

STORM DRAINAGE ANALYSIS

FOR

SIGWALT STREET APARTMENTS 37 S. CHESTNUT AVE. ARLINGTON HEIGHTS, IL

PREPARED FOR:

CA VENTURES

130 E. RAMDOLPH STREET, SUITE 2100
CHICAGO, IL 60601
312-800-5370

PREPARED BY:

RWG Engineering, LLC

975 E. 22nd Street Wheaton, Illinois 60189 (630) 774-9501

JOB#291-127-16-301

JULY 10, 2017 REVISION: August 16, 2017 REVISION: September 6, 2017

PROJECT & SITE DESCRIPTION

FINAL ENGINEERING PLANS

Sigwalt Street Apartments

37 S. Chestnut Ave., Arlington Heights, Cook County, IL

Project Overview:

The final engineering plans for Sigwalt Street Apartments include the development of a 0.909 acre site into a residential apartment building.

The proposed development is serviced by city water and sanitary sewer. The sanitary and watermain connections are both made along Sigwalt Street.

The entire 0.909 acre site has detention provided in the onsite StormTrap. Detention storage is calculated using village criteria since it is more restrictive than MWRD criteria. A release rate of 0.18 cfs/ac was used for the 100 year storm event. Runoff coefficients of 0.50 (pervious) and 0.95 (impervious) were used to calculate a composite "C" factor per village code. A minimum restrictor size of 2" was used.

VCBMP's are required by MWRD and are incorporated into the design for the entire project. A Soil Erosion and Sedimentation Control Plan is included with this phase of work and reflects perimeter silt fence and erosion control blanket. Erosion control measures are to be installed prior to commencement of demolition work and routinely augmented as work progresses.

Original Existing Site Drainage Conditions:

The existing 0.909 acre property is almost 100% pervious, covered by grass. Many years ago there was residential housing located on this property. It was demolished, and no previous development impervious area was taken into any calculations for this site.

Existing onsite storm sewer is present in the internal portion of the lot. This storm sewer will be removed and replaced with a proposed detention storage design.

Proposed Site Drainage Conditions:

The entire 0.909 acre parcel will be disturbed and undergo improvements with this project. All site runoff will be collected and delivered to an onsite storm water detention StormTrap. Storm

water detention, as previously stated, was calculated using Village of Arlington Heights criteria. Volume control requirements were calculated using MWRD criteria. In order to achieve volume control storage, a green roof and permeable pavers were added to the plans where possible. See below numbers as a summary to the enclosed calculations.

Total Site "C" = 82

Required Detention Volume (Per Village Code) = 0.29 ac-ft

Provided Detention Volume (Per Village Code) = 0.29 ac-ft

Allowable Release Rate (Per Village Code) = 0.16 cfs (used to size detention)

Actual Release Rate (Per Village Code) = 0.27 cfs (with 2" restrictor)

Required Volume Control Storage (Per MWRD Ordinance) = 0.053 ac-ft

Provided Volume Control Storage (Per MWRD Ordinance) = in progress

(See attached calculations)

CALCULATION OF COMPOSITE RUN-OFF COEFFICIENT

Designer:	MRM
Description:	SIGWALT APARTMENTS

TOTAL PROJECT AREA

0.909 Ac.

IMPERVIOUS AREA FOR TOTAL SITE

BUILDING - IMPERVIOUS ONLY	0.606 Ad	٥.
SIDEWALKS/PATIOS	0.026 Ad	Э.
	0.632 Ac	2.

PERVIOUS AREA FOR TOTAL SITE

GREEN ROOF	0.044 Ac.
PERMEABLE PAVERS	0.014 Ac.
GREEN SPACE	0.219 Ac.
	0.277 Ac.

TOTAL SITE AREA	0.909	Ac.
IMPERVIOUS AREA	0.632	Ac.
PERCENTAGE OF IMPERVIOUS	70	%
	LICE 700/	

USE 70%

WITH 35% IMPERVIOUS AREA:

PERVIOUS = 30% @ 0.50 =	0.1500
IMPERVIOUS = 70% @ 0.95 =	0.6650
COMPOSITE "C" =	0.815

TOTAL COMPOSITE "C" FACTOR 0.82

RWG ENGINEERING, LLC. 975 E. 22nd Street Wheaton, IL 60189 (630) 774-9501

Detention Calculator Modified Rational Method

(HOURS) (MIN) (IN/HR) (CFS) (CFS) (ACRE-FT) Trapped water area in acres		ATION SHEETS	LCU	MSD BASIN CAL	DESCRIPTION	TELEPHONE (630) 774-9501 DESCRI								
(HOURS) (MIN) (IN/HR) (CFS) (ACRE-FT) Trapped water area in acres 0.50 30 5.60 4.15 3.98 0.17 Net area for release computation in acres 0.67 40 4.92 3.64 3.48 0.19 Allowable release rate in CFS 0.83 50 4.24 3.14 2.98 0.21 Unrestricted release rate in CFS 1.00 60 3.56 2.64 2.47 0.21 Bypass release rate in CFS 1.50 90 2.90 2.15 1.98 0.25 Total allowable release in CFS 2.00 120 2.24 1.66 1.50 0.25 Developed runoff coefficient 3.00 180 1.62 1.20 1.04 0.26 Developed runoff coefficient 3.00 180 1.62 1.20 1.04 0.26 Developed runoff coefficient 3.00 180 0.95 0.70 0.54 0.27 Total allowable release rate in CFS 5.00 300 1.17 <td></td> <td>7.58 in 100 Year Rainfall)</td> <td>n 70</td> <td>Technical Bulletin</td> <td></td> <td></td> <td></td> <td></td> <td></td>		7.58 in 100 Year Rainfall)	n 70	Technical Bulletin										
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Pervious Area 30.00 0.50 0.15			-											
Total: 100.00 0.50 0.15	_					0.50								

ORIFICE WORKSHEET

Designer: MRM
Description STORMTRAP- 100 YR. RESTRICTOR

FLOWS ARE BASED ON THE FOLLOWING EQUATION:

$$Q = AC\sqrt{2gH}$$

Q = FLOW (cfs) A = AREA (sqr.ft.) C = Orifice Coefficient g = 32.2 ft/sec² H = Head (ft.)

ORIFICE DATA:

Orifice diameter(inches)
Orifice area(square feet)
Proposed invert elevation
Centerline of flow
Orifice coeficient

2.00 inches 0.022 sqr. ft. 686.00 ft. 686.08 ft 0.61 Minimum size

RATING TABLE:

Water Elevation (ft.)*	Head (ft.)	Q (cfs)
686.00	(0.08)	#NUM!
687.00	0.92	0.10
688.00	1.92	0.15
689.00	2.92	0.18
690.00	3.92	0.21
691.00	4.92	0.24
692.00	5.92	0.26
692.50	6.42	0.27
693.50	7.42	0.29
694.50	8.42	0.31
695.50	9.42	0.33
696.50	10.42	0.34

HWL of Stormtrap

^{*}Water elevation must be higher than centerline of flow

291-Revised Storm Master-070517

9/6/2017 1:52 PM

STORM SEWER WORKSHEET

Designer: MRM
Description: SIGWALT APARTMENTS

<u>o</u>

10 YR.

FREQUENCY:

ROUGH. COEFF. 0.013

RUNOFF COEFF:

0.81

	LOWER MH	N			685.75											
	LOWE	RIM			693.55											
	S MH	N			686.00											
	UPPER MH	RIM			694.00											
	CAP	CFS			9.45	Contract of the second					100 M					
	_	Ŀ			31											
	VEL	FPS			5.35											
PIPE	SLOPE	%			0.81											
PIPE	DIA	Z			18.00											
	ø	CFS			7.38				The state of the s	1000		10 mg			200 May 100 May	
	8 	IN/HR		100 YR.	10.02											
Æ	T/C	MIN			10											
TIME	FLOW	MIN			0											
	CXA				0.74											
-AL	AREA	AC			0.91											
TOTAL	"C"			:dı	0.81											
Ü	AREA	AC		1 StormTra	0.91											
ADDED	ڻ ا			n pipe fron	0.81											
	MH-MH			Downstream pipe from StormTrap:	27-9											