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STORMWATER MANAGEMENT PLAN

FOR

VALLEY WEST SHOPPING CENTER

10520 FRANCE AVE S

BLOOMINGTON, MN

PREPARED BY:

JESSICA ANDERSEN

BRADY BUSSELMAN, PE

Project Introduction

The proposed project is a 0.95 acre redevelopment located at the Valley West Shopping Center located northwest of the intersection of W Old Shakopee Rd and France Ave S in Bloomington, MN. The project is located within the Lower Minnesota River Watershed District. Stormwater management onsite has been designed to meet the rate control and volume retention requirements of the City and Watershed. The City of Bloomington is the LGU.

Existing Conditions

The existing project area is a building and parking lot. The project area to be disturbed is 97% impervious with 0.92 acres if hard surface. Geotechnical borings prepared by Braun Intertec show under lying soils to be poorly graded sands, which may be classified as Hydrologic Soil Group type A soils and are highly suitable for infiltration. The site drains into the adjacent storm sewer which travels north. There is currently no stormwater management system in place.

Proposed Conditions

The proposed project will reconstruct the building and parking lot areas, with a reduced impervious percentage of 89 percent, generating 0.85 acres of new and reconstructed impervious surfaces. In order to provide stormwater management onsite, an underground infiltration system is proposed beneath the parking lot. The system will discharge to the existing storm sewer to the east.

Rate Control

The City of Bloomington requires that the redevelopment must achieve a net reduction of pre-project discharge rates for the 2-, 10-, and 100-year 24-hour Atlas 14 rainfall events. Rate control is achieved onsite through the reduction of onsite impervious surface, reducing the weighted curve number for the site from 96 to 92. The runoff rate control analysis was performed in HydroCAD using the MSE 3 rainfall distribution. The results of the analysis follow with additional information available in the appendices.

Maximum Rate of Runoff (cfs)

Storm Event	Total Existing	Total Proposed
2-year	3.79	3.37
10-year	5.84	5.48
100-year	10.52	10.26

VOLUME REDUCTION

The City of Bloomington requires onsite retention of the first 1.1 inches of runoff from new and reconstructed impervious surfaces. The proposed storm sewer onsite drains to an underground infiltration system which captures the first 1.1 inches of rainfall and bypasses the larger storm events. The system consists of 6 inches of bottom rock, a 30 inch chamber, and another 6 inches of top rock, for a total depth of 3.75 feet. The rock within the system has 40% voids, reducing the equivalent depth of the system to 2.9 feet. Based on the underlying HSG type A soils, an infiltration rate of 0.8 in/hr and maximum infiltration depth of 3.2 feet are used for the design. The results of the volume retention calculations are provided below.

$$Required\ Infiltration\ Volume(ft^3) = V_{inf} = 1(in) * \frac{1\ ft}{12\ in} * New\ Impervious\ Area\ (ft^2)$$

$$V_{inf}(ft^3) = 1.1(in) * \frac{1\ ft}{12\ in} * 37{,}166(\ ft^2) = 3{,}407\ ft^3$$

Volume Control Analysis

New Impervious Surface	36,982	sf
Design Infiltration/Filtration Rainfall Event	1.1	in
Required Infiltration/Filtration Volume	**3,407**	**cf**
Maximum Allowable Infiltration Rate	0.80	in/hr
Required Drawdown Time	48	hrs
Maximum Live Storage Depth	**3.2**	**ft**
Provided Volume Below Outlet	**3,564**	**cf**

STORMWATER SYSTEM OPERATIONS & MAINTENANCE

If required by the LGU, an operations & maintenance agreement will be prepared for the project.

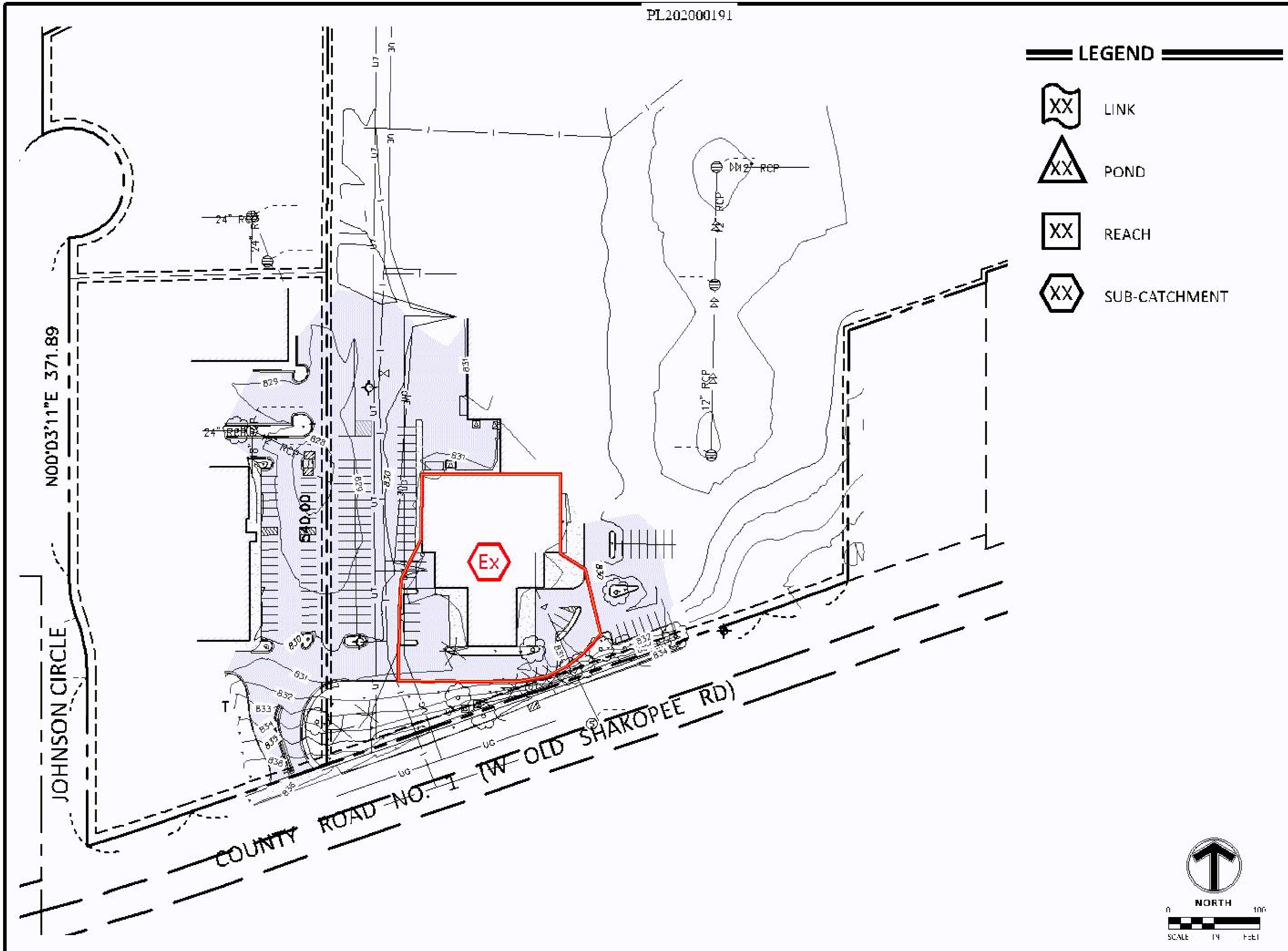
SUMMARY

The proposed Valley West Shopping Center project will meet the requirements of the City of Bloomington, Lower Minnesota River Watershed District, and MPCA through construction of of an underground infiltration system. This BMP will provide the required rate control and volume reduction improvements prior to discharging stormwater runoff from the site to downstream receiving waters.

If you have any questions, comments, or additional information regarding this report, please contact me at jandersen@sambatek.com or 763-259-6679.

APPENDIX A – DRAINAGE MAPS

PL202000191



Sambatek
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Engineering | Surveying | Planning | Environmental

Client
KRAUS ANDERSON

Project
VALLEY WEST

Location
BLOOMINGTON, MN

Certification

Summary
Approved: BB Drawn: AJR

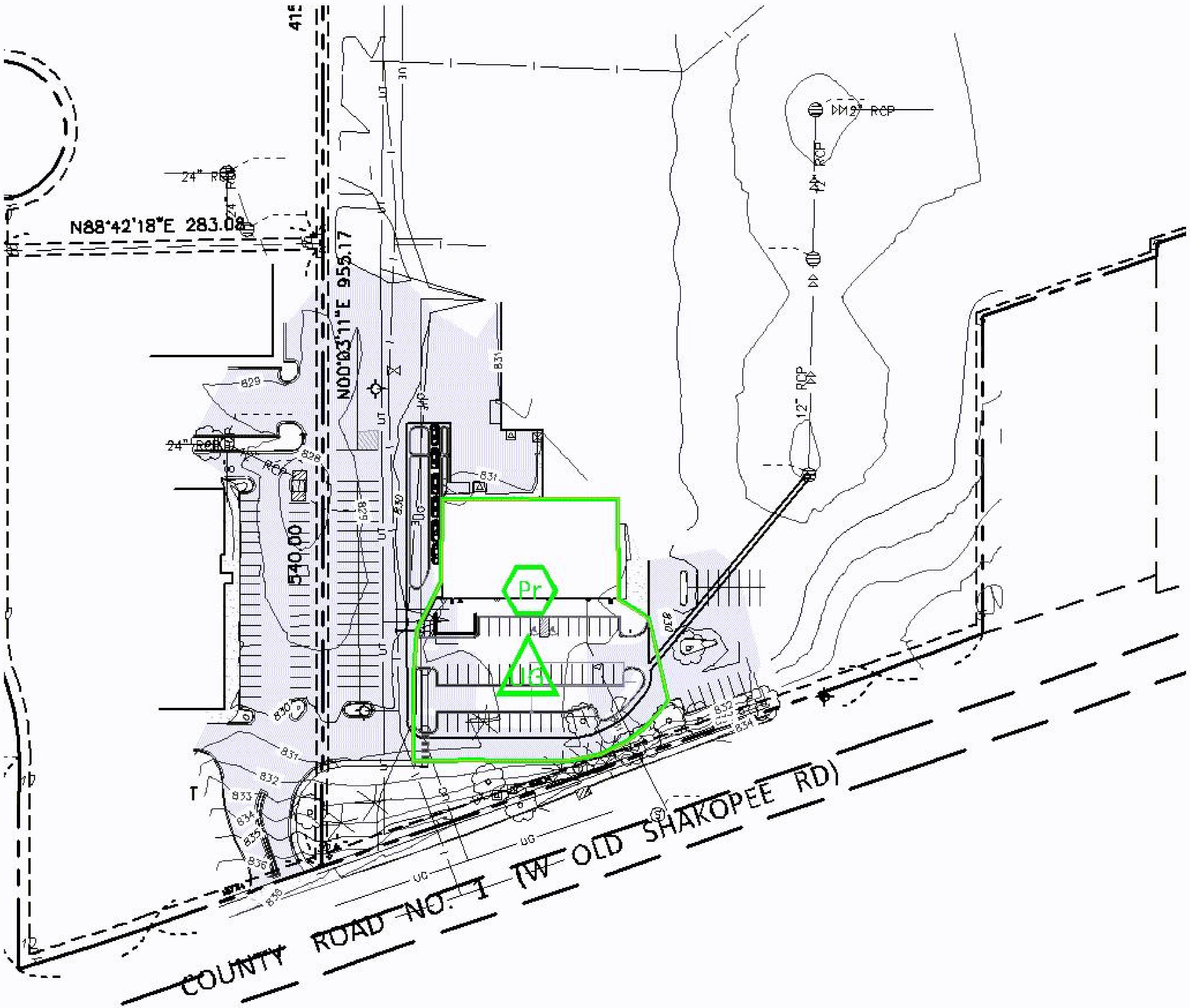
Revision History
No. Date By Submittal / Rev.

Sheet Title
EXISTING DRAINAGE MAP

Sheet No. **Revision**
1/2

Project No. 21618

PL202000191



LEGEND

XX	LINK
XX	POND
XX	REACH
XX	SUB-CATCHMENT

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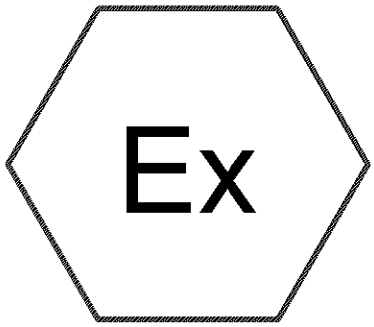
Sheet Title
PROPOSED DRAINAGE MAP

Sheet No. 2/2 **Revision**

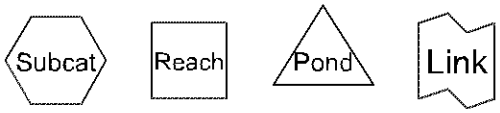
Project No. 21618

APPENDIX B – HYDROCAD CALCULATIONS

Ex 0.95 AC



Existing Area to be Distrurbed



Routing Diagram for 21618 - HydroCAD - 080619
Prepared by {enter your company name here}, Printed 8/6/2019
HydroCAD® 10.00-20 s/n 01876 © 2017 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.033	39	>75% Grass cover, Good, HSG A (Ex)
0.915	98	Paved parking, HSG A (Ex)
0.948	**96**	**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentEx: Existing Area to be Runoff Area=0.948 ac 96.52% Impervious Runoff Depth=2.38"
Tc=5.0 min CN=96 Runoff=3.79 cfs 0.188 af

Total Runoff Area = 0.948 ac Runoff Volume = 0.188 af Average Runoff Depth = 2.38"
3.48% Pervious = 0.033 ac 96.52% Impervious = 0.915 ac

Summary for Subcatchment Ex: Existing Area to be Distrurbed

[49] Hint: Tc<2dt may require smaller dt

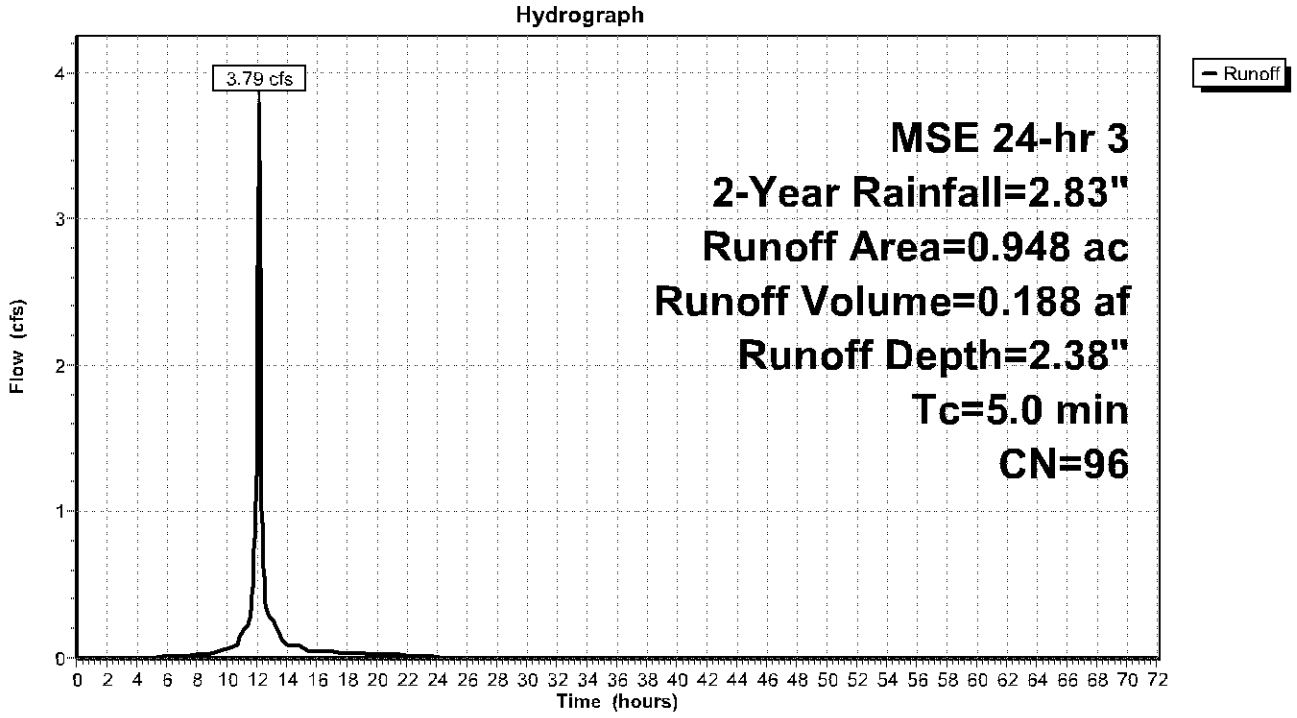
Runoff = 3.79 cfs @ 12.11 hrs, Volume= 0.188 af, Depth= 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.83"

Area (ac)	CN	Description
0.915	98	Paved parking, HSG A
0.033	39	>75% Grass cover, Good, HSG A
0.948	96	Weighted Average
0.033		3.48% Pervious Area
0.915		96.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Ex: Existing Area to be Distrurbed



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentEx: Existing Area to be Runoff Area=0.948 ac 96.52% Impervious Runoff Depth=3.78"
Tc=5.0 min CN=96 Runoff=5.84 cfs 0.298 af

Total Runoff Area = 0.948 ac Runoff Volume = 0.298 af Average Runoff Depth = 3.78"
3.48% Pervious = 0.033 ac 96.52% Impervious = 0.915 ac

Summary for Subcatchment Ex: Existing Area to be Distrurbed

[49] Hint: Tc<2dt may require smaller dt

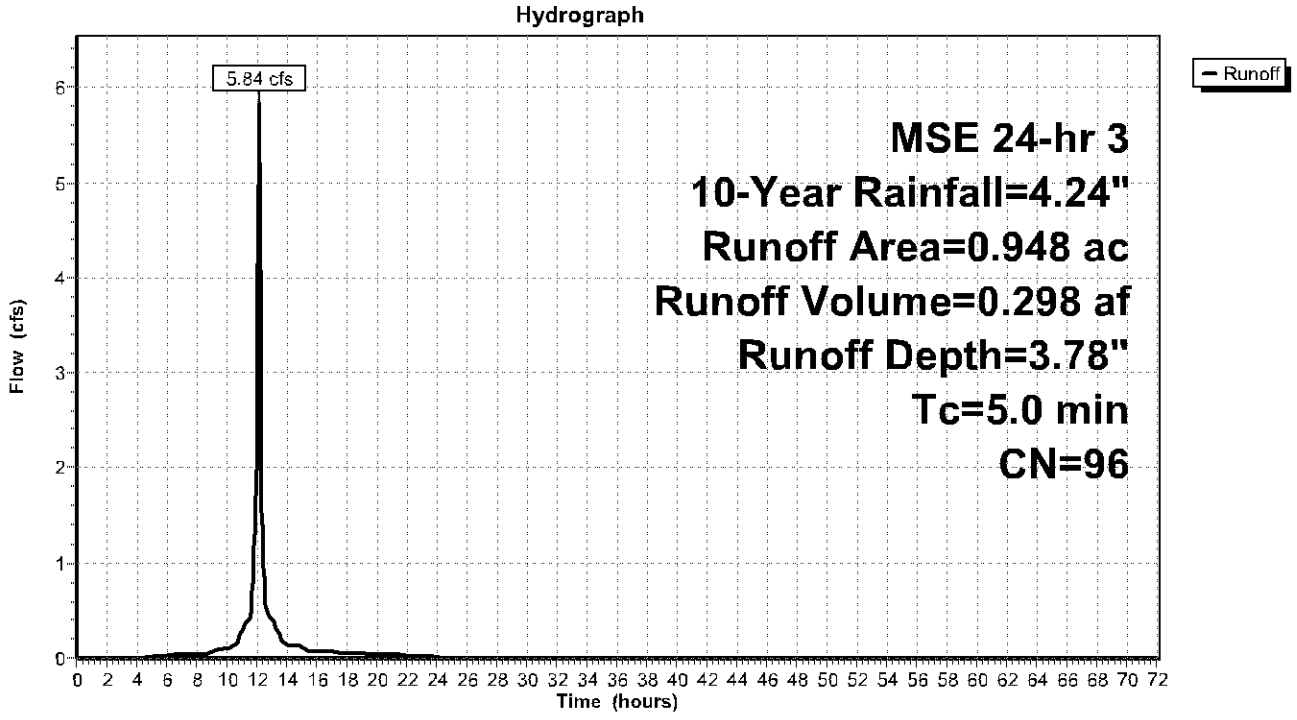
Runoff = 5.84 cfs @ 12.11 hrs, Volume= 0.298 af, Depth= 3.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.24"

Area (ac)	CN	Description
0.915	98	Paved parking, HSG A
0.033	39	>75% Grass cover, Good, HSG A
0.948	96	Weighted Average
0.033		3.48% Pervious Area
0.915		96.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Ex: Existing Area to be Distrurbed



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentEx: Existing Area to be Runoff Area=0.948 ac 96.52% Impervious Runoff Depth=7.02"
Tc=5.0 min CN=96 Runoff=10.52 cfs 0.555 af

Total Runoff Area = 0.948 ac Runoff Volume = 0.555 af Average Runoff Depth = 7.02"
3.48% Pervious = 0.033 ac 96.52% Impervious = 0.915 ac

Summary for Subcatchment Ex: Existing Area to be Distrurbed

[49] Hint: Tc<2dt may require smaller dt

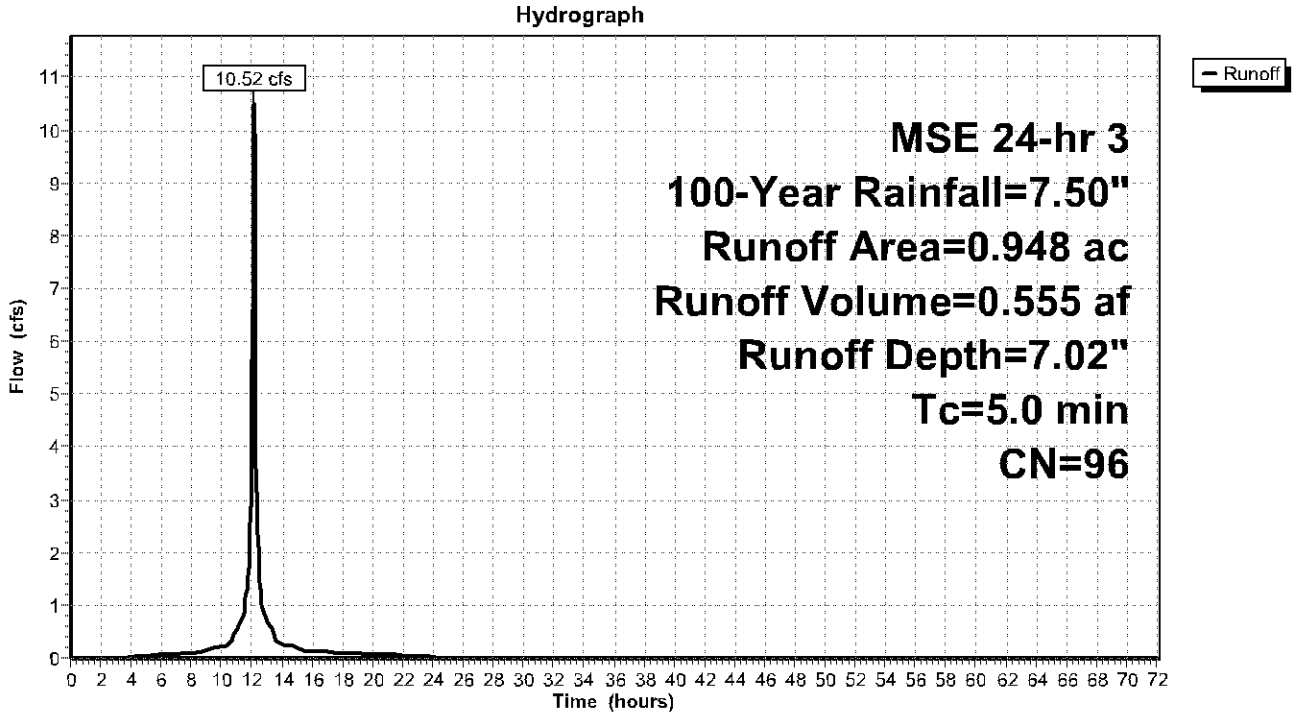
Runoff = 10.52 cfs @ 12.11 hrs, Volume= 0.555 af, Depth= 7.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.50"

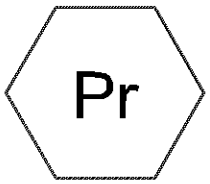
Area (ac)	CN	Description
0.915	98	Paved parking, HSG A
0.033	39	>75% Grass cover, Good, HSG A
0.948	96	Weighted Average
0.033		3.48% Pervious Area
0.915		96.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

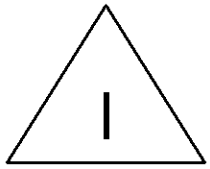
Subcatchment Ex: Existing Area to be Distrurbed



Prop Redevelopment



Proposed Area to be Redeveloped



ADS System

Routing Diagram for 21618 - HydroCAD - 080619
Prepared by {enter your company name here}, Printed 8/6/2019

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.101	39	>75% Grass cover, Good, HSG A (Pr)
0.849	98	Paved parking, HSG C (Pr)
0.950	**92**	**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPr: Proposed Area to be Runoff Area=41,382 sf 89.37% Impervious Runoff Depth=2.00"
Tc=5.0 min CN=92 Runoff=3.37 cfs 0.158 af

Pond I: ADS System Peak Elev=0.00' Storage=0 cf

Total Runoff Area = 0.950 ac Runoff Volume = 0.158 af Average Runoff Depth = 2.00"
10.63% Pervious = 0.101 ac 89.37% Impervious = 0.849 ac

Summary for Subcatchment Pr: Proposed Area to be Redeveloped

[49] Hint: Tc<2dt may require smaller dt

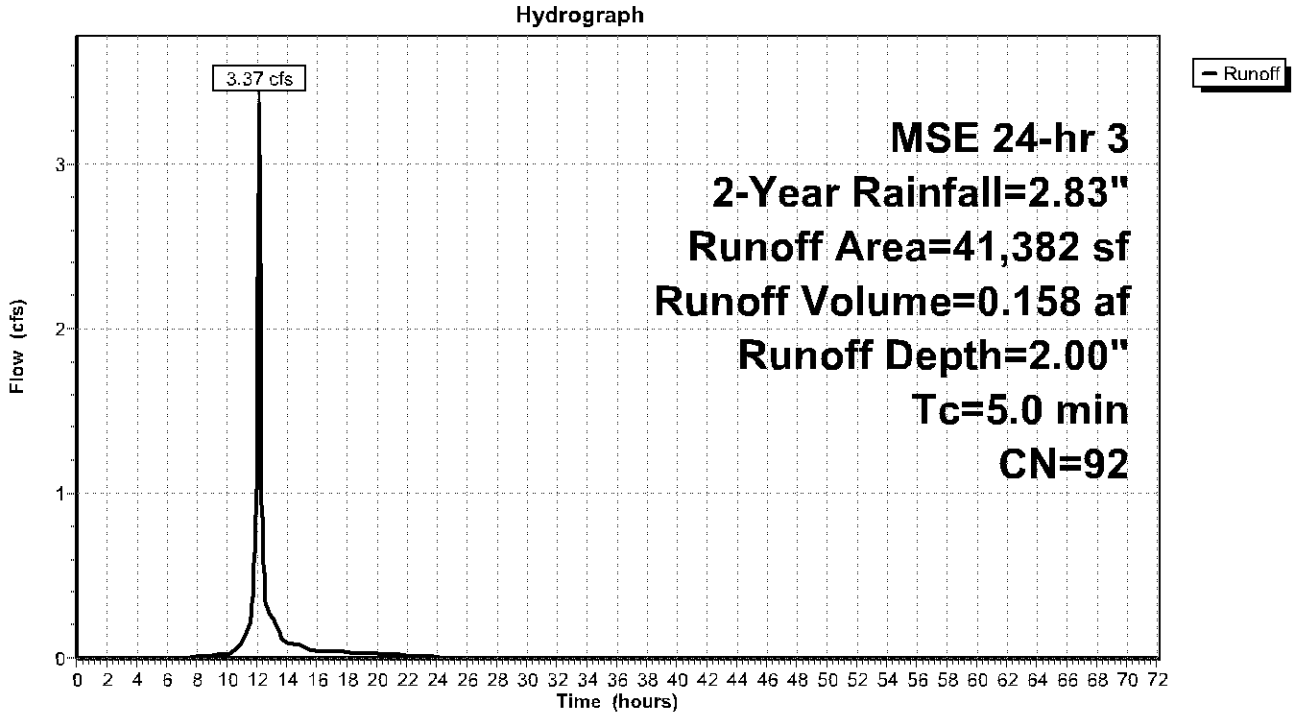
Runoff = 3.37 cfs @ 12.11 hrs, Volume= 0.158 af, Depth= 2.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.83"

Area (sf)	CN	Description
36,982	98	Paved parking, HSG C
4,400	39	>75% Grass cover, Good, HSG A
41,382	92	Weighted Average
4,400		10.63% Pervious Area
36,982		89.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Pr: Proposed Area to be Redeveloped



Summary for Pond I: ADS System

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1A	822.30'	1,543 cf	**20.50'W x 81.94'L x 3.50'H Field A** 5,879 cf Overall - 2,021 cf Embedded = 3,858 cf x 40.0% Voids
#2A	822.80'	2,021 cf	**ADS_StormTech SC-740 +Cap** x 44 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 4 Rows of 11 Chambers
		3,564 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Pond I: ADS System - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

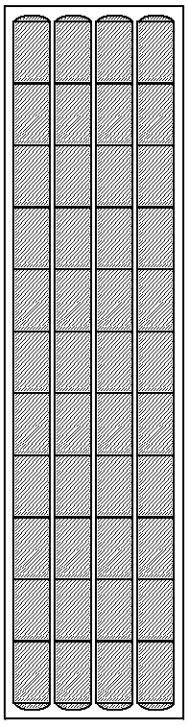
11 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 79.94' Row Length +12.0" End Stone x 2 = 81.94' Base Length
4 Rows x 51.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

44 Chambers x 45.9 cf = 2,021.4 cf Chamber Storage

5,879.0 cf Field - 2,021.4 cf Chambers = 3,857.6 cf Stone x 40.0% Voids = 1,543.0 cf Stone Storage

Chamber Storage + Stone Storage = 3,564.4 cf = 0.082 af
Overall Storage Efficiency = 60.6%
Overall System Size = 81.94' x 20.50' x 3.50'

44 Chambers
217.7 cy Field
142.9 cy Stone



Stage-Area-Storage for Pond I: ADS System

Elevation (feet)	Storage (cubic-feet)
822.30	0
822.35	34
822.40	67
822.45	101
822.50	134
822.55	168
822.60	202
822.65	235
822.70	269
822.75	302
822.80	336
822.85	404
822.90	473
822.95	541
823.00	610
823.05	678
823.10	745
823.15	813
823.20	880
823.25	947
823.30	1,014
823.35	1,081
823.40	1,147
823.45	1,213
823.50	1,279
823.55	1,344
823.60	1,409
823.65	1,473
823.70	1,538
823.75	1,602
823.80	1,665
823.85	1,728
823.90	1,791
823.95	1,853
824.00	1,915
824.05	1,976
824.10	2,037
824.15	2,097
824.20	2,156
824.25	2,215
824.30	2,274
824.35	2,332
824.40	2,389
824.45	2,445
824.50	2,501
824.55	2,556
824.60	2,610
824.65	2,663
824.70	2,715
824.75	2,766
824.80	2,817
824.85	2,866
824.90	2,913
824.95	2,960
825.00	3,004
825.05	3,046
825.10	3,085
825.15	3,123
825.20	3,159
825.25	3,194
825.30	3,228
825.35	3,262
825.40	3,296
825.45	3,329
825.50	3,363
825.55	3,396
825.60	3,430
825.65	3,464
825.70	3,497
825.75	3,531
825.80	**3,564**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPr: Proposed Area to be Runoff Area=41,382 sf 89.37% Impervious Runoff Depth=3.35"
Tc=5.0 min CN=92 Runoff=5.48 cfs 0.265 af

Pond I: ADS System Peak Elev=0.00' Storage=0 cf

Total Runoff Area = 0.950 ac Runoff Volume = 0.265 af Average Runoff Depth = 3.35"
10.63% Pervious = 0.101 ac 89.37% Impervious = 0.849 ac

Summary for Subcatchment Pr: Proposed Area to be Redeveloped

[49] Hint: Tc<2dt may require smaller dt

Runoff = 5.48 cfs @ 12.11 hrs, Volume= 0.265 af, Depth= 3.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.24"

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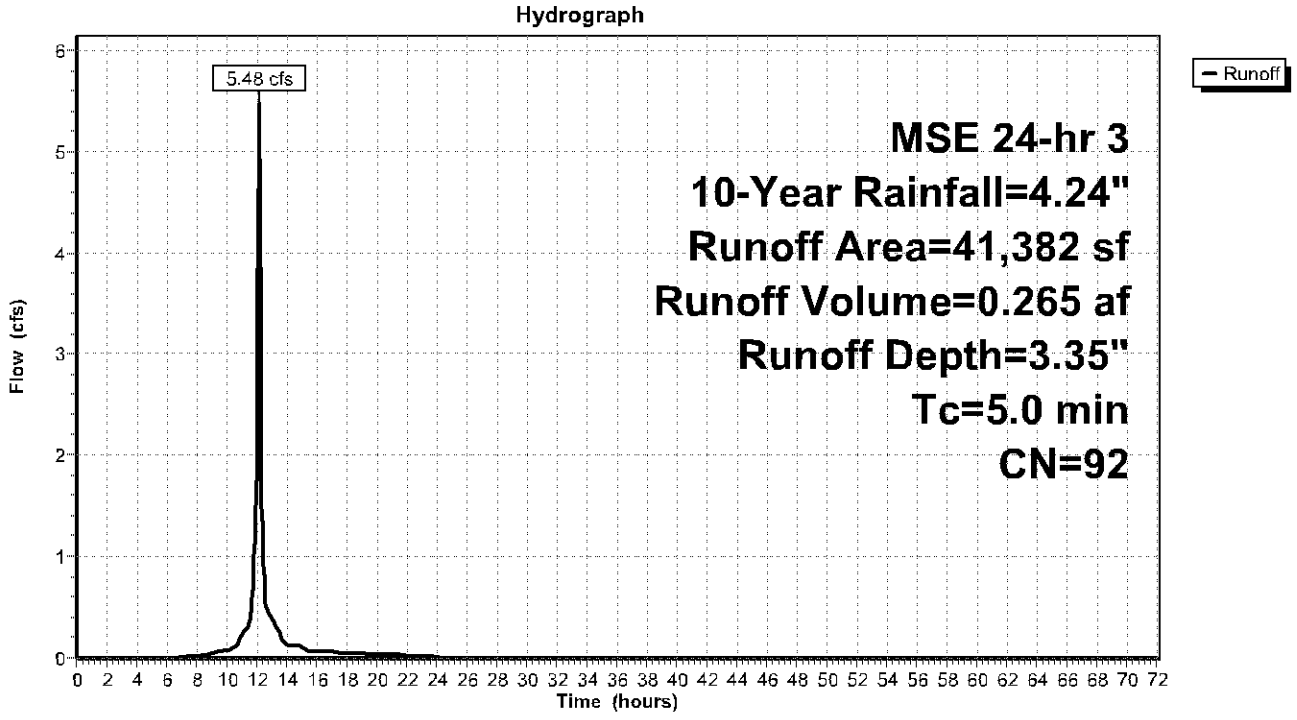
36,982		89.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Pr: Proposed Area to be Redeveloped



Summary for Pond I: ADS System

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1A	822.30'	1,543 cf	**20.50'W x 81.94'L x 3.50'H Field A** 5,879 cf Overall - 2,021 cf Embedded = 3,858 cf x 40.0% Voids
#2A	822.80'	2,021 cf	**ADS_StormTech SC-740 +Cap** x 44 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 4 Rows of 11 Chambers
		3,564 cf	Total Available Storage

Storage Group A created with Chamber Wizard

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51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

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5,879.0 cf Field - 2,021.4 cf Chambers = 3,857.6 cf Stone x 40.0% Voids = 1,543.0 cf Stone Storage

Chamber Storage + Stone Storage = 3,564.4 cf = 0.082 af
Overall Storage Efficiency = 60.6%
Overall System Size = 81.94' x 20.50' x 3.50'

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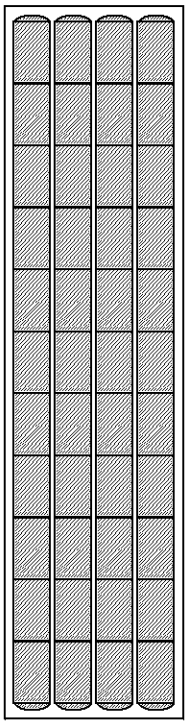
217.7 cy Field
142.9 cy Stone



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822.75	302
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822.85	404
822.90	473
822.95	541
823.00	610
823.05	678
823.10	745
823.15	813
823.20	880
823.25	947
823.30	1,014
823.35	1,081
823.40	1,147
823.45	1,213
823.50	1,279
823.55	1,344
823.60	1,409
823.65	1,473
823.70	1,538
823.75	1,602
823.80	1,665
823.85	1,728
823.90	1,791
823.95	1,853
824.00	1,915
824.05	1,976
824.10	2,037
824.15	2,097
824.20	2,156
824.25	2,215
824.30	2,274
824.35	2,332
824.40	2,389
824.45	2,445
824.50	2,501
824.55	2,556
824.60	2,610
824.65	2,663
824.70	2,715
824.75	2,766
824.80	2,817
824.85	2,866
824.90	2,913
824.95	2,960
825.00	3,004
825.05	3,046
825.10	3,085
825.15	3,123
825.20	3,159
825.25	3,194
825.30	3,228
825.35	3,262
825.40	3,296
825.45	3,329
825.50	3,363
825.55	3,396
825.60	3,430
825.65	3,464
825.70	3,497
825.75	3,531
825.80	**3,564**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentPr: Proposed Area to be Runoff Area=41,382 sf 89.37% Impervious Runoff Depth=6.55"
Tc=5.0 min CN=92 Runoff=10.26 cfs 0.518 af

Pond I: ADS System Peak Elev=0.00' Storage=0 cf

Total Runoff Area = 0.950 ac Runoff Volume = 0.518 af Average Runoff Depth = 6.55"
10.63% Pervious = 0.101 ac 89.37% Impervious = 0.849 ac

Summary for Subcatchment Pr: Proposed Area to be Redeveloped

[49] Hint: Tc<2dt may require smaller dt

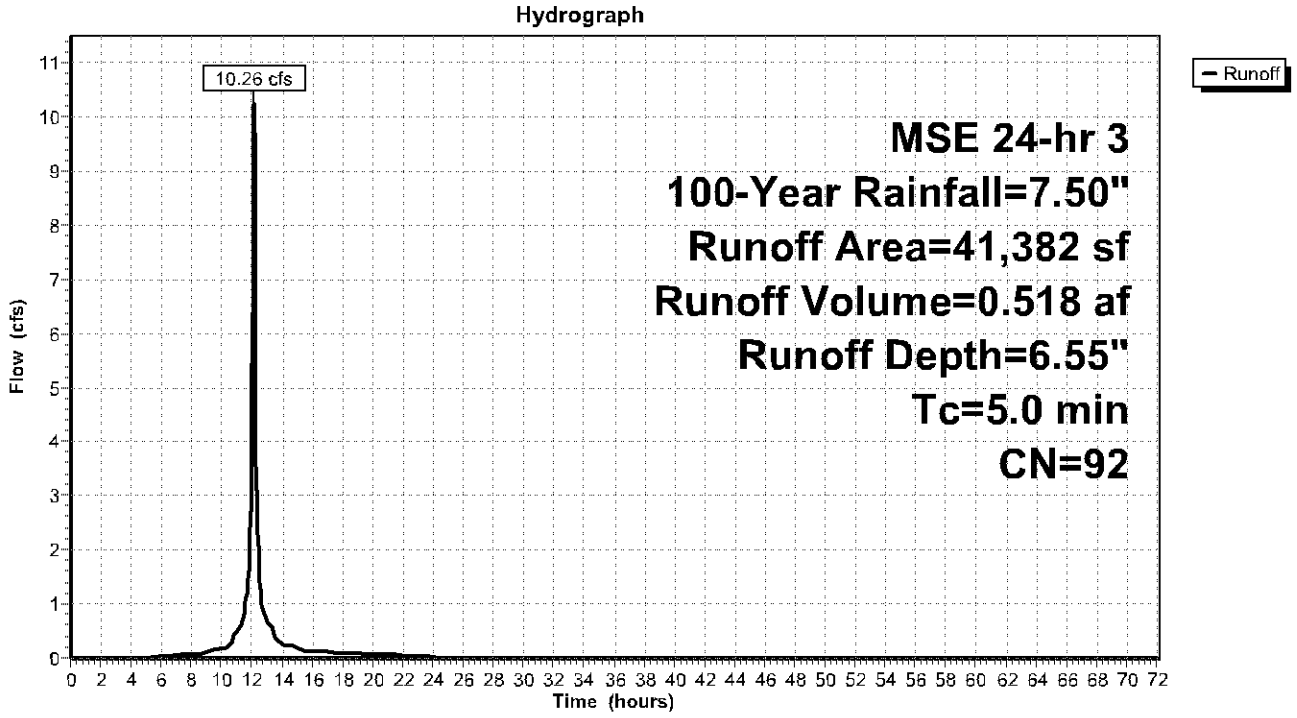
Runoff = 10.26 cfs @ 12.11 hrs, Volume= 0.518 af, Depth= 6.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.50"

Area (sf)	CN	Description
36,982	98	Paved parking, HSG C
4,400	39	>75% Grass cover, Good, HSG A
41,382	92	Weighted Average
4,400		10.63% Pervious Area
36,982		89.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment Pr: Proposed Area to be Redeveloped



Summary for Pond I: ADS System

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1A	822.30'	1,543 cf	**20.50'W x 81.94'L x 3.50'H Field A** 5,879 cf Overall - 2,021 cf Embedded = 3,858 cf x 40.0% Voids
#2A	822.80'	2,021 cf	**ADS_StormTech SC-740 +Cap** x 44 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 4 Rows of 11 Chambers
		3,564 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Pond I: ADS System - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

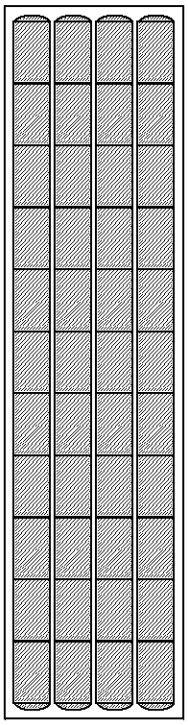
11 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 79.94' Row Length +12.0" End Stone x 2 = 81.94' Base Length
4 Rows x 51.0" Wide + 6.0" Spacing x 3 + 12.0" Side Stone x 2 = 20.50' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

44 Chambers x 45.9 cf = 2,021.4 cf Chamber Storage

5,879.0 cf Field - 2,021.4 cf Chambers = 3,857.6 cf Stone x 40.0% Voids = 1,543.0 cf Stone Storage

Chamber Storage + Stone Storage = 3,564.4 cf = 0.082 af
Overall Storage Efficiency = 60.6%
Overall System Size = 81.94' x 20.50' x 3.50'

44 Chambers
217.7 cy Field
142.9 cy Stone

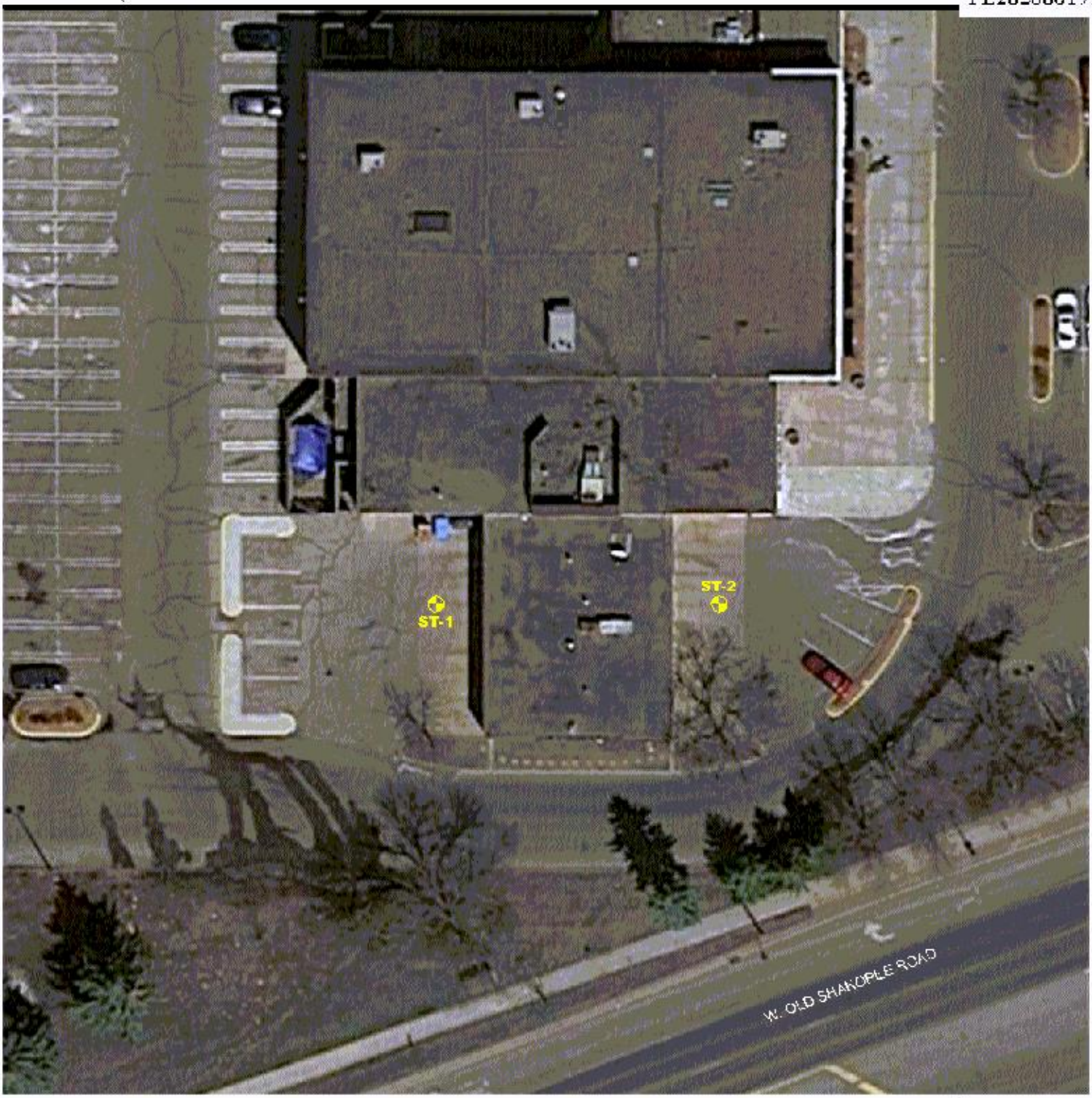


Stage-Area-Storage for Pond I: ADS System

Elevation (feet)	Storage (cubic-feet)
822.30	0
822.35	34
822.40	67
822.45	101
822.50	134
822.55	168
822.60	202
822.65	235
822.70	269
822.75	302
822.80	336
822.85	404
822.90	473
822.95	541
823.00	610
823.05	678
823.10	745
823.15	813
823.20	880
823.25	947
823.30	1,014
823.35	1,081
823.40	1,147
823.45	1,213
823.50	1,279
823.55	1,344
823.60	1,409
823.65	1,473
823.70	1,538
823.75	1,602
823.80	1,665
823.85	1,728
823.90	1,791
823.95	1,853
824.00	1,915
824.05	1,976
824.10	2,037
824.15	2,097
824.20	2,156
824.25	2,215
824.30	2,274
824.35	2,332
824.40	2,389
824.45	2,445
824.50	2,501
824.55	2,556
824.60	2,610
824.65	2,663
824.70	2,715
824.75	2,766
824.80	2,817
824.85	2,866
824.90	2,913
824.95	2,960
825.00	3,004
825.05	3,046
825.10	3,085
825.15	3,123
825.20	3,159
825.25	3,194
825.30	3,228
825.35	3,262
825.40	3,296
825.45	3,329
825.50	3,363
825.55	3,396
825.60	3,430
825.65	3,464
825.70	3,497
825.75	3,531
825.80	**3,564**

APPENDIX C – DRAFT BORING LOGS

PL202000191



DENOTES APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

DRAFT
Subject to Change

20' 0 40'

SCALE 1" = 40'

BRAUN INTERTEC
The Subsurface Tree Solution Co.
11001 Hampshire Avenue S.
Minneapolis, MN 55438
952.995.2000
braunintertec.com

Project No: B1904035

Drawing No: B1904035

Drawn By:	JAG
Date Drawn:	5-9-19
Checked By:	RJR
Last Modified:	5-9-19

West Stormwater System

10605 Penn Avenue S.

Bloomington, Minnesota

Soil Boring Location Sketch

BRAUN INTERTEC
The Science You Build On.

LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1904635
Geotechnical Evaluation
Valley West Stormwater System
10606 France Avenue South
Bloomington, Minnesota

BORING: **ST-1**
LOCATION: See attached sketch
NORTHING: EASTING:
START DATE: 05/15/19 END DATE: 05/15/19
SURFACING: Bituminous WEATHER: Sunny

DRILLER: M. Barber LOGGED BY: R. Fritz
SURFACE ELEVATION: RIG: GP-1 METHOD: 3 1/4" HSA

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
0.8		PAVEMENT, 5 inches bituminous over 4 inches aggregate base.					
		POORLY GRADED SAND (SP), fine to medium sand, brown, moist, loose to medium dense (TERRACE DEPOSIT)		5-5-4 (9) 168"			
5				2-2-3 (5) 144"			
				4-3-4 (7) 144"			
10				5-5-6 (11) 168"			
				7-7-8-10/0" (REF) 204"			
14.5		END OF BORING					
15		Boring immediately backfilled					
20							
25							
30							

BRAUN INTERTEC
The Science You Build On.

LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1904635
Geotechnical Evaluation
Valley West Stormwater System
10606 France Avenue South
Bloomington, Minnesota

BORING: **ST-2**
LOCATION: See attached sketch
NORTHING: EASTING:
START DATE: 05/15/19 END DATE: 05/15/19
SURFACING: Bituminous WEATHER: Sunny

DRILLER: M. Barber LOGGED BY: R. Fritz
SURFACE ELEVATION: RIG: GP-1 METHOD: 3 1/4" HSA

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
0.8		PAVEMENT, 5 inches bituminous over 3 1/2 inches aggregate base.					
		FILL: POORLY GRADED SAND with SILT (SP-SM), fine to medium sand, brown, moist		4-4-3 (7) 156"			
4.0		POORLY GRADED SAND (SP), fine to medium sand, brown, moist, loose to medium dense (TERRACE DEPOSIT)		1-1-1 (2) 144"			
5				3-3-3 (6) 156"			
10				5-3-3 (6) 168"			
14.5		END OF BORING		7-7-6-5/0" (REF) 216"			
15		Boring immediately backfilled					
20							
25							
30							