5 YEAR STORM - DETENTION STORAGE VOLUME

5 YR POND DESIGN					Rainfall Intesity, I (in/hr)					A	$Q_{peak} = Q_0$
Step			K	C				T_c (min)	I (in/hr)	(acres)	(cfs)
1	Existing Conditions										2.76
2	Proposed Conditions		1	0.90				10	6.10	1.4	7.74

Time Step	T_d duration (min)	K	C	I (in/hr)	A (acres)	Q_{peak} (cfs)	Volume (ft^3)			Volume (acre-ft)
							Inflow T_d*Q*60	Outflow $0.5*(T_c+T_d)*Q_o*60$	Required Storage Inflow-Outflow	Previous Column/43,560
1	10	1	0.90	6.10	1.41	7.74	4,645	1,655	2,990	0.069
2	20	1	0.90	4.90	1.41	6.22	7,462	2,482	4,980	0.114
3	30	1	0.90	4.10	1.41	5.20	9,365	3,309	6,056	0.139
4	40	1	0.90	3.40	1.41	4.31	10,355	4,137	6,218	0.143
5	50	1	0.90	2.80	1.41	3.55	10,660	4,964	5,695	0.131
6	60	1	0.90	2.60	1.41	3.30	11,878	5,792	6,086	0.140
7	70	1	0.90	2.40	1.41	3.05	12,792	6,619	6,173	0.142

MAX STORAGE (AC-FT) **0.14**
6,218

EXISTING CONDITIONS
C_{ex} = UNDEVELOPED RUN-OFF COEFFICIENT = 0.35
I_{20} = 4.9 in/hr
A_{ex} = UNDEVELOPED AREA = DRAINAGE AREAS 3-1.0, 3-1.1, 3-1.2, 3-1.3, 3-1.3A, 3-1.4, 3-1.4A, 3-1.5, 3-1.6, 3-2.0, & 3-3.0 (SEE DA MAP SHEET C-7)

C_{dev} = DEVELOPED RUN-OFF COEFFICIENT = 0.90
I_{10} = 6.1 in/hr
A_{dev} = DEVELOPED AREA = DRAINAGE AREA 3A (SEE DA MAP SHEET C-7)

$Q_{5,ex} = C_{ex}*I_{20}*A_{ex} + C_{dev}*I_{10}*A_{dev}$
$Q_{5,ex} = 0.35*4.9*1.32 + 0.90*6.1*0.09$
$Q_{5,ex} = 2.76$ cfs

PROPOSED CONDITIONS
C_{dev} = DEVELOPED RUN-OFF COEFFICIENT = 0.90
I_{10} = 6.1 in/hr
A_{dev} = DEVELOPED AREA = DRAINAGE AREAS 3-1.0, 3-1.1, 3-1.2, 3-1.3, 3-1.3A, 3-1.4, 3-1.4A, 3-1.5, 3-1.6, 3-2.0, 3-3.0, & 3A (SEE DA MAP SHEET C-7)

$Q_{5,ult} = C_{dev}*I_{10}*A_{dev}$
$Q_{5,ult} = 0.9*6.1*1.4$
$Q_{5,ult} = 7.74$ cfs

10 YEAR STORM - DETENTION STORAGE VOLUME

10 YR POND DESIGN					Rainfall Intesity, I (in/hr)					A	$Q_{peak} = Q_0$
Step			K	C				T_c (min)	I (in/hr)	(acres)	(cfs)
1	Existing Conditions										3.30
2	Proposed Conditions		1	0.90				10	7.10	1.4	9.01

Time Step	T_d duration (min)	K	C	I (in/hr)	A (acres)	Q_{peak} (cfs)	Volume (ft^3)			Volume (acre-ft)
							Inflow T_d*Q*60	Outflow $0.5*(T_c+T_d)*Q_o*60$	Required Storage Inflow-Outflow	Previous Column/43,560
1	10	1	0.90	7.10	1.41	9.01	5,406	1,981	3,425	0.079
2	20	1	0.90	5.90	1.41	7.49	8,985	2,971	6,014	0.138
3	30	1	0.90	4.80	1.41	6.09	10,964	3,961	7,003	0.161
4	40	1	0.90	4.00	1.41	5.08	12,182	4,951	7,231	0.166
5	50	1	0.90	3.50	1.41	4.44	13,325	5,942	7,383	0.169
6	60	1	0.90	3.00	1.41	3.81	13,705	6,932	6,773	0.155
7	70	1	0.90	2.80	1.41	3.55	14,923	7,922	7,001	0.161

MAX STORAGE (AC-FT) **0.17**
7,383

EXISTING CONDITIONS
C_{ex} = UNDEVELOPED RUN-OFF COEFFICIENT = 0.35
I_{20} = 5.9 in/hr
A_{ex} = UNDEVELOPED AREA = DRAINAGE AREAS 3-1.0, 3-1.1, 3-1.2, 3-1.3, 3-1.3A, 3-1.4, 3-1.4A, 3-1.5, 3-1.6, 3-2.0, & 3-3.0 (SEE DA MAP SHEET C-7)

C_{dev} = DEVELOPED RUN-OFF COEFFICIENT = 0.90
I_{10} = 7.1 in/hr
A_{dev} = DEVELOPED AREA = DRAINAGE AREA 3A (SEE DA MAP SHEET C-7)

$Q_{10,ex} = C_{ex}*I_{20}*A_{ex} + C_{dev}*I_{10}*A_{dev}$
$Q_{10,ex} = 0.35*5.9*1.32 + 0.90*7.1*0.09$
$Q_{10,ex} = 3.30$ cfs

PROPOSED CONDITIONS
C_{dev} = DEVELOPED RUN-OFF COEFFICIENT = 0.90
I_{10} = 7.1 in/hr
A_{dev} = DEVELOPED AREA = DRAINAGE AREAS 3-1.0, 3-1.1, 3-1.2, 3-1.3, 3-1.3A, 3-1.4, 3-1.4A, 3-1.5, 3-1.6, 3-2.0, 3-3.0, & 3A (SEE DA MAP SHEET C-7)

$Q_{10,ult} = C_{dev}*I_{10}*A_{dev}$
$Q_{10,ult} = 0.9*7.1*1.4$
$Q_{10,ult} = 9.01$ cfs

25 YEAR STORM - DETENTION STORAGE VOLUME

25 YR POND DESIGN					Rainfall Intesity, I (in/hr)					A	$Q_{peak} = Q_0$
Step			K	C				T_c (min)	I (in/hr)	(acres)	(cfs)
1	Existing Conditions										3.72
2	Proposed Conditions		1	0.90				10	8.30	1.4	10.53

Time Step	T_d duration (min)	K	C	I (in/hr)	A (acres)	Q_{peak} (cfs)	Volume (ft^3)			Volume (acre-ft)
							Inflow T_d*Q*60	Outflow $0.5*(T_c+T_d)*Q_o*60$	Required Storage Inflow-Outflow	Previous Column/43,560
1	10	1	0.90	8.30	1.41	10.53	6,320	2,233	4,087	0.094
2	20	1	0.90	6.60	1.41	8.38	10,050	3,349	6,701	0.154
3	30	1	0.90	5.50	1.41	6.98	12,563	4,466	8,097	0.186
4	40	1	0.90	4.60	1.41	5.84	14,010	5,582	8,428	0.193
5	50	1	0.90	4.00	1.41	5.08	15,228	6,699	8,529	0.196
6	60	1	0.90	3.50	1.41	4.44	15,989	7,815	8,174	0.188
7	70	1	0.90	3.30	1.41	4.19	17,588	8,932	8,657	0.199

MAX STORAGE (AC-FT) **0.20**
8,657

EXISTING CONDITIONS
C_{ex} = UNDEVELOPED RUN-OFF COEFFICIENT = 0.35
I_{20} = 6.6 in/hr
A_{ex} = UNDEVELOPED AREA = DRAINAGE AREAS 3-1.0, 3-1.1, 3-1.2, 3-1.3, 3-1.3A, 3-1.4, 3-1.4A, 3-1.5, 3-1.6, 3-2.0, & 3-3.0 (SEE DA MAP SHEET C-7)

C_{dev} = DEVELOPED RUN-OFF COEFFICIENT = 0.90
I_{10} = 8.3 in/hr
A_{dev} = DEVELOPED AREA = DRAINAGE AREA 3A (SEE DA MAP SHEET C-7)

$Q_{25,ex} = C_{ex}*I_{20}*A_{ex} + C_{dev}*I_{10}*A_{dev}$
$Q_{25,ex} = 0.35*6.6*1.32 + 0.90*8.3*0.09$
$Q_{25,ex} = 3.72$ cfs

PROPOSED CONDITIONS
C_{dev} = DEVELOPED RUN-OFF COEFFICIENT = 0.90
I_{10} = 8.3 in/hr
A_{dev} = DEVELOPED AREA = DRAINAGE AREAS 3-1.0, 3-1.1, 3-1.2, 3-1.3, 3-1.3A, 3-1.4, 3-1.4A, 3-1.5, 3-1.6, 3-2.0, 3-3.0, & 3A (SEE DA MAP SHEET C-7)

$Q_{25,ult} = C_{dev}*I_{10}*A_{dev}$
$Q_{25,ult} = 0.9*8.3*1.4$
$Q_{25,ult} = 10.53$ cfs

100 YEAR STORM - DETENTION STORAGE VOLUME

100 YR POND DESIGN					Rainfall Intesity, I (in/hr)					A	$Q_{peak} = Q_0$
Step			K	C				T_c (min)	I (in/hr)	(acres)	(cfs)
1	Existing Conditions										4.63
2	Proposed Conditions		1	0.90				10	9.80	1.4	12.44

Time Step	T_d duration (min)	K	C	I (in/hr)	A (acres)	Q_{peak} (cfs)	Volume (ft^3)			Volume (acre-ft)
							Inflow T_d*Q*60	Outflow $0.5*(T_c+T_d)*Q_o*60$	Required Storage Inflow-Outflow	Previous Column/43,560
1	10	1	0.90	9.80	1.41	12.44	7,462	2,777	4,685	0.108
2	20	1	0.90	8.30	1.41	10.53	12,639	4,166	8,474	0.195
3	30	1	0.90	6.90	1.41	8.76	15,761	5,554	10,207	0.234
4	40	1	0.90	5.80	1.41	7.36	17,664	6,943	10,722	0.246
5	50	1	0.90	5.00	1.41	6.35	19,035	8,331	10,704	0.246
6	60	1	0.90	4.50	1.41	5.71	20,558	9,720	10,838	0.249
7	70	1	0.90	4.00	1.41	5.08	21,319	11,108	10,211	0.234

MAX STORAGE (AC-FT) **0.25**
10,838

EXISTING CONDITIONS
C_{ex} = UNDEVELOPED RUN-OFF COEFFICIENT = 0.35
I_{20} = 8.3 in/hr
A_{ex} = UNDEVELOPED AREA = DRAINAGE AREAS 3-1.0, 3-1.1, 3-1.2, 3-1.3, 3-1.3A, 3-1.4, 3-1.4A, 3-1.5, 3-1.6, 3-2.0, & 3-3.0 (SEE DA MAP SHEET C-7)

C_{dev} = DEVELOPED RUN-OFF COEFFICIENT = 0.90
I_{10} = 9.8 in/hr
A_{dev} = DEVELOPED AREA = DRAINAGE AREA 3A (SEE DA MAP SHEET C-7)

$Q_{100,ex} = C_{ex}*I_{20}*A_{ex} + C_{dev}*I_{10}*A_{dev}$
$Q_{100,ex} = 0.35*8.3*1.32 + 0.90*9.8*0.09$
$Q_{100,ex} = 4.63$ cfs

PROPOSED CONDITIONS
C_{dev} = DEVELOPED RUN-OFF COEFFICIENT = 0.90
I_{10} = 9.8 in/hr
A_{dev} = DEVELOPED AREA = DRAINAGE AREAS 3-1.0, 3-1.1, 3-1.2, 3-1.3, 3-1.3A, 3-1.4, 3-1.4A, 3-1.5, 3-1.6, 3-2.0, 3-3.0, & 3A (SEE DA MAP SHEET C-7)

$Q_{100,ult} = C_{dev}*I_{10}*A_{dev}$
$Q_{100,ult} = 0.9*9.80*1.4$
$Q_{100,ult} = 12.44$ cfs

RECORD DRAWING
June 9, 2020
To the best of our knowledge Wier & Associates, Inc., states this plan is As-Built. This information provided is based on surveying at the site and information provided by the contractor.

ALL RESPONSIBILITY FOR ADEQUACY OF DESIGN REMAINS WITH THE DESIGN ENGINEER. THE CITY OF ROCKWALL, IN REVIEWING AND RELEASING PLANS FOR CONSTRUCTION, ASSUMES NO RESPONSIBILITY FOR ADEQUACY OR ACCURACY OF DESIGN

CAUTION ! !
EXISTING UTILITIES ARE INDICATED ON THE PLANS FROM AVAILABLE INFORMATION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION OF ALL UTILITIES, TO NOTIFY ALL UTILITY COMPANIES OF THE CONTRACTORS OPERATIONS, TO PROTECT ALL UTILITIES FROM DAMAGE, TO REPAIR ALL UTILITIES DAMAGED DUE TO THE CONTRACTORS OPERATIONS, AND TO NOTIFY THE ENGINEER PROMPTLY OF ALL CONFLICTS OF THE WORK WITH EXISTING UTILITIES.

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Revisions:

Mark	Date	By
3	12/17/19	RBC
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Mark	Date	By

LOT 2, BLOCK A
LAKESHORE COMMONS
1979 NORTH LAKESHORE DRIVE
ROCKWALL, TEXAS
STORE# 03897

STORE
SERIES
P13-LSR

SHEET TITLE
DETENTION POND VOLUME REQUIREMENTS

- ☐ For Permit
- ☐ For Bid
- ■ For Construction

Job No. : 17144
Store : #03897
Date : 10/4/2018
Drawn By : RRW
Checked By: PNA

Sheet
PS-3.1

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