STORMWATER MANAGEMENT REPORT

Contents:

Project:
Reserve at Muir Park
(Formerly Prospect Pointe)

Location:
1001 Oak Avenue
Prospect Heights, Illinois

Prepared For:
Lexington Homes
1731 N. Marcey Street, #200
Chicago, IL 60614

Date:
March 20, 2020

Revised:
May 22, 2020

Prepared By:
Phil Ceratto, P.E.
Haeger Project No.: 18-219

ENGINEERING | SURVEYING | CONSTRUCTION

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DRAINAGE SUMMARY

Reserve at Muir Park is a 9.722-acre parcel on the former Muir School / JFH Academy parcel. The 9.722-acre parcel includes the John Muir Park owned by the Prospect Height's Park District. The site is bounded to the north by Drake's First Addition to Prospect Heights Subdivision, to the east by Lemke Farms Unit 2 Subdivision and Pleasant Run Park in Wheeling, IL, to the south by Polo Run Unit 2 Subdivision and to the west by Pleasant Run Subdivision. In coordination with the Prospect Height's Park District, development of the 9.722-acre parcel is proposed to include construction of a multi-family residential development and improvements to the existing park.

Stormwater management in the form of detention storage was previously provided for Pleasant Run Park and John Muir Park on the Muir Park site. This detention was calculated using the MWRD SPO methodology. The time of concentration was calculated using the longest diagonal and the allowable release rate was determined by calculating the existing 3-year release rate and deducting the 100-year release for unrestricted areas. Required detention volume was calculated using the modified rational method with Technical Paper 40 (TP40) rainfall intensities. Described in further detail below, the portion of detention previously allocated for the Pleasant Run Park site is being relocated to the proposed basin, while detention for Muir Park is being provided based on the new requirements of the WMO

The purpose of this stormwater management report is to summarize the existing drainage conditions of the Muir School, Muir Park and Pleasant Run Park, including previously provided detention and depressional storage, and the requirements for the development of this site in accordance with the Metropolitan Water Reclamation District Watershed Management Ordinance.

Existing Drainage

The existing site was separated into six (6) distinct drainage areas. These drainage areas were determined based on tributary areas to depressional storage or to existing drainage structures and storm sewer. Curve numbers were calculated for each area based on TR-55 curve number tables for Hydrologic Soil Group D. For larger areas, time of concentration was calculated using the NRCS method while smaller areas were assumed to have a five (5) minute time of concentration. Depressional storage areas, where applicable, were calculated based on existing 1-foot contours and irregular weir cross sections were used to determine the extents of the depressional storage.

Upstream areas west of the site, identified as The Forums, Pleasant Run, and an area west of Elmhurst Road tributary to The Forums discharge into the 36" sewer along the southern property line via detention storage and restrictor pipes provided during the permitting and construction of those developments. To provide an analysis of existing and proposed flows through this sewer, which is proposed to serve as the primary outfall for the proposed development, these upstream tributary areas were included in the model. Coverage areas, restrictor sizes, and approximate pond storage volumes were gathered from the original MWRD permit application (#73-1228) for use in the model.

The information above was input into a PondPack hydrologic model with Bulletin 75 rainfall data. The model was run for the 24 hour storm event for the 10-, 50-year recurrence intervals, and for the 100-year critical duration analysis. The 100-year critical duration analysis determined the BFE of the existing depressional storage areas, which is being compensated at a ratio of 1.5:1 in the proposed basin.

In addition to the existing drainage analysis, detention was previously provided for the park sites in Prospect Heights and Wheeling. Refer to Appendix D for the previously prepared detention calculations for the park stes. The share of detention provided for the Wheeling park was calculated and combined with the required

detention volume in the proposed conditions calculations. Since the Prospect Heights park will be redeveloped and the existing basin will be relocated as part of these improvements, the share of existing detention allocated to Prospect Heights was not included in these calculations. Refer to the existing conditions exhibits, calculations and hydrologic reports provided in Appendix B for additional details.

Proposed Drainage

Similar to the existing conditions analysis, the site was separated into drainage areas based on the proposed grading and utility design. The site was designed to minimize unrestricted development area to the greatest extent practicable, while maintaining existing drainage patterns from the adjacent sites onto or through the development. The upstream areas west of the site (The Forums, Pleasant Run, etc) are unimpacted by the proposed development – restricted discharge from these sites will continue to flow into the 36" sewer to remain along the southern perimeter of the site.

The proposed basin was designed in accordance with Prospect Heights and MWRD requirements, while maintaining the general drainage conditions from the Pleasant Run park and Lemke Farms subdivision to the east. Due to grading constraints on the perimeter of the site, small portions along the eastern property line will flow unrestricted into the adjacent sewer system. Small upstream areas along the western perimeter of the site and to the north of the site by the Oak Avenue R.O.W. will be bypassed through the proposed pond.

As noted above, the share of detention storage previously allocated to the Pleasant Run Park in Wheeling is being relocated to the proposed detention basin while the John Muir Park in Prospect Heights is being redeveloped in accordance with the new ordinance, with new detention storage provided in the proposed pond.

The overflow structure for the proposed development was designed to meet MWRD runoff control requirements by providing capacity to overflow the critical duration peak inflow into the pond. The overflow structure is proposed to be a 7' x 22' box culvert constructed over the existing 36" sewer for discharge directly into the sewer. 18' of the face of the 22' culvert will be lowered below the rim elevation to function as an overflow weir at the proposed high water level. In the event the water level continues to raise above the top of the weir elevation, the box culvert will have open grating to allow for additional overflow capacity.

The information above was input into a PondPack hydrologic model with Bulletin 75 rainfall data. The model was run for the 24 hour storm event for the 10-, 50-year recurrence intervals, and for the 100-year critical duration analysis. The 100-year critical duration analysis determined the peak discharge rate and elevation from the proposed pond, accounting for all incoming runoff, was 2.62 cfs and 656.58, respectively. The peak discharge through the 36" sewer was determined to be 18.73 cfs. The full flow capacity of a 36" sewer at 0.18%, per the original design plans of the sewer construction, is 28.30 cfs, indicating that the peak discharge from the basin and upstream areas, including overflow as determined by the hydraulic modelling, can be safely discharged downstream. Based on the anticipated maximum water surface level and the design overflow capacity of the overflow structure, the stormwater design should have no adverse impacts to the existing or proposed buildings adjacent the pond or overflow route due to their elevations relative to the pond. Specific design values of the basin, including NWL / HWL and other parameters are summarized in the following section and in Appendix C.

Stormwater Management Design

The proposed stormwater management system was designed using the MWRD nomograph based on the following criteria:

Runoff Control

- Due to the grading constraints at the perimeter of the site, portions of the development area along the eastern property line will be unrestricted by the proposed stormwater management system.
    - Tributary Development Area = 9.646 Ac. [CN = 91 / ADJ. CN = 86]
    - Upstream Tributary Area = 0.130 Ac. [CN = 82]

- Tributary development area and curve number were input into PondPack to determine the 100 year, critical duration peak flow rate.
    - Peak Flow = 68.63 cfs [30 minute event]

- A box culvert overflow structure was designed to detain water in the proposed basin and convey runoff to the existing 36" sewer.
    - Weir & Grate Flow = 222.06 cfs
        - Weir Length = 18.00 ft
        - Weir Elevation = 656.50 ft
        - Grate Open Area = 129.36 sf
        - Grate Elevation = 657.00
        - Crest HGL Elevation = 657.10 ft

Volume Control

- Proposed impervious area of the development = 5.012 Ac.
    - Required Volume Control Storage = 0.418 ac-ft

- Proposed volume control storage will be provided in the storage below the outlet of the proposed wetland detention basin, including soil media mix and coarse aggregate
    - Volume Control Storage = 0.538 Ac-Ft
        - Top of Volume Control Elevation = 651.75
        - Pond Bottom Elevation = 650.75
        - Underdrain Invert = 648.75

Detention

- Development area = 9.722 Ac.
    - Watershed Planning Area = Des Plaines River
    - Watershed Planning Area Release Rate = 0.20 cfs/ac
    - Release Rate per City Requirements = 0.15 cfs/ac
    - Gross Allowable Release Rate = 1.458 cfs
- Proposed unrestricted area along the eastern property line = 0.077 Ac.
    - Unrestricted Release Rate per PondPack = 0.070 cfs
- Net allowable release rate = 1.388 cfs
- Calculated storage volume per Nomograph = 4.036 ac-ft
- Additional storage volume (Wheeling Parcel) = 0.483 ac-ft
- Additional storage volume (Depressional Storage) = 0.150 ac-ft
- Total required storage volume = 4.669 ac-ft

- Provided storage volume @ Design HWL (656.60) = 4.810 ac-ft
    - NWL = 652.00
    - City HWL = 655.88
    - Provided storage volume @ City HWL = 4.040 ac-ft
- Orifice diameter = 4.42 in
    - Orifice invert = 648.75
    - Release rate @ City HWL = 1.37 cfs

Appendix A - Maps

Aerial Exhibit

USGS Exhibit

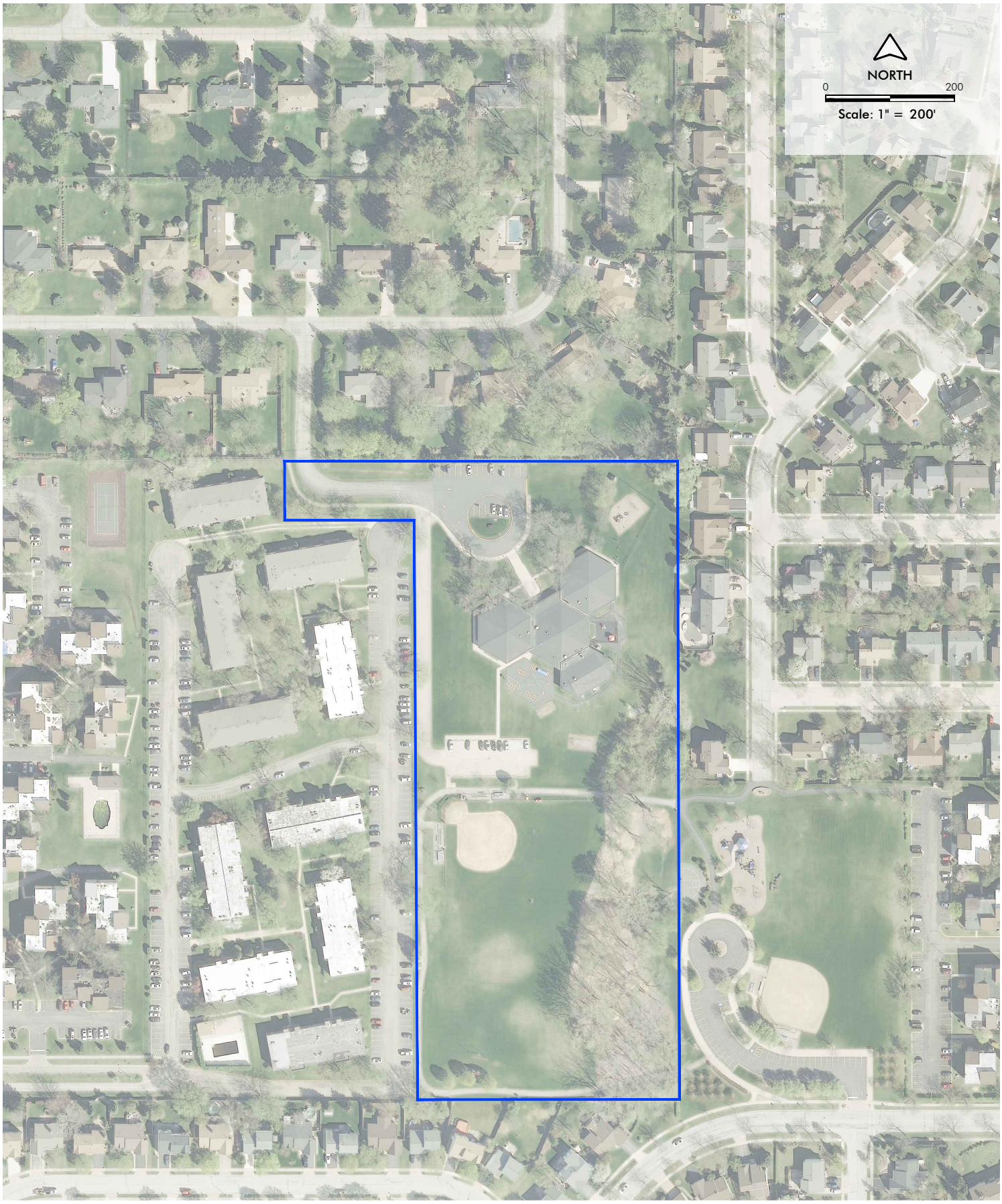
FEMA Firm Exhibit

MWRD Inundation Exhibit

National Wetlands Inventory Exhibit

NRCS Soils Exhibit

GIS Topography Exhibit



AERIAL EXHIBIT

1001 OAK AVENUE

CITY OF PROSPECT HEIGHTS, COOK COUNTY, ILLINOIS

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100 East State Parkway, Schaumburg, IL 60173 Tel: 847.394.6600 Fax: 847.394.6608
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Engineer:	P A C
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USGS EXHIBIT

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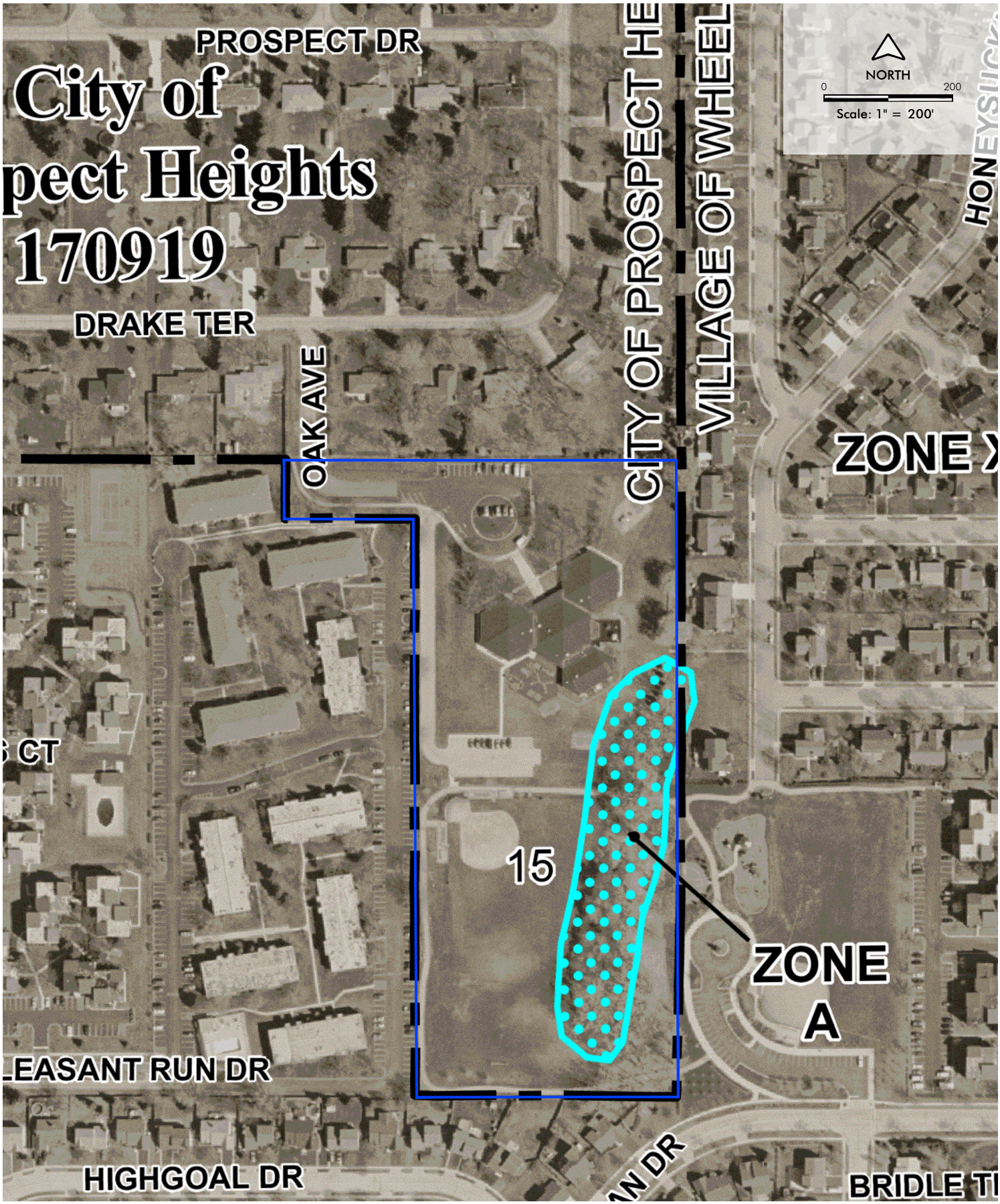

FEMA FIRM EXHIBIT

1001 OAK AVENUE

CITY OF PROSPECT HEIGHTS, COOK COUNTY, ILLINOIS

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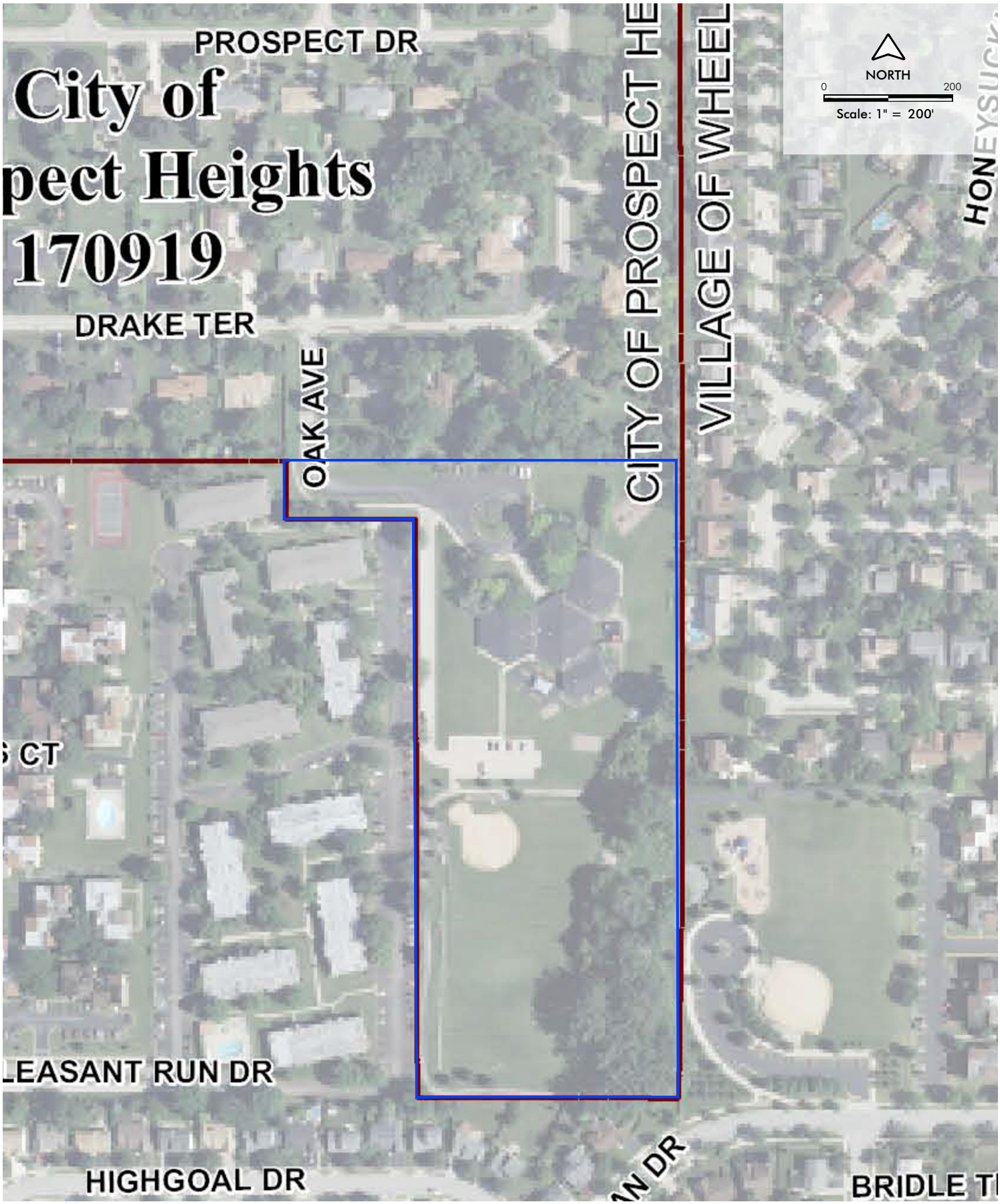

MWRD INUNDATION EXHIBIT
1001 OAK AVENUE

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NATIONAL WETLAND INVENTORY EXHIBIT
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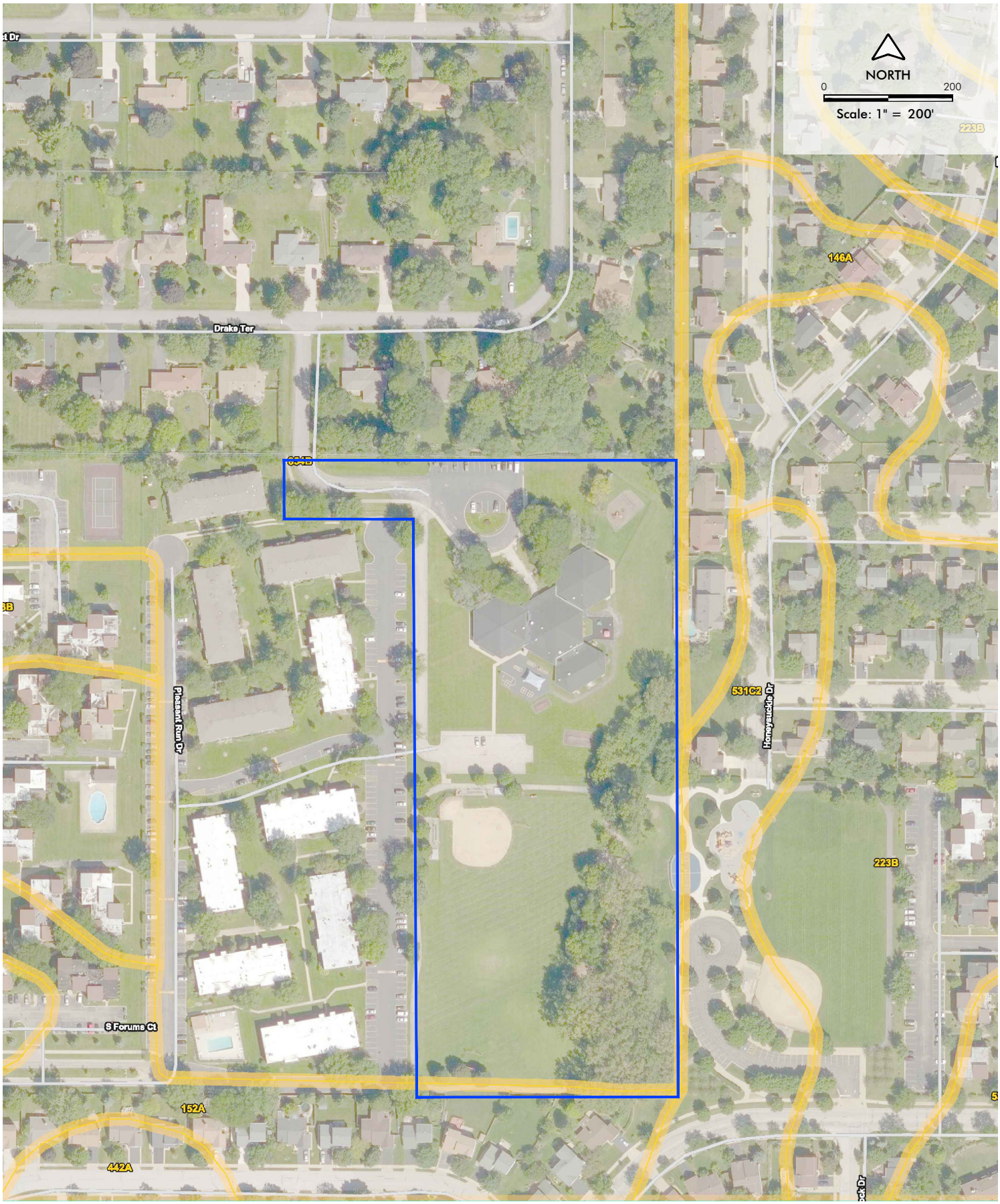

NRCS SOILS EXHIBIT
1001 OAK AVENUE

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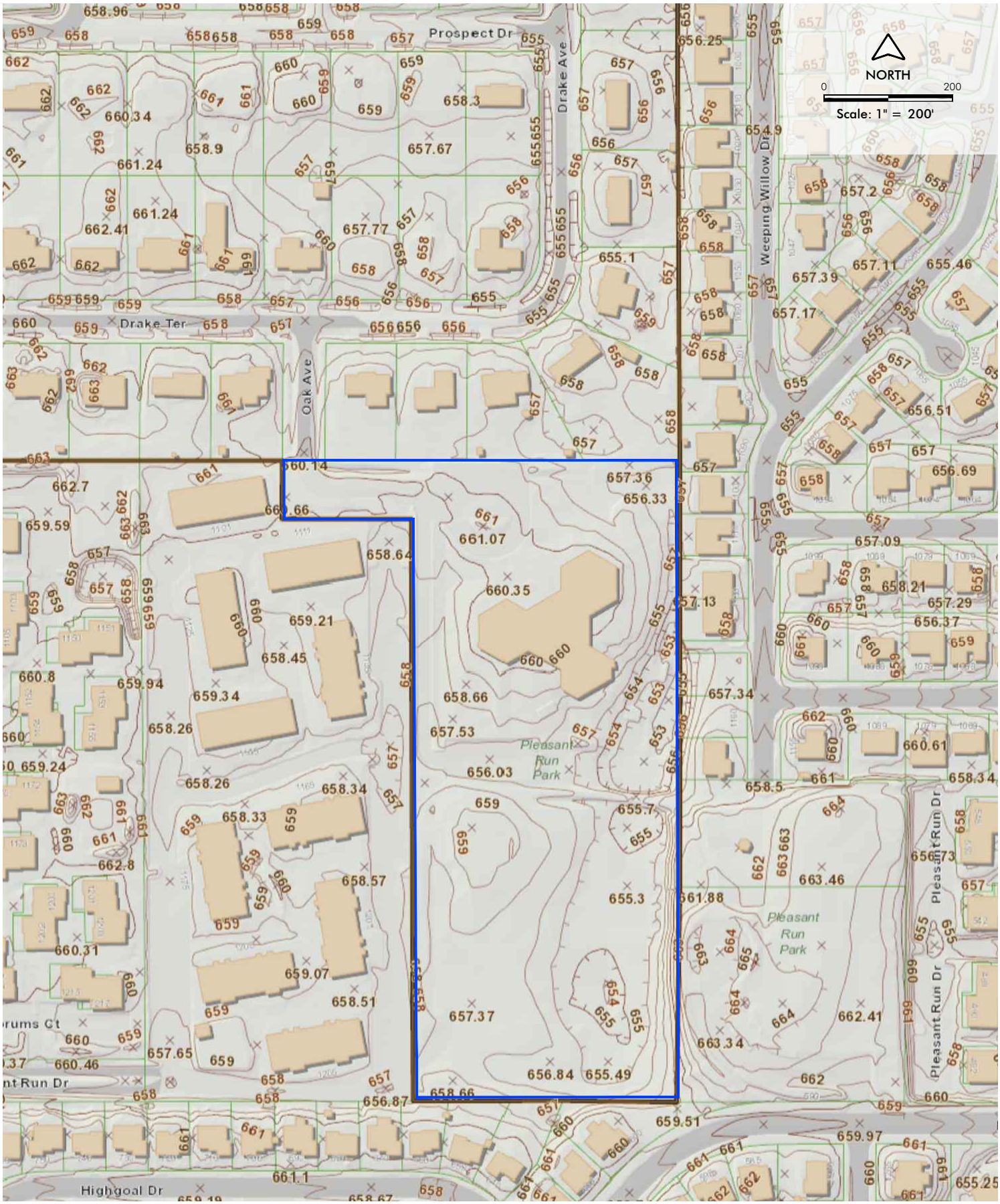

GIS TOPOGRAPHY EXHIBIT
1001 OAK AVENUE

CITY OF PROSPECT HEIGHTS, COOK COUNTY, ILLINOIS

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Project Manager:	T A S
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Date:	03/20/2020
Project No.	18-219
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Appendix B – Existing Conditions Drainage Analysis

Existing Conditions Drainage Exhibit

Curve Number Calculations

NRCS Time of Concentration Calculations

Detention / Depressional Storage Volume Calculations

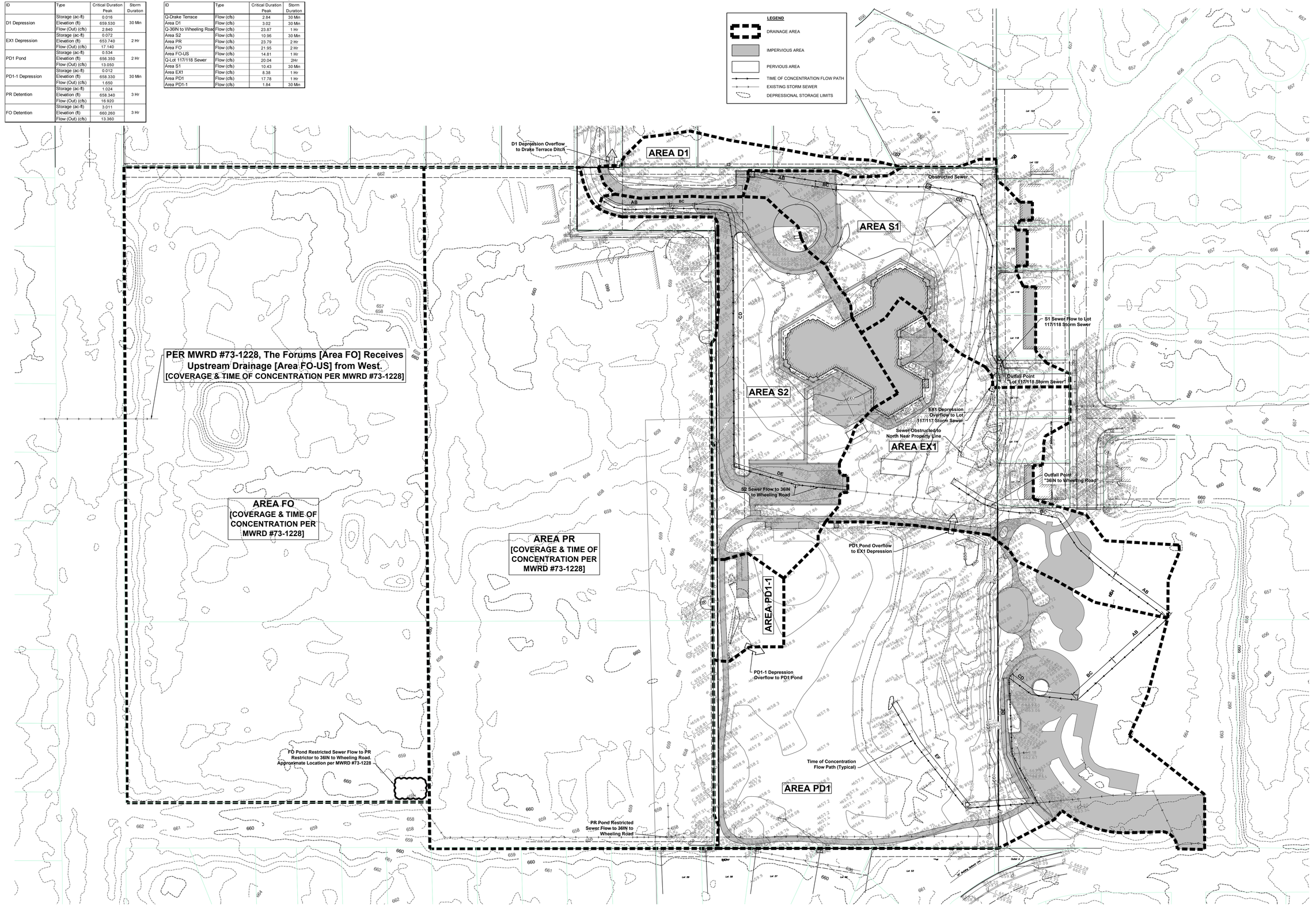
Existing Conditions PondPack Reports

DEPRESSIONAL AREA / POND SUMMARY TABLE (100-YEAR)

ID	Type	Critical Duration Peak	Storm Duration
D1 Depression	Storage (ac-ft)	0.016	30 Min
	Elevation (ft)	659.530	
	Flow (Out) (cfs)	2.840	
EX1 Depression	Storage (ac-ft)	0.072	2 Hr
	Elevation (ft)	653.740	
	Flow (Out) (cfs)	17.140	
PD1 Pond	Storage (ac-ft)	0.534	2 Hr
	Elevation (ft)	656.350	
	Flow (Out) (cfs)	13.050	
PD1-1 Depression	Storage (ac-ft)	0.012	30 Min
	Elevation (ft)	658.330	
	Flow (Out) (cfs)	1.650	
PR Detention	Storage (ac-ft)	1.024	3 Hr
	Elevation (ft)	658.340	
	Flow (Out) (cfs)	16.920	
FO Detention	Storage (ac-ft)	3.011	3 Hr
	Elevation (ft)	660.260	
	Flow (Out) (cfs)	13.360	

DRAINAGE AREA FLOW SUMMARY TABLE (100-YEAR)

ID	Type	Critical Duration Peak	Storm Duration
Q-Drake Terrace	Flow (cfs)	2.84	30 Min
Area D1	Flow (cfs)	3.02	30 Min
Q-36IN to Wheeling Road	Flow (cfs)	23.87	1 Hr
Area S2	Flow (cfs)	10.96	30 Min
Area PR	Flow (cfs)	23.79	2 Hr
Area FO	Flow (cfs)	21.95	2 Hr
Area FO-US	Flow (cfs)	14.81	1 Hr
Q-Lot 117/118 Sewer	Flow (cfs)	20.04	2Hr
Area S1	Flow (cfs)	10.43	30 Min
Area EX1	Flow (cfs)	8.38	1 Hr
Area PD1	Flow (cfs)	17.78	1 Hr
Area PD1-1	Flow (cfs)	1.84	30 Min



No.	Date	Revision
1	05/22/2020	per Village Review & Comment

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EXISTING CONDITIONS DRAINAGE EXHIBIT

RESERVES AT MUIR PARK LEXINGTON HOMES

PROSPECT HEIGHTS, ILLINOIS

Project Manager:	T A S
Engineer:	P A C
Date:	03/16/2020
Project No.	18-219
Sheet	1/1

Plot Date: May 20, 2020 - 4:37pm Plotted By: Phil
File Name: P:\2018\18219\Drawings\Exhibits\18219_Existing Drainage Exhibit.dwg

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - **AREA PD1** **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 3/12/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA

___ UNRESTRICTED AREA

___ UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

___ PROPOSED CONDITION

X EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious Surface	D	98	1.126	110.36
Pervious Surface	D	80	4.808	384.65
TOTALS:			5.93	495.01

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{495.01}{5.93} \rightarrow \textbf{Composite CN} = \textbf{83.42}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - **AREA PD1**-1 **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 3/12/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA

___ UNRESTRICTED AREA

___ UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

___ PROPOSED CONDITION

X EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious Surface	D	98	0.050	4.90
Pervious Surface	D	80	0.262	20.98
TOTALS:			0.31	25.88

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{25.88}{0.31} \rightarrow \textbf{Composite CN} = \textbf{82.88}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - **AREA EX1** **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA

___ UNRESTRICTED AREA

___ UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

___ PROPOSED CONDITION

X EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious Surface	D	98	0.456	44.68
Pervious Surface	D	80	1.715	137.19
TOTALS:			2.17	181.87

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{181.87}{2.17} \rightarrow \textbf{Composite CN} = \textbf{83.78}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - **AREA D1** **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 3/12/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA

___ UNRESTRICTED AREA

___ UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

___ PROPOSED CONDITION

X EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious Surface	D	98	0.075	7.31
Pervious Surface	D	80	0.438	35.03
TOTALS:			0.51	42.34

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{42.34}{0.51} \rightarrow \textbf{Composite CN} = \textbf{82.62}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - **AREA S1** **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA

___ UNRESTRICTED AREA

___ UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

___ PROPOSED CONDITION

X EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious Surface	D	98	0.447	43.79
Pervious Surface	D	80	1.420	113.57
TOTALS:			1.87	157.36

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{157.36}{1.87} \rightarrow \textbf{Composite CN} = \textbf{84.31}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - **AREA S2** **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 3/12/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA

___ UNRESTRICTED AREA

___ UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

___ PROPOSED CONDITION

X EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious Surface	D	98	1.162	113.89
Pervious Surface	D	80	1.195	95.62
TOTALS:			2.36	209.51

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{209.51}{2.36} \rightarrow \textbf{Composite CN} = \textbf{88.87}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - **AREA PR** **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA

___ UNRESTRICTED AREA

___ UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

___ PROPOSED CONDITION

X EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious Surface	D	98	4.910	481.18
Pervious Surface	D	80	4.314	345.14
TOTALS:			9.22	826.32

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{826.32}{9.22} \rightarrow \textbf{Composite CN} = \textbf{89.58}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - **AREA FO** **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA

___ UNRESTRICTED AREA

___ UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

___ PROPOSED CONDITION

X EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious Surface	D	98	3.890	381.22
Pervious Surface	D	80	5.480	438.40
TOTALS:			9.37	819.62

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{819.62}{9.37} \rightarrow \textbf{Composite CN} = \textbf{87.47}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - **AREA FO-US** **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA

___ UNRESTRICTED AREA

___ UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

___ PROPOSED CONDITION

X EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Residential District 1/2 Acre Lots	D	85	5.80	493.00
TOTALS:			5.80	493.00

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{493.00}{5.80} \rightarrow \textbf{Composite CN} = \textbf{85.00}$$

NRCS TIME OF CONCENTRATION (T_c) OR TRAVEL TIME (T_t)

PROJECT: Reserves at Muir Park - **AREA PD1** **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 3/12/2020

CONDITION (SELECT FROM DROP-DOWN)

___ PROPOSED CONDITION **X** EXISTING CONDITION

SHEET FLOW

1.	Segment ID		AB					
2.	Surface description		Short Grass					
3.	Manning's roughness coefficient, *n*		0.15					
4.	Flow length, *L* (≤ 100 ft)		100	ft				
5.	2-year, 24-hr rainfall, P_2		3.34	in	3.34			
6.	Land slope, *s*		0.005	ft/ft				
7.	Travel time, T_t	$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5}s^{0.4}}(60)$	16.70	+		=	16.70	min

SHALLOW CONCENTRATED FLOW

8.	Segment ID		BC		CD			
9.	Surface description (drop-down list)		Unpaved		Paved			
10.	Flow length, *L*		77.7	ft	107.8			
11.	Watercourse slope, *s*		0.006	ft/ft	0.005			
12.	Average velocity, *V*		1.25	fps	1.44			
13.	Travel time, T_t	$T_t = \frac{L}{60V}$	1.04	+	1.25	=	2.29	min

SHALLOW CONCENTRATED FLOW (cont'd)

8.	Segment ID		EF					
9.	Surface description (drop-down list)		Unpaved					
10.	Flow length, *L*		560.6	ft				
11.	Watercourse slope, *s*		0.004	ft/ft				
12.	Average velocity, *V*		1.02	fps				
13.	Travel time, T_t	$T_t = \frac{L}{60V}$	9.16	+		=	9.16	min

OPEN CHANNEL FLOW

14.	Segment ID	DE			
15.	Cross-sectional flow area, *A*	0.78	ft^2		
16.	Wetted Perimeter, P_w	3.14	ft		
17.	Hydraulic radius, *R*	0.25	ft		
18.	Flow Length, *L*	296.4	ft		

19.	Channel slope, *S*		0.007	ft/ft				
20.	Manning's roughness coefficient, *n*		0.013					
21.	Average velocity, *V*	$V = \frac{1.486}{n} R^{\frac{2}{3}} S^{\frac{1}{2}}$	3.78	fps				
22.	Travel time, T_t	$T_t = \frac{L}{60V}$	1.31	+		=	1.31	min

TIME-OF-CONCENTRATION (T_c) OR TRAVEL TIME (T_t)

23.	Time-of-Concentration, *Tc,* or Travel Time, *Tt*	$T_c, T_t = \sum T_t$	=	29.45	min

NRCS TIME OF CONCENTRATION (T_c) OR TRAVEL TIME (T_t)

PROJECT: Reserves at Muir Park - **AREA EX1** **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 3/12/2020

CONDITION (SELECT FROM DROP-DOWN)

___ PROPOSED CONDITION **X** EXISTING CONDITION

SHEET FLOW

1.	Segment ID		AB					
2.	Surface description		Short Grass					
3.	Manning's roughness coefficient, *n*		0.15					
4.	Flow length, *L* (≤ 100 ft)		100	ft				
5.	2-year, 24-hr rainfall, P_2		3.34	in	3.34			
6.	Land slope, *s*		0.005	ft/ft				
7.	Travel time, T_t	$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5}s^{0.4}}(60)$	16.70	+		=	16.70	min

SHALLOW CONCENTRATED FLOW

8.	Segment ID		BC-P		BC-UP			
9.	Surface description (drop-down list)		Paved		Unpaved			
10.	Flow length, *L*		60.3	ft	228.3			
11.	Watercourse slope, *s*		0.037	ft/ft	0.037			
12.	Average velocity, *V*		3.91	fps	3.10			
13.	Travel time, T_t	$T_t = \frac{L}{60V}$	0.26	+	1.23	=	1.48	min

OPEN CHANNEL FLOW

14.	Segment ID							
15.	Cross-sectional flow area, *A*			ft^2				
16.	Wetted Perimeter, P_w			ft				
17.	Hydraulic radius, *R*			ft				
18.	Flow Length, *L*			ft				
19.	Channel slope, *S*			ft/ft				
20.	Manning's roughness coefficient, *n*							
21.	Average velocity, *V*	$V = \frac{1.486}{n}R^{\frac{2}{3}}S^{\frac{1}{2}}$		fps				
22.	Travel time, T_t	$T_t = \frac{L}{60V}$		+		=		min

TIME-OF-CONCENTRATION (T_c) OR TRAVEL TIME (T_t)

23.	Time-of-Concentration, *Tc,* or Travel Time, *Tt*	$T_c, T_t = \sum T_t$	=	18.18	min

NRCS TIME OF CONCENTRATION (T_c) OR TRAVEL TIME (T_t)

PROJECT: Reserves at Muir Park - **AREA S1** **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 3/12/2020

CONDITION (SELECT FROM DROP-DOWN)

___ PROPOSED CONDITION **X** EXISTING CONDITION

SHEET FLOW

1. Segment ID		AB					
2. Surface description		Asphalt					
3. Manning's roughness coefficient, *n*		0.011					
4. Flow length, *L* (≤ 100 ft)		100	ft				
5. 2-year, 24-hr rainfall, P_2		3.34	in	3.34			
6. Land slope, *s*		0.004	ft/ft				
7. Travel time, T_t	$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5}s^{0.4}}(60)$	2.26	+		=	2.26	min

SHALLOW CONCENTRATED FLOW

8. Segment ID		BC		CD			
9. Surface description (drop-down list)		Paved		Unpaved			
10. Flow length, *L*		30.4	ft	458.6			
11. Watercourse slope, *s*		0.015	ft/ft	0.013			
12. Average velocity, *V*		2.49	fps	1.84			
13. Travel time, T_t	$T_t = \frac{L}{60V}$	0.20	+	4.15	=	4.36	min

OPEN CHANNEL FLOW

14. Segment ID							
15. Cross-sectional flow area, *A*			ft^2				
16. Wetted Perimeter, P_w			ft				
17. Hydraulic radius, *R*			ft				
18. Flow Length, *L*			ft				
19. Channel slope, *S*			ft/ft				
20. Manning's roughness coefficient, *n*							
21. Average velocity, *V*	$V = \frac{1.486}{n}R^{\frac{2}{3}}S^{\frac{1}{2}}$		fps				
22. Travel time, T_t	$T_t = \frac{L}{60V}$		+		=		min

TIME-OF-CONCENTRATION (T_c) OR TRAVEL TIME (T_t)

23. Time-of-Concentration, *Tc,* or Travel Time, *Tt*	$T_c, T_t = \sum T_t$	=	6.62	min

NRCS TIME OF CONCENTRATION (T_c) OR TRAVEL TIME (T_t)

PROJECT: Reserves at Muir Park - **AREA S2** **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 3/12/2020

CONDITION (SELECT FROM DROP-DOWN)

___ PROPOSED CONDITION **X** EXISTING CONDITION

SHEET FLOW

1. Segment ID		AB					
2. Surface description		Short Grass					
3. Manning's roughness coefficient, *n*		0.15					
4. Flow length, *L* (≤ 100 ft)		100	ft				
5. 2-year, 24-hr rainfall, P_2		3.34	in	3.34			
6. Land slope, *s*		0.009	ft/ft				
7. Travel time, T_t	$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5}s^{0.4}}(60)$	13.38	+		=	13.38	min

SHALLOW CONCENTRATED FLOW

8. Segment ID		BC		CD			
9. Surface description (drop-down list)		Unpaved		Paved			
10. Flow length, *L*		36.8	ft	419.7			
11. Watercourse slope, *s*		0.007	ft/ft	0.008			
12. Average velocity, *V*		1.35	fps	1.82			
13. Travel time, T_t	$T_t = \frac{L}{60V}$	0.45	+	3.85	=	4.30	min

OPEN CHANNEL FLOW

14. Segment ID		DE					
15. Cross-sectional flow area, *A*		0.20	ft^2				
16. Wetted Perimeter, P_w		1.57	ft				
17. Hydraulic radius, *R*		0.12	ft				
18. Flow Length, *L*		169.9	ft				
19. Channel slope, *S*		0.004	ft/ft				
20. Manning's roughness coefficient, *n*		0.011					
21. Average velocity, *V*	$V = \frac{1.486}{n}R^{\frac{2}{3}}S^{\frac{1}{2}}$	2.13	fps				
22. Travel time, T_t	$T_t = \frac{L}{60V}$	1.33	+		=	1.33	min

TIME-OF-CONCENTRATION (T_c) OR TRAVEL TIME (T_t)

23. Time-of-Concentration, *Tc,* or Travel Time, *Tt*	$T_c, T_t = \sum T_t$	=	19.01	min

DETENTION VOLUME PROVIDED

PROJECT: Reserves at Muir Park - **AREA PD1** **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 3/12/2020

AREA UNITS (CHOOSE WITH DROP-DOWN)

Units: ft²

POND / VAULT / SURFACE DETENTION VOLUME

Elevation (ft)	Area (ft²)	Average Area (ft²)	Increment Volume (ac-ft)	Cumulative Volume (ac-ft)
654.10	0.00			0.000
		401.63	0.01	
655.00	803.26			0.008
		11670.28	0.27	
656.00	22537.29			0.276
		32006.96	0.37	
656.50	41476.63			0.644

STORM SEWER DETENTION VOLUME

Diameter (in)	Length (ft)	Volume (ac-ft)
12	0	0.00

TOTAL DETENTION VOLUME

Pond / Vault / Surface Detention Volume (ac-ft)	0.64
Storm Sewer Detention Volume (ac-ft)	0.00
Total Detention Volume (ac-ft)	**0.64**

DEPRESSIONAL STORAGE VOLUME

PROJECT: Reserves at Muir Park - **AREA PD1**-1 **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 3/12/2020

AREA UNITS (CHOOSE WITH DROP-DOWN)

Units: ft²

POND / VAULT / SURFACE DETENTION VOLUME

Elevation (ft)	Area (ft²)	Average Area (ft²)	Increment Volume (ac-ft)	Cumulative Volume (ac-ft)
657.90	0.00			0.000
		113.41	0.00	
658.00	226.82			0.000
		1314.80	0.01	
658.20	2402.78			0.006

STORM SEWER DETENTION VOLUME

Diameter (in)	Length (ft)	Volume (ac-ft)
12	0	0.00

TOTAL DETENTION VOLUME

Pond / Vault / Surface Detention Volume (ac-ft)	0.01
Storm Sewer Detention Volume (ac-ft)	0.00
Total Detention Volume (ac-ft)	**0.01**

DEPRESSIONAL STORAGE VOLUME

PROJECT: Reserves at Muir Park - **AREA EX1** **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 3/12/2020

AREA UNITS (CHOOSE WITH DROP-DOWN)

Units: ft²

POND / VAULT / SURFACE DETENTION VOLUME

Elevation (ft)	Area (ft²)	Average Area (ft²)	Increment Volume (ac-ft)	Cumulative Volume (ac-ft)
652.95	0.00			0.000
		1001.00	0.00	
653.00	2002.00			0.001
		2586.58	0.01	
653.20	3171.15			0.013

STORM SEWER DETENTION VOLUME

Diameter (in)	Length (ft)	Volume (ac-ft)
12	0	0.00

TOTAL DETENTION VOLUME

Pond / Vault / Surface Detention Volume (ac-ft)	0.01
Storm Sewer Detention Volume (ac-ft)	0.00
Total Detention Volume (ac-ft)	**0.01**

DEPRESSIONAL STORAGE VOLUME

PROJECT: Reserves at Muir Park - **AREA D1** **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 3/12/2020

AREA UNITS (CHOOSE WITH DROP-DOWN)

Units: ft²

POND / VAULT / SURFACE DETENTION VOLUME

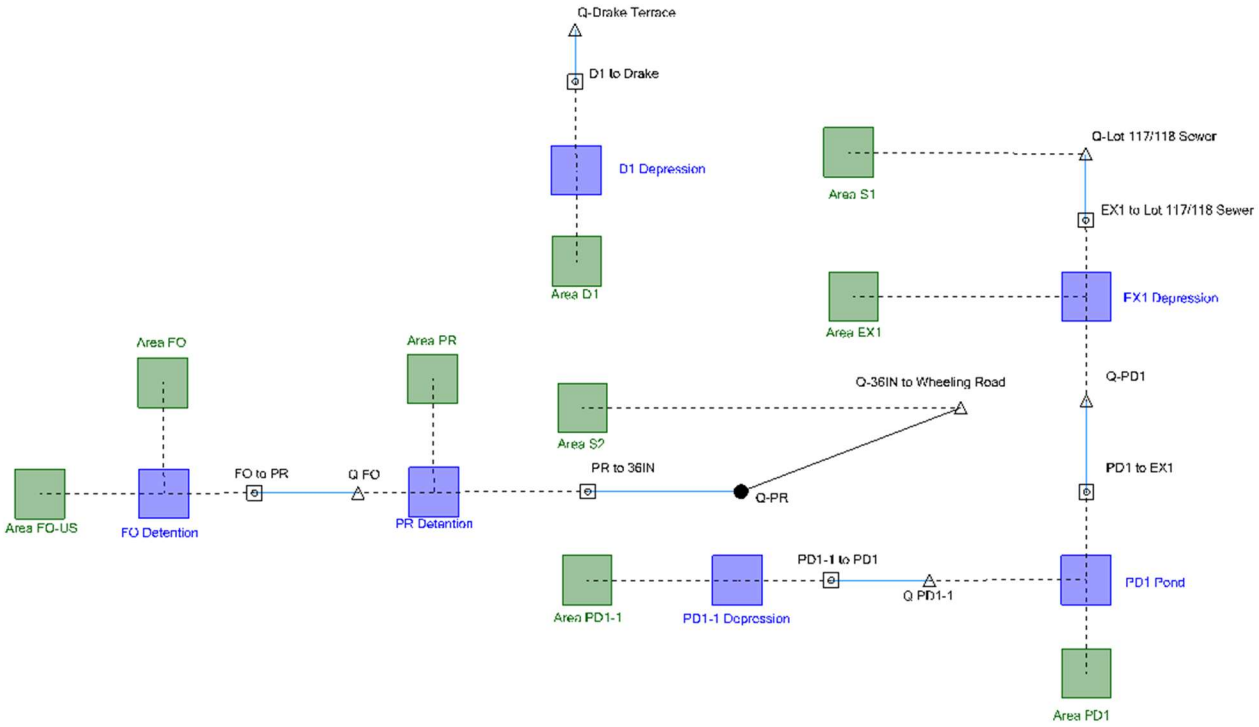
Elevation (ft)	Area (ft²)	Average Area (ft²)	Increment Volume (ac-ft)	Cumulative Volume (ac-ft)
658.50	0.00			0.000
		355.80	0.00	
659.00	711.60			0.004
		822.30	0.00	
659.10	933.00			0.006

STORM SEWER DETENTION VOLUME

Diameter (in)	Length (ft)	Volume (ac-ft)
12	0	0.00

TOTAL DETENTION VOLUME

Pond / Vault / Surface Detention Volume (ac-ft)	0.01
Storm Sewer Detention Volume (ac-ft)	0.00
Total Detention Volume (ac-ft)	**0.01**



Existing Conditions PondPack Reports

Project Summary	
Title	Prospect Pointe - Existing Conditions
Engineer	PAC
Company	Haeger Engineering LLC
Date	5/22/2020

Notes	Existing Conditions 24 Hour, 10-, 50- & 100-Year Critical Duration Analysis

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Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Area D1	10yr 24hr	10	0.140	15.60	0.24
Area D1	50yr 24hr	50	0.232	15.60	0.38
Area D1	100yr 5m	100	0.006	0.10	0.77
Area D1	100yr 10m	100	0.024	0.10	2.90
Area D1	100yr 15m	100	0.039	0.10	2.60
Area D1	100yr 30m	100	0.067	0.15	3.02
Area D1	100yr 1hr	100	0.097	0.25	2.46
Area D1	100yr 2hr	100	0.133	0.25	2.00
Area D1	100yr 3hr	100	0.153	0.30	1.73
Area D1	100yr 6hr	100	0.189	0.60	1.24
Area D1	100yr 12hr	100	0.231	4.80	0.66
Area D1	100yr 18hr	100	0.255	11.70	0.55
Area D1	100yr 24hr	100	0.275	15.60	0.45
Area D1	100yr 48hr	100	0.310	40.50	0.24
Area D1	100yr 72hr	100	0.332	61.00	0.17
Area D1	100yr 120hr	100	0.366	102.00	0.11
Area D1	100yr 240hr	100	0.449	204.00	0.07
Area PD1-1	10yr 24hr	10	0.085	15.60	0.15
Area PD1-1	50yr 24hr	50	0.141	15.60	0.23
Area PD1-1	100yr 5m	100	0.004	0.10	0.47
Area PD1-1	100yr 10m	100	0.015	0.10	1.76
Area PD1-1	100yr 15m	100	0.024	0.10	1.58
Area PD1-1	100yr 30m	100	0.041	0.15	1.84
Area PD1-1	100yr 1hr	100	0.059	0.25	1.50
Area PD1-1	100yr 2hr	100	0.081	0.25	1.22
Area PD1-1	100yr 3hr	100	0.093	0.30	1.05
Area PD1-1	100yr 6hr	100	0.115	0.60	0.76
Area PD1-1	100yr 12hr	100	0.140	4.80	0.40
Area PD1-1	100yr 18hr	100	0.155	11.70	0.34
Area PD1-1	100yr 24hr	100	0.167	15.60	0.27
Area PD1-1	100yr 48hr	100	0.189	40.50	0.15
Area PD1-1	100yr 72hr	100	0.202	61.00	0.11
Area PD1-1	100yr 120hr	100	0.222	102.00	0.07
Area PD1-1	100yr 240hr	100	0.273	204.00	0.04
Area S2	10yr 24hr	10	0.759	15.60	1.22
Area S2	50yr 24hr	50	1.203	15.60	1.85
Area S2	100yr 5m	100	0.057	0.25	2.34
Area S2	100yr 10m	100	0.170	0.25	6.94
Area S2	100yr 15m	100	0.251	0.30	9.04
Area S2	100yr 30m	100	0.398	0.30	10.96
Area S2	100yr 1hr	100	0.553	0.40	10.94
Area S2	100yr 2hr	100	0.726	0.50	9.10
Area S2	100yr 3hr	100	0.823	0.50	7.76
Area S2	100yr 6hr	100	1.000	0.70	5.98
Area S2	100yr 12hr	100	1.195	4.90	3.25

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Area S2	100yr 18hr	100	1.309	11.70	2.66
Area S2	100yr 24hr	100	1.407	15.60	2.13
Area S2	100yr 48hr	100	1.559	40.50	1.16
Area S2	100yr 72hr	100	1.672	61.00	0.82
Area S2	100yr 120hr	100	1.829	102.00	0.54
Area S2	100yr 240hr	100	2.216	204.00	0.32
Area S1	10yr 24hr	10	0.523	15.60	0.90
Area S1	50yr 24hr	50	0.863	15.60	1.40
Area S1	100yr 5m	100	0.024	0.10	2.60
Area S1	100yr 10m	100	0.094	0.10	9.93
Area S1	100yr 15m	100	0.150	0.15	9.52
Area S1	100yr 30m	100	0.254	0.20	10.44
Area S1	100yr 1hr	100	0.367	0.25	9.21
Area S1	100yr 2hr	100	0.497	0.25	7.41
Area S1	100yr 3hr	100	0.571	0.35	6.40
Area S1	100yr 6hr	100	0.706	0.60	4.59
Area S1	100yr 12hr	100	0.856	4.80	2.43
Area S1	100yr 18hr	100	0.945	11.70	2.03
Area S1	100yr 24hr	100	1.021	15.60	1.63
Area S1	100yr 48hr	100	1.147	40.50	0.89
Area S1	100yr 72hr	100	1.228	61.00	0.64
Area S1	100yr 120hr	100	1.351	102.00	0.42
Area S1	100yr 240hr	100	1.653	204.00	0.25
Area PD1	10yr 24hr	10	1.614	15.60	2.78
Area PD1	50yr 24hr	50	2.685	15.60	4.38
Area PD1	100yr 5m	100	0.067	0.35	1.81
Area PD1	100yr 10m	100	0.278	0.35	7.50
Area PD1	100yr 15m	100	0.447	0.40	11.43
Area PD1	100yr 30m	100	0.771	0.50	16.23
Area PD1	100yr 1hr	100	1.126	0.55	17.78
Area PD1	100yr 2hr	100	1.534	0.70	16.32
Area PD1	100yr 3hr	100	1.766	0.85	14.13
Area PD1	100yr 6hr	100	2.192	0.90	10.30
Area PD1	100yr 12hr	100	2.667	5.00	7.33
Area PD1	100yr 18hr	100	2.946	11.70	6.32
Area PD1	100yr 24hr	100	3.185	15.60	5.11
Area PD1	100yr 48hr	100	3.561	40.50	2.81
Area PD1	100yr 72hr	100	3.837	61.00	2.01
Area PD1	100yr 120hr	100	4.224	102.00	1.31
Area PD1	100yr 240hr	100	5.185	204.00	0.79
Area EX1	10yr 24hr	10	0.608	15.60	1.04
Area EX1	50yr 24hr	50	1.003	15.60	1.63
Area EX1	100yr 5m	100	0.028	0.20	1.22
Area EX1	100yr 10m	100	0.110	0.20	4.78
Area EX1	100yr 15m	100	0.174	0.30	6.39

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Area EX1	100yr 30m	100	0.295	0.35	8.19
Area EX1	100yr 1hr	100	0.427	0.40	8.38
Area EX1	100yr 2hr	100	0.578	0.55	7.02
Area EX1	100yr 3hr	100	0.664	0.55	5.82
Area EX1	100yr 6hr	100	0.821	0.70	4.52
Area EX1	100yr 12hr	100	0.996	4.90	2.78
Area EX1	100yr 18hr	100	1.099	11.70	2.35
Area EX1	100yr 24hr	100	1.187	15.60	1.89
Area EX1	100yr 48hr	100	1.325	40.50	1.04
Area EX1	100yr 72hr	100	1.427	61.00	0.74
Area EX1	100yr 120hr	100	1.569	102.00	0.48
Area EX1	100yr 240hr	100	1.922	204.00	0.29
Area FO	10yr 24hr	10	2.858	15.70	4.59
Area FO	50yr 24hr	50	4.600	15.70	7.07
Area FO	100yr 5m	100	0.179	0.65	2.41
Area FO	100yr 10m	100	0.587	0.65	7.92
Area FO	100yr 15m	100	0.892	0.70	11.83
Area FO	100yr 30m	100	1.453	0.80	18.40
Area FO	100yr 1hr	100	2.051	0.95	21.69
Area FO	100yr 2hr	100	2.727	1.05	21.95
Area FO	100yr 3hr	100	3.107	1.20	20.35
Area FO	100yr 6hr	100	3.801	1.45	15.85
Area FO	100yr 12hr	100	4.570	5.50	11.80
Area FO	100yr 18hr	100	5.021	11.90	9.97
Area FO	100yr 24hr	100	5.405	15.70	8.19
Area FO	100yr 48hr	100	6.012	41.00	4.54
Area FO	100yr 72hr	100	6.449	61.00	3.24
Area FO	100yr 120hr	100	7.071	102.00	2.12
Area FO	100yr 240hr	100	8.603	204.00	1.27
Area PR	10yr 24hr	10	3.053	15.70	4.74
Area PR	50yr 24hr	50	4.797	15.70	7.15
Area PR	100yr 5m	100	0.251	0.65	3.38
Area PR	100yr 10m	100	0.712	0.65	9.60
Area PR	100yr 15m	100	1.038	0.70	13.77
Area PR	100yr 30m	100	1.623	0.80	20.56
Area PR	100yr 1hr	100	2.236	0.95	23.69
Area PR	100yr 2hr	100	2.921	1.05	23.79
Area PR	100yr 3hr	100	3.303	1.20	21.90
Area PR	100yr 6hr	100	3.999	1.35	17.12
Area PR	100yr 12hr	100	4.767	5.40	12.08
Area PR	100yr 18hr	100	5.216	11.90	10.06
Area PR	100yr 24hr	100	5.598	15.70	8.24
Area PR	100yr 48hr	100	6.202	41.00	4.55
Area PR	100yr 72hr	100	6.635	61.00	3.24
Area PR	100yr 120hr	100	7.251	102.00	2.11

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Area PR	100yr 240hr	100	8.769	204.00	1.26
Area FO-US	10yr 24hr	10	1.672	15.70	2.79
Area FO-US	50yr 24hr	50	2.736	15.60	4.34
Area FO-US	100yr 5m	100	0.086	0.50	1.56
Area FO-US	100yr 10m	100	0.315	0.50	5.72
Area FO-US	100yr 15m	100	0.492	0.60	8.51
Area FO-US	100yr 30m	100	0.824	0.70	13.04
Area FO-US	100yr 1hr	100	1.183	0.70	14.81
Area FO-US	100yr 2hr	100	1.592	0.90	14.61
Area FO-US	100yr 3hr	100	1.823	1.00	13.15
Area FO-US	100yr 6hr	100	2.247	1.20	9.82
Area FO-US	100yr 12hr	100	2.717	5.30	7.24
Area FO-US	100yr 18hr	100	2.993	11.80	6.21
Area FO-US	100yr 24hr	100	3.229	15.60	5.05
Area FO-US	100yr 48hr	100	3.602	40.50	2.78
Area FO-US	100yr 72hr	100	3.871	61.00	1.98
Area FO-US	100yr 120hr	100	4.253	102.00	1.30
Area FO-US	100yr 240hr	100	5.198	204.00	0.78

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Q-Drake Terrace	10yr 24hr	10	0.134	15.60	0.24
Q-Drake Terrace	50yr 24hr	50	0.226	15.60	0.38
Q-Drake Terrace	100yr 5m	100	0.000	0.00	0.00
Q-Drake Terrace	100yr 10m	100	0.018	0.15	1.89
Q-Drake Terrace	100yr 15m	100	0.033	0.20	2.10
Q-Drake Terrace	100yr 30m	100	0.061	0.20	2.84
Q-Drake Terrace	100yr 1hr	100	0.091	0.25	2.47
Q-Drake Terrace	100yr 2hr	100	0.127	0.30	1.91
Q-Drake Terrace	100yr 3hr	100	0.147	0.35	1.65
Q-Drake Terrace	100yr 6hr	100	0.183	0.60	1.20
Q-Drake Terrace	100yr 12hr	100	0.225	4.80	0.66
Q-Drake Terrace	100yr 18hr	100	0.249	11.70	0.55
Q-Drake Terrace	100yr 24hr	100	0.269	15.60	0.44
Q-Drake Terrace	100yr 48hr	100	0.304	39.00	0.25
Q-Drake Terrace	100yr 72hr	100	0.326	58.50	0.18
Q-Drake Terrace	100yr 120hr	100	0.360	97.00	0.12
Q-Drake Terrace	100yr 240hr	100	0.443	204.00	0.07
Q-36IN to Wheeling Road	10yr 24hr	10	8.344	15.70	10.40
Q-36IN to Wheeling Road	50yr 24hr	50	13.335	15.70	13.58

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Q-36IN to Wheeling Road	100yr 5m	100	0.573	0.65	7.26
Q-36IN to Wheeling Road	100yr 10m	100	1.784	0.30	13.67
Q-36IN to Wheeling Road	100yr 15m	100	2.675	0.35	18.09
Q-36IN to Wheeling Road	100yr 30m	100	4.300	0.45	22.28
Q-36IN to Wheeling Road	100yr 1hr	100	6.024	0.50	23.87
Q-36IN to Wheeling Road	100yr 2hr	100	7.966	0.65	23.06
Q-36IN to Wheeling Road	100yr 3hr	100	9.056	0.80	21.57
Q-36IN to Wheeling Road	100yr 6hr	100	11.047	1.05	19.35
Q-36IN to Wheeling Road	100yr 12hr	100	13.249	5.10	17.90
Q-36IN to Wheeling Road	100yr 18hr	100	14.541	11.80	16.88
Q-36IN to Wheeling Road	100yr 24hr	100	15.639	15.70	15.06
Q-36IN to Wheeling Road	100yr 48hr	100	17.376	43.00	10.42
Q-36IN to Wheeling Road	100yr 72hr	100	18.627	59.50	8.69
Q-36IN to Wheeling Road	100yr 120hr	100	20.404	102.00	6.06
Q-36IN to Wheeling Road	100yr 240hr	100	24.785	204.00	3.62
Q-Lot 117/118 Sewer	10yr 24hr	10	2.810	15.60	3.75
Q-Lot 117/118 Sewer	50yr 24hr	50	4.673	15.60	7.31
Q-Lot 117/118 Sewer	100yr 5m	100	0.106	0.10	2.60
Q-Lot 117/118 Sewer	100yr 10m	100	0.477	0.10	9.93
Q-Lot 117/118 Sewer	100yr 15m	100	0.775	0.30	10.85
Q-Lot 117/118 Sewer	100yr 30m	100	1.341	0.30	15.33
Q-Lot 117/118 Sewer	100yr 1hr	100	1.961	0.85	18.38
Q-Lot 117/118 Sewer	100yr 2hr	100	2.671	0.95	20.04
Q-Lot 117/118 Sewer	100yr 3hr	100	3.074	1.10	18.70
Q-Lot 117/118 Sewer	100yr 6hr	100	3.815	1.55	14.99
Q-Lot 117/118 Sewer	100yr 12hr	100	4.640	5.40	12.42
Q-Lot 117/118 Sewer	100yr 18hr	100	5.126	11.70	10.84
Q-Lot 117/118 Sewer	100yr 24hr	100	5.541	15.60	8.78
Q-Lot 117/118 Sewer	100yr 48hr	100	6.202	43.00	4.51
Q-Lot 117/118 Sewer	100yr 72hr	100	6.675	64.50	3.13
Q-Lot 117/118 Sewer	100yr 120hr	100	7.347	102.00	2.27
Q-Lot 117/118 Sewer	100yr 240hr	100	9.013	204.00	1.37

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Q-PR	10yr 24hr	10	7.584	15.80	9.23
Q-PR	50yr 24hr	50	12.132	15.90	11.82
Q-PR	100yr 5m	100	0.516	0.65	7.12
Q-PR	100yr 10m	100	1.614	0.70	12.19
Q-PR	100yr 15m	100	2.423	0.80	14.56
Q-PR	100yr 30m	100	3.902	1.20	15.31
Q-PR	100yr 1hr	100	5.471	1.55	15.96
Q-PR	100yr 2hr	100	7.240	2.50	16.78
Q-PR	100yr 3hr	100	8.233	3.05	16.92
Q-PR	100yr 6hr	100	10.047	3.60	16.40
Q-PR	100yr 12hr	100	12.054	7.70	15.33
Q-PR	100yr 18hr	100	13.232	12.00	14.48
Q-PR	100yr 24hr	100	14.233	15.90	13.05
Q-PR	100yr 48hr	100	15.817	43.50	9.35
Q-PR	100yr 72hr	100	16.954	59.50	7.87
Q-PR	100yr 120hr	100	18.575	102.00	5.52
Q-PR	100yr 240hr	100	22.570	204.00	3.30

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
D1 Depression (IN)	10yr 24hr	10	0.140	15.60	0.24	(N/A)	(N/A)
D1 Depression (OUT)	10yr 24hr	10	0.134	15.60	0.24	659.26	0.010
D1 Depression (IN)	50yr 24hr	50	0.232	15.60	0.38	(N/A)	(N/A)
D1 Depression (OUT)	50yr 24hr	50	0.226	15.60	0.38	659.29	0.010
D1 Depression (IN)	100yr 5m	100	0.006	0.10	0.77	(N/A)	(N/A)
D1 Depression (OUT)	100yr 5m	100	0.000	0.00	0.00	659.09	0.006
D1 Depression (IN)	100yr 10m	100	0.024	0.10	2.90	(N/A)	(N/A)

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
D1 Depression (OUT)	100yr 10m	100	0.018	0.15	1.89	659.47	0.014
D1 Depression (IN)	100yr 15m	100	0.039	0.10	2.60	(N/A)	(N/A)
D1 Depression (OUT)	100yr 15m	100	0.033	0.20	2.10	659.48	0.015
D1 Depression (IN)	100yr 30m	100	0.067	0.15	3.02	(N/A)	(N/A)
D1 Depression (OUT)	100yr 30m	100	0.061	0.20	2.84	659.53	0.016
D1 Depression (IN)	100yr 1hr	100	0.097	0.25	2.46	(N/A)	(N/A)
D1 Depression (OUT)	100yr 1hr	100	0.091	0.25	2.47	659.51	0.015
D1 Depression (IN)	100yr 2hr	100	0.133	0.25	2.00	(N/A)	(N/A)
D1 Depression (OUT)	100yr 2hr	100	0.127	0.30	1.91	659.47	0.014
D1 Depression (IN)	100yr 3hr	100	0.153	0.30	1.73	(N/A)	(N/A)
D1 Depression (OUT)	100yr 3hr	100	0.147	0.35	1.65	659.45	0.014
D1 Depression (IN)	100yr 6hr	100	0.189	0.60	1.24	(N/A)	(N/A)
D1 Depression (OUT)	100yr 6hr	100	0.183	0.60	1.20	659.41	0.013
D1 Depression (IN)	100yr 12hr	100	0.231	4.80	0.66	(N/A)	(N/A)
D1 Depression (OUT)	100yr 12hr	100	0.225	4.80	0.66	659.34	0.011

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
D1 Depression (IN)	100yr 18hr	100	0.255	11.70	0.55	(N/A)	(N/A)
D1 Depression (OUT)	100yr 18hr	100	0.249	11.70	0.55	659.32	0.011
D1 Depression (IN)	100yr 24hr	100	0.275	15.60	0.45	(N/A)	(N/A)
D1 Depression (OUT)	100yr 24hr	100	0.269	15.60	0.44	659.31	0.011
D1 Depression (IN)	100yr 48hr	100	0.310	40.50	0.24	(N/A)	(N/A)
D1 Depression (OUT)	100yr 48hr	100	0.304	39.00	0.25	659.26	0.010
D1 Depression (IN)	100yr 72hr	100	0.332	61.00	0.17	(N/A)	(N/A)
D1 Depression (OUT)	100yr 72hr	100	0.326	58.50	0.18	659.24	0.009
D1 Depression (IN)	100yr 120hr	100	0.366	102.00	0.11	(N/A)	(N/A)
D1 Depression (OUT)	100yr 120hr	100	0.360	97.00	0.12	659.22	0.009
D1 Depression (IN)	100yr 240hr	100	0.449	204.00	0.07	(N/A)	(N/A)
D1 Depression (OUT)	100yr 240hr	100	0.443	204.00	0.07	659.20	0.008
PD1-1 Depression (IN)	10yr 24hr	10	0.085	15.60	0.15	(N/A)	(N/A)
PD1-1 Depression (OUT)	10yr 24hr	10	0.079	15.60	0.15	658.25	0.008
PD1-1 Depression (IN)	50yr 24hr	50	0.141	15.60	0.23	(N/A)	(N/A)

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
PD1-1 Depression (OUT)	50yr 24hr	50	0.135	15.60	0.23	658.26	0.009
PD1-1 Depression (IN)	100yr 5m	100	0.004	0.10	0.47	(N/A)	(N/A)
PD1-1 Depression (OUT)	100yr 5m	100	0.000	0.00	0.00	658.12	0.004
PD1-1 Depression (IN)	100yr 10m	100	0.015	0.10	1.76	(N/A)	(N/A)
PD1-1 Depression (OUT)	100yr 10m	100	0.009	0.15	0.81	658.30	0.011
PD1-1 Depression (IN)	100yr 15m	100	0.024	0.10	1.58	(N/A)	(N/A)
PD1-1 Depression (OUT)	100yr 15m	100	0.018	0.20	1.22	658.32	0.011
PD1-1 Depression (IN)	100yr 30m	100	0.041	0.15	1.84	(N/A)	(N/A)
PD1-1 Depression (OUT)	100yr 30m	100	0.035	0.20	1.65	658.33	0.012
PD1-1 Depression (IN)	100yr 1hr	100	0.059	0.25	1.50	(N/A)	(N/A)
PD1-1 Depression (OUT)	100yr 1hr	100	0.053	0.25	1.51	658.33	0.012
PD1-1 Depression (IN)	100yr 2hr	100	0.081	0.25	1.22	(N/A)	(N/A)
PD1-1 Depression (OUT)	100yr 2hr	100	0.075	0.35	1.07	658.31	0.011
PD1-1 Depression (IN)	100yr 3hr	100	0.093	0.30	1.05	(N/A)	(N/A)
PD1-1 Depression (OUT)	100yr 3hr	100	0.087	0.40	0.94	658.31	0.011

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
PD1-1 Depression (IN)	100yr 6hr	100	0.115	0.60	0.76	(N/A)	(N/A)
PD1-1 Depression (OUT)	100yr 6hr	100	0.109	0.65	0.71	658.29	0.010
PD1-1 Depression (IN)	100yr 12hr	100	0.140	4.80	0.40	(N/A)	(N/A)
PD1-1 Depression (OUT)	100yr 12hr	100	0.134	4.80	0.40	658.27	0.009
PD1-1 Depression (IN)	100yr 18hr	100	0.155	11.70	0.34	(N/A)	(N/A)
PD1-1 Depression (OUT)	100yr 18hr	100	0.149	11.70	0.34	658.27	0.009
PD1-1 Depression (IN)	100yr 24hr	100	0.167	15.60	0.27	(N/A)	(N/A)
PD1-1 Depression (OUT)	100yr 24hr	100	0.161	15.60	0.27	658.26	0.009
PD1-1 Depression (IN)	100yr 48hr	100	0.189	40.50	0.15	(N/A)	(N/A)
PD1-1 Depression (OUT)	100yr 48hr	100	0.183	40.50	0.15	658.25	0.008
PD1-1 Depression (IN)	100yr 72hr	100	0.202	61.00	0.11	(N/A)	(N/A)
PD1-1 Depression (OUT)	100yr 72hr	100	0.196	58.50	0.11	658.24	0.008
PD1-1 Depression (IN)	100yr 120hr	100	0.222	102.00	0.07	(N/A)	(N/A)
PD1-1 Depression (OUT)	100yr 120hr	100	0.216	97.00	0.07	658.22	0.007
PD1-1 Depression (IN)	100yr 240hr	100	0.273	204.00	0.04	(N/A)	(N/A)

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
PD1-1 Depression (OUT)	100yr 240hr	100	0.267	193.00	0.04	658.21	0.007
PD1 Pond (IN)	10yr 24hr	10	1.693	15.60	2.93	(N/A)	(N/A)
PD1 Pond (OUT)	10yr 24hr	10	1.692	17.00	1.93	655.87	0.241
PD1 Pond (IN)	50yr 24hr	50	2.820	15.60	4.61	(N/A)	(N/A)
PD1 Pond (OUT)	50yr 24hr	50	2.820	15.80	4.40	656.16	0.393
PD1 Pond (IN)	100yr 5m	100	0.067	0.35	1.81	(N/A)	(N/A)
PD1 Pond (OUT)	100yr 5m	100	0.067	0.50	1.29	655.03	0.015
PD1 Pond (IN)	100yr 10m	100	0.287	0.35	7.60	(N/A)	(N/A)
PD1 Pond (OUT)	100yr 10m	100	0.286	0.70	1.78	655.64	0.179
PD1 Pond (IN)	100yr 15m	100	0.465	0.40	11.57	(N/A)	(N/A)
PD1 Pond (OUT)	100yr 15m	100	0.465	0.80	2.53	656.06	0.317
PD1 Pond (IN)	100yr 30m	100	0.805	0.45	16.86	(N/A)	(N/A)
PD1 Pond (OUT)	100yr 30m	100	0.805	0.80	8.36	656.27	0.472
PD1 Pond (IN)	100yr 1hr	100	1.179	0.55	18.48	(N/A)	(N/A)
PD1 Pond (OUT)	100yr 1hr	100	1.179	0.90	12.25	656.34	0.524
PD1 Pond (IN)	100yr 2hr	100	1.609	0.70	17.04	(N/A)	(N/A)
PD1 Pond (OUT)	100yr 2hr	100	1.608	1.00	13.05	656.35	0.534
PD1 Pond (IN)	100yr 3hr	100	1.852	0.80	14.85	(N/A)	(N/A)
PD1 Pond (OUT)	100yr 3hr	100	1.852	1.15	12.05	656.33	0.522
PD1 Pond (IN)	100yr 6hr	100	2.301	0.90	10.81	(N/A)	(N/A)
PD1 Pond (OUT)	100yr 6hr	100	2.301	1.65	9.21	656.28	0.485
PD1 Pond (IN)	100yr 12hr	100	2.801	5.00	7.70	(N/A)	(N/A)

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
PD1 Pond (OUT)	100yr 12hr	100	2.800	5.50	7.48	656.25	0.459
PD1 Pond (IN)	100yr 18hr	100	3.095	11.70	6.65	(N/A)	(N/A)
PD1 Pond (OUT)	100yr 18hr	100	3.095	11.80	6.52	656.22	0.441
PD1 Pond (IN)	100yr 24hr	100	3.346	15.60	5.38	(N/A)	(N/A)
PD1 Pond (OUT)	100yr 24hr	100	3.346	15.70	5.29	656.19	0.416
PD1 Pond (IN)	100yr 48hr	100	3.744	40.50	2.96	(N/A)	(N/A)
PD1 Pond (OUT)	100yr 48hr	100	3.744	43.00	2.73	656.07	0.329
PD1 Pond (IN)	100yr 72hr	100	4.033	61.00	2.11	(N/A)	(N/A)
PD1 Pond (OUT)	100yr 72hr	100	4.033	65.00	1.86	655.76	0.213
PD1 Pond (IN)	100yr 120hr	100	4.441	102.00	1.38	(N/A)	(N/A)
PD1 Pond (OUT)	100yr 120hr	100	4.440	102.00	1.37	655.09	0.031
PD1 Pond (IN)	100yr 240hr	100	5.452	204.00	0.83	(N/A)	(N/A)
PD1 Pond (OUT)	100yr 240hr	100	5.451	204.00	0.83	654.80	0.006
EX1 Depression (IN)	10yr 24hr	10	2.300	15.60	2.86	(N/A)	(N/A)
EX1 Depression (OUT)	10yr 24hr	10	2.287	15.70	2.85	653.46	0.042
EX1 Depression (IN)	50yr 24hr	50	3.823	15.70	5.96	(N/A)	(N/A)
EX1 Depression (OUT)	50yr 24hr	50	3.810	15.70	5.96	653.55	0.051
EX1 Depression (IN)	100yr 5m	100	0.095	0.25	2.30	(N/A)	(N/A)
EX1 Depression (OUT)	100yr 5m	100	0.082	0.45	1.55	653.41	0.035

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
EX1 Depression (IN)	100yr 10m	100	0.396	0.20	6.12	(N/A)	(N/A)
EX1 Depression (OUT)	100yr 10m	100	0.383	0.30	5.51	653.54	0.050
EX1 Depression (IN)	100yr 15m	100	0.639	0.30	7.90	(N/A)	(N/A)
EX1 Depression (OUT)	100yr 15m	100	0.626	0.35	7.60	653.59	0.055
EX1 Depression (IN)	100yr 30m	100	1.100	0.70	9.94	(N/A)	(N/A)
EX1 Depression (OUT)	100yr 30m	100	1.087	0.75	9.91	653.63	0.060
EX1 Depression (IN)	100yr 1hr	100	1.606	0.85	15.78	(N/A)	(N/A)
EX1 Depression (OUT)	100yr 1hr	100	1.593	0.85	15.74	653.72	0.070
EX1 Depression (IN)	100yr 2hr	100	2.187	1.00	17.14	(N/A)	(N/A)
EX1 Depression (OUT)	100yr 2hr	100	2.174	1.00	17.14	653.74	0.072
EX1 Depression (IN)	100yr 3hr	100	2.516	1.10	15.88	(N/A)	(N/A)
EX1 Depression (OUT)	100yr 3hr	100	2.503	1.15	15.89	653.72	0.070
EX1 Depression (IN)	100yr 6hr	100	3.122	1.60	12.38	(N/A)	(N/A)
EX1 Depression (OUT)	100yr 6hr	100	3.109	1.60	12.39	653.67	0.065
EX1 Depression (IN)	100yr 12hr	100	3.797	5.40	10.12	(N/A)	(N/A)

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
EX1 Depression (OUT)	100yr 12hr	100	3.784	5.50	10.10	653.64	0.060
EX1 Depression (IN)	100yr 18hr	100	4.194	11.70	8.83	(N/A)	(N/A)
EX1 Depression (OUT)	100yr 18hr	100	4.181	11.80	8.82	653.61	0.058
EX1 Depression (IN)	100yr 24hr	100	4.533	15.60	7.16	(N/A)	(N/A)
EX1 Depression (OUT)	100yr 24hr	100	4.520	15.60	7.15	653.58	0.054
EX1 Depression (IN)	100yr 48hr	100	5.069	43.00	3.70	(N/A)	(N/A)
EX1 Depression (OUT)	100yr 48hr	100	5.056	43.00	3.67	653.49	0.045
EX1 Depression (IN)	100yr 72hr	100	5.460	64.50	2.54	(N/A)	(N/A)
EX1 Depression (OUT)	100yr 72hr	100	5.447	64.50	2.54	653.45	0.040
EX1 Depression (IN)	100yr 120hr	100	6.010	102.00	1.86	(N/A)	(N/A)
EX1 Depression (OUT)	100yr 120hr	100	5.997	102.00	1.86	653.42	0.037
EX1 Depression (IN)	100yr 240hr	100	7.373	204.00	1.12	(N/A)	(N/A)
EX1 Depression (OUT)	100yr 240hr	100	7.360	204.00	1.12	653.38	0.032
PR Detention (IN)	10yr 24hr	10	7.583	15.80	9.23	(N/A)	(N/A)
PR Detention (OUT)	10yr 24hr	10	7.583	15.80	9.23	655.25	0.000
PR Detention (IN)	50yr 24hr	50	12.132	15.80	11.83	(N/A)	(N/A)
PR Detention (OUT)	50yr 24hr	50	12.132	15.90	11.82	656.09	0.000

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
PR Detention (IN)	100yr 5m	100	0.516	0.65	7.16	(N/A)	(N/A)
PR Detention (OUT)	100yr 5m	100	0.516	0.65	7.12	654.72	0.000
PR Detention (IN)	100yr 10m	100	1.614	0.65	12.21	(N/A)	(N/A)
PR Detention (OUT)	100yr 10m	100	1.614	0.70	12.19	656.23	0.000
PR Detention (IN)	100yr 15m	100	2.423	0.80	15.54	(N/A)	(N/A)
PR Detention (OUT)	100yr 15m	100	2.423	0.80	14.56	657.20	0.000
PR Detention (IN)	100yr 30m	100	3.900	0.80	22.19	(N/A)	(N/A)
PR Detention (OUT)	100yr 30m	100	3.900	1.20	15.31	657.54	0.238
PR Detention (IN)	100yr 1hr	100	5.471	0.95	26.38	(N/A)	(N/A)
PR Detention (OUT)	100yr 1hr	100	5.471	1.55	15.96	657.85	0.544
PR Detention (IN)	100yr 2hr	100	7.240	1.10	26.63	(N/A)	(N/A)
PR Detention (OUT)	100yr 2hr	100	7.240	2.50	16.78	658.26	0.948
PR Detention (IN)	100yr 3hr	100	8.233	1.20	24.89	(N/A)	(N/A)
PR Detention (OUT)	100yr 3hr	100	8.233	3.05	16.92	658.34	1.024
PR Detention (IN)	100yr 6hr	100	10.047	2.90	21.77	(N/A)	(N/A)
PR Detention (OUT)	100yr 6hr	100	10.047	3.60	16.40	658.07	0.760
PR Detention (IN)	100yr 12hr	100	12.054	7.00	17.68	(N/A)	(N/A)
PR Detention (OUT)	100yr 12hr	100	12.054	7.70	15.33	657.55	0.249
PR Detention (IN)	100yr 18hr	100	13.230	12.00	14.50	(N/A)	(N/A)
PR Detention (OUT)	100yr 18hr	100	13.230	12.00	14.48	657.16	0.000
PR Detention (IN)	100yr 24hr	100	14.232	15.80	13.05	(N/A)	(N/A)
PR Detention (OUT)	100yr 24hr	100	14.232	15.90	13.05	656.56	0.000
PR Detention (IN)	100yr 48hr	100	15.816	43.00	9.38	(N/A)	(N/A)

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
PR Detention (OUT)	100yr 48hr	100	15.816	43.50	9.35	655.29	0.000
PR Detention (IN)	100yr 72hr	100	16.954	59.00	7.96	(N/A)	(N/A)
PR Detention (OUT)	100yr 72hr	100	16.954	59.50	7.87	654.90	0.000
PR Detention (IN)	100yr 120hr	100	18.575	102.00	5.52	(N/A)	(N/A)
PR Detention (OUT)	100yr 120hr	100	18.575	102.00	5.52	654.55	0.000
PR Detention (IN)	100yr 240hr	100	22.570	204.00	3.30	(N/A)	(N/A)
PR Detention (OUT)	100yr 240hr	100	22.570	204.00	3.30	654.36	0.000
FO Detention (IN)	10yr 24hr	10	4.530	15.70	7.38	(N/A)	(N/A)
FO Detention (OUT)	10yr 24hr	10	4.530	18.00	5.18	657.01	0.496
FO Detention (IN)	50yr 24hr	50	7.335	15.70	11.41	(N/A)	(N/A)
FO Detention (OUT)	50yr 24hr	50	7.335	19.10	6.30	658.41	1.640
FO Detention (IN)	100yr 5m	100	0.265	0.60	3.80	(N/A)	(N/A)
FO Detention (OUT)	100yr 5m	100	0.265	0.60	3.79	655.80	0.000
FO Detention (IN)	100yr 10m	100	0.903	0.60	13.03	(N/A)	(N/A)
FO Detention (OUT)	100yr 10m	100	0.903	1.80	5.32	656.96	0.455
FO Detention (IN)	100yr 15m	100	1.385	0.65	19.78	(N/A)	(N/A)
FO Detention (OUT)	100yr 15m	100	1.385	2.00	5.85	657.55	0.940
FO Detention (IN)	100yr 30m	100	2.277	0.70	30.60	(N/A)	(N/A)
FO Detention (OUT)	100yr 30m	100	2.277	1.90	6.93	658.61	1.793
FO Detention (IN)	100yr 1hr	100	3.235	0.80	35.58	(N/A)	(N/A)
FO Detention (OUT)	100yr 1hr	100	3.235	2.75	7.73	659.68	2.569
FO Detention (IN)	100yr 2hr	100	4.319	1.00	35.77	(N/A)	(N/A)
FO Detention (OUT)	100yr 2hr	100	4.319	2.20	13.17	660.26	3.008

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
FO Detention (IN)	100yr 3hr	100	4.930	1.10	32.98	(N/A)	(N/A)
FO Detention (OUT)	100yr 3hr	100	4.930	2.40	13.36	660.26	3.011
FO Detention (IN)	100yr 6hr	100	6.048	1.40	25.46	(N/A)	(N/A)
FO Detention (OUT)	100yr 6hr	100	6.048	3.05	12.92	660.25	2.999
FO Detention (IN)	100yr 12hr	100	7.287	5.40	19.01	(N/A)	(N/A)
FO Detention (OUT)	100yr 12hr	100	7.287	7.20	10.59	660.18	2.946
FO Detention (IN)	100yr 18hr	100	8.014	11.80	16.17	(N/A)	(N/A)
FO Detention (OUT)	100yr 18hr	100	8.014	15.30	7.30	659.92	2.743
FO Detention (IN)	100yr 24hr	100	8.634	15.70	13.23	(N/A)	(N/A)
FO Detention (OUT)	100yr 24hr	100	8.634	19.10	6.87	659.26	2.264
FO Detention (IN)	100yr 48hr	100	9.615	41.00	7.32	(N/A)	(N/A)
FO Detention (OUT)	100yr 48hr	100	9.615	45.00	5.46	657.43	0.835
FO Detention (IN)	100yr 72hr	100	10.320	61.00	5.23	(N/A)	(N/A)
FO Detention (OUT)	100yr 72hr	100	10.319	59.00	4.86	656.62	0.178
FO Detention (IN)	100yr 120hr	100	11.324	102.00	3.42	(N/A)	(N/A)
FO Detention (OUT)	100yr 120hr	100	11.324	102.00	3.41	655.46	0.000
FO Detention (IN)	100yr 240hr	100	13.801	204.00	2.05	(N/A)	(N/A)
FO Detention (OUT)	100yr 240hr	100	13.801	204.00	2.05	654.94	0.000

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 10m

Return Event: 100 years
Storm Event: 10m100y

Time-Depth Curve: 10m100y	
Label	10m100y
Start Time	0.00 hours
Increment	0.00 hours
End Time	0.08 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.00 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.29	0.59	0.77	0.94
0.02	1.08	1.19	1.28	1.35	1.42
0.04	1.48	1.51	1.55	1.58	1.62
0.06	1.66	1.69	1.73	1.75	1.76
0.08	1.80	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 120hr

Return Event: 100 years
Storm Event: 120h100y

Time-Depth Curve: 120h100y	
Label	120h100y
Start Time	0.00 hours
Increment	6.00 hours
End Time	120.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 6.00 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.21	0.53	0.85	1.07
30.00	1.39	1.71	2.03	2.35	2.67
60.00	2.98	3.41	3.73	4.16	4.80
90.00	5.44	6.29	7.68	8.95	9.81
120.00	10.66	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 12hr

Return Event: 100 years
Storm Event: 12h100y

Time-Depth Curve: 12h100y	
Label	12h100y
Start Time	0.00 hours
Increment	0.60 hours
End Time	12.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.60 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.22	0.60	0.90	1.19
3.00	1.64	2.16	2.91	3.80	4.63
6.00	5.22	5.67	6.04	6.34	6.56
9.00	6.79	6.94	7.09	7.24	7.31
12.00	7.39	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 15m

Return Event: 100 years
Storm Event: 15m100y

Time-Depth Curve: 15m100y	
Label	15m100y
Start Time	0.00 hours
Increment	0.01 hours
End Time	0.25 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.01 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.37	0.77	1.00	1.21
0.06	1.39	1.53	1.65	1.74	1.83
0.13	1.90	1.95	2.00	2.04	2.09
0.19	2.13	2.18	2.23	2.25	2.27
0.25	2.30	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 18hr

Return Event: 100 years
Storm Event: 18h100y

Time-Depth Curve: 18h100y	
Label	18h100y
Start Time	0.00 hours
Increment	0.90 hours
End Time	18.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.90 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.24	0.48	0.73	0.97
4.50	1.21	1.53	1.85	2.18	2.58
9.00	3.06	3.63	4.59	5.64	6.37
13.50	6.85	7.17	7.42	7.66	7.82
18.00	7.98	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 1hr

Return Event: 100 years
Storm Event: 1h100y

Time-Depth Curve: 1h100y	
Label	1h100y
Start Time	0.00 hours
Increment	0.05 hours
End Time	1.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.05 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.64	1.33	1.73	2.10
0.25	2.42	2.66	2.86	3.02	3.18
0.50	3.30	3.39	3.47	3.55	3.63
0.75	3.71	3.79	3.87	3.91	3.95
1.00	3.99	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 240hr

Return Event: 100 years
Storm Event: 240h100y

Time-Depth Curve: 240h100y	
Label	240h100y
Start Time	0.00 hours
Increment	12.00 hours
End Time	240.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 12.00 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.25	0.63	1.01	1.27
60.00	1.64	2.02	2.40	2.78	3.16
120.00	3.54	4.05	4.43	4.93	5.69
180.00	6.45	7.46	9.11	10.63	11.64
240.00	12.65	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 24hr

Return Event: 100 years
Storm Event: 24h100y

Time-Depth Curve: 24h100y	
Label	24h100y
Start Time	0.00 hours
Increment	1.20 hours
End Time	24.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 1.20 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.26	0.51	0.77	1.03
6.00	1.29	1.63	1.97	2.31	2.74
12.00	3.26	3.86	4.88	6.00	6.77
18.00	7.28	7.63	7.88	8.14	8.31
24.00	8.48	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 10 Year Critical
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Time-Depth Curve: 24h10y	
Label	24h10y
Start Time	0.00 hours
Increment	1.20 hours
End Time	24.00 hours
Return Event	10 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 1.20 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.15	0.31	0.46	0.62
6.00	0.77	0.98	1.18	1.39	1.65
12.00	1.96	2.32	2.94	3.60	4.07
18.00	4.38	4.58	4.74	4.89	5.00
24.00	5.10	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 50 Year Critical
Scenario: 50yr 24hr

Return Event: 50 years
Storm Event: 24h50y

Time-Depth Curve: 24h50y	
Label	24h50y
Start Time	0.00 hours
Increment	1.20 hours
End Time	24.00 hours
Return Event	50 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 1.20 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.22	0.45	0.68	0.90
6.00	1.13	1.42	1.73	2.03	2.40
12.00	2.85	3.37	4.27	5.25	5.93
18.00	6.38	6.67	6.90	7.12	7.28
24.00	7.43	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 2hr

Return Event: 100 years
Storm Event: 2h100y

Time-Depth Curve: 2h100y	
Label	2h100y
Start Time	0.00 hours
Increment	0.10 hours
End Time	2.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.10 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.80	1.64	2.14	2.58
0.50	2.98	3.28	3.53	3.73	3.93
1.00	4.08	4.17	4.27	4.37	4.47
1.50	4.57	4.67	4.77	4.82	4.87
2.00	4.92	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 30m

Return Event: 100 years
Storm Event: 30m100y

Time-Depth Curve: 30m100y	
Label	30m100y
Start Time	0.00 hours
Increment	0.03 hours
End Time	0.50 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.03 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.51	1.05	1.36	1.65
0.13	1.90	2.09	2.25	2.38	2.50
0.25	2.60	2.66	2.73	2.79	2.85
0.38	2.92	2.98	3.04	3.07	3.11
0.50	3.14	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 3hr

Return Event: 100 years
Storm Event: 3h100y

Time-Depth Curve: 3h100y	
Label	3h100y
Start Time	0.00 hours
Increment	0.15 hours
End Time	3.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.15 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.88	1.81	2.36	2.85
0.75	3.29	3.62	3.90	4.12	4.34
1.50	4.50	4.61	4.72	4.83	4.94
2.25	5.05	5.16	5.27	5.33	5.38
3.00	5.44	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 48hr

Return Event: 100 years
Storm Event: 48h100y

Time-Depth Curve: 48h100y	
Label	48h100y
Start Time	0.00 hours
Increment	2.40 hours
End Time	48.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 2.40 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.19	0.46	0.74	0.93
12.00	1.21	1.48	1.76	2.04	2.32
24.00	2.60	2.97	3.25	3.62	4.18
36.00	4.73	5.48	6.68	7.80	8.54
48.00	9.28	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 5m

Return Event: 100 years
Storm Event: 5m100y

Time-Depth Curve: 5m100y	
Label	5m100y
Start Time	0.00 hours
Increment	0.00 hours
End Time	0.08 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.00 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.16	0.34	0.44	0.54
0.02	0.62	0.68	0.73	0.77	0.81
0.04	0.84	0.87	0.89	0.91	0.93
0.06	0.95	0.97	0.99	1.00	1.01
0.08	1.02	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 6hr

Return Event: 100 years
Storm Event: 6h100y

Time-Depth Curve: 6h100y	
Label	6h100y
Start Time	0.00 hours
Increment	0.30 hours
End Time	6.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.30 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	1.03	2.12	2.76	3.34
1.50	3.86	4.24	4.57	4.82	5.08
3.00	5.27	5.40	5.53	5.66	5.79
4.50	5.92	6.04	6.17	6.24	6.30
6.00	6.37	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 72hr

Return Event: 100 years
Storm Event: 72h100y

Time-Depth Curve: 72h100y	
Label	72h100y
Start Time	0.00 hours
Increment	3.60 hours
End Time	72.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 3.60 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.20	0.49	0.79	0.99
18.00	1.28	1.58	1.87	2.17	2.46
36.00	2.76	3.15	3.45	3.84	4.43
54.00	5.02	5.81	7.09	8.27	9.06
72.00	9.85	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time of Concentration Calculations
Label: Area D1
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.08 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.08 hours

Subsection: Time of Concentration Calculations
Label: Area D1
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.30 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.30 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	1.00 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	1.00 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.75 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.75 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.49 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.49 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.08 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.08 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	1.00 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	1.00 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.11 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.11 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.32 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.32 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Subsection: Runoff CN-Area
Label: Area D1
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area EX1
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area FO
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area FO-US
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area PD1
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area PD1-1
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area PR
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area S1
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area S2
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Elevation vs. Volume Curve
Label: D1 Depression
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Elevation-Volume

Pond Elevation (ft)	Pond Volume (ac-ft)
658.50	0.000
659.00	0.004
659.10	0.006
659.50	0.015
660.00	0.035

Subsection: Elevation vs. Volume Curve
Label: EX1 Depression
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Elevation-Volume

Pond Elevation (ft)	Pond Volume (ac-ft)
652.95	0.000
653.00	0.001
653.20	0.013
654.00	0.100

Subsection: Elevation vs. Volume Curve
Label: FO Detention
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Elevation-Volume

Pond Elevation (ft)	Pond Volume (ac-ft)
654.10	0.000
656.40	0.000
658.50	1.710
660.00	2.800
660.50	3.200

Subsection: Elevation vs. Volume Curve
Label: PD1 Pond
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Elevation-Volume

Pond Elevation (ft)	Pond Volume (ac-ft)
654.10	0.000
655.00	0.008
656.00	0.276
656.50	0.644

Subsection: Elevation vs. Volume Curve
Label: PD1-1 Depression
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Elevation-Volume

Pond Elevation (ft)	Pond Volume (ac-ft)
657.90	0.000
658.00	0.000
658.20	0.006
658.50	0.020

Subsection: Elevation vs. Volume Curve
Label: PR Detention
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Elevation-Volume

Pond Elevation (ft)	Pond Volume (ac-ft)
653.32	0.000
657.30	0.000
658.50	1.180

Subsection: Outlet Input Data
Label: OF D1
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Requested Pond Water Surface Elevations	
Minimum (Headwater)	658.50 ft
Increment (Headwater)	0.05 ft
Maximum (Headwater)	660.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Irregular Weir	Weir D1	Forward	TW	659.10	660.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Weir D1
Structure Type: Irregular Weir

Station (ft)	Elevation (ft)
0.00	0.90
5.80	0.00
19.30	0.90

Lowest Elevation	659.10 ft
Weir Coefficient	3.00 (ft^0.5)/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

Requested Pond Water Surface Elevations	
Minimum (Headwater)	652.95 ft
Increment (Headwater)	0.05 ft
Maximum (Headwater)	654.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Irregular Weir	Weir EX1	Forward	TW	653.20	654.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Weir EX1
Structure Type: Irregular Weir

Station (ft)	Elevation (ft)
0.00	0.80
42.50	0.00
60.20	0.80

Lowest Elevation	653.20 ft
Weir Coefficient	3.00 (ft^0.5)/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

Requested Pond Water Surface Elevations	
Minimum (Headwater)	657.90 ft
Increment (Headwater)	0.05 ft
Maximum (Headwater)	658.50 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Irregular Weir	Weir PD1-1	Forward	TW	658.20	658.50
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Weir PD1-1
Structure Type: Irregular Weir

Station (ft)	Elevation (ft)
0.00	0.30
45.86	0.00
70.86	0.30

Lowest Elevation	658.20 ft
Weir Coefficient	3.00 (ft^0.5)/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

Requested Pond Water Surface Elevations	
Minimum (Headwater)	653.32 ft
Increment (Headwater)	0.05 ft
Maximum (Headwater)	658.50 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice PR	Forward	TW	653.32	658.50
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Orifice PR
Structure Type: Orifice-Circular

Number of Openings	1
Elevation	653.32 ft
Orifice Diameter	15.00 in
Orifice Coefficient	0.820

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

Requested Pond Water Surface Elevations	
Minimum (Headwater)	654.10 ft
Increment (Headwater)	0.05 ft
Maximum (Headwater)	660.50 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice FO	Forward	TW	654.10	660.50
Rectangular Weir	Weir FO	Forward	TW	660.00	660.50
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Orifice FO Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	654.10 ft
Orifice Diameter	10.00 in
Orifice Coefficient	0.820

Structure ID: Weir FO Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	660.00 ft
Weir Length	20.00 ft
Weir Coefficient	3.00 (ft^0.5)/s

Requested Pond Water Surface Elevations	
Minimum (Headwater)	654.10 ft
Increment (Headwater)	0.05 ft
Maximum (Headwater)	656.50 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Culvert-Circular	Culvert PD1	Forward	TW	654.14	656.50
Irregular Weir	Weir PD1	Forward	TW	655.94	656.50
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Weir PD1
Structure Type: Irregular Weir

Station (ft)	Elevation (ft)
0.00	0.56
30.00	0.00
53.00	0.56

Lowest Elevation	655.94 ft
Weir Coefficient	3.00 (ft^0.5)/s

Structure ID: Culvert PD1 Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	8.00 in
Length	36.10 ft
Length (Computed Barrel)	36.10 ft
Slope (Computed)	0.011 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.200
Kb	0.054
Kr	0.200
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.089
T2 ratio (HW/D)	1.192
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	654.87 ft	T1 Flow	1.00 ft³/s

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T2 Elevation	654.93 ft	T2 Flow	1.14 ft³/s

Subsection: Outlet Input Data
Label: RF/OF PD1
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

Index

Appendix C – Proposed Conditions Drainage Analysis

Proposed Conditions Drainage Exhibit

MWRD Calculations Overview

Park District Storm Water Analysis

Curve Number & Adjusted Curve Number Calculations

Nomograph Calculations

Proposed Conditions PondPack Reports

Provided Detention & Volume Control Calculations

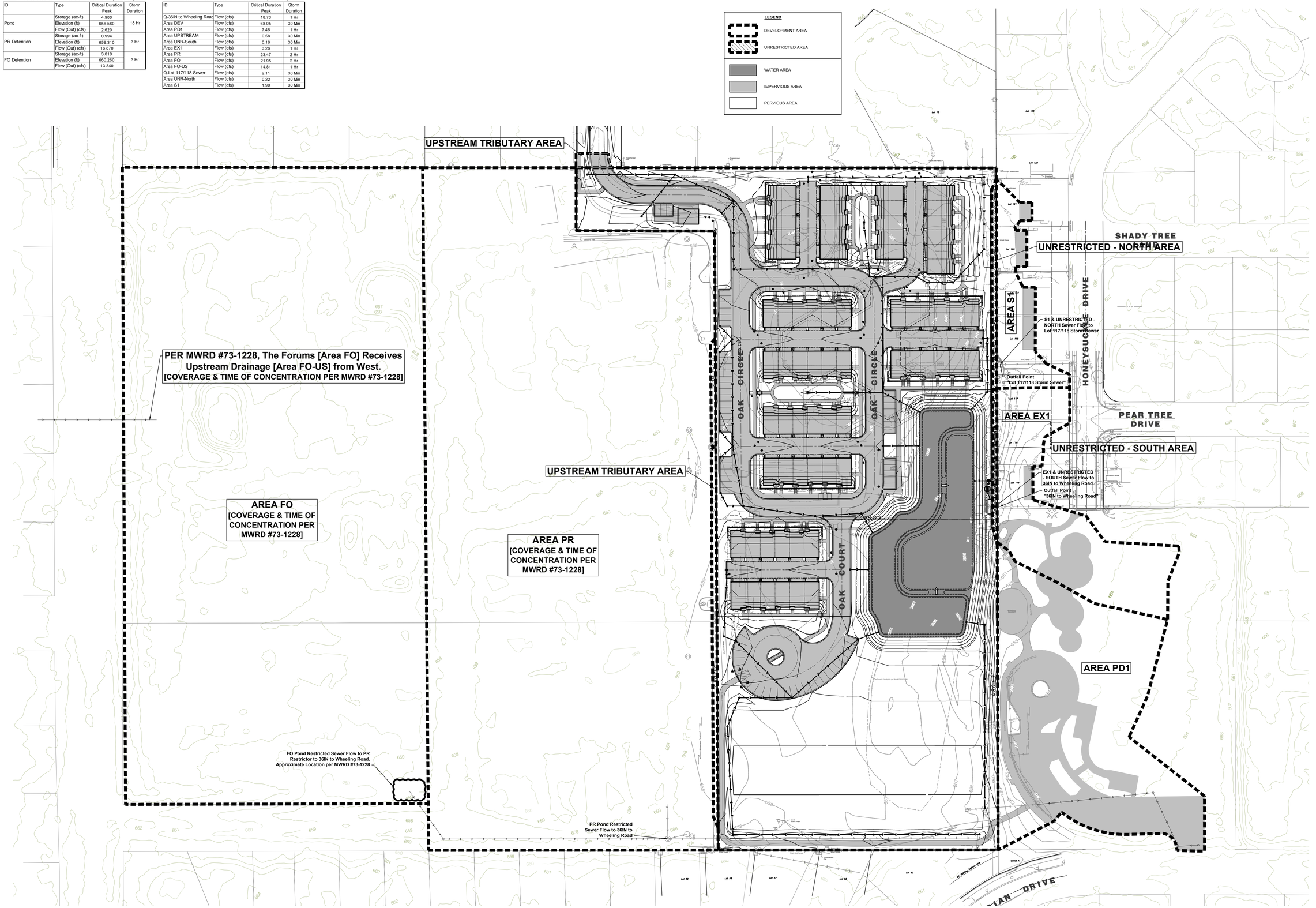
Orifice and Weir Discharge Rate Calculations

DEPRESSIONAL AREA / POND SUMMARY TABLE (100-YEAR)

ID	Type	Critical Duration Peak	Storm Duration
Pond	Storage (ac-ft)	4.900	18 Hr
	Elevation (ft)	656.580	
	Flow (Out) (cfs)	2.620	
PR Detention	Storage (ac-ft)	0.994	3 Hr
	Elevation (ft)	658.310	
	Flow (Out) (cfs)	16.870	
FO Detention	Storage (ac-ft)	3.010	3 Hr
	Elevation (ft)	660.260	
	Flow (Out) (cfs)	13.340	

DRAINAGE AREA FLOW SUMMARY TABLE (100-YEAR)

ID	Type	Critical Duration Peak	Storm Duration
Q-36IN to Wheeling Road	Flow (cfs)	18.73	1 Hr
Area DEV	Flow (cfs)	68.05	30 Min
Area PD1	Flow (cfs)	7.46	1 Hr
Area UPSTREAM	Flow (cfs)	0.58	30 Min
Area UNR-South	Flow (cfs)	0.16	30 Min
Area EX1	Flow (cfs)	3.26	1 Hr
Area PR	Flow (cfs)	23.47	2 Hr
Area FO	Flow (cfs)	21.95	2 Hr
Area FO-US	Flow (cfs)	14.81	1 Hr
Q-Lot 117/118 Sewer	Flow (cfs)	2.11	30 Min
Area UNR-North	Flow (cfs)	0.22	30 Min
Area S1	Flow (cfs)	1.90	30 Min



No.	Revision	Date
1	per Village Review & Comment	05/22/2020

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PROPOSED CONDITIONS DRAINAGE EXHIBIT

RESERVES AT MUIR PARK LEXINGTON HOMES

PROSPECT HEIGHTS, ILLINOIS

Project Manager:	T A S
Engineer:	P A C
Date:	03/16/2020
Project No.	18-219
Sheet	1/1

Plot Date: May 20, 2020 - 4:46pm Plotted By: Phil
File Name: P:\2018\18219\Drawings\Exhibits\18219_Drainage Exhibit.dwg

MWRD CALCULATION OVERVIEW

PROJECT: Reserves at Muir Park **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

DEFINITIONS & CONSTRAINTS

1.	Development Area	9.722	acres
2.	Watershed Planning Area	Village Requirement	
3.	Watershed Planning Area Release Rate	0.15	cfs/ac
4.	Gross Allowable Release Rate	1.458	cfs
5.	Unrestricted Release Rate (See Area Below)	0.070	cfs
6.	Net Allowable Release Rate	1.388	cfs

AREAS / CURVE NUMBERS

7.	Detained Area (See Calculations)	9.646	acres	91.17	CN
8.	Unrestricted Area (See Calculations)	0.077	acres	80.00	CN

VOLUME CONTROL

9.	Development Impervious Area	5.012	acres
10.	Required Volume Control Storage	0.418	ac-ft

DETENTION

11.	Methodology	Nomograph	
12.	Calculated Storage Volume	4.036	acres
13.	Additional Storage Volume (Wheeling Park)	0.483	acres
14.	Additional Storage Volume (Depressional Storage * 150%)	0.150	acres
15.	Total Required Storage Volume	4.669	acres

PARK DISTRICT STORM WATER ANALYSIS (PREVIOUS CALCULATIONS)

PROJECT: Reserves at Muir Park **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

DEFINITIONS & CONSTRAINTS

1. Development Area (Wheeling)	4.00	acres
2. Development Area (Prospect Heights)	4.15	acres
3. Unrestricted Area (Wheeling)	0.46	acres
4. Detained Area (Combined)	7.69	cfs
5. Detention Required (Combined)	1.05	ac-ft
6. Detention Required (Prospect Heights)*	0.567	ac-ft

*Prospect Heights parcel to be redeveloped, detention will be provided under new ordinance.

7. Detention Required (Wheeling)	**0.483**	ac-ft

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - Detained Development Area **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

X DETAINED AREA

___ UNRESTRICTED AREA

___ UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

X PROPOSED CONDITION

___ EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Water Surface	D	100	0.88	87.55
Impervious Surface	D	98	5.01	491.18
Pervious Surface	D	80	3.76	300.66
		TOTALS:	9.65	879.39

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{879.39}{9.65} \rightarrow \textbf{Composite CN} = \textbf{91.17}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - Unrestricted South **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA

X UNRESTRICTED AREA

___ UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

X PROPOSED CONDITION

___ EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Pervious Surface	D	80	0.03	2.55
TOTALS:			0.03	2.55

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{2.55}{0.03} \rightarrow \textbf{Composite CN} = \textbf{80.00}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - Unrestricted North **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA

X UNRESTRICTED AREA

___ UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

X PROPOSED CONDITION

___ EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Pervious Surface	D	80	0.04	3.57
TOTALS:			0.04	3.57

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{3.57}{0.04} \rightarrow \textbf{Composite CN} = \textbf{80.00}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - Upstream Area **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA

___ UNRESTRICTED AREA

X UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

X PROPOSED CONDITION

___ EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious Surface	D	98	0.02	1.53
Pervious Surface	D	80	0.11	9.12
TOTALS:			0.13	10.64

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{10.64}{0.13} \rightarrow \textbf{Composite CN} = \textbf{82.16}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - AREA PD1 **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

X DETAINED AREA

___ UNRESTRICTED AREA

X UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

X PROPOSED CONDITION

___ EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious Surface	D	98	1.01	98.56
Pervious Surface	D	80	0.97	77.41
TOTALS:			1.97	175.97

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{175.97}{1.97} \rightarrow \textbf{Composite CN} = \textbf{89.17}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - AREA EX1 **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA

___ UNRESTRICTED AREA

X UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

X PROPOSED CONDITION

___ EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious Surface	D	98	0.16	15.25
Pervious Surface	D	80	0.72	57.72
TOTALS:			0.88	72.97

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{72.97}{0.88} \rightarrow \textbf{Composite CN} = \textbf{83.19}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - AREA S1 **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA

___ UNRESTRICTED AREA

X UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

X PROPOSED CONDITION

___ EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious Surface	D	98	0.07	6.62
Pervious Surface	D	80	0.29	23.06
TOTALS:			0.36	29.68

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{29.68}{0.36} \rightarrow \textbf{Composite CN} = \textbf{83.42}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - AREA PR **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA

___ UNRESTRICTED AREA

X UPSTREAM AREA

___ MAJOR STORMWATER SYSTEM

___ OTHER:

CONDITION (SELECT WITH DROP-DOWN)

X PROPOSED CONDITION

___ EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious Surface	D	98	4.91	481.18
Pervious Surface	D	80	4.19	335.20
TOTALS:			9.10	816.38

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{816.38}{9.10} \rightarrow \textbf{Composite CN} = \textbf{89.71}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - AREA FO **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA ___ MAJOR STORMWATER SYSTEM

___ UNRESTRICTED AREA ___ OTHER:

X UPSTREAM AREA

CONDITION (SELECT WITH DROP-DOWN)

X PROPOSED CONDITION ___ EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Impervious Surface	D	98	3.89	381.22
Pervious Surface	D	80	5.48	438.40
TOTALS:			9.37	819.62

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{819.62}{9.37} \rightarrow \textbf{Composite CN} = \textbf{87.47}$$

COMPOSITE RUNOFF CURVE NUMBER (*CN*)

PROJECT: Reserves at Muir Park - AREA FO-US **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

TYPE OF AREA (SELECT WITH DROP-DOWN)

___ DETAINED AREA ___ MAJOR STORMWATER SYSTEM

___ UNRESTRICTED AREA ___ OTHER:

X UPSTREAM AREA

CONDITION (SELECT WITH DROP-DOWN)

X PROPOSED CONDITION ___ EXISTING CONDITION

RUNOFF CURVE NUMBER

Surface Description	Hydrologic Soil Group (HSG)	CN	Area (acres)	Product (CN)(Area)
Residential District 1/2 Acre Lots	D	85	5.80	493.00
TOTALS:			5.80	493.00

COMPOSITE RUNOFF CURVE NUMBER

$$\text{Composite CN} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{493.00}{5.80} \rightarrow \textbf{Composite CN} = \textbf{85.00}$$

ADJUSTED COMPOSITE RUNOFF CURVE NUMBER (CN_{ADJ})

PROJECT: Reserves at Muir Park - Detained Development Area **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

DEVELOPMENT INFORMTION

1.	Area Detained, *A*	9.646	acres
2.	Total Impervious Area	5.012	acres
3.	Composite CN	91.17	
4.	Volume Control Storage Provided, VC_P	0.538	ac-ft
5.	Depth of Rainfall, *P*	8.57	inches

RUNOFF VOLUME (NRCS EQUATIONS)

6.	Maximum Retention, *S*	$S = \frac{1000}{CN} - 10$	0.97	inches
7.	Runoff Depth, Q_D	$Q_D = \frac{(P - 0.2S)^2}{(P + 0.8S)}$	7.51	inches
8.	Runoff Volume, V_R	$V_R = Q_D A \left(\frac{1}{12\frac{in}{ft}}\right)$	6.04	ac-ft

VOLUME CONTROL STORAGE

9.	Volume Control Storage Required, VC_R	0.418	ac-ft
10.	Additional Volume Control Storage Provided	0.120	ac-ft

ADJUSTED RUNOFF VOLUME

11.	Adjusted Runoff Volume, V_{ADJ}	$V_{ADJ} = V_R - VC_P$	5.497	ac-ft
12.	Adjusted Runoff Depth, Q_{ADJ}		6.84	inches
13.	Adjusted Maximum Retention, S_{ADJ}		1.68	inches

ADJUSTED COMPOSITE RUNOFF CURVE NUMBER

14.	Adjusted Runoff Curve Number, CN_{ADJ}	85.62	

NOMOGRAPH: BULLETIN 70 RAINFALL DATA (2019)

PROJECT: Reserves at Muir Park **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** **5/22/2020**

DEVELOPMENT INFORMATION

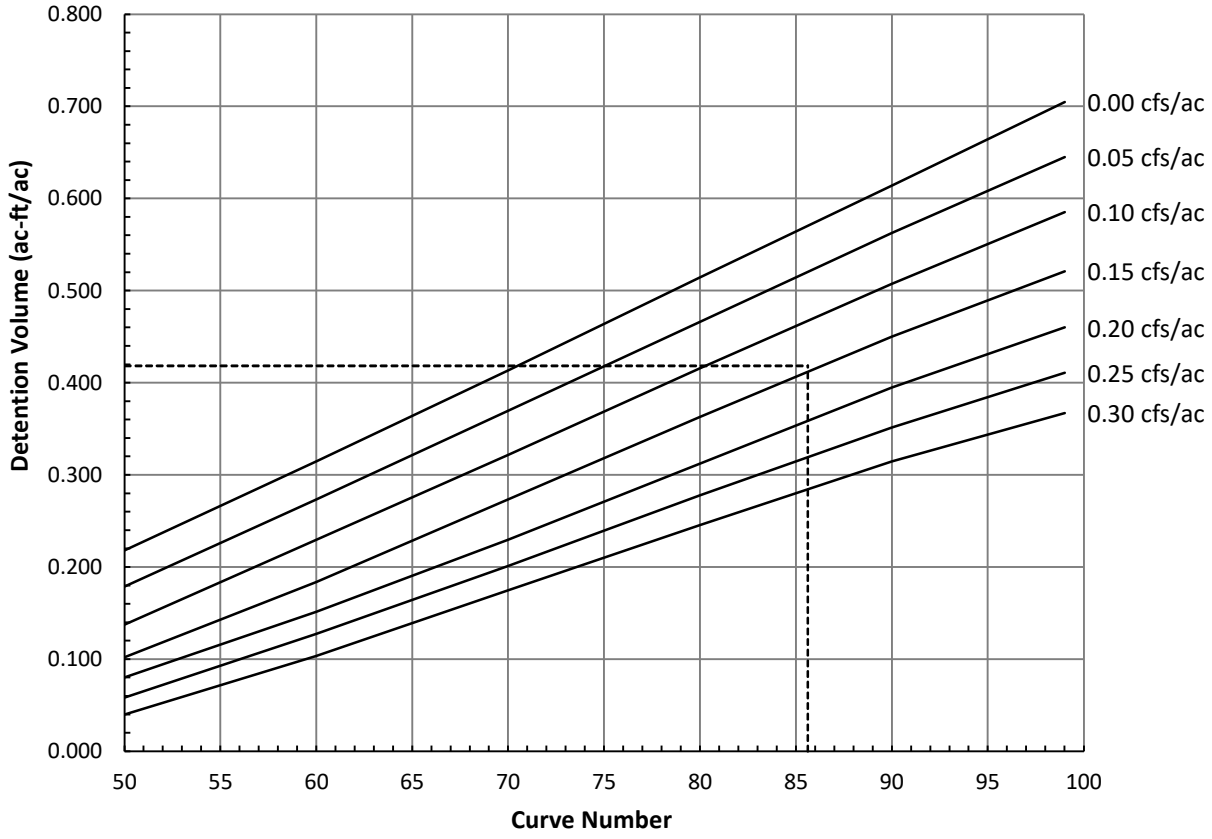
1.	Detained Area	9.646	acres
2.	Curve Number	85.62	
3.	Actual Release Rate	1.388	cfs

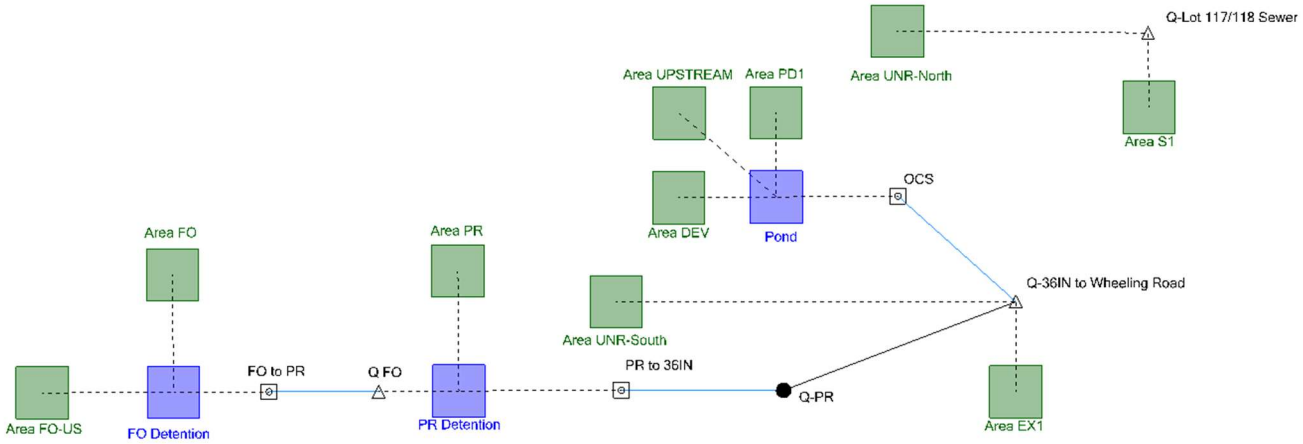
REQUIRED DETENTION VOLUME

4.	Required Detention Volume	4.036	ac-ft

NOMOGRAPH

NOMOGRAPH: BULLETIN 70 (2019)





Proposed Conditions PondPack Reports

Project Summary	
Title	Prospect Pointe - Proposed Conditions
Engineer	PAC
Company	Haeger Engineering LLC
Date	5/22/2020

Notes	Proposed Conditions 24 Hour, 10-, 50- & 100-Year Critical Duration Analysis

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Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Area UNR-South	10yr 24hr	10	0.008	15.60	0.01
Area UNR-South	50yr 24hr	50	0.014	15.60	0.02
Area UNR-South	100yr 240hr	100	0.027	204.00	0.00
Area UNR-South	100yr 5m	100	0.000	0.10	0.03
Area UNR-South	100yr 10m	100	0.001	0.10	0.15
Area UNR-South	100yr 15m	100	0.002	0.15	0.13
Area UNR-South	100yr 30m	100	0.004	0.15	0.16
Area UNR-South	100yr 1hr	100	0.005	0.25	0.14
Area UNR-South	100yr 2hr	100	0.008	0.25	0.11
Area UNR-South	100yr 3hr	100	0.009	0.30	0.09
Area UNR-South	100yr 6hr	100	0.011	0.60	0.07
Area UNR-South	100yr 12hr	100	0.013	4.80	0.04
Area UNR-South	100yr 18hr	100	0.015	11.70	0.03
Area UNR-South	100yr 24hr	100	0.016	15.60	0.03
Area UNR-South	100yr 48hr	100	0.018	40.50	0.01
Area UNR-South	100yr 72hr	100	0.020	61.00	0.01
Area UNR-South	100yr 120hr	100	0.022	102.00	0.01
Area UNR-North	10yr 24hr	10	0.011	15.60	0.02
Area UNR-North	50yr 24hr	50	0.019	15.60	0.03
Area UNR-North	100yr 240hr	100	0.038	204.00	0.01
Area UNR-North	100yr 5m	100	0.000	0.10	0.04
Area UNR-North	100yr 10m	100	0.002	0.10	0.21
Area UNR-North	100yr 15m	100	0.003	0.15	0.18
Area UNR-North	100yr 30m	100	0.005	0.15	0.22
Area UNR-North	100yr 1hr	100	0.008	0.25	0.19
Area UNR-North	100yr 2hr	100	0.011	0.25	0.15
Area UNR-North	100yr 3hr	100	0.012	0.30	0.13
Area UNR-North	100yr 6hr	100	0.015	0.60	0.10
Area UNR-North	100yr 12hr	100	0.019	4.80	0.05
Area UNR-North	100yr 18hr	100	0.021	11.70	0.05
Area UNR-North	100yr 24hr	100	0.023	15.60	0.04
Area UNR-North	100yr 48hr	100	0.026	40.50	0.02
Area UNR-North	100yr 72hr	100	0.028	61.00	0.01
Area UNR-North	100yr 120hr	100	0.031	102.00	0.01
Area PD1	10yr 24hr	10	0.636	15.60	1.02
Area PD1	50yr 24hr	50	1.007	15.60	1.54
Area PD1	100yr 240hr	100	1.855	204.00	0.27
Area PD1	100yr 5m	100	0.048	0.35	1.29
Area PD1	100yr 10m	100	0.142	0.35	3.84
Area PD1	100yr 15m	100	0.210	0.40	5.38
Area PD1	100yr 30m	100	0.333	0.45	7.12
Area PD1	100yr 1hr	100	0.463	0.55	7.46
Area PD1	100yr 2hr	100	0.608	0.65	6.73
Area PD1	100yr 3hr	100	0.689	0.70	5.78
Area PD1	100yr 6hr	100	0.837	0.85	4.41

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Area PD1	100yr 12hr	100	1.001	5.00	2.68
Area PD1	100yr 18hr	100	1.097	11.70	2.22
Area PD1	100yr 24hr	100	1.178	15.60	1.78
Area PD1	100yr 48hr	100	1.306	40.50	0.97
Area PD1	100yr 72hr	100	1.400	61.00	0.69
Area PD1	100yr 120hr	100	1.531	102.00	0.45
Area FO	10yr 24hr	10	2.858	15.70	4.59
Area FO	50yr 24hr	50	4.600	15.70	7.07
Area FO	100yr 240hr	100	8.603	204.00	1.27
Area FO	100yr 5m	100	0.179	0.65	2.41
Area FO	100yr 10m	100	0.587	0.65	7.92
Area FO	100yr 15m	100	0.892	0.70	11.83
Area FO	100yr 30m	100	1.453	0.80	18.40
Area FO	100yr 1hr	100	2.051	0.95	21.69
Area FO	100yr 2hr	100	2.727	1.05	21.95
Area FO	100yr 3hr	100	3.107	1.20	20.35
Area FO	100yr 6hr	100	3.801	1.45	15.85
Area FO	100yr 12hr	100	4.570	5.50	11.80
Area FO	100yr 18hr	100	5.021	11.90	9.97
Area FO	100yr 24hr	100	5.405	15.70	8.19
Area FO	100yr 48hr	100	6.012	41.00	4.54
Area FO	100yr 72hr	100	6.449	61.00	3.24
Area FO	100yr 120hr	100	7.071	102.00	2.12
Area PR	10yr 24hr	10	3.012	15.70	4.67
Area PR	50yr 24hr	50	4.732	15.70	7.05
Area PR	100yr 240hr	100	8.651	204.00	1.24
Area PR	100yr 5m	100	0.248	0.65	3.34
Area PR	100yr 10m	100	0.702	0.65	9.47
Area PR	100yr 15m	100	1.024	0.70	13.58
Area PR	100yr 30m	100	1.601	0.80	20.29
Area PR	100yr 1hr	100	2.206	0.95	23.37
Area PR	100yr 2hr	100	2.881	1.05	23.47
Area PR	100yr 3hr	100	3.259	1.20	21.61
Area PR	100yr 6hr	100	3.945	1.35	16.89
Area PR	100yr 12hr	100	4.703	5.40	11.92
Area PR	100yr 18hr	100	5.146	11.90	9.92
Area PR	100yr 24hr	100	5.523	15.70	8.13
Area PR	100yr 48hr	100	6.118	41.00	4.48
Area PR	100yr 72hr	100	6.545	61.00	3.19
Area PR	100yr 120hr	100	7.154	102.00	2.08
Area FO-US	10yr 24hr	10	1.672	15.70	2.79
Area FO-US	50yr 24hr	50	2.736	15.60	4.34
Area FO-US	100yr 240hr	100	5.198	204.00	0.78
Area FO-US	100yr 5m	100	0.086	0.50	1.56
Area FO-US	100yr 10m	100	0.315	0.50	5.72

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Area FO-US	100yr 15m	100	0.492	0.60	8.51
Area FO-US	100yr 30m	100	0.824	0.70	13.04
Area FO-US	100yr 1hr	100	1.183	0.70	14.81
Area FO-US	100yr 2hr	100	1.592	0.90	14.61
Area FO-US	100yr 3hr	100	1.823	1.00	13.15
Area FO-US	100yr 6hr	100	2.247	1.20	9.82
Area FO-US	100yr 12hr	100	2.717	5.30	7.24
Area FO-US	100yr 18hr	100	2.993	11.80	6.21
Area FO-US	100yr 24hr	100	3.229	15.60	5.05
Area FO-US	100yr 48hr	100	3.602	40.50	2.78
Area FO-US	100yr 72hr	100	3.871	61.00	1.98
Area FO-US	100yr 120hr	100	4.253	102.00	1.30
Area EX1	10yr 24hr	10	0.239	15.60	0.41
Area EX1	50yr 24hr	50	0.397	15.60	0.65
Area EX1	100yr 240hr	100	0.767	204.00	0.12
Area EX1	100yr 5m	100	0.010	0.20	0.44
Area EX1	100yr 10m	100	0.041	0.20	1.82
Area EX1	100yr 15m	100	0.066	0.30	2.45
Area EX1	100yr 30m	100	0.114	0.35	3.18
Area EX1	100yr 1hr	100	0.167	0.40	3.26
Area EX1	100yr 2hr	100	0.227	0.55	2.75
Area EX1	100yr 3hr	100	0.261	0.55	2.26
Area EX1	100yr 6hr	100	0.324	0.70	1.75
Area EX1	100yr 12hr	100	0.395	4.90	1.11
Area EX1	100yr 18hr	100	0.436	11.70	0.94
Area EX1	100yr 24hr	100	0.471	15.60	0.76
Area EX1	100yr 48hr	100	0.527	40.50	0.42
Area EX1	100yr 72hr	100	0.568	61.00	0.30
Area EX1	100yr 120hr	100	0.625	102.00	0.19
Area S1	10yr 24hr	10	0.097	15.60	0.17
Area S1	50yr 24hr	50	0.161	15.60	0.27
Area S1	100yr 240hr	100	0.311	204.00	0.05
Area S1	100yr 5m	100	0.004	0.10	0.43
Area S1	100yr 10m	100	0.017	0.10	1.76
Area S1	100yr 15m	100	0.027	0.15	1.71
Area S1	100yr 30m	100	0.046	0.20	1.90
Area S1	100yr 1hr	100	0.068	0.25	1.68
Area S1	100yr 2hr	100	0.092	0.25	1.33
Area S1	100yr 3hr	100	0.106	0.35	1.16
Area S1	100yr 6hr	100	0.131	0.60	0.84
Area S1	100yr 12hr	100	0.160	4.80	0.46
Area S1	100yr 18hr	100	0.177	11.70	0.38
Area S1	100yr 24hr	100	0.191	15.60	0.31
Area S1	100yr 48hr	100	0.215	40.50	0.17
Area S1	100yr 72hr	100	0.230	61.00	0.12

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Area S1	100yr 120hr	100	0.254	102.00	0.08
Area DEV	10yr 24hr	10	3.279	15.60	5.14
Area DEV	50yr 24hr	50	5.112	15.50	7.68
Area DEV	100yr 240hr	100	9.280	204.00	1.32
Area DEV	100yr 5m	100	0.292	0.15	21.36
Area DEV	100yr 10m	100	0.792	0.15	57.04
Area DEV	100yr 15m	100	1.146	0.15	58.21
Area DEV	100yr 30m	100	1.770	0.20	68.05
Area DEV	100yr 1hr	100	2.419	0.25	59.93
Area DEV	100yr 2hr	100	3.142	0.30	48.38
Area DEV	100yr 3hr	100	3.543	0.35	41.98
Area DEV	100yr 6hr	100	4.275	0.60	29.13
Area DEV	100yr 12hr	100	5.081	4.80	13.78
Area DEV	100yr 18hr	100	5.552	11.70	11.04
Area DEV	100yr 24hr	100	5.953	15.50	8.83
Area DEV	100yr 48hr	100	6.594	40.50	4.80
Area DEV	100yr 72hr	100	7.045	61.00	3.40
Area DEV	100yr 120hr	100	7.692	102.00	2.22
Area UPSTREAM	10yr 24hr	10	0.034	15.60	0.06
Area UPSTREAM	50yr 24hr	50	0.058	15.60	0.10
Area UPSTREAM	100yr 240hr	100	0.112	204.00	0.02
Area UPSTREAM	100yr 5m	100	0.001	0.15	0.10
Area UPSTREAM	100yr 10m	100	0.006	0.15	0.42
Area UPSTREAM	100yr 15m	100	0.009	0.20	0.48
Area UPSTREAM	100yr 30m	100	0.016	0.25	0.58
Area UPSTREAM	100yr 1hr	100	0.024	0.30	0.55
Area UPSTREAM	100yr 2hr	100	0.033	0.40	0.42
Area UPSTREAM	100yr 3hr	100	0.038	0.40	0.36
Area UPSTREAM	100yr 6hr	100	0.047	0.65	0.28
Area UPSTREAM	100yr 12hr	100	0.057	4.80	0.16
Area UPSTREAM	100yr 18hr	100	0.063	11.70	0.14
Area UPSTREAM	100yr 24hr	100	0.068	15.60	0.11
Area UPSTREAM	100yr 48hr	100	0.077	40.50	0.06
Area UPSTREAM	100yr 72hr	100	0.083	61.00	0.04
Area UPSTREAM	100yr 120hr	100	0.091	102.00	0.03

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Q-36IN to Wheeling Road	10yr 24hr	10	11.739	15.70	10.71
Q-36IN to Wheeling Road	50yr 24hr	50	18.656	15.70	13.63

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Q-36IN to Wheeling Road	100yr 240hr	100	34.493	204.00	4.43
Q-36IN to Wheeling Road	100yr 5m	100	0.864	0.65	8.06
Q-36IN to Wheeling Road	100yr 10m	100	2.587	0.70	13.22
Q-36IN to Wheeling Road	100yr 15m	100	3.843	0.85	15.60
Q-36IN to Wheeling Road	100yr 30m	100	6.115	0.55	17.95
Q-36IN to Wheeling Road	100yr 1hr	100	8.519	0.55	18.73
Q-36IN to Wheeling Road	100yr 2hr	100	11.220	0.65	18.62
Q-36IN to Wheeling Road	100yr 3hr	100	12.728	2.65	18.66
Q-36IN to Wheeling Road	100yr 6hr	100	15.287	3.60	18.07
Q-36IN to Wheeling Road	100yr 12hr	100	18.542	5.40	17.19
Q-36IN to Wheeling Road	100yr 18hr	100	20.322	11.90	16.49
Q-36IN to Wheeling Road	100yr 24hr	100	21.845	15.70	15.00
Q-36IN to Wheeling Road	100yr 48hr	100	24.256	43.00	11.01
Q-36IN to Wheeling Road	100yr 72hr	100	25.981	61.50	9.30
Q-36IN to Wheeling Road	100yr 120hr	100	28.439	102.00	6.81
Q-Lot 117/118 Sewer	10yr 24hr	10	0.108	15.60	0.19
Q-Lot 117/118 Sewer	50yr 24hr	50	0.180	15.60	0.30
Q-Lot 117/118 Sewer	100yr 240hr	100	0.349	204.00	0.05
Q-Lot 117/118 Sewer	100yr 5m	100	0.004	0.10	0.48
Q-Lot 117/118 Sewer	100yr 10m	100	0.018	0.10	1.96
Q-Lot 117/118 Sewer	100yr 15m	100	0.030	0.15	1.89
Q-Lot 117/118 Sewer	100yr 30m	100	0.051	0.20	2.11
Q-Lot 117/118 Sewer	100yr 1hr	100	0.075	0.25	1.87
Q-Lot 117/118 Sewer	100yr 2hr	100	0.103	0.25	1.48
Q-Lot 117/118 Sewer	100yr 3hr	100	0.118	0.35	1.29
Q-Lot 117/118 Sewer	100yr 6hr	100	0.147	0.60	0.94
Q-Lot 117/118 Sewer	100yr 12hr	100	0.179	4.80	0.51
Q-Lot 117/118 Sewer	100yr 18hr	100	0.198	11.70	0.43
Q-Lot 117/118 Sewer	100yr 24hr	100	0.214	15.60	0.35
Q-Lot 117/118 Sewer	100yr 48hr	100	0.241	40.50	0.19
Q-Lot 117/118 Sewer	100yr 72hr	100	0.258	61.00	0.14
Q-Lot 117/118 Sewer	100yr 120hr	100	0.284	102.00	0.09

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
Q-PR	10yr 24hr	10	7.543	15.80	9.18
Q-PR	50yr 24hr	50	12.068	15.90	11.75
Q-PR	100yr 240hr	100	22.452	204.00	3.29
Q-PR	100yr 5m	100	0.513	0.65	7.08
Q-PR	100yr 10m	100	1.605	0.70	12.12
Q-PR	100yr 15m	100	2.409	0.85	14.45
Q-PR	100yr 30m	100	3.878	1.20	15.28
Q-PR	100yr 1hr	100	5.441	1.55	15.92
Q-PR	100yr 2hr	100	7.203	2.50	16.72
Q-PR	100yr 3hr	100	8.189	3.05	16.87
Q-PR	100yr 6hr	100	9.993	3.60	16.34
Q-PR	100yr 12hr	100	11.995	7.70	15.28
Q-PR	100yr 18hr	100	13.159	12.00	14.38
Q-PR	100yr 24hr	100	14.158	15.90	12.97
Q-PR	100yr 48hr	100	15.734	43.50	9.31
Q-PR	100yr 72hr	100	16.865	59.50	7.83
Q-PR	100yr 120hr	100	18.478	102.00	5.49

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
PR Detention (IN)	10yr 24hr	10	7.542	15.80	9.19	(N/A)	(N/A)
PR Detention (OUT)	10yr 24hr	10	7.541	15.80	9.18	655.24	0.000
PR Detention (IN)	50yr 24hr	50	12.068	15.80	11.76	(N/A)	(N/A)
PR Detention (OUT)	50yr 24hr	50	12.068	15.90	11.75	656.07	0.000
PR Detention (IN)	100yr 240hr	100	22.452	204.00	3.29	(N/A)	(N/A)
PR Detention (OUT)	100yr 240hr	100	22.452	204.00	3.29	654.35	0.000
PR Detention (IN)	100yr 5m	100	0.512	0.65	7.11	(N/A)	(N/A)
PR Detention (OUT)	100yr 5m	100	0.512	0.65	7.08	654.71	0.000
PR Detention (IN)	100yr 10m	100	1.605	0.65	12.14	(N/A)	(N/A)
PR Detention (OUT)	100yr 10m	100	1.605	0.70	12.12	656.20	0.000
PR Detention (IN)	100yr 15m	100	2.409	0.80	15.14	(N/A)	(N/A)

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
PR Detention (OUT)	100yr 15m	100	2.409	0.85	14.45	657.15	0.000
PR Detention (IN)	100yr 30m	100	3.878	0.80	21.92	(N/A)	(N/A)
PR Detention (OUT)	100yr 30m	100	3.878	1.20	15.28	657.53	0.226
PR Detention (IN)	100yr 1hr	100	5.441	0.95	26.08	(N/A)	(N/A)
PR Detention (OUT)	100yr 1hr	100	5.441	1.55	15.92	657.83	0.525
PR Detention (IN)	100yr 2hr	100	7.200	1.10	26.32	(N/A)	(N/A)
PR Detention (OUT)	100yr 2hr	100	7.200	2.50	16.72	658.23	0.919
PR Detention (IN)	100yr 3hr	100	8.188	1.20	24.61	(N/A)	(N/A)
PR Detention (OUT)	100yr 3hr	100	8.188	3.05	16.87	658.31	0.994
PR Detention (IN)	100yr 6hr	100	9.993	2.90	21.60	(N/A)	(N/A)
PR Detention (OUT)	100yr 6hr	100	9.993	3.60	16.34	658.04	0.731
PR Detention (IN)	100yr 12hr	100	11.990	7.00	17.52	(N/A)	(N/A)
PR Detention (OUT)	100yr 12hr	100	11.990	7.70	15.28	657.53	0.224
PR Detention (IN)	100yr 18hr	100	13.159	12.00	14.41	(N/A)	(N/A)
PR Detention (OUT)	100yr 18hr	100	13.159	12.00	14.38	657.12	0.000
PR Detention (IN)	100yr 24hr	100	14.157	15.80	12.97	(N/A)	(N/A)
PR Detention (OUT)	100yr 24hr	100	14.157	15.90	12.97	656.52	0.000
PR Detention (IN)	100yr 48hr	100	15.733	43.00	9.33	(N/A)	(N/A)
PR Detention (OUT)	100yr 48hr	100	15.733	43.50	9.31	655.27	0.000
PR Detention (IN)	100yr 72hr	100	16.865	59.00	7.92	(N/A)	(N/A)
PR Detention (OUT)	100yr 72hr	100	16.865	59.50	7.83	654.89	0.000
PR Detention (IN)	100yr 120hr	100	18.478	102.00	5.50	(N/A)	(N/A)
PR Detention (OUT)	100yr 120hr	100	18.478	102.00	5.49	654.55	0.000

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
FO Detention (IN)	10yr 24hr	10	4.530	15.70	7.38	(N/A)	(N/A)
FO Detention (OUT)	10yr 24hr	10	4.530	18.00	5.18	657.00	0.493
FO Detention (IN)	50yr 24hr	50	7.335	15.70	11.41	(N/A)	(N/A)
FO Detention (OUT)	50yr 24hr	50	7.335	19.10	6.30	658.40	1.632
FO Detention (IN)	100yr 240hr	100	13.801	204.00	2.05	(N/A)	(N/A)
FO Detention (OUT)	100yr 240hr	100	13.801	204.00	2.05	654.94	0.000
FO Detention (IN)	100yr 5m	100	0.265	0.60	3.80	(N/A)	(N/A)
FO Detention (OUT)	100yr 5m	100	0.265	0.60	3.79	655.80	0.000
FO Detention (IN)	100yr 10m	100	0.903	0.60	13.03	(N/A)	(N/A)
FO Detention (OUT)	100yr 10m	100	0.903	1.80	5.31	656.96	0.452
FO Detention (IN)	100yr 15m	100	1.385	0.65	19.78	(N/A)	(N/A)
FO Detention (OUT)	100yr 15m	100	1.385	2.00	5.84	657.55	0.933
FO Detention (IN)	100yr 30m	100	2.277	0.70	30.60	(N/A)	(N/A)
FO Detention (OUT)	100yr 30m	100	2.277	1.85	6.90	658.61	1.790
FO Detention (IN)	100yr 1hr	100	3.235	0.80	35.58	(N/A)	(N/A)
FO Detention (OUT)	100yr 1hr	100	3.235	2.70	7.83	659.68	2.566
FO Detention (IN)	100yr 2hr	100	4.319	1.00	35.77	(N/A)	(N/A)
FO Detention (OUT)	100yr 2hr	100	4.319	2.20	13.14	660.26	3.007
FO Detention (IN)	100yr 3hr	100	4.930	1.10	32.98	(N/A)	(N/A)
FO Detention (OUT)	100yr 3hr	100	4.930	2.40	13.34	660.26	3.010
FO Detention (IN)	100yr 6hr	100	6.048	1.40	25.46	(N/A)	(N/A)
FO Detention (OUT)	100yr 6hr	100	6.048	3.05	12.89	660.25	2.998
FO Detention (IN)	100yr 12hr	100	7.287	5.40	19.01	(N/A)	(N/A)

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
FO Detention (OUT)	100yr 12hr	100	7.287	7.20	10.56	660.18	2.945
FO Detention (IN)	100yr 18hr	100	8.014	11.80	16.17	(N/A)	(N/A)
FO Detention (OUT)	100yr 18hr	100	8.014	15.30	7.29	659.91	2.731
FO Detention (IN)	100yr 24hr	100	8.634	15.70	13.23	(N/A)	(N/A)
FO Detention (OUT)	100yr 24hr	100	8.634	19.10	6.87	659.25	2.254
FO Detention (IN)	100yr 48hr	100	9.615	41.00	7.32	(N/A)	(N/A)
FO Detention (OUT)	100yr 48hr	100	9.615	45.00	5.47	657.42	0.830
FO Detention (IN)	100yr 72hr	100	10.320	61.00	5.23	(N/A)	(N/A)
FO Detention (OUT)	100yr 72hr	100	10.319	59.00	4.85	656.61	0.174
FO Detention (IN)	100yr 120hr	100	11.324	102.00	3.42	(N/A)	(N/A)
FO Detention (OUT)	100yr 120hr	100	11.324	102.00	3.41	655.46	0.000
Pond (IN)	10yr 24hr	10	3.949	15.60	6.22	(N/A)	(N/A)
Pond (OUT)	10yr 24hr	10	3.949	21.80	1.20	654.25	2.196
Pond (IN)	50yr 24hr	50	6.177	15.60	9.32	(N/A)	(N/A)
Pond (OUT)	50yr 24hr	50	6.177	24.00	1.38	655.91	4.085
Pond (IN)	100yr 240hr	100	11.247	204.00	1.61	(N/A)	(N/A)
Pond (OUT)	100yr 240hr	100	11.247	216.50	1.08	653.21	1.129
Pond (IN)	100yr 5m	100	0.342	0.15	21.98	(N/A)	(N/A)
Pond (OUT)	100yr 5m	100	0.342	0.50	0.96	652.31	0.290
Pond (IN)	100yr 10m	100	0.940	0.15	59.01	(N/A)	(N/A)
Pond (OUT)	100yr 10m	100	0.940	0.70	1.04	652.94	0.868
Pond (IN)	100yr 15m	100	1.365	0.20	61.04	(N/A)	(N/A)
Pond (OUT)	100yr 15m	100	1.365	0.80	1.10	653.36	1.280
Pond (IN)	100yr 30m	100	2.119	0.20	70.98	(N/A)	(N/A)
Pond (OUT)	100yr 30m	100	2.119	1.00	1.18	654.08	2.011
Pond (IN)	100yr 1hr	100	2.906	0.25	63.21	(N/A)	(N/A)
Pond (OUT)	100yr 1hr	100	2.906	1.35	1.26	654.77	2.759
Pond (IN)	100yr 2hr	100	3.782	0.30	51.28	(N/A)	(N/A)
Pond (OUT)	100yr 2hr	100	3.782	2.25	1.33	655.45	3.546
Pond (IN)	100yr 3hr	100	4.269	0.35	44.65	(N/A)	(N/A)
Pond (OUT)	100yr 3hr	100	4.269	3.20	1.36	655.78	3.932
Pond (IN)	100yr 6hr	100	5.159	0.65	32.84	(N/A)	(N/A)
Pond (OUT)	100yr 6hr	100	4.959	6.10	1.41	656.25	4.503

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Pond (IN)	100yr 12hr	100	6.139	4.80	16.58	(N/A)	(N/A)
Pond (OUT)	100yr 12hr	100	6.139	10.90	2.47	656.57	4.892
Pond (IN)	100yr 18hr	100	6.712	11.70	13.39	(N/A)	(N/A)
Pond (OUT)	100yr 18hr	100	6.712	16.30	2.62	656.58	4.900
Pond (IN)	100yr 24hr	100	7.200	15.50	10.72	(N/A)	(N/A)
Pond (OUT)	100yr 24hr	100	7.200	21.70	2.32	656.56	4.884
Pond (IN)	100yr 48hr	100	7.977	40.50	5.83	(N/A)	(N/A)
Pond (OUT)	100yr 48hr	100	7.977	48.50	1.40	656.09	4.306
Pond (IN)	100yr 72hr	100	8.528	61.00	4.14	(N/A)	(N/A)
Pond (OUT)	100yr 72hr	100	8.528	72.50	1.33	655.44	3.534
Pond (IN)	100yr 120hr	100	9.314	102.00	2.70	(N/A)	(N/A)
Pond (OUT)	100yr 120hr	100	9.314	120.00	1.24	654.56	2.530

Time-Depth Curve: 10m100y	
Label	10m100y
Start Time	0.00 hours
Increment	0.00 hours
End Time	0.08 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.00 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.29	0.59	0.77	0.94
0.02	1.08	1.19	1.28	1.35	1.42
0.04	1.48	1.51	1.55	1.58	1.62
0.06	1.66	1.69	1.73	1.75	1.76
0.08	1.80	(N/A)	(N/A)	(N/A)	(N/A)

Time-Depth Curve: 120h100y	
Label	120h100y
Start Time	0.00 hours
Increment	6.00 hours
End Time	120.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 6.00 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.21	0.53	0.85	1.07
30.00	1.39	1.71	2.03	2.35	2.67
60.00	2.98	3.41	3.73	4.16	4.80
90.00	5.44	6.29	7.68	8.95	9.81
120.00	10.66	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 12hr

Return Event: 100 years
Storm Event: 12h100y

Time-Depth Curve: 12h100y	
Label	12h100y
Start Time	0.00 hours
Increment	0.60 hours
End Time	12.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.60 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.22	0.60	0.90	1.19
3.00	1.64	2.16	2.91	3.80	4.63
6.00	5.22	5.67	6.04	6.34	6.56
9.00	6.79	6.94	7.09	7.24	7.31
12.00	7.39	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 15m

Return Event: 100 years
Storm Event: 15m100y

Time-Depth Curve: 15m100y	
Label	15m100y
Start Time	0.00 hours
Increment	0.01 hours
End Time	0.25 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.01 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.37	0.77	1.00	1.21
0.06	1.39	1.53	1.65	1.74	1.83
0.13	1.90	1.95	2.00	2.04	2.09
0.19	2.13	2.18	2.23	2.25	2.27
0.25	2.30	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 18hr

Return Event: 100 years
Storm Event: 18h100y

Time-Depth Curve: 18h100y	
Label	18h100y
Start Time	0.00 hours
Increment	0.90 hours
End Time	18.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.90 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.24	0.48	0.73	0.97
4.50	1.21	1.53	1.85	2.18	2.58
9.00	3.06	3.63	4.59	5.64	6.37
13.50	6.85	7.17	7.42	7.66	7.82
18.00	7.98	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 1hr

Return Event: 100 years
Storm Event: 1h100y

Time-Depth Curve: 1h100y	
Label	1h100y
Start Time	0.00 hours
Increment	0.05 hours
End Time	1.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.05 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.64	1.33	1.73	2.10
0.25	2.42	2.66	2.86	3.02	3.18
0.50	3.30	3.39	3.47	3.55	3.63
0.75	3.71	3.79	3.87	3.91	3.95
1.00	3.99	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 240hr

Return Event: 100 years
Storm Event: 240h100y

Time-Depth Curve: 240h100y	
Label	240h100y
Start Time	0.00 hours
Increment	12.00 hours
End Time	240.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 12.00 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.25	0.63	1.01	1.27
60.00	1.64	2.02	2.40	2.78	3.16
120.00	3.54	4.05	4.43	4.93	5.69
180.00	6.45	7.46	9.11	10.63	11.64
240.00	12.65	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 24hr

Return Event: 100 years
Storm Event: 24h100y

Time-Depth Curve: 24h100y	
Label	24h100y
Start Time	0.00 hours
Increment	1.20 hours
End Time	24.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 1.20 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.26	0.51	0.77	1.03
6.00	1.29	1.63	1.97	2.31	2.74
12.00	3.26	3.86	4.88	6.00	6.77
18.00	7.28	7.63	7.88	8.14	8.31
24.00	8.48	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 10 Year Critical
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Time-Depth Curve: 24h10y	
Label	24h10y
Start Time	0.00 hours
Increment	1.20 hours
End Time	24.00 hours
Return Event	10 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 1.20 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.15	0.31	0.46	0.62
6.00	0.77	0.98	1.18	1.39	1.65
12.00	1.96	2.32	2.94	3.60	4.07
18.00	4.38	4.58	4.74	4.89	5.00
24.00	5.10	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 50 Year Critical
Scenario: 50yr 24hr

Return Event: 50 years
Storm Event: 24h50y

Time-Depth Curve: 24h50y	
Label	24h50y
Start Time	0.00 hours
Increment	1.20 hours
End Time	24.00 hours
Return Event	50 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 1.20 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.22	0.45	0.68	0.90
6.00	1.13	1.42	1.73	2.03	2.40
12.00	2.85	3.37	4.27	5.25	5.93
18.00	6.38	6.67	6.90	7.12	7.28
24.00	7.43	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 2hr

Return Event: 100 years
Storm Event: 2h100y

Time-Depth Curve: 2h100y	
Label	2h100y
Start Time	0.00 hours
Increment	0.10 hours
End Time	2.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.10 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.80	1.64	2.14	2.58
0.50	2.98	3.28	3.53	3.73	3.93
1.00	4.08	4.17	4.27	4.37	4.47
1.50	4.57	4.67	4.77	4.82	4.87
2.00	4.92	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 30m

Return Event: 100 years
Storm Event: 30m100y

Time-Depth Curve: 30m100y	
Label	30m100y
Start Time	0.00 hours
Increment	0.03 hours
End Time	0.50 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.03 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.51	1.05	1.36	1.65	
0.13	1.90	2.09	2.25	2.38	2.50	
0.25	2.60	2.66	2.73	2.79	2.85	
0.38	2.92	2.98	3.04	3.07	3.11	
0.50	3.14	(N/A)	(N/A)	(N/A)	(N/A)	

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 3hr

Return Event: 100 years
Storm Event: 3h100y

Time-Depth Curve: 3h100y	
Label	3h100y
Start Time	0.00 hours
Increment	0.15 hours
End Time	3.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.15 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.88	1.81	2.36	2.85
0.75	3.29	3.62	3.90	4.12	4.34
1.50	4.50	4.61	4.72	4.83	4.94
2.25	5.05	5.16	5.27	5.33	5.38
3.00	5.44	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 48hr

Return Event: 100 years
Storm Event: 48h100y

Time-Depth Curve: 48h100y	
Label	48h100y
Start Time	0.00 hours
Increment	2.40 hours
End Time	48.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 2.40 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.19	0.46	0.74	0.93
12.00	1.21	1.48	1.76	2.04	2.32
24.00	2.60	2.97	3.25	3.62	4.18
36.00	4.73	5.48	6.68	7.80	8.54
48.00	9.28	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 5m

Return Event: 100 years
Storm Event: 5m100y

Time-Depth Curve: 5m100y	
Label	5m100y
Start Time	0.00 hours
Increment	0.00 hours
End Time	0.08 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.00 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.16	0.34	0.44	0.54
0.02	0.62	0.68	0.73	0.77	0.81
0.04	0.84	0.87	0.89	0.91	0.93
0.06	0.95	0.97	0.99	1.00	1.01
0.08	1.02	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 6hr

Return Event: 100 years
Storm Event: 6h100y

Time-Depth Curve: 6h100y	
Label	6h100y
Start Time	0.00 hours
Increment	0.30 hours
End Time	6.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.30 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	1.03	2.12	2.76	3.34
1.50	3.86	4.24	4.57	4.82	5.08
3.00	5.27	5.40	5.53	5.66	5.79
4.50	5.92	6.04	6.17	6.24	6.30
6.00	6.37	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: B75 - 100 Year Critical
Scenario: 100yr 72hr

Return Event: 100 years
Storm Event: 72h100y

Time-Depth Curve: 72h100y	
Label	72h100y
Start Time	0.00 hours
Increment	3.60 hours
End Time	72.00 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 3.60 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.00	0.00	0.20	0.49	0.79	0.99
18.00	1.28	1.58	1.87	2.17	2.46
36.00	2.76	3.15	3.45	3.84	4.43
54.00	5.02	5.81	7.09	8.27	9.06
72.00	9.85	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time of Concentration Calculations
Label: Area DEV
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.17 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.17 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.30 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.30 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	1.00 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	1.00 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.75 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.75 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.49 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.49 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	1.00 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	1.00 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.11 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.11 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.08 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.08 hours

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.08 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.08 hours

Subsection: Time of Concentration Calculations
Label: Area UNR-South
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Subsection: Time of Concentration Calculations
Label: Area UPSTREAM
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Time of Concentration Results

Segment #1: User Defined Tc	
Time of Concentration	0.17 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.17 hours

Subsection: Time of Concentration Calculations
Label: Area UPSTREAM
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

==== User Defined

Tc = Value entered by user
Where: Tc= Time of concentration, hours

Subsection: Runoff CN-Area
Label: Area DEV
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area EX1
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area FO
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area FO-US
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area PD1
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area PR
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area S1
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area UNR-North
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area UNR-South
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: Area UPSTREAM
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Elevation vs. Volume Curve
Label: FO Detention
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Elevation-Volume

Pond Elevation (ft)	Pond Volume (ac-ft)
654.10	0.000
656.40	0.000
658.50	1.710
660.00	2.800
660.50	3.200

Subsection: Elevation vs. Volume Curve
Label: Pond
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Elevation-Volume

Pond Elevation (ft)	Pond Volume (ac-ft)
648.75	0.000
652.00	0.000
653.00	0.920
654.00	1.920
655.00	3.010
656.00	4.190
656.50	4.810
657.50	6.000

Subsection: Elevation vs. Volume Curve
Label: PR Detention
Scenario: 10yr 24hr

Return Event: 10 years
Storm Event: 24h10y

Elevation-Volume

Pond Elevation (ft)	Pond Volume (ac-ft)
653.32	0.000
657.30	0.000
658.50	1.180

Requested Pond Water Surface Elevations	
Minimum (Headwater)	653.32 ft
Increment (Headwater)	0.05 ft
Maximum (Headwater)	658.50 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice PR	Forward	TW	653.32	658.50
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Orifice PR Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	653.32 ft
Orifice Diameter	15.00 in
Orifice Coefficient	0.820

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

Requested Pond Water Surface Elevations	
Minimum (Headwater)	654.10 ft
Increment (Headwater)	0.05 ft
Maximum (Headwater)	660.50 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice FO	Forward	TW	654.10	660.50
Rectangular Weir	Weir FO	Forward	TW	660.00	660.50
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Orifice FO Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	654.10 ft
Orifice Diameter	10.00 in
Orifice Coefficient	0.820

Structure ID: Weir FO Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	660.00 ft
Weir Length	20.00 ft
Weir Coefficient	3.00 (ft^0.5)/s

Requested Pond Water Surface Elevations	
Minimum (Headwater)	648.75 ft
Increment (Headwater)	0.05 ft
Maximum (Headwater)	656.50 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice Pond	Forward	TW	648.75	657.50
Rectangular Weir	Weir Pond	Forward	TW	656.50	657.50
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Orifice Pond Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	648.75 ft
Orifice Diameter	4.42 in
Orifice Coefficient	0.610

Structure ID: Weir Pond Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	656.50 ft
Weir Length	18.00 ft
Weir Coefficient	3.00 (ft^0.5)/s

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

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DETENTION VOLUME PROVIDED

PROJECT: Reserves at Muir Park **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** **5/22/2020**

AREA UNITS (CHOOSE WITH DROP-DOWN)

Units: ft²

POND / VAULT / SURFACE DETENTION VOLUME

Elevation (ft)	Area (ft²)	Average Area (ft²)	Increment Volume (ac-ft)	Cumulative Volume (ac-ft)
652.00	38136.00			0.00
		39956.00	0.92	
653.00	41776.00			0.92
		43647.00	1.00	
654.00	45518.00			1.92
		47438.50	1.09	
655.00	49359.00			3.01
		51093.92	1.03	
655.88	52828.84			4.04
		53065.42	0.15	
656.00	53302.00			4.19
		54306.50	0.62	
656.50	55311.00			4.81

STORM SEWER DETENTION VOLUME

Diameter (in)	Length (ft)	Volume (ac-ft)
12	0	0.00

TOTAL DETENTION VOLUME

Pond / Vault / Surface Detention Volume (ac-ft)	4.81
Storm Sewer Detention Volume (ac-ft)	0.00
Total Detention Volume (ac-ft)	**4.81**

VOLUME CONTROL CALCULATIONS

PROJECT: Reserves at Muir Park **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

AREA UNITS (CHOOSE WITH DROP-DOWN)

Units: ft²

SURFACE VOLUME CONTROL

Elevation (ft)	Area (ft²)	Average Area (ft²)	Increment Volume (ac-ft)	Cumulative Volume (ac-ft)
650.75	15951.00			0.000
		18011.50	0.41	
651.75	20072.00			0.413

TOTAL VOLUME CONTROL

Volume Type	Porosity	MWRD Factor	Area (SF)	Depth (ft)	Media Volume (CF)	Storage Volume (CF)
Surface Storage	1.00	1.00	N/A	N/A	18011.50	18011.50
Soil Media Mix	0.25	0.50	15951.00	1.50	23926.50	2990.81
Coarse Aggregate (Above UD)	0.36	0.50	15951.00	0.50	7975.50	1435.59
Coarse Aggregate (Below UD)	0.36	1.00	15951.00	0.17	2711.67	976.20
Total						**23414.10**
Total (ac-ft)						**0.538**

ORIFICE DISCHARGE RATE

PROJECT: Reserves at Muir Park - Detained Development Area **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** **5/22/2020**

RESTRICTOR INFORMTION

1.	Orifice Number	1		
2.	Orifice diameter, *d*	4.42	in	
3.	Discharge Coefficient, C_d	0.61		
4.	Invert Elevation	648.75	ft	
5.	High Water Elevation, HWL	655.88	ft	
6.	Tail Water Elevation	N/A	ft	

ACTUAL RELEASE RATE

6.	Free Flow Actual Release Rate at HWL	1.37	cfs	
7.	Submerged Actual Release Rate at HWL	0.00	cfs	

STAGE-DISCHARGE TABLE CONDITION (SELECT FROM DROP-DOWN)

Free-flow

STAGE-DISCHARGE TABLE

Elevation (ft)	Orifice 1 (cfs)	Orifice 2 (cfs)	Total (cfs)	
652.00	0.91		0.91	
653.00	1.05		1.05	
654.00	1.17		1.17	
655.00	1.28		1.28	
655.82	1.37		1.37	
655.88	1.37		1.37	HWL
656.00	1.39		1.39	
656.50	1.43		1.43	

BOX CULVERT OVERFLOW STRUCTURE - WEIR & GRATE CAPACITY

PROJECT: Reserves at Muir Park **PERMIT NUMBER:**

LOCATION: 1001 Oak Avenue, Prospect Heights, IL **DATE:** 5/22/2020

WEIR INFORMATION

1. Weir Number	1		
2. Weir Length	18.00	ft	
3. Weir Coefficient	3.0		
4. Weir Elevation	656.50	ft	
5. Hydraulic Grade Line (HGL) Crest	657.10	ft	

GRATE INFORMATION

1. Grate Number	1		
2. Grate Area	154.00	sf	
3. Open Area of Grate	129.36	sf	
4. Orifice Coefficient	0.6		
5. Grate Elevation	657.00	ft	
6. Hydraulic Grade Line (HGL) Crest	657.10	ft	

ACTUAL RELEASE RATE

6. Free Flow Actual Release Rate at HGL Crest	222.06	cfs	

STAGE-DISCHARGE TABLE

Elevation (ft)	Weir 1 (cfs)	Grate 1 (cfs)	Total (cfs)
656.50	0.00	0.00	0.00
657.00	19.09	0.00	19.09
657.10	25.10	196.97	222.06
657.20	31.63	278.55	310.18
657.30	38.64	341.16	379.80
657.40	46.11	393.93	440.04
657.50	54.00	440.43	494.43

OUTFALL SEWER CAPACITY

PROJECT: RESERVES AT MUIR PARK
SUBJECT: STORM SEWER
Assumptions: n = 0.013 for RCP

MH/CB No.	q (cfs)	Diam. (in)	Slope (%)	Pipe full Q	Pipe full V	q/Q Capacity	v/V
A	18.73						
A to B		36	0.18	28.30	4.00	0.66	0.93
B							

Appendix D – Historical Storm Water Calculations

John Muir / Pleasant Run Park

The Forums / Pleasant Run Subdivisions

JOHN MUIR/ PLEASANT RUN PARK

VILLAGES OF WHEELING AND PROSPECT HEIGHTS, ILLINOIS

STORM WATER CALCULATIONS

Prepared by:
ENGINEERING RESOURCE ASSOCIATES, INC.
214 W. Willow Ave.
Wheaton, IL 60187
(630) 668-5995

July, 1998

Introduction and Existing Conditions

The project site is located in T42N, R11E, Sec. 15, in the Villages of Wheeling and Prospect Heights, Illinois. Current plans call for improvements to the existing open space and creation of a park. Construction is slated to start in late fall 1998. To establish whether detention was required for the proposed improvements, MWRDGC permits for adjacent properties were reviewed. Review of MWRDGC Permits Nos. 72-241, 72-240, 73-1228, 85-655, 76-644, and 78-606 did not indicate that detention for the subject site had been previously provided for in any of the other detention facilities in the area. Detention calculations were therefore performed to establish detention required for the proposed improvements.

The current property contains open space and athletic fields. Construction activities will take place throughout the property, which is located along the incorporation boundary between Prospect Heights and Wheeling.

Summary of Site Land Cover

The total area of development is 4.0 acres in Wheeling, and 4.15 acres in Prospect Heights. The total area of development will be 8.15 acres. For the total area of development, the area to be paved is 0.986 acres on the eastern half of the property, and 0.495 acres on the western one-half of the property. A break down of final build out conditions is provided as follows:

	Area (acres)	Rational "C"	A x C
Total Impervious Area	1.481	0.95	1.40695
Pond	1.343	1.0	1.343
Pervious Area	5.326	0.45	2.3967
Total	8.15	0.63	5.1466

Summary of Detention Calculations

Time of concentration was estimated using methods provided by the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). Based on an average flow path length of 250 feet, and an overall slope of 0.02 ft/ft, the time of concentration was estimated to be 18 minutes. Using the Rational Method approach, (Q=CIA), where A was the total area of the site (8.15 acres), I was the intensity for a 3 year storm (3.15 in/hr, TP-40), and C of 0.15, the release rate was determined to be 3.85 cfs.

A small portion of the eastern one-half of the site will release storm runoff unrestricted. Based on a flow path of 100 feet, and an overall slope of 0.07 ft/ft, the time of concentration was estimated to be 9 minutes. Again, using Q=CIA where A was the area of unrestricted release (0.46 acres), I was the intensity for a 100 year storm (8.0 in/hr), and C of 0.45, the final release rate was determined to be 3.85 cfs – 1.656 cfs = 2.194 cfs. The total tributary area is therefore 8.15 Ac – 0.46 Ac = 7.69 Ac. The final composite runoff coefficient was calculated as follows:

	Area (acres)	Rational "C"	A x C
Total Impervious Area	1.481	0.95	1.407
Pond	1.469	1.0	1.469
Pervious Area	4.74	0.45	2.133
Total	7.69	0.65	5.009

Using a modified Rational Method approach, the initial required detention volume determined was 1.050 ac-ft. The provided detention volume at overtopping is summarized in the table below.

Elevation (ft)	Elev. Diff. (ft)	Area	Average Area (sq. ft.)	Volume (cu. ft.)	Cumul. Volume (ac. -ft.)
655		753			0.00
	1.0		9502.5	9502.5	
656		18252			0.218
	0.6		31149.0	18689.4	
656.6		44046			0.647
	0.4		51273.0	20509.2	
657		58500			1.118
	0.5		61245.0	30622.5	
657.5 (Overflow)		63990			1.820

By using the proposed stage-storage relationship for the detention pond, the initial proposed high water level was calculated to be 656.94.

The outlet pipe sizing was established using Bernoulli's Equation as outlined in Recommendations for Design of Outflow Control Devices of Stormwater Detention Facilities, (MWRDGC, 1978). The initial release rate of 2.194 cfs was used to size the outlet pipe. The maximum high water elevation was set at 657.5 (overtopping). An iterative approach was used, establishing a design pipe diameter of 8 inches and a design release rate of 2.14 cfs.

Using the modified Rational Method approach again with a release rate of 2.14 cfs, the final required detention volume was determined to be 1.06 ac-ft, and a final high water level of 656.95.

An overflow weir was also designed for the site. Using $Q = CLH^{1.5}$, with a C of 3.0, L = 17.0 feet, and H = 0.5, Q = 18.0 cfs, which exceeds the inflow rate into the pond for the design storm duration that produces the greatest detention requirement.

Support calculations and exhibits are provided on the following sheets.

DESIGN SUMMARY

Determination of Allowable Release Rate – Undeveloped Site

1.	Area of Site	8.15 Ac
2.	Average Ground Slope	2%
3.	Overland Flow Distance	250 ft.
4.	Overland Time of Concentration	18 min.
5.	Rainfall Intensity of Three (3) Year Storm	3.15 in/hr
6.	Undeveloped Runoff Coefficient	0.15
7.	Allowable Release Rate	3.85 cfs
8.	Unrestricted Release Area	0.46 Ac
9.	Unrestricted Area Developed Runoff Coefficient	0.45
10.	Unrestricted Release Area Average Ground Slope	7%
11.	Unrestricted Release Area Time of Concentration	9 min.
12.	Rainfall Intensity for 100 Year Storm	8.0 in/hr
13.	Unrestricted Area Release Rate	1.656 cfs
14.	Final Allowable Release Rate 3.85 cfs – 1.656 cfs =	2.194 cfs

Determination of Reservoir Size – Developed Site

15.	Impervious Drainage Area	1.481 Ac
16.	Pond	1.469 Ac
17.	Pervious Area	4.866 Ac
18.	Total Area Draining to Pond	7.69 Ac
19.	Composite Runoff Coefficient	0.65
20.	Required Reservoir Capacity	1.06 Ac–ft
21.	Reservoir Capacity Provided	1.82 Ac- ft
22.	Outlet Pipe	8 in. Dia. PVC

INITIAL

TP-40								
Runoff Coeff. C	Storm Duration	Storm Duration (hrs)	Rainfall Intensity TP-40 I	Drainage Area (Ac) A	Inflow Rate (cfs) C*I*A	Release Rate (cfs)	Storage Rate (cfs)	Storage Req'd (cu. ft.)
0.65	5	0.08333333	9.7	7.69	48.48545	2.194	46.29145	0.321468
0.65	10	0.16666667	7.6	7.69	37.9886	2.194	35.7946	0.497147
0.65	15	0.25	6.5	7.69	32.49025	2.194	30.29625	0.631172
0.65	20	0.33333333	5.5	7.69	27.49175	2.194	25.29775	0.702715
0.65	30	0.5	4.4	7.69	21.9934	2.194	19.7994	0.824975
0.65	40	0.66666667	3.7	7.69	18.49445	2.194	16.30045	0.905581
0.65	50	0.83333333	3.2	7.69	15.9952	2.194	13.8012	0.958417
0.65	1	1	2.8	7.69	13.9958	2.194	11.8018	0.983483
0.65	1.5	1.5	2.1	7.69	10.49685	2.194	8.30285	1.037856
0.65	2	2	1.7	7.69	8.49745	2.194	6.30345	1.050575 ← MAX
0.65	3	3	1.2	7.69	5.9982	2.194	3.8042	0.95105
0.65	4	4	1	7.69	4.9985	2.194	2.8045	0.934833
0.65	5	5	0.84	7.69	4.19874	2.194	2.00474	0.835308
0.65	6	6	0.73	7.69	3.648905	2.194	1.454905	0.727453
0.65	7	7	0.65	7.69	3.249025	2.194	1.055025	0.615431
0.65	8	8	0.58	7.69	2.89913	2.194	0.70513	0.470087
0.65	9	9	0.53	7.69	2.649205	2.194	0.455205	0.341404
0.65	10	10	0.49	7.69	2.449265	2.194	0.255265	0.212721
0.65	11	11	0.46	7.69	2.29931	2.194	0.10531	0.096534
0.65	12	12	0.43	7.69	2.149355	2.194	-0.04464	-0.04464
0.65	13	13	0.4	7.69	1.9994	2.194	-0.1946	-0.21082
0.65	14	14	0.38	7.69	1.89943	2.194	-0.29457	-0.34366
0.65	15	15	0.36	7.69	1.79946	2.194	-0.39454	-0.49318
0.65	16	16	0.34	7.69	1.69949	2.194	-0.49451	-0.65935
0.65	17	17	0.33	7.69	1.649505	2.194	-0.5445	-0.77137
0.65	18	18	0.31	7.69	1.549535	2.194	-0.64447	-0.9667
0.65	19	19	0.3	7.69	1.49955	2.194	-0.69445	-1.09955
0.65	20	20	0.29	7.69	1.449565	2.194	-0.74444	-1.24073
0.65	21	21	0.28	7.69	1.39958	2.194	-0.79442	-1.39024
0.65	22	22	0.27	7.69	1.349595	2.194	-0.84441	-1.54808
0.65	23	23	0.26	7.69	1.29961	2.194	-0.89439	-1.71425
0.65	24	24	0.25	7.69	1.249625	2.194	-0.94438	-1.88875

TP-40								
			Rainfall	Drainage	Inflow	Release	Storage	Storage
Runoff	Storm	Storm	Intensity	Area	Rate	Rate	Rate	Req'd
Coeff.	Duration	Duration	TP-40	(Ac)	(cfs)	(cfs)	(cfs)	(cu. ft.)
C		(hrs)	I	A	C*I*A			
0.65	5	0.08333333	9.7	7.69	48.48545	2.14	46.34545	0.321843
0.65	10	0.16666667	7.6	7.69	37.9886	2.14	35.8486	0.497897
0.65	15	0.25	6.5	7.69	32.49025	2.14	30.35025	0.632297
0.65	20	0.33333333	5.5	7.69	27.49175	2.14	25.35175	0.704215
0.65	30	0.5	4.4	7.69	21.9934	2.14	19.8534	0.827225
0.65	40	0.66666667	3.7	7.69	18.49445	2.14	16.35445	0.908581
0.65	50	0.83333333	3.2	7.69	15.9952	2.14	13.8552	0.962167
0.65	1	1	2.8	7.69	13.9958	2.14	11.8558	0.987983
0.65	1.5	1.5	2.1	7.69	10.49685	2.14	8.35685	1.044606
0.65	2	2	1.7	7.69	8.49745	2.14	6.35745	1.059575 ← MAX
0.65	3	3	1.2	7.69	5.9982	2.14	3.8582	0.96455
0.65	4	4	1	7.69	4.9985	2.14	2.8585	0.952833
0.65	5	5	0.84	7.69	4.19874	2.14	2.05874	0.857808
0.65	6	6	0.73	7.69	3.648905	2.14	1.508905	0.754453
0.65	7	7	0.65	7.69	3.249025	2.14	1.109025	0.646931
0.65	8	8	0.58	7.69	2.89913	2.14	0.75913	0.506087
0.65	9	9	0.53	7.69	2.649205	2.14	0.509205	0.381904
0.65	10	10	0.49	7.69	2.449265	2.14	0.309265	0.257721
0.65	11	11	0.46	7.69	2.29931	2.14	0.15931	0.146034
0.65	12	12	0.43	7.69	2.149355	2.14	0.009355	0.009355
0.65	13	13	0.4	7.69	1.9994	2.14	-0.1406	-0.15232
0.65	14	14	0.38	7.69	1.89943	2.14	-0.24057	-0.28067
0.65	15	15	0.36	7.69	1.79946	2.14	-0.34054	-0.42568
0.65	16	16	0.34	7.69	1.69949	2.14	-0.44051	-0.58735
0.65	17	17	0.33	7.69	1.649505	2.14	-0.4905	-0.69487
0.65	18	18	0.31	7.69	1.549535	2.14	-0.59047	-0.8857
0.65	19	19	0.3	7.69	1.49955	2.14	-0.64045	-1.01405
0.65	20	20	0.29	7.69	1.449565	2.14	-0.69044	-1.15073
0.65	21	21	0.28	7.69	1.39958	2.14	-0.74042	-1.29574
0.65	22	22	0.27	7.69	1.349595	2.14	-0.79041	-1.44908
0.65	23	23	0.26	7.69	1.29961	2.14	-0.84039	-1.61075
0.65	24	24	0.25	7.69	1.249625	2.14	-0.89038	-1.78075

TIME OF CONCENTRATION FOR OVERLAND FLOW

ATTACHMENT 3

SOURCE. DEPARTMENT OF THE ARMY, TECHNICAL MANUAL, TM5-820-1

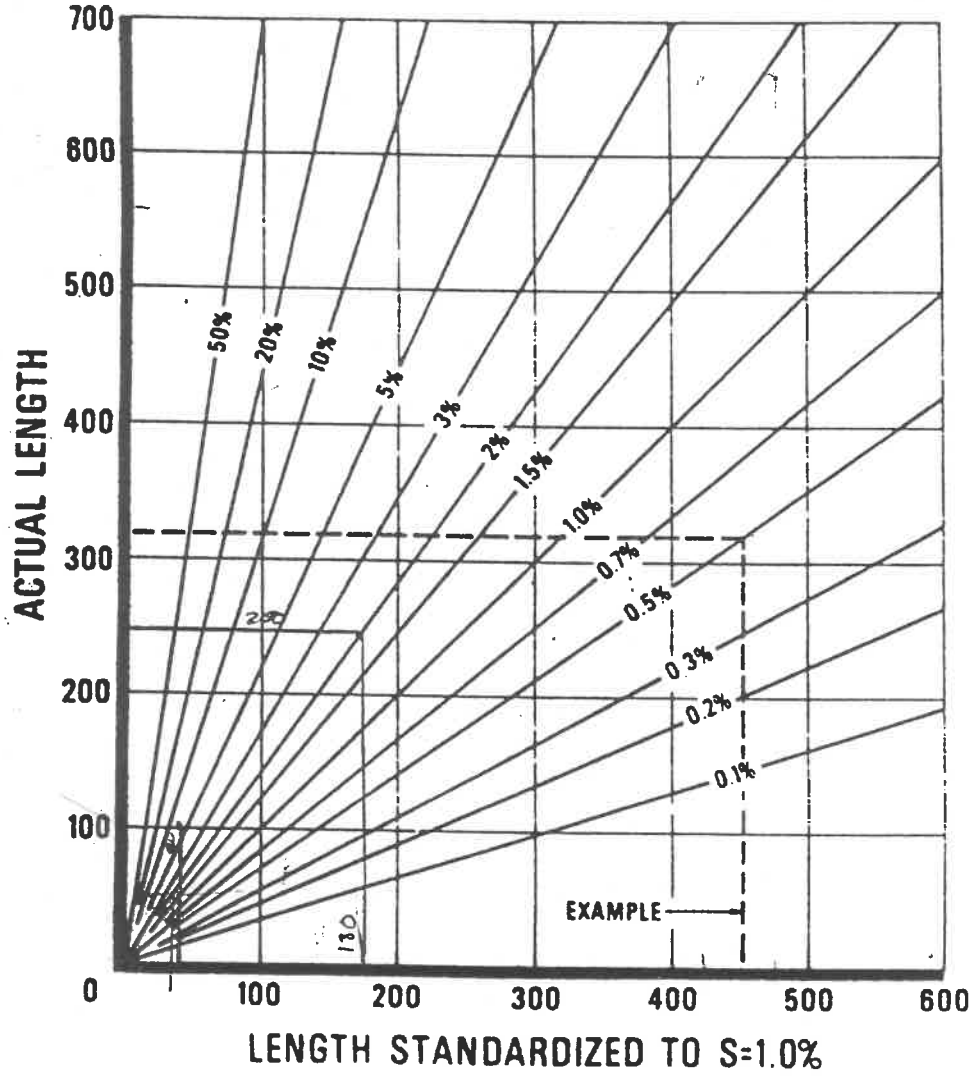


FIGURE 3-A

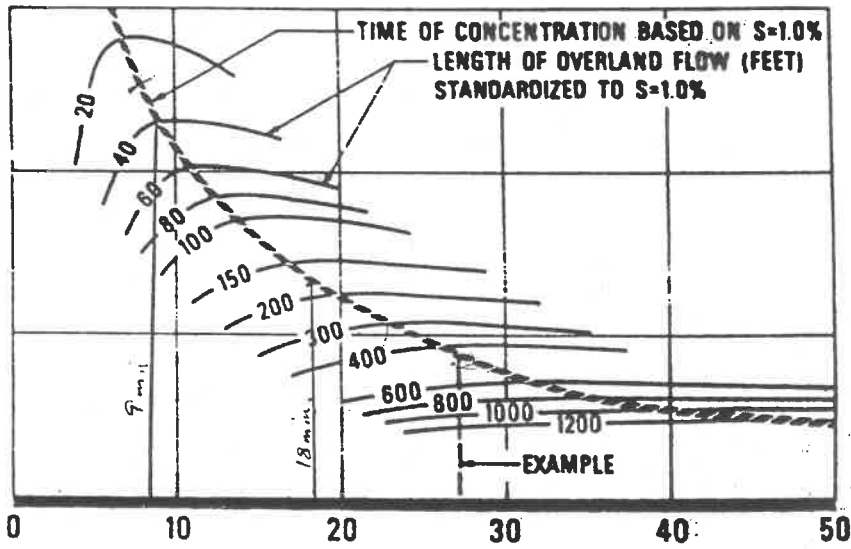


FIGURE 3-B

EXAMPLE

320 FEET OVERLAND FLOW AT S=0.5% ENTER FIG. 3-A
ACTUAL LENGTH AT 320. GO TO S=0.5%. READ 450
FEET ON STANDARDIZED LENGTH GO TO FIG. 3-B
ENTER AT 450 FEET GO DOWN TO 27 MINUTES.

THE METROPOLITAN SANITARY DISTRICT
OF GREATER CHICAGO

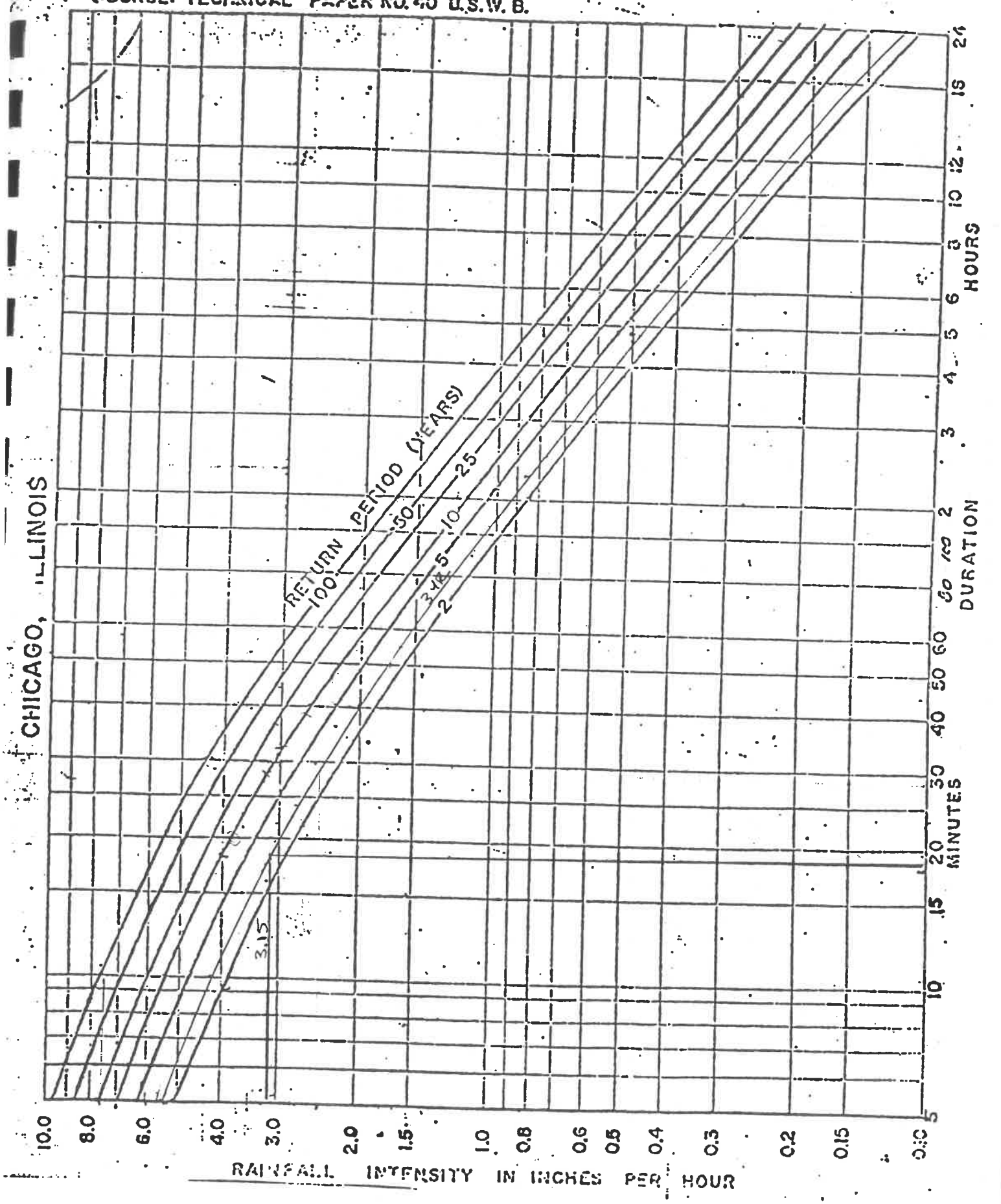
ENGINEERING DEPARTMENT

A.Y.T. & F.J.K. APRIL, 1972

LSS-72-037

RAINFALL INTENSITY VS. DURATION CHART

SOURCE: TECHNICAL PAPER NO. 40 U.S.W.B.



ENGINEERING RESOURCE ASSOCIATES, INC.
CONSULTING ENGINEERS & SURVEYORS

214 WEST WILLOW AVENUE
WHEATON, ILLINOIS 60187
PHONE (630) 668-5095 FAX (630) 668-0893

TITLE JOHN MUIR PARK SHEET 1 OF 1

JOB No. 980201 BY: DOT DATE: 7/98

OUTLET PIPE DESIGN

UPSTREAM INVERT : 656.00

DOWNSTREAM INVERT : 655.80

LENGTH : 20 LF

HIGHWATER ELEVATION (OVERTOPPING) : 657.50

MAXIMUM ALLOWABLE DISCHARGE : 2.194 cfs

FROM MSD, RECOMMENDATIONS FOR DESIGN OF OUTFLOW CONTROL DEVICES OF STORMWATER DETENTION FACILITIES, 4-6-78

$$Q = A\left[\frac{H}{\frac{K_e + K_o}{2g} + \frac{2.87 n^2 L}{D^{4/3}}}\right]^{1/2}$$

K_e (SQUARE EDGE) = 0.43
n = 0.012 PVC
K_o = 1.0

START WITH 12 INCH PIPE,

$$Q = \frac{\pi (1)^2}{4}\left[\frac{657.50 - (655.80 + 0.5)}{\frac{0.43+1}{64.4} + \frac{2.87(0.012)^2(20)}{(1)^{4/3}}}\right]^{1/2} = 4.92 \text{ cfs}$$

$2.194 << 4.92$ cfs, NO GOOD

TRY 8 INCH PIPE

$$Q = \frac{\pi (0.667)^2}{4}\left[\frac{657.50 - (655.80 + 0.33)}{\frac{1.43}{64.4} + \frac{2.87(0.012)^2(20)}{(0.667)^{4/3}}}\right]^{1/2} = 2.14 \text{ cfs}$$

$2.194 \geq 2.14$ cfs $\Rightarrow$ OK

USE 8 IN PVC PIPE AS OUTLET

DRAFT COPY

MSDGC Permit No. 74-1229

IEPA Log No. _____

SCHEDULE D DETENTION

I. Project Information

Name of Project as shown on plans: The Forums

Location: Elmhurst Road South of Hintz Road

II. Determination of Allowable Release Rate - Undeveloped Site:

		PLEASANT RUN	FORUMS	
1.	Area of site	9.1	9.37	acres
2.	Average ground slope		.007	foot/foot
3.	Overland flow distance		1000	feet
4.	Overland flow time of concentration	60	~~37~~ 60	minutes
5.	Average slope of channelized flow (See Note a)		NA	foot/foot
6.	Channelized flow distance (See Note a)		NA	feet
7.	Channelized flow time of concentration		NA	minutes
8.	Total time of concentration (Line 4 + Line 7)	60	~~37~~ 60	minutes
9.	Rainfall intensity for three-year storm	1.60	1.60	inches/hr.
10.	Runoff coefficient (Use c=0.15 as maximum, see Article 6-4b(2) of the MSDGC Manual)	0.15	~~0.15~~	
11.	Allowable release rate, (line 1 x line 9 x line 10:Q=ciA)	2.18	2.25	cfs.

Note a: For flow in a well defined channel determine time of concentration from measured lengths, cross-sections and slopes and submit necessary calculations and drawings.

III. Determination of Reservoir Size - Developed Site:

12.	Impervious drainage area	4.91	3.89	acres
13.	Pervious drainage area	4.19	5.48	acres
14.	Composite runoff coefficient (c)	0.58	~~.47~~ 0.54	
15.	Required reservoir capacity (attach calculations)	1.14	~~.73~~ 1.86	acre-feet

IV. Permissible Bypass Rate through Development Site from Upstream Area:

A. Determination of Bypass Rate:

16.	Total area upstream	7.24	5.80	acres
17.	~~Future~~/present impervious area (cross out inappropriate case)		1.45	acres
18.	~~Future~~/present pervious area (cross out inappropriate case)		4.35	acres
19.	Composite runoff coefficient(Must not be less than 0.35 per MSDGC Manual of Procedures Article 6-4b(3))	0.35	0.35	
20.	Design storm frequency for the upstream area (Design storm frequency shall be as determined by local ordinance; if no local requirement is established, use 5-yr. storm frequency.)	5	5	year
21.	Time of concentration for the upstream area at point of entry (upstream area to be considered as undeveloped) (By same method as line 8)	45	45	minutes
22.	Design storm intensity for above duration	1.9	1.90	inches/hour
23.	Permissible bypass rate (line 16 x line 19 x line 22)	4.80 + 6.11 for Forums	3.86	cfs.

B. Determination of Required Size of Bypass System:

24.	Bypass system will be open channel/closed conduit (cross out inappropriate case),		
25.	Water cross-section area for discharge in line 23	3.14	sq. ft.
26.	Wetted perimeter for area in line 25	6.28	feet
27.	Hydraulic radius (line 25 ÷ line 26)	0.50	feet
28.	Line 27 to the 2/3 power	0.630	
29.	Invert slope	.0004	foot/foot
30.	Line 29 to the 1/2 power	.02	
31.	Manning's roughness coefficient (n)	.015	
32.	Bypass capacity [(1.49 x line 25 x line 28 x line 30) ÷ (line 31)]	3.86	cfs.

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

Engineering Firm: R. B. Neukranz & Associates

P.E. SEAL

Signature: R. B. Neukranz Date: October 18, 1973

(Name and Title)

0

LOCAL SEWER SYSTEMS SECTION

DETENTION REVIEW SHEET

RECEIVED
MAR 6 1974
LOCAL SEWER SYSTEMS
FIELD OFFICE

A. Project

Permit No. 73-1228 Date Received by 11-29-73

Name of Project The Forums

Location Elmhurst Road South of Hintz Road Wheeling

B. Basic Information

1. Total Area 9.37 Acres
2. Impervious Area 3.89 Acres
3. Runoff Coefficient 0.54
4. Project is Residential [X]; Non-Residential [ ]
5. Project is in flood plain area ..... ~~Yes~~/No
6. Building Connections are proposed under this permit ..... Yes/~~No~~
7. Detention is required for the project covered by this permit ..... Yes/~~No~~
8. Detention is provided under this permit ..... Yes/~~No~~
9. Detention data as submitted was adequate to complete review ..... ~~Yes~~/No
   If not, date when adequate data was received 2-26-74

C. Non-Applicability

Detention requirements are not applicable for the reason(s) indicated:

1. Project is in combined sewer area ..... ____
2. Area of project is 5 acres or less ..... ____
3. Project is residential, area is less than 10 acres, and the runoff coefficient is less than 0.60 ..... ____
4. Project consists of an outlet sewer only and no connections are proposed. Special condition is placed on permit to preclude future connections unless detention requirements are met ..... ____
5. Buildings existing and currently served by septic system ..... ____
6. Although detention requirements do not apply, retention is provided. . . ____

   Detention is based on MSD criteria ..... ____
   Detention is based on criteria other than MSD ..... ____

D. Relation with Other Projects

1. Detention required for this project is provided by existing detention facilities ..... ____
   Existing facilities are covered by Permit No. ____
2. Detention facilities provided under this permit are intended to serve ~~future~~ other areas OTHER X
   If so, ~~future contributing~~ area 9.1 acres. (Pleasant Run 72-240)
3. Project covered by permit receives drainage from another area and the flow is bypassed X
   If so, bypassed drainage area 5.80 acres. --Forums
   ~~7.24~~ acres-Pleasant Inn

MSD Permit No. 73-1228

4. Project covered by permit does not fall within detention requirements. There is a potential that other areas may be served by the facilities constructed under this permit and the total area so served may fall within the detention requirements. A special condition is placed on the permit to preclude this occurrence ..... _____

5. Project is served by facilities constructed under a previous permit issued with a condition that detention shall be provided when the total area served by the permit previously issued exceeds the area limitation of the ordinance. The addition of this project will result in a total area that exceeds the area limitations ..... _____

6. Project covered by permit does not fall within the detention requirements. There is no potential that other areas may be served by the facilities constructed under this permit ..... _____

   a. The project is surrounded by developed areas which are served by other facilities ..... _____
   b. Sewer covered by permit consists of building connection only that does not lend itself to future extension ..... _____

E. Design Summary **Forums/Pleasant Run**

	MSD Requirements	Project Design
1. Drainage area for which detention is provided under this permit	xxxxxxxxx	9.37/9.40re
2. Detention requirements for area above	1.06/1.14 ac. ft.	1.71/1.18ac. ft.
3. Detention requirements for this project	1.06/1.14 ac. ft.	1.71/1.18 ac. ft.
4. Release rate for area under (1) above	2.25/2.18 cfs	2.25/2.18cfs
5. Bypass rate; if any **10.91=4.80+6.11 from Forums**	3.86/10.91cfs	3.86/10.91 cfs
6. Total discharge	6.11/13.09 cfs	6.11/13.09 cfs

F. Method of Detention

1. Roof detention with roof restrictors [ ]
2. Detention on Ground [ ], Street [ ], Parking Lot [XXX]
   Diameter of restrictor pipe used 10/15 inch
3. Detention Pond [XXX], Diameter of outlet pipe _____ inch, slope _____

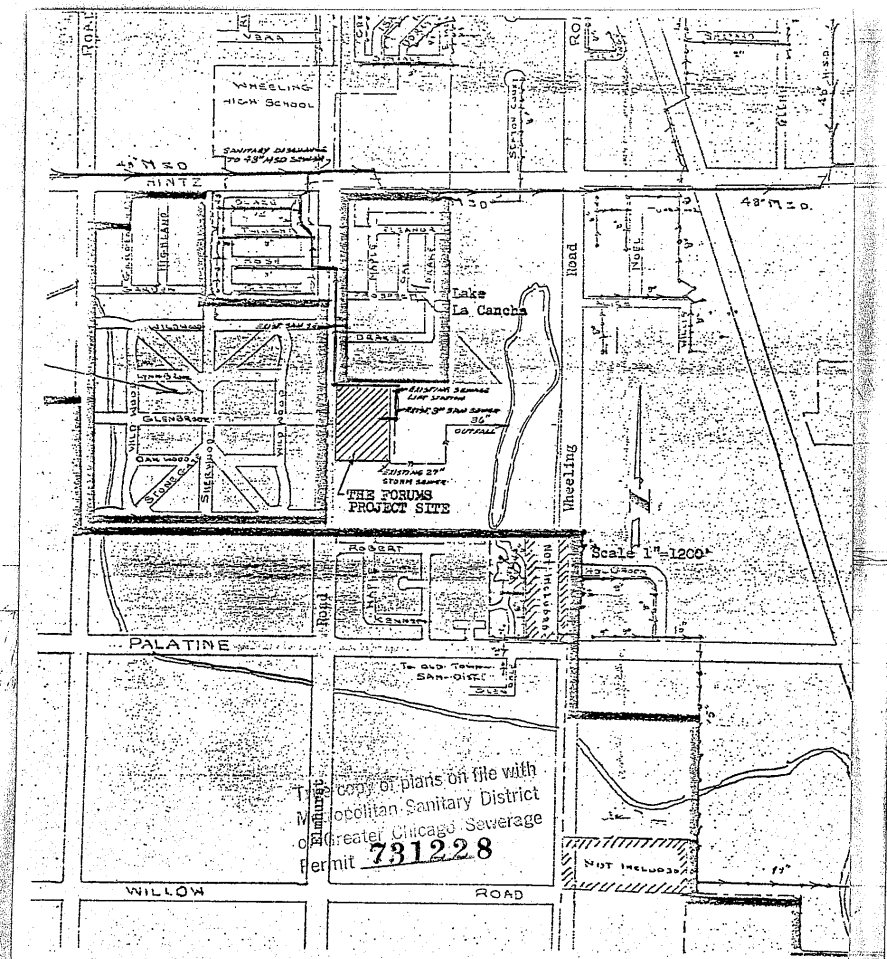
G. Other Comments

Discharge from the Forums consists of 3.86 cfs bypass from off-site and 2.25 cfs allowable release from the site for a total of 6.11 cfs through a 10 inch pipe. Discharge from Pleasant Run consists of 6.11 cfs bypass from the Forums, 4.80 cfs bypass from off-site and 2.18 cfs allowable release from the site for a total of 13.09 cfs through a 15 inch pipe.

Reviewed: JTR:jr Date: 2-28-74. Checked: wff Date: 2-28-74

CC: Talhami, Griesbach, Jendzio, Lanyon

LSS-72-09-01



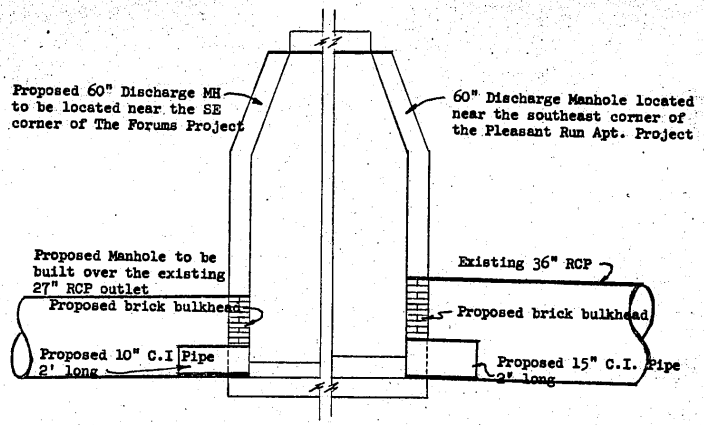
FIELD COPY

LOCATION MAP

R. B. Neukranz & Associates
400 South Milwaukee Ave.
Wheeling, Illinois 60090
Sec 15, T42N, R11E
Wheeling Township

THE FORUMS

WHEELING ILLINOIS



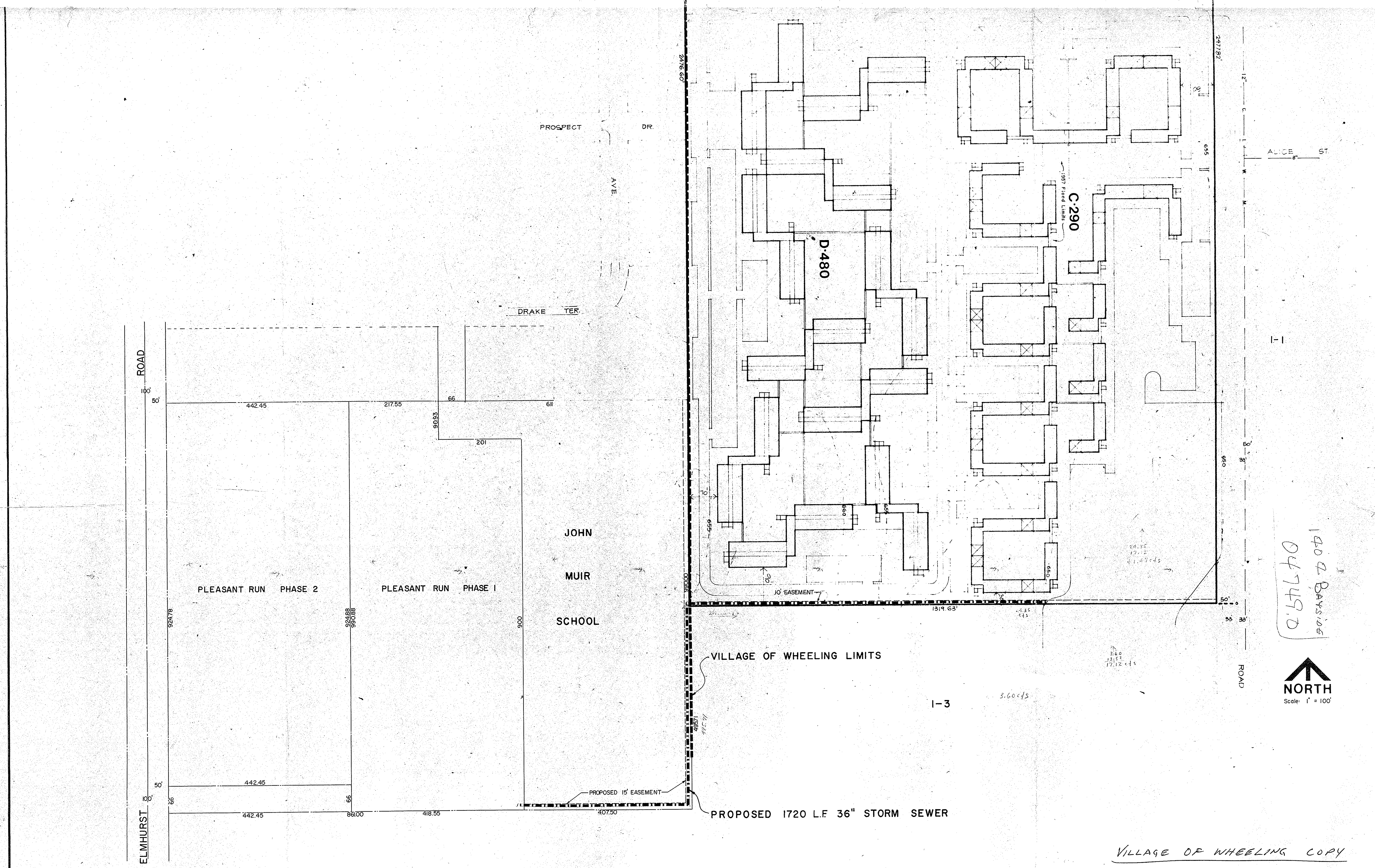
ADDENDUM NO 1

R. B. Neukranz & Associates
Consulting Engineers

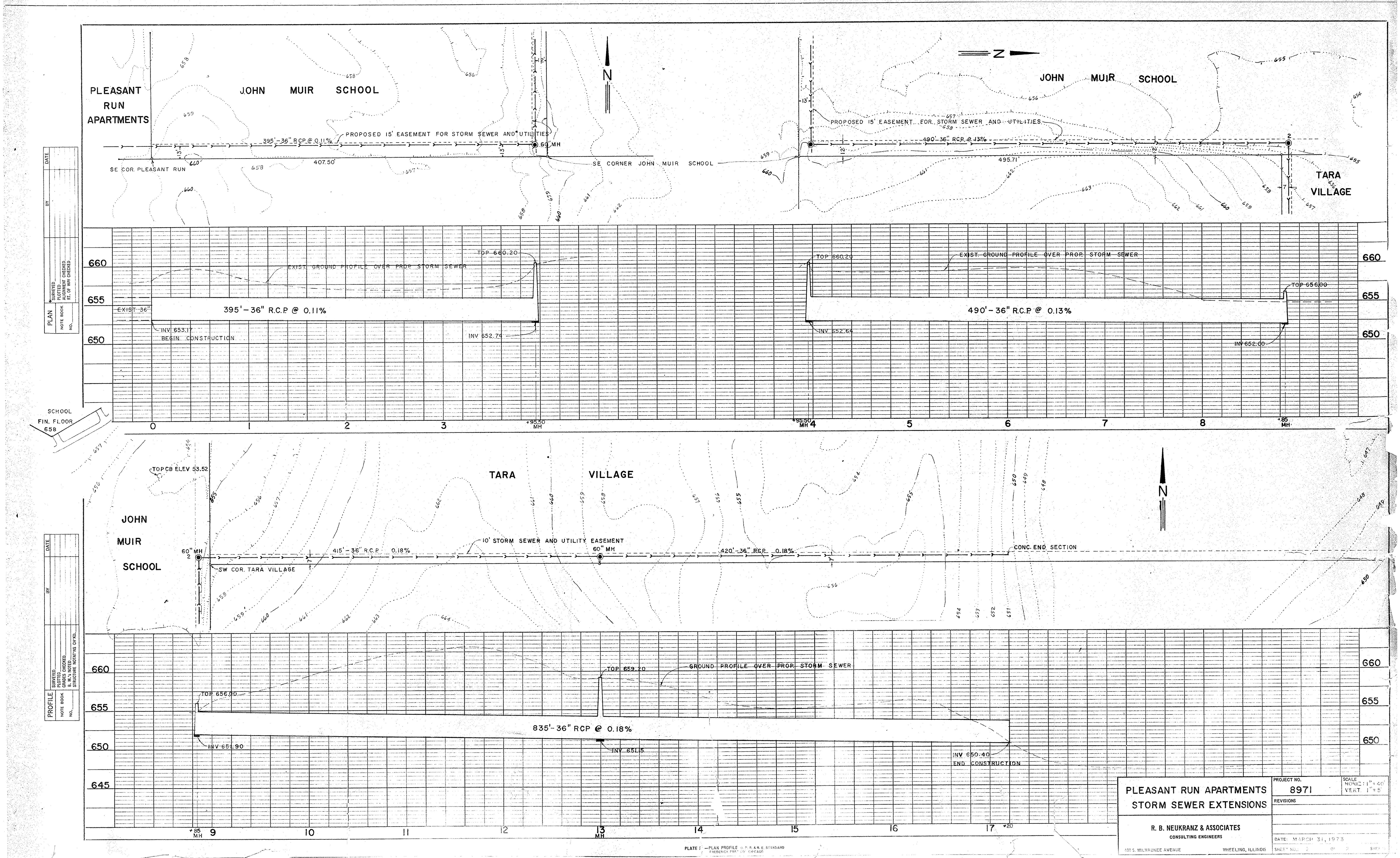
400 South Milwaukee Ave.
Wheeling, Illinois

PROJECT 11173

2/21/74



PLEASANT RUN APARTMENTS STORM SEWER EXTENSIONS	PROJECT NO. 8971	SCALE 1" = 100'
R. B. NEUKRANZ & ASSOCIATES CONSULTING ENGINEERS 400 S. MILWAUKEE AVENUE WHEELING, ILLINOIS	REVISIONS DATE: MARCH 31, 1972 SHEET NO.: 1 OF 2 SHEETS	


PLEASANT RUN APARTMENTS
JOHN MUIR SCHOOL
PROPOSED 15' EASEMENT FOR STORM SEWER AND UTILITIES
395'-36" RCP @ 0.11%
60" MH
407.50'
SE COR. PLEASANT RUN
SE CORNER JOHN MUIR SCHOOL
N
Z
490'-36" RCP @ .13%
495.71'
TARA VILLAGE
TOP 660.20
EXIST. GROUND PROFILE OVER PROP. STORM SEWER
EXIST. 36"
395'-36" R.C.P. @ 0.11%
INV 653.17
BEGIN CONSTRUCTION
INV 652.79
TOP 656.00
490'-36" R.C.P. @ 0.13%
INV 652.64
INV 652.00
SCHOOL FIN. FLOOR 658
TOP CB ELEV 53.52
TARA VILLAGE
JOHN MUIR SCHOOL
10' STORM SEWER AND UTILITY EASEMENT
415'-36" R.C.P. 0.18%
420'-36" RCP 0.18%
CONC. END SECTION
SW COR. TARA VILLAGE
TOP 659.20
GROUND PROFILE OVER PROP. STORM SEWER
TOP 656.00
835'-36" RCP @ 0.18%
INV 651.90
INV 651.5
INV 650.40
END CONSTRUCTION
PLAN
PROFILE
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
GRADES CHECKED
B. M.'S NOTED
STRUCTURE NOTATIONS CH'KD.
NOTE BOOK
NO.
DATE
BY
PLATE 7 — PLAN PROFILE

PLEASANT RUN APARTMENTS
STORM SEWER EXTENSIONS

R. B. NEUKRANZ & ASSOCIATES
CONSULTING ENGINEERS
400 S. MILWAUKEE AVENUE WHEELING, ILLINOIS

PROJECT NO. 8971

SCALE HORIZ: 1" = 40' VERT. 1" = 5'

REVISIONS

DATE: MARCH 31, 1973

SHEET NO. 2 OF 2 SHEETS