RWG

Engineering,

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	Ac.
SIDEWALKS/PATIOS	0.026	Ac.
	0.632	Ac.

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	%
	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**

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Detention Calculator
Modified Rational Method

TELEPHONE (630) 774-9501			DESCRIPTION		MSD BASIN CALCULATION SHEETS	
					Technical Bulletin 70 (7.58 in. - 100 Year Rainfall)	

DURATION (HOURS)	TIME (MIN)	100 YR. INT (IN/HR)	INFLOW RATE (CFS)	STORED RATE (CFS)	VOLUME (ACRE-FT)				
0.50	30	5.60	4.15	3.98	0.17	Area of site in acres:	0.91
0.67	40	4.92	3.64	3.48	0.19	Trapped water area in acres:	0.00
0.83	50	4.24	3.14	2.98	0.21	Net area for release computation in acres:	0.00
1.00	60	3.56	2.64	2.47	0.21	Allowable release rate in CFS:	0.16
1.50	90	2.90	2.15	1.98	0.25	Unrestricted release rate in CFS:	0.00
2.00	120	2.24	1.66	1.50	0.25	Bypass release rate in CFS:	0.00
3.00	180	1.62	1.20	1.04	0.26	Total allowable release in CFS:	0.16
4.00	240	1.40	1.03	0.87	0.29	Developed runoff coefficient:	0.82
5.00	300	1.17	0.87	0.71	0.29		
6.00	360	0.95	0.70	0.54	0.27	**Maximum volume in Acre-Ft =**	**0.29**
7.00	420	0.88	0.65	0.49	0.29		
8.00	480	0.82	0.61	0.44	0.29 <===		
9.00	540	0.75	0.56	0.39	0.29		
10.00	600	0.68	0.51	0.34	0.29		
11.00	660	0.62	0.46	0.29	0.27		
12.00	720	0.55	0.41	0.24	0.24		
13.00	780	0.52	0.39	0.22	0.24		
14.00	840	0.50	0.37	0.20	0.24		
15.00	900	0.47	0.35	0.18	0.23		
16.00	960	0.44	0.33	0.16	0.22		
17.00	1020	0.42	0.31	0.14	0.20		
18.00	1080	0.39	0.29	0.12	0.19		
19.00	1140	0.38	0.28	0.12	0.18		
20.00	1200	0.37	0.27	0.11	0.18		
21.00	1260	0.36	0.26	0.10	0.17		
22.00	1320	0.34	0.25	0.09	0.17		
23.00	1380	0.33	0.25	0.08	0.16		
24.00	1440	0.32	0.24	0.07	0.15		

	% of site	"C" Factor	Composite "C"
Open Water Area	0.00	1.00	0.00
Impervious Area	70.00	0.95	0.67
Pervious Area	30.00	0.50	0.15
Total :	100.00		0.82

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)	2.00	inches	Minimum size
Orifice area(square feet)	0.022	sqr. ft.	
Proposed invert elevation	686.00	ft.	
Centerline of flow	686.08	ft	
Orifice coeficient	0.61		

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	**HWL of Stormtrap**
693.50	7.42	0.29	
694.50	8.42	0.31	
695.50	9.42	0.33	
696.50	10.42	0.34	

*Water elevation must be higher than centerline of flow

STORM SEWER WORKSHEET

Designer: **MRM**
Description: **SIGWALT APARTMENTS**

FREQUENCY: 10 YR.   ROUGH. COEFF. 0.013   RUNOFF COEFF.: 0.81

| MH-MH | ADDED | | | TOTAL | | | TIME | | | I | Q | PIPE DIA | PIPE SLOPE | VEL | L | CAP | UPPER MH | | LOWER MH | |
	"C"	AREA AC	C X A	"C"	AREA AC	C X A	FLOW MIN	T/C MIN		IN/HR	CFS	IN	%	FPS	FT	CFS	RIM	INV	RIM	INV
Downstream pipe from StormTrap:									100 YR.											
27-9	0.81	0.91	0.74	0.81	0.91		0	10		10.02	7.38	18.00	0.81	5.35	31	9.45	694.00	686.00	693.55	685.75

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