

**MJK Southpoint Development  
E. Rand Road & E. Palatine Road  
Preliminary Drainage Report**

Prepared for:

**MJK Real Estate Holding Company  
790 Estate Drive, Suite 100  
Deerfield, IL**

**July 2021**  
Revised December 2021



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## **1.0 PROJECT OVERVIEW**

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### **1.1 EXISTING CONDITIONS**

The MJK Southpoint Development is located at E. Rand Road and E. Palatine Road in Arlington Heights, IL. The existing site consist of commercial buildings, parking lots, and a detention basin that was last permitted through the Metropolitan Water Reclamation District of Greater Chicago (MWRD) in 1988. The detention pond was designed for a tributary area of 28.08 acres as shown in Exhibit A. The pond design was based on a release rate of 0.18 cfs/acre and required a volume of 5.68 ac-ft including 0.76 ac-ft of parking lot detention. The pond now holds approximately 3.44 ac-ft of stormwater per recent survey data.

### **1.2 PROPOSED DRAINAGE IMPROVEMENTS**

The proposed development will disturb approximately 10.08 acres of the overall site as shown in Exhibit B. The detention for the proposed area will be required to be designed with Bulletin 75 rainfall data for Cook County. The required release rate for MWRD for Arlington Heights is 0.20 cfs/acre, but since the existing pond used a release rate of 0.18 cfs/acre the smaller of the two release rates will be used for the updated design.

The proposed development will require approximately 4.82 ac-ft of additional detention volume. The undisturbed areas of the existing development require 4.12 ac-ft of detention volume based on TP-40 Rainfall data. The existing 0.76 ac-ft of parking lot detention will not be disturbed and is included in the detention requirements for the existing site. The existing pond and parking lot detention will account for 4.20 ac-ft of volume. Therefore, the detention pond will only need to be reconfigured to account for the additional volume required per the current MWRD ordinance requirements. The volume of the detention pond will need to provide at least 8.18 ac-ft. The total detention volume for the whole site will need to be at least 8.94 ac-ft. The detention pond design has been reconfigured to hold 8.49 ac-ft of stormwater. The preliminary design can be found on sheet 10, Grading Plan – 3.

Volume control for Outlot #1 will be provided using permeable pavers in the parking lot. The WMO ordinance requires 0.14 ac-ft of storage. The proposed design will provide 0.15 ac-ft of storage in the coarse aggregate below the pavers.



## COMPOSITE RUNOFF COEFFICIENT (C)

PROJECT: MJK Southpoint Development PERMIT NUMBER: \_\_\_\_\_

LOCATION: E. Rand Rd & E. Palatine Rd, Arlington Heights DATE: 10/11/2021

### TYPE OF AREA (SELECT WITH DROP-DOWN)

DETAINED AREA
  MAJOR STORMWATER SYSTEM  
 UNRESTRICTED AREA
  OTHER: \_\_\_\_\_  
 UPSTREAM AREA

### CONDITION (SELECT WITH DROP-DOWN)

PROPOSED CONDITION
  EXISTING CONDITION

### RUNOFF COEFFICIENT

Surface Description	C	Area (acres)	Product (C)(Area)
Pavement	0.90	8.86	7.97
Landscaped Areas	0.45	1.22	0.55

TOTALS: 10.08 8.52

### COMPOSITE RUNOFF COEFFICIENT

$$\text{Composite C} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{\boxed{8.52}}{\boxed{10.08}} \rightarrow \text{Composite C} = \boxed{0.85}$$

## COMPOSITE RUNOFF COEFFICIENT (C)

PROJECT: MJK Southpoint Development

PERMIT NUMBER: \_\_\_\_\_

LOCATION: E. Rand Rd & E. Palatine Rd, Arlington Heights

DATE: 12/1/2021

### TYPE OF AREA (SELECT WITH DROP-DOWN)

DETAINED AREA
  MAJOR STORMWATER SYSTEM  
 UNRESTRICTED AREA
 OTHER: \_\_\_\_\_  
 UPSTREAM AREA

### CONDITION (SELECT WITH DROP-DOWN)

PROPOSED CONDITION
  EXISTING CONDITION

### RUNOFF COEFFICIENT

Surface Description	C	Area (acres)	Product (C)(Area)
Pavement	0.90	8.85	7.97
Landscaped Areas	0.45	1.23	0.55

TOTALS:	10.08	8.52
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### COMPOSITE RUNOFF COEFFICIENT

$$\text{Composite C} = \frac{\text{Total Product}}{\text{Total Area}} = \frac{8.52}{10.08} \rightarrow \text{Composite C} = \boxed{0.85}$$

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

PROJECT: MJK Southpoint Development

PERMIT NUMBER: \_\_\_\_\_

LOCATION: E. Rand Rd & E. Palatine Rd, Arlington Heights

DATE: 8/23/2021

### CONDITION (SELECT FROM DROP-DOWN)

PROPOSED CONDITION

EXISTING CONDITION

### SHEET FLOW

1. Segment ID	AB	BC	
2. Surface description	Grass	Paved	
3. Manning's roughness coefficient, $n$	0.15	0.011	
4. Flow length, $L$ ( $\leq 100$ ft)	74	26	ft
5. 2-year, 24-hr rainfall, $P_2$	3.34	3.34	in
6. Land slope, $s$	0.010	0.010	ft/ft
7. Travel time, $T_t$	9.95	0.53	+ = <span style="border: 1px solid black; padding: 2px;">10.48</span> min

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5}S^{0.4}} (60)$$

### SHALLOW CONCENTRATED FLOW

8. Segment ID	CD		
9. Surface description (drop-down list)	Paved		
10. Flow length, $L$	174		ft
11. Watercourse slope, $s$	0.015		ft/ft
12. Average velocity, $V$	2.49		fps
13. Travel time, $T_t$	1.16		+ = <span style="border: 1px solid black; padding: 2px;">1.16</span> min

$$T_t = \frac{L}{60V}$$

### OPEN CHANNEL FLOW

14. Segment ID	DE	EF	
15. Cross-sectional flow area, $A$	3.14	60.00	ft <sup>2</sup>
16. Wetted Perimeter, $P_w$	6.28	34.00	ft
17. Hydraulic radius, $R$	0.50	1.76	ft
18. Flow Length, $L$	687	983	ft
19. Channel slope, $S$	0.004	0.003	ft/ft
20. Manning's roughness coefficient, $n$	0.013	0.013	
21. Average velocity, $V$	4.55	8.88	fps
22. Travel time, $T_t$	2.51	1.85	+ = <span style="border: 1px solid black; padding: 2px;">4.36</span> min

$$V = \frac{1.486}{n} R^{\frac{2}{3}} S^{\frac{1}{2}}$$

$$T_t = \frac{L}{60V}$$

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

23. Time-of-Concentration,  $T_c$ , or Travel Time,  $T_t$        $T_c, T_t = \sum T_t =$  16.00 min

### REQUIRED VOLUME CONTROL CALCULATIONS:

- Impervious Area,  $A_{imp} = 72,904.5 \text{ ft}^2$
- Required Volume Control,  $V_c = 0.0833 * A_{imp} = 0.0833 * 72,904.5 = 6,072.95 \text{ ft}^3$
- $V_c = 0.14 \text{ ac-ft}$
- Volume control reduction is negligible due to only a slight reduction in impervious area from the existing site.

## VOLUME CONTROL STORAGE PROVIDED

**PROJECT NAME:** MJK Southpoint Development      **PERMIT NUMBER:** \_\_\_\_\_

**LOCATION:** Rand & Palatine, Arl Hts      **DATE:** 12/2/2021

### STORAGE VOLUME, V<sub>A</sub>: COARSE AGGREGATE (ABOVE INVERT)

Storage Volume = 0.50 \* Porosity \* V<sub>A</sub>

Surface Area (ft <sup>2</sup> )	Depth, D <sub>A</sub> (ft)	V <sub>A</sub> (ac-ft)	Porosity	Storage Volume Provided (ac-ft)
2141.40	1.50	0.07	0.36	0.013
3800.87	1.50	0.13	0.36	0.024
2193.74	1.50	0.08	0.36	0.014

### STORAGE VOLUME, V<sub>B</sub>: COARSE AGGREGATE (BELOW INVERT)

Storage Volume = Porosity \* V<sub>B</sub>

Surface Area (ft <sup>2</sup> )	Depth, D <sub>A</sub> (ft)	V <sub>A</sub> (ac-ft)	Porosity	Storage Volume Provided (ac-ft)
2141.40	1.50	0.07	0.36	0.027
3800.87	1.50	0.13	0.36	0.047
2193.74	1.50	0.08	0.36	0.027

### TOTAL VOLUME CONTROL STORAGE

Total Storage Above Invert (ac-ft)      0.05

Total Storage Below Invert (ac-ft)      0.10

**Total Volume Control Storage (ac-ft)      0.15**

## DETENTION VOLUME PROVIDED

**PROJECT:** MJK Southpoint Development

**PERMIT NUMBER:** \_\_\_\_\_

**LOCATION:** E. Rand Rd & E. Palatine Rd, Arlington Heights

**DATE:** 10/18/2021

### AREA UNITS (CHOOSE WITH DROP-DOWN)

Units:

### POND / VAULT / SURFACE DETENTION VOLUME

Elevation (ft)	Area (ft <sup>2</sup> )	Average Area (ft <sup>2</sup> )	Increment Volume (ac-ft)	Cumulative Volume (ac-ft)
673.50	0.00			0.00
		293.31	0.00	
674.00	586.61			0.00
		20374.98	0.47	
675.00	40163.35			0.47
		54140.15	1.24	
676.00	68116.95			1.71
		69526.82	1.60	
677.00	70936.69			3.31
		72363.04	1.66	
678.00	73789.38			4.97
		75248.93	1.73	
679.00	76708.48			6.70
		78227.07	1.80	
680.00	79745.66			8.49

### STORM SEWER DETENTION VOLUME

Diameter (in)	Length (ft)	Volume (ac-ft)

### TOTAL DETENTION VOLUME

Pond / Vault / Surface Detention Volume (ac-ft)

8.49

Storm Sewer Detention Volume (ac-ft)

0.00

**Total Detention Volume (ac-ft)**

**8.49**





MJK SOUTHPOINT DEVELOPMENT

**EXHIBIT A  
EXISTING TRIBUTARY AREA  
1988 PERMIT**



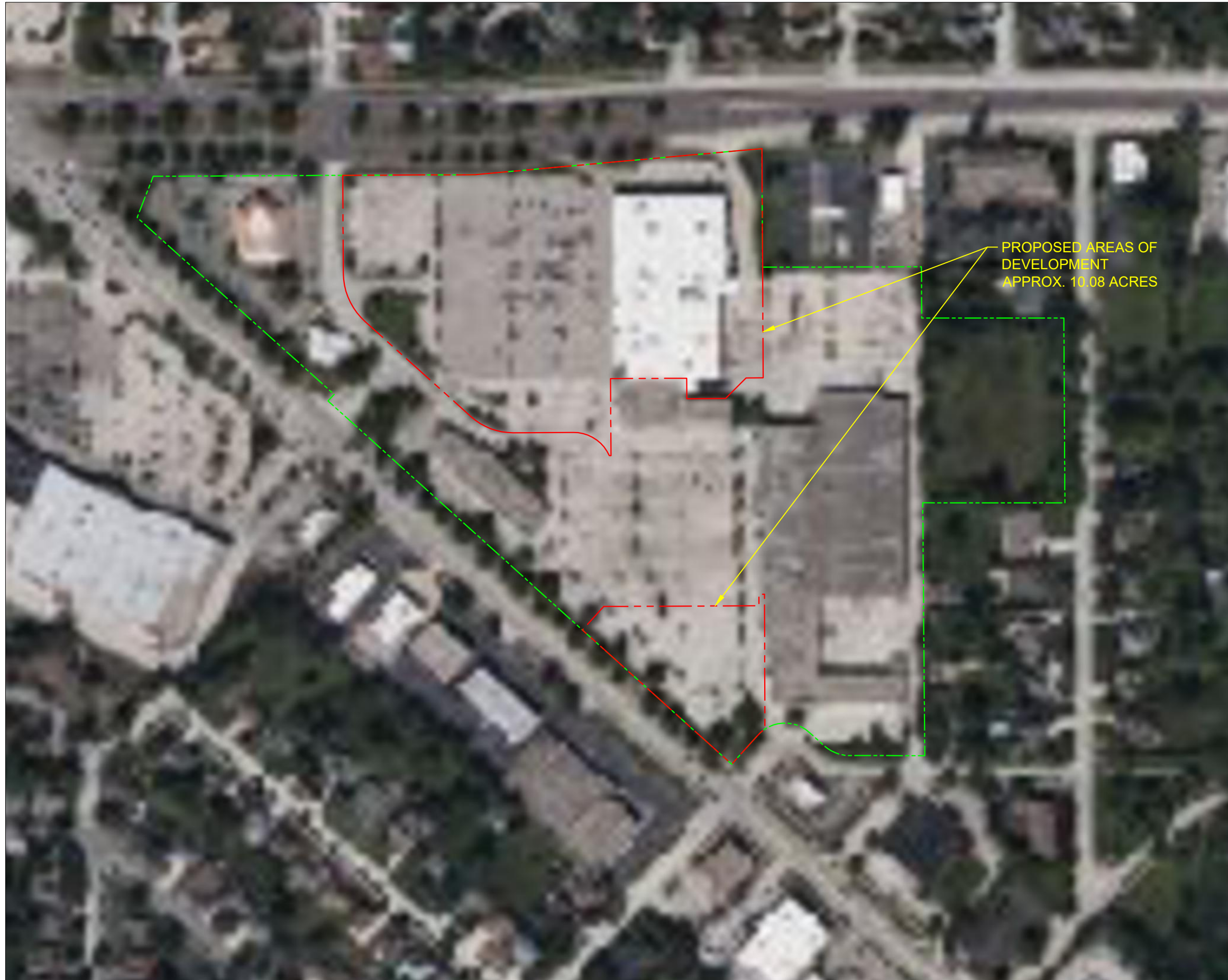
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CHECKED BY:	SCALE:
WC	NTS
DATE:	SHEET #:
8/26/2021	1 OF 1

SHEET NAME:

EXHIBIT A

FILE NAME:

PRELIM DRAINAGE -  
EXHIBIT A



MJK SOUTHPOINT DEVELOPMENT

**EXHIBIT B**  
**PROPOSED DEVELOPMENT AREA**



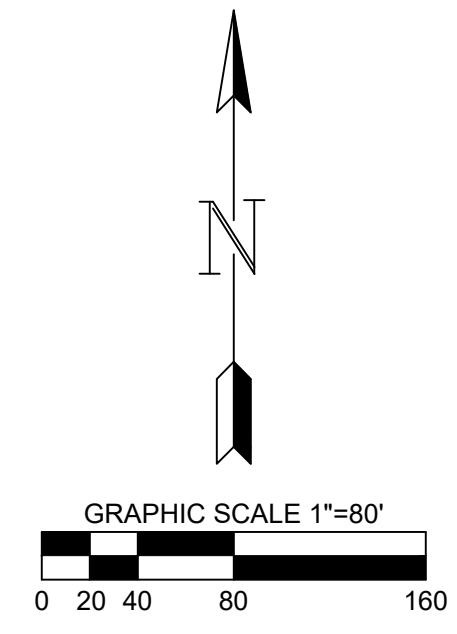
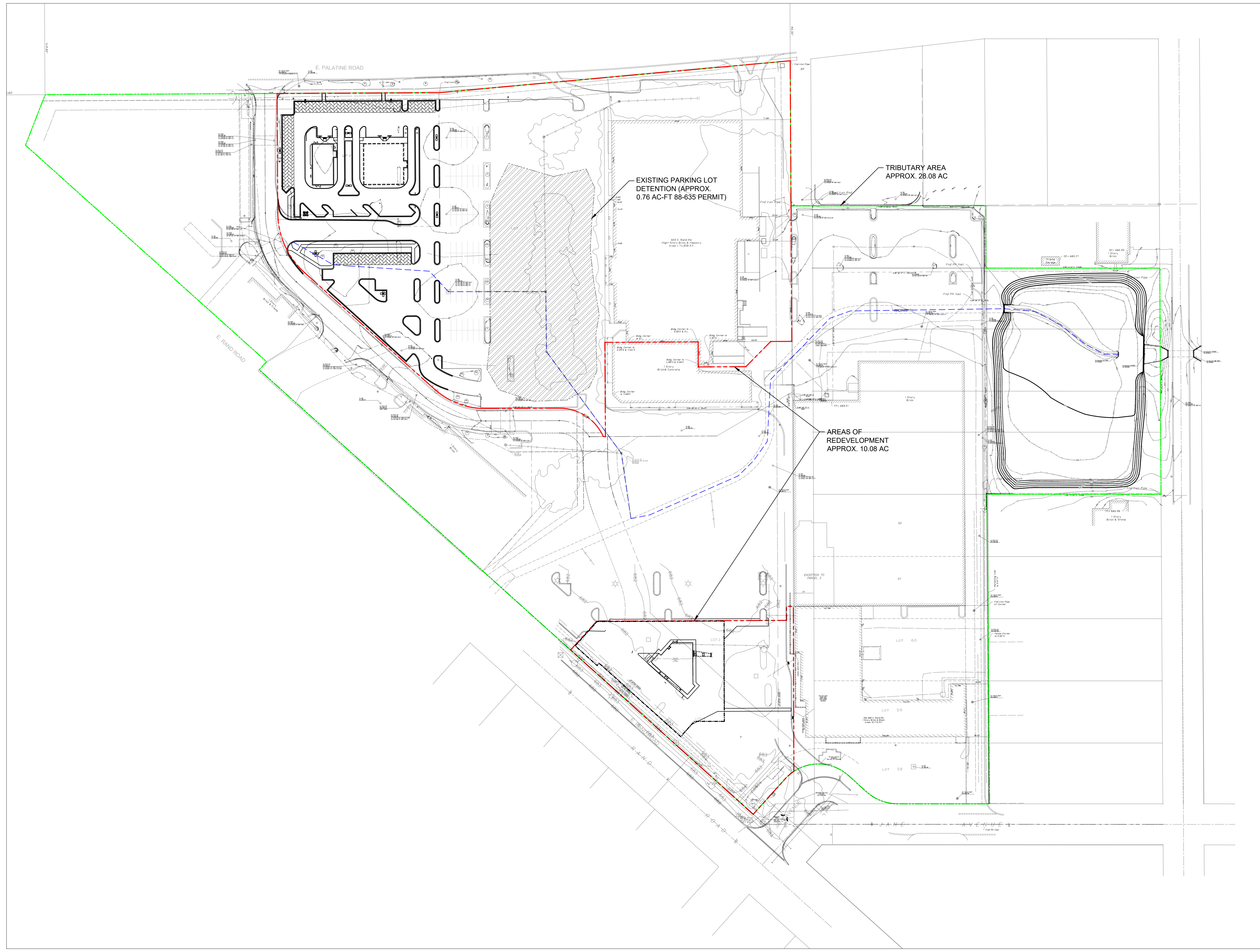
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PGW	21-4002
CHECKED BY:	SCALE:
WC	NTS
DATE:	SHEET #:
10/7/2021	1 OF 1

SHEET NAME:

EXHIBIT B

FILE NAME:

PRELIM DRAINAGE - EXHIBIT B



**LEGEND**

- PROPOSED REDEVELOPMENT AREAS
- TRIBUTARY AREA
- TIME OF CONCENTRATION PATH
- EXISTING PARKING LOT DETENTION
- PROPOSED VOLUME CONTROL

REVISIONS		DESCRIPTION:
NO.	DATE:	

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**EXHIBIT C - DRAINAGE EXHIBIT**  
 E. RAND ROAD & E. PALATINE ROAD  
 ARLINGTON HEIGHTS, IL

DRAWN BY:	PROJECT:
PGW	21-4002
CHECKED BY:	SCALE:
WC	1" = 80'
DATE:	SHEET #:
12/7/2021	1 OF 1
FILE NAME:	