Drainage / Detention Calculations (5-YEAR)

Modified Rational Method

Required Storage Volume — **5,641 cubic-feet** / **0.129 acre-feet**

Onsite Existing Conditions

Area	0.93	acres	Total Acreage Going to Pond Area- DA (C-1&OS-2)
Time (Tc)	20	minutes	
C value	0.35		
I-5 yr	4.90	in/hr	
Q 5-yr	**1.59**	**cfs**	**Allowable Release**
	0.55	**cfs**	**By- Pass Q DA (B-1&B-2)**
	1.05	**cfs**	**Actual Allowable Release**
	1.37	**cfs**	**Actual Pond Release**

Onsite Proposed Conditions

Area	0.94	acres	Total Acreage Going to Pond- DA (C-1&C-2&OS-1)
Time (Tc)	10	minutes	
C value	0.90		
I-5 yr	6.10	in/hr	
Q 5-yr	**5.16**	**cfs**	**Developed Runoff**

Runoff per Storm Event - Developed

Time (min.)	I-5yr	C value	Area (ac)	Runoff (cfs)
5	6.873	0.90	0.94	5.81
10	6.100	0.90	0.94	5.16
15	5.500	0.90	0.94	4.65
20	4.900	0.90	0.94	4.15
25	4.500	0.90	0.94	3.81
30	4.100	0.90	0.94	3.47
35	3.750	0.90	0.94	3.17
40	3.400	0.90	0.94	2.88
50	2.800	0.90	0.94	2.37
60	2.600	0.90	0.94	2.20
70	2.450	0.90	0.94	2.07
80	2.300	0.90	0.94	1.95
90	2.100	0.90	0.94	1.78
100	1.900	0.90	0.94	1.61
110	1.800	0.90	0.94	1.52
120	1.700	0.90	0.94	1.44
130	1.600	0.90	0.94	1.35
140	1.400	0.90	0.94	1.18

Rockwall Rainfall Intensity

Time (min.)	I-5 yr	I-10 yr	I-25 yr	I-100 yr
5	6.873	7.975	9.185	11.103
10	6.100	7.100	8.300	9.800
15	5.500	6.500	7.500	9.000
20	4.900	5.900	6.600	8.300
25	4.500	5.350	6.050	7.600
30	4.100	4.800	5.500	6.900
35	3.750	4.400	5.050	6.350
40	3.400	4.000	4.600	5.800
50	2.800	3.500	4.000	5.000
60	2.600	3.000	3.500	4.500
70	2.450	2.860	3.310	4.000
80	2.300	2.600	3.133	3.700
90	2.100	2.500	2.900	3.500
100	1.900	2.400	2.700	3.400
110	1.800	2.300	2.500	3.200
120	1.700	2.200	2.400	3.100
130	1.600	1.800	2.250	2.800
140	1.400	1.600	2.000	2.500

Inflow per Storm Event

Storm Event	Runoff	Inflow (ft^3)
5	5.81	1,744
10	5.16	3,096
15	4.65	4,188
20	4.15	4,974
25	3.81	5,711
30	3.47	6,243
35	3.17	6,662
40	2.88	6,903
50	2.37	7,106
60	2.20	7,919
70	2.07	8,705
80	1.95	9,340
90	1.78	9,594
100	1.61	9,644
110	1.52	10,050
120	1.44	10,355
130	1.35	10,558
140	1.18	9,949

Outflow per Storm Event

Storm	Time	Release	Outflow (ft^3)
5	15	1.37	617
10	20	1.37	822
15	25	1.37	1,028
20	30	1.37	1,233
25	35	1.37	1,439
30	40	1.37	1,644
35	45	1.37	1,850
40	50	1.37	2,055
50	60	1.37	2,466
60	70	1.37	2,877
70	80	1.37	3,288
80	90	1.37	3,699
90	100	1.37	4,110
100	110	1.37	4,521
110	120	1.37	4,932
120	130	1.37	5,343
130	140	1.37	5,754
140	150	1.37	6,165

Detention Volume

Storm	Inflow	Outflow	Storage (ft^3)	Storage (acre-ft)
5	1,744	617	1,128	0.026
10	3,096	822	2,274	0.052
15	4,188	1,028	3,160	0.073
20	4,974	1,233	3,741	0.086
25	5,711	1,439	4,272	0.098
30	6,243	1,644	4,599	0.106
35	6,662	1,850	4,813	0.110
40	6,903	2,055	4,848	0.111
50	7,106	2,466	4,640	0.107
60	7,919	2,877	5,042	0.116
70	8,705	3,288	5,417	0.124
80	9,340	3,699	**5,641**	**0.129**
90	9,594	4,110	5,484	0.126
100	9,644	4,521	5,123	0.118
110	10,050	4,932	5,118	0.118
120	10,355	5,343	5,012	0.115
130	10,558	5,754	4,804	0.110
140	9,949	6,165	3,784	0.087

Drainage / Detention Calculations (10-YEAR)

Modified Rational Method

Required Storage Volume — **7,434 cubic-feet** / **0.171 acre-feet**

Onsite Existing Conditions

Area	0.93	acres	Total Acreage Going to Pond Area- DA (C-1&OS-2)
Time (Tc)	20	minutes	
C value	0.35		
I-10 yr	5.90	in/hr	
Q 10-yr	**1.92**	**cfs**	**Allowable Release**
	0.64	**cfs**	**By- Pass Q DA (B-1&B-2)**
	1.28	**cfs**	**Actual Allowable Release**
	1.53	**cfs**	**Actual Pond Release**

Onsite Proposed Conditions

Area	0.94	acres	Total Acreage Going to Pond- DA (C-1&C-2&OS-1)
Time (Tc)	10	minutes	
C value	0.90		
I-10 yr	7.10	in/hr	
Q 10-yr	**6.01**	**cfs**	**Developed Runoff**

Runoff per Storm Event - Developed

Time (min.)	I-10yr	C value	Area (ac)	Runoff (cfs)
5	7.975	0.90	0.94	6.75
10	7.100	0.90	0.94	6.01
15	6.500	0.90	0.94	5.50
20	5.900	0.90	0.94	4.99
25	5.350	0.90	0.94	4.53
30	4.800	0.90	0.94	4.06
35	4.400	0.90	0.94	3.72
40	4.000	0.90	0.94	3.38
50	3.500	0.90	0.94	2.96
60	3.000	0.90	0.94	2.54
70	2.860	0.90	0.94	2.42
80	2.600	0.90	0.94	2.20
90	2.500	0.90	0.94	2.12
100	2.400	0.90	0.94	2.03
110	2.300	0.90	0.94	1.95
120	2.200	0.90	0.94	1.86
130	1.800	0.90	0.94	1.52
140	1.600	0.90	0.94	1.35

Rockwall Rainfall Intensity

Time (min.)	I-5 yr	I-10 yr	I-25 yr	I-100 yr
5	6.873	7.975	9.185	11.103
10	6.100	7.100	8.300	9.800
15	5.500	6.500	7.500	9.000
20	4.900	5.900	6.600	8.300
25	4.500	5.350	6.050	7.600
30	4.100	4.800	5.500	6.900
35	3.750	4.400	5.050	6.350
40	3.400	4.000	4.600	5.800
50	2.800	3.500	4.000	5.000
60	2.600	3.000	3.500	4.500
70	2.450	2.860	3.310	4.000
80	2.300	2.600	3.133	3.700
90	2.100	2.500	2.900	3.500
100	1.900	2.400	2.700	3.400
110	1.800	2.300	2.500	3.200
120	1.700	2.200	2.400	3.100
130	1.600	1.800	2.250	2.800
140	1.400	1.600	2.000	2.500

Inflow per Storm Event

Storm Event	Runoff	Inflow (ft^3)
5	6.75	2,024
10	6.01	3,604
15	5.50	4,949
20	4.99	5,990
25	4.53	6,789
30	4.06	7,309
35	3.72	7,817
40	3.38	8,122
50	2.96	8,883
60	2.54	9,137
70	2.42	10,162
80	2.20	10,558
90	2.12	11,421
100	2.03	12,182
110	1.95	12,842
120	1.86	13,401
130	1.52	11,878
140	1.35	11,370

Outflow per Storm Event

Storm	Time	Release	Outflow (ft^3)
5	15	1.53	689
10	20	1.53	918
15	25	1.53	1,148
20	30	1.53	1,377
25	35	1.53	1,607
30	40	1.53	1,836
35	45	1.53	2,066
40	50	1.53	2,295
50	60	1.53	2,754
60	70	1.53	3,213
70	80	1.53	3,672
80	90	1.53	4,131
90	100	1.53	4,590
100	110	1.53	5,049
110	120	1.53	5,508
120	130	1.53	5,967
130	140	1.53	6,426
140	150	1.53	6,885

Detention Volume

Storm	Inflow	Outflow	Storage (ft^3)	Storage (acre-ft)
5	2,024	689	1,336	0.031
10	3,604	918	2,686	0.062
15	4,949	1,148	3,802	0.087
20	5,990	1,377	4,613	0.106
25	6,789	1,607	5,183	0.119
30	7,309	1,836	5,473	0.126
35	7,817	2,066	5,752	0.132
40	8,122	2,295	5,827	0.134
50	8,883	2,754	6,129	0.141
60	9,137	3,213	5,924	0.136
70	10,162	3,672	6,490	0.149
80	10,558	4,131	6,427	0.148
90	11,421	4,590	6,831	0.157
100	12,182	5,049	7,133	0.164
110	12,842	5,508	7,334	0.168
120	13,401	5,967	**7,434**	**0.171**
130	11,878	6,426	5,452	0.125
140	11,370	6,885	4,485	0.103

Drainage / Detention Calculations (25-YEAR)

Modified Rational Method

Required Storage Volume — **8,418 cubic-feet** / **0.193 acre-feet**

Onsite Existing Conditions

Area	0.93	acres	Total Acreage Going to Pond Area- DA (C-1&OS-2)
Time (Tc)	20	minutes	
C value	0.35		
I-25yr	6.60	in/hr	
Q 25-yr	**2.15**	**cfs**	**Allowable Release**
	0.75	**cfs**	**By- Pass Q DA (B-1&B-2)**
	1.40	**cfs**	**Actual Allowable Release**
	1.61	**cfs**	**Actual Pond Release**

Onsite Proposed Conditions

Area	0.94	acres	Total Acreage Going to Pond- DA (C-1&C-2&OS-1)
Time (Tc)	10	minutes	
C value	0.90		
I-25yr	8.30	in/hr	
Q 25-yr	**7.02**	**cfs**	**Developed Runoff**

Runoff per Storm Event - Developed

Time (min.)	I-25yr	C value	Area (ac)	Runoff (cfs)
5	9.185	0.90	0.94	7.77
10	8.300	0.90	0.94	7.02
15	7.500	0.90	0.94	6.35
20	6.600	0.90	0.94	5.58
25	6.050	0.90	0.94	5.12
30	5.500	0.90	0.94	4.65
35	5.050	0.90	0.94	4.27
40	4.600	0.90	0.94	3.89
50	4.000	0.90	0.94	3.38
60	3.500	0.90	0.94	2.96
70	3.310	0.90	0.94	2.80
80	3.133	0.90	0.94	2.65
90	2.900	0.90	0.94	2.45
100	2.700	0.90	0.94	2.28
110	2.500	0.90	0.94	2.12
120	2.400	0.90	0.94	2.03
130	2.250	0.90	0.94	1.90
140	2.000	0.90	0.94	1.69

Rockwall Rainfall Intensity

Time (min.)	I-5 yr	I-10 yr	I-25 yr	I-100 yr
5	6.873	7.975	9.185	11.103
10	6.100	7.100	8.300	9.800
15	5.500	6.500	7.500	9.000
20	4.900	5.900	6.600	8.300
25	4.500	5.350	6.050	7.600
30	4.100	4.800	5.500	6.900
35	3.750	4.400	5.050	6.350
40	3.400	4.000	4.600	5.800
50	2.800	3.500	4.000	5.000
60	2.600	3.000	3.500	4.500
70	2.450	2.860	3.310	4.000
80	2.300	2.600	3.133	3.700
90	2.100	2.500	2.900	3.500
100	1.900	2.400	2.700	3.400
110	1.800	2.300	2.500	3.200
120	1.700	2.200	2.400	3.100
130	1.600	1.800	2.250	2.800
140	1.400	1.600	2.000	2.500

Inflow per Storm Event

Storm Event	Runoff	Inflow (ft^3)
5	7.77	2,331
10	7.02	4,213
15	6.35	5,711
20	5.58	6,700
25	5.12	7,677
30	4.65	8,375
35	4.27	8,972
40	3.89	9,340
50	3.38	10,152
60	2.96	10,660
70	2.80	11,761
80	2.65	12,722
90	2.45	13,248
100	2.28	13,705
110	2.12	13,959
120	2.03	14,619
130	1.90	14,847
140	1.69	14,213

Outflow per Storm Event

Storm	Time	Release	Outflow (ft^3)
5	15	1.61	725
10	20	1.61	966
15	25	1.61	1,208
20	30	1.61	1,449
25	35	1.61	1,691
30	40	1.61	1,932
35	45	1.61	2,174
40	50	1.61	2,415
50	60	1.61	2,898
60	70	1.61	3,381
70	80	1.61	3,864
80	90	1.61	4,347
90	100	1.61	4,830
100	110	1.61	5,313
110	120	1.61	5,796
120	130	1.61	6,279
130	140	1.61	6,762
140	150	1.61	7,245

Detention Volume

Storm	Inflow	Outflow	Storage (ft^3)	Storage (acre-ft)
5	2,331	725	1,607	0.037
10	4,213	966	3,247	0.075
15	5,711	1,208	4,503	0.103
20	6,700	1,449	5,251	0.121
25	7,677	1,691	5,987	0.137
30	8,375	1,932	6,443	0.148
35	8,972	2,174	6,798	0.156
40	9,340	2,415	6,925	0.159
50	10,152	2,898	7,254	0.167
60	10,660	3,381	7,279	0.167
70	11,761	3,864	7,897	0.181
80	12,722	4,347	8,375	0.192
90	13,248	4,830	**8,418**	**0.193**
100	13,705	5,313	8,392	0.193
110	13,959	5,796	8,163	0.187
120	14,619	6,279	8,340	0.191
130	14,847	6,762	8,085	0.186
140	14,213	7,245	6,968	0.160

Drainage / Detention Calculations (100-YEAR)

Modified Rational Method

Required Storage Volume — **11,785 cubic-feet** / **0.271 acre-feet**

Onsite Existing Conditions

Area	0.93	acres	Total Acreage Going to Pond Area- DA (C-1&OS-2)
Time (Tc)	20	minutes	
C value	0.35		
I-100yr	8.30	in/hr	
Q 100-yr	**2.70**	**cfs**	**Allowable Release**
	0.88	**cfs**	**By- Pass Q DA (B-1&B-2)**
	1.82	**cfs**	**Actual Allowable Release**
	1.82	**cfs**	**Actual Pond Release**

Onsite Proposed Conditions

Area	0.94	acres	Total Acreage Going to Pond- DA (C-1&C-2&OS-1)
Time (Tc)	10	minutes	
C value	0.90		
I-100yr	9.80	in/hr	
Q 100-yr	**8.29**	**cfs**	**Developed Runoff**

Runoff per Storm Event - Developed

Time (min.)	I-100yr	C value	Area (ac)	Runoff (cfs)
5	11.103	0.90	0.94	9.39
10	9.800	0.90	0.94	8.29
15	9.000	0.90	0.94	7.61
20	8.300	0.90	0.94	7.02
25	7.600	0.90	0.94	6.43
30	6.900	0.90	0.94	5.84
35	6.350	0.90	0.94	5.37
40	5.800	0.90	0.94	4.91
50	5.000	0.90	0.94	4.23
60	4.500	0.90	0.94	3.81
70	4.000	0.90	0.94	3.38
80	3.700	0.90	0.94	3.13
90	3.500	0.90	0.94	2.96
100	3.400	0.90	0.94	2.88
110	3.200	0.90	0.94	2.71
120	3.100	0.90	0.94	2.62
130	2.800	0.90	0.94	2.37
140	2.500	0.90	0.94	2.12

Rockwall Rainfall Intensity

Time (min.)	I-5 yr	I-10 yr	I-25 yr	I-100 yr
5	6.873	7.975	9.185	11.103
10	6.100	7.100	8.300	9.800
15	5.500	6.500	7.500	9.000
20	4.900	5.900	6.600	8.300
25	4.500	5.350	6.050	7.600
30	4.100	4.800	5.500	6.900
35	3.750	4.400	5.050	6.350
40	3.400	4.000	4.600	5.800
50	2.800	3.500	4.000	5.000
60	2.600	3.000	3.500	4.500
70	2.450	2.860	3.310	4.000
80	2.300	2.600	3.133	3.700
90	2.100	2.500	2.900	3.500
100	1.900	2.400	2.700	3.400
110	1.800	2.300	2.500	3.200
120	1.700	2.200	2.400	3.100
130	1.600	1.800	2.250	2.800
140	1.400	1.600	2.000	2.500

Inflow per Storm Event

Storm Event	Runoff	Inflow (ft^3)
5	9.39	2,818
10	8.29	4,974
15	7.61	6,853
20	7.02	8,426
25	6.43	9,644
30	5.84	10,507
35	5.37	11,281
40	4.91	11,776
50	4.23	12,690
60	3.81	13,705
70	3.38	14,213
80	3.13	15,025
90	2.96	15,989
100	2.88	17,258
110	2.71	17,868
120	2.62	18,883
130	2.37	18,477
140	2.12	17,766

Outflow per Storm Event

Storm	Time	Release	Outflow (ft^3)
5	15	1.82	819
10	20	1.82	1,092
15	25	1.82	1,365
20	30	1.82	1,638
25	35	1.82	1,911
30	40	1.82	2,184
35	45	1.82	2,457
40	50	1.82	2,730
50	60	1.82	3,276
60	70	1.82	3,822
70	80	1.82	4,368
80	90	1.82	4,914
90	100	1.82	5,460
100	110	1.82	6,006
110	120	1.82	6,552
120	130	1.82	7,098
130	140	1.82	7,644
140	150	1.82	8,190

Detention Volume

Storm	Inflow	Outflow	Storage (ft^3)	Storage (acre-ft)
5	2,818	819	1,999	0.046
10	4,974	1,092	3,882	0.089
15	6,853	1,365	5,488	0.126
20	8,426	1,638	6,788	0.156
25	9,644	1,911	7,733	0.178
30	10,507	2,184	8,323	0.191
35	11,281	2,457	8,824	0.203
40	11,776	2,730	9,046	0.208
50	12,690	3,276	9,414	0.216
60	13,705	3,822	9,883	0.227
70	14,213	4,368	9,845	0.226
80	15,025	4,914	10,111	0.232
90	15,989	5,460	10,529	0.242
100	17,258	6,006	11,252	0.258
110	17,868	6,552	11,316	0.260
120	18,883	7,098	**11,785**	**0.271**
130	18,477	7,644	10,833	0.249
140	17,766	8,190	9,576	0.220

Available Storage

Elevation (ft)	Area (sf)	Volume (cf)	Cumulative Volume (cf)	Discharge Rate* (cfs)	
553.56	3584.35	-	-	-	
554.00	3897.52	1,646	1,646	-	
554.25	5092.83	1,124	2,770	-	
554.35	5570.95	533	3,303	-	
554.73	7387.82	2,462	5,765	1.37	←5-yr
554.95	8439.69	1,741	7,506	1.53	←10-yr
554.98	8583.13	255	7,762	-	
555.00	8678.75	173	7,934	-	
555.06	9049.03	532	8,466	1.61	←25-yr
555.39	11085.56	3,322	11,788	1.82	←100-yr
555.50	14850.06	1,426	13,215	-	

Q (allowable release) =	5-yr	10-yr	25-yr	100-yr
	1.05	1.28	1.40	1.82

Outlet Calculations

Design	C	Area (sf)	h (ft)	Q (cfs)
5-Yr	0.6	0.31	0.86	1.37
10-Yr	0.6	0.31	1.08	1.53
25-Yr	0.6	0.31	1.19	1.61
100-Yr	0.6	0.31	1.52	1.82

RECORD DRAWING

TO THE BEST OF OUR KNOWLEDGE CARRILLO ENGINEERING, HEREBY STATES THAT THIS PLAN IS AS–BUILT. THE INFORMATION PROVIDED IS BASED ON SURVEYING AT THE SITE AND INFORMATION PROVIDED BY THE CONTRACTOR.

DATE: SEPTEMBER 27, 2021

BENCH MARK:
All elevations shown hereon are based on the City of Rockwall Control Monumentation System.

COR-11 Brass Disk stamped "City of Rockwall Survey Monument" on the northeast side of Mims Road at the southerly end of a concrete headwall at the intersection of the northeast line of Mims Rd. with the southeast Line of I-30. Elevation=565.98'

TBM - "X" cut on the southeast corner of an electric transformer pad at the northeast corner of Lot 3A-R. Elevation = 557.37'

NOT FOR REGULATORY APPROVAL, PERMITTING, OR CONSTRUCTION

STATE OF TEXAS
ANNA C. BLACKWELL
97350
LICENSED
PROFESSIONAL ENGINEER

3-1-2021

Revision Schedule		
Rev. #	Revision Description	Revision Date

Carrillo Engineering
Carrillo Engineering LLC

Carrillo Engineering, LLC
301 Commerce Street, Ste 1410 - Fort Worth, Texas 76102
Phone 817-697-4996 - Firm Registration #F-15893

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509 PECAN STREET
SUITE 100
FORT WORTH, TX 76102
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ROCKWALL DFPS

ELLIS CENTRE #2 ADDITION
BOCK C, LOT 3A-R
1203 SIGMA CT,
ROCKWALL, TX 75087

3/1/2021
ISSUE DATE

DETENTION POND CALCULATIONS

C4.03