DETENTION POND VOLUME CALCULATOR						
MODIFIED RATIONAL METHOD						
5 YEAR FREQUENCY						
	Acres	Q				
SITE TOTAL	8.73	16.63				
BYPASS	0.47	2.58				
Q_{total}-Q_{BYPASS}		14.05				
Present Conditions				Proposed Conditions		
	DETAINED AREAS				TOTAL AREA	BYPASS AREA
EXISTING DA ID	5, 6, & 7	OS 1 & OS 2		PROPOSED DA ID	DA 1 - DA16 & O1 - O4	14, 15, & 16
AREA, ACRES	7.49	1.24		AREA, ACRES	8.73	0.47
C	0.35	0.50		C	0.90	0.90
Tc	20.00	10.00		Tc	10.00	10.00
i_5	4.90	6.10		i_5	6.10	6.10
Q_5	12.85	3.78		Q_5	47.93	2.58

Time	Inflow	Outflow	Storage (cf)	Tc	Intensity
5	20271	6321	13950	5	8.6
10	28757	8428	20328	10	6.1
15	38892	10535	28357	15	5.5
20	46199	12642	33557	20	4.9
30	57985	16856	41128	30	4.1
40	64113	21071	43043	40	3.4
50	65999	25285	40714	50	2.8
60	73542	29499	44043	60	2.6
70	79199	33713	45486	70	2.4
80	86741	37927	48814	80	2.3
90	89098	42141	46957	90	2.1
100	89570	46355	43215	100	1.9
110	93341	50569	42772	110	1.8

DETENTION POND VOLUME CALCULATOR						
MODIFIED RATIONAL METHOD						
10 YEAR FREQUENCY						
	Acres	Q				
SITE TOTAL	8.73	19.87				
BYPASS	0.47	3.00				
Q_{total}-Q_{BYPASS}		16.87				
Present Conditions				Proposed Conditions		
	DETAINED AREAS				TOTAL AREA	BYPASS AREA
EXISTING DA ID	5, 6, & 7	OS 1 & OS 2		PROPOSED DA ID	DA 1 - DA16 & O1 - O4	14, 15, & 16
AREA, ACRES	7.49	1.24		AREA, ACRES	8.73	0.47
C	0.35	0.50		C	0.90	0.90
Tc	20.00	10.00		Tc	10.00	10.00
i_{10}	5.90	7.10		i_{10}	7.10	7.10
Q_{10}	15.47	4.40		Q_{10}	55.78	3.00

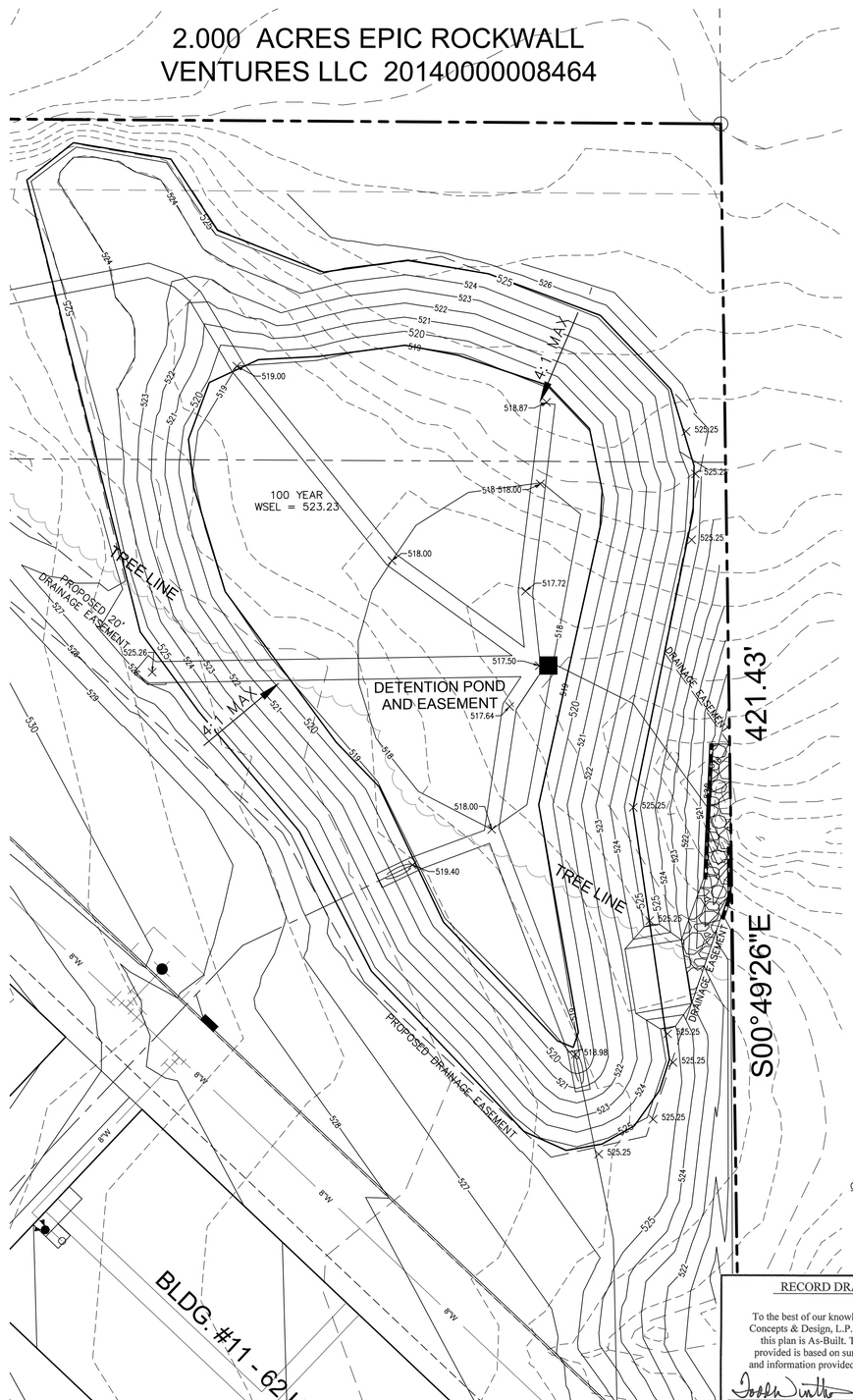
Time	Inflow	Outflow	Storage (cf)	Tc	Intensity
5	23807	7589	16217	5	10.1
10	33471	10119	23351	10	7.1
15	45963	12649	33314	15	6.5
20	55628	15179	40449	20	5.9
30	67884	20239	47646	30	4.8
40	75427	25298	50129	40	4.0
50	82499	30358	52141	50	3.5
60	84856	35418	49438	60	3.0
70	92398	40477	51921	70	2.8
80	98055	45537	52518	80	2.6
90	106070	50597	55473	90	2.5
100	113141	55656	57484	100	2.4
110	119269	60716	58553	110	2.3

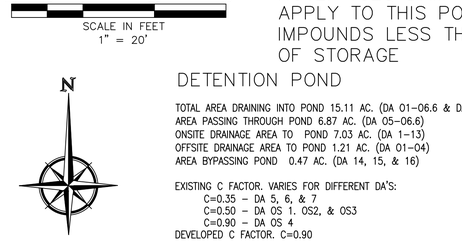
DETENTION POND VOLUME CALCULATOR						
MODIFIED RATIONAL METHOD						
25 YEAR FREQUENCY						
	Acres	Q				
SITE TOTAL	8.73	22.45				
BYPASS	0.47	3.51				
Q_{total}-Q_{BYPASS}		18.94				
Present Conditions				Proposed Conditions		
	DETAINED AREAS				TOTAL AREA	BYPASS AREA
EXISTING DA ID	5, 6, & 7	OS 1 & OS 2		PROPOSED DA ID	DA 1 - DA16 & O1 - O4	14, 15, & 16
AREA, ACRES	7.49	1.24		AREA, ACRES	8.73	0.47
C	0.35	0.50		C	0.90	0.90
Tc	20.00	10.00		Tc	10.00	10.00
i_{25}	6.60	8.30		i_{25}	8.30	8.30
Q_{25}	17.30	5.15		Q_{25}	65.21	3.51

Time	Inflow	Outflow	Storage (cf)	Tc	Intensity
5	28285	8522	19764	5	12.0
10	39128	11362	27766	10	8.3
15	53035	14203	38832	15	7.5
20	62227	17043	45184	20	6.6
30	77784	22724	55060	30	5.5
40	86741	28406	58336	40	4.6
50	94284	34087	60197	50	4.0
60	98998	39768	59231	60	3.5
70	108898	45449	63449	70	3.3
80	116912	51130	65782	80	3.1
90	123041	56811	66230	90	2.9
100	127283	62492	64791	100	2.7
110	129641	68173	61467	110	2.5

DETENTION POND VOLUME CALCULATOR						
MODIFIED RATIONAL METHOD						
100 YEAR FREQUENCY						
	Acres	Q				
SITE TOTAL	8.73	27.83				
BYPASS	0.47	4.15				
Q_{total}-Q_{BYPASS}		23.69				
Present Conditions				Proposed Conditions		
	DETAINED AREAS				TOTAL AREA	BYPASS AREA
EXISTING DA ID	5, 6, & 7	OS 1 & OS 2		PROPOSED DA ID	DA 1 - DA16 & O1 - O4	14, 15, & 16
AREA, ACRES	7.49	1.24		AREA, ACRES	8.73	0.47
C	0.35	0.50		C	0.90	0.9
Tc	20.00	10.00		Tc	10.00	10
i_{100}	8.30	9.80		i_{100}	9.80	9.8
Q_{100}	21.76	6.08		Q_{100}	77.00	4.15

Time	Inflow	Outflow	Storage (cf)	Tc	Intensity
5	35121	10660	24461	5	14.9
10	46199	14213	31986	10	9.8
15	63642	17767	45875	15	9.0
20	78256	21320	56936	20	8.3
30	97584	28427	69157	30	6.9
40	109369	35534	73836	40	5.8
50	117855	42640	75215	50	5.0
60	127283	49747	77536	60	4.5
70	131998	56854	75144	70	4.0
80	137655	63960	73694	80	3.7
90	148497	71067	77430	90	3.5
100	160283	78174	82109	100	3.4
110	163866	85281	78585	110	3.2





20 10 0 20 40
SCALE IN FEET
1" = 20'

NOTE: TCEQ DAM SAFETY DOES NOT APPLY TO THIS POND BECAUSE IT IMPOUNDS LESS THAN 15 ACRE-FEET OF STORAGE

NOTE: DETENTION SHALL BE FULLY INSTALLED & OPERATIONAL BEFORE PAVING AND BUILDING CONSTRUCTION.

DETENTION POND

TOTAL AREA DRAINING INTO POND 15.11 AC. (DA 01-06.6 & DA 1-13)
AREA PASSING THROUGH POND 6.87 AC. (DA 05-06.6)
ONSITE DRAINAGE AREA TO POND 7.03 AC. (DA 1-13)
OFFSITE DRAINAGE AREA TO POND 1.21 AC. (DA 01-04)
AREA BYPASSING POND 0.47 AC. (DA 14, 15, & 16)

EXISTING C FACTOR. VARIES FOR DIFFERENT DA'S:
C=0.35 - DA 5, 6, & 7
C=0.50 - DA OS 1. OS2, & OS3
C=0.90 - DA OS 4
DEVELOPED C FACTOR. C=0.90

ALLOWABLE RELEASE, 5 YEAR (Q= CIA)
5 YEAR 20 MINUTE INTENSITY I=4.90
5 YEAR 10 MINUTE INTENSITY I=6.10
14.05cfs (site) 22.32cfs (pass thru)
Q(5)= 36.37 cfs (ALLOWABLE RELEASE)

ALLOWABLE RELEASE, 10 YEAR (Q= CIA)
10 YEAR 20 MINUTE INTENSITY I=5.90
10 YEAR 10 MINUTE INTENSITY I=7.10
16.87cfs (site) 25.98cfs (pass thru)
Q(10)= 42.85cfs (ALLOWABLE RELEASE)

ALLOWABLE RELEASE, 25 YEAR (Q= CIA)
25 YEAR 20 MINUTE INTENSITY I=6.60
25 YEAR 10 MINUTE INTENSITY I=8.30
18.94cfs (site) 30.37cfs (pass thru)
Q(25)= 49.31 cfs (ALLOWABLE RELEASE)

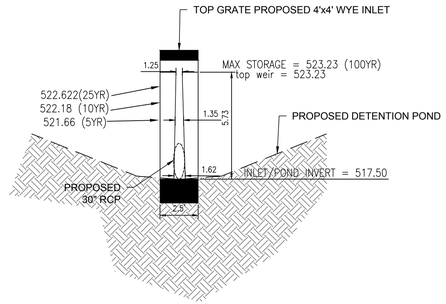
ALLOWABLE RELEASE, 100 YEAR (Q= CIA)
100 YEAR 20 MINUTE INTENSITY I=8.30
100 YEAR 10 MINUTE INTENSITY I=9.80
23.69cfs (site) 35.86cfs (pass thru)
Q(100)= 59.55 cfs (ALLOWABLE RELEASE)

Detention Pond Volume Calculations

Pond Overflow Elevation = 525.25
100yr Water Surface Elevation = 523.23
INVERT ELEVATION 517.50

Contour Elevation	Surface Area (sf)	Average Area	Cumulative Volume (cf)	
517.50	0			
		1,694	847	
518.00	3,388			
		8,407	5,051	
519.00	13,425			
		14,503	19,554	
520.00	15,581			
		16,706	36,260	
521.00	17,830			
		19,005	55,265	5-48,814
522.00	20,180			10-58,553
		21,432	76,697	25-66,230
523.00	22,684			100-82,109
		23,973	100,670	
524.00	25,261			
		26,633	127,303	
525.00	28,004			

5 YEAR WS 521.66
10 YEAR WS 522.15
25 YEAR WS 522.62
100 YEAR WS 523.23

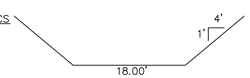


4'x4' WYE INLET

N.T.S

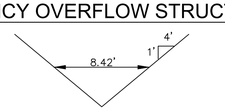
NOTE:
TRAPEZOIDAL WEIR OPENING, WEIR CALCULATION BASED ON WIDTH AT WATER SURFACE OF EACH STORM.

OVERFLOW STRUCTURE CALCS
Q=59.60 CFS
d=0.47 FT
v=6.44 FT/S
s=1.00%



EMERGENCY OVERFLOW STRUCTURE

OVERFLOW STRUCTURE RIP RAP SLOPE PROTECTION CALCS
Q=59.60 CFS
d=1.05 FT
v=12.65 FT/S
s=1.60%

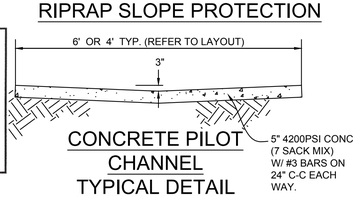


RIPRAP SLOPE PROTECTION

RECORD DRAWINGS

To the best of our knowledge Engineering Concepts & Design, L.P., hereby states that this plan is As-Built. This information provided is based on surveying at the site and information provided by the contractor.

TODD WINTTERS 3-15-2021 DATE



CONCRETE PILOT CHANNEL TYPICAL DETAIL

1"=1'

5" 4200PSI CONC (7 SACK MIX) W/ #3 BARS ON 24" C-C EACH WAY.

NOTE:
ENTIRE DETENTION SYSTEM TO BE MAINTAINED BY PROPERTY OWNER.

Outlet Structure Calculations
5 Year Discharge @ Max Water Surface

Q total = #####fs Allowed
Storage Elevation = 521.66
Invert Elevation = 517.50
Width Weir (1) = 1.35

Q total = 38.18cfs Provided
Q ALLOW TO Q DESIGN, 10yr DIFFERENCE = ###%

WEIR (1)
$Q=CL(H)^{\frac{3}{2}}$
C= 3.333
H= 4.16 {H = Storage elev. minus FL of weir}
L= 1.35
Q= 38.18cfs

Weir opening 1.35 feet x 4.16 '@ WS 521.66

Outlet Structure Calculations
10 Year Discharge @ Max Water Surface

Q total = 42.85cfs Allowed
Storage Elevation = 522.15
Invert Elevation = 517.50
Width Weir (1) = 1.32

Q total = 44.12cfs Provided
Q ALLOW TO Q DESIGN, 10yr DIFFERENCE = 3.0%

WEIR (1)
$Q=CL(H)^{\frac{3}{2}}$
C= 3.333
H= 4.65 {H = Storage elev. minus FL of weir}
L= 1.32
Q= 44.12cfs

Weir opening 1.32 feet x 4.65 '@ WS 522.15

Outlet Structure Calculations
25 Year Discharge @ Max Water Surface

Q total = 49.31cfs Allowed
Storage Elevation = 522.62
Invert Elevation = 517.50
Width Weir (1) = 1.29

Q total = 49.81cfs Provided
Q ALLOW TO Q DESIGN, 10yr DIFFERENCE = 1.0%

WEIR (1)
$Q=CL(H)^{\frac{3}{2}}$
C= 3.333
H= 5.12 {H = Storage elev. minus FL of weir}
L= 1.29
Q= 49.81cfs

Weir opening 1.29 feet x 5.12 '@ WS 522.62

Outlet Structure Calculations
100 Year Discharge @ Max Water Surface

Q total = 59.55 cfs Allowed

Storage Elevation = 523.23
Invert Elevation = 517.50
Width Weir (1) = 1.25

Storage Elevation = 523.23
Invert Elevation = 523.23
Width Weir (2) = 12.0

Q total = 57.14 cfs Provided
Q ALLOW TO Q DESIGN, 10yr DIFFERENCE = -4.0%

WEIR (1)
$Q=CL(H)^{\frac{3}{2}}$
C= 3.333
H= 5.73 {H = Storage elev. minus FL of weir}
L= 1.25
Q= 57.14cfs

Weir opening 1.25 feet x 5.73 '@ FL 523.23

WEIR (2)
$Q=CL(H)^{\frac{3}{2}}$
C= 3.333
H= 0.00 {H = Storage elev. minus FL of weir}
L= 12.0
Q= 0.00 cfs

Weir opening 12.0 feet x 0.00 '@ FL 523.23

"Case No. SP2019-027"

BENCHMARKS: CITY OF ROCKWALL , TEXAS - CONTROL MONUMENTATION

ROCKWALL MONUMENT "RESET #1 3" BRASS DISK FOUND AT FM 740 (RIDGE ROAD) AND SUMMER LEE DRIVE NEAR NORTHWEST CORNER OF THE PARKING LOT FOR THE COMMUNITY BANK.
N: 7011544.252; E: 2590135.160; ELEVATION: 567.704
BASED ON NAD-83 TX, STATE PLANE, NORTH CENTRAL ZONE.

ENGINEERINGCONCEPTS & DESIGN, L.P.
ENGINEERING / PROJECT MANAGEMENT / CONSTRUCTION SERVICES - FIRM REG. #F-001145
201 WINDCO CIR, STE 200, WYLIE, TX 75098
972-941-8400 FAX: 972-941-8401 WWW.ECDLP.COM

REVISIONS:

DRAWN:	ECDLP	DATE:	January 7, 2020
CHECKED:	TW	DATE:	January 7, 2020
PROJECT NO.:	5211		
DWG FILE NAME:	09-DETENTION POND.DWG		

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF CONSTRUCTION.

STATE OF TEXAS
TODD D. WINTTERS
87085
REGISTERED PROFESSIONAL ENGINEER

DETENTION POND
HORIZON ROAD SELF STORAGE
PHASE 1& 2 - 575 UNITS
TRACT 23 OF RAINBOW ACRES
CITY OF ROCKWALL, ROCKWALL COUNTY, TEXAS

SHEET 15

Z:\PROJECTS\05211 Rockwall Mini Storage\dwg\SHEETS\09-DETENTION POND.dwg-DETENTION POND Plotted Mar 05, 2021 at 9:32am by Tony | Last Saved by: Tony