

**9575 W. Higgins Road, Suite 700, Rosemont, Illinois 60018
Phone: (847) 696-4060 Fax: (847) 696-4065**

Preliminary

Stormwater Management Report

Arlington Heights Senior

2045 S Arlington Heights Rd

Village of Arlington Heights

Cook County, Illinois

Project No. 11144
August 19, 2020
Revised November 20, 2020

Engineer's Signature
Brian C. Ratajczak

Date

Illinois Registration NO.: 062-053203
Expiration Date: 11/30/2021

CONTENTS

Tab Description

Title Sheet

Index

Drainage Certificate

1. Narrative

2. Detention Calculations & Retention Calculations

3. Exhibits

- **Preliminary Detention and Drainage Exhibit
- Including Pervious/Impervious Area Calculations**

DRAINAGE CERTIFICATE

I HEREBY DECLARE THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, THE DRAINAGE OF SURFACE WATERS WILL NOT BE CHANGED BY THE CONSTRUCTION OF SUCH SUBDIVISION OR ANY PART THEREOF, OR THAT IF SUCH SURFACE WATER DRAINAGE WILL BE CHANGED, REASONABLE PROVISION HAS BEEN MADE FOR COLLECTION AND DIVERSION OF SUCH SURFACE WATERS INTO PUBLIC AREAS, OR DRAINS WHICH THE DEVELOPER HAS A RIGHT TO USE, AND THAT SUCH SURFACE WATERS WILL BE PLANNED FOR IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING PRACTICES SO AS TO REDUCE THE LIKELIHOOD OF DAMAGE TO THE ADJOINING PROPERTY DUE OF THE CONSTRUCTION OF THE SUBDIVISION.

OWNER OR ATTORNEY

DESIGN ENGINEER



1 Narrative

NARRATIVE

1.1 Existing Conditions

The 8.21 acre property is the existing Arlington Executive Court development located on the southeast corner of Arlington Heights Rd and Seegers Rd with Tonne Rd along the eastern property line. The existing property consists of four single-story office buildings. The property is within the Weller Creek watershed which is tributary to the Des Plaines River. The site generally drains from west to east. The two existing western office buildings are approximately four feet higher than the two existing eastern office buildings. The office buildings were permitted under MWRD Permit No. 79-246. There are two existing restrictors controlling the stormwater runoff release rate from the property. One connects to the existing Weller Creek Tile system to the north and the other connects to the existing storm sewer within the Tonne Rd right-of-way. The Village has indicated that the existing drainage system to the north has limited capacity and that proposed release rate cannot exceed existing conditions.

1.2 Proposed Stormwater Management Design

The proposed development is a 3-story senior living building with proposed roadway and utilities to service the building. Native vegetation bottom basins are proposed to accommodate the required detention volume and retention volume.

The detention volume required for the site was calculated using the Metropolitan Water Reclamation District's (MWRD) method with Bulletin 75 Table 15 rainfall data for the 100-year storm event with the Village's allowable release rate of 0.18 cfs per acre. A composite C-value of 0.77 has been calculated based on the proposed preliminary site plan with C=0.50 for pervious areas and C=0.95 for impervious areas.

The calculations included in Section 2 show that a total of 2.68 ac-ft of detention volume is required and a total of 0.41 ac-ft of retention volume is required. Retention volume is based upon the MWRD WMO ordinance requiring one inch of retention volume per acre of impervious area. The 3.03 ac-ft of detention volume and 0.41 ac-ft of retention volume that is proposed exceeds or meets the required detention and retention volumes, respectively.



2 Detention Calculations and Retention Calculations for Site Improvements

ORIFICE DISCHARGE RATE

PROJECT: 11144 - Arlington Heights Senior

PERMIT NUMBER: _____

LOCATION: 2045 S Arlington Heights Rd

DATE: 10/28/2020

RESTRICTOR INFORMATION

1. Orifice Number	EAST		
2. Orifice diameter, d	4.40	in	
3. Discharge Coefficient, C_d	0.61		
4. Invert Elevation	698.75	ft	
5. High Water Elevation, HWL	703.50	ft	
6. Tail Water Elevation		ft	

ACTUAL RELEASE RATE

6. Free Flow Actual Release Rate at HWL	1.10	cfs	
7. Submerged Actual Release Rate at HWL		cfs	

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

Free-flow

STAGE-DISCHARGE TABLE

Elevation (ft)	Orifice 1 (cfs)	Orifice 2 (cfs)	Total (cfs)
698.75	0.00		0.00
699.00	0.13		0.13
700.00	0.53		0.53
701.00	0.74		0.74
702.00	0.91		0.91
703.00	1.04		1.04
703.50	1.10		1.10

HWL

Allowable Release Rate = 0.18 cfs per acre
 Site Area = 8.21 acres
Req'd Release Rate = 1.48 cfs (total)

ORIFICE DISCHARGE RATE

PROJECT: 11144 - Arlington Heights Senior

PERMIT NUMBER: _____

LOCATION: 2045 S Arlington Heights Rd

DATE: 10/28/2020

RESTRICTOR INFORMATION

1. Orifice Number	WEST		
2. Orifice diameter, d	2.50	in	
3. Discharge Coefficient, C_d	0.61		
4. Invert Elevation	701.00	ft	
5. High Water Elevation, HWL	705.50	ft	
6. Tail Water Elevation		ft	

ACTUAL RELEASE RATE

6. Free Flow Actual Release Rate at HWL	0.35	cfs	
7. Submerged Actual Release Rate at HWL		cfs	

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

Free-flow

STAGE-DISCHARGE TABLE

Elevation (ft)	Orifice 1 (cfs)	Orifice 2 (cfs)	Total (cfs)
701.00	0.00		0.00
702.00	0.16		0.16
703.00	0.23		0.23
704.00	0.28		0.28
705.00	0.33		0.33
705.50	0.35		0.35

HWL

Allowable Release Rate = 0.18 cfs per acre
 Site Area = 8.21 acres
Req'd Release Rate = 1.48 cfs (total)



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CONSULTING ENGINEERS
 SITE DEVELOPMENT ENGINEERS
 LAND SURVEYORS

PROJECT: ARLINGTON HEIGHTS SENIOR
 LOCATION: ARLINGTON HEIGHTS, IL

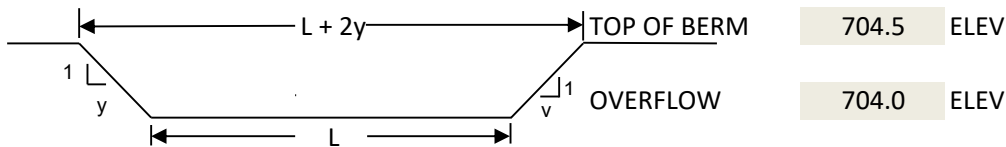
PROJECT #: 11144
 DATE: 11/20/2020
 LAST REVISED:

CALCULATION TITLE: STAGE DISCHARGE TABLE (SINGLE ELEVATION RESTRICTOR)
 DESCRIPTION: EMERGENCY OVERFLOW WEIR - EAST
 SITE CONDITION: PROPOSED

OVERFLOW WEIR DESIGN

- Size Q_{100} from site detention Area plus Q_{100} from Tributary Offsite Area

Q_{100} INFLOW PEAK= 54.18 CFS From TR-20 or other Calculation



VARIABLES

L = 60 FT (LENGTH)
 Y = 10 FT (SIDESLOPE)
 H = 0.5 FT

USE WEIR FORMULA

$Q = CAH^{1/2}$

$A = (H \times L) + (H \times y)$
 A = 35.00 S.F.

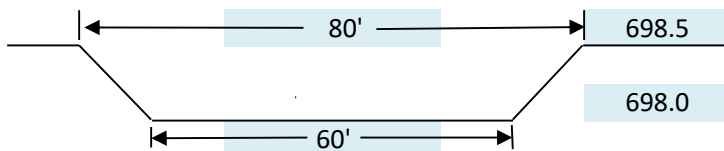
$C = 3.0 (H \times L) + (H \times y)$

Q_{100YR} REQUIRED = 54.18 CFS

Q_{100YR} PROVIDED = 74.25 CFS 74.25 CFS

Q_{100} PROV. > Q_{100} REQ. TRUE

DESIGNED WEIR:





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PROJECT: ARLINGTON HEIGHTS SENIOR
 LOCATION: ARLINGTON HEIGHTS, IL

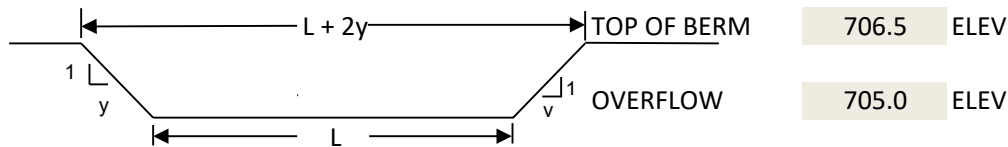
PROJECT #: 11144
 DATE: 11/20/2020
 LAST REVISED:

CALCULATION TITLE: STAGE DISCHARGE TABLE (SINGLE ELEVATION RESTRICTOR)
 DESCRIPTION: EMERGENCY OVERFLOW WEIR - WEST
 SITE CONDITION: PROPOSED

OVERFLOW WEIR DESIGN

- Size Q_{100} from site detention Area plus Q_{100} from Tributary Offsite Area

Q_{100} INFLOW PEAK= 13.20 CFS From TR-20 or other Calculation



VARIABLES

L = 10 FT (LENGTH)
 Y = 10 FT (SIDESLOPE)
 H = 0.5 FT

USE WEIR FORMULA

$$Q = CAH^{1/2}$$

A = (H x L) + (H x y)
 A = 10.00 S.F.

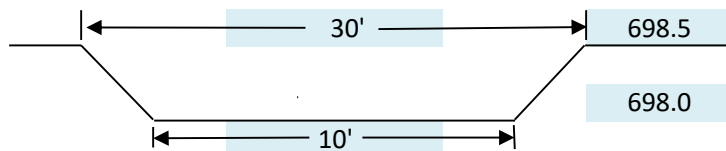
C = 3.0 (H x L) + (H x y)

Q_{100YR} REQUIRED = 13.20 CFS

Q_{100YR} PROVIDED = 21.21 CFS 21.21 CFS

Q_{100} PROV. > Q_{100} REQ. TRUE

DESIGNED WEIR:



MODIFIED RATIONAL METHOD: BULLETIN 70 RAINFALL DATA (2019)

PROJECT: 11144 - Arlington Heights Senior

PERMIT NUMBER: _____

LOCATION: 2045 S Arlington Heights Rd

DATE: 10/28/2020

DEVELOPMENT INFORMATION

1. Detained Area

8.210

acres

2. Composite Runoff Coefficient

0.770

3. Actual Release Rate

1.478

cfs

REQUIRED DETENTION VOLUME

4. Required Detention Volume

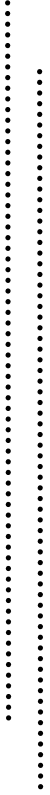
2.682

ac-ft

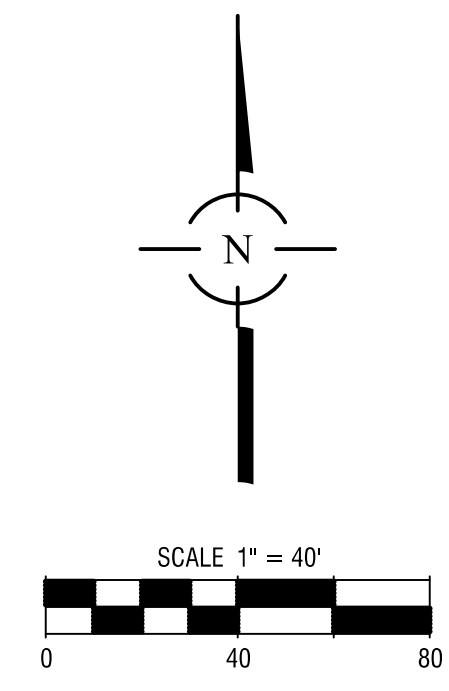
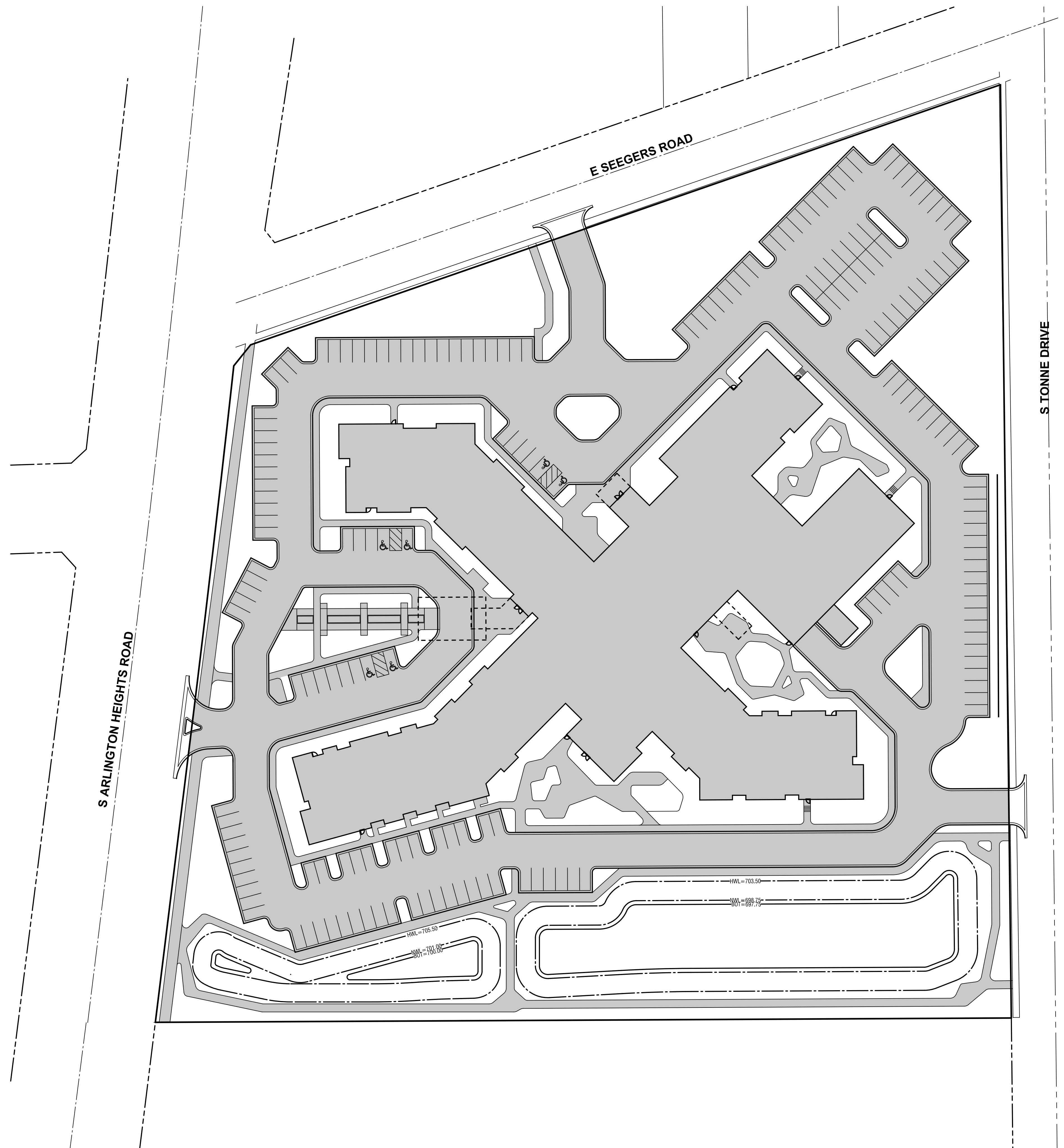
CALCULATION TABLE

Storm Duration	Rainfall Intensity (in/hr)	Inflow Rate (cfs)	Stored Rate (cfs)	Required Storage (ac-ft)
5 min	12.34	78.02	76.54	0.527
10 min	10.80	68.26	66.78	0.920
15 min	9.26	58.51	57.03	1.178
20 min	7.97	50.39	48.91	1.347
30 min	6.34	40.09	38.61	1.596
40 min	5.27	33.32	31.84	1.754
50 min	4.52	28.61	27.13	1.868
1 hr	4.03	25.46	23.99	1.982
1.5 hr	3.03	19.14	17.66	2.190
2 hr	2.49	15.71	14.23	2.353
3 hr	1.83	11.56	10.08	2.499
4 hr	1.48	9.35	7.87	2.601
5 hr	1.25	7.91	6.43	2.658
6 hr	1.07	6.77	5.29	2.625
7 hr	0.97	6.11	4.64	2.682
8 hr	0.87	5.49	4.01	2.650
9 hr	0.79	5.00	3.52	2.617
10 hr	0.72	4.55	3.07	2.540
11 hr	0.67	4.24	2.76	2.507
12 hr	0.62	3.93	2.45	2.430
18 hr	0.45	2.83	1.35	2.010
24 hr	0.36	2.26	0.78	1.546

←



3 Exhibits



LEGEND
 [Shaded Box] IMPERVIOUS AREA
 [Unshaded Box] PERVIOUS AREA

NOTES:
 SITE AREA = 8.21 Ac.
 PERVIOUS AREA = 3.24 Ac.
 IMPERVIOUS AREA = 4.97 Ac.
 PERCENT IMPERVIOUS = 60.5%

NO.	DATE	REMARKS

NO.	DATE	REVISIONS PER VILLAGE	REVISIONS PER CLIENT	REMARKS
1	11/20/20			
1	10/28/20			

PRELIMINARY IMPERVIOUS AREA EXHIBIT
ARLINGTON HEIGHTS SENIOR
2045 S. ARLINGTON HEIGHTS ROAD
 ARLINGTON HEIGHTS, ILLINOIS

CONSULTING ENGINEERS
SITE DEVELOPMENT ENGINEERS
LAND SURVEYORS

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FILENAME:
11144-P-IMP

DATE:
08/19/20

JOB NO.
11144

SHEET
P-IMP
1 OF 1