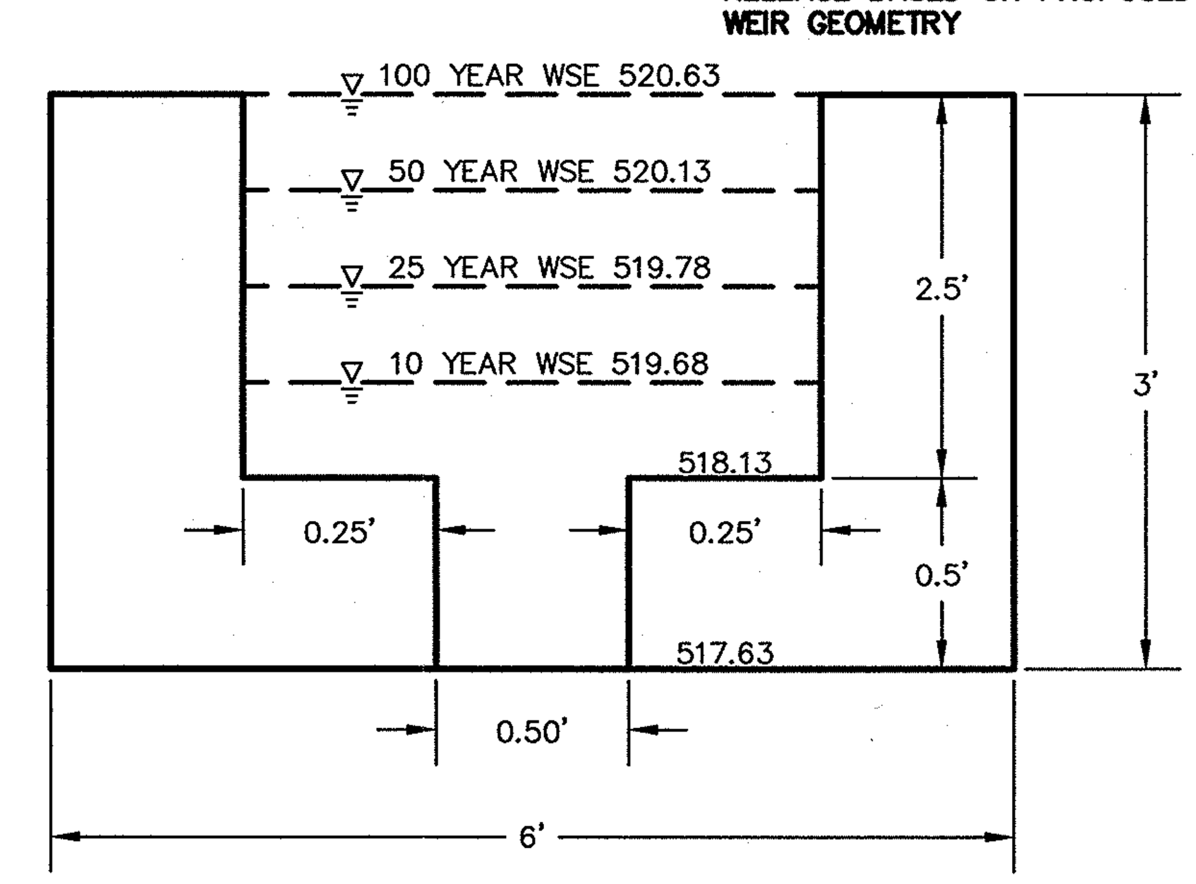
WEIR PLATE DETAIL AND ANALYSIS

NTS

WEIR EQUATION
Q = $CLH^{1.5}$
Q = ALLOWABLE RELEASE (CFS)
L = LENGTH (FEET)
H = HEAD (FEET)
C = WEIR COEFFICIENT (3.0)
*CALCULATIONS AVAILABLE UPON REQUEST.

RETURN PERIOD (YEAR)	AGRICULTURAL RELEASE (CFS)	*ACTUAL RELEASE (CFS)
10	4.47	4.50
25	5.31	4.93
50	5.70	5.59
100	6.38	6.35

*RELEASE BASED ON PROPOSED WEIR GEOMETRY



*SEE STORM SEWER DETAIL SHEET FOR WEIR PLATE CONSTRUCTION DETAIL

RECORD DRAWING
THIS RECORD DRAWING HEREIN REFLECTS TO THE BEST OF THE DESIGN ENGINEER'S KNOWLEDGE, THE APPROXIMATE LOCATION OF THE CONSTRUCTED WORK, USING INFORMATION AS PROVIDED BY THE CONTRACTORS AND SURVEYED GRADES.

No.	Date	Revisions	App.

Kimley-Horn and Associates, Inc.
9300 Wade Boulevard, Suite 320
Frisco, Texas 75035
Tel. No. (972) 335–3580
Fax No. (972) 335–3779

STATE OF TEXAS
PIETER D. KESSELS
87775
LICENSED PROFESSIONAL ENGINEER
5-25-2009
For Construction

ROCKWALL COMMONS MIXED USE TRACT
CITY OF ROCKWALL, TEXAS

STORM DRAINAGE DETENTION CALCULATIONS

Scale: AS SHOWN
Designed by: P.D.K
Drawn by: C.D.R.
Checked by: P.D.K.
Date: 05\25\04
Project No. 067051007

SHEET
C–7
OF 24