



AUTO REPAIR FACILITY

3650 N. Wilke Road
Arlington Heights, IL 60004
18.NPL.C01

August 27, 2018
Revised October 10, 2018

PRELIMINARY STORM WATER COMPUTATIONS



LICENSE EXPIRES: 11/30/19

SIGNED: 10/10/2018

Expansion of Napleton Arlington Heights CDJR

3650 N. Wilke Road

Existing Conditions Stormwater Detention Requirements

Site area = 1.77 Acres
 Allowed Release Rate (Area x 0.18 cfs/Ac.) = 0.32 cfs
 Total Impervious Area (0.95) = 0.788 Acres
 Total Pervious Area (0.50) = 0.984 Acres
 Weighted "C" Factor = 0.70

A	B	C	D	E	F	G	H	J	K
Runoff Factor "C"	Storm Duration (min)	(hrs)	Rainfall Intensity "I" (in/hr"	Site Area "A" (acres)	Inflow Rate (CxlxA) (cfs)	Release Rate (cfs)	Storage Rate (cfs)	Storage Required (cu-ft)	(Ac-ft)
0.70	5	0.08	10.92	1.77	13.55	0.32	13.23	3,810	0.087
0.70	10	0.17	10.02	1.77	12.43	0.32	12.11	7,413	0.170
0.70	15	0.25	8.20	1.77	10.17	0.32	9.85	8,869	0.204
0.70	30	0.50	5.60	1.77	6.95	0.32	6.63	11,932	0.274
0.70	60	1.00	3.56	1.77	4.42	0.32	4.10	14,753	0.339
0.70	90	1.50	2.75	1.77	3.41	0.32	3.09	16,702	0.383
0.70	120	2.00	2.24	1.77	2.78	0.32	2.46	17,714	0.407
0.70	180	3.00	1.62	1.77	2.01	0.32	1.69	18,265	0.419
0.70	240	4.00	1.28	1.77	1.59	0.32	1.27	18,279	0.420
0.70	300	5.00	1.08	1.77	1.34	0.32	1.02	18,382	0.422
0.70	360	6.00	0.95	1.77	1.18	0.32	0.86	18,575	0.426
0.70	420	7.00	0.83	1.77	1.03	0.32	0.71	17,920	0.411
0.70	480	8.00	0.75	1.77	0.93	0.32	0.61	17,621	0.405
0.70	540	9.00	0.68	1.77	0.84	0.32	0.53	17,010	0.391
0.70	600	10.00	0.63	1.77	0.78	0.32	0.46	16,667	0.383
0.70	660	11.00	0.59	1.77	0.73	0.32	0.41	16,369	0.376
0.70	720	12.00	0.55	1.77	0.68	0.32	0.36	15,713	0.361
0.70	780	13.00	0.52	1.77	0.65	0.32	0.33	15,281	0.351
0.70	840	14.00	0.49	1.77	0.61	0.32	0.29	14,580	0.335
0.70	900	15.00	0.46	1.77	0.57	0.32	0.25	13,612	0.312
0.70	960	16.00	0.43	1.77	0.53	0.32	0.21	12,376	0.284
0.70	1020	17.00	0.41	1.77	0.51	0.32	0.19	11,631	0.267
0.70	1080	18.00	0.39	1.77	0.48	0.32	0.17	10,707	0.246

Max Volume = 0.426 Acre Feet
 18,575 cu-ft

Expansion of Napleton Arlington Heights CDJR

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Existing Conditions Stormwater Detention Requirements

Site area = 1.77 Acres
 Allowed Release Rate (Area x 0.18 cfs/Ac.) = 0.32 cfs
 Total Impervious Area (0.95) = 0.995 Acres
 Total Pervious Area (0.50) = 0.776 Acres
 Weighted "C" Factor = 0.75

A	B	C	D	E	F	G	H	J	K
Runoff Factor "C"	Storm Duration (min)	(hrs)	Rainfall Intensity "I" (in/hr)	Site Area "A" (acres)	Inflow Rate (CxlxA) (cfs)	Release Rate (cfs)	Storage Rate (cfs)	Storage Required (cu-ft)	(Ac-ft)
0.75	5	0.08	10.92	1.77	14.56	0.32	14.24	4,101	0.094
0.75	10	0.17	10.02	1.77	13.36	0.32	13.04	7,981	0.183
0.75	15	0.25	8.20	1.77	10.93	0.32	10.61	9,553	0.219
0.75	30	0.50	5.60	1.77	7.47	0.32	7.15	12,866	0.295
0.75	60	1.00	3.56	1.77	4.75	0.32	4.43	15,940	0.366
0.75	90	1.50	2.75	1.77	3.67	0.32	3.35	18,078	0.415
0.75	120	2.00	2.24	1.77	2.99	0.32	2.67	19,209	0.441
0.75	180	3.00	1.62	1.77	2.16	0.32	1.84	19,886	0.457
0.75	240	4.00	1.28	1.77	1.71	0.32	1.39	19,987	0.459
0.75	300	5.00	1.08	1.77	1.44	0.32	1.12	20,184	0.463
0.75	360	6.00	0.95	1.77	1.27	0.32	0.95	20,477	0.470
0.75	420	7.00	0.83	1.77	1.11	0.32	0.79	19,858	0.456
0.75	480	8.00	0.75	1.77	1.00	0.32	0.68	19,623	0.450
0.75	540	9.00	0.68	1.77	0.91	0.32	0.59	19,052	0.437
0.75	600	10.00	0.63	1.77	0.84	0.32	0.52	18,769	0.431
0.75	660	11.00	0.59	1.77	0.79	0.32	0.47	18,533	0.425
0.75	720	12.00	0.55	1.77	0.73	0.32	0.41	17,915	0.411
0.75	780	13.00	0.52	1.77	0.69	0.32	0.37	17,535	0.403
0.75	840	14.00	0.49	1.77	0.65	0.32	0.33	16,869	0.387
0.75	900	15.00	0.46	1.77	0.61	0.32	0.29	15,914	0.365
0.75	960	16.00	0.43	1.77	0.57	0.32	0.25	14,671	0.337
0.75	1020	17.00	0.41	1.77	0.55	0.32	0.23	13,956	0.320
0.75	1080	18.00	0.39	1.77	0.52	0.32	0.20	13,049	0.300

Max Volume = 0.470 Acre Feet
 20,477 cu-ft

Existing Site Required = 0.426 Acre Feet
 Proposed Site Requires = 0.470 Acre Feet
Difference in Storage to be provided with project = 0.044 Acre Feet
 1,901 Cubic Feet

PROPOSED CONDITIONS ORIFICE/WEIR STRUCTURE RATING ANALYSIS

10/10/2018

PROJECT NAME: Expansion of Napleton Arlington Heights CDJR
PROJ. NO.: 18.NPL.C01

OUTLET:

SITE AREA = 1.77 ACRES
ADDITIONAL TRIB. DISTURBED AREA = 0.00 ACRES
TOTAL TRIBUTARY DETENTION/VOLUME CONTROL AREA = 1.77 ACRES
ALLOWABLE RELEASE RATE (0.18 CFS/ACRE) = 0.32 CFS

OUTLET:

ORIFICE:	2.5 IN. DIA. @ ELEV	711.74
WEIR:	10 FEET WIDE @ ELEV	715.10

ORIFICE FLOW EQUATION: $Q = C_d A (2gH)^{0.5}$

WEIR FLOW EQUATION: $Q = 3.0L(H)^{1.5}$

HYDRAULIC DIMENSIONS

	# 1
ORIFICE AREA (ft ²)	0.0341
ORIFICE DIAMETER (in)	2.50
ORIFICE DISCHARGE COEFFICIENT	0.61
ORIFICE ELEV. (ft-NAVD88)	711.74
TAILWATER OR CENTROID (ft-NAVD88)	711.844
WEIR LENGTH (ft)	10.00
WEIR COEFFICIENT	3.0
WEIR ELEV. (ft-NAVD88)	715.10

ELEVATION-DISCHARGE RELATIONSHIP

Elevation (feet)	Q-Orifice (cfs)	Q-Weir (cfs)	Q-Total (cfs)
711.74	0.00	0.00	0.00
712.00	0.07	0.00	0.07
713.00	0.18	0.00	0.18
714.00	0.25	0.00	0.25
715.00	0.30	0.00	0.30

Detention HWL

PROPOSED STORMWATER VOLUME

ELEV.	Contour area	Storage	Cumulative total	
			CU.FT.	ACRE-FEET
715.00	1596	1307	1944	0.045
714.00	1017	446	637	0.015
713.50	766	192	192	0.004
713.00	0		0	0.000