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PRELIMINARY STORMWATER MANAGEMENT NARRATIVE  
PROPOSED SELF STORAGE  
401 W. GOLF ROAD  
VILLAGE OF ARLINGTON HEIGHTS, IL 60005

Prepared: December 15, 2022



Signed: 12-15-2022  
Expires: 11-30-2023



Preliminary Stormwater Management Narrative  
Proposed Self Storage – 410 W. Golf Road, Village of Arlington Heights, IL 60005

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## PART I - SUMMARY

### INTRODUCTION

The Proposed Self-Storage Development will be a new 3-story building with an approximately 35,452 sf footprint and associated 9 parking spaces and three loading areas. The Project will be developed on a 2.387-acre parcel located in the northeast quarter of Section 16, Township 41 North, Range 11 East of the Third Principal Meridian in the Village of Arlington Heights, Cook County, IL. The common address of the property is 410 W. Golf Road, Arlington Heights, IL 60005. The parcel is generally bounded by Golf Road to the north, commercial/retail to the east, south and west.

This report has been prepared for the purpose of providing a discussion of the methodology used and the design assumptions considered in managing the drainage across this site.

### EXISTING CONDITIONS

As shown on Civil Engineering Plans (the Plans), the site currently consists of three existing one-story concrete and brick buildings, associated parking areas, and an asphalt driveway that connects to Golf Road.

As further noted on the Plans and on exhibit "EDC – Existing Drainage Conditions" located in Part II of this report, the site currently drains un-detained in two directions. There is a summit that bisects the property and runoff from 0.761 acres (Subarea-1) west towards the adjoining property and the remaining 1.626 acres (Subarea-2) are directed east towards the adjoining property. Runoff from Subarea – 1 is collected by an existing underground storm system on the neighboring property to the west or would overflow into Subarea-2 depending on the severity of the storm event. Runoff from Subarea – 2 sheet flows towards the neighboring property to the east where it is collected by an existing underground storm system on that property and directed to an existing detention basin that is off site approximately 200 feet east of the southeast corner of the property. The existing emergency overflow for both subareas during system failure or in the event of severe storms appears to occur at the southeast corner of the property and directs the overflow to that previously mentioned detention basin.

As further noted on exhibit EDC, the calculated un-detained existing 100-yr runoff to the west is 7.99 CFS and 14.27 CFS to the east for a total of 22.26 CFS.

### PROPOSED CONDITIONS

As can be seen on the Plans and as previously described, in the proposed with-development conditions, the site will consist of a new 3-story building with an approximately 35,452 sf footprint and associated 9 parking spaces and three loading areas. Runoff from the proposed improvements



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will be collected in a new underground storm sewer detention system and released via an outlet control structure with a 2.65" restrictor orifice into the existing storm sewer to the south of the property that connects to the previously mentioned off-site detention basin.

The Village of Arlington Heights Stormwater Regulations require that detention be provided for all new development and re-development using an allowable release rate of 0.18 CFS/AC. As noted on the rational method calculation sheet located in Part II of this report, with an allowable release rate of 0.429 CFS the proposed improvements would require approximately 0.891 AC-FT (38,808 CF) of detention volume.

As further noted on the plans, the project proposed to provide the required volume using a Contech Engineered Solutions CMP 60" diameter underground storm pipe detention system. The system will be a perforated pipe system that will also provide storage within the stone voids. As noted on the Site Utility Plan Sheet C4.0, the proposed system will provide 41,835 CF of storage which is more than required and includes additional volume to satisfy MWRD Volume Control requirements.

Runoff from the site will be collected via proposed storm structures that will have the capacity to contain the 100-year storm event and direct the runoff into the underground system via storm sewer pipes. The stored volume will then be released via an outlet control structure at the southeast of the property. In order to maximize the detention volume and limit the release to the 0.18 CFS/AC required, a 2.65" restrictor plate will be placed in the outlet control structure. As designed, the system will result in a proposed conditions runoff of 0.429 CFS during the 100-year event, which is a significant reduction from the 22.26 CFS under existing conditions and an overall benefit to the watershed.

#### MWRD Runoff Control Requirements

Because the site is over 0.5 acres in size it needs to comply with the runoff control requirements of Section 502 of the MWRD Watershed Management Ordinance (WMO). Runoff control will be provided by the proposed detention system, outlet control structure, and overflow weir within the outlet control structure. The system is designed to collect, store and slowly release the 100-year runoff. When the system is functioning properly, the restrictor is unblocked and the volume is available, the storm management system will be capable of fully containing the 100-yr storm event without overtopping any of the structures. Furthermore, should the system ever fail, the restrictor be blocked, and the storage volume not be available, the emergency overflow weir in the outlet control structure has been designed with enough capacity to pass the peak runoff flow. As noted in the MWRD Schedule D included in Part II of this report, the peak runoff for the site is calculated to be approximately 25.07 cfs and as noted on the Emergency Overflow Weir Calculation Spreadsheet also located in Part II of this report the proposed overflow weir baffle wall within the outlet control structure has the capacity to pass 26.26 cfs, and will therefore be able to pass the peak runoff without overtopping any structures should the system ever fail. It should also be noted that if the system ever fails, the maximum HWL the system could reach is 710.60 which is 1.90' below the



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proposed finished floor elevation of 712.50 and complies with the District requirements for building protection.

#### MWRD Volume Control Requirements

Because the site is over 0.5 acres in size it needs to comply with the volume control requirements of Section 503 of the MWRD Watershed Management Ordinance (WMO). As noted on the filled out MWRD Schedule D form for this project, the gross volume control storage for this site is calculated as 0.155 ac-ft (6,752 C.F.). As noted on the plans, this volume control is proposed to be provided within the proposed naturalized basin at the southwest corner of the property along with partial stone storage underneath the proposed detention system.

#### **UNDERGROUND STORM SEWER DESIGN**

The proposed underground storm sewer system for the project was designed with enough capacity to collect, contain, and pass the 100-year storm without overtopping any of the structures. All design rainfall events are based on the Illinois State Water Survey's Bulletin 75 values for Northeast Illinois.

#### **WETLANDS**

A review of the National Wetland Inventory Map indicates that there do not appear to be any wetlands in the vicinity of the project location.

#### **FLOODPLAIN**

In accordance with FIRM Panel 17031C0211J with effective date of August 19, 2008 there is no regulatory floodplain or floodway on the subject property.

#### **CONCLUSION**

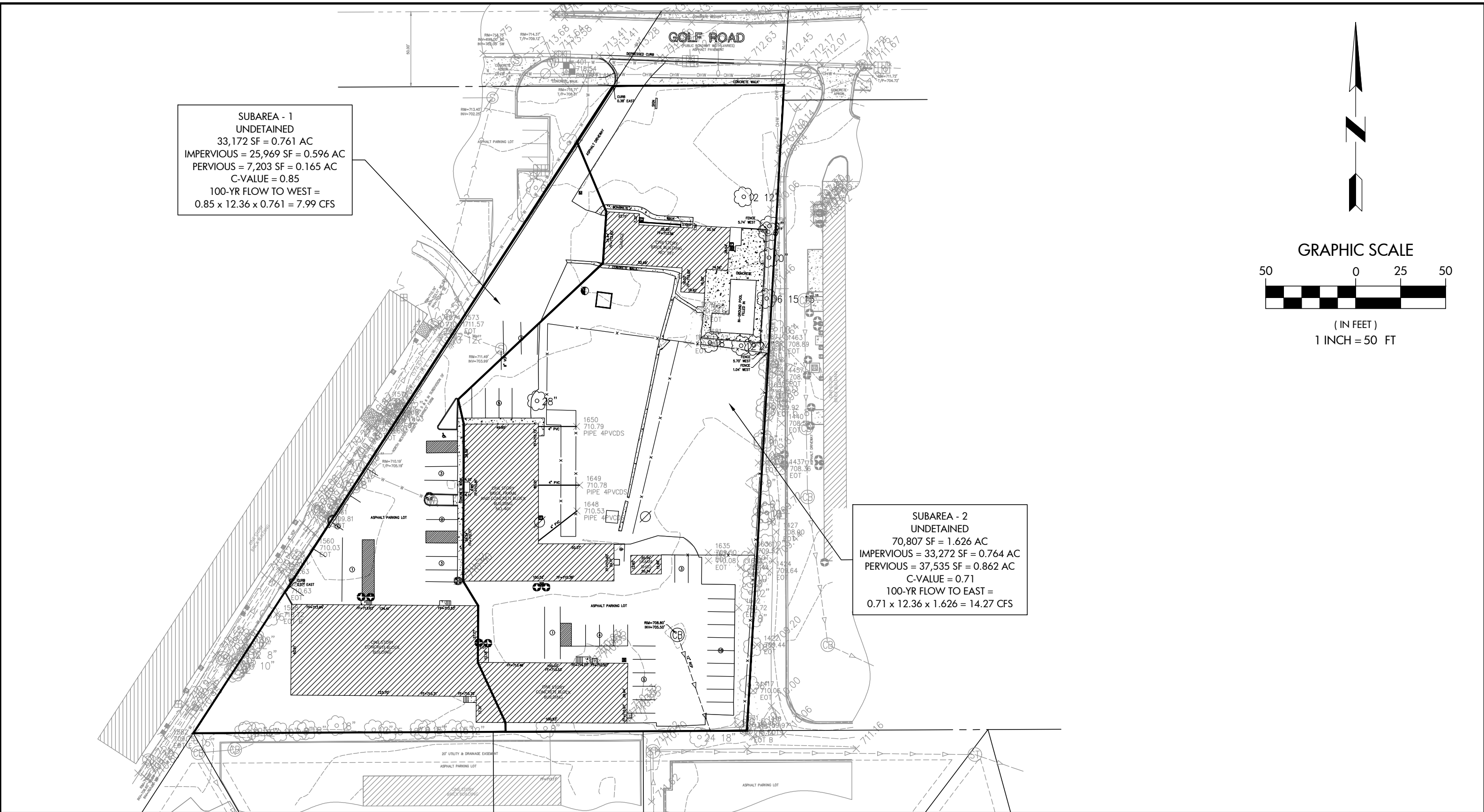
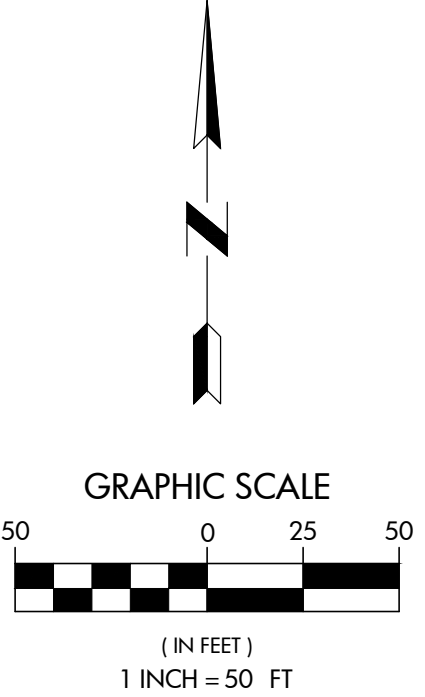
The proposed drainage improvements, underground storm sewer and detention system for the Proposed Self-Storage Development described in this report have been designed to collect, convey, and manage accumulated runoff from the project in substantial accordance with the Stormwater Regulations. It is our professional opinion that this report and the exhibits and technical analyses presented herein demonstrate that this Proposed Self-Storage Development, when fully constructed, will meet the intent of the current stormwater management requirements, will present no detrimental impacts downstream or to adjacent properties and should be granted approval.



## **PART II – EXHIBITS**

SUBAREA - 1  
 UNDETAINED  
 33,172 SF = 0.761 AC  
 IMPERVIOUS = 25,969 SF = 0.596 AC  
 PERVIOUS = 7,203 SF = 0.165 AC  
 C-VALUE = 0.85  
 100-YR FLOW TO WEST =  
 $0.85 \times 12.36 \times 0.761 = 7.99$  CFS

SUBAREA - 2  
 UNDETAINED  
 70,807 SF = 1.626 AC  
 IMPERVIOUS = 33,272 SF = 0.764 AC  
 PERVIOUS = 37,535 SF = 0.862 AC  
 C-VALUE = 0.71  
 100-YR FLOW TO EAST =  
 $0.71 \times 12.36 \times 1.626 = 14.27$  CFS



REVISIONS	

CIVIL ENGINEERS - PLANNERS - DEVELOPMENT CONSULTANTS



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**EXISTING DRAINAGE CONDITIONS**

**PROPOSED SELF-STORAGE DEVELOPMENT**

**410 W. GOLF ROAD, ARLINGTON HEIGHTS, IL**

DRAWN BY: OP    DATE: 12-15-22    SCALE: 1"=50'    PROJ. MGR.: OP

**EXHIBIT NO.**

**EDC**

PROJECT #: 22013



**PROPOSED SELF-STORAGE DEVELOPMENT  
410 W. GOLF ROAD, ARLINGTON HEIGHTS, IL  
PRELIMINARY RATIONAL METHOD CALCULATION SHEET  
PROPOSED CONDITIONS**

**A = TRIBUTARY AREA: 2.387 ACRES**

**RUNOFF COEFFICIENT CALCULATIONS**

IMPERVIOUS AREA:	1.854 X 0.95	1.76	<b>C = TOTAL / A = 0.85</b>
GRASS AREA:	0.533 X 0.50	0.27	
WET DETENTION:	0 X 1.00	0	
<b>TOTAL =</b>		<b>2.03</b>	

**RELEASE RATES**

**ALLOWABLE RELEASE RATES: 0.18 CFS/AC x TRIBUTARY AREA = 0.42966 CFS**

**STORAGE VOLUME (CALCULATED USING CURRENT BULLETIN 75 RAINFALL DATA)**

STORM DURATION HOURS	RAINFALL INTENSITY IN/HR	RUNOFF RATE CFS	RELEASE RATE CFS	STORAGE RATE CFS	STORAGE REQUIRED	
					CUBIC-FOOT	ACRE-FOOT
t	I	Q=C*I*A	Qr	Qs=Q-Qr	Qs*t*3600	CF/43560
0.5	6.34	12.86	0.42966	12.43	22374	0.514
1	4.03	8.17	0.42966	7.74	27864	0.640
1.5	3.03	6.14	0.42966	5.71	30834	0.708
2	2.49	5.05	0.42966	4.62	33264	0.764
3	1.83	3.71	0.42966	3.28	35424	0.813
4	1.48	3.00	0.42966	2.57	37008	0.850
5	1.25	2.53	0.42966	2.11	37980	0.872
6	1.07	2.17	0.42966	1.74	37584	0.863
7	0.97	1.97	0.42966	1.54	38808	0.891
8	0.87	1.76	0.42966	1.33	38304	0.879
9	0.79	1.60	0.42966	1.17	37908	0.870
10	0.72	1.46	0.42966	1.03	37080	0.851
11	0.67	1.36	0.42966	0.93	36828	0.845
12	0.62	1.26	0.42966	0.83	35856	0.823
18	0.45	0.91	0.42966	0.48	31104	0.714
24	0.36	0.73	0.42966	0.30	25920	0.595

**REQUIRED STORAGE VOLUME: 38808 0.891**





PROJECT # 22013  
 DATE: 12/15/2022

**PROPOSED SELF-STORAGE DEVELOPMENT  
 410 W. GOLF ROAD, ARLINGTON HEIGHTS, IL  
 RESTRICTOR CALCULATIONS**

Basin Area	2.387 acres	<u>Restrictor Data:</u>	
Curve Number		Orifice Coef	0.61
Time of Conc.		Bottom Orifice Elevation	704 (invert)
		Diameter	2.65 inches
Maximum 2yr Release Rate	N/A N/A cfs	Top Orifice Elevation	(invert)
		Diameter	inches
Maximum 100yr Release Rate	0.4296 cfs	2-yr HWL	N/A
		100-yr HWL	709.36

Elevation	Volume (acre-ft)	Head on Bottom Restrictor	Head on Top Restrictor	Discharge (cfs)
704.00	0.000	0.00	0.00	0.0000
705.00	0.170	0.89	0.00	0.1768
706.00	0.340	1.89	0.00	0.2577
707.00	0.510	2.89	0.00	0.3187
708.00	0.680	3.89	0.00	0.3698
709.00	0.850	4.89	0.00	0.4146
709.50	0.930	5.39	0.00	0.4353

# SCHEDULE D

## STORMWATER MANAGEMENT FACILITIES

WMO Permit Number: \_\_\_\_\_

NAME OF PROJECT: \_\_\_\_\_  
*(Submit a separate Schedule D for each stormwater facility, as needed)*

1. **RUNOFF REQUIREMENTS:** Submit calculations and an exhibit that delineates the 100-year critical storm conveyed by the major stormwater system including cross-sections indicating the HGL at critical points (e.g. overflow weirs)
  - A. Method used to calculate the 100-year peak design runoff rate:  
 Hydrologic model       Rational Method →  $i_{100\text{-year}}$  \_\_\_\_\_ in/hr
  - B. Onsite tributary area to the major stormwater system..... C or CN \_\_\_\_\_ , \_\_\_\_\_ acres
  - C. Offsite tributary area to the major stormwater system..... C or CN \_\_\_\_\_ , \_\_\_\_\_ acres
  - D. Total tributary area to the major stormwater system..... C or CN \_\_\_\_\_ , \_\_\_\_\_ acres
  - E. Ratio of offsite to onsite tributary area..... \_\_\_\_\_
  - F. Time-of-concentration..... \_\_\_\_\_ minutes
  - G. 100-year peak design runoff rate..... \_\_\_\_\_ cfs
  - H. Capacity of major stormwater system discharging offsite..... \_\_\_\_\_ cfs
  - I. Offsite discharge location of the major stormwater system:  
 ROW/drainage easement     Adjacent property *(submit calculations to comply with §502.3.B)*
  - J. Type and location of major stormwater system: \_\_\_\_\_
  - K. Building lowest entry elevation(s) are located at least 1 foot above the adjacent HGL:  
*(Submit calculations and cross-sections showing the lowest entry elevation(s) and adjacent HGL)*  
 Yes       No *(for existing buildings located within the property holdings, submit acknowledgment)*
  
2. **VOLUME CONTROL REQUIREMENTS:** Submit calculations and a detail for the volume control facility including a cross-section indicating relevant elevations and the seasonal high groundwater table (SHGWT).
  - A. Does the site have any restrictive covenants related to environmental conditions (e.g., NFR letter)?  
 No       Yes → Explain: \_\_\_\_\_
  - B. Site constraint(s) that precludes the use of onsite retention-based practices *(submit documentation)*:  
 None     SHGWT     Contaminated Soil     Other: \_\_\_\_\_
  - C. Proposed impervious area of development..... \_\_\_\_\_ acres
  - D. Gross volume control storage (2.C / 12)..... \_\_\_\_\_ ac-ft
  - E. The onsite gross volume control storage may be reduced when a site constraint is present:
    1. Existing impervious area within development..... \_\_\_\_\_ acres
    2. VC storage reduction (5)(2.D)[1 - (2.C / 2.E.1)]..... \_\_\_\_\_ ac-ft
  - F. Required volume control storage (2.D - 2.E.2)..... \_\_\_\_\_ ac-ft
  - G. Provided volume within retention-based practice..... \_\_\_\_\_ ac-ft
  - H. Volume control facility (*\*only when a site constraint is present*)
    - Retention-based practice      → Type of practice: \_\_\_\_\_
    - Flow-through practice\*      → Type of practice: \_\_\_\_\_
    - Detention Storage\*      → Type of facility: \_\_\_\_\_
    - Offsite retention-based practice\*      → WMO Permit Number: \_\_\_\_\_
  - I. Designed as an offsite retention-based practice:  
 No       Yes → Impervious runoff volume tributary to facility..... \_\_\_\_\_ ac-ft

# SCHEDULE D

## STORMWATER MANAGEMENT FACILITIES

WMO Permit Number: \_\_\_\_\_

**3. DETENTION REQUIREMENTS:** Submit calculations and an exhibit that includes a cross-section of the detention facility and a detail of the control structure, and delineates the tributary, unrestricted, depressional storage, and bypass areas with the acreage and curve number indicated.

- A. Watershed specific release rate (*Appendix B*)..... cfs/ac
- B. Detention service area ..... acres
- C. Gross allowable release rate ..... cfs
- D. Unrestricted area..... CN \_\_\_\_\_ , \_\_\_\_\_ acres
- E. Unrestricted release rate (*100-year, 24-hour storm*)..... cfs
- F. Depressional storage release rate adjustment (*100-year, 24-hour storm*)..... cfs
- G. Net allowable release rate (*3.C – 3.E – 3.F*)..... cfs
- H. Control structure (restriction) information:
  - 1. Diameter..... in
  - 2. Actual Release Rate..... cfs
  - 3.  $C_d$ .....
  - 4. HWL..... ft
  - 5. Type.....
  - 6. Invert elevation..... ft
- I. Method used to determine the required detention volume:
  - Hydrologic Model
  - Nomograph
- J. Time-of-concentration..... minutes
- K. Area detained (*include trade areas*)..... CN \_\_\_\_\_ , \_\_\_\_\_ acres
- L. Adjusted CN (*when onsite retention-based practices are provided*).....
- M. Required detention volume at actual release rate (*3.H.2*)..... ac-ft
- N. Provided detention volume at HWL (*3.H.4*)..... ac-ft
- O. Drawdown time..... hours
- P. Type of stormwater detention facility: \_\_\_\_\_
- Q. Designed as an offsite detention facility:
  - No
  - Yes → Runoff volume tributary to facility..... ac-ft

**4. OFFSITE DETENTION REQUIREMENTS:** This item is only applicable when the development utilizes an offsite detention facility to comply with the detention requirements.

- A. Site limitation(s) that precludes the use of an onsite detention facility (*submit justification*):
  - Floodway
  - Shallow Bedrock
  - Other: \_\_\_\_\_
- B. Area requiring detention..... CN \_\_\_\_\_ , \_\_\_\_\_ acres
- C. Runoff volume from area to be detained offsite..... ac-ft
- D. WMO Permit Number for offsite detention facility.....

**Engineering Firm:** \_\_\_\_\_

**Name:** \_\_\_\_\_ **Phone:** \_\_\_\_\_

**Title:** \_\_\_\_\_ **Email:** \_\_\_\_\_

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

# Emergency Overflow Spillway Calculations

Proposed Self-Storage Development - 410 W. Golf Rd, Arlington Heights, IL  
OUTLET CONTROL STRUCTURE EMERGENCY OVERFLOW WEIR

Date: 12-15-2022

## 100-year Rainfall Event

Tributary Area = 2.387 acre

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**100-Year Peak Runoff Rate = 25.07 cfs**

Weir Equation:  $Q = 3.33 L H^{(3/2)}$  (Broad Crested Weir)

**\*\*concrete or asphalt\*\***

Weir Equation:  $Q = 2.60 L H^{(3/2)}$  (Broad Crested Weir)

**\*\*grass\*\***

Where: L (length) = 6 ft.

H (head) = 1.20 ft.

## Emergency Overflow Spillway Rate Capacity

**Q = 26.26 cfs**