www.JSDinc.com

# Stormwater Management Plan Report

## Jilly's Car Wash
## 2301 W. Bluemound Road
## City of Waukesha, Wisconsin

Report Date: January 10, 2023


Prepared for:

Briohn Design Group
3885 N. Brookfield Rd., Suite 200
Brookfield, WI 53045

Prepared by:

JSD Professional Services, Inc.
W238 N1610 Busse Road, Suite 100
Waukesha, WI 53188

JSD Project No. 22-11993

## TABLE OF CONTENTS



**Questions and comments can be directed to:**


Jared Simon, P.E.
Project Engineer
jared.simon@jsdinc.com

Rizal W. Iskandarsjach, P.E., P.L.S.
Senior Project Engineer
riz@jsdinc.com

Phone: 262.513.0666
Fax: 262.513.1232

Milwaukee Regional Office
W238 N1610 Busse Rd, Suite 100
Waukesha, WI 53188
www.jsdinc.com

## APPENDICES

**APPENDIX 1 - LOCATION MAP**

**APPENDIX 2 - SOIL DATA**

- NRCS – WEB SOIL SURVEY

**APPENDIX 3 - WATER QUANTITY CALCULATIONS**

- EXISTING CONDITIONS HYDROLOGY EXHIBIT
- EXISTING CONDITIONS HYDROCAD OUTPUT
- PROPOSED CONDITIONS HYDROLOGY EXHIBIT
- PROPOSED CONDITIONS HYDROCAD OUTPUT

**APPENDIX 4 - WATER QUALITY CALCULATIONS**

- SLAMM INPUT
- SLAMM OUTPUT

**APPENDIX 5 - DESIGN DETAILS**

- SITE GRADING PLAN
- SITE EROSION CONTROL PLAN
- SITE UTILITY PLAN
- BIOFILTRATION BASIN DETAIL
- STORM SEWER CALCULATIONS

**APPENDIX 6 - STORM WATER MAINTENANCE AGREEMENT**

## 1.0 INTRODUCTION

The proposed Jilly's Car Wash redevelopment is located southeast of the intersection of W. Bluemound Road and Parklawn Drive in the Northwest 1/4 of the Southwest 1/4 of Section 30, Township 7 North, Range 20 East, in the City of Waukesha, Waukesha County, Wisconsin. The site is generally bounded by W. Bluemound Road to the north, Parklawn Drive to the west, and commercial properties to the south and east. A location map can be found in **Appendix 1**.

***This Stormwater Management Plan has been created to address runoff rate control, water quality treatment, and infiltration requirements for the proposed Jilly's Car Wash redevelopment.***

The proposed redevelopment will consist of the demolition of the existing building, pavement, and other site features. A new car wash with asphalt and concrete pavement will be constructed. New sanitary sewer and water service will be extended from Parklawn Drive to serve the proposed car wash, and a biofiltration basin will be located at the north end of the site to provide stormwater management. The biofiltration basin will be utilized to provide runoff rate control, water quality treatment, and infiltration in accordance with City of Waukesha requirements. Please refer to **Section 3.0** and **Section 5.0** for design criteria and more details of the stormwater management facilities.

## 2.0 EXISTING CONDITIONS

The existing site is 1.28 acres consisting of a restaurant surrounded by asphalt parking. Several artificial turf and gravel bocce courts are also present on site. The northern half of the site surface drains northeasterly and eventually enters a storm sewer system located northeast of the property. The southwest corner of the site surface drains into the Parklawn right-of-way where it is intercepted by curb inlets. The remainder of the site surface drains to an inlet near the southeast corner of the property. See **Appendix 3** for an Existing Conditions Hydrology Exhibit.

Four soil types have been identified on-site using soils data obtained from the United States Department of Agriculture – Natural Resources Conservation Service Web Soil Survey. The web soil survey is included in **Appendix 2**. A listing of the soil map units and descriptions is shown in Table 1 below.

**Table 1 – Soil Types**

| Map Symbol | Map Unit Name | Hydrologic Soil Group |
|---|---|---|
| HmB2 | Hochheim loam | D |
| HmD2 | Hochheim loam | D |
| ScB | St. Charles silt loam | B |
| ThB | Theresa silt loam | C |

## 3.0 DESIGN CRITERIA

*3.1 City of Waukesha*
Chapter 32 – Storm Water Management and Erosion Control

*3.2 Wisconsin Department of Natural Resources*
WDNR – Technical Standards (NR151 and NR216)

Water Quantity: The peak discharge rates under post-development site conditions shall not exceed the rates under pre-development conditions for the 1-year, 2-year, 10-year, and 100-year storm events. WDNR regulations require that post-development peak discharge rates do not exceed existing rates for the 1-year and 2-year storm events. **Section 5.1** of this report details the rate control design utilized to achieve water quantity objectives.

Water Quality: For redevelopment, City of Waukesha and WDNR require the post-development total suspended solids load from parking areas and roads to be reduced by 40%, based on an average annual rainfall, as compared to no runoff management controls. Please refer to **Section 5.2** for a description of the water quality treatment measures.

Infiltration: Redevelopment sites are exempt from WDNR infiltration requirements; However, the City of Waukesha requires for Medium Imperviousness developments the post-development infiltration volume to be 75% of the pre-development infiltration volume or the infiltration area be 2% of the total site. Please refer to **Section 5.3** of this report for an explanation of the proposed infiltration measures.

## 4.0 ANALYSIS

HydroCAD® Stormwater Modeling System (Version 10.00) software has been used to analyze the stormwater characteristics for the Jilly's Car Wash redevelopment. HydroCAD® uses the accepted TR-55 methodology for determining peak runoff discharge rates. Stormwater modeling was conducted for the 1-year, 2-year, 10-year, and 100-year storm events for compliance with City of Waukesha requirements. The rainfall depths utilized in the HydroCAD® models were obtained from City of Waukesha ordinance and are shown below in Table 2.

**Table 2 – Rainfall Depths**

| Storm Event | Rainfall Depth |
|---|---|
| 1-year | 2.4" |
| 2-year | 2.7" |
| 10-year | 3.81" |
| 100-year | 6.18" |

Existing conditions ground cover were assigned curve numbers consistent with the values listed in City of Waukesha ordinance for hydrologic soil group B. The existing soil types include hydrologic soil groups B, C, and D; however group B was used to represent the entire site in order to achieve a more conservative runoff value. Curve numbers for the proposed conditions ground

cover were selected using the standard values specified in TR-55 for building roof, paved parking, and grass cover. Results of the existing and proposed conditions modeling have been included in **Appendix 3**.

The sediment reduction and infiltration characteristics of the site have been analyzed using WinSLAMM® (version 10.4.1) Source Loading and Management Model. Source areas were based on the existing and proposed ground cover used in the HydroCAD® models. Storage volumes and outlet devices entered into the WinSLAMM® model were also derived from the HydroCAD® analysis. WinSLAMM® input data and results have been included in **Appendix 4**.

## 5.0 DESIGN

The proposed redevelopment will disturb approximately 1.28 acres and result in a net reduction of roughly 0.35 acres of impervious surfaces. The proposed biofiltration basin will promote groundwater recharge by allowing runoff to infiltrate into the native silt loam soil. The basin features a 4-foot sand storage layer below 2 feet of engineered soil and has been designed to provide peak discharge control, total suspended solids removal, and infiltration for all storm events up to and including the 100-year event. Discharge from the basin will be controlled by a 6" diameter draintile and the top of the 24" diameter standpipe. Runoff will ultimately discharge through a 12" diameter storm sewer which will outfall near an existing 30" diameter culvert east of the basin. Runoff from the site ultimately drains to a regional detention pond north of The Home Depot. A spillway has been provided to allow runoff from storm events in excess of the 100-year event to discharge safely to the east. The biofiltration basin and spillway have been designed in accordance with WDNR Technical Standards 1004. Please refer to **Appendix 3** for a Proposed Conditions Hydrology Exhibit and **Appendix 5** for further details of the biofiltration basin.

### 5.1 Runoff Rate Control

The proposed biofiltration basin has been designed to reduce the post-development peak discharge rates to existing rates during the 1-year, 2-year, 10-year, and 100-year storm events in accordance with City of Waukesha requirements. Tables 3 and 4 summarize the post-development hydrologic characteristics of the site. A comparison of existing and post-development peak discharge rates is provided in Table 5. Please refer to **Appendix 3** for additional details of the HydroCAD® modeling.

**Table 3 – Proposed Drainage Area Hydrologic Characteristics**

| Drainage Area (HydroCAD Node) | | Area (acres) | Curve Number | Runoff (cfs) | | | |
|---|---|---|---|---|---|---|---|
| | | | | 1-yr | 2-yr | 10-yr | 100-yr |
| 1S | Detained | 0.378 | 90 | 1.00 | 1.18 | 1.84 | 3.25 |
| 2S | Undetained West | 0.241 | 70 | 0.16 | 0.23 | 0.53 | 1.33 |
| 3S | Undetained East | 0.658 | 84 | 1.27 | 1.56 | 2.67 | 5.12 |
| 4S | Offsite | 0.081 | 86 | 0.18 | 0.21 | 0.35 | 0.66 |

**Table 4 – Proposed Stormwater Facility Characteristics**

| Stormwater Facility | | 1-yr | 2-yr | 10-yr | 100-yr |
|---|---|---|---|---|---|
| 1P | Peak Inflow (cfs) | 1.00 | 1.18 | 1.84 | 3.25 |
| | Peak Outflow (cfs) | 0.01 | 0.03 | 0.88 | 3.15 |
| | Peak Water Surface Elevation | 886.39 | 886.60 | 886.72 | 886.88 |
| | Spillway Elevation | 887.50 | | | |
| | Top of Berm Elevation | 888.00 | | | |

**Table 5 – Peak Discharge Rates**

| | 1-yr (cfs) | 2-yr (cfs) | 10-yr (cfs) | 100-yr (cfs) |
|---|---|---|---|---|
| Existing | 3.98 | 4.62 | 6.99 | 11.99 |
| Post-Development | 1.60 | 2.00 | 3.57 | 10.22 |

### 5.2 Water Quality Treatment

Water quality for the Jilly's Car Wash redevelopment will be achieved through settling of suspended solids in the 3-foot deep sumps of the storm inlets located throughout the site. Additional water quality will be provided by filtration of sediment via the engineered soil of the biofiltration basin. The biofiltration basin was modeled in WinSLAMM® using the biofilter control practice with the engineered soil depth, storage layer depth, and outlets presented in the HydroCAD® model. A native soil infiltration rate of 0.13 inches/hour was selected to represent the silt loam identified by the web soil survey.

To avoid claiming credit for sediment removal from the offsite areas, Subcatchment 4S was modeled using the "other control" device in WinSLAMM®. This process eliminates the offsite sediment loading from the TSS calculations while still modeling the volume of water that will enter the catch basins from offsite. As a result, the model calculates the removal efficiency of the catch basins based on sediment loading only from the on-site pavement and does not take credit for removal of offsite sediment.

Total suspended solids reduction, shown in Table 6, has been determined based on the difference between TSS loading from parking and roads under the "without controls" and "after controls" conditions as calculated using WinSLAMM® software.

**Table 6 – Total Suspended Solids Loading from Pavement**

| Drainage Area | Solids Loading (lbs.) | Treatment Device | Removal Efficiency | Solids Removed (lbs.) |
|---|---|---|---|---|
| Detained | 121.0 | Catch Basins | 32.30% | 39.1 |
| | | Biofiltration Basin | 60.99% | 50.0 |
| Undetained West | 38.7 | None | 0% | 0 |
| Undetained East | 228.8 | Catch Basins | 33.26% | 76.1 |
| | Total = 388.5 | | | Total = 165.2 |

Paved areas of the site (discounting offsite pavement) produce 388.5 lbs. of sediment; to achieve a 40% reduction at least 155.4 lbs. must be removed. As Table 6 demonstrates, the proposed treatment devices will actually remove 165.2 lbs. of sediment from the pavement. Refer to **Appendix 4** for additional input and output data used in the water quality calculations.

### 5.3 Infiltration

The bio-filtration basin will be comprised of 4 feet of sand/gravel material, another 2 feet of engineered soil, all constructed over the top of the native soils. WinSLAMM® software was used to calculate the annual pre- and post-development infiltration volumes for the site. Calculations demonstrate the post-development infiltration volume will be 101% of the pre-development infiltration volume. Please refer to **Appendix 2** for a record of the soil borings and **Appendix 4** for infiltration calculations.

### 5.4 Storm Sewer

Proposed storm sewer will be constructed to facilitate drainage for the paved parking areas. The storm sewers have been designed in accordance with the rational method and have been sized to accommodate runoff from the 10-year, 24-hour storm event. Complete storm sewer design computations are included in **Appendix 5**.

## 6.0 CONCLUSION

The stormwater management facilities for Jilly's Car Wash have been designed to meet or exceed WDNR and City of Waukesha requirements. The post-development peak runoff discharge rates during the 1-year, 2-year, 10-year, and 100-year storm events will not exceed the pre-development discharge rates. The proposed biofiltration basin and inlet sumps will provide a total suspended solids reduction in excess of the 40% requirement for redevelopment. The proposed site will infiltration volume will be 101% of the pre-development volume exceeding the required infiltration volume of 75% of the pre-development infiltration volume.

*(Appendices Follow)*

# APPENDIX 1

## Location Map

# JILLY'S CAR WASH


## Location Map

## City of Waukesha, Waukesha County, WI

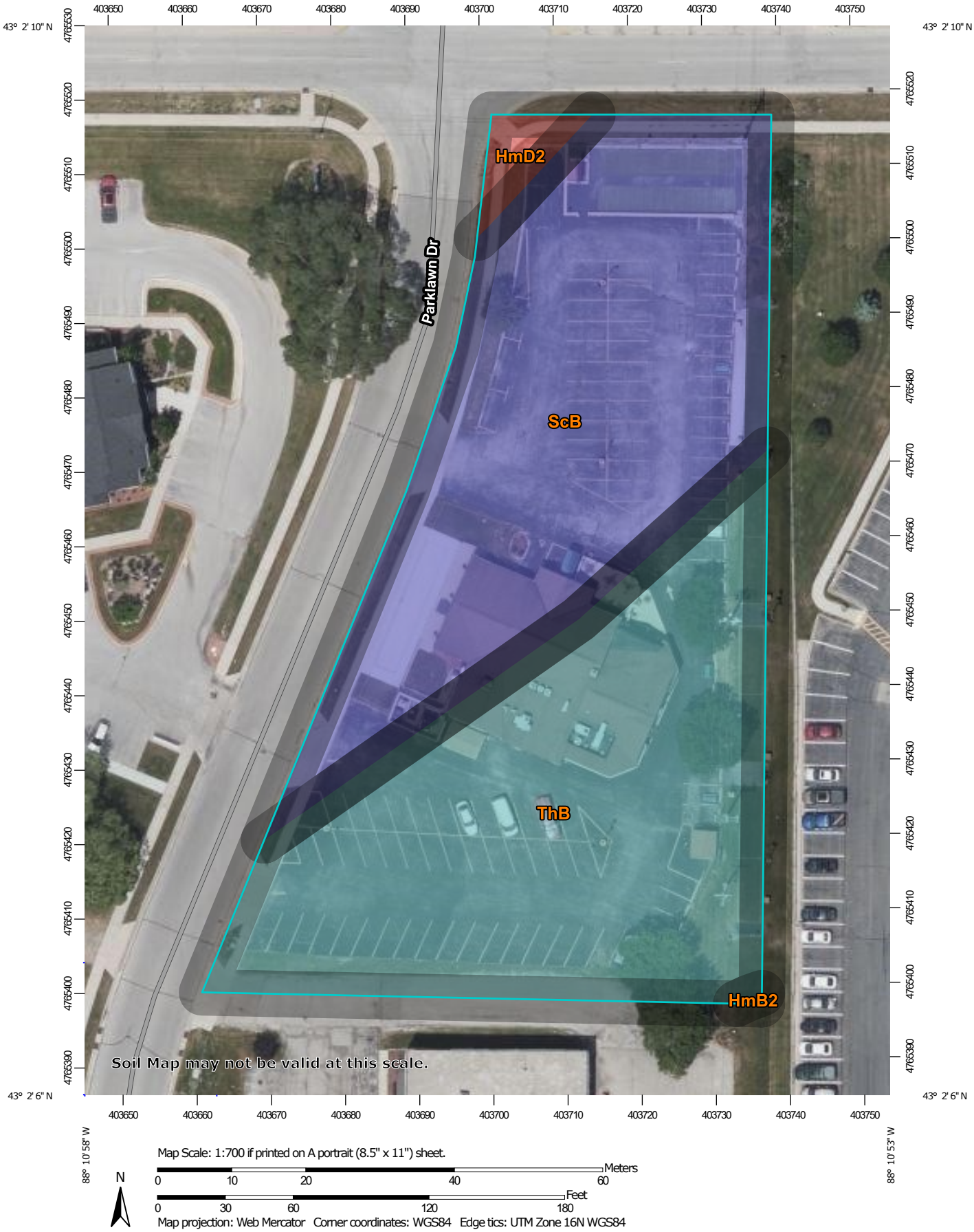
(NW 1/4 of SW 1/4 of Section 30, Township 7 North, Range 20 East)

# APPENDIX 2

## Soil Data

- NRCS – Web Soil Survey

Hydrologic Soil Group—Milwaukee and Waukesha Counties, Wisconsin
(Jilly's Car Wash)




Map Scale: 1:700 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 30 60 120 180

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

- Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

**Soil Rating Lines**

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

**Soil Rating Points**

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

**Water Features**

- Streams and Canals

**Transportation**

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**

- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Milwaukee and Waukesha Counties, Wisconsin
Survey Area Data: Version 18, Sep 7, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 20, 2020—Aug 20, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| HmB2 | Hochheim loam, 2 to 6 percent slopes, eroded | D | 0.0 | 0.0% |
| HmD2 | Hochheim loam, 12 to 20 percent slopes, eroded | D | 0.0 | 1.8% |
| ScB | St. Charles silt loam, 2 to 6 percent slopes | B | 0.8 | 48.2% |
| ThB | Theresa silt loam, 2 to 6 percent slopes | C | 0.8 | 50.0% |
| **Totals for Area of Interest** | | | **1.6** | **100.0%** |

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

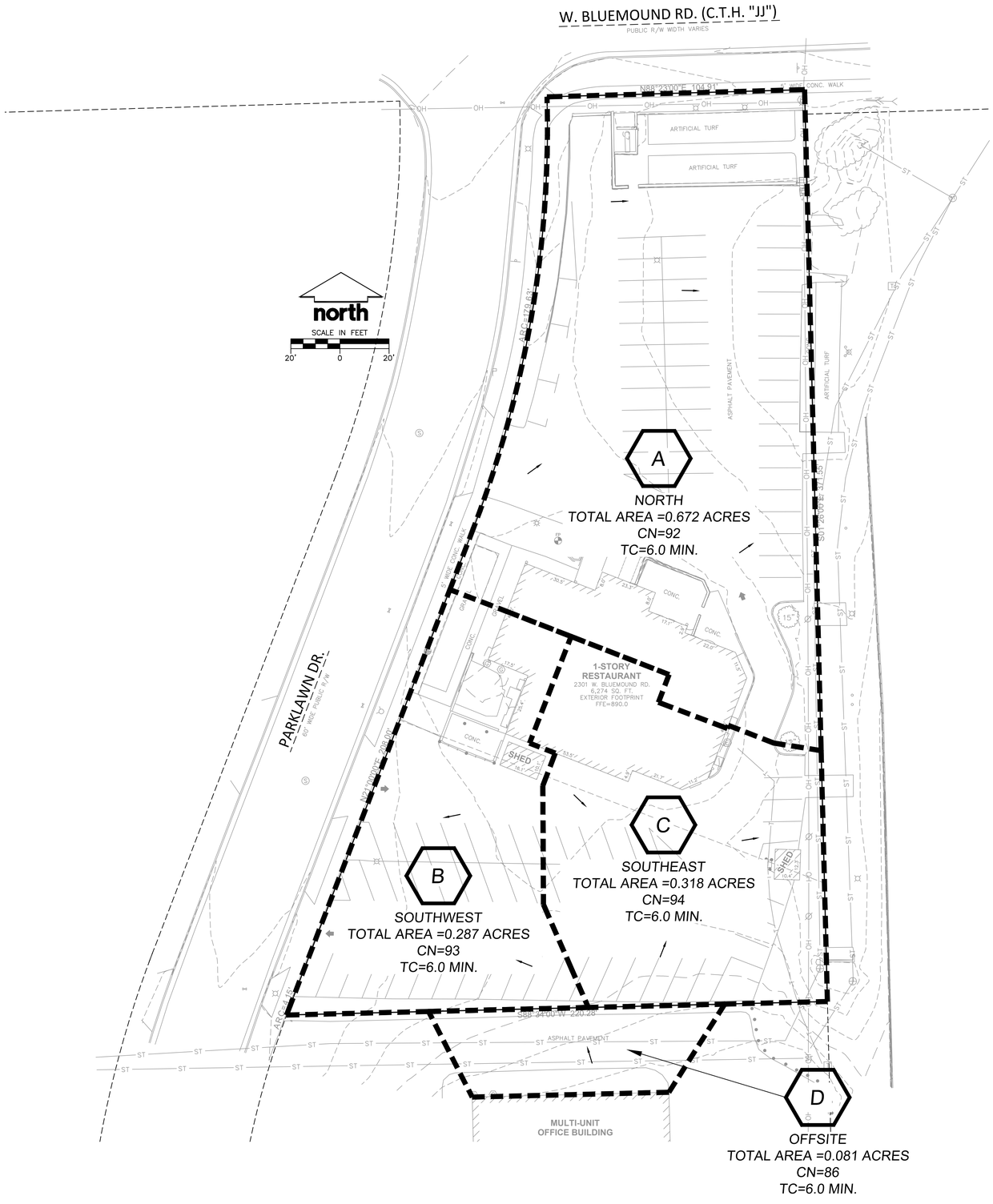
*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

# APPENDIX 3

## Water Quantity Calculations

- Existing Conditions Hydrology Exhibit
- Existing Conditions HydroCAD Output
- Proposed Conditions Hydrology Exhibit
- Proposed Conditions HydroCAD Output




**LEGEND**

| | | | |
|---|---|---|---|
| SANITARY SEWER MANHOLE | SAN | SANITARY SEWER |
| STORM MANHOLE | W | WATER MAIN |
| CATCH BASIN ROUND | ST | STORM SEWER |
| CATCH BASIN SQUARE | RD | ROOF DRAIN |
| FIRE HYDRANT | G | UNDERGROUND GAS |
| WATER VALVE | E | UNDERGROUND ELECTRIC |
| GAS VALVE | T | UNDERGROUND TELEPHONE |
| LIGHT POLE | FIB | UNDERGROUND FIBER OPTICS |
| TELEPHONE PEDESTAL | OH | OVERHEAD UTILITY |
| ELECTRICAL MANHOLE | SF | SILT FENCE |
| SIGN | | CONIFEROUS TREE |
| POWER POLE | | DECIDUOUS TREE |
| GUY WIRE | | |

BRIOHN
DESIGN GROUP
3885 N.BROOKFIELD ROAD, SUITE 200
BROOKFIELD WISCONSIN 53045-1950
(262) 790-0500 PHONE
(262) 790-0505 FAX

SHEET TITLE
# EXISTING HYDROLOGY EXHIBIT

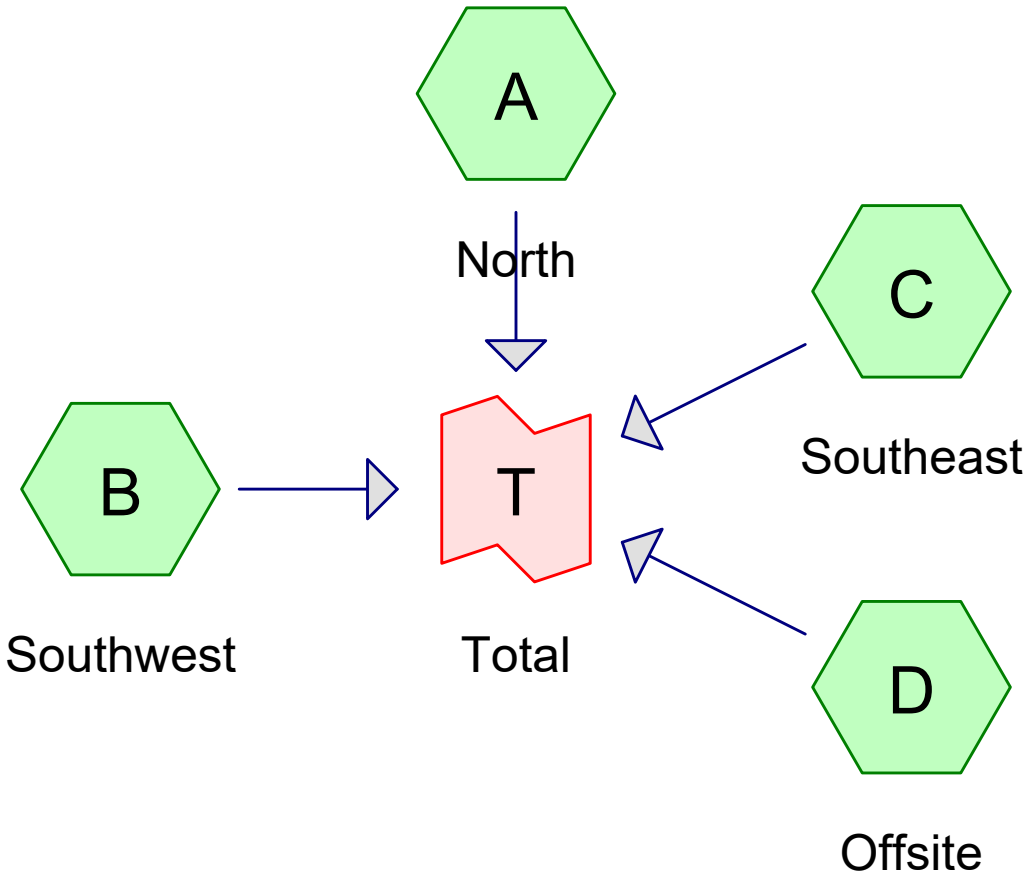
PROPOSED:
JILLY'S CAR WASH
2301 W. BLUEMOUND RD.
CITY OF WAUKESHA, WI

DRAFT - NOT FOR CONSTRUCTION

DIGGERS HOTLINE
Call 811 or (800) 242-8511
Milwaukee Area (262) 432-7910
Hearing Impaired TDD (800) 542-2289
www.DiggersHotline.com

JSD
MILWAUKEE REGIONAL OFFICE
W238 N1610 BUSSE ROAD, SUITE 100
WAUKESHA, WISCONSIN 53188
P. 262.513.0666
JSD PROJ. NO.: 22-11993
JSD PROJ. MGR.: RWI

| | |
|---|---|
| JOB: | 3461 |
| DRAWN: | CAP |
| CHECKED: | RWI |
| DATE: | 12-16-2022 |
| SHEET: | H1.0 |




Subcat Reach Pond Link

**Routing Diagram for 22-11993 Existing**
Prepared by JSD Professional Services Inc, Printed 12/14/2022
HydroCAD® 10.20-2f s/n 01985 © 2022 HydroCAD Software Solutions LLC

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment A: North** Runoff Area=29,270 sf 84.76% Impervious Runoff Depth=1.60"
Tc=6.0 min CN=92 Runoff=1.94 cfs 0.090 af

**Subcatchment B: Southwest** Runoff Area=12,505 sf 87.17% Impervious Runoff Depth=1.69"
Tc=6.0 min CN=93 Runoff=0.87 cfs 0.040 af

**Subcatchment C: Southeast** Runoff Area=13,839 sf 88.19% Impervious Runoff Depth=1.77"
Tc=6.0 min CN=94 Runoff=1.00 cfs 0.047 af

**Subcatchment D: Offsite** Runoff Area=3,544 sf 66.45% Impervious Runoff Depth=1.16"
Tc=6.0 min CN=86 Runoff=0.18 cfs 0.008 af

**Link T: Total** Inflow=3.98 cfs 0.185 af
Primary=3.98 cfs 0.185 af

**Total Runoff Area = 1.358 ac Runoff Volume = 0.185 af Average Runoff Depth = 1.63"**
**15.02% Pervious = 0.204 ac 84.98% Impervious = 1.154 ac**

## Summary for Subcatchment A: North

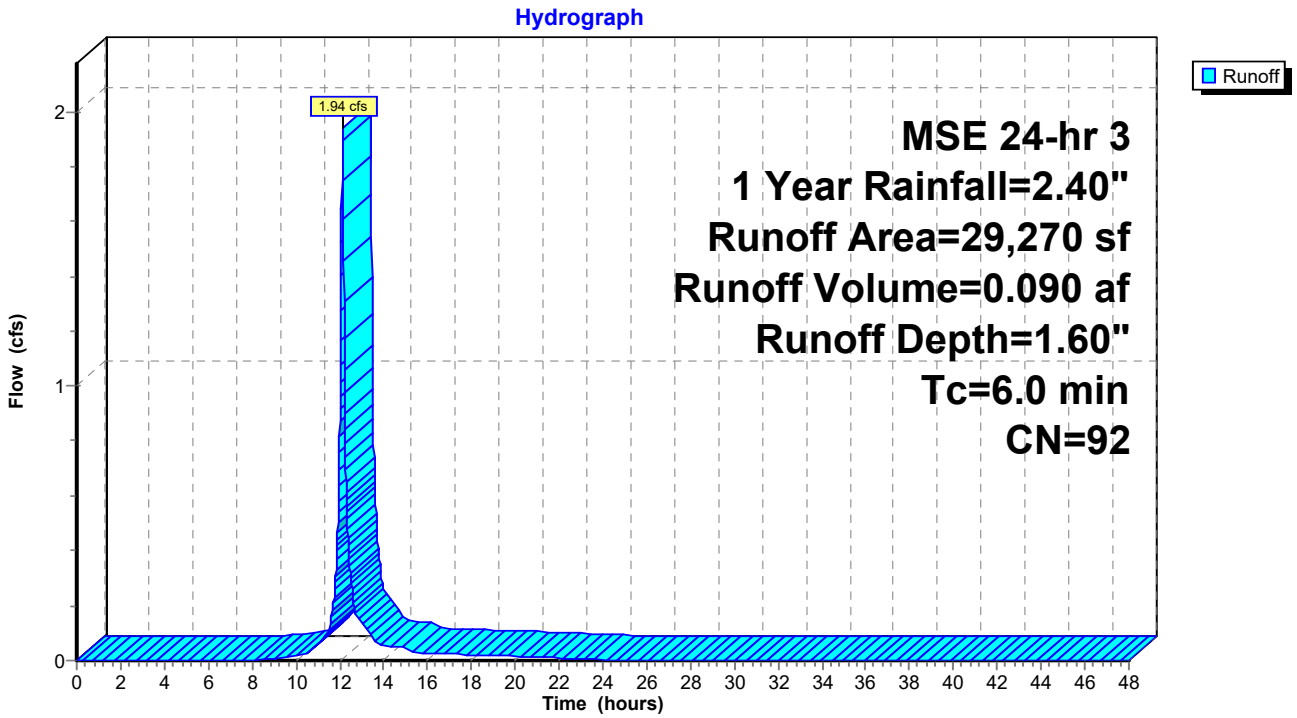
Runoff = 1.94 cfs @ 12.13 hrs, Volume= 0.090 af, Depth= 1.60"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

| Area (sf) | CN | Description |
|---|---|---|
| 22,255 | 98 | Paved parking, HSG B |
| 2,555 | 98 | Roofs, HSG B |
| 4,460 | 61 | >75% Grass cover, Good, HSG B |
| 29,270 | 92 | Weighted Average |
| 4,460 | | 15.24% Pervious Area |
| 24,810 | | 84.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment A: North



## Summary for Subcatchment B: Southwest

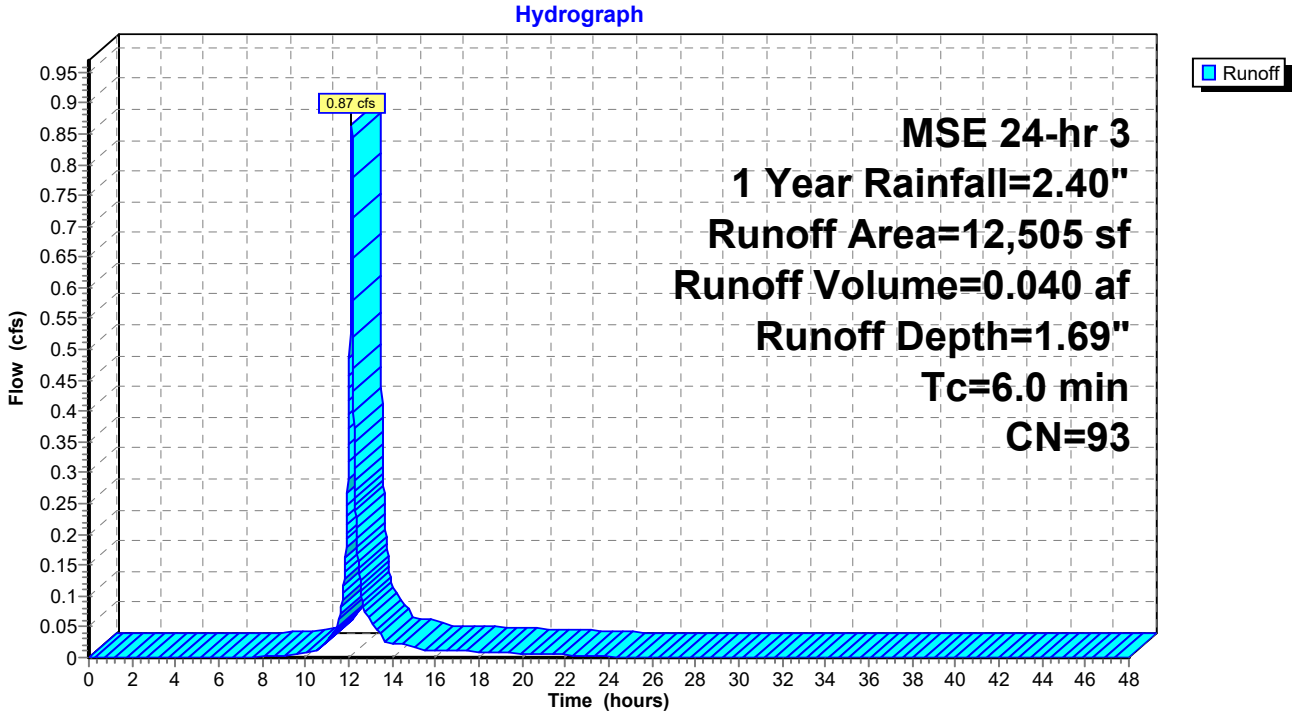
Runoff = 0.87 cfs @ 12.13 hrs, Volume= 0.040 af, Depth= 1.69"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

| Area (sf) | CN | Description |
|---|---|---|
| 9,875 | 98 | Paved parking, HSG B |
| 1,025 | 98 | Roofs, HSG B |
| 1,605 | 61 | >75% Grass cover, Good, HSG B |
| 12,505 | 93 | Weighted Average |
| 1,605 | | 12.83% Pervious Area |
| 10,900 | | 87.17% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

## Subcatchment B: Southwest



## Summary for Subcatchment C: Southeast

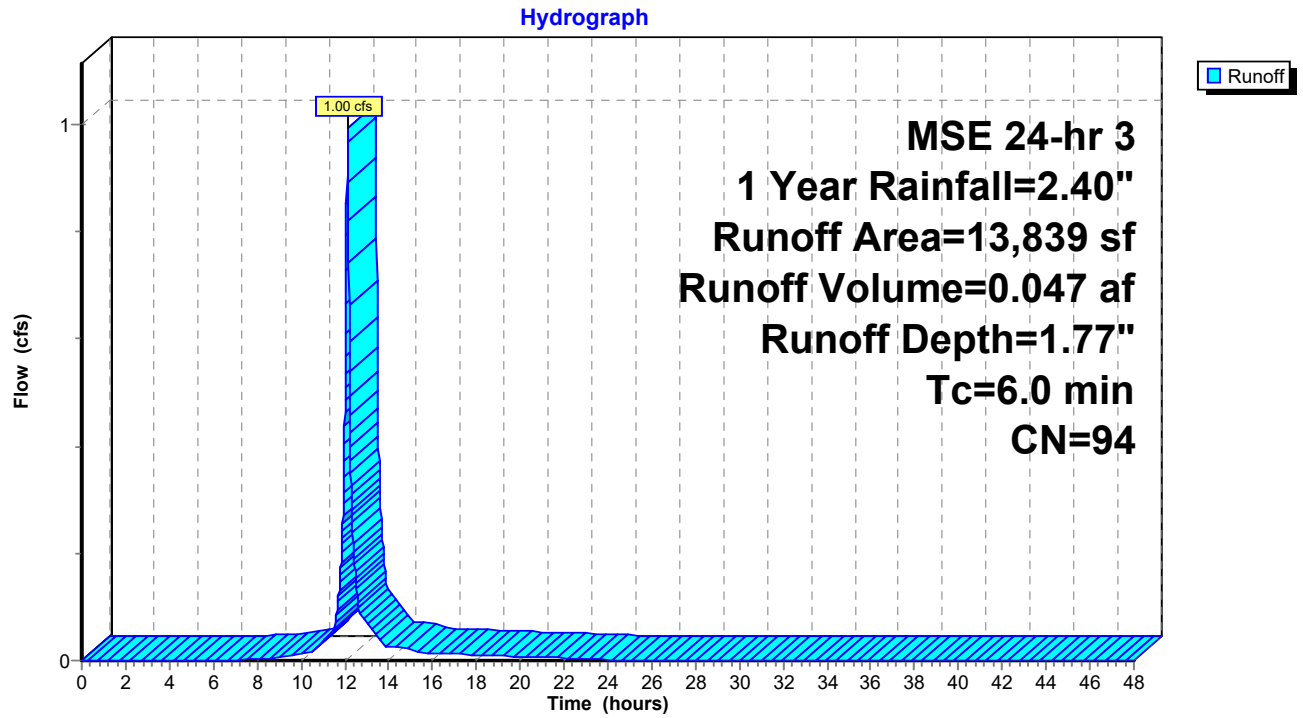
Runoff = 1.00 cfs @ 12.13 hrs, Volume= 0.047 af, Depth= 1.77"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

| Area (sf) | CN | Description |
|---|---|---|
| 9,215 | 98 | Paved parking, HSG B |
| 2,990 | 98 | Roofs, HSG B |
| 1,634 | 61 | >75% Grass cover, Good, HSG B |
| 13,839 | 94 | Weighted Average |
| 1,634 | | 11.81% Pervious Area |
| 12,205 | | 88.19% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

## Subcatchment C: Southeast



## Summary for Subcatchment D: Offsite

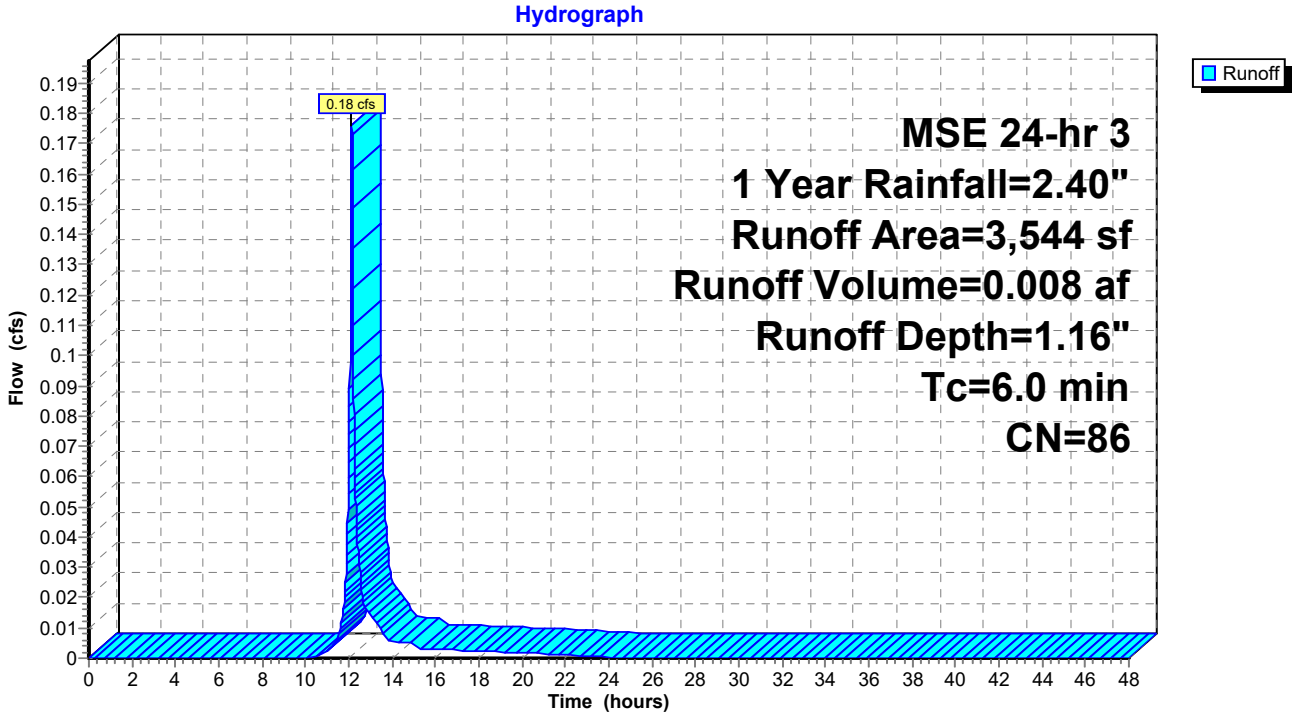
Runoff = 0.18 cfs @ 12.13 hrs, Volume= 0.008 af, Depth= 1.16"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

| Area (sf) | CN | Description |
|---|---|---|
| 2,355 | 98 | Paved parking, HSG B |
| 1,189 | 61 | >75% Grass cover, Good, HSG B |
| 3,544 | 86 | Weighted Average |
| 1,189 | | 33.55% Pervious Area |
| 2,355 | | 66.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment D: Offsite

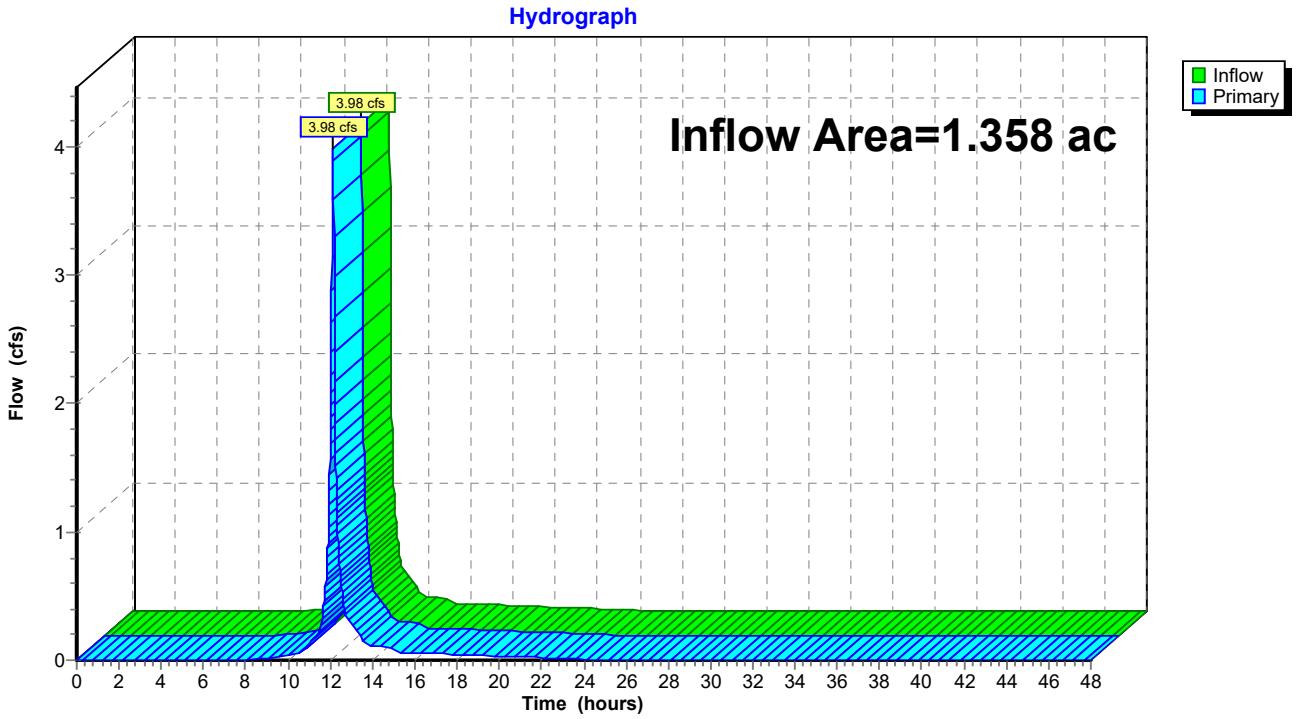


## Summary for Link T: Total

Inflow Area = 1.358 ac, 84.98% Impervious, Inflow Depth = 1.63" for 1 Year event
Inflow = 3.98 cfs @ 12.13 hrs, Volume= 0.185 af
Primary = 3.98 cfs @ 12.13 hrs, Volume= 0.185 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Link T: Total



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment A: North** Runoff Area=29,270 sf 84.76% Impervious Runoff Depth=1.88"
Tc=6.0 min CN=92 Runoff=2.26 cfs 0.105 af

**Subcatchment B: Southwest** Runoff Area=12,505 sf 87.17% Impervious Runoff Depth=1.97"
Tc=6.0 min CN=93 Runoff=1.00 cfs 0.047 af

**Subcatchment C: Southeast** Runoff Area=13,839 sf 88.19% Impervious Runoff Depth=2.06"
Tc=6.0 min CN=94 Runoff=1.15 cfs 0.055 af

**Subcatchment D: Offsite** Runoff Area=3,544 sf 66.45% Impervious Runoff Depth=1.41"
Tc=6.0 min CN=86 Runoff=0.21 cfs 0.010 af

**Link T: Total** Inflow=4.62 cfs 0.216 af
Primary=4.62 cfs 0.216 af

**Total Runoff Area = 1.358 ac Runoff Volume = 0.216 af Average Runoff Depth = 1.91"**
**15.02% Pervious = 0.204 ac 84.98% Impervious = 1.154 ac**

## Summary for Subcatchment A: North

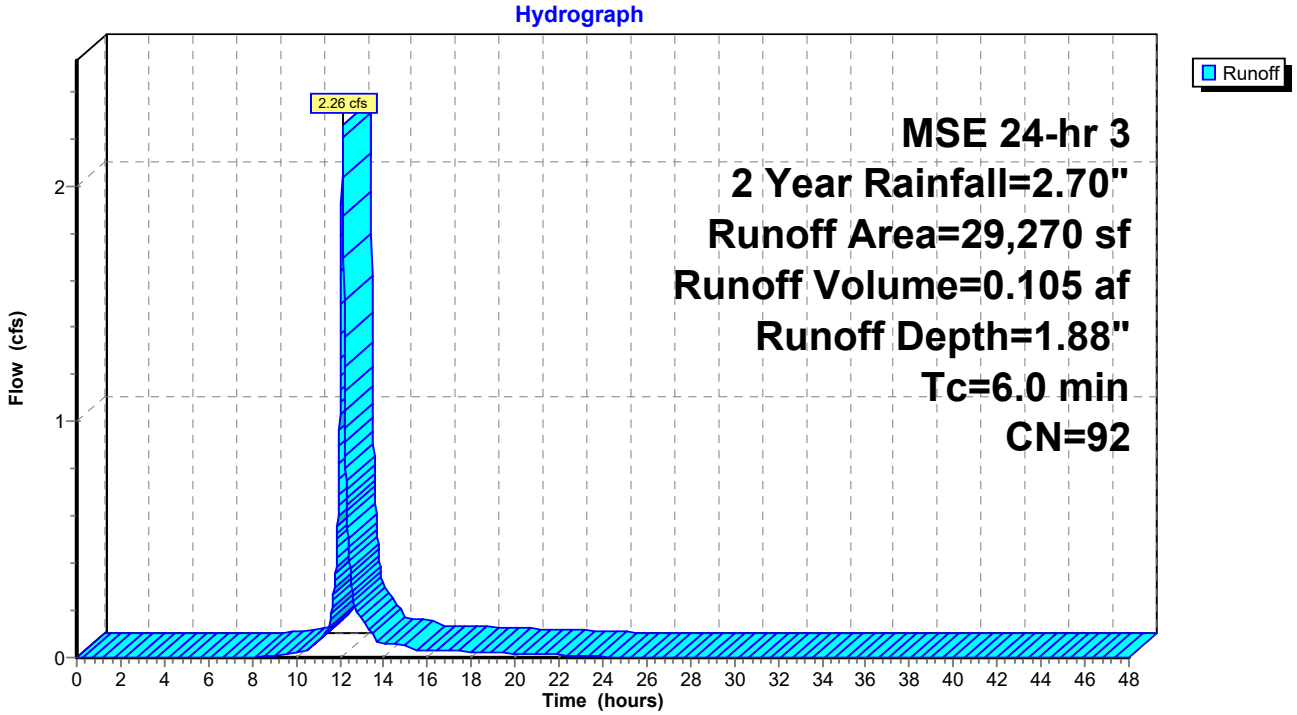
Runoff = 2.26 cfs @ 12.13 hrs, Volume= 0.105 af, Depth= 1.88"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

| Area (sf) | CN | Description |
|---|---|---|
| 22,255 | 98 | Paved parking, HSG B |
| 2,555 | 98 | Roofs, HSG B |
| 4,460 | 61 | >75% Grass cover, Good, HSG B |
| 29,270 | 92 | Weighted Average |
| 4,460 | | 15.24% Pervious Area |
| 24,810 | | 84.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment A: North



## Summary for Subcatchment B: Southwest

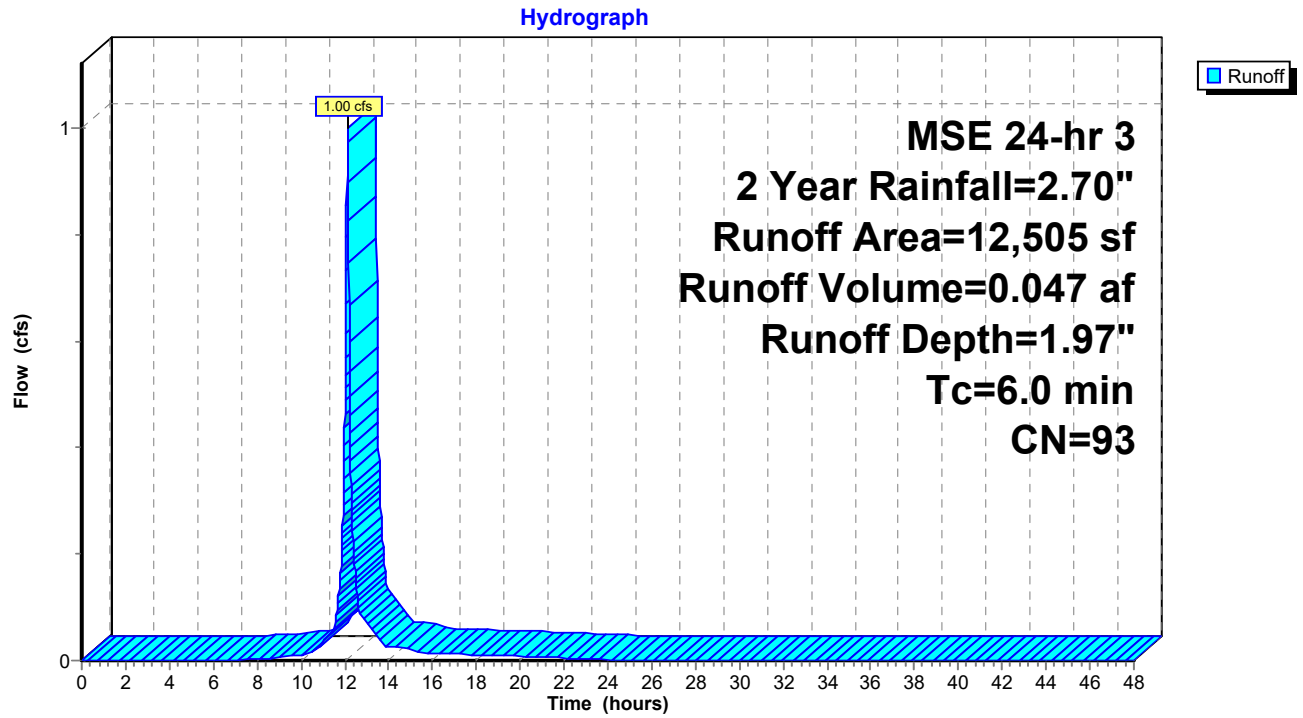
Runoff = 1.00 cfs @ 12.13 hrs, Volume= 0.047 af, Depth= 1.97"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

| Area (sf) | CN | Description |
|---|---|---|
| 9,875 | 98 | Paved parking, HSG B |
| 1,025 | 98 | Roofs, HSG B |
| 1,605 | 61 | >75% Grass cover, Good, HSG B |
| 12,505 | 93 | Weighted Average |
| 1,605 | | 12.83% Pervious Area |
| 10,900 | | 87.17% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment B: Southwest



## Summary for Subcatchment C: Southeast

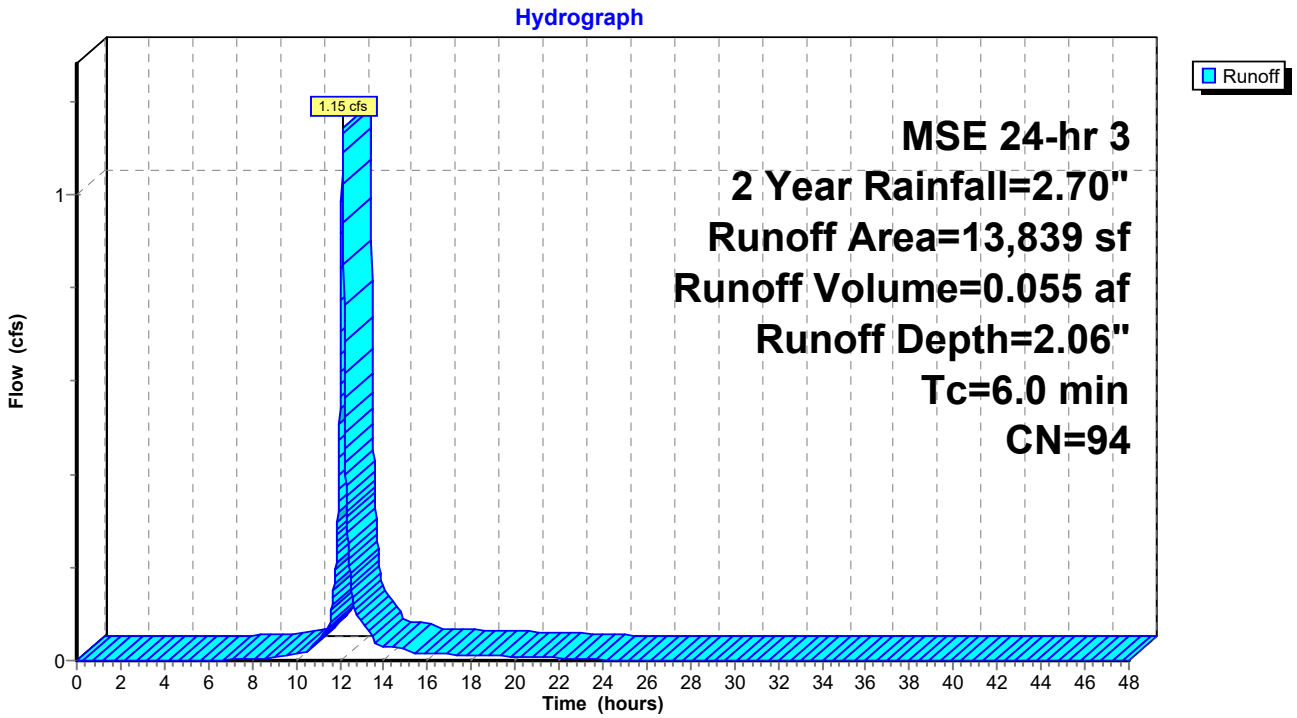
Runoff = 1.15 cfs @ 12.13 hrs, Volume= 0.055 af, Depth= 2.06"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

| Area (sf) | CN | Description |
|---|---|---|
| 9,215 | 98 | Paved parking, HSG B |
| 2,990 | 98 | Roofs, HSG B |
| 1,634 | 61 | >75% Grass cover, Good, HSG B |
| 13,839 | 94 | Weighted Average |
| 1,634 | | 11.81% Pervious Area |
| 12,205 | | 88.19% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

## Subcatchment C: Southeast



## Summary for Subcatchment D: Offsite

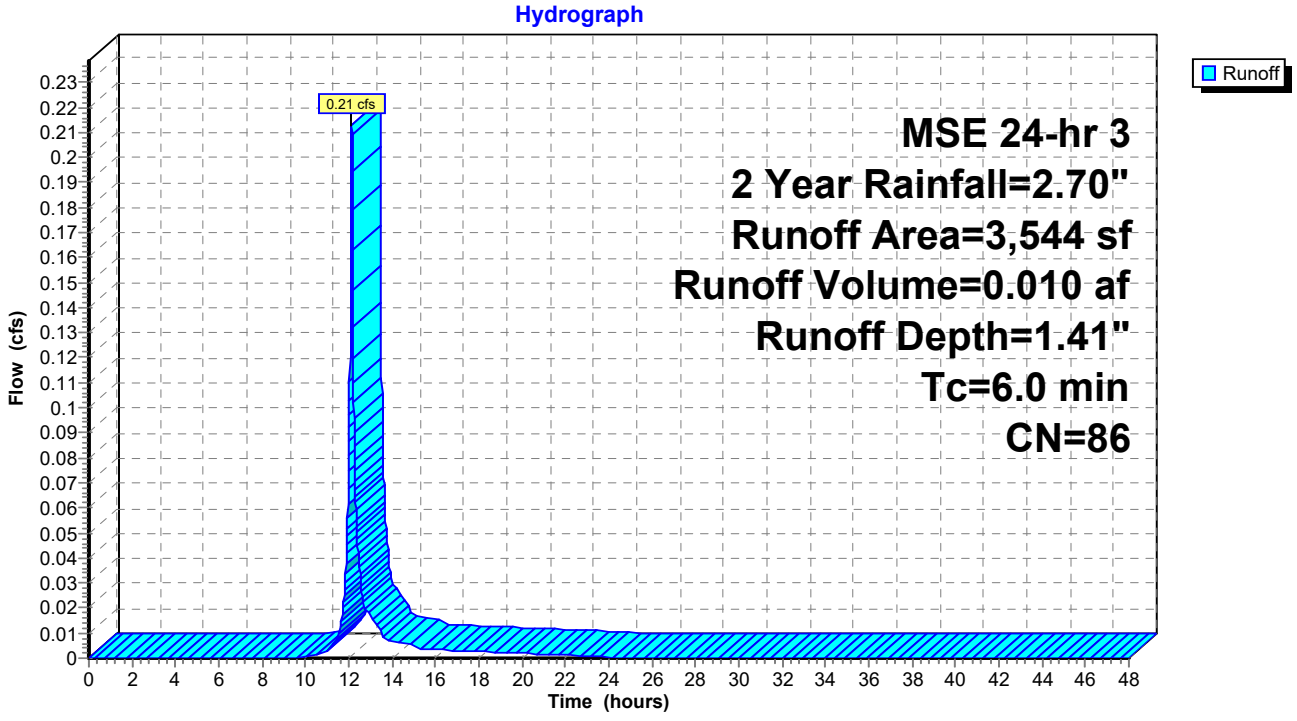
Runoff = 0.21 cfs @ 12.13 hrs, Volume= 0.010 af, Depth= 1.41"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

| Area (sf) | CN | Description |
|---|---|---|
| 2,355 | 98 | Paved parking, HSG B |
| 1,189 | 61 | >75% Grass cover, Good, HSG B |
| 3,544 | 86 | Weighted Average |
| 1,189 | | 33.55% Pervious Area |
| 2,355 | | 66.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment D: Offsite

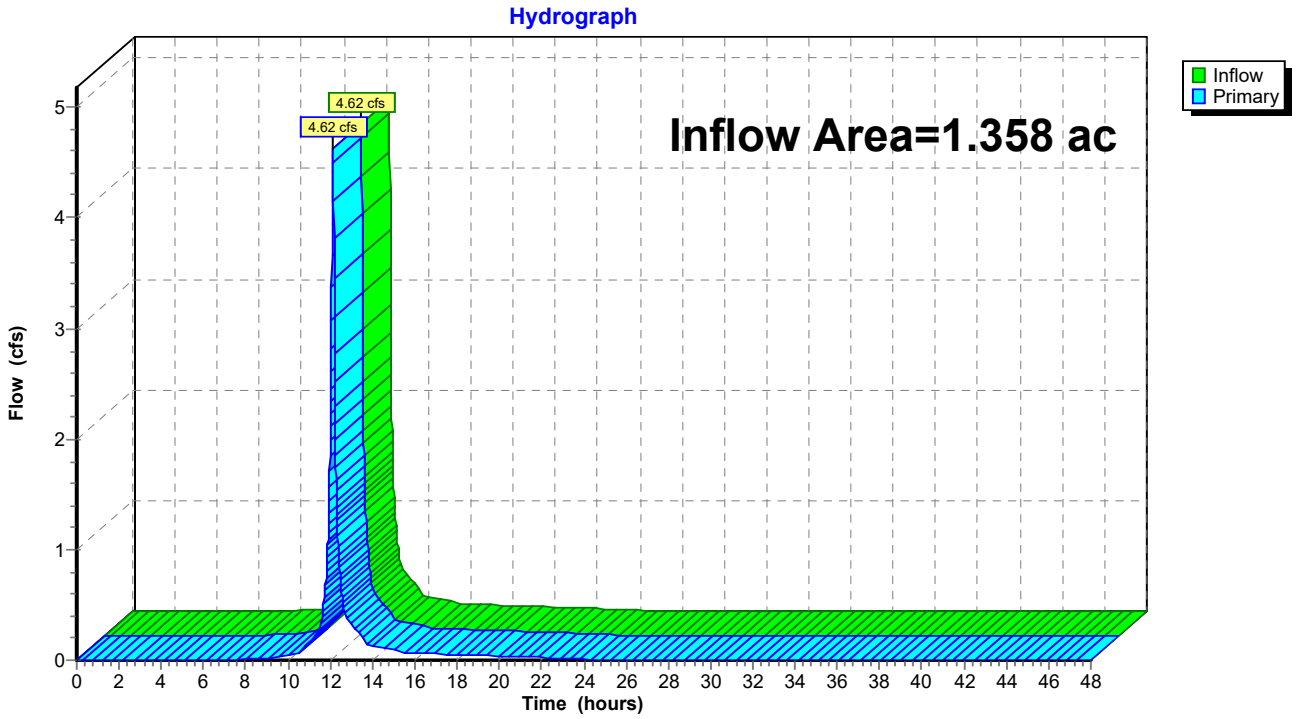


## Summary for Link T: Total

Inflow Area = 1.358 ac, 84.98% Impervious, Inflow Depth = 1.91" for 2 Year event
Inflow = 4.62 cfs @ 12.13 hrs, Volume= 0.216 af
Primary = 4.62 cfs @ 12.13 hrs, Volume= 0.216 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Link T: Total



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment A: North** Runoff Area=29,270 sf 84.76% Impervious Runoff Depth=2.93"
Tc=6.0 min CN=92 Runoff=3.44 cfs 0.164 af

**Subcatchment B: Southwest** Runoff Area=12,505 sf 87.17% Impervious Runoff Depth=3.04"
Tc=6.0 min CN=93 Runoff=1.50 cfs 0.073 af

**Subcatchment C: Southeast** Runoff Area=13,839 sf 88.19% Impervious Runoff Depth=3.14"
Tc=6.0 min CN=94 Runoff=1.70 cfs 0.083 af

**Subcatchment D: Offsite** Runoff Area=3,544 sf 66.45% Impervious Runoff Depth=2.37"
Tc=6.0 min CN=86 Runoff=0.35 cfs 0.016 af

**Link T: Total** Inflow=6.99 cfs 0.336 af
Primary=6.99 cfs 0.336 af

**Total Runoff Area = 1.358 ac Runoff Volume = 0.336 af Average Runoff Depth = 2.97"**
**15.02% Pervious = 0.204 ac 84.98% Impervious = 1.154 ac**

## Summary for Subcatchment A: North

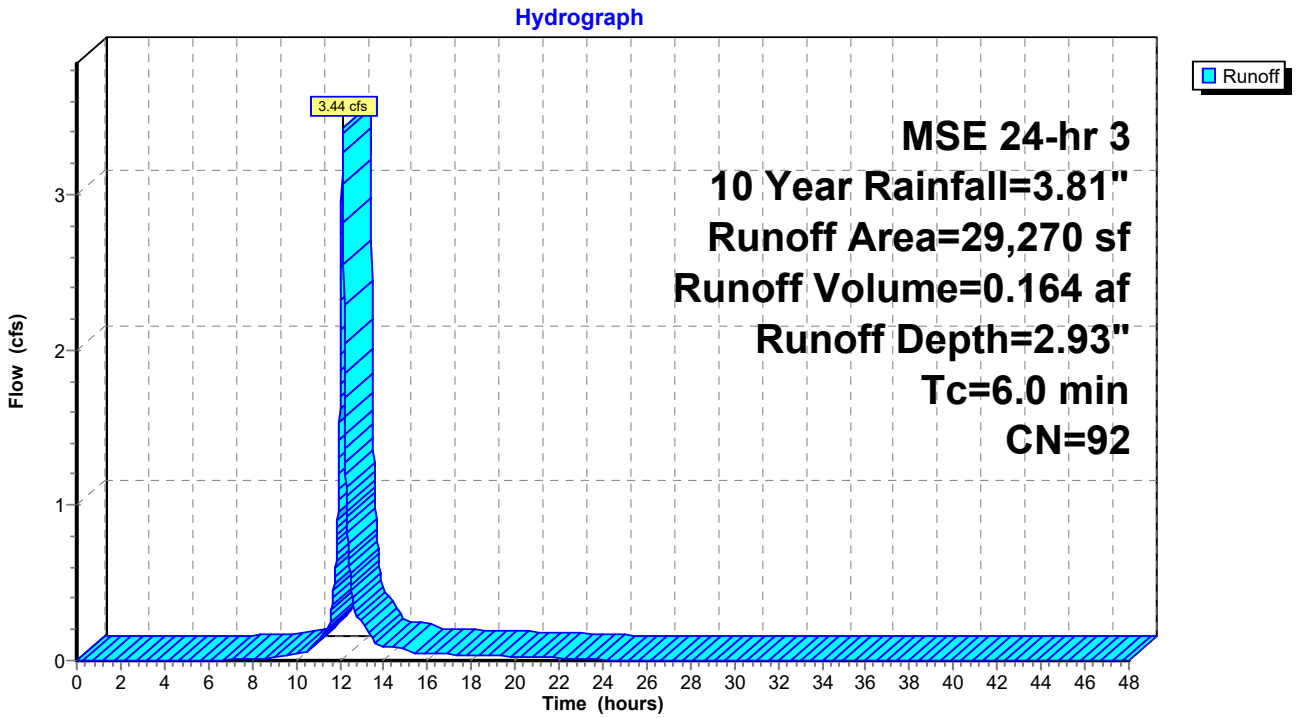
Runoff = 3.44 cfs @ 12.13 hrs, Volume= 0.164 af, Depth= 2.93"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

| Area (sf) | CN | Description |
|---|---|---|
| 22,255 | 98 | Paved parking, HSG B |
| 2,555 | 98 | Roofs, HSG B |
| 4,460 | 61 | >75% Grass cover, Good, HSG B |
| 29,270 | 92 | Weighted Average |
| 4,460 | | 15.24% Pervious Area |
| 24,810 | | 84.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment A: North



## Summary for Subcatchment B: Southwest

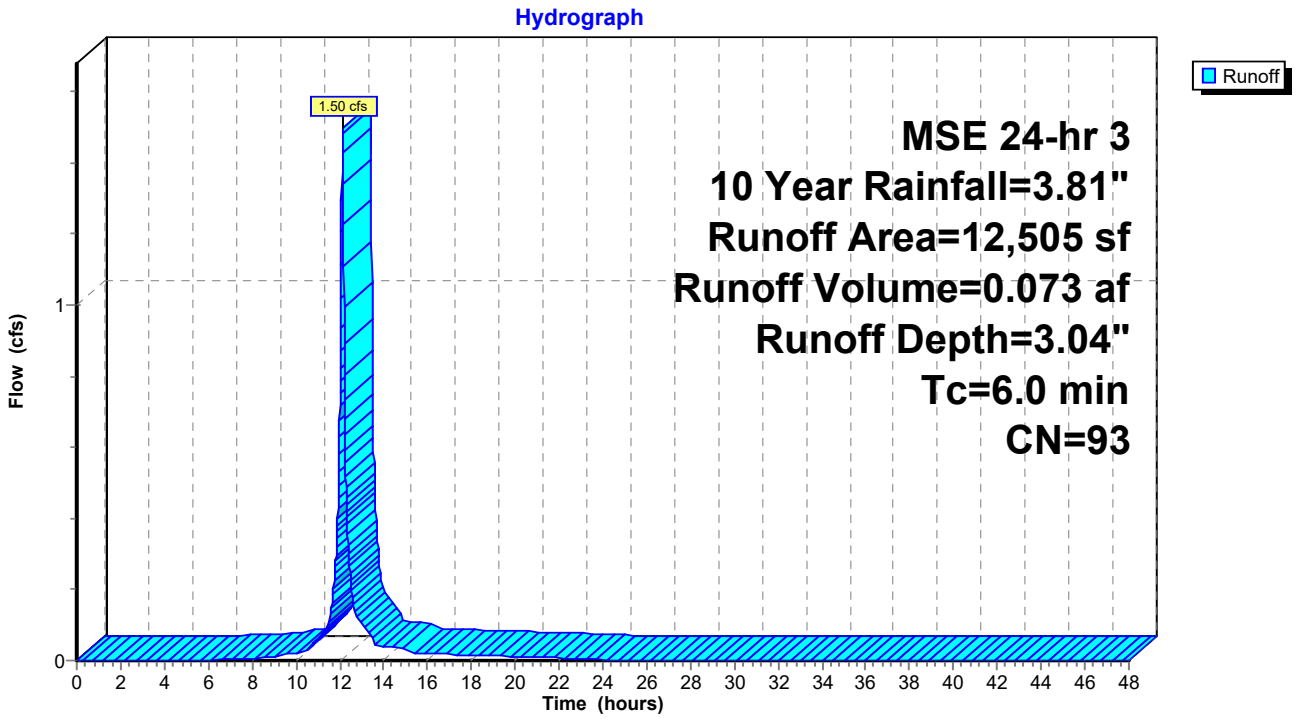
Runoff = 1.50 cfs @ 12.13 hrs, Volume= 0.073 af, Depth= 3.04"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

| Area (sf) | CN | Description |
|---|---|---|
| 9,875 | 98 | Paved parking, HSG B |
| 1,025 | 98 | Roofs, HSG B |
| 1,605 | 61 | >75% Grass cover, Good, HSG B |
| 12,505 | 93 | Weighted Average |
| 1,605 | | 12.83% Pervious Area |
| 10,900 | | 87.17% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment B: Southwest



## Summary for Subcatchment C: Southeast

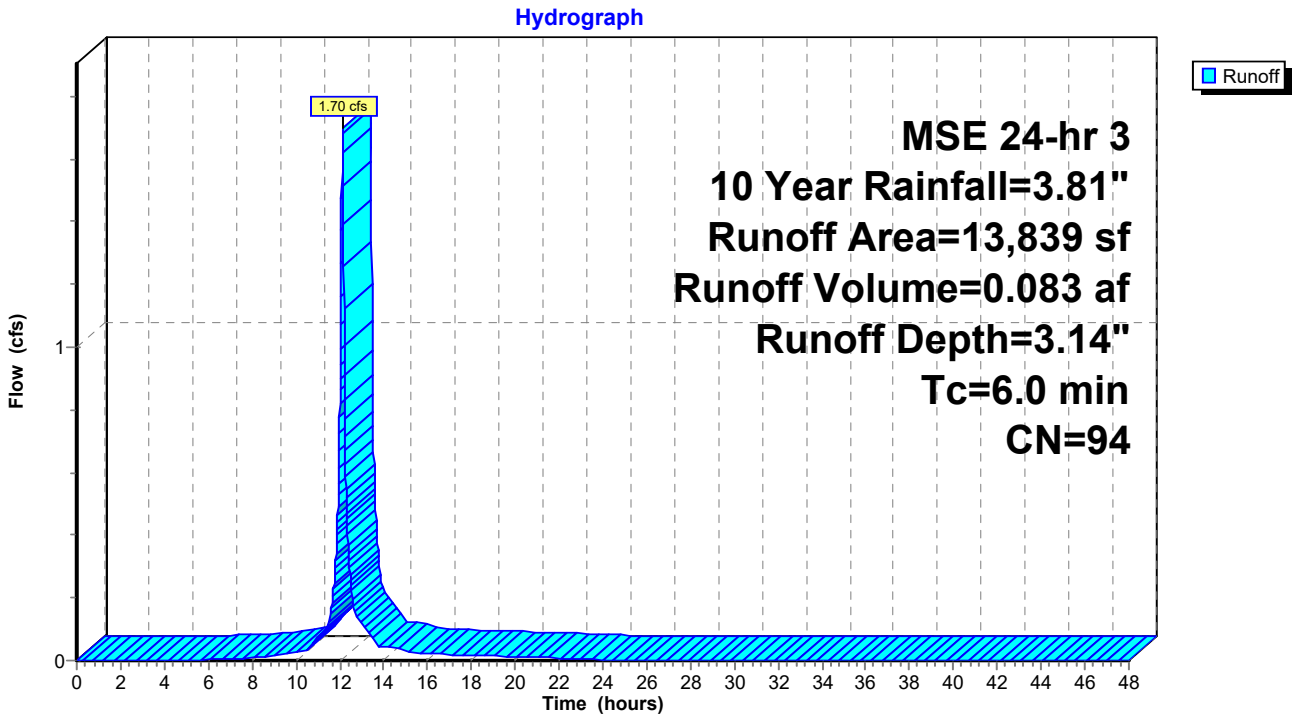
Runoff = 1.70 cfs @ 12.13 hrs, Volume= 0.083 af, Depth= 3.14"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

| Area (sf) | CN | Description |
|---|---|---|
| 9,215 | 98 | Paved parking, HSG B |
| 2,990 | 98 | Roofs, HSG B |
| 1,634 | 61 | >75% Grass cover, Good, HSG B |
| 13,839 | 94 | Weighted Average |
| 1,634 | | 11.81% Pervious Area |
| 12,205 | | 88.19% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

## Subcatchment C: Southeast



## Summary for Subcatchment D: Offsite

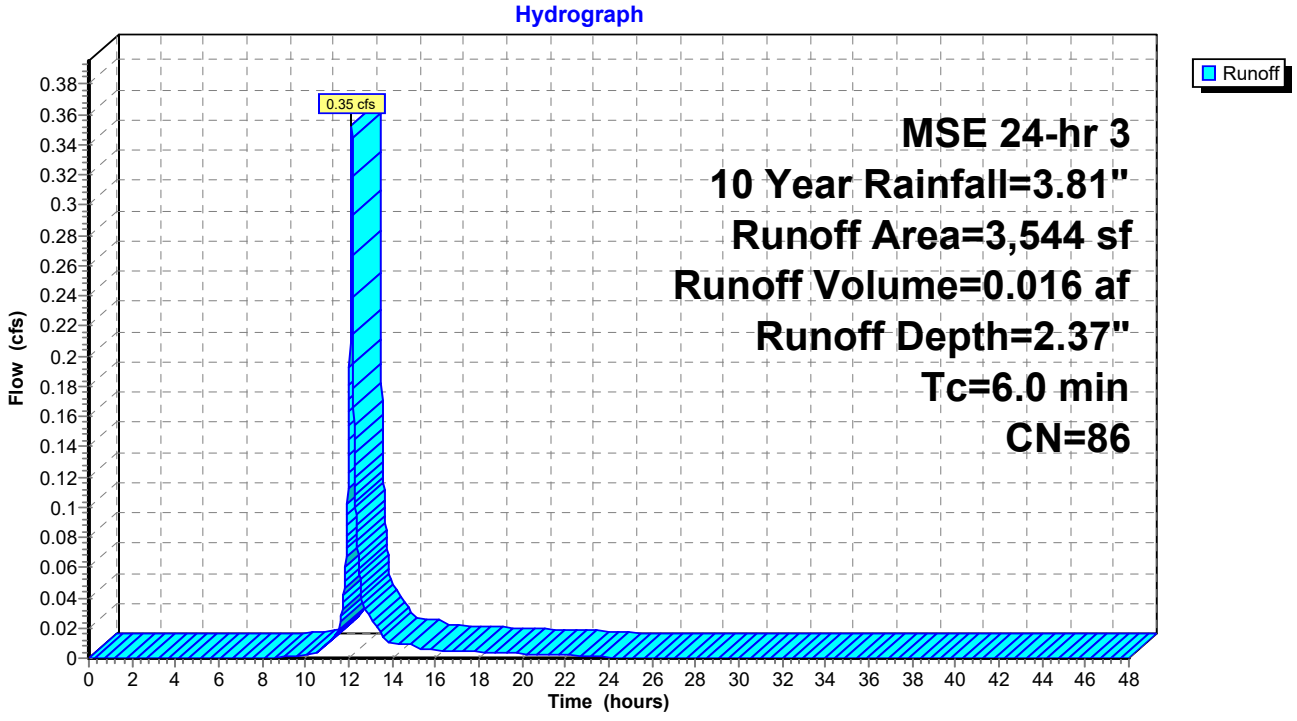
Runoff = 0.35 cfs @ 12.13 hrs, Volume= 0.016 af, Depth= 2.37"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

| Area (sf) | CN | Description |
|---|---|---|
| 2,355 | 98 | Paved parking, HSG B |
| 1,189 | 61 | >75% Grass cover, Good, HSG B |
| 3,544 | 86 | Weighted Average |
| 1,189 | | 33.55% Pervious Area |
| 2,355 | | 66.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment D: Offsite

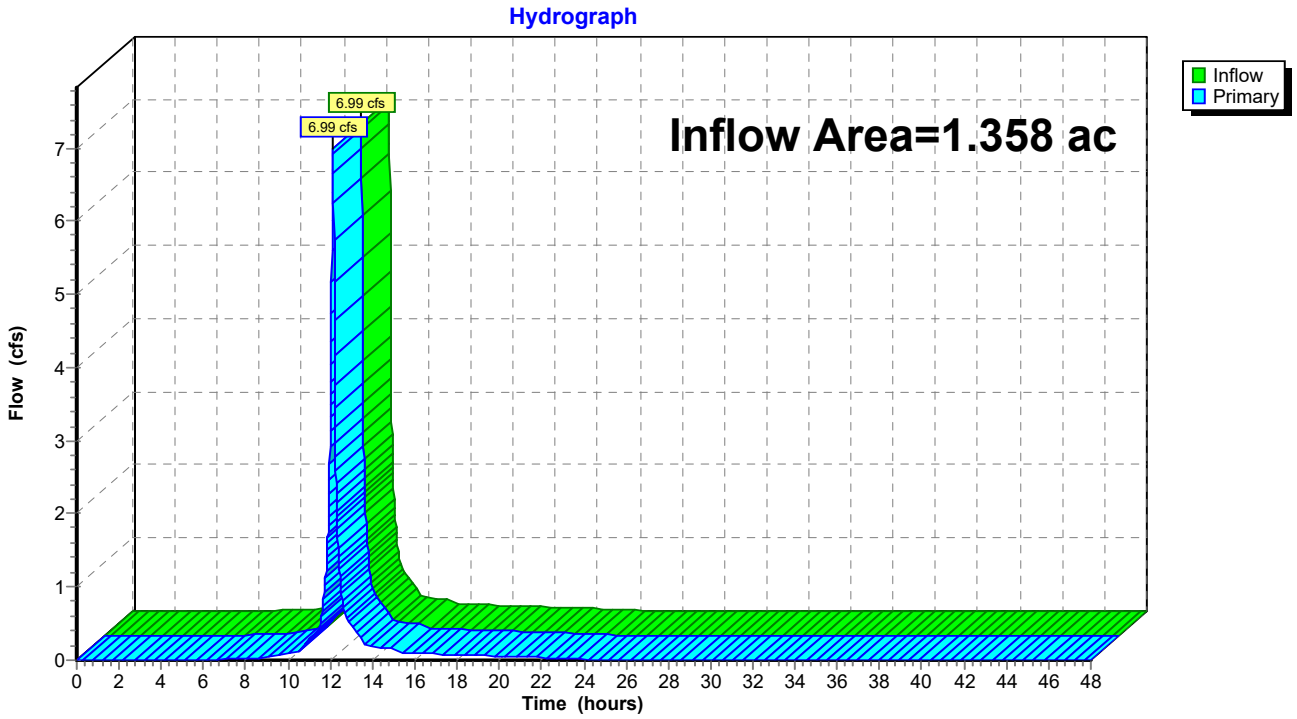


## Summary for Link T: Total

Inflow Area = 1.358 ac, 84.98% Impervious, Inflow Depth = 2.97" for 10 Year event
Inflow = 6.99 cfs @ 12.13 hrs, Volume= 0.336 af
Primary = 6.99 cfs @ 12.13 hrs, Volume= 0.336 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Link T: Total



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment A: North** Runoff Area=29,270 sf 84.76% Impervious Runoff Depth=5.25"
Tc=6.0 min CN=92 Runoff=5.92 cfs 0.294 af

**Subcatchment B: Southwest** Runoff Area=12,505 sf 87.17% Impervious Runoff Depth=5.36"
Tc=6.0 min CN=93 Runoff=2.56 cfs 0.128 af

**Subcatchment C: Southeast** Runoff Area=13,839 sf 88.19% Impervious Runoff Depth=5.47"
Tc=6.0 min CN=94 Runoff=2.86 cfs 0.145 af

**Subcatchment D: Offsite** Runoff Area=3,544 sf 66.45% Impervious Runoff Depth=4.58"
Tc=6.0 min CN=86 Runoff=0.66 cfs 0.031 af

**Link T: Total** Inflow=11.99 cfs 0.598 af
Primary=11.99 cfs 0.598 af

**Total Runoff Area = 1.358 ac Runoff Volume = 0.598 af Average Runoff Depth = 5.28"**
**15.02% Pervious = 0.204 ac 84.98% Impervious = 1.154 ac**

## Summary for Subcatchment A: North

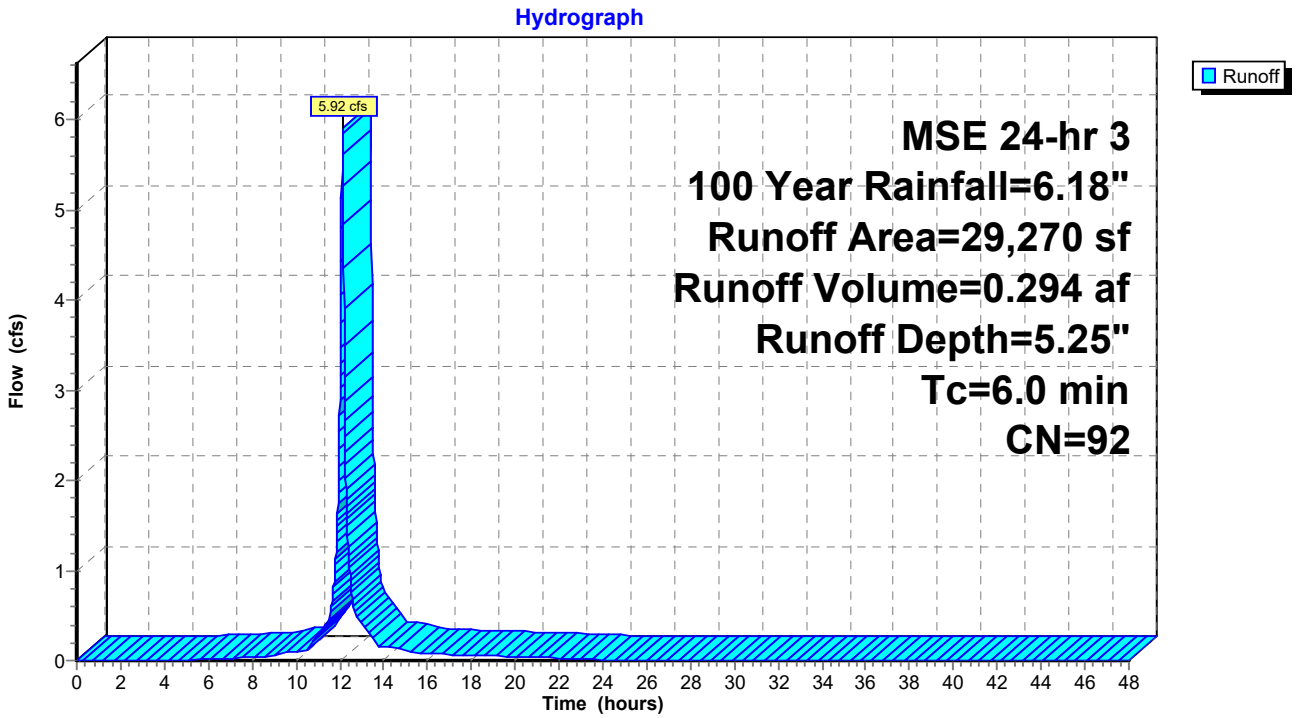
Runoff = 5.92 cfs @ 12.13 hrs, Volume= 0.294 af, Depth= 5.25"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

| Area (sf) | CN | Description |
|---|---|---|
| 22,255 | 98 | Paved parking, HSG B |
| 2,555 | 98 | Roofs, HSG B |
| 4,460 | 61 | >75% Grass cover, Good, HSG B |
| 29,270 | 92 | Weighted Average |
| 4,460 | | 15.24% Pervious Area |
| 24,810 | | 84.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment A: North



## Summary for Subcatchment B: Southwest

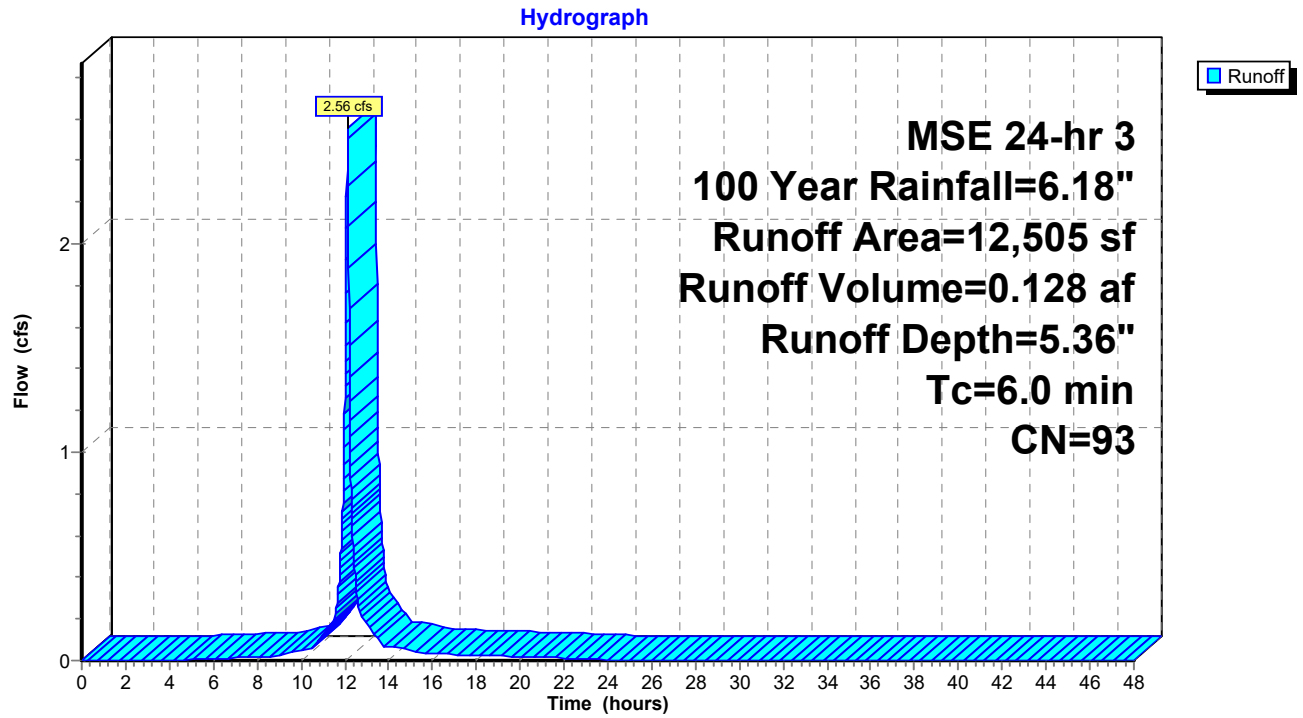
Runoff = 2.56 cfs @ 12.13 hrs, Volume= 0.128 af, Depth= 5.36"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

| Area (sf) | CN | Description |
|---|---|---|
| 9,875 | 98 | Paved parking, HSG B |
| 1,025 | 98 | Roofs, HSG B |
| 1,605 | 61 | >75% Grass cover, Good, HSG B |
| 12,505 | 93 | Weighted Average |
| 1,605 | | 12.83% Pervious Area |
| 10,900 | | 87.17% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment B: Southwest



## Summary for Subcatchment C: Southeast

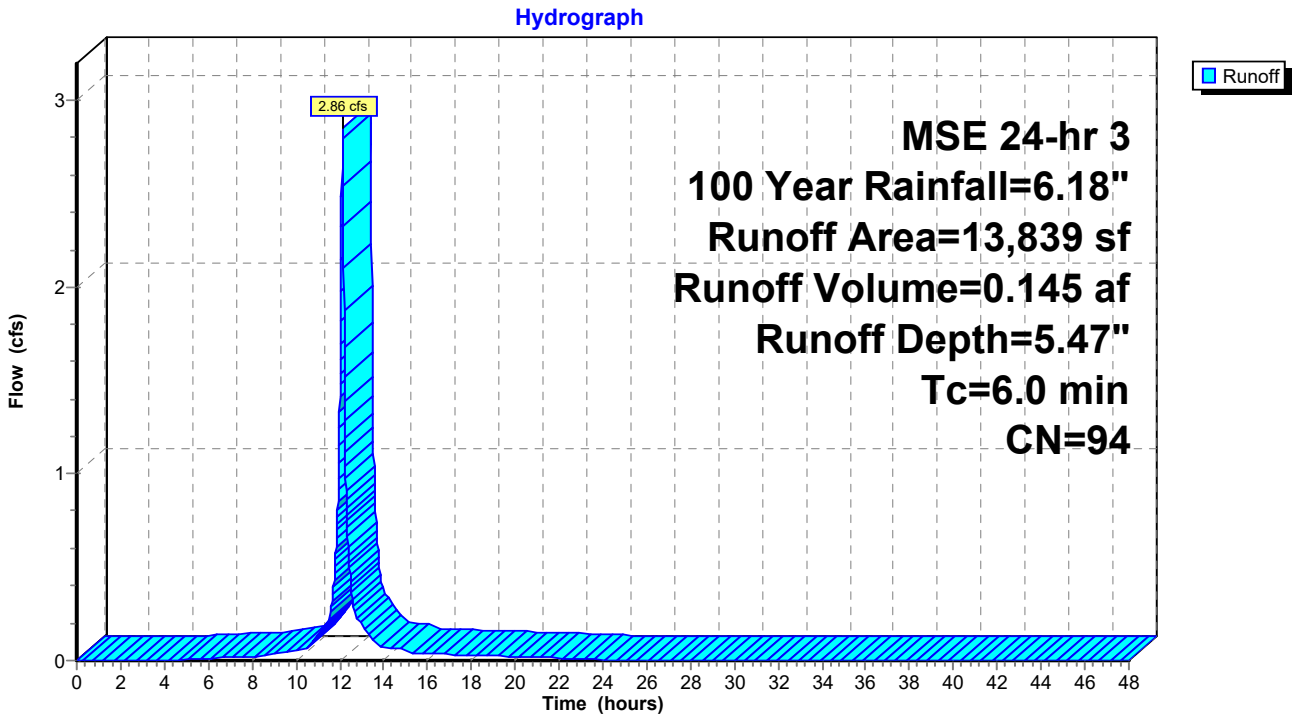
Runoff = 2.86 cfs @ 12.13 hrs, Volume= 0.145 af, Depth= 5.47"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

| Area (sf) | CN | Description |
|---|---|---|
| 9,215 | 98 | Paved parking, HSG B |
| 2,990 | 98 | Roofs, HSG B |
| 1,634 | 61 | >75% Grass cover, Good, HSG B |
| 13,839 | 94 | Weighted Average |
| 1,634 | | 11.81% Pervious Area |
| 12,205 | | 88.19% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

## Subcatchment C: Southeast



## Summary for Subcatchment D: Offsite

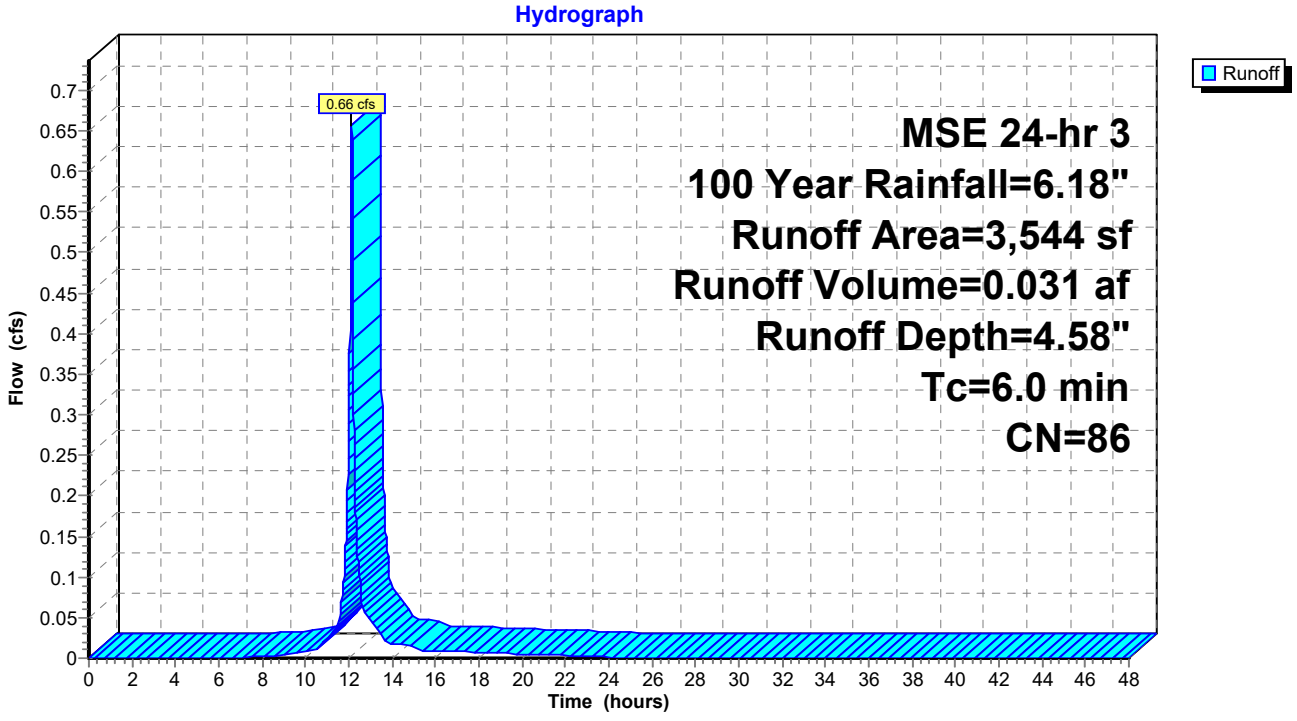
Runoff = 0.66 cfs @ 12.13 hrs, Volume= 0.031 af, Depth= 4.58"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

| Area (sf) | CN | Description |
|---|---|---|
| 2,355 | 98 | Paved parking, HSG B |
| 1,189 | 61 | >75% Grass cover, Good, HSG B |
| 3,544 | 86 | Weighted Average |
| 1,189 | | 33.55% Pervious Area |
| 2,355 | | 66.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment D: Offsite

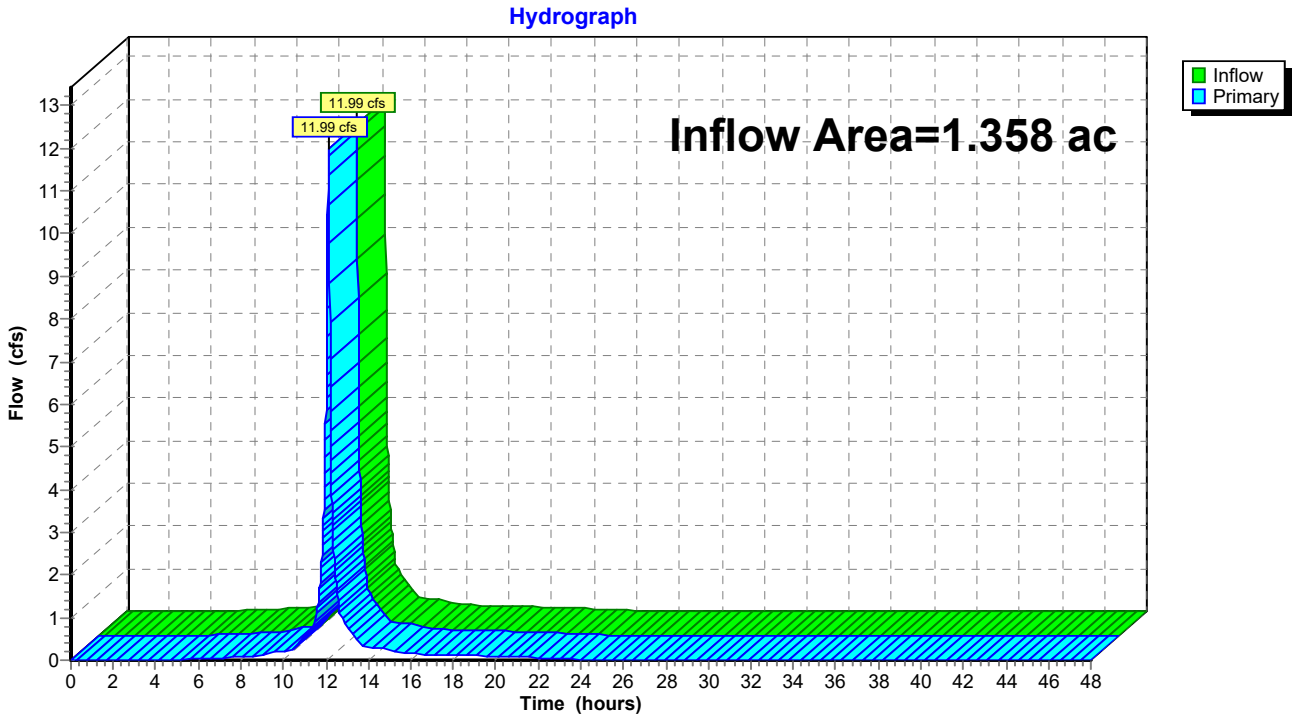


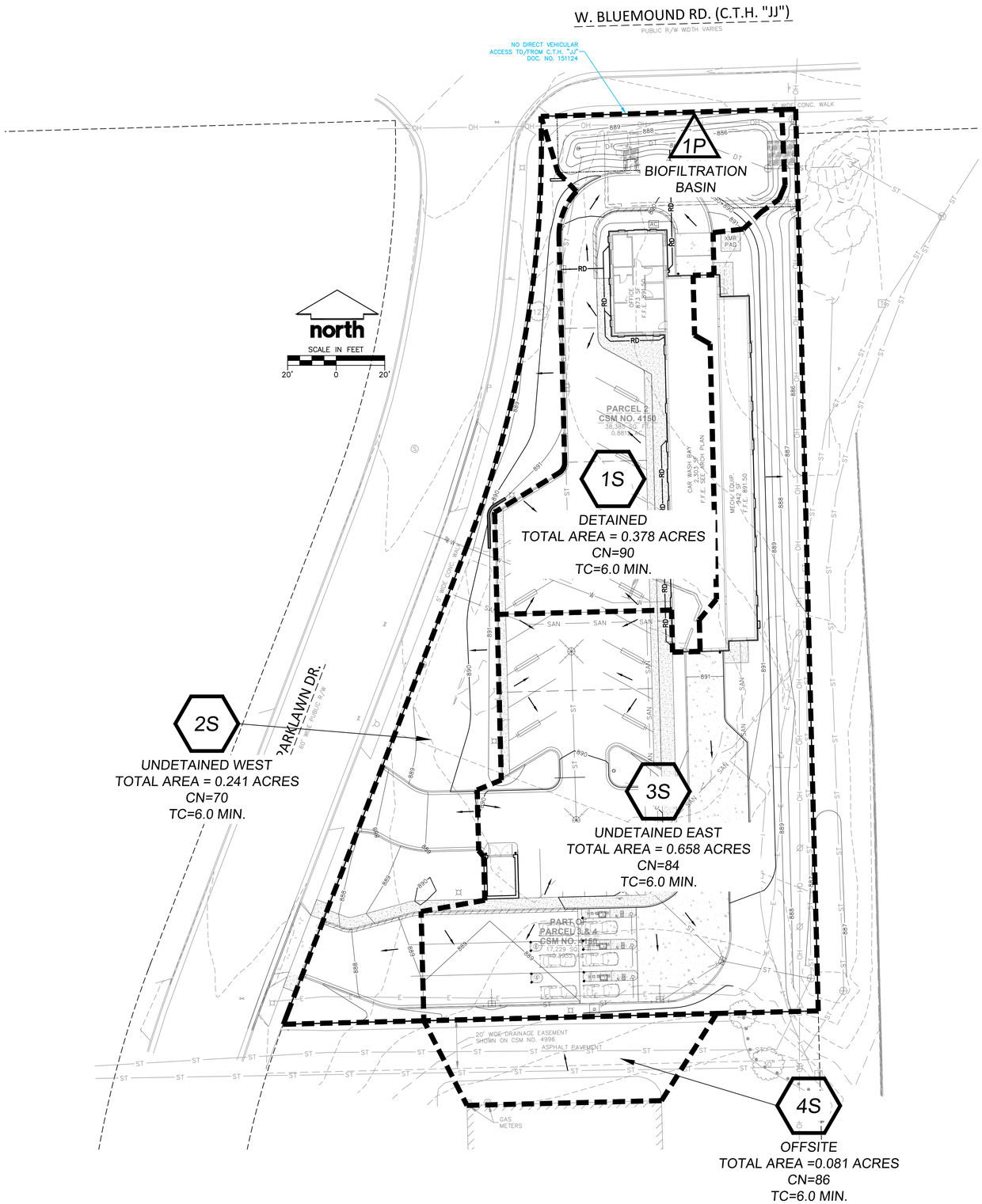
## Summary for Link T: Total

Inflow Area = 1.358 ac, 84.98% Impervious, Inflow Depth = 5.28" for 100 Year event
Inflow = 11.99 cfs @ 12.13 hrs, Volume= 0.598 af
Primary = 11.99 cfs @ 12.13 hrs, Volume= 0.598 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Link T: Total






**LEGEND**

| | | | |
|---|---|---|---|
| SANITARY SEWER MANHOLE | SAN | SANITARY SEWER |
| STORM MANHOLE | W | WATER MAIN |
| CATCH BASIN ROUND | ST | STORM SEWER |
| CATCH BASIN SQUARE | RD | ROOF DRAIN |
| FIRE HYDRANT | G | UNDERGROUND GAS |
| WATER VALVE | E | UNDERGROUND ELECTRIC |
| GAS VALVE | T | UNDERGROUND TELEPHONE |
| LIGHT POLE | FIB | UNDERGROUND FIBER OPTICS |
| TELEPHONE PEDESTAL | OH | OVERHEAD UTILITY |
| ELECTRICAL MANHOLE | SF | SILT FENCE |
| SIGN | | CONIFEROUS TREE |
| POWER POLE | | DECIDUOUS TREE |
| GUY WIRE | | |


BRIOHN
DESIGN GROUP
3885 N.BROOKFIELD ROAD, SUITE 200
BROOKFIELD WISCONSIN 53045-1950
(262) 790-0500 PHONE
(262) 790-0505 FAX


SHEET TITLE
PROPOSED HYDROLOGY EXHIBIT

WISCONSIN
RIZAL W. ISKANDARSJACH
E-41735
MILWAUKEE, WI
PROFESSIONAL ENGINEER
1/10/23

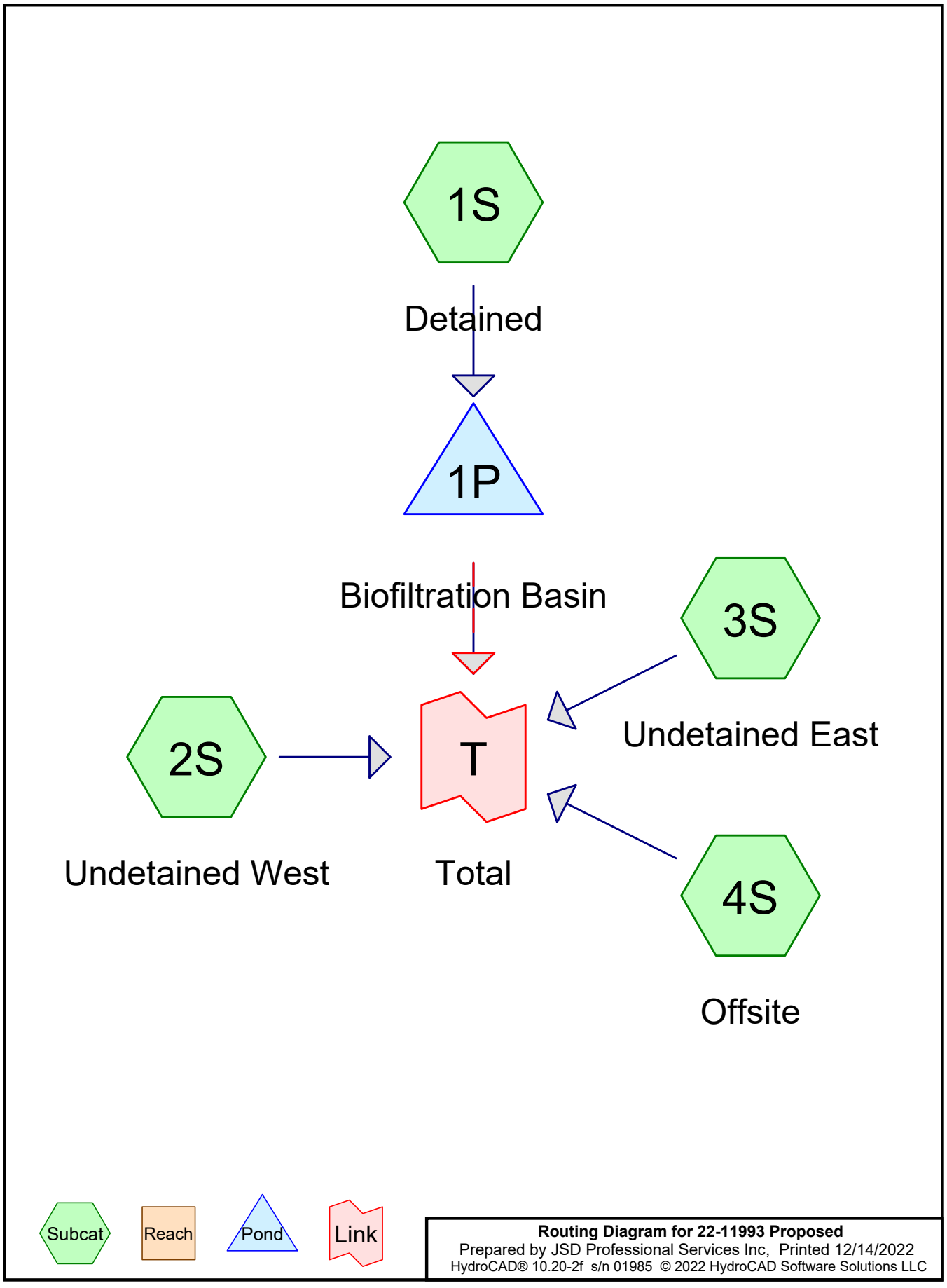
PROPOSED:
JILLY'S CAR WASH
2301 W. BLUEMOUND RD.
CITY OF WAUKESHA, WI

REVISION # 1: CITY SPAR COMMENTS 2023-01-10

| | |
|---|---|
| JOB: | 3461 |
| DRAWN: | CAP |
| CHECKED: | RWI |
| DATE: | 12-16-2022 |
| SHEET: | H2.0 |

DIGGERS HOTLINE
Call 811 or (800) 242-8511
Milwaukee Area (262) 432-7910
Hearing Impaired TDD (800) 542-2289
www.DiggersHotline.com


JSD
MILWAUKEE REGIONAL OFFICE
W238 N1610 BUSSE ROAD, SUITE 100
WAUKESHA, WISCONSIN 53188
P. 262.513.0666
JSD PROJ. NO.: 22-11993
JSD PROJ. MGR.: RWI




**Routing Diagram for 22-11993 Proposed**
Prepared by JSD Professional Services Inc, Printed 12/14/2022
HydroCAD® 10.20-2f s/n 01985 © 2022 HydroCAD Software Solutions LLC

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: Detained** Runoff Area=16,480 sf 78.67% Impervious Runoff Depth=1.44"
Tc=6.0 min CN=90 Runoff=1.00 cfs 0.045 af

**Subcatchment2S: UndetainedWest** Runoff Area=10,515 sf 25.53% Impervious Runoff Depth=0.41"
Tc=6.0 min CN=70 Runoff=0.16 cfs 0.008 af

**Subcatchment3S: UndetainedEast** Runoff Area=28,619 sf 61.99% Impervious Runoff Depth=1.04"
Tc=6.0 min CN=84 Runoff=1.27 cfs 0.057 af

**Subcatchment4S: Offsite** Runoff Area=3,544 sf 66.45% Impervious Runoff Depth=1.16"
Tc=6.0 min CN=86 Runoff=0.18 cfs 0.008 af

**Pond 1P: BiofiltrationBasin** Peak Elev=886.39' Storage=1,546 cf Inflow=1.00 cfs 0.045 af
Discarded=0.00 cfs 0.008 af Primary=0.01 cfs 0.012 af Secondary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.020 af

**Link T: Total** Inflow=1.60 cfs 0.085 af
Primary=1.60 cfs 0.085 af

**Total Runoff Area = 1.358 ac Runoff Volume = 0.118 af Average Runoff Depth = 1.05"**
**39.58% Pervious = 0.537 ac 60.42% Impervious = 0.821 ac**

## Summary for Subcatchment 1S: Detained

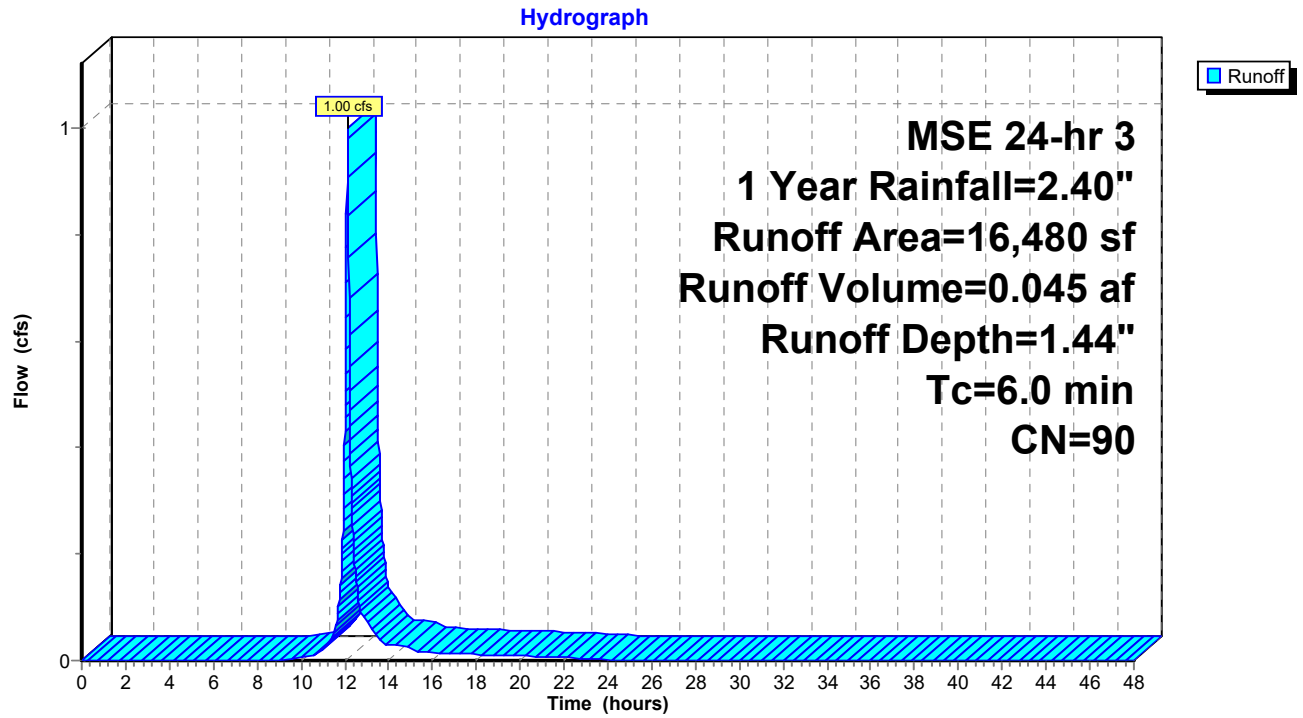
Runoff = 1.00 cfs @ 12.13 hrs, Volume= 0.045 af, Depth= 1.44"
Routed to Pond 1P : Biofiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

| Area (sf) | CN | Description |
|---|---|---|
| 8,430 | 98 | Paved parking, HSG B |
| 4,535 | 98 | Roofs, HSG B |
| 3,515 | 61 | >75% Grass cover, Good, HSG B |
| 16,480 | 90 | Weighted Average |
| 3,515 | | 21.33% Pervious Area |
| 12,965 | | 78.67% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment 1S: Detained



## Summary for Subcatchment 2S: Undetained West

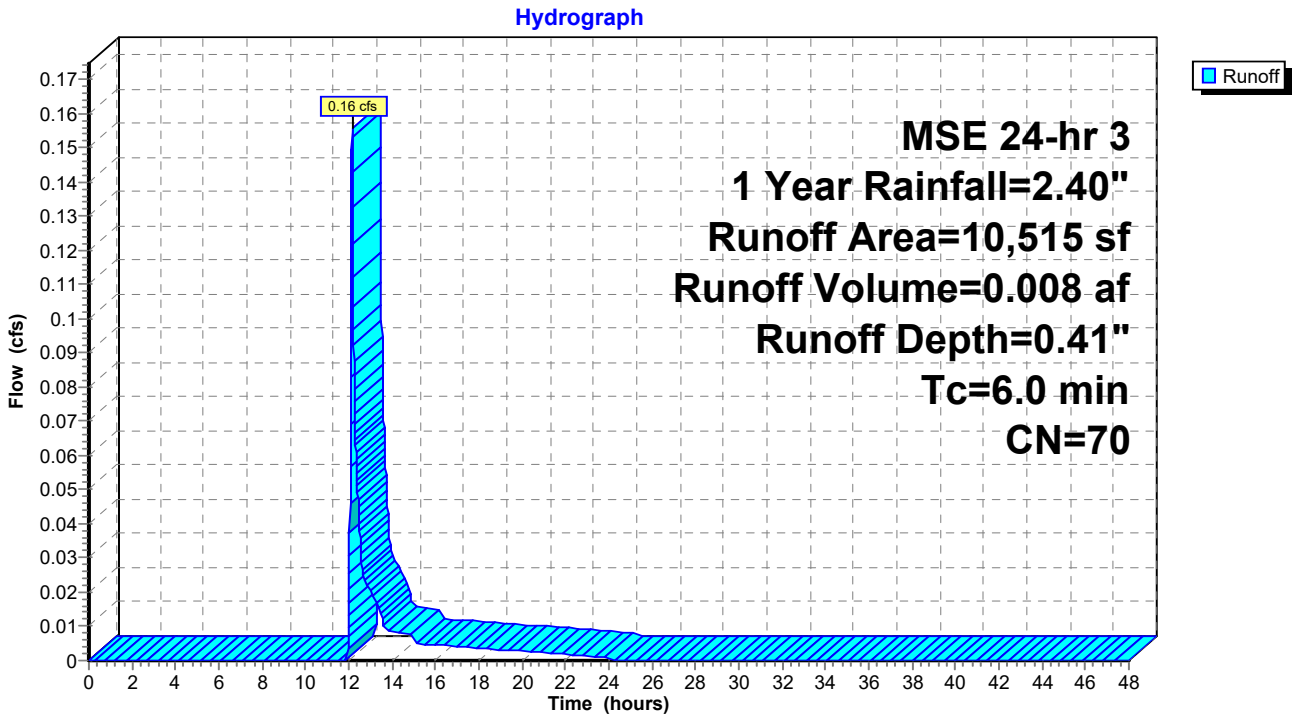
Runoff = 0.16 cfs @ 12.15 hrs, Volume= 0.008 af, Depth= 0.41"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

| Area (sf) | CN | Description |
|---|---|---|
| 2,685 | 98 | Paved parking, HSG B |
| 0 | 98 | Roofs, HSG B |
| 7,830 | 61 | >75% Grass cover, Good, HSG B |
| 10,515 | 70 | Weighted Average |
| 7,830 | | 74.47% Pervious Area |
| 2,685 | | 25.53% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment 2S: Undetained West



## Summary for Subcatchment 3S: Undetained East

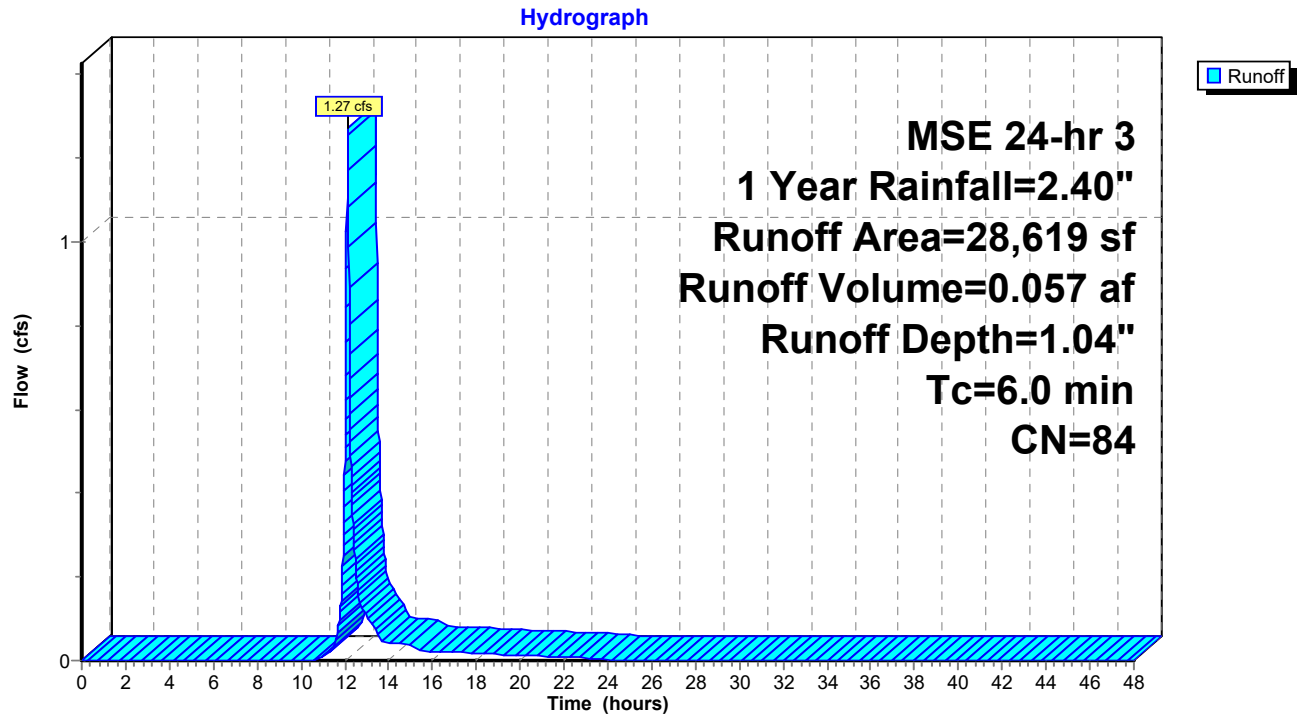
Runoff = 1.27 cfs @ 12.14 hrs, Volume= 0.057 af, Depth= 1.04"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

| Area (sf) | CN | Description |
|---|---|---|
| 15,965 | 98 | Paved parking, HSG B |
| 1,775 | 98 | Roofs, HSG B |
| 10,879 | 61 | >75% Grass cover, Good, HSG B |
| 28,619 | 84 | Weighted Average |
| 10,879 | | 38.01% Pervious Area |
| 17,740 | | 61.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment 3S: Undetained East



## Summary for Subcatchment 4S: Offsite

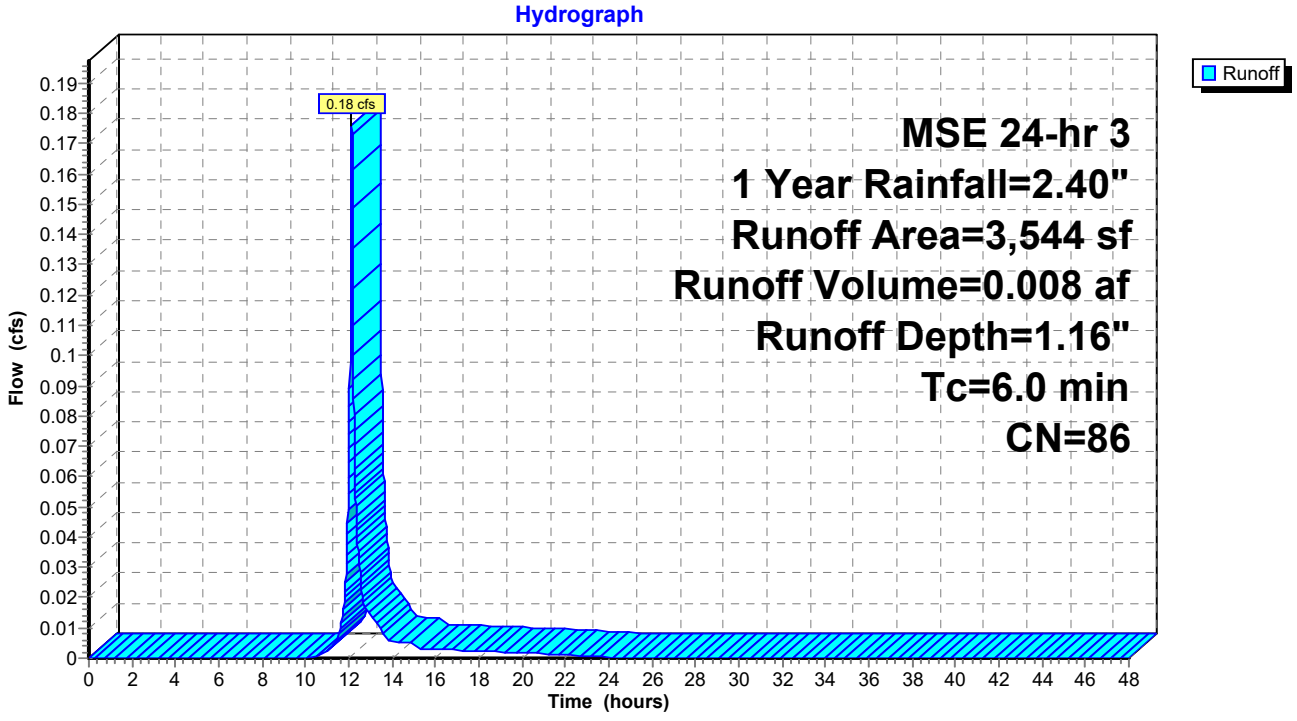
Runoff = 0.18 cfs @ 12.13 hrs, Volume= 0.008 af, Depth= 1.16"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 1 Year Rainfall=2.40"

| Area (sf) | CN | Description |
|---|---|---|
| 2,355 | 98 | Paved parking, HSG B |
| 1,189 | 61 | >75% Grass cover, Good, HSG B |
| 3,544 | 86 | Weighted Average |
| 1,189 | | 33.55% Pervious Area |
| 2,355 | | 66.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment 4S: Offsite



## Summary for Pond 1P: Biofiltration Basin

Inflow Area = 0.378 ac, 78.67% Impervious, Inflow Depth = 1.44" for 1 Year event
Inflow = 1.00 cfs @ 12.13 hrs, Volume= 0.045 af
Outflow = 0.02 cfs @ 15.17 hrs, Volume= 0.020 af, Atten= 98%, Lag= 182.2 min
Discarded = 0.00 cfs @ 15.17 hrs, Volume= 0.008 af
Primary = 0.01 cfs @ 15.17 hrs, Volume= 0.012 af
Routed to Link T : Total
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link T : Total

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 886.39' @ 15.17 hrs Surf.Area= 834 sf Storage= 1,546 cf

Plug-Flow detention time= 664.8 min calculated for 0.020 af (44% of inflow)
Center-of-Mass det. time= 579.5 min ( 1,376.7 - 797.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 880.00' | 3,426 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Voids (%) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|---|
| 880.00 | 672 | 0.0 | 0 | 0 |
| 884.00 | 672 | 33.0 | 887 | 887 |
| 886.00 | 672 | 27.0 | 363 | 1,250 |
| 887.00 | 1,085 | 100.0 | 879 | 2,128 |
| 888.00 | 1,510 | 100.0 | 1,298 | 3,426 |

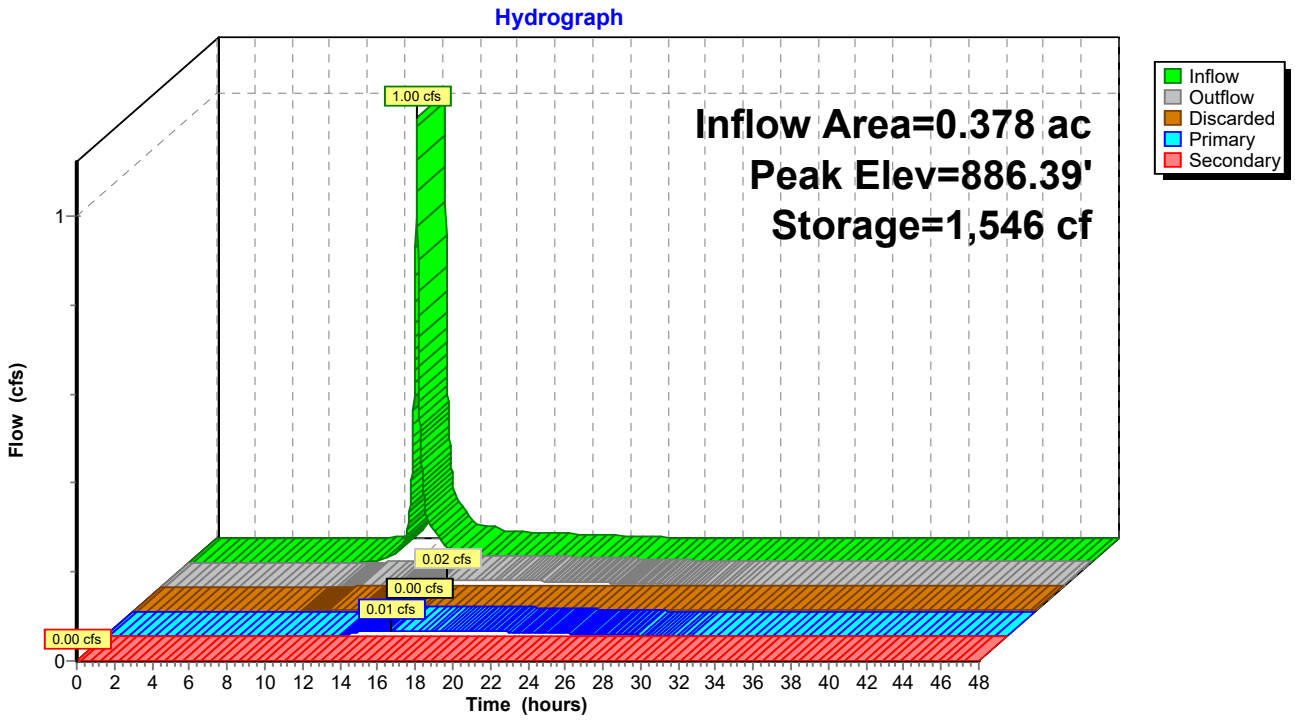
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 880.00' | **0.130 in/hr Infiltration over Horizontal area**<br>Conductivity to Groundwater Elevation = 850.00' |
| #2 | Primary | 883.50' | **12.0" Round Culvert**<br>L= 29.8' CPP, end-section conforming to fill, Ke= 0.500<br>Inlet / Outlet Invert= 883.50' / 883.00' S= 0.0168 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf |
| #3 | Device 2 | 883.50' | **6.0" Round Draintile**<br>L= 80.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 883.50' / 883.50' S= 0.0000 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf |
| #4 | Device 3 | 883.50' | **3.610 in/hr Infiltration through Engineer Fill over Surface area above 883.50'**<br>Conductivity to Groundwater Elevation = 850.00'<br>Excluded Surface area = 672 sf |
| #5 | Device 2 | 886.60' | **24.0" Horiz. Rim** C= 0.600 Limited to weir flow at low heads |
| #6 | Secondary | 887.50' | **5.0' long x 10.0' breadth Spillway**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Discarded OutFlow** Max=0.00 cfs @ 15.17 hrs HW=886.39' (Free Discharge)
└**1=Infiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=0.01 cfs @ 15.17 hrs HW=886.39' (Free Discharge)
└**2=Culvert** (Passes 0.01 cfs of 5.85 cfs potential flow)
└**3=Draintile** (Passes 0.01 cfs of 0.90 cfs potential flow)
└**4=Infiltration through Engineer Fill**( Controls 0.01 cfs)
└**5=Rim** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=880.00' (Free Discharge)
└**6=Spillway** ( Controls 0.00 cfs)

## Pond 1P: Biofiltration Basin

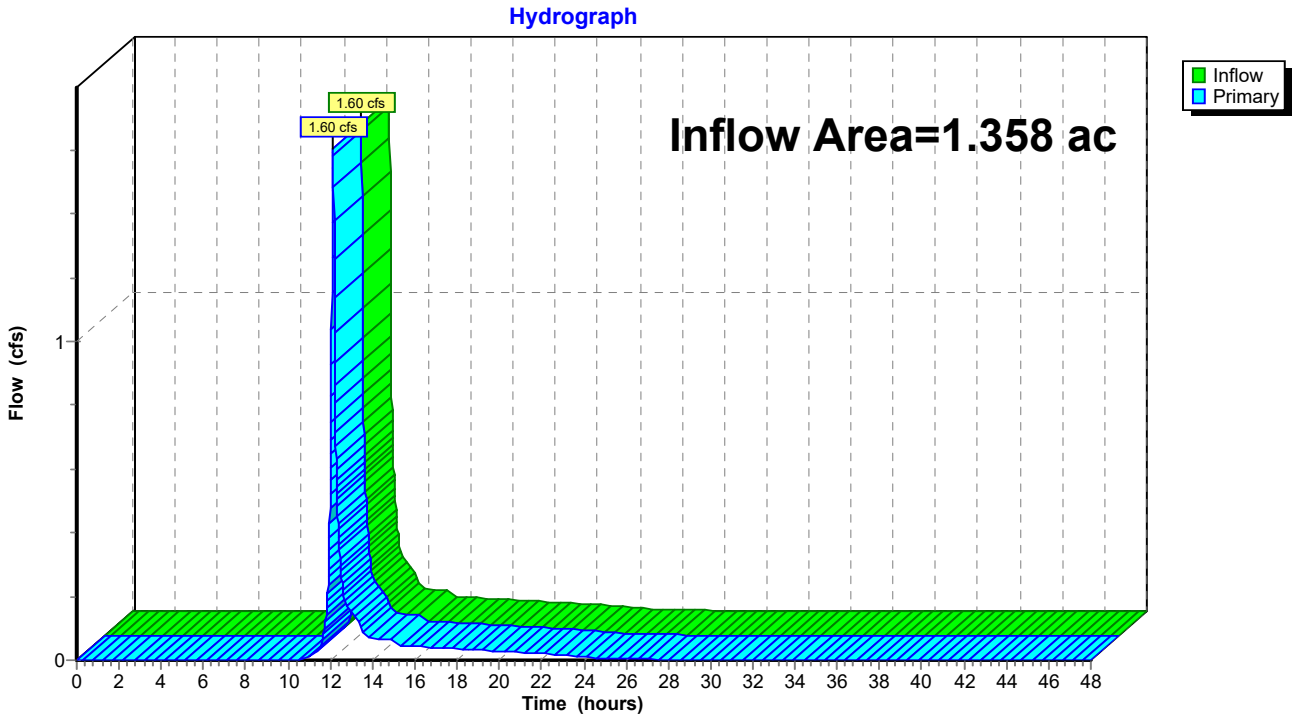


## Summary for Link T: Total

Inflow Area = 1.358 ac, 60.42% Impervious, Inflow Depth = 0.75" for 1 Year event
Inflow = 1.60 cfs @ 12.14 hrs, Volume= 0.085 af
Primary = 1.60 cfs @ 12.14 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Link T: Total



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: Detained** Runoff Area=16,480 sf 78.67% Impervious Runoff Depth=1.71"
Tc=6.0 min CN=90 Runoff=1.18 cfs 0.054 af

**Subcatchment2S: UndetainedWest** Runoff Area=10,515 sf 25.53% Impervious Runoff Depth=0.55"
Tc=6.0 min CN=70 Runoff=0.23 cfs 0.011 af

**Subcatchment3S: UndetainedEast** Runoff Area=28,619 sf 61.99% Impervious Runoff Depth=1.27"
Tc=6.0 min CN=84 Runoff=1.56 cfs 0.070 af

**Subcatchment4S: Offsite** Runoff Area=3,544 sf 66.45% Impervious Runoff Depth=1.41"
Tc=6.0 min CN=86 Runoff=0.21 cfs 0.010 af

**Pond 1P: BiofiltrationBasin** Peak Elev=886.60' Storage=1,730 cf Inflow=1.18 cfs 0.054 af
Discarded=0.00 cfs 0.008 af Primary=0.03 cfs 0.020 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.028 af

**Link T: Total** Inflow=2.00 cfs 0.110 af
Primary=2.00 cfs 0.110 af

**Total Runoff Area = 1.358 ac Runoff Volume = 0.144 af Average Runoff Depth = 1.28"**
**39.58% Pervious = 0.537 ac 60.42% Impervious = 0.821 ac**

## Summary for Subcatchment 1S: Detained

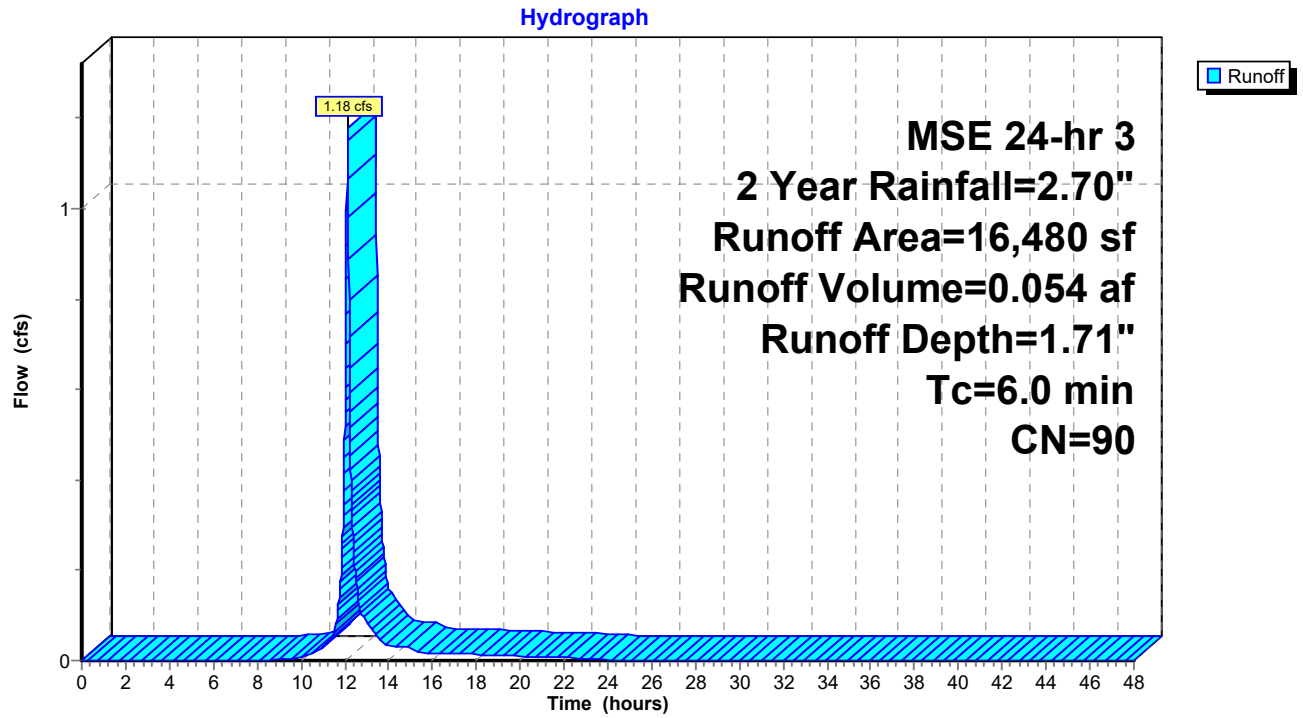
Runoff = 1.18 cfs @ 12.13 hrs, Volume= 0.054 af, Depth= 1.71"
Routed to Pond 1P : Biofiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

| Area (sf) | CN | Description |
|---|---|---|
| 8,430 | 98 | Paved parking, HSG B |
| 4,535 | 98 | Roofs, HSG B |
| 3,515 | 61 | >75% Grass cover, Good, HSG B |
| 16,480 | 90 | Weighted Average |
| 3,515 | | 21.33% Pervious Area |
| 12,965 | | 78.67% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment 1S: Detained



## Summary for Subcatchment 2S: Undetained West

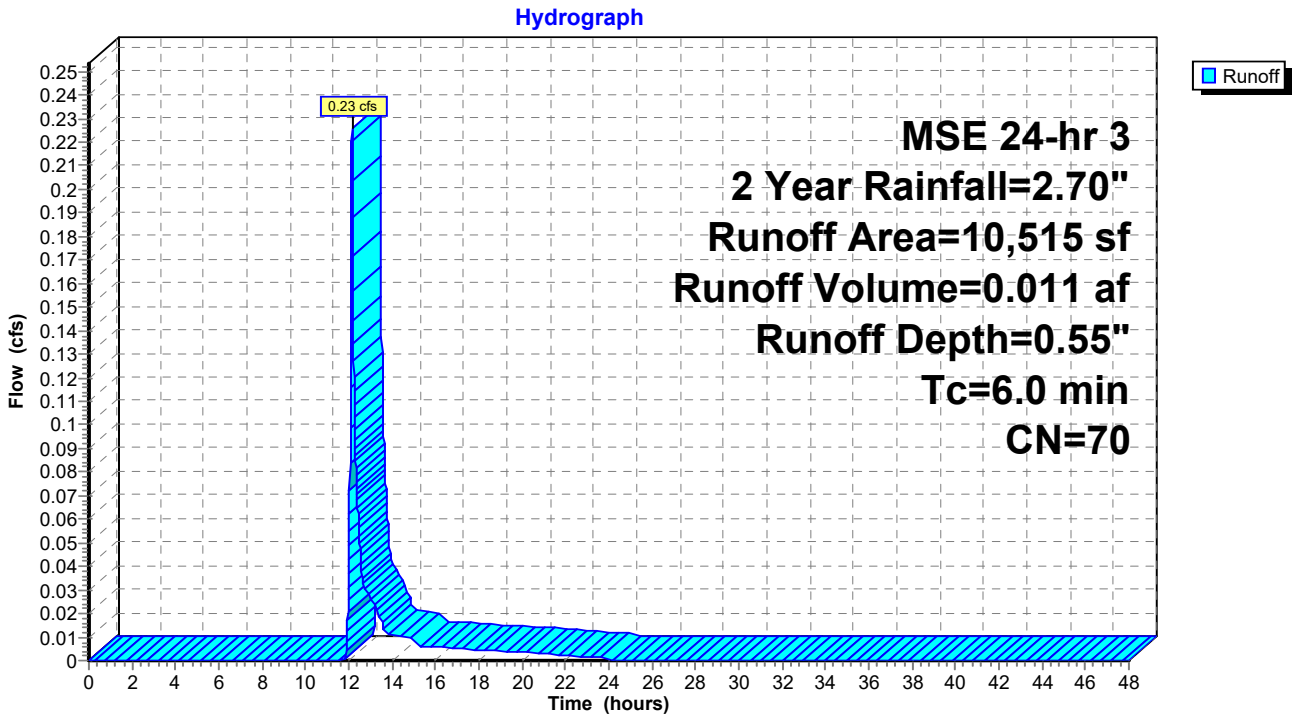
Runoff = 0.23 cfs @ 12.14 hrs, Volume= 0.011 af, Depth= 0.55"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

| Area (sf) | CN | Description |
|---|---|---|
| 2,685 | 98 | Paved parking, HSG B |
| 0 | 98 | Roofs, HSG B |
| 7,830 | 61 | >75% Grass cover, Good, HSG B |
| 10,515 | 70 | Weighted Average |
| 7,830 | | 74.47% Pervious Area |
| 2,685 | | 25.53% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment 2S: Undetained West



## Summary for Subcatchment 3S: Undetained East

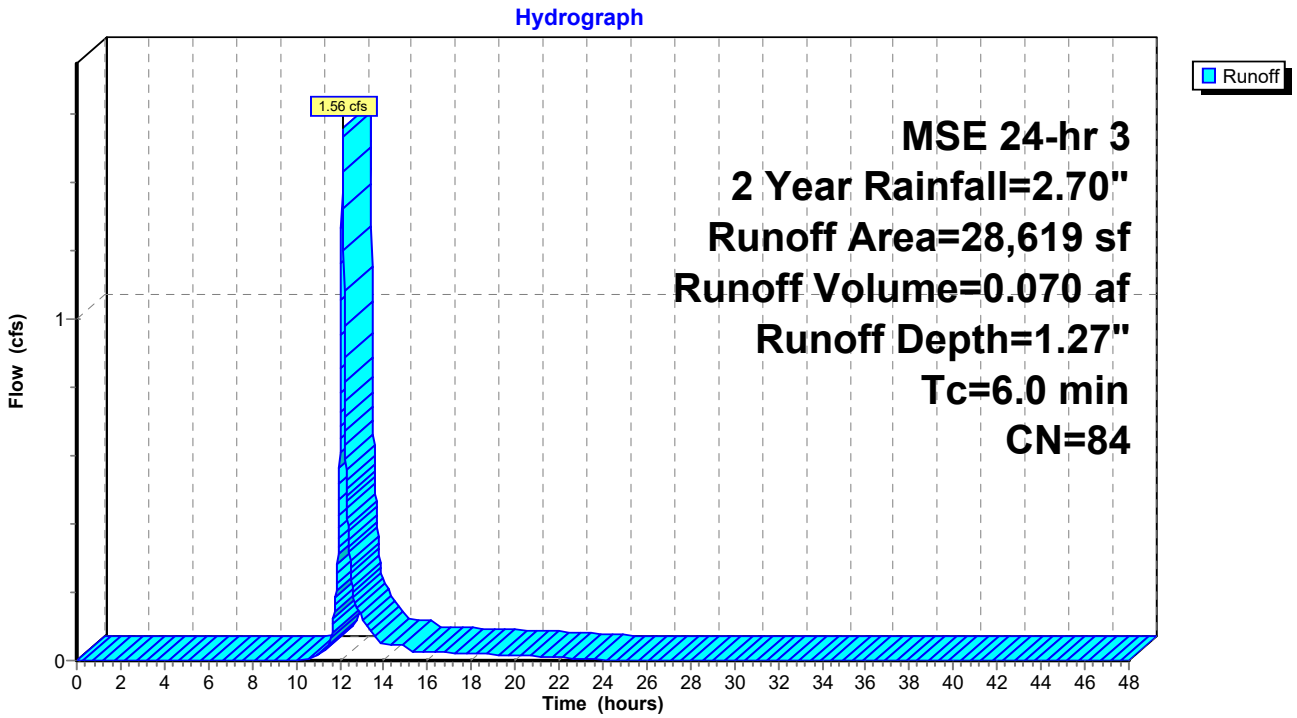
Runoff = 1.56 cfs @ 12.14 hrs, Volume= 0.070 af, Depth= 1.27"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

| Area (sf) | CN | Description |
|---|---|---|
| 15,965 | 98 | Paved parking, HSG B |
| 1,775 | 98 | Roofs, HSG B |
| 10,879 | 61 | >75% Grass cover, Good, HSG B |
| 28,619 | 84 | Weighted Average |
| 10,879 | | 38.01% Pervious Area |
| 17,740 | | 61.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment 3S: Undetained East



## Summary for Subcatchment 4S: Offsite

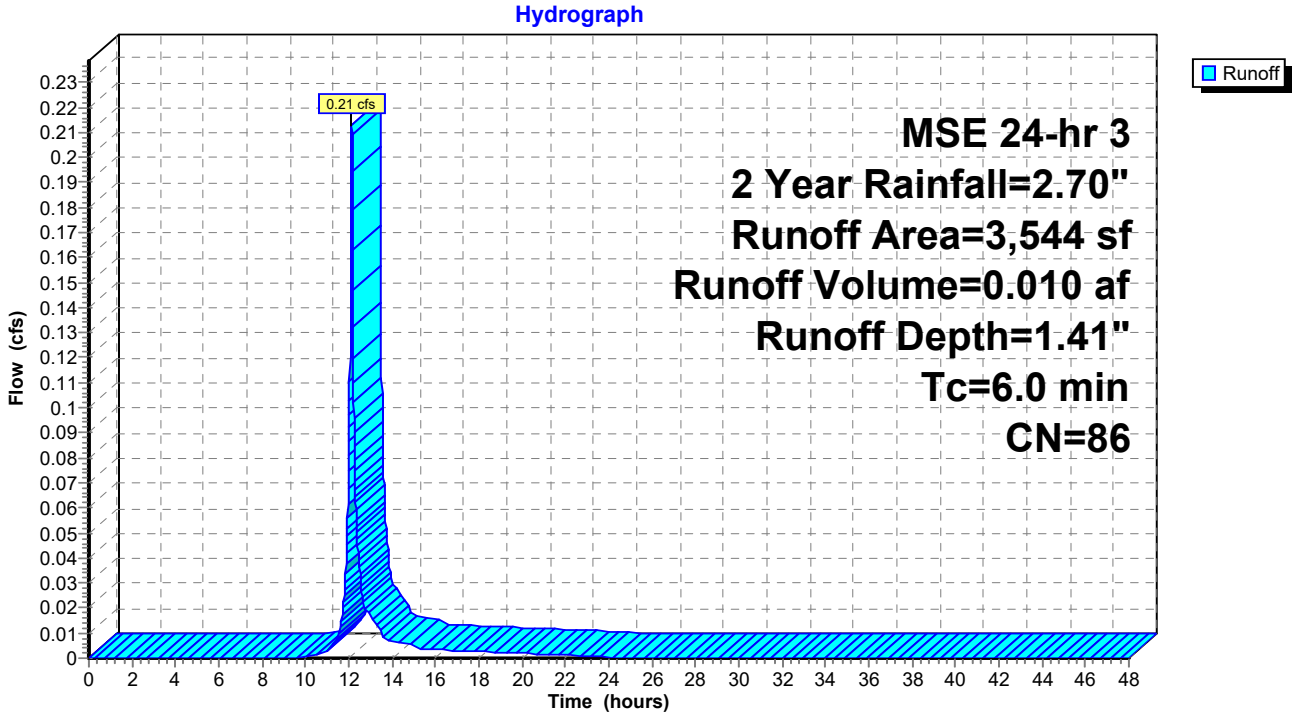
Runoff = 0.21 cfs @ 12.13 hrs, Volume= 0.010 af, Depth= 1.41"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 2 Year Rainfall=2.70"

| Area (sf) | CN | Description |
|---|---|---|
| 2,355 | 98 | Paved parking, HSG B |
| 1,189 | 61 | >75% Grass cover, Good, HSG B |
| 3,544 | 86 | Weighted Average |
| 1,189 | | 33.55% Pervious Area |
| 2,355 | | 66.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment 4S: Offsite



## Summary for Pond 1P: Biofiltration Basin

Inflow Area = 0.378 ac, 78.67% Impervious, Inflow Depth = 1.71" for 2 Year event
Inflow = 1.18 cfs @ 12.13 hrs, Volume= 0.054 af
Outflow = 0.03 cfs @ 13.84 hrs, Volume= 0.028 af, Atten= 97%, Lag= 102.6 min
Discarded = 0.00 cfs @ 13.84 hrs, Volume= 0.008 af
Primary = 0.03 cfs @ 13.84 hrs, Volume= 0.020 af
Routed to Link T : Total
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link T : Total

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 886.60' @ 13.84 hrs Surf.Area= 921 sf Storage= 1,730 cf

Plug-Flow detention time= 578.5 min calculated for 0.028 af (52% of inflow)
Center-of-Mass det. time= 497.9 min ( 1,291.7 - 793.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 880.00' | 3,426 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Voids (%) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|---|
| 880.00 | 672 | 0.0 | 0 | 0 |
| 884.00 | 672 | 33.0 | 887 | 887 |
| 886.00 | 672 | 27.0 | 363 | 1,250 |
| 887.00 | 1,085 | 100.0 | 879 | 2,128 |
| 888.00 | 1,510 | 100.0 | 1,298 | 3,426 |

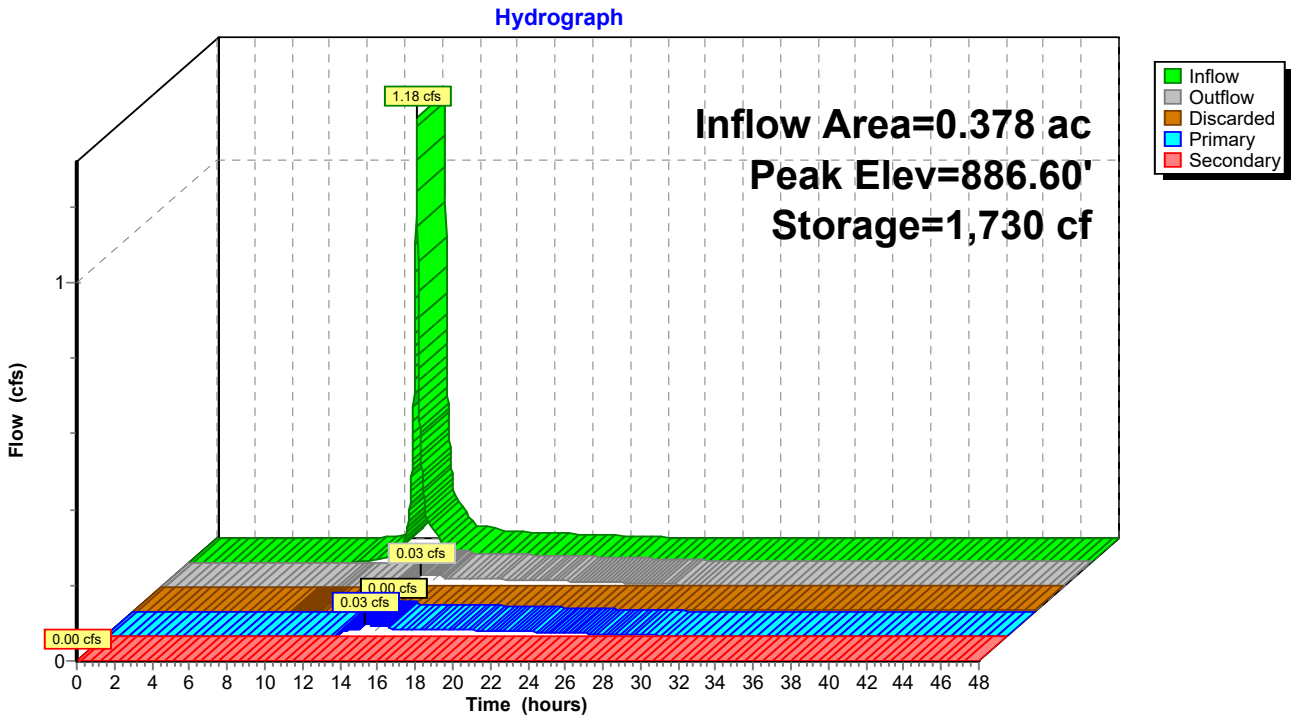
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 880.00' | **0.130 in/hr Infiltration over Horizontal area**<br>Conductivity to Groundwater Elevation = 850.00' |
| #2 | Primary | 883.50' | **12.0" Round Culvert**<br>L= 29.8' CPP, end-section conforming to fill, Ke= 0.500<br>Inlet / Outlet Invert= 883.50' / 883.00' S= 0.0168 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf |
| #3 | Device 2 | 883.50' | **6.0" Round Draintile**<br>L= 80.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 883.50' / 883.50' S= 0.0000 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf |
| #4 | Device 3 | 883.50' | **3.610 in/hr Infiltration through Engineer Fill over Surface area above 883.50'**<br>Conductivity to Groundwater Elevation = 850.00'<br>Excluded Surface area = 672 sf |
| #5 | Device 2 | 886.60' | **24.0" Horiz. Rim** C= 0.600 Limited to weir flow at low heads |
| #6 | Secondary | 887.50' | **5.0' long x 10.0' breadth Spillway**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Discarded OutFlow** Max=0.00 cfs @ 13.84 hrs HW=886.60' (Free Discharge)
└**1=Infiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=0.02 cfs @ 13.84 hrs HW=886.60' (Free Discharge)
└**2=Culvert** (Passes 0.02 cfs of 6.10 cfs potential flow)
└**3=Draintile** (Passes 0.02 cfs of 0.94 cfs potential flow)
└**4=Infiltration through Engineer Fill**( Controls 0.02 cfs)
└**5=Rim** (Weir Controls 0.00 cfs @ 0.16 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=880.00' (Free Discharge)
└**6=Spillway** ( Controls 0.00 cfs)

## Pond 1P: Biofiltration Basin

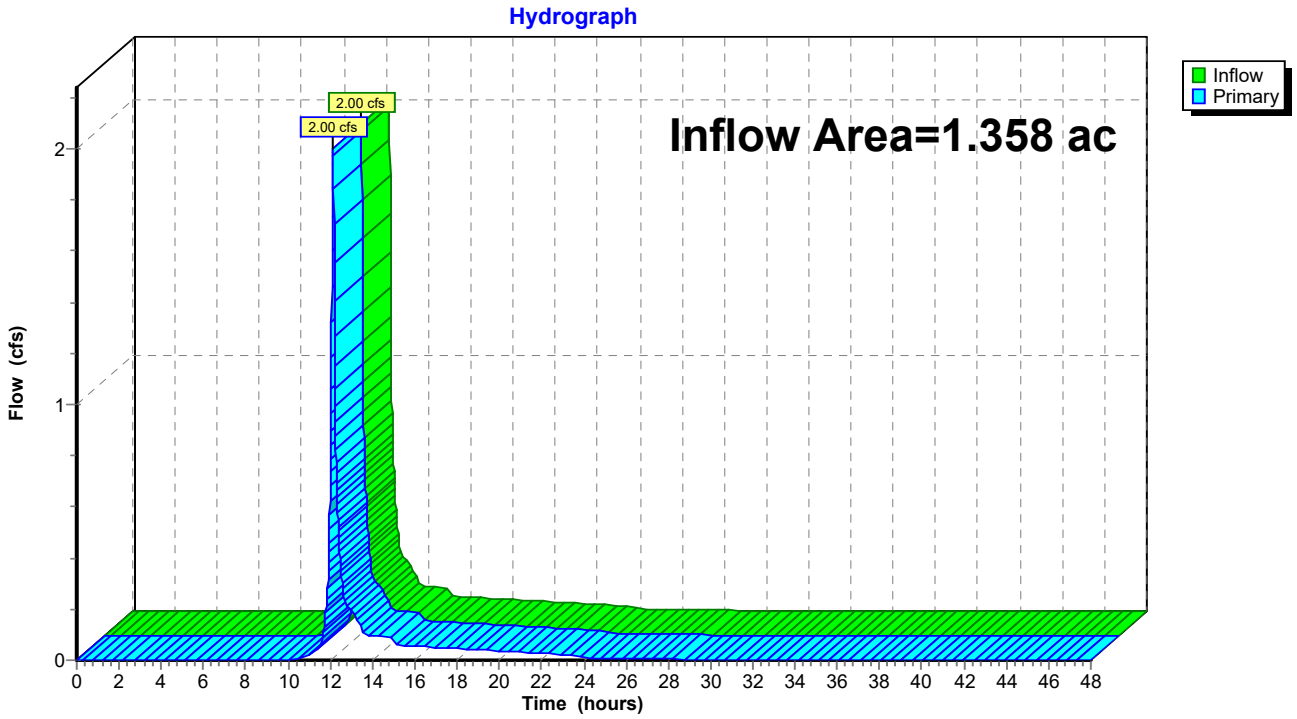


## Summary for Link T: Total

Inflow Area = 1.358 ac, 60.42% Impervious, Inflow Depth = 0.97" for 2 Year event
Inflow = 2.00 cfs @ 12.14 hrs, Volume= 0.110 af
Primary = 2.00 cfs @ 12.14 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Link T: Total



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: Detained** Runoff Area=16,480 sf 78.67% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=90 Runoff=1.84 cfs 0.086 af

**Subcatchment2S: UndetainedWest** Runoff Area=10,515 sf 25.53% Impervious Runoff Depth=1.20"
Tc=6.0 min CN=70 Runoff=0.53 cfs 0.024 af

**Subcatchment3S: UndetainedEast** Runoff Area=28,619 sf 61.99% Impervious Runoff Depth=2.20"
Tc=6.0 min CN=84 Runoff=2.67 cfs 0.121 af

**Subcatchment4S: Offsite** Runoff Area=3,544 sf 66.45% Impervious Runoff Depth=2.37"
Tc=6.0 min CN=86 Runoff=0.35 cfs 0.016 af

**Pond 1P: BiofiltrationBasin** Peak Elev=886.72' Storage=1,841 cf Inflow=1.84 cfs 0.086 af
Discarded=0.00 cfs 0.009 af Primary=0.88 cfs 0.052 af Secondary=0.00 cfs 0.000 af Outflow=0.89 cfs 0.060 af

**Link T: Total** Inflow=3.57 cfs 0.213 af
Primary=3.57 cfs 0.213 af

**Total Runoff Area = 1.358 ac Runoff Volume = 0.247 af Average Runoff Depth = 2.19"**
**39.58% Pervious = 0.537 ac 60.42% Impervious = 0.821 ac**

## Summary for Subcatchment 1S: Detained

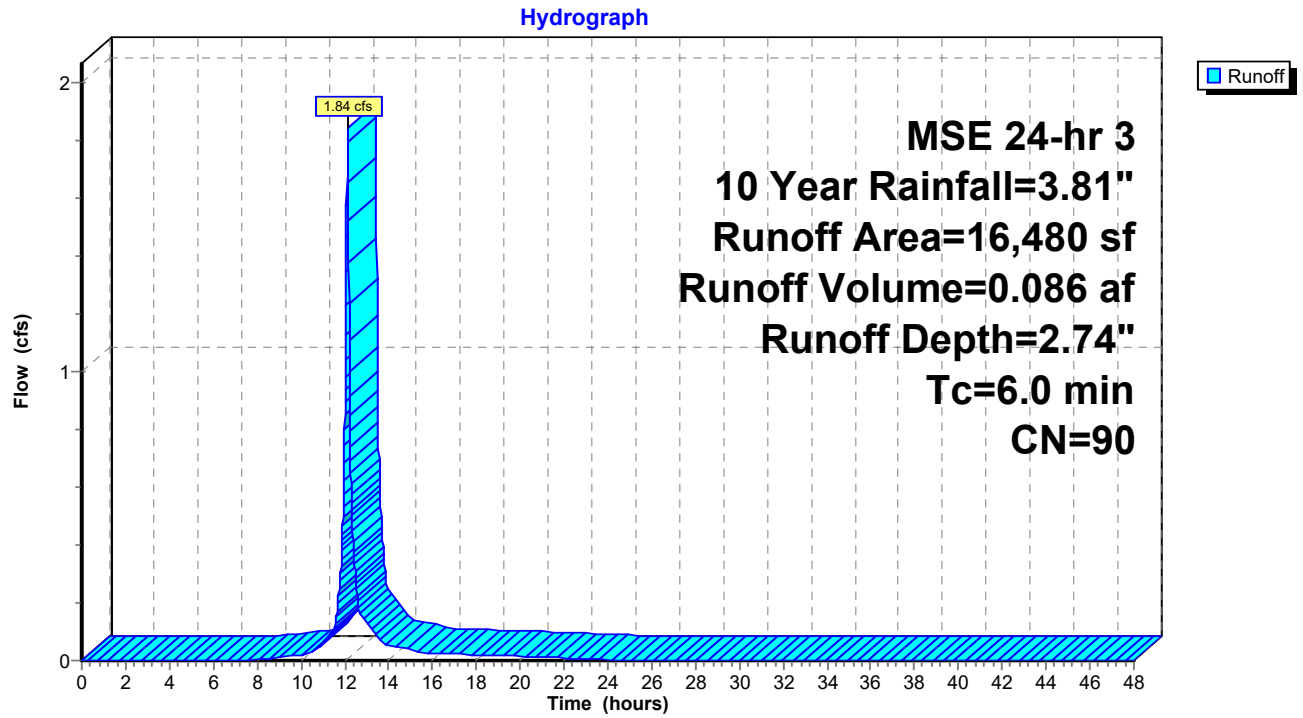
Runoff = 1.84 cfs @ 12.13 hrs, Volume= 0.086 af, Depth= 2.74"
Routed to Pond 1P : Biofiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

| Area (sf) | CN | Description |
|---|---|---|
| 8,430 | 98 | Paved parking, HSG B |
| 4,535 | 98 | Roofs, HSG B |
| 3,515 | 61 | >75% Grass cover, Good, HSG B |
| 16,480 | 90 | Weighted Average |
| 3,515 | | 21.33% Pervious Area |
| 12,965 | | 78.67% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

## Subcatchment 1S: Detained



## Summary for Subcatchment 2S: Undetained West

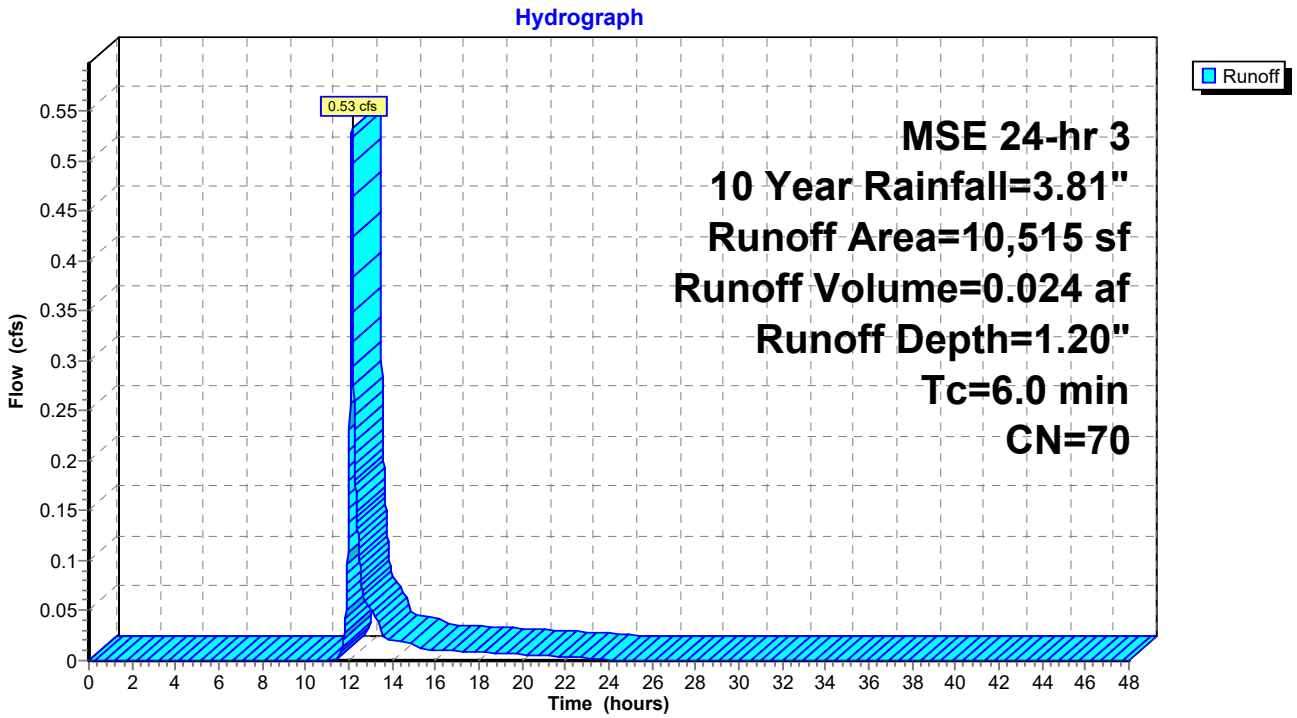
Runoff = 0.53 cfs @ 12.14 hrs, Volume= 0.024 af, Depth= 1.20"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

| Area (sf) | CN | Description |
|---|---|---|
| 2,685 | 98 | Paved parking, HSG B |
| 0 | 98 | Roofs, HSG B |
| 7,830 | 61 | >75% Grass cover, Good, HSG B |
| 10,515 | 70 | Weighted Average |
| 7,830 | | 74.47% Pervious Area |
| 2,685 | | 25.53% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment 2S: Undetained West



## Summary for Subcatchment 3S: Undetained East

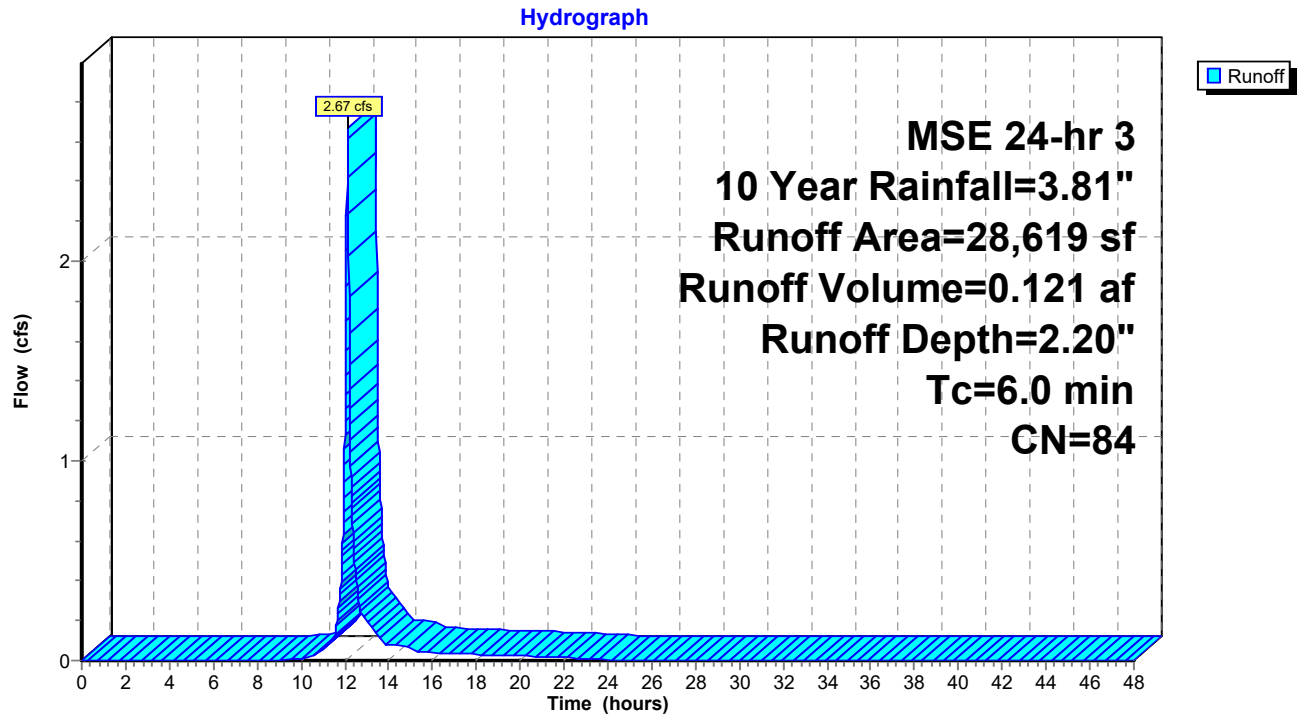
Runoff = 2.67 cfs @ 12.13 hrs, Volume= 0.121 af, Depth= 2.20"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

| Area (sf) | CN | Description |
|---|---|---|
| 15,965 | 98 | Paved parking, HSG B |
| 1,775 | 98 | Roofs, HSG B |
| 10,879 | 61 | >75% Grass cover, Good, HSG B |
| 28,619 | 84 | Weighted Average |
| 10,879 | | 38.01% Pervious Area |
| 17,740 | | 61.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment 3S: Undetained East



## Summary for Subcatchment 4S: Offsite

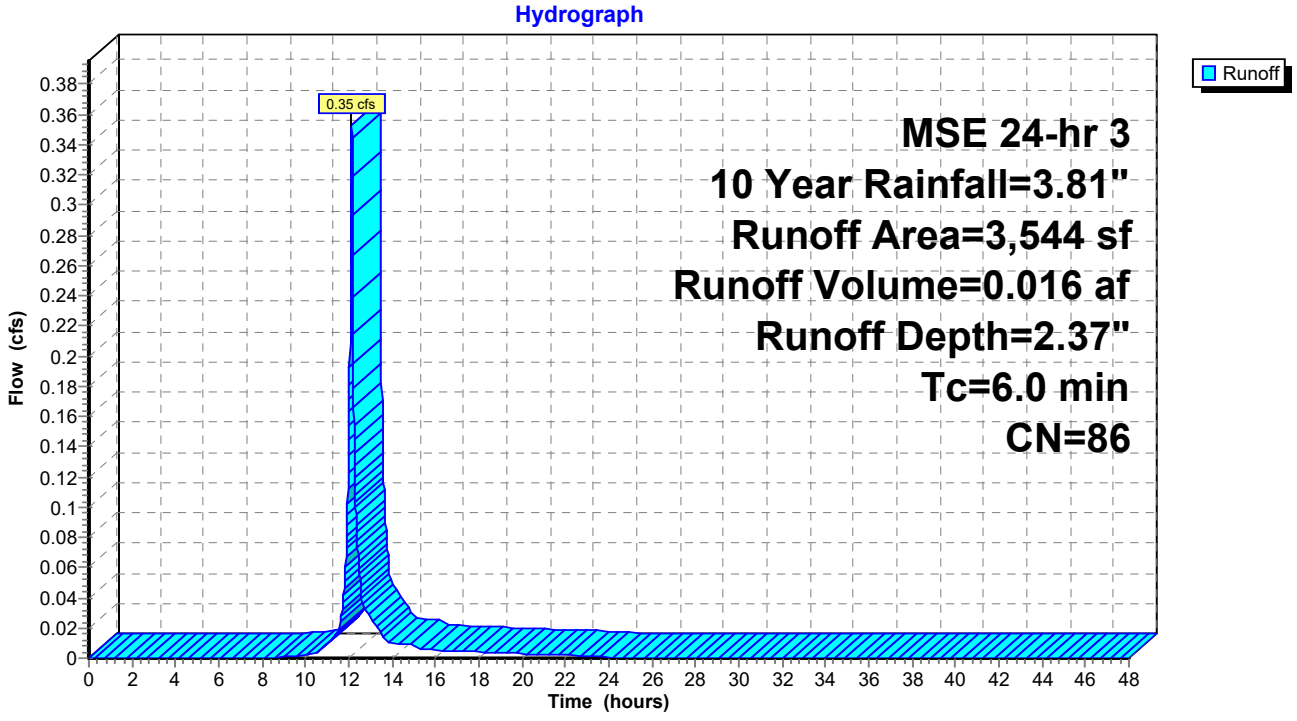
Runoff = 0.35 cfs @ 12.13 hrs, Volume= 0.016 af, Depth= 2.37"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 10 Year Rainfall=3.81"

| Area (sf) | CN | Description |
|---|---|---|
| 2,355 | 98 | Paved parking, HSG B |
| 1,189 | 61 | >75% Grass cover, Good, HSG B |
| 3,544 | 86 | Weighted Average |
| 1,189 | | 33.55% Pervious Area |
| 2,355 | | 66.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

## Subcatchment 4S: Offsite



## Summary for Pond 1P: Biofiltration Basin

Inflow Area = 0.378 ac, 78.67% Impervious, Inflow Depth = 2.74" for 10 Year event
Inflow = 1.84 cfs @ 12.13 hrs, Volume= 0.086 af
Outflow = 0.89 cfs @ 12.22 hrs, Volume= 0.060 af, Atten= 52%, Lag= 5.6 min
Discarded = 0.00 cfs @ 12.22 hrs, Volume= 0.009 af
Primary = 0.88 cfs @ 12.22 hrs, Volume= 0.052 af
Routed to Link T : Total
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link T : Total

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 886.72' @ 12.22 hrs Surf.Area= 970 sf Storage= 1,841 cf

Plug-Flow detention time= 329.7 min calculated for 0.060 af (70% of inflow)
Center-of-Mass det. time= 260.1 min ( 1,044.5 - 784.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 880.00' | 3,426 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Voids (%) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|---|
| 880.00 | 672 | 0.0 | 0 | 0 |
| 884.00 | 672 | 33.0 | 887 | 887 |
| 886.00 | 672 | 27.0 | 363 | 1,250 |
| 887.00 | 1,085 | 100.0 | 879 | 2,128 |
| 888.00 | 1,510 | 100.0 | 1,298 | 3,426 |

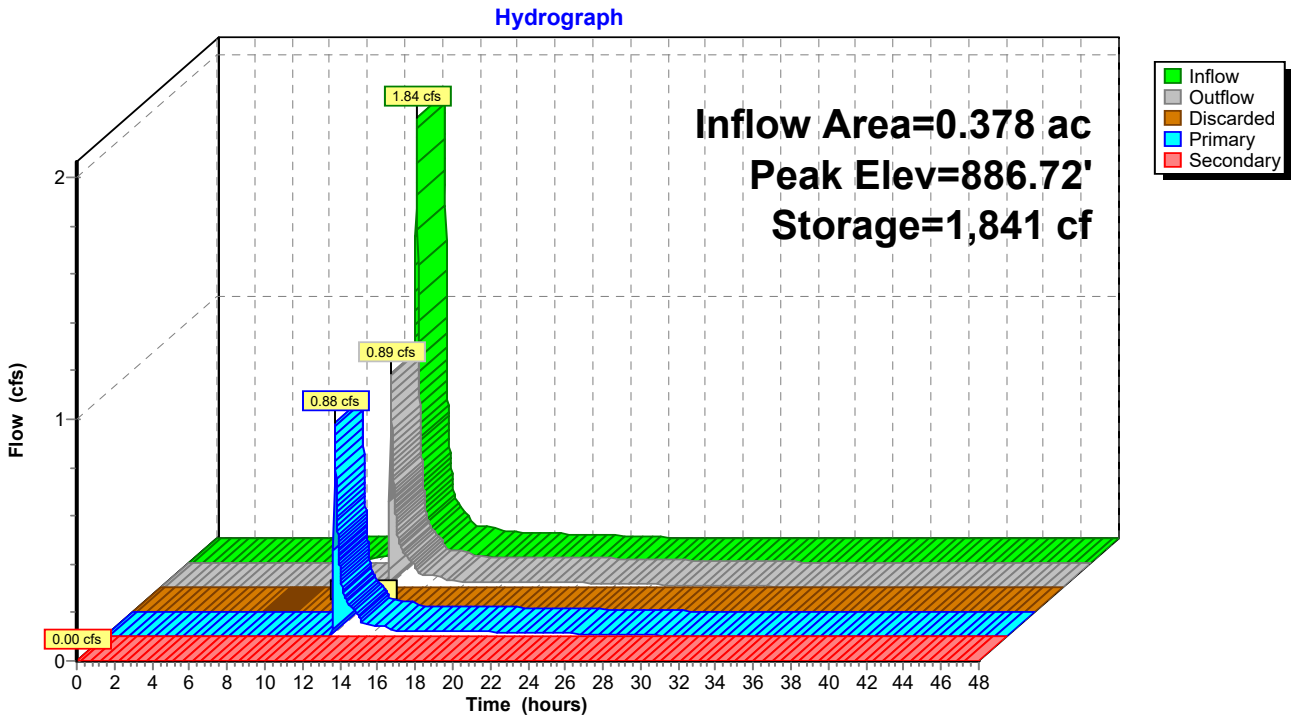
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 880.00' | **0.130 in/hr Infiltration over Horizontal area**<br>Conductivity to Groundwater Elevation = 850.00' |
| #2 | Primary | 883.50' | **12.0" Round Culvert**<br>L= 29.8' CPP, end-section conforming to fill, Ke= 0.500<br>Inlet / Outlet Invert= 883.50' / 883.00' S= 0.0168 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf |
| #3 | Device 2 | 883.50' | **6.0" Round Draintile**<br>L= 80.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 883.50' / 883.50' S= 0.0000 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf |
| #4 | Device 3 | 883.50' | **3.610 in/hr Infiltration through Engineer Fill over Surface area above 883.50'**<br>Conductivity to Groundwater Elevation = 850.00'<br>Excluded Surface area = 672 sf |
| #5 | Device 2 | 886.60' | **24.0" Horiz. Rim** C= 0.600 Limited to weir flow at low heads |
| #6 | Secondary | 887.50' | **5.0' long x 10.0' breadth Spillway**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Discarded OutFlow** Max=0.00 cfs @ 12.22 hrs HW=886.72' (Free Discharge)
└**1=Infiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=0.88 cfs @ 12.22 hrs HW=886.72' (Free Discharge)
└**2=Culvert** (Passes 0.88 cfs of 6.24 cfs potential flow)
└**3=Draintile** (Passes 0.03 cfs of 0.96 cfs potential flow)
└**4=Infiltration through Engineer Fill**( Controls 0.03 cfs)
└**5=Rim** (Weir Controls 0.85 cfs @ 1.13 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=880.00' (Free Discharge)
└**6=Spillway** ( Controls 0.00 cfs)

## Pond 1P: Biofiltration Basin

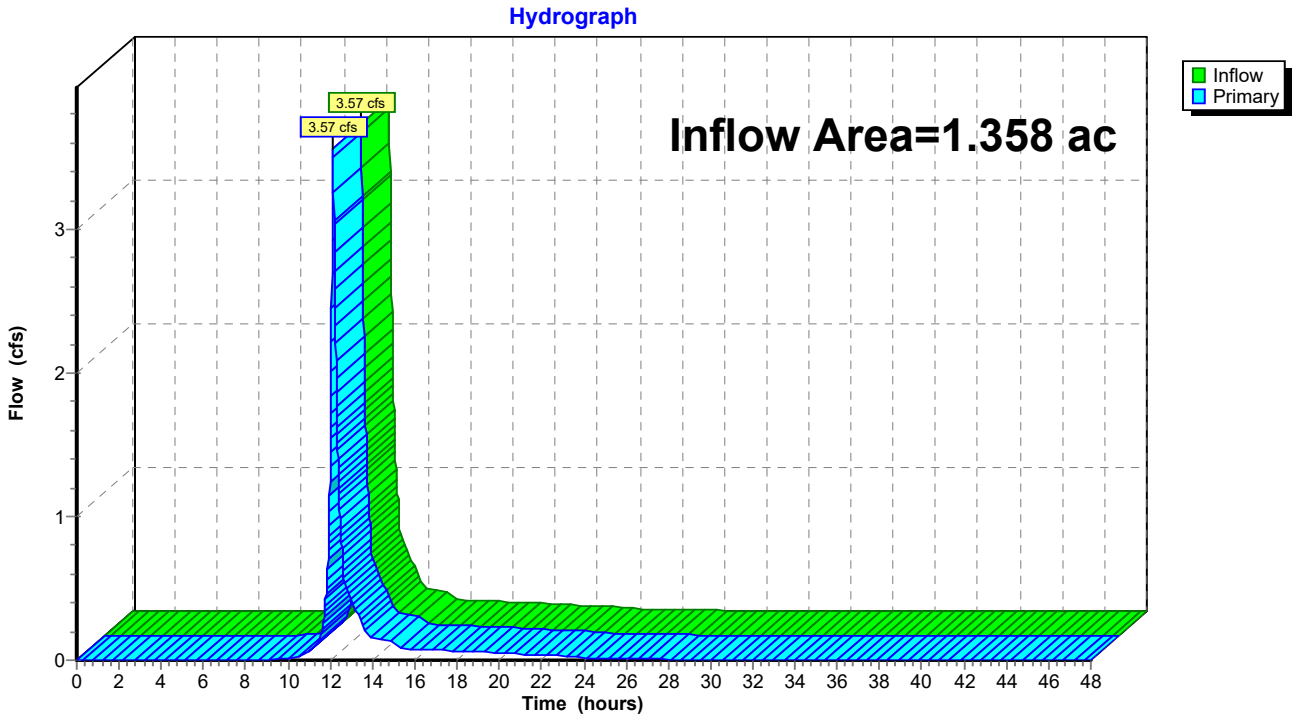


## Summary for Link T: Total

Inflow Area = 1.358 ac, 60.42% Impervious, Inflow Depth = 1.88" for 10 Year event
Inflow = 3.57 cfs @ 12.13 hrs, Volume= 0.213 af
Primary = 3.57 cfs @ 12.13 hrs, Volume= 0.213 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Link T: Total



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment1S: Detained** Runoff Area=16,480 sf 78.67% Impervious Runoff Depth=5.02"
Tc=6.0 min CN=90 Runoff=3.25 cfs 0.158 af

**Subcatchment2S: UndetainedWest** Runoff Area=10,515 sf 25.53% Impervious Runoff Depth=2.95"
Tc=6.0 min CN=70 Runoff=1.33 cfs 0.059 af

**Subcatchment3S: UndetainedEast** Runoff Area=28,619 sf 61.99% Impervious Runoff Depth=4.37"
Tc=6.0 min CN=84 Runoff=5.12 cfs 0.239 af

**Subcatchment4S: Offsite** Runoff Area=3,544 sf 66.45% Impervious Runoff Depth=4.58"
Tc=6.0 min CN=86 Runoff=0.66 cfs 0.031 af

**Pond 1P: BiofiltrationBasin** Peak Elev=886.88' Storage=2,006 cf Inflow=3.25 cfs 0.158 af
Discarded=0.00 cfs 0.009 af Primary=3.15 cfs 0.123 af Secondary=0.00 cfs 0.000 af Outflow=3.16 cfs 0.132 af

**Link T: Total** Inflow=10.22 cfs 0.452 af
Primary=10.22 cfs 0.452 af

**Total Runoff Area = 1.358 ac Runoff Volume = 0.488 af Average Runoff Depth = 4.31"**
**39.58% Pervious = 0.537 ac 60.42% Impervious = 0.821 ac**

## Summary for Subcatchment 1S: Detained

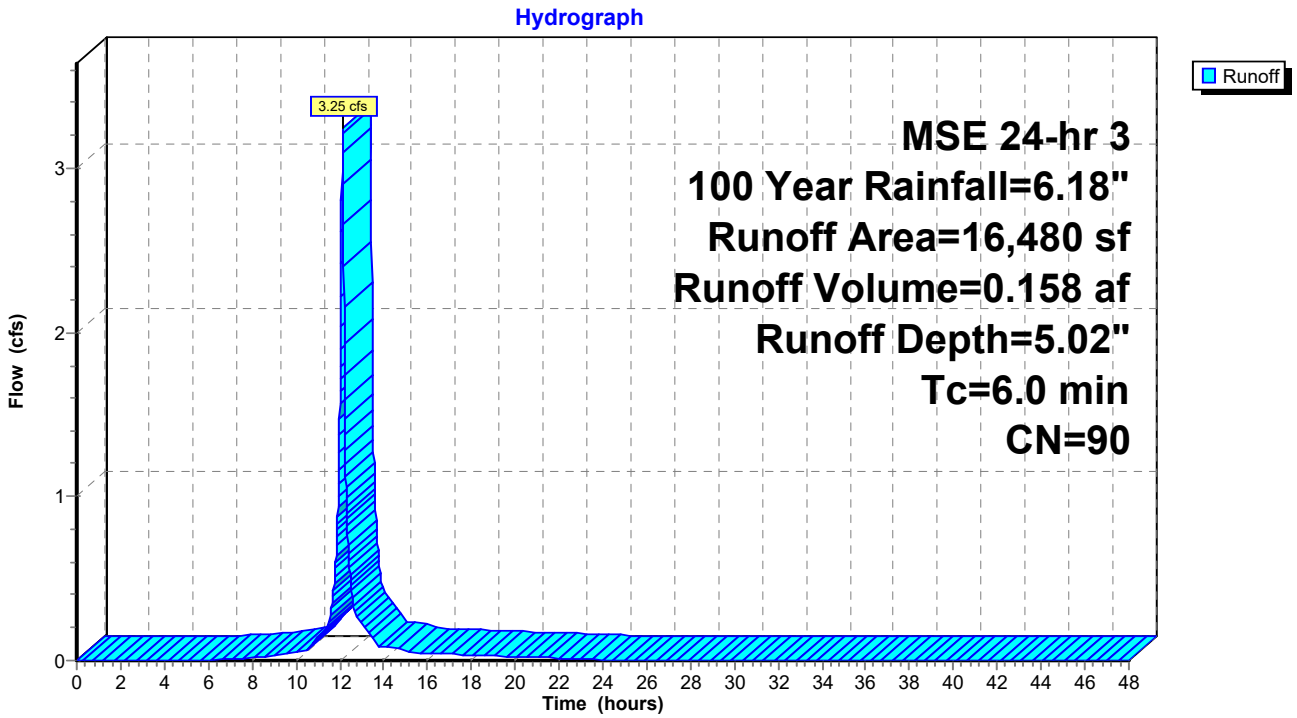
Runoff = 3.25 cfs @ 12.13 hrs, Volume= 0.158 af, Depth= 5.02"
Routed to Pond 1P : Biofiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

| Area (sf) | CN | Description |
|---|---|---|
| 8,430 | 98 | Paved parking, HSG B |
| 4,535 | 98 | Roofs, HSG B |
| 3,515 | 61 | >75% Grass cover, Good, HSG B |
| 16,480 | 90 | Weighted Average |
| 3,515 | | 21.33% Pervious Area |
| 12,965 | | 78.67% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment 1S: Detained



## Summary for Subcatchment 2S: Undetained West

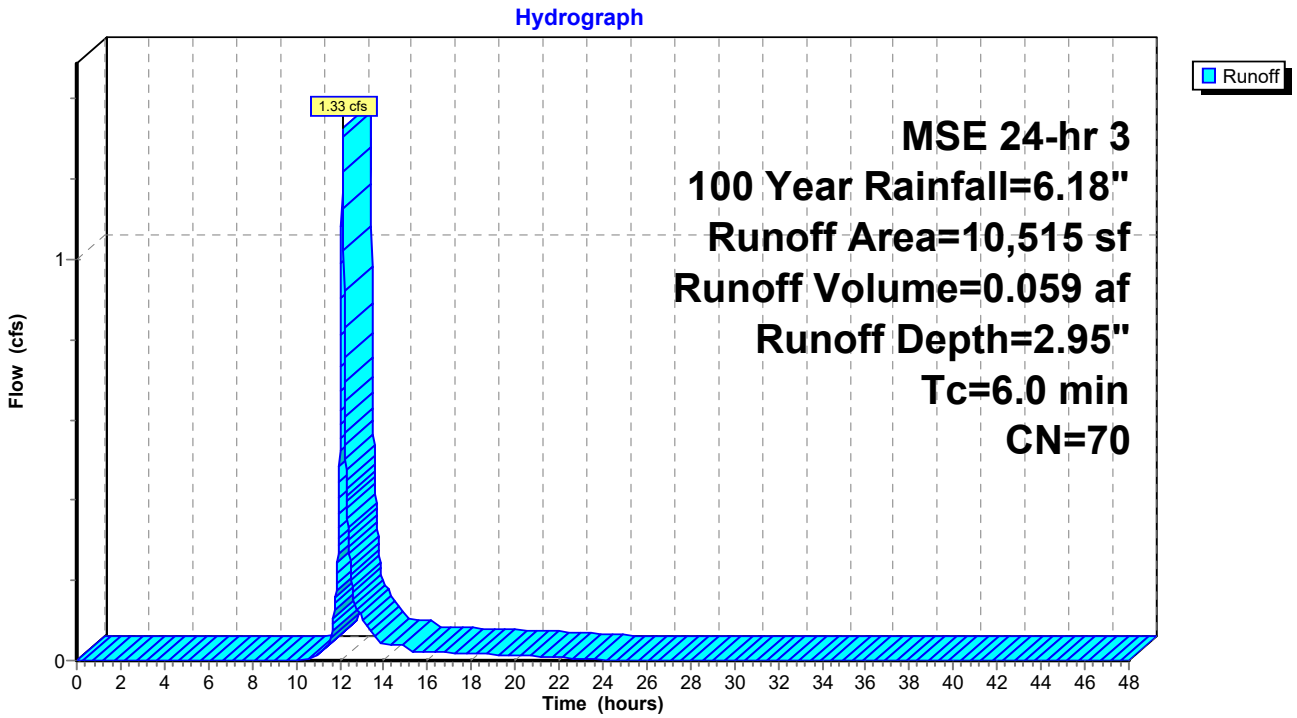
Runoff = 1.33 cfs @ 12.13 hrs, Volume= 0.059 af, Depth= 2.95"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

| Area (sf) | CN | Description |
|---|---|---|
| 2,685 | 98 | Paved parking, HSG B |
| 0 | 98 | Roofs, HSG B |
| 7,830 | 61 | >75% Grass cover, Good, HSG B |
| 10,515 | 70 | Weighted Average |
| 7,830 | | 74.47% Pervious Area |
| 2,685 | | 25.53% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment 2S: Undetained West



## Summary for Subcatchment 3S: Undetained East

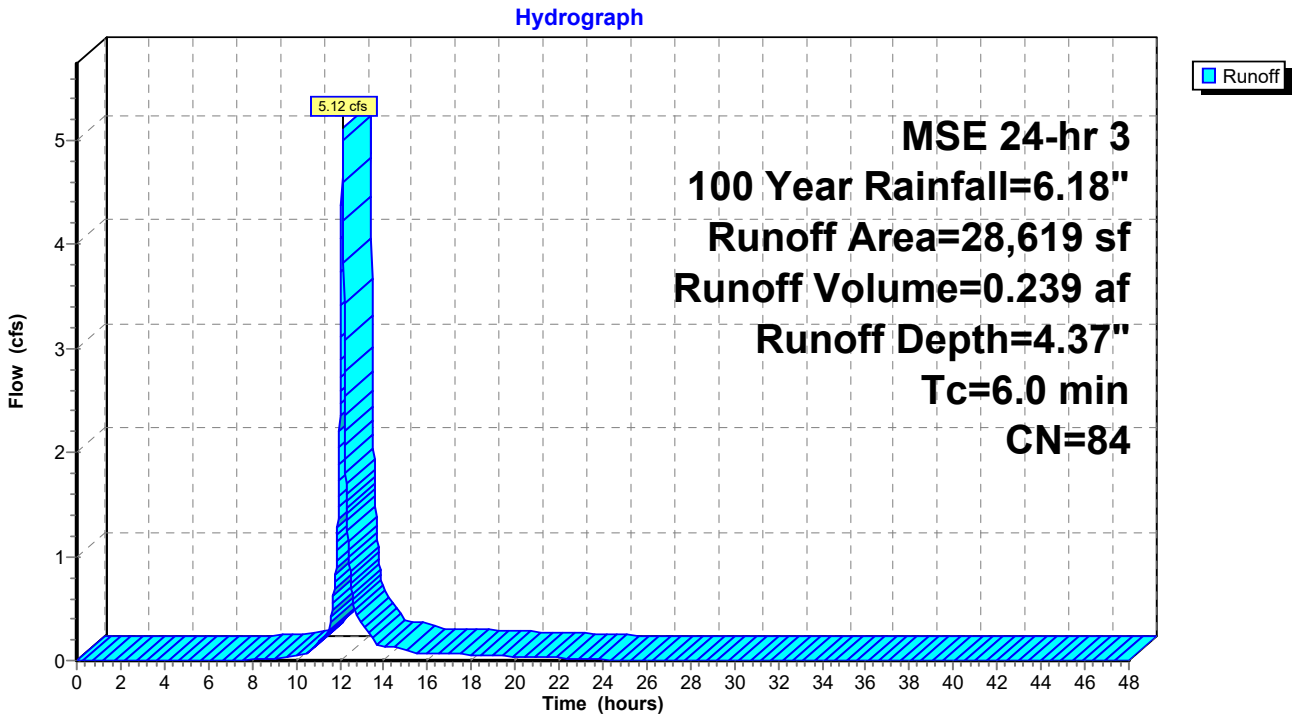
Runoff = 5.12 cfs @ 12.13 hrs, Volume= 0.239 af, Depth= 4.37"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

| Area (sf) | CN | Description |
|---|---|---|
| 15,965 | 98 | Paved parking, HSG B |
| 1,775 | 98 | Roofs, HSG B |
| 10,879 | 61 | >75% Grass cover, Good, HSG B |
| 28,619 | 84 | Weighted Average |
| 10,879 | | 38.01% Pervious Area |
| 17,740 | | 61.99% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment 3S: Undetained East



## Summary for Subcatchment 4S: Offsite

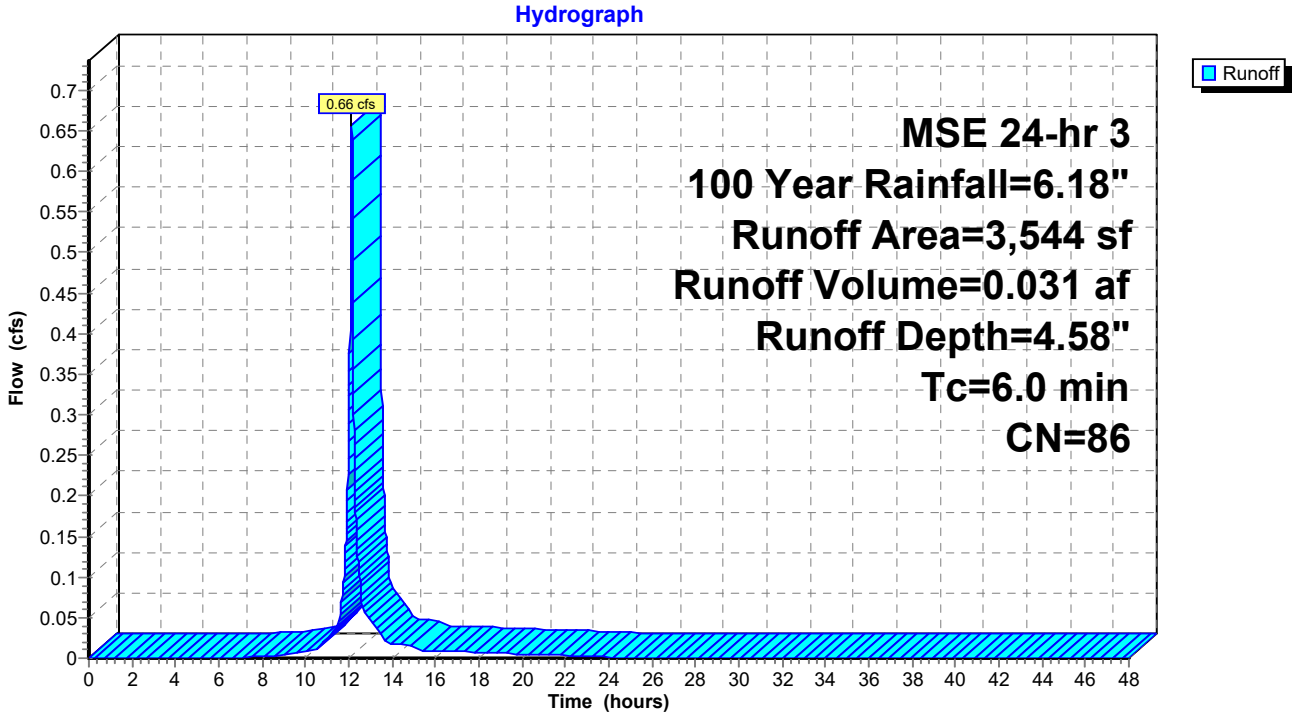
Runoff = 0.66 cfs @ 12.13 hrs, Volume= 0.031 af, Depth= 4.58"
Routed to Link T : Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100 Year Rainfall=6.18"

| Area (sf) | CN | Description |
|---|---|---|
| 2,355 | 98 | Paved parking, HSG B |
| 1,189 | 61 | >75% Grass cover, Good, HSG B |
| 3,544 | 86 | Weighted Average |
| 1,189 | | 33.55% Pervious Area |
| 2,355 | | 66.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry,** |

### Subcatchment 4S: Offsite



## Summary for Pond 1P: Biofiltration Basin

Inflow Area = 0.378 ac, 78.67% Impervious, Inflow Depth = 5.02" for 100 Year event
Inflow = 3.25 cfs @ 12.13 hrs, Volume= 0.158 af
Outflow = 3.16 cfs @ 12.15 hrs, Volume= 0.132 af, Atten= 3%, Lag= 0.9 min
Discarded = 0.00 cfs @ 12.15 hrs, Volume= 0.009 af
Primary = 3.15 cfs @ 12.15 hrs, Volume= 0.123 af
Routed to Link T : Total
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link T : Total

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 886.88' @ 12.15 hrs Surf.Area= 1,037 sf Storage= 2,006 cf

Plug-Flow detention time= 190.4 min calculated for 0.132 af (83% of inflow)
Center-of-Mass det. time= 136.3 min ( 908.8 - 772.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 880.00' | 3,426 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Voids (%) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|---|
| 880.00 | 672 | 0.0 | 0 | 0 |
| 884.00 | 672 | 33.0 | 887 | 887 |
| 886.00 | 672 | 27.0 | 363 | 1,250 |
| 887.00 | 1,085 | 100.0 | 879 | 2,128 |
| 888.00 | 1,510 | 100.0 | 1,298 | 3,426 |

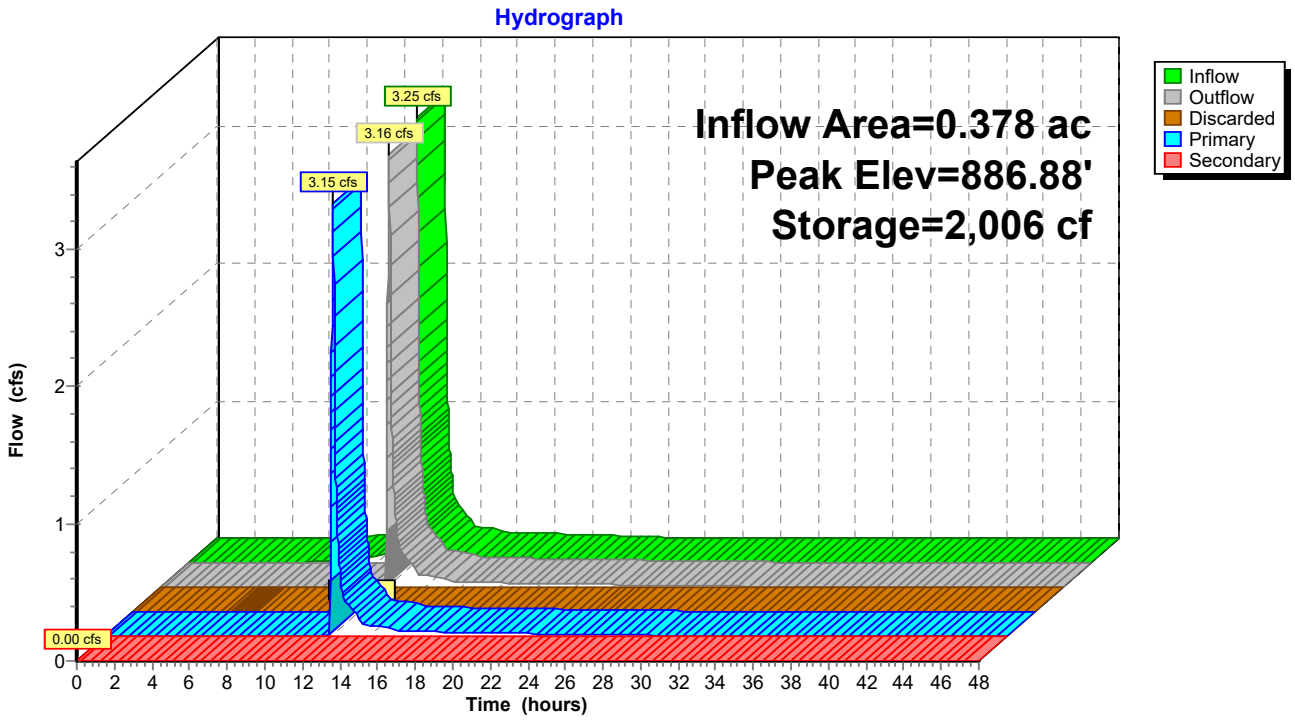
| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 880.00' | **0.130 in/hr Infiltration over Horizontal area**<br>Conductivity to Groundwater Elevation = 850.00' |
| #2 | Primary | 883.50' | **12.0" Round Culvert**<br>L= 29.8' CPP, end-section conforming to fill, Ke= 0.500<br>Inlet / Outlet Invert= 883.50' / 883.00' S= 0.0168 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf |
| #3 | Device 2 | 883.50' | **6.0" Round Draintile**<br>L= 80.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 883.50' / 883.50' S= 0.0000 '/' Cc= 0.900<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf |
| #4 | Device 3 | 883.50' | **3.610 in/hr Infiltration through Engineer Fill over Surface area above 883.50'**<br>Conductivity to Groundwater Elevation = 850.00'<br>Excluded Surface area = 672 sf |
| #5 | Device 2 | 886.60' | **24.0" Horiz. Rim** C= 0.600 Limited to weir flow at low heads |
| #6 | Secondary | 887.50' | **5.0' long x 10.0' breadth Spillway**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Discarded OutFlow** Max=0.00 cfs @ 12.15 hrs HW=886.88' (Free Discharge)
└**1=Infiltration** ( Controls 0.00 cfs)

**Primary OutFlow** Max=3.14 cfs @ 12.15 hrs HW=886.88' (Free Discharge)
└**2=Culvert** (Passes 3.14 cfs of 6.42 cfs potential flow)
└**3=Draintile** (Passes 0.03 cfs of 0.99 cfs potential flow)
└**4=Infiltration through Engineer Fill**( Controls 0.03 cfs)
└**5=Rim** (Weir Controls 3.11 cfs @ 1.74 fps)

**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=880.00' (Free Discharge)
└**6=Spillway** ( Controls 0.00 cfs)

## Pond 1P: Biofiltration Basin

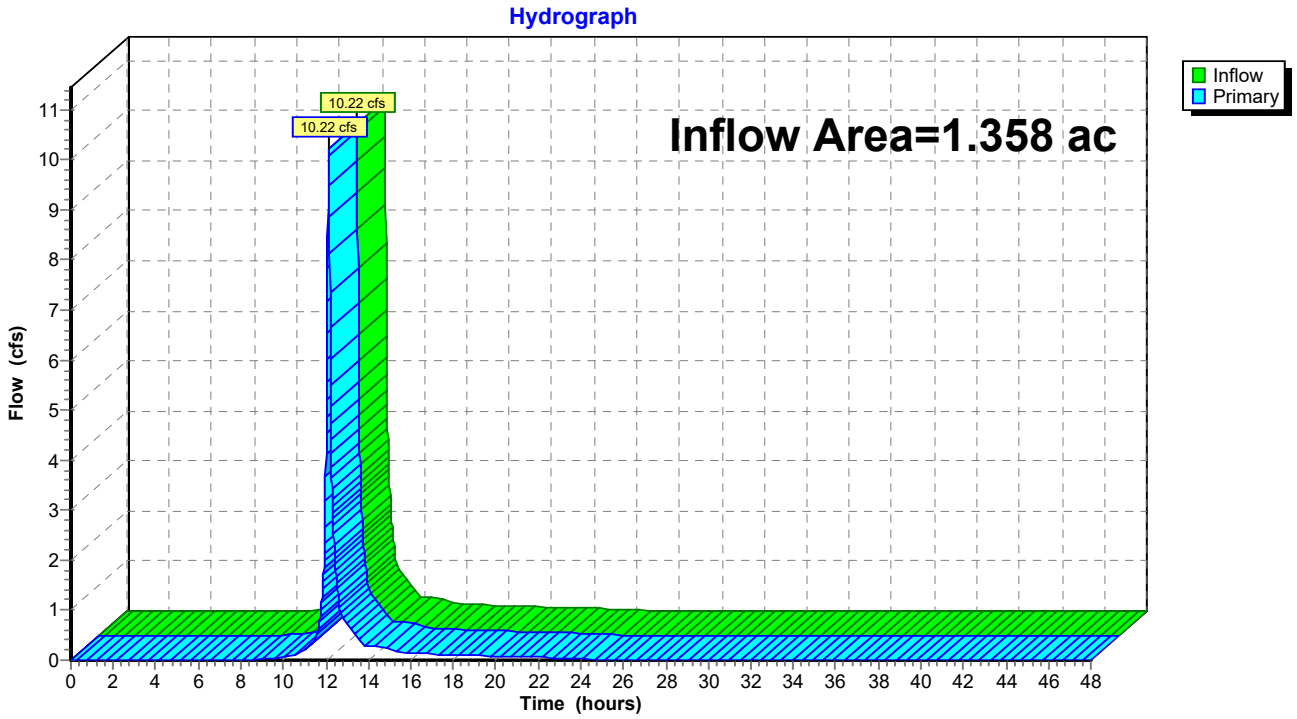


## Summary for Link T: Total

Inflow Area = 1.358 ac, 60.42% Impervious, Inflow Depth = 3.99" for 100 Year event
Inflow = 10.22 cfs @ 12.14 hrs, Volume= 0.452 af
Primary = 10.22 cfs @ 12.14 hrs, Volume= 0.452 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

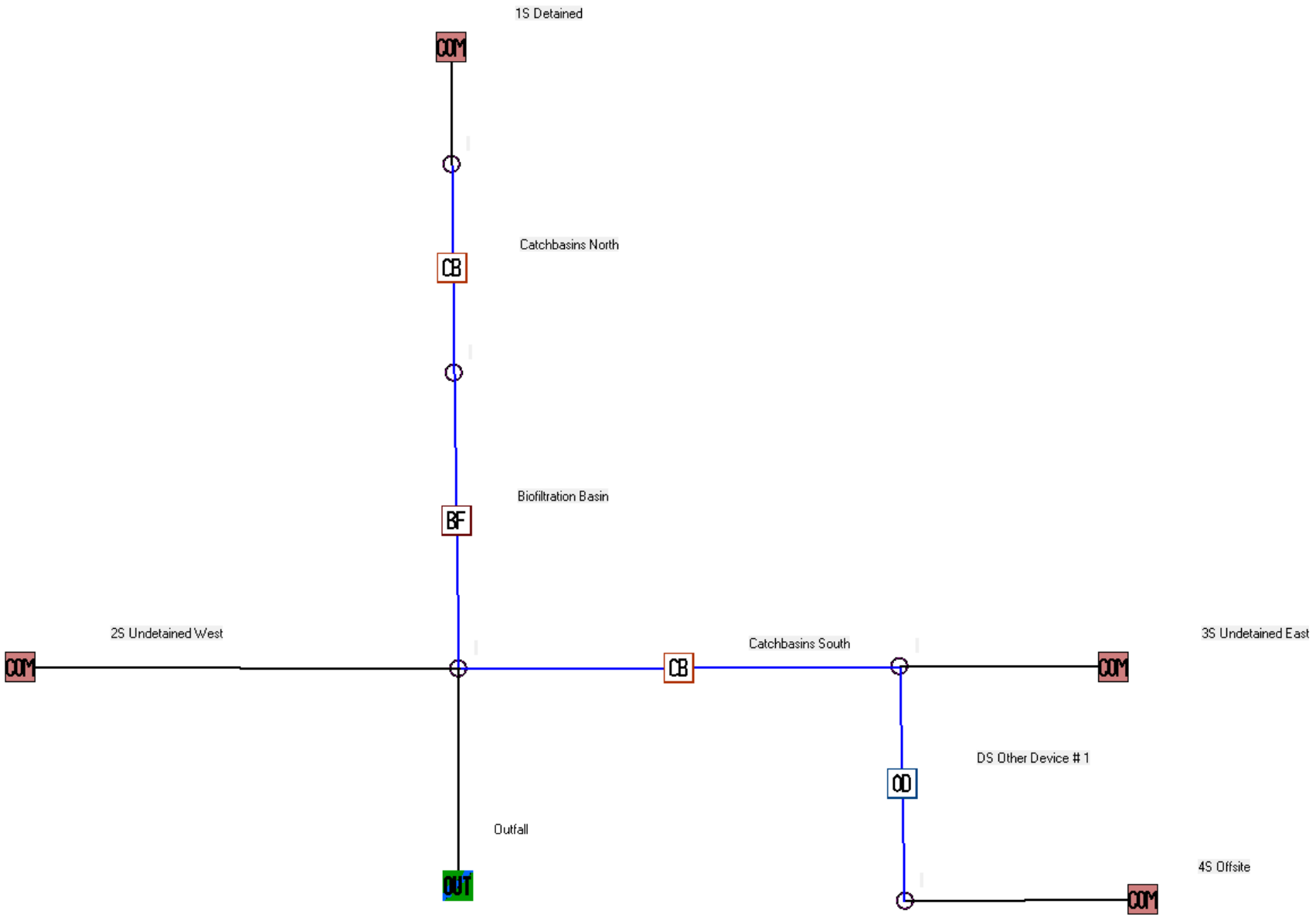
## Link T: Total



# APPENDIX 4

## Water Quality Calculations

- SLAMM Input
- SLAMM Output
- SLAMM Infiltration


1S Detained
COM
Catchbasins North
CB
Biofiltration Basin
BF
2S Undetained West
COM
CB
Catchbasins South
3S Undetained East
COM
DS Other Device # 1
OD
Outfall
OUT
4S Offsite
COM

Data file name:  R:\2022\2211993\04 Civil\SWMP\Modeling\22-11993 Proposed.mdb
WinSLAMM Version 10.4.1
Rain file name:  C:\WinSLAMM Files\Rain Files\WI Milwaukee 69.RAN
Particulate Solids Concentration file name:  C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name:  C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Residential Street Delivery file name:  C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name:  C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name:  C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name:  C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name:  C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name:  C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance:  False
Pollutant Relative Concentration file name:  C:\WinSLAMM Files\WI_GEO03.ppdx
Source Area PSD and Peak to Average Flow Ratio File:  C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator:  -42
Study period starting date:  01/05/69  Study period ending date:  12/31/69
Start of Winter Season:  12/06  End of Winter Season:  03/28
Date:  12-15-2022  Time:  08:57:48
Site information:

LU# 1 - Commercial:  1S Detained  Total area (ac):  0.378
     1 - Roofs 1:  0.104 ac.  Pitched  Connected  Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     13 - Paved Parking 1:  0.194 ac.  Connected  Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     51 - Small Landscaped Areas 1:  0.080 ac.  Normal Silty  Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 2 - Commercial:  2S Undetained West  Total area (ac):  0.241
     13 - Paved Parking 1:  0.062 ac.  Connected  Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
     51 - Small Landscaped Areas 1:  0.179 ac.  Normal Silty  Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 3 - Commercial:  3S Undetained East  Total area (ac):  0.658
     1 - Roofs 1:  0.041 ac.  Pitched  Connected  Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

13 - Paved Parking 1:  0.367 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1:  0.250 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

LU# 4 - Commercial:  4S Offsite     Total area (ac):  0.081
13 - Paved Parking 1:  0.054 ac.    Connected    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz
51 - Small Landscaped Areas 1:  0.027 ac.    Normal Silty    Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

Control Practice 1:  Biofilter CP# 1 (DS) - Biofiltration Basin
1.  Top area (square feet) =  1510
2.  Bottom aea (square feet) =  672
3.  Depth (ft):  8
4.  Biofilter width (ft) - for Cost Purposes Only:  10
5.  Infiltration rate (in/hr) =  0.13
6.  Random infiltration rate generation?  No
7.  Infiltration rate fraction (side):  1
8.  Infiltration rate fraction (bottom):  1
9.  Depth of biofilter that is rock filled (ft) 4
10.  Porosity of rock filled volume =  0.33
11.  Engineered soil infiltration rate:  3.6
12.  Engineered soil depth (ft) =  2
13.  Engineered soil porosity =  0.27
14. Percent solids reduction due to flow through engineered soil =  0
15. Biofilter peak to average flow ratio =  3.8
16. Number of biofiltration control devices =  1
17. Particle size distribution file:  Not needed - calculated by program
18. Initial water surface elevation (ft):  0
Soil Data  Soil Type Fraction in Eng. Soil
Biofilter Outlet/Discharge Characteristics:
Outlet type:  Broad Crested Weir
1.  Weir crest length (ft):  10
2.  Weir crest width (ft):  5
3.  Height of datum to bottom of weir opening:  7.5

Outlet type:  Vertical Stand Pipe
1.  Stand pipe diameter (ft):  2
2.  Stand pipe height above datum (ft):  6.6
Outlet type:  Drain Tile/Underdrain
1.  Underdrain outlet diameter (ft):  0.5
2.  Invert elevation above datum (ft):  3.5
3.  Number of underdrain outlets:  1

Control Practice 2:  Catchbasin Cleaning CP# 1 (DS) - Catchbasins South
1. Fraction of area served by catchbasins = 1.00
2. Number of catchbasins = 5
3. Average sump depth below catchbasin outlet invert (feet) = 3
4. Depth of sediment in catchbasin sump at beginning of study period (ft) = 0
5. Typical outlet pipe diameter (ft) = 1
6. Typical outlet pipe Mannings n = 0.012
7. Typical outlet pipe slope (ft/ft) = 0.005
8. Typical catchbasin sump surface area (square feet) = 12.6
9. Total catchbasin depth (feet) = 5
10. Inflow hydrograph peak to average flow ratio = 3.8
11. Leakage rate through sump bottom (in/hr) = 0
12. Catchbasin Critical Particle Size File Name:

Control Practice 3:  Catchbasin Cleaning CP# 2 (DS) - Catchbasins North
1. Fraction of area served by catchbasins = 1.00
2. Number of catchbasins = 3
3. Average sump depth below catchbasin outlet invert (feet) = 3
4. Depth of sediment in catchbasin sump at beginning of study period (ft) = 0
5. Typical outlet pipe diameter (ft) = 1
6. Typical outlet pipe Mannings n = 0.012
7. Typical outlet pipe slope (ft/ft) = 0.005
8. Typical catchbasin sump surface area (square feet) = 12.6
9. Total catchbasin depth (feet) = 5
10. Inflow hydrograph peak to average flow ratio = 3.8
11. Leakage rate through sump bottom (in/hr) = 0

12. Catchbasin Critical Particle Size File Name: Not needed - calculated by program

Control Practice 4: Other Device CP# 1 (DS) - DS Other Device # 1
Fraction of drainage area served by device (ac) = 1.00
Particulate Concentration reduction fraction = 1.00
Filterable Concentration reduction fraction = 1.00
Runoff volume reduction fraction = 0

Data File: R:\2022\2211993\04 Civil\SWMP\Modeling\22-11993 Proposed.mdb
Rain File: WI Milwaukee 69.RAN
Date: 12-15-22 Time: 8:29:33 AM
Site Description:

## Commercial: 1S Detained Areas - Particulate Solids Yield (lbs)

Summary for All Events

| | Land Use Totals | Roofs 1 | **Paved Parking 1** | Small Landscaped Areas 1 |
|---|---|---|---|---|
| Total: | 147.7 | 20.8 | **121.0** | 5.9 |

## Commercial: 2S Undetained West Areas - Particulate Solids Yield (lbs)

Summary for All Events

| | Land Use Totals | **Paved Parking 1** | Small Landscaped Areas 1 |
|---|---|---|---|
| Total: | 52.0 | **38.7** | 13.3 |

## Commercial: 3S Undetained East Areas - Particulate Solids Yield (lbs)

Summary for All Events

| | Land Use Totals | Roofs 1 | **Paved Parking 1** | Small Landscaped Areas 1 |
|---|---|---|---|---|
| Total: | 255.6 | 8.2 | **228.8** | 18.6 |

## Commercial: 4S Offsite Areas - Particulate Solids Yield (lbs)

Summary for All Events

| | Land Use Totals | **Paved Parking 1** | Small Landscaped Areas 1 |
|---|---|---|---|
| Total: | 35.7 | **33.7** | 2.0 |

Data File: R:\2022\2211993\04 Civil\SWMP\Modeling\22-11993 Proposed.mdb
Rain File: WI Milwaukee 69.RAN
Date: 12-15-22 Time: 8:29:35 AM
Site Description:

| Control Practice Name or Location | Total Influent Load (lbs) | Total Effluent Load (lbs) | Percent Load Reduction |
|---|---|---|---|
| Biofiltration Basin | 100 | 39.01 | 60.99 |
| Catchbasins South | 255.6 | 170.6 | 33.26 |
| Catchbasins North | 147.7 | 100 | 32.3 |
| DS Other Device # 1 | 35.67 | 0 | 100 |

SLAMM for Windows Version 10.4.1
(c) Copyright Robert Pitt and John Voorhees 2019, All Rights Reserved

Data file name:  R:\2022\2211993\04 Civil\SWMP\Modeling\22-11993 Proposed.mdb
Data file description:
Rain file name:  C:\WinSLAMM Files\Rain Files\WI Milwaukee 69.RAN
Particulate Solids Concentration file name:  C:\WinSLAMM Files\v10.1 WI_AVG01.pscx
Runoff Coefficient file name:  C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name:  C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name:  C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name:  C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name:  C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name:  C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name:  C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name:  C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance:  False
Source Area PSD and Peak to Average Flow Ratio File:  C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
If Other Device Pollutant Load Reduction Values = 1, Off-site Pollutant Loads are Removed from Pollutant Load % Reduction calculations
Seed for random number generator:  -42
Start of Winter Season:  12/06  End of Winter Season:  03/28
Model Run Start Date:  01/05/69  Model Run End Date:  12/31/69
Date of run:  12-15-2022  Time of run:  08:57:01
Total Area Modeled (acres):  1.358
Years in Model Run:  0.99

| | Runoff Volume (cu ft) | Percent Runoff Volume Reduction | Particulate Solids Conc. (mg/L) | Particulate Solids Yield (lbs) | Percent Particulate Solids Reduction |
|---|---|---|---|---|---|
| Total of all Land Uses without Controls: | 68869 | - | 105.9 | 455.2 | - |
| Outfall Total with Controls: | 52216 | 24.18% | 80.25 | 261.6 | 42.53% |
| Annualized Total After Outfall Controls: | 52941 | | | 265.2 | |

**Milwaukee Regional Office**
W238 N1610 Busse Rd, Suite 100
Waukesha, WI 53188

# WinSLAMM Infiltration Calculations

Jilly's Car Wash - Waukesha
1/10/2023

## Existing

| | | |
|---|---|---|
| Drainage Area | 1.358 | acres |
| | 59,154 | sf |
| Flow Off-Site | 52,824 | $ft^3$/year (From WinSLAMM)(See below) |
| **Runoff** | | |
| Depth of Rain Off-Site (Area/Flow) | 0.8930 | ft |
| | 10.7158 | in |
| Total Depth of Rain | 29.02 | in/year |
| **Rain Stay-On** | **18.30** | in/year |
| **75% stay-on** | **13.73** | in/year |

## Proposed

| | | |
|---|---|---|
| Drainage Area | 1.358 | acres |
| | 59,154 | sf |
| Flow Off-Site | 52,216 | $ft^3$ (From WinSLAMM)(See below) |
| **Runoff** | | |
| Depth of Rain Off-Site (Area/Flow) | 0.8827 | ft |
| | 10.5925 | in |
| Total Depth of Rain | 29.02 | in/year |
| **Rain Stay-On** | **18.43** | in/year |
| | **101** | % Infiltrated |

WinSLAMM

Land Uses | Junctions | Control Practices | Outfal

**Runoff Volume (cf)** | Part. Solids Yield (lbs) | Part. Solids Conc. (mg/L) | Pollutant Yield

Data File: R:\2022\2211993\04 Civil\SWMP\Modeling\22-11993 Proposed.mdb
Rain File: WI Milwaukee 69.RAN
Date: 01-10-23 Time: 1:04:54 PM
Site Description:

Runoff Volume Total (cf) at the Outfall

| Rain Number | Start Date | Rain Total (in) | Outfall Total (cf) | Rv | Total Losses (in.) | Calculated CN* | Event Peak Flow (cfs) | Pre-Dev Runoff Vol. |
|---|---|---|---|---|---|---|---|---|
| Minimum: | | 0.00 | 0 | 0.034 | 0.01 | 89.2 | 0.001 | 0.0 |
| Maximum: | | 1.96 | 5898 | 0.610 | 0.85 | 99.7 | 1.355 | 6262.0 |
| Average: | | 0.25 | 450.1 | 0.155 | 0.16 | 92.1 | 0.324 | 593.5 |
| Total: | | 29.02 | 52216 | | 18.44 | | | 52824.00 |

* Note: NRCS does not recommend using CN method for rains < 0.5 in.
See 'PreDevelopment Areas and CN' Help for more info.

**Milwaukee Regional Office**
W238 N1610 Busse Rd, Suite 100
Waukesha, WI 53188

## WinSLAMM Infiltration Calculations

Jilly's Car Wash - Waukesha
1/10/2023

Land Uses | Junctions | **Control Practices** | Outfall | Output Summary

Runoff Volume | Part. Solids Yield (lbs) | Part. Solids Conc. (mg/L) | **Summary Table**

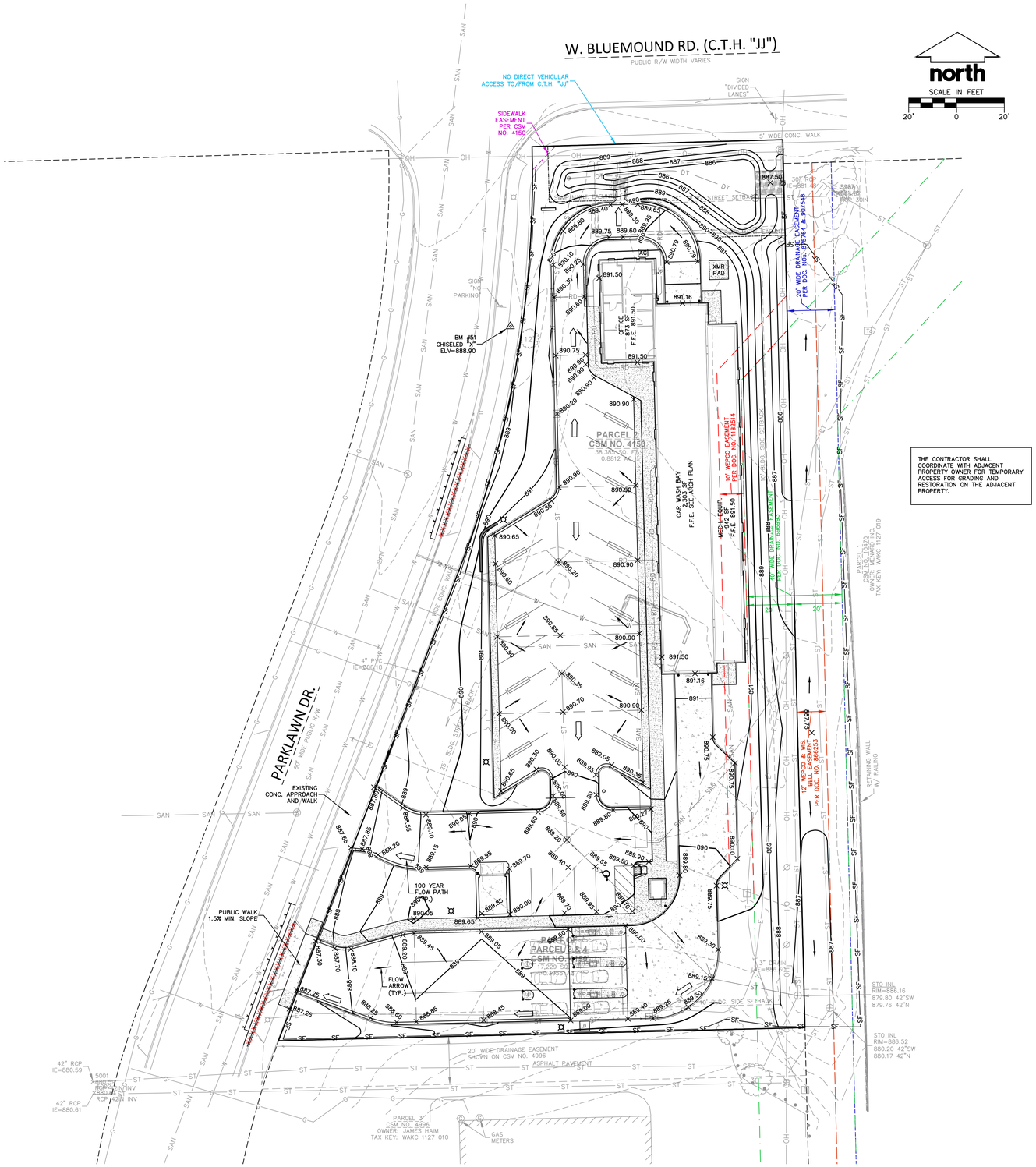
Data File: R:\2022\2211993\04 sed.mdb
Rain File: WI Milwaukee 69.RAN
Date: 01-10-23 Time: 1:04:54 PM
Site Description:

| Col. #: | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 18 | 19 | 21 | 22 | 23 | 27 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Control Practice No. | Control Practice Type | Total Inflow Volume (cf) | Total Outflow Volume (cf) | Percent Volume Reduction | Total Influent Load (lbs) | Total Effluent Load (lbs) | Percent Load Reduction | Flow Weighted Influent Conc (mg/L) | Flow Weighted Effluent Conc (mg/L) | Percent Conc. Reduction | Influent Median Part. Size (microns) | Effluent Median Part. Size (microns) | Notes | Maximum Stage (ft) | Hydraulic Volume Out (cf) | % Device Volume Full | Bypass Volume (cf) | Treated Volume (cf) | Maximum Surface Ponding Time (hrs) | Ma Sub Po Tir |
| 1 | Biofilter | 25399 | 8746 | 65.57 | 100.0 | 39.01 | 60.99 | 63.08 | 71.44 | -13.255 | 4.80 | 5.35 | No Biofilter Overflows | 6.67 | 7592 | | | | 6.4 | |
| 2 | Catchbasin Cleaning | 37768 | 37768 | 0 | 255.6 | 170.6 | 33.26 | 108.4 | 72.36 | 33.242 | 7.80 | 4.72 | | | | 0.7 % | 0 | 37811 | | |
| 3 | Catchbasin Cleaning | 25399 | 25399 | 0 | 147.7 | 100.0 | 32.30 | 93.12 | 63.08 | 32.266 | 7.80 | 4.80 | | | | 0.7 % | 0 | 25428 | | |
| 4 | Other Device | 4290 | 4290 | 0 | 35.67 | 0 | 100.0 | 133.2 | 0 | 100.000 | 7.80 | 7.80 | | | | | | | | |

# APPENDIX 5

## Design Details

- Site Grading Plan
- Site Erosion Control Plan
- Site Utility Plan
- Biofiltration Basin Detail
- Storm Sewer Sizing Calculations




## GRADING NOTES

1. CONTRACTOR SHALL VERIFY ALL GRADES, ENSURE ALL AREAS DRAIN PROPERLY AND REPORT ANY DISCREPANCIES TO JSD PROFESSIONAL SERVICES, INC. PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITIES.
2. ALL EXISTING CONTOURS REPRESENT EXISTING SURFACE GRADES UNLESS OTHERWISE NOTED. ALL PROPOSED GRADES SHOWN ARE FINISH SURFACE GRADES UNLESS OTHERWISE NOTED.
3. ALL EXCAVATIONS AND MATERIAL PLACEMENT SHALL BE COMPLETED TO DESIGN ELEVATIONS AS DEPICTED IN THE PLANS.
   - CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR THE COMPUTATION(S) OF ALL GRADING QUANTITIES. WHILE JSD ATTEMPTS TO PROVIDE A COST EFFECTIVE APPROACH TO BALANCE EARTHWORK, GRADING DESIGN IS BASED ON MANY FACTORS, INCLUDING SAFETY, AESTHETICS, AND COMMON ENGINEERING STANDARD OF CARE, THEREFORE NO GUARANTEE CAN BE MADE FOR A BALANCED SITE.
   - THE CONTRACTOR MAY SOLICIT APPROVAL FROM ENGINEER/OWNER TO ADJUST FINAL GRADES FROM DESIGN GRADES TO PROVIDE AN OVERALL SITE BALANCE AS A RESULT OF FIELD CONDITIONS.
4. GRADING ACTIVITIES SHALL BE IN A MANNER TO ALLOW POSITIVE DRAINAGE ACROSS DISTURBED SOILS, WHICH MAY INCLUDE EXCAVATION OF TEMPORARY DITCHES TO PREVENT PONDING, AND IF NECESSARY PUMPING TO ALLEVIATE PONDING. CONTRACTOR SHALL PREVENT SURFACE WATER FROM ENTERING INTO EXCAVATIONS. IN NO WAY SHALL OWNER BE RESPONSIBLE FOR REMEDIATION OF UNSUITABLE SOILS CREATED/ORIGINATED AS A RESULT OF IMPROPER SITE GRADING OR SEQUENCING. CONTRACTOR SHALL SEQUENCE GRADING ACTIVITIES TO LIMIT EXPOSURE OF DISTURBED SOILS DUE TO WEATHER.
5. THE CONTRACTOR IS RESPONSIBLE FOR MEETING MINIMUM COMPACTION STANDARDS AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER. CONTRACTOR SHALL REFER TO THE GEOTECHNICAL ENGINEERING SERVICES REPORT PREPARED BY _____ AND DATED _____, 2022 FOR SITE COMPACTION REQUIREMENTS. THE CONTRACTOR SHALL NOTIFY ENGINEER/OWNER IF PROPER COMPACTION CANNOT BE OBTAINED. THE PROJECT'S GEOTECHNICAL CONSULTANT SHALL DETERMINE WHICH IN-SITU SOILS ARE TO BE CONSIDERED UNSUITABLE SOILS. THE ENGINEER/OWNER AND GEOTECHNICAL TESTING CONSULTANT WILL DETERMINE IF REMEDIAL MEASURES WILL BE NECESSARY.
6. IN THE EVENT THAT ANY MOISTURE-DENSITY TEST(S) FAIL TO MEET SPECIFICATION REQUIREMENTS, THE CONTRACTOR SHALL PERFORM CORRECTIVE WORK AS NECESSARY TO BRING THE MATERIAL INTO COMPLIANCE AND RETEST THE FAILED AREA AT NO COST TO THE OWNER.
7. WITH THE AUTHORIZATION OF THE ENGINEER/OWNER, MATERIAL THAT IS TOO WET TO PERMIT PROPER COMPACTION MAY BE SPREAD ON FILL AREAS IN AN EFFORT TO DRY. CONTRACTOR SHALL CLEARLY FIELD MARK THE EXTERIOR LIMITS OF SPREAD MATERIAL WITH PAINTED LATH AND SUBMIT A PLAN TO THE ENGINEER/OWNER THAT IDENTIFIES THE LIMITS. UNDER NO CONDITION SHALL THE SPREAD MATERIAL DEPTH EXCEED THE MORE RESTRICTIVE OF: THE EFFECTIVE TREATMENT DEPTH OF MACHINERY THAT WILL BE USED TO TURNOVER THE SPREAD MATERIAL; OR THE MAXIMUM COMPACTION LIFT DEPTH.
8. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY ENGINEER/OWNER IF GROUNDWATER IS ENCOUNTERED DURING EXCAVATION.
9. CONTRACTOR IS SOLELY RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF ADEQUATE AND SAFE TEMPORARY SHORING, BRACING, RETENTION STRUCTURES, AND EXCAVATIONS.
10. THE SITE SHALL BE COMPLETED TO WITHIN 0.10-FT (+/-) OF THE PROPOSED GRADES AS INDICATED WITHIN THE PLANS PRIOR TO PLACEMENT OF TOPSOIL OR STONE. CONTRACTOR IS ENCOURAGED TO SEQUENCE CONSTRUCTION SUCH THAT THE SITE IS DIVIDED INTO SMALLER AREAS TO ALLOW STABILIZATION OF DISTURBED SOILS IMMEDIATELY UPON COMPLETION OF INDIVIDUAL SMALLER AREAS.
11. CONTRACTOR SHALL CONTACT "DIGGER'S HOTLINE" FOR LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES AND SHALL BE RESPONSIBLE FOR PROTECTING SAID UTILITIES FROM ANY DAMAGE DURING CONSTRUCTION.
12. CONTRACTOR SHALL PROTECT INLETS AND ADJACENT PROPERTIES WITH SILT FENCING OR APPROVED EROSION CONTROL METHODS UNTIL CONSTRUCTION IS COMPLETED. CONTRACTOR SHALL PLACE SILT FENCING AT DOWN SLOPE SIDE OF GRADING LIMITS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO ANY EXISTING FACILITIES OR UTILITIES. ANY DAMAGE SHALL BE REPAIRED TO THE OWNER'S SATISFACTION AT THE EXPENSE OF THE CONTRACTOR.
14. WORK WITHIN ANY ROADWAY RIGHT-OF-WAY SHALL BE COORDINATED WITH THE APPROPRIATE MUNICIPAL OFFICIAL PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND FEES. GRADING WITHIN RIGHT-OF-WAY IS SUBJECT TO APPROVAL BY SAID OFFICIALS. RESTORATION OF RIGHT-OF-WAY IS CONSIDERED INCIDENTAL AND SHALL BE INCLUDED IN THE COST OF GRADING. RESTORATION SHALL INCLUDE ALL ITEMS NECESSARY TO RESTORE RIGHT-OF-WAY IN-KIND INCLUDING LANDSCAPING.
15. CONTRACTOR SHALL COMPLY WITH ALL CITY AND/OR STATE CONSTRUCTION STANDARDS/ORDINANCES.
16. THE STORM WATER FACILITY SHALL BE INSPECTED BY A CITY OF WAUKESHA INSPECTOR AT LEAST ONCE DURING CONSTRUCTION AND ONCE AFTER FINAL SITE STABILIZATION OF THE SITE.

## CONSTRUCTION SITE SEQUENCING

1. INSTALL PERIMETER SILT FENCE, EXISTING INLET PROTECTION, AND TEMPORARY CONSTRUCTION ENTRANCE.
2. STRIP AND STOCKPILE TOPSOIL, INSTALL SILT FENCE AROUND PERIMETER OF STOCKPILE.
3. CONDUCT ROUGH GRADING EFFORTS.
4. INSTALL UTILITY PIPING AND STRUCTURES, IMMEDIATELY INSTALL INLET PROTECTION.
5. COMPLETE FINAL GRADING, INSTALLATION OF GRAVEL BASE COURSES, PLACEMENT OF CURBS, PAVEMENTS, WALKS, ETC.
6. PLACE TOPSOIL AND IMMEDIATELY STABILIZE DISTURBED AREAS WITH EROSION CONTROLS.
7. EROSION CONTROL MEASURES SHALL BE REMOVED ONLY AFTER SITE CONSTRUCTION IS COMPLETE WITH ALL SOIL SURFACES HAVING AN ESTABLISHED VEGETATIVE COVER THAT MEETS OR EXCEEDS THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES DEFINITION OF 'FINAL STABILIZATION'.

   CONTRACTOR MAY MODIFY SEQUENCING AFTER ITEM 1 AS NEEDED TO COMPLETE CONSTRUCTION IF EROSION CONTROLS ARE MAINTAINED IN ACCORDANCE WITH THE CONSTRUCTION SITE EROSION CONTROL REQUIREMENTS.

## LEGEND

| | | | |
|---|---|---|---|
| (S) | SANITARY SEWER MANHOLE | SAN | SANITARY SEWER |
| (ST) | STORM MANHOLE | W | WATER MAIN |
| | CATCH BASIN ROUND | ST | STORM SEWER |
| | CATCH BASIN SQUARE | RD | ROOF DRAIN |
| | FIRE HYDRANT | G | UNDERGROUND GAS |
| | WATER VALVE | E | UNDERGROUND ELECTRIC |
| | GAS VALVE | T | UNDERGROUND TELEPHONE |
| | LIGHT POLE | FIB | UNDERGROUND FIBER OPTICS |
| T | TELEPHONE PEDESTAL | OH | OVERHEAD UTILITY |
| E | ELECTRICAL MANHOLE | SF | SILT FENCE |
| | SIGN | | CONIFEROUS TREE |
| | POWER POLE | | DECIDUOUS TREE |
| | GUY WIRE | | |


BRIOHN DESIGN GROUP
3885 N BROOKFIELD ROAD, SUITE 200
BROOKFIELD WISCONSIN 53045-1950
(262) 790-0500 PHONE
(262) 790-0505 FAX


SHEET TITLE: SITE GRADING PLAN

WISCONSIN RIZAL W. ISKANDARSJACH E-41735 MILWAUKEE, WI PROFESSIONAL ENGINEER
1/10/23

PROPOSED:
JILLY'S CAR WASH
2301 W. BLUEMOUND RD.
CITY OF WAUKESHA, WI

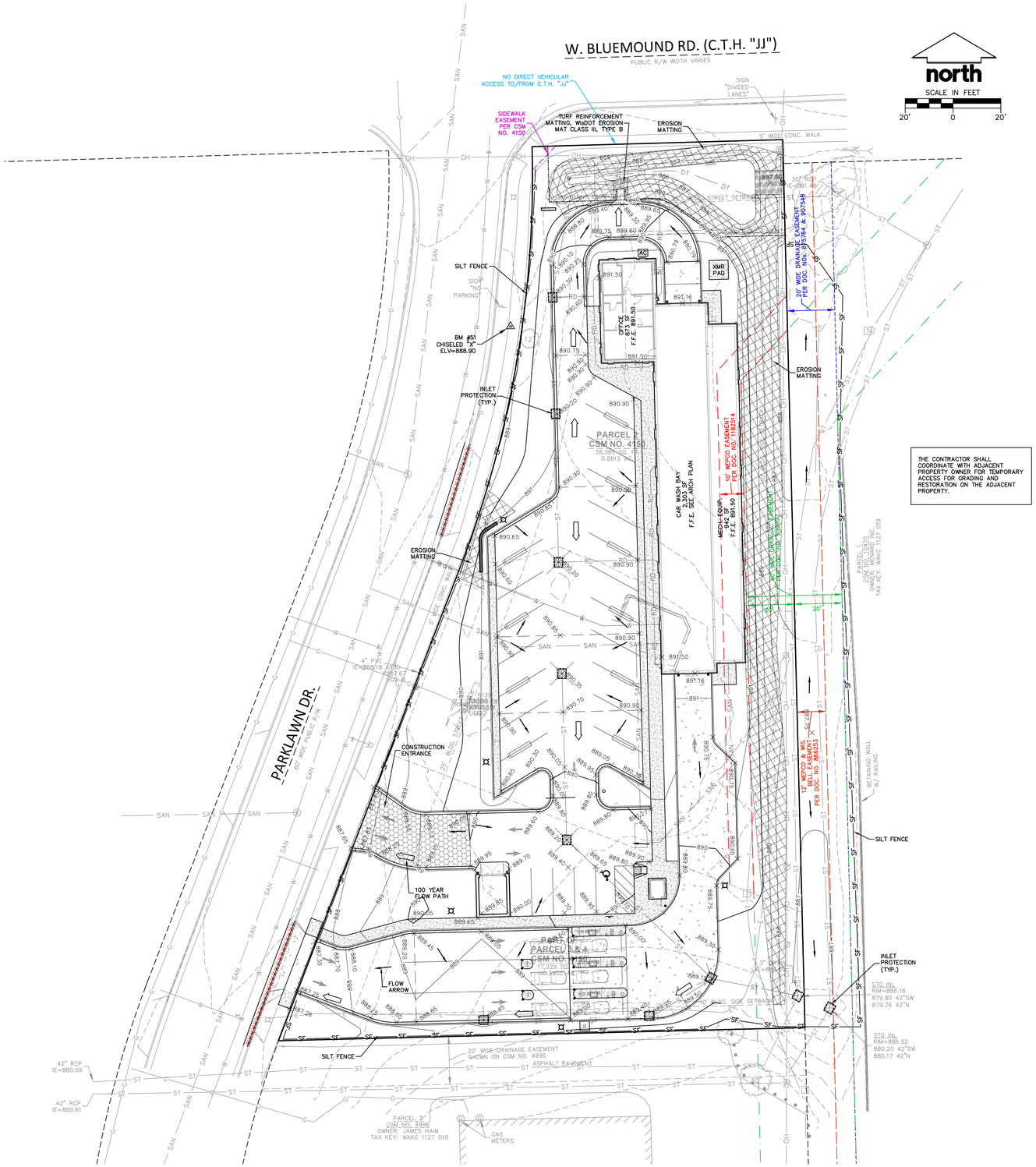
REVISION #1: CITY SPAR COMMENTS 2023-01-10

| | |
|---|---|
| JOB: | 3461 |
| DRAWN: | CAP |
| CHECKED: | RWI |
| DATE: | 12-16-2022 |

SHEET: C3.0

DIGGERS HOTLINE
Call 811 or (800) 242-8511
Milwaukee Area (262) 432-7910
Hearing Impaired TDD (800) 542-2289
www.DiggersHotline.com


JSD
MILWAUKEE REGIONAL OFFICE
W238 N1610 BUSSE ROAD, SUITE 100
WAUKESHA, WISCONSIN 53188
P. 262.513.0666
JSD PROJ. NO.: 22-11993
JSD PROJ. MGR.: RWI




## EROSION AND SEDIMENT CONTROL NOTES

1. ALL CONSTRUCTION SHALL ADHERE TO THE REQUIREMENTS SET FORTH IN WISCONSIN'S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER GENERAL PERMIT FOR CONSTRUCTION SITE LAND DISTURBANCE ACTIVITIES. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES (WDNR) TECHNICAL STANDARDS (REFERRED TO AS BMP'S) AND CITY OF WAUKESHA ORDINANCE. THESE PROCEDURES AND STANDARDS SHALL BE REFERRED TO AS BEST MANAGEMENT PRACTICES (BMP'S). IT IS THE RESPONSIBILITY OF ALL CONTRACTORS ASSOCIATED WITH THE PROJECT TO OBTAIN A COPY OF, AND UNDERSTAND, THE BMP'S PRIOR TO THE START OF CONSTRUCTION ACTIVITIES.
2. THE EROSION CONTROL MEASURES INDICATED ON THE PLANS ARE THE MINIMUM REQUIREMENTS. ADDITIONAL CONTROL MEASURES AS DIRECTED BY JSD PROFESSIONAL SERVICES, INC. OR GOVERNING AGENCIES SHALL BE INSTALLED WITHIN 24 HOURS OF REQUEST.
3. MODIFICATIONS TO THE APPROVED EROSION CONTROL PLAN IN ORDER TO MEET UNFORESEEN FIELD CONDITIONS ARE ALLOWED IF MODIFICATIONS CONFORM TO BMP'S. ALL MODIFICATIONS MUST BE APPROVED BY JSD/MUNICIPALITY PRIOR TO DEVIATION OF THE APPROVED PLAN.
4. INSTALL PERIMETER EROSION CONTROL MEASURES (SUCH AS CONSTRUCTION ENTRANCES, SILT FENCE AND EXISTING INLET PROTECTION) PRIOR TO ANY SITE WORK, INCLUDING GRADING OR DISTURBANCE OF EXISTING SURFACE COVER, AS SHOWN ON PLAN IN ORDER TO PROTECT ADJACENT PROPERTIES/STORM SEWER SYSTEMS FROM SEDIMENT TRANSPORT.
5. CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT ALL LOCATIONS OF VEHICLE INGRESS/EGRESS POINTS. CONTRACTOR IS RESPONSIBLE TO COORDINATE LOCATION(S) WITH THE PROPER AUTHORITIES, PROVIDE NECESSARY FEES AND OBTAIN ALL REQUIRED APPROVALS OR PERMITS. ADDITIONAL CONSTRUCTION ENTRANCES OTHER THAN AS SHOWN ON THE PLANS MUST BE PRIOR APPROVED BY THE APPLICABLE GOVERNING AGENCIES PRIOR TO INSTALLATION.
6. PAVED SURFACES ADJACENT TO CONSTRUCTION ENTRANCES SHALL BE SWEPT AND/OR SCRAPED TO REMOVE ACCUMULATED SOIL, DIRT AND/OR DUST AFTER THE END OF EACH WORK DAY AND AS REQUESTED BY THE GOVERNING AGENCIES.
7. ALL EXISTING STORM SEWER FACILITIES THAT WILL COLLECT RUNOFF FROM DISTURBED AREAS SHALL BE PROTECTED TO PREVENT SEDIMENT DEPOSITION WITHIN STORM SEWER SYSTEMS. INLET PROTECTION SHALL BE IMMEDIATELY FITTED AT THE INLET OF ALL INSTALLED STORM SEWER. ALL INLETS, STRUCTURES, PIPES, AND SWALES SHALL BE KEPT CLEAN AND FREE OF SEDIMENTATION AND DEBRIS.
8. EROSION CONTROL FOR UTILITY CONSTRUCTION (STORM SEWER, SANITARY SEWER, WATER MAIN, ETC.) OUTSIDE OF THE PERIMETER CONTROLS SHALL INCORPORATE THE FOLLOWING:
   - PLACE EXCAVATED TRENCH MATERIAL ON THE HIGH SIDE OF THE TRENCH.
   - BACKFILL, COMPACT, AND STABILIZE THE TRENCH IMMEDIATELY AFTER PIPE CONSTRUCTION.
   - DISCHARGE TRENCH WATER INTO A SEDIMENTATION BASIN OR FILTERING TANK IN ACCORDANCE WITH BMP'S PRIOR TO RELEASE INTO STORM SEWER OR DITCHES.
9. AT A MINIMUM, SEDIMENT BASINS AND NECESSARY TEMPORARY DRAINAGE PROVISIONS SHALL BE CONSTRUCTED AND OPERATIONAL BEFORE BEGINNING OF SIGNIFICANT MASS GRADING OPERATIONS TO PREVENT OFFSITE DISCHARGE OF UNTREATED RUNOFF.
10. ALL TEMPORARY AND PERMANENT EROSION CONTROL MEASURES MUST BE MAINTAINED AND REPAIRED AS NEEDED. THE GENERAL CONTRACTOR WILL BE RESPONSIBLE FOR INSPECTION AND REPAIR DURING CONSTRUCTION. THE OWNER WILL BE RESPONSIBLE IF EROSION CONTROL IS REQUIRED AFTER THE CONTRACTOR HAS COMPLETED THE PROJECT.
11. TOPSOIL STOCKPILES SHALL HAVE A BERM OR TRENCH AROUND THE CIRCUMFERENCE AND PERIMETER SILT FENCE TO CONTROL SILT. IF TOPSOIL STOCKPILE REMAINS UNDISTURBED FOR MORE THAN SEVEN (7) DAYS, TEMPORARY SEEDING AND STABILIZATION IS REQUIRED.
12. EROSION CONTROL MEASURES TEMPORARILY REMOVED FOR UNAVOIDABLE CONSTRUCTION ACTIVITIES SHALL BE IN WORKING ORDER PRIOR TO THE COMPLETION OF EACH WORK DAY.
13. MAINTAIN SOIL EROSION CONTROL DEVICES THROUGH THE DURATION OF THIS PROJECT. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN THIRTY (30) DAYS AFTER FINAL SITE STABILIZATION IS ACHIEVED OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED. DISTURBANCES ASSOCIATED WITH EROSION CONTROL REMOVAL SHALL BE IMMEDIATELY STABILIZED.
14. PUMPS MAY BE USED AS BYPASS DEVICES. IN NO CASE SHALL PUMPED WATER BE DIVERTED OUTSIDE THE PROJECT LIMITS.
15. GRADING EFFORTS SHALL BE CONDUCTED IN SUCH A MANNER AS TO MINIMIZE EROSION. EROSION AND SEDIMENT CONTROL MEASURES SHALL CONSIDER THE TIME OF YEAR, SITE CONDITIONS, AND THE USE OF TEMPORARY OR PERMANENT MEASURES. ALL DISTURBED AREAS THAT WILL NOT BE WORKED FOR A PERIOD OF THIRTY (30) DAYS REQUIRE TEMPORARY SEEDING FOR EROSION CONTROL. SEEDING FOR EROSION CONTROL SHALL BE IN ACCORDANCE WITH TECHNICAL STANDARDS.
16. ALL DISTURBED SLOPES EXCEEDING 4:1 YET LESS THAN 3:1, SHALL BE STABILIZED WITH NORTH AMERICAN GREEN S75BN EROSION MATTING (OR APPROVED EQUAL) AND DISTURBED SLOPES EXCEEDING 3:1 YET LESS THAN 2:1 SHALL BE STABILIZED WITH NORTH AMERICAN GREEN C125BN (OR APPROVED EQUAL) OR APPLICATION OF AN APPROVED POLYMER SOIL STABILIZATION TREATMENT OR A COMBINATION THEREOF, AS REQUIRED. EROSION MATTING AND/OR NETTING USED ONSITE SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S GUIDELINES.
17. DURING PERIODS OF EXTENDED DRY WEATHER, THE CONTRACTOR SHALL KEEP A WATER TRUCK ON SITE FOR THE PURPOSE OF WATERING DOWN SOILS WHICH MAY OTHERWISE BECOME AIRBORNE. THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING WIND EROSION (DUST) DURING CONSTRUCTION AT HIS/HER EXPENSE.
18. DISTURBED AREAS AND AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION SHALL BE VISUALLY INSPECTED FOR EVIDENCE OF, OR THE POTENTIAL FOR, POLLUTANTS ENTERING THE DRAINAGE SYSTEM ON A DAILY BASIS.
19. QUALIFIED PERSONNEL (PROVIDED BY THE GENERAL/PRIME CONTRACTOR) SHALL INSPECT DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED AND EROSION AND SEDIMENT CONTROLS WITHIN 24 HOURS OF ALL 0.5-INCH, OR MORE, PRECIPITATION EVENTS WITH A MINIMUM INSPECTION INTERVAL OF ONCE EVERY SEVEN (7) CALENDAR DAYS IN THE ABSENCE OF A QUALIFYING RAIN OR SNOWFALL EVENT. REPORTING SHALL BE IN ACCORDANCE WITH PART IV D.4. (a–f), OF THE NPDES GENERAL PERMIT. CONTRACTOR SHALL IMMEDIATELY ARRANGE TO HAVE ANY DEFICIENT ITEMS REVEALED DURING INSPECTIONS REPAIRED/REPLACED.
20. THE FOLLOWING MAINTENANCE PRACTICES SHALL BE USED TO MAINTAIN, IN GOOD AND EFFECTIVE OPERATING CONDITIONS, VEGETATION, EROSION AND SEDIMENT CONTROL MEASURES, AND OTHER PROTECTIVE MEASURES IDENTIFIED IN THIS PLAN. UPON IDENTIFICATION, DEFICIENCIES IN STORMWATER CONTROLS SHALL BE ADDRESSED IMMEDIATELY. THE MAINTENANCE PROCEDURES FOR THIS DEVELOPMENT SHALL INCLUDE, BUT NOT BE LIMITED TO THE BELOW.
   - SILT FENCE – REPAIR OR REPLACE ANY DAMAGED FILTER FABRIC AND/OR STAKES. REMOVE ACCUMULATED SEDIMENT WHEN IT HAS REACHED ONE-HALF THE ABOVE GROUND HEIGHT OF THE FENCE.
   - CONSTRUCTION ENTRANCE – AS NEEDED, ADD STONE TO MAINTAIN CONSTRUCTION ENTRANCE DIMENSIONS AND EFFECTIVENESS.
   - DITCH CHECK (STRAW BALES) – RE-SECURE STAKES; ADJUST OR REPOSITION BALES TO ADDRESS PROPER FLOW OF STORMWATER; AND REMOVE ACCUMULATED SEDIMENT WHEN IT HAS REACHED ONE-HALF THE HEIGHT OF THE BALE.
   - EROSION CONTROL MATTING – REPAIR MATTING IMMEDIATELY IF INSPECTION REVEALS BREACHED OR FAILED CONDITIONS. REPAIR AND RE-GRADE SOIL WHERE CHANNELIZATION HAS OCCURRED.
   - DIVERSION, BERM/SWALE – REPLACE OR RE-COMPACT THE CONSTRUCTION MATERIALS AS NECESSARY.
   - INLET PROTECTION – CLEAN, REPAIR OR REPLACE FILTER FABRIC AND/OR STONE WHEN CONTROL MEASURE IS CLOGGED. INLET FILTER BAGS SHALL BE REPLACED ONCE BAG BECOMES ONE-HALF FULL OF SEDIMENT.

   ADDITIONAL POLLUTANT CONTROL MEASURES TO BE IMPLEMENTED DURING CONSTRUCTION ACTIVITIES SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING.

   - CONSTRUCTION WASTE SHALL BE PROPERLY DISPOSED OF. THIS INCLUDES ALL CONSTRUCTION SITE WASTE MATERIAL, SANITARY WASTE AND WASTE FROM VEHICLE TRACKING OF SEDIMENTS. THE CONTRACTOR SHALL ENSURE THAT NO MATERIAL WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURIED, DUMPED, BURNED, OR DISCHARGED TO THE WATERS OF THE STATE. VEHICLES HAULING MATERIAL AWAY FROM THE SITE SHALL BE COVERED WITH A TARPAULIN TO PREVENT BLOWING DEBRIS.
   - DUST CONTROL SHALL BE ACCOMPLISHED BY ONE OR MORE OF THE FOLLOWING METHODS:
     - A. COVERING 30% OR MORE OF THE SOIL SURFACE WITH A NON-ERODIBLE MATERIAL.
     - B. ROUGHENING THE SOIL TO PRODUCE RIDGES PERPENDICULAR TO THE PREVAILING WIND. RIDGES SHALL BE AT LEAST SIX (6) INCHES IN HEIGHT.
     - C. FREQUENT WATERING OF EXCAVATION AND FILL AREAS.
     - D. PROVIDING GRAVEL OR PAVING AT ENTRANCE/EXIT DRIVES, PARKING AREAS AND TRANSIT PATHS.
   - STREET SWEEPING SHALL BE PERFORMED TO IMMEDIATELY REMOVE ANY SEDIMENT TRACKED ON PAVEMENTS.
21. NOTIFY THE CITY OF WAUKESHA ENGINEERING DEPARTMENT ONCE ALL EROSION CONTROL IS INSTALLED FOR CITY INSPECTION AND APPROVAL PRIOR TO STARTING CONSTRUCTION ACTIVITIES.
22. REMOVE EROSION CONTROL DEVICES AFTER SITE IS FULLY ESTABLISHED AND THERE IS NO CHANCE EROSION CAN TAKE PLACE.
23. CONTRACTOR SHALL NOTIFY THE CITY OF WAUKESHA OF ALL CHANGES TO THE EROSION CONTROL PLAN. CITY OF WAUKESHA SHALL REVIEW AND APPROVE ALL CHANGES PRIOR TO COMMENCING WORK.
24. CONTRACTOR SHALL NOTIFY THE CITY OF WAUKESHA WHEN THE SITE IS FULLY ESTABLISHED AND READY FOR FINAL INSPECTION. UPON CITY'S APPROVAL OF SITE, CONTRACTOR SHALL BE PERMITTED TO REMOVE ALL EROSION CONTROL.

## LEGEND

| | | | |
|---|---|---|---|
| (S) | SANITARY SEWER MANHOLE | SAN | SANITARY SEWER |
| (ST) | STORM MANHOLE | W | WATER MAIN |
| | CATCH BASIN ROUND | ST | STORM SEWER |
| | CATCH BASIN SQUARE | RD | ROOF DRAIN |
| | FIRE HYDRANT | G | UNDERGROUND GAS |
| | WATER VALVE | E | UNDERGROUND ELECTRIC |
| | GAS VALVE | T | UNDERGROUND TELEPHONE |
| | LIGHT POLE | FIB | UNDERGROUND FIBER OPTICS |
| T | TELEPHONE PEDESTAL | OH | OVERHEAD UTILITY |
| E | ELECTRICAL MANHOLE | SF | SILT FENCE |
| | SIGN | | CONIFEROUS TREE |
| | POWER POLE | | DECIDUOUS TREE |
| | GUY WIRE | | |


BRIOHN DESIGN GROUP
3885 N BROOKFIELD ROAD, SUITE 200
BROOKFIELD WISCONSIN 53045-1950
(262) 790-0500 PHONE
(262) 790-0505 FAX


SHEET TITLE: SITE EROSION CONTROL PLAN

WISCONSIN RIZAL W. ISKANDARSJACH E-41735 MILWAUKEE, WI PROFESSIONAL ENGINEER 1/10/23

PROPOSED:
JILLY'S CAR WASH
2301 W. BLUEMOUND RD.
CITY OF WAUKESHA, WI

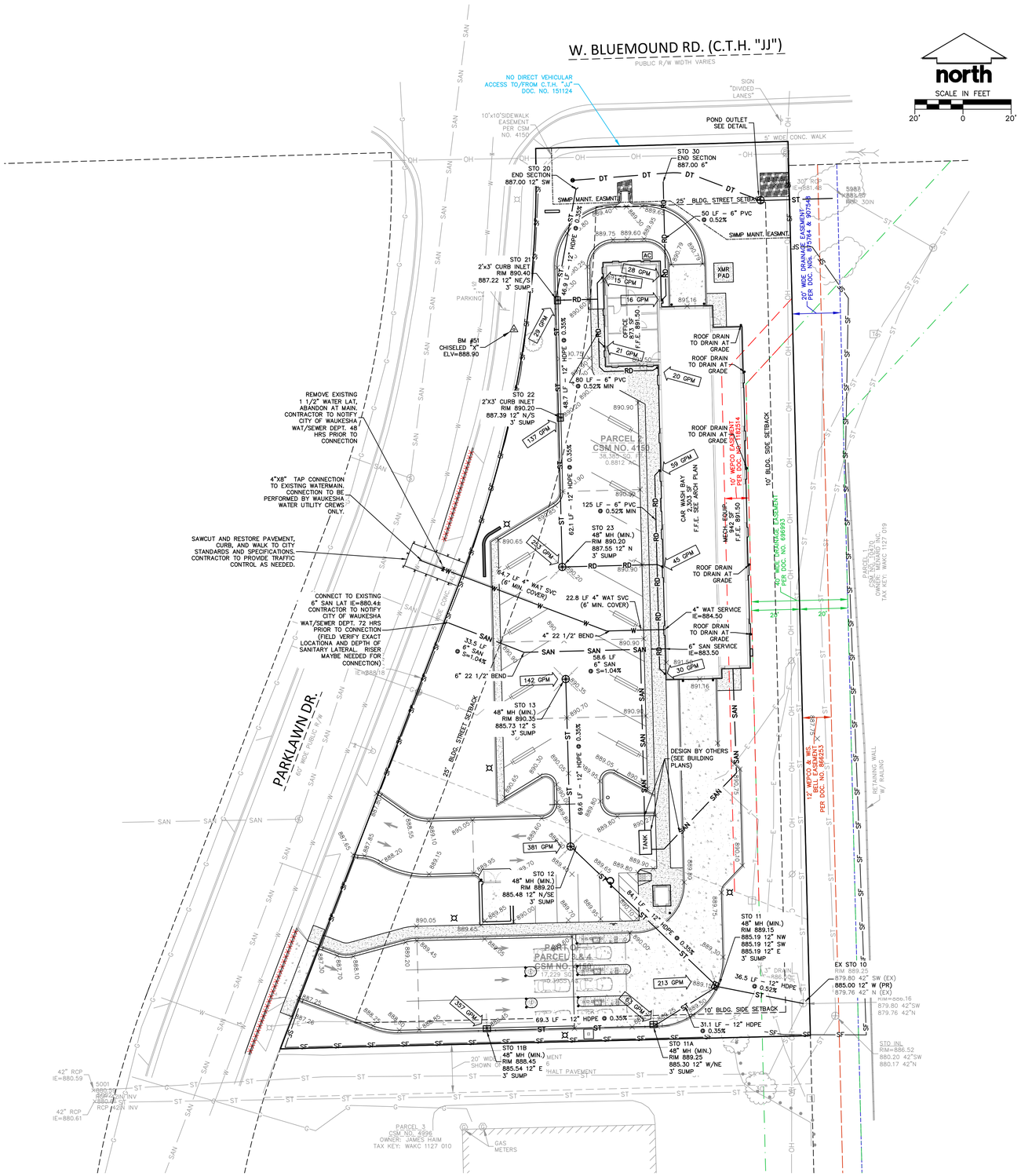
REVISION #1: CITY SPAR COMMENTS 2023-01-10

| | |
|---|---|
| JOB: | 3461 |
| DRAWN: | CAP |
| CHECKED: | RWI |
| DATE: | 12-16-2022 |

SHEET: C4.0

DIGGERS HOTLINE
Call 811 or (800) 242-8511
Milwaukee Area (262) 432-7910
Hearing Impaired TDD (800) 542-2289
www.DiggersHotline.com


JSD
MILWAUKEE REGIONAL OFFICE
W238 N1610 BUSSE ROAD, SUITE 100
WAUKESHA, WISCONSIN 53188
P. 262.513.0666
JSD PROJ. NO.: 22-11993
JSD PROJ. MGR.: RWI




## UTILITY NOTES

1. EXISTING UTILITIES ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE TYPE, LOCATION, SIZE AND ELEVATION OF UNDERGROUND UTILITIES AS THEY DEEM NECESSARY FOR PROPOSED UTILITY CONNECTIONS AND/OR TO AVOID DAMAGE THERETO. CONTRACTOR SHALL CALL "DIGGER'S HOTLINE" PRIOR TO ANY CONSTRUCTION.
2. ALL UTILITY WORK SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR SEWER AND WATER CONSTRUCTION IN (WISCONSIN LATEST EDITION AND ADDENDUM) AND ALL STATE AND LOCAL CODES AND SPECIFICATIONS. IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE WHICH SPECIFICATIONS AND CODES APPLY, AND TO COORDINATE ALL CONSTRUCTION ACTIVITIES WITH THE APPROPRIATE LOCAL AND STATE AUTHORITIES.
3. UTILITY CONSTRUCTION AND SPECIFICATIONS SHALL COMPLY WITH THE CITY OF WAUKESHA SPECIAL PROVISIONS AND WISCONSIN DEPARTMENT OF SAFETY AND PROFESSIONAL SERVICES DSPS 382.
4. TRACER WIRES SHALL BE INSTALLED AS NECESSARY IN ACCORD WITH 182.0715(2R) OF THE STATE STATUTES AND CITY OF WAUKESHA REQUIREMENTS.
5. LENGTHS OF PROPOSED UTILITIES ARE TO CENTER OF STRUCTURES OR FITTINGS AND MAY VARY SLIGHTLY FROM PLAN. LENGTHS ARE SHOWN FOR CONTRACTOR CONVENIENCE ONLY. CONTRACTOR IS SOLELY RESPONSIBLE FOR COMPUTATIONS OF MATERIALS REQUIRED TO COMPLETE WORK. LENGTHS SHALL BE FIELD VERIFIED DURING CONSTRUCTION.
6. CONTRACTOR SHALL ADJUST AND/OR RECONSTRUCT EXISTING UTILITY COVERS (SUCH AS MANHOLE COVERS, VALVE BOX COVERS, ETC.) TO MATCH FINISHED GRADES OF THE AREAS DISTURBED DURING CONSTRUCTION.
7. CONTRACTOR SHALL FIELD VERIFY LOCATIONS, ELEVATIONS, AND SIZES OF PROPOSED UTILITIES AND CHECK ALL UTILITY CROSSINGS FOR CONFLICTS PRIOR TO ATTEMPTING CONNECTIONS AND BEGINNING UTILITY CONSTRUCTION.
8. STORM SEWER SPECIFICATIONS –

   PIPE – REINFORCED CONCRETE PIPE (RCP) SHALL MEET THE REQUIREMENTS OF ASTO CLASS IV (MINIMUM) C–76 WITH RUBBER GASKET JOINTS CONFORMING TO ASTO C–443; HIGH DENSITY DUAL–WALL POLYETHYLENE N–12 CORRUGATED PIPE (HDPE) SHALL BE AS MANUFACTURED BY ADS OR EQUAL WITH WATER TIGHT JOINTS, AND SHALL MEET THE REQUIREMENTS OF AASHTO DESIGNATION M–294 TYPE "S", OR POLYVINYL CHLORIDE (PVC) – CLASS PS46 MEETING AASHTO M278, AS NOTED.

   INLETS/CATCH BASINS – INLETS/CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH FILE NO. 25 OF THE "STANDARD SPECIFICATIONS" WITH A 1'–8" X 2'–6" MAXIMUM OPENING. FRAME & GRATE SHALL BE NEENAH R–2504 WITH TYPE G GRATE, OR EQUAL. CURB FRAME & GRATE SHALL BE NEENAH R–3322B WITH TYPE G GRATE, OR EQUAL.

   BACKFILL AND BEDDING – STORM SEWER SHALL BE CONSTRUCTED WITH GRAVEL BACKFILL AND CLASS "B" BEDDING IN ALL PAVED AREAS AND TO A POINT 5 FEET BEYOND THE EDGE OF PAVEMENT. TRENCHES RUNNING PARALLEL TO AND LESS THAN 5 FEET FROM THE EDGE OF PAVEMENT SHALL ALSO REQUIRE GRAVEL BACKFILL. LANDSCAPED AREAS MAY BE BACKFILLED WITH EXCAVATED MATERIAL IN CONFORMANCE WITH SECTION 8.43.5 OF THE "STANDARD SPECIFICATIONS".

   MANHOLE FRAMES AND COVERS – MANHOLE FRAMES AND COVERS SHALL BE NEENAH R–1713 WITH TYPE "B" SELF SEALING LIDS, NON–ROCKING OR EQUAL .

   FIELD TILE CONNECTION – ALL FIELD TILE ENCOUNTERED DURING CONSTRUCTION SHALL BE INCLUDED IN THE UNIT PRICE(S) FOR STORM SEWER. TILE LINES CROSSED BY THE TRENCH SHALL BE REPLACED WITH THE SAME MATERIAL AS THE STORM SEWER.
9. WATER MAIN SPECIFICATIONS –

   PIPE – WATER MAIN SHALL BE POLYVINYL CHLORIDE (PVC) PIPE MEETING THE REQUIREMENTS OF AWWA STANDARD C–900. CLASS 150, DR–18, WITH CAST IRON O.D. AND INTEGRAL ELASTOMERIC BELL AND SPIGOT JOINTS. VALVES AND VALVE BOXES – GATE VALVES SHALL BE AWWA GATE VALVES MEETING THE REQUIREMENTS OF AWWA C–500 AND CHAPTER 8.27.0 OF THE "STANDARD SPECIFICATIONS".GATE VALVES AND VALVE BOXES SHALL CONFORM TO LOCAL PLUMBING ORDINANCES.

   10–GAUGE TRACER WIRE SHALL BE INSTALLED ALONG THE ENTIRE LENGTH OF ALL PRIVATE WATER MAINS, HYDRANT LEADS. FIRE DEPARTMENT CONNECTION LEADS AND LATERALS. THE TRACER WIRE SHALL BE EXTENDED TO THE SURFACE AT THE BUILDING WALL AND ALL OTHER SYSTEM LIMITS AND ENCLOSED IN RISER BOX WITH "WATER"ON THE COVER.

   BEDDING AND COVER MATERIAL – PIPE BEDDING AND COVER MATERIAL SHALL BE SAND, CRUSHED STONE CHIPS OR CRUSHED STONE SCREENINGS CONFORMING TO CHAPTER 8.43.2 OF THE "STANDARD SPECIFICATIONS".

   BACKFILL – BACKFILL MATERIAL AND INSTALLATION SHALL BE IN ACCORDANCE WITH CHAPTER 2.6.0 OF THE "STANDARD SPECIFICATIONS". GRAVEL BACKFILL IS REQUIRED IN ALL PAVED AREAS AND TO A POINT 5 FEET BEYOND THE EDGE OF PAVEMENT. TRENCHES RUNNING PARALLEL TO AND LESS THAN 5 FEET FROM THE EDGE OF PAVEMENT SHALL ALSO REQUIRE GRAVEL BACKFILL. LANDSCAPED AREAS MAY BE BACKFILLED WITH EXCAVATED MATERIAL IN CONFORMANCE WITH SECTION 8.43.5 OF THE "STANDARD SPECIFICATIONS".
10. SANITARY SEWER SPECIFICATIONS –

    PIPE – SANITARY SEWER PIPE MATERIAL SHALL BE POLYVINYL CHLORIDE (PVC) MEETING REQUIREMENTS OF ASTO D 3034, SDR–35, WITH INTEGRAL BELL TYPE FLEXIBLE ELASTOMERIC JOINTS, MEETING THE REQUIREMENTS OF ASTO D–3212.

    SANITARY SEWER LATERALS SHALL HAVE A GREEN #12 LOCATER WIRE INSTALLED ALONG THE ENTIRE LENGTH. LOCATER WIRE SHALL BE BROUGHT TO THE SURFACE AT THE EDGE OF THE BUILDING AND ENCLOSED IN A CURB BOX WITH "SEWER ON THE COVER.

    BEDDING AND COVER MATERIAL – BEDDING AND COVER MATERIAL SHALL CONFORM TO THE APPROPRIATE SECTIONS OF THE "STANDARD SPECIFICATION" WITH THE FOLLOWING MODIFICATION: "COVER MATERIAL SHALL BE THE SAME AS USED FOR BEDDING AND SHALL CONFORM TO SECTION 8.43.2 (A). BEDDING AND COVER MATERIAL SHALL BE PLACED IN A MINIMUM OF THREE SEPARATE LIFTS, OR AS REQUIRED TO INSURE ADEQUATE COMPACTING OF THESE MATERIALS, WITH ONE LIFT OF BEDDING MATERIAL ENDING AT OR NEAR THE SPRINGLINE OF THE PIPE. THE CONTRACTOR SHALL TAKE CARE TO COMPLETELY WORK BEDDING MATERIAL UNDER THE HAUNCH OF THE PIPE TO PROVIDE ADEQUATE SIDE SUPPORT."

    BACKFILL – BACKFILL MATERIAL AND INSTALLATION SHALL BE IN ACCORDANCE CHAPTER 2.6.0 OF THE "STANDARD SPECIFICATIONS." GRAVEL BACKFILL IS REQUIRED IN ALL PAVED AREAS AND TO A POINT 5 FEET BEYOND THE EDGE OF PAVEMENT. TRENCHES RUNNING PARALLEL TO AND LESS THAN 5 FEET FROM THE EDGE OF PAVEMENT SHALL ALSO REQUIRE GRAVEL BACKFILL. LANDSCAPED AREAS MAY BE BACKFILLED WITH EXCAVATED MATERIAL IN CONFORMANCE WITH SECTION 8.43.5 OF THE "STANDARD SPECIFICATIONS."

    MANHOLE FRAMES AND COVERS – MANHOLE FRAMES AND COVERS SHALL BE NEENAH R–1661 WITH TYPE "B" SELF SEALING LIDS, NON–ROCKING OR EQUAL.

    CONTRACTOR SHALL COORDINATE WITH CITY PLUMBING AND BUILDING INSPECTOR WHEN CONNECTING TO EXISTING SANITARY SEWER STUB.

    CONTRACTOR SHALL INSTALL PLUG ON THE DOWNSTREAM END OF PROPOSED SANITARY SEWER UNTIL SANITARY SEWER IS CONSTRUCTED. PLUG SHALL BE REMOVED ONCE THE PROPOSED SANITARY SEWER SYSTEM IS CLEANED OUT AND READY FOR OPERATION. CONTRACTOR SHALL CLEAN OUT ALL DEBRIS THAT ENTERS THE SANITARY SEWER SYSTEM.

    ALL SANITARY SEWER TO BE INSTALLED IN ACCORDANCE WITH CITY OF WAUKESHA STANDARDS.
11. WATER MAIN AND SANITARY SEWER SHALL BE INSULATED WHEREVER THE DEPTH OF COVER IS LESS THAN 6 FEET. INSULATION AND PLACING OF INSULATION SHALL CONFORM TO CHAPTER 4.17.0 "INSULATION" OF THE STANDARD SPECIFICATIONS FOR SEWER AND WATER CONSTRUCTION IN WISCONSIN 6TH EDITION UPDATED WITH ITS LATEST ADDENDUM (TYP.).
12. TRACER WIRE SHALL BE INSTALLED ALONG THE SANITARY SEWER SERVICE. THE TRACER WIRE SHALL BE CONTINUOUS AND SHALL BE EXTENDED ABOVE GRADE VIA A 4–INCH PVC PIPE WITH SCREW–ON CAP ADJACENT TO THE PROPOSED TERMINATION POINT OF THE LATERAL FOR THE PROPOSED BUILDING.
13. ALL NEW ON–SITE SANITARY, STORM AND WATER UTILITIES SHALL BE PRIVATELY OWNED AND MAINTAINED BY THE PROPERTY OWNER.
14. ALL APPLICATIONS AND FEES FOR SANITARY SEWER MUST BE COMPLETED AND PAID PRIOR TO CONNECTION TO SEWER SYSTEMS.
15. ANY UTILITY WORK IN THE RIGHT–OF–WAY AND ALL SANITARY SEWER CONNECTIONS TO BE INSPECTED BY CITY. NOTIFY CITY 72 HOURS IN ADVANCE OF CONNECTING TO SEWER.
16. THE PROPOSED 4"X8" TAP CONNECTION TO THE EXISTING PUBLIC WATER MAIN IS TO BE PERFORMED ONLY BY WAUKESHA WATER UTILITY CREWS. THE CONTRACTOR IS RESPONSIBLE FOR EXCAVATING THE TRENCH, SHORING, AND MEANS OF LOWERING THE TAPPING MACHINE, AS WELL AS TRAFFIC CONTROL AND PAVEMENT RESTORATION. CONTRACTOR TO CONTACT CHRIS WALTER AT (262) 409–4460 48 HOUR NOTICE TO ENSURE THE CITY HAS AVAILABILITY FOR THE TAP.
17. ONLY WATER UTILITY CREWS CAN OPERATE EXISTING VALVES. CONTRACTOR TO CONTACT CHRIS WALTER AT (262) 409–4460 48 HOUR NOTICE TO ENSURE THE CITY HAS AVAILABILITY FOR INSPECTION AND OPERATING THE EXISTING VALVES.
18. CONTRACTOR TO CONTACT TOM KRAUSE AT TKRAUSE@WAUKESHA–WATER.COM OR (262) 352–3022 TO OBTAIN AND SUBMIT A NEW WATER SERVICE APPLICATION.

## LEGEND

| | | | |
|---|---|---|---|
| SANITARY SEWER MANHOLE | | SAN | SANITARY SEWER |
| STORM MANHOLE | | W | WATER MAIN |
| CATCH BASIN ROUND | | ST | STORM SEWER |
| CATCH BASIN SQUARE | | RD | ROOF DRAIN |
| FIRE HYDRANT | | G | UNDERGROUND GAS |
| WATER VALVE | | E | UNDERGROUND ELECTRIC |
| GAS VALVE | | T | UNDERGROUND TELEPHONE |
| LIGHT POLE | | FIB | UNDERGROUND FIBER OPTICS |
| TELEPHONE PEDESTAL | | OH | OVERHEAD UTILITY |
| ELECTRICAL MANHOLE | | SF | SILT FENCE |
| SIGN | | | CONIFEROUS TREE |
| POWER POLE | | | DECIDUOUS TREE |
| GUY WIRE | | | |

DIGGERS HOTLINE
Call 811 or (800) 242-8511
Milwaukee Area (262) 432-7910
Hearing Impaired TDD (800) 542-2289
www.DiggersHotline.com

JSD
MILWAUKEE REGIONAL OFFICE
W238 N1610 BUSSE ROAD, SUITE 100
WAUKESHA, WISCONSIN 53188
P. 262.513.0666
JSD PROJ. NO.: 22-11993
JSD PROJ. MGR.: RWI

BRIOHN
DESIGN GROUP
3885 N BROOKFIELD ROAD, SUITE 200
BROOKFIELD WISCONSIN 53045-1950
(262) 790-0500 PHONE
(262) 790-0505 FAX

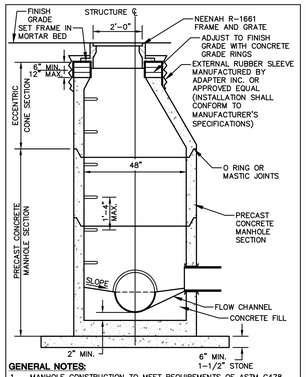
SHEET TITLE
SITE UTILITY PLAN

WISCONSIN
RIZAL W. ISKANDARSJACH
E-41735
MILWAUKEE, WI
PROFESSIONAL ENGINEER
1/10/23

PROPOSED:
JILLY'S CAR WASH
2301 W. BLUEMOUND RD.
CITY OF WAUKESHA, WI

REVISION #1: CITY SPAR COMMENTS 2023-01-10

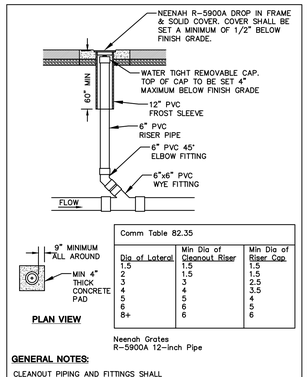
| | |
|---|---|
| JOB: | 3461 |
| DRAWN: | CAP |
| CHECKED: | RWI |
| DATE: | 12-16-2022 |
| SHEET: | C5.0 |




**GENERAL NOTES:**

1. MANHOLE CONSTRUCTION TO MEET REQUIREMENTS OF ASTM C478.
2. JOINTS SHALL BE WATERTIGHT. USE BUTYL RUBBER GASKET.
3. USE MORTAR FOR PIPE CONNECTIONS.
4. ALL MANHOLES SHALL HAVE RUBBER CHIMNEY BOOT SEALS.

## SANITARY MANHOLE
N.T.S.



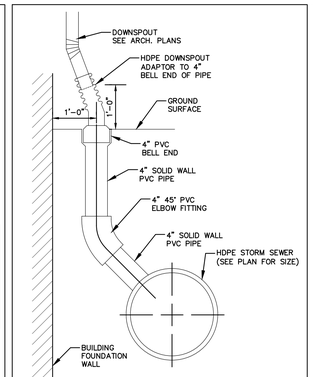

Comm Table 82.35

| Dia of Lateral | Min Dia of Cleanout Riser | Min Dia of Riser Cap |
|---|---|---|
| 1.5 | 1.5 | 1.5 |
| 2 | 1.5 | 1.5 |
| 3 | 3 | 2.5 |
| 4 | 4 | 3.5 |
| 5 | 5 | 4 |
| 6 | 6 | 5 |
| 8+ | 6 | 6 |

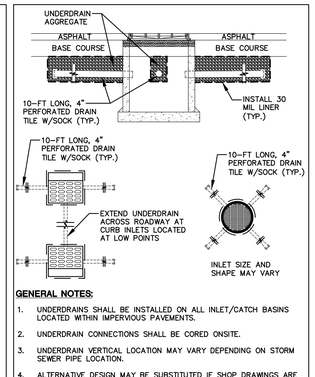
**GENERAL NOTES:**

CLEANOUT PIPING AND FITTINGS SHALL MATCH SANITARY SEWER LATERAL MATERIAL

## CLEANOUT
N.T.S.



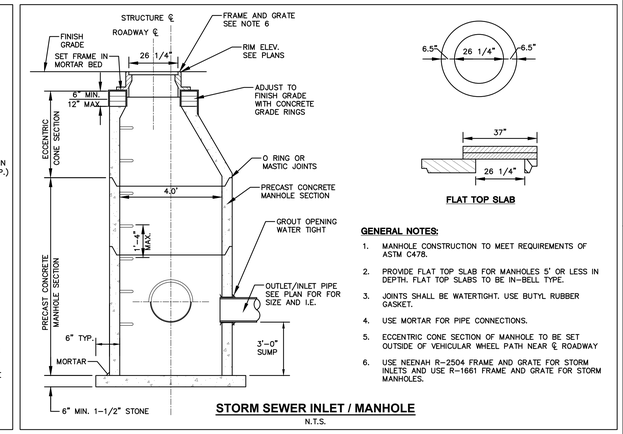

## DOWNSPOUT DETAIL
N.T.S.




**GENERAL NOTES:**

1. UNDERDRAINS SHALL BE INSTALLED ON ALL INLET/CATCH BASINS LOCATED WITHIN IMPERVIOUS PAVEMENTS.
2. UNDERDRAIN CONNECTIONS SHALL BE CORED ONSITE.
3. UNDERDRAIN VERTICAL LOCATION MAY VARY DEPENDING ON STORM SEWER PIPE LOCATION.
4. ALTERNATIVE DESIGN MAY BE SUBSTITUTED IF SHOP DRAWINGS ARE SUBMITTED AND APPROVED BY CITY OF MUSKEGO.

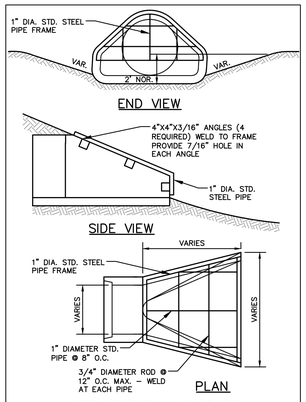
## CATCH BASIN/INLET UNDERDRAIN
N.T.S.



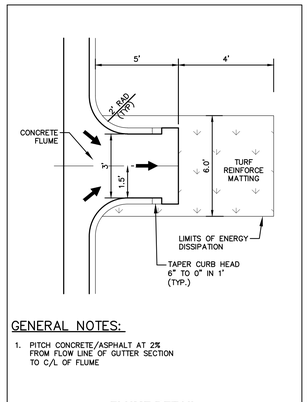

**GENERAL NOTES:**

1. MANHOLE CONSTRUCTION TO MEET REQUIREMENTS OF ASTM C478.
2. PROVIDE FLAT TOP SLAB FOR MANHOLES 5' OR LESS IN DEPTH. FLAT TOP SLABS TO BE IN-BELL TYPE.
3. JOINTS SHALL BE WATERTIGHT. USE BUTYL RUBBER GASKET.
4. USE MORTAR FOR PIPE CONNECTIONS.
5. ECCENTRIC CONE SECTION OF MANHOLE TO BE SET OUTSIDE OF VEHICULAR WHEEL PATH NEAR ℄ ROADWAY
6. USE NEENAH R-2504 FRAME AND GRATE FOR STORM INLETS AND USE R-1661 FRAME AND GRATE FOR STORM MANHOLES.

## STORM SEWER INLET / MANHOLE
N.T.S.



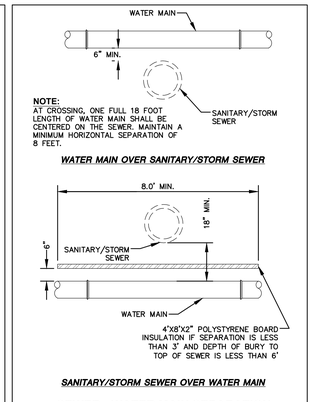

## APRON ENDWALL W/ GRATE
N.T.S.



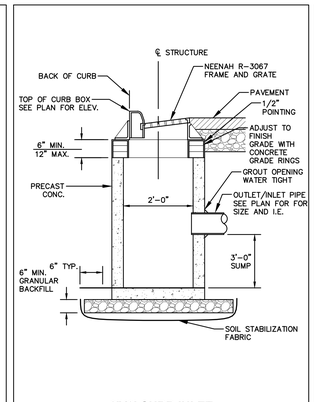

GENERAL NOTES:

1. PITCH CONCRETE/ASPHALT AT 2% FROM FLOW LINE OF GUTTER SECTION TO C/L OF FLUME

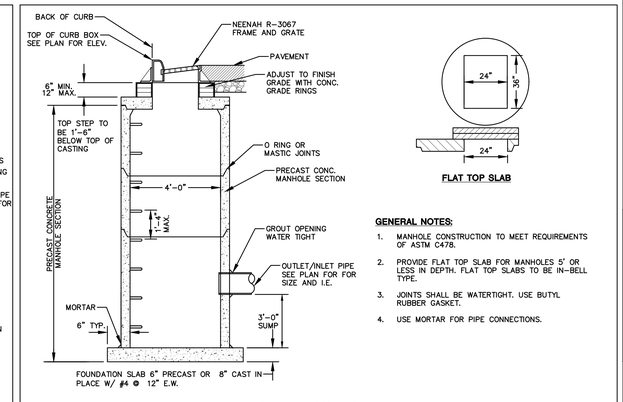
## FLUME DETAIL
N.T.S.




## SEWER - WATER MAIN SEPARATION
N.T.S.



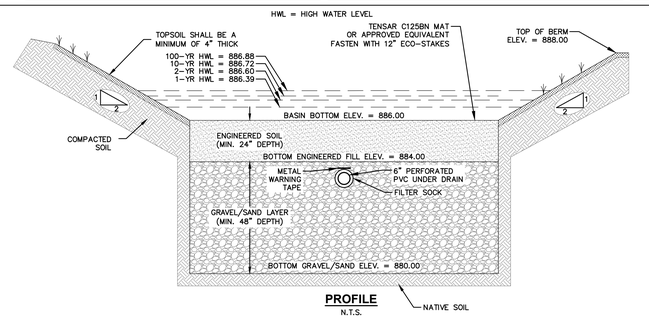

## 2'X3' CURB INLET
N.T.S.



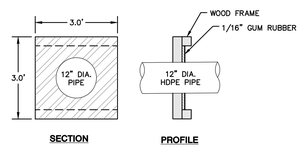

**GENERAL NOTES:**

1. MANHOLE CONSTRUCTION TO MEET REQUIREMENTS OF ASTM C478.
2. PROVIDE FLAT TOP SLAB FOR MANHOLES 5' OR LESS IN DEPTH. FLAT TOP SLABS TO BE IN-BELL TYPE.
3. JOINTS SHALL BE WATERTIGHT. USE BUTYL RUBBER GASKET.
4. USE MORTAR FOR PIPE CONNECTIONS.

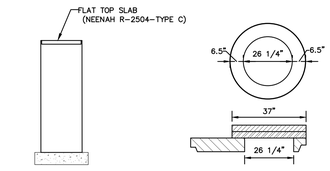
## 4' DIAMETER CURB INLET
N.T.S.



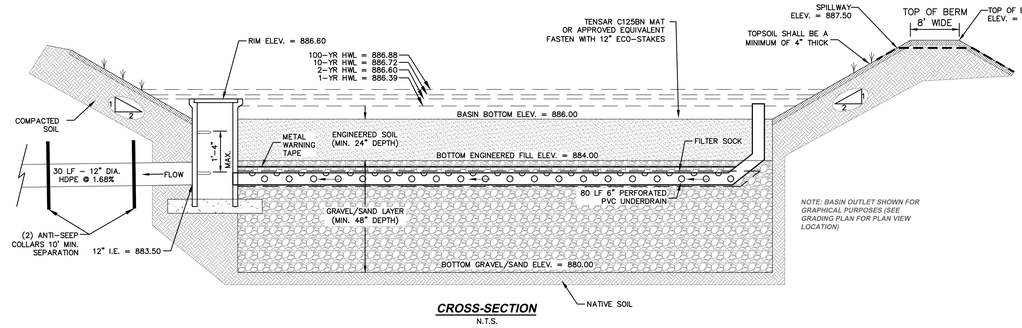

## PROFILE
N.T.S.



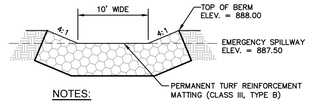

## GUM RUBBER ANTI-SEEP COLLAR
N.T.S.




## OUTLET STRUCTURE DETAIL
N.T.S.




## CROSS-SECTION
N.T.S.




NOTES:

1. EXTEND MATTING TO TOE OF SLOPE ON THE INSIDE AND OUTSIDE OF THE BASIN.
2. MATTING SHALL BE INSTALLED IN ACCORDANCE WITH WDNR TECH STANDARD 1052 AND MANUFACTURER'S GUIDELINES.

## EMERGENCY SPILLWAY DETAIL
N.T.S.

## BIOFILTRATION BASIN
N.T.S.

GENERAL NOTES:

1. ALL CONSTRUCTION PRACTICES SHALL MEET THE SPECIFICATIONS OF THE WDNR TECHNICAL STANDARD 1004 – BIORETENTION FOR INFILTRATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN A COPY OF THIS STANDARD AND CONSTRUCT THE BIO-FILTRATION DEVICE IN ACCORDANCE WITH THE REQUIREMENTS OUTLINED THEREIN.
2. CONTRACTOR SHALL INSTALL 18" OF ENGINEERED SOIL CONSISTING OF: 85% ASTM C33 SAND, 15% CERTIFIED COMPOST (SEE GENERAL NOTE 3).
3. CERTIFIED COMPOST SHALL CONSIST OF: >40% ORGANIC MATTER, <60% ASH CONTENT, pH OF 6-8, AND MOISTURE CONTENT OF 35-50% BY WEIGHT.
4. CONTRACTOR SHALL INSTALL 48" OF SAND/GRAVEL STORAGE LAYER SHALL CONSIST OF SAND OR GRAVEL MATERIAL MEETING THE SPECIFICATIONS IN SECTION V.B.7 OF WDNR TECHNICAL STANDARD 1004.
5. CONFIRM WITH GEOTECHNICAL ENGINEER THAT THE SILT LOAM SOIL PROFILE HAS BEEN REACHED PRIOR TO BACKFILLING THE BIO-FILTRATION BASIN.
6. IF ADDITIONAL EXCAVATION IS REQUIRED BELOW THE SAND SOIL PROFILE TO REACH THE LISTED NATIVE SOIL LAYER, THE BACKFILL USED TO RETURN THE BOTTOM OF THE BIO-FILTRATION SYSTEM TO THE BOTTOM OF THE SAND LAYER ELEVATION MUST HAVE AN EQUAL OR HIGHER INFILTRATION RATE THAN THE LISTED NATIVE SOIL LAYER AS CONFIRMED BY A GEOTECHNICAL ENGINEER.
7. FILTER FABRIC SHALL BE PLACED ABOVE AND ON THE SIDES OF THE PERFORATED PIPE, BETWEEN THE PEA GRAVEL AND THE ENGINEERED SOIL, A WIDTH OF 4 FEET CENTERED OVER THE FLOW LINE OF THE PIPE.
8. NO MOW FESCUE WITH ANNUAL RYE FROM PRAIRIE NURSERY COMPANY, OR EQUIVALENT, INSTALLED PER MANUFACTURER'S SPECIFICATIONS, IN THE AREAS SURROUNDING THE BASIN, ON SIDE SLOPES, AND OVER ANY LAND THAT DISCHARGES INTO THE BASIN FOR EROSION CONTROL WHEN BASIN IS BROUGHT ON-LINE. ROOTSTOP AND PLUGS ARE REQUIRED TO ESTABLISH VEGETATION AT THE INVERT OF THE BASIN. SEE PLANT LIST FOR PLUGS.
9. RUNOFF MUST INFILTRATE WITHIN 24-HOURS. BASINS UNABLE TO MAINTAIN THESE RATES MUST BE DEEP TILLED, REGRADED, AND IF NECESSARY REPLANTED TO RESTORE ORIGINAL INFILTRATION RATES.
10. ALL WORK TO BE CONDUCTED IN CONFORMANCE WITH APPLICABLE LOCAL, REGIONAL, AND STATE STORMWATER STANDARDS FOR THE PROJECT SITE AS APPROVED BY THE REGULATORY ENGINEER.
11. THE PLACING, CONSTRUCTION AND COMPOSITION OF THE TURF REINFORCEMENT MATTING, CLASS III, TYPE B SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 628 OF THE STATE OF WISCONSIN STANDARD SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION, CURRENT EDITION. HEREAFTER, THIS PUBLICATION WILL BE REFERRED TO AS STATE HIGHWAY SPECIFICATIONS.
12. EROSION MATTING IS REQUIRED ON ALL SIDE SLOPES.

NOTE:

INFILTRATION DEVICES ARE DESIGNED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES (WDNR), COUNTY, MUNICIPALITY, AND ENGINEERING STANDARD OF CARE. ALL DESIGNATED INFILTRATION AREAS (e.g. RAIN GARDENS, INFILTRATION BASINS, BIORETENTION DEVICES) SHALL BE FENCED PRIOR TO CONSTRUCTION AND REMAIN UNDISTURBED AND PROTECTED DURING THE CONSTRUCTION OF PROPOSED SITE IMPROVEMENTS. PROPOSED BIO-FILTRATION DEVICES SHALL NOT BE CONSTRUCTED UNTIL THE DEVICE'S CONTRIBUTING WATERSHED AREA MEETS ESTABLISHED VEGETATION REQUIREMENTS SET FORTH WITHIN THE RESPECTIVE WDNR TECHNICAL STANDARDS. IF THE LOCATION OF THE INFILTRATION AREA CONFLICTS WITH CONSTRUCTION STAGING AND/OR CONSTRUCTION TRAFFIC AND IS DISTURBED, COMPACTION MITIGATION WILL BE REQUIRED AT THE CONTRACTOR'S EXPENSE.

THE CONTRACTOR IS REQUIRED TO PROVIDE QUALIFIED STAFF FOR INSPECTION AND OBSERVATION OF THE CONSTRUCTION ACTIVITIES RELATING TO ALL JOB SITE REGULATORY COMPLIANCE INCLUDING THE PROTECTION AND CONSTRUCTION OF ALL STORMWATER MANAGEMENT FEATURES. ANY OBSERVATION OF PLAN OR SITE DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER OF RECORD PRIOR TO CONSTRUCTION.


BRIOHN DESIGN GROUP
3885 N BROOKFIELD ROAD, SUITE 200
BROOKFIELD WISCONSIN 53045-1950
(262) 790-0500 PHONE
(262) 790-0505 FAX


DETAILS

SHEET TITLE

WISCONSIN
RIZAL W. ISKANDARSJACH
E-41735
MILWAUKEE, WI
PROFESSIONAL ENGINEER
1/10/23

PROPOSED:
JILLY'S CAR WASH
2301 W. BLUEMOUND RD.
CITY OF WAUKESHA, WI

REVISION #1: CITY SP&R COMMENTS 2023-01-10

| | |
|---|---|
| JOB: | 3461 |
| DRAWN: | CAP |
| CHECKED: | RWI |
| DATE: | 12-16-2022 |
| SHEET: | C6.1 |


JSD
MILWAUKEE REGIONAL OFFICE
W238 N1610 BUSSE ROAD, SUITE 100
WAUKESHA, WISCONSIN 53188
P. 262.513.0666
JSD PROJ. NO.: 22-11993
JSD PROJ. MGR.: RWI

# RATIONAL METHOD STORM SEWER CALCULATIONS

Project Name: **JILLY'S CAR WASH**

Project Location: Waukesha N, WI
JSD Project Number: 22-11993

Performed by: APM
Date: 12/14/2022

*MILWAUKEE REGIONAL OFFICE*
*W238 N1610 Busse Road, Suite 100*
*Waukesha, Wisconsin 53188*
*Ph: (262) 513-0666 Fax: (262) 513-1232*

**Structure abbreviations are as follows: ES - End Section, MH - Manhole, FI - Field Inlet, TD - Trench Drain, BC - Building Connection, RD - Roof Drain, STB - Stub**

| PIPE LOCATION | | STRUCTURE CONTRIBUTING AREA | | | | | PIPE FLOW | | | | PIPE DATA | | | | PIPE CAPACITY INFORMATION | | | | | | | DROP | ELEVATIONS | | | COVER TO CROWN (FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | ACTUAL FLOW | | | | | | | | | | | |
| UP STRUCT | DOWN STRUCT | ROOF C = 0.95 (SQ FT) | PAVED C = 0.95 (SQ FT) | GRASS C = 0.20 (SQ FT) | INDIVID AREA (ACRES) | INDIV COMP C VALUE (UNITLESS) | STORM EVENT 2,5,10,25,50,100 | INTENSITY I (IN/HR) | INDIV RUNOFF (CFS) | TOTAL FLOW (CFS) | LENGTH (FT) | DIA. (IN) | SLOPE (FT/FT) | Manning's n RCP=0.013 HDPE=0.012 PVC=0.011 | REQD DROP | ACTUAL DROP | PARTS FULL | VEL (FPS) | FULL FLOW (CFS) | TIME TO STRUCT. (MIN) | TIME IN SEWER (MIN) | THRU STRUCT (FT) | RIM/(F/L) UP | INVERT UP | INVERT DOWN | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **STM 23** | **STM 22** | 4,150 | 4,115 | 0 | 0.19 | 0.95 | 10 | 6.27 | 1.13 | 1.13 | **46.9** | **12** | **0.0035** | **0.012** | 0.04 | 0.16 | 0.50 | 2.91 | 2.28 | 5.00 | 5.27 | 0.00 | **890.20** | **887.55** | **887.39** | 1.55 |
| **STM 22** | **STM 21** | 0 | 2,255 | 0 | 0.05 | 0.95 | 10 | 6.20 | 0.30 | 1.44 | **48.7** | **12** | **0.0035** | **0.012** | 0.07 | 0.17 | 0.60 | 3.08 | 2.28 | 5.27 | 5.53 | 0.00 | **890.20** | **887.39** | **887.22** | 1.71 |
| **STM 21** | **STM 20** | 0 | 480 | 20 | 0.01 | 0.92 | 10 | 6.13 | 0.06 | 1.50 | **62.1** | **12** | **0.0035** | **0.012** | 0.09 | 0.22 | 0.63 | 3.12 | 2.28 | 5.53 | 5.86 | 0.00 | **890.30** | **887.22** | **887.00** | 1.98 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **STM 11B** | **STM 11A** | 0 | 5,465 | 1,655 | 0.16 | 0.78 | 10 | 6.27 | 0.80 | 0.80 | **69.3** | **12** | **0.0035** | **0.012** | 0.03 | 0.24 | 0.40 | 2.69 | 2.28 | 5.00 | 5.43 | 0.00 | **888.45** | **885.54** | **885.30** | 1.81 |
| **STM 11A** | **STM 11** | 0 | 990 | 295 | 0.03 | 0.78 | 10 | 6.16 | 0.14 | 0.94 | **31.1** | **12** | **0.0035** | **0.012** | 0.02 | 0.11 | 0.45 | 2.80 | 2.28 | 5.43 | 5.61 | 0.00 | **889.25** | **885.30** | **885.19** | 2.85 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **STM 13** | **STM 12** | 0 | 2,310 | 0 | 0.05 | 0.95 | 10 | 6.27 | 0.32 | 0.32 | **69.6** | **12** | **0.0035** | **0.012** | 0.00 | 0.24 | 0.21 | 2.08 | 2.28 | 5.00 | 5.56 | 0.00 | **890.35** | **885.73** | **885.48** | 3.52 |
| **STM 12** | **STM 11** | 0 | 6,155 | 265 | 0.15 | 0.92 | 10 | 6.27 | 0.85 | 1.17 | **84.1** | **12** | **0.0035** | **0.012** | 0.08 | 0.29 | 0.53 | 2.96 | 2.28 | 5.00 | 5.47 | 0.00 | **889.20** | **885.48** | **885.19** | 2.62 |
| **STM 11** | **STM 10** | 0 | 3,425 | 535 | 0.09 | 0.85 | 10 | 6.14 | 0.47 | 2.58 | **36.5** | **12** | **0.0052** | **0.012** | 0.16 | 0.19 | 0.82 | 4.02 | 2.78 | 5.47 | 5.63 | 0.00 | **889.15** | **885.19** | **885.00** | 2.86 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |

# Anti-Seep Collar Design

Project: **JILLY'S CAR WASH**
Project Location: Waukesha, WI
JSD Project # : 22-11993

Performed By: JJS Date: 12/15/2022

**MILWAUKEE REGIONAL OFFICE**
W238 N1610 Busse Rd., Suite 100
Waukesha, Wisconsin 53188
Ph: (262) 513-0666 Fax: (262) 513-1232

## BIOFILTRATION BASIN

| | | |
|---|---|---|
| **Discharge Pipe Diameter =** | 1 | ft |
| **Discharge Pipe Slope =** | 0.0168 | ft/ft |
| **100yr Pond Water Surface Elev. =** | 886.88 | |
| **Pond Discharge Pipe Elev. =** | 883.50 | |
| **Embankment Side Slope (H:1) =** | 2.00 | |

Notes:

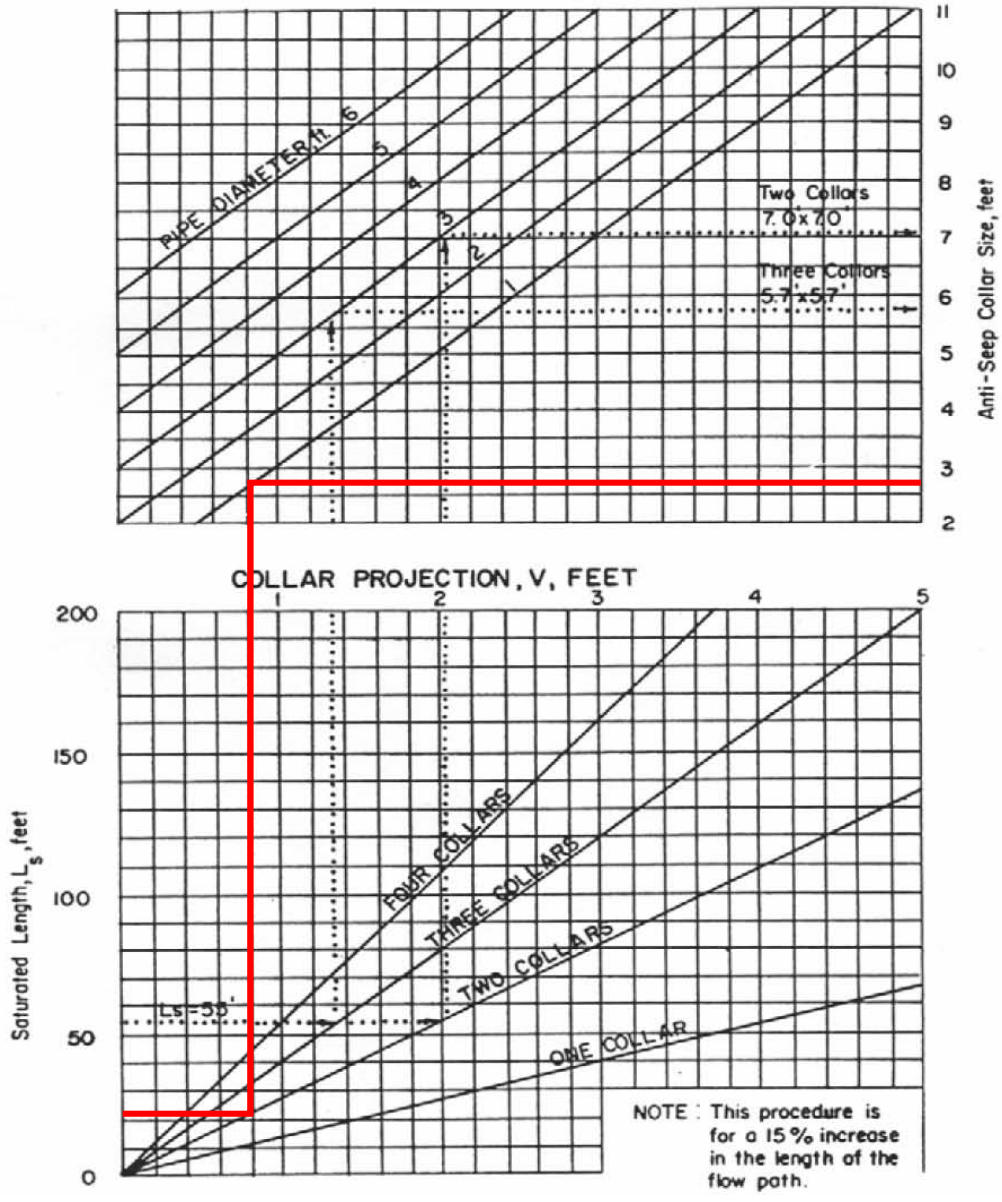
$Ls$ - Length of Discharge Pipe in Saturated Zone
$y$ - Headwater Acting on Discharge Pipe
$z$ - Embankment Side Slope

$$Ls = y(z+4)\left[1+\frac{PipeSlope}{0.25-PipeSlope}\right]$$

$$Ls = (886.88 - 883.50)\ (2.00 + 4)\left|1 + \frac{0.0168}{(0.25 - 0.1680)}\right|$$

$Ls$ = **21.74 ft**

**Figure 5A.31(2)**
**Anti-Seep Collar Design Charts** (USDA - NRCS)



# APPENDIX 6

## Storm Water Maintenance Agreement

Document Number

# Storm Water Management Practice Maintenance Agreement

**Dominic J & Elayne M Albanese Living Trust,** as "Owner" of the property described below, in accordance with Chapter 32 City of Waukesha Storm Water Management and Erosion Control, agrees to install and maintain storm water management practice(s) on the subject property in accordance with approved plans and Storm Water Management Plan conditions. The owner further agrees to the terms stated in this document to ensure that the storm water management practice(s) continues serving the intended functions in perpetuity. This Agreement includes the following exhibits:

**Exhibit A:** Legal Description of the real estate for which this Agreement applies ("Property").
**Exhibit B:** Location Map(s) – shows an accurate location of each storm water management practice affected by this Agreement.
**Exhibit C:** Maintenance Plan – prescribes those activities that must be carried out to maintain compliance with this Agreement.

Note: After construction verification has been accepted by the City of Waukesha, for all planned storm water management practices, an addendum(s) to this agreement shall be recorded by the Owner showing design and construction details. The addendum(s) may contain several additional exhibits, including certification by City of Waukesha of Storm Water and Erosion Control Permit termination, as described below.

Name and Return Address

City of Waukesha
201 Delafield Street
Waukesha, WI 53188

WAKC 097-4992, WAKC 097-4993,
WAKC 097-4994
Parcel Identification Number(s) – (PIN)

Through this Agreement, the Owner hereby subjects the Property to the following covenants, conditions and restrictions:

1. The Owner shall be responsible for the routine and extraordinary maintenance and repair of the storm water management practice(s) and drainage easements identified in Exhibit B until Storm Water and Erosion Control Permit termination by the City of Waukesha in accordance with Chapter 32 of the City Code of Ordinances.
2. After Storm Water and Erosion Control Permit termination under 1., the current Owner(s) shall be solely responsible for maintenance and repair of the storm water management practices and drainage easements in accordance with the maintenance plan contained in Exhibit C.
3. The Owner(s) shall, at their own cost, complete inspections of the storm water management practices at the time intervals listed in Exhibit C, and conduct the inspections by a qualified professional, file the reports with the City of Waukesha after each inspection and complete any maintenance or repair work recommended in the report. The Owner(s) shall be liable for the failure to undertake any maintenance or repairs. After the work is completed by the Contractor, the qualified professional shall verify that the work was properly completed and submit the follow-up report to the City within 30 days.
4. In addition, and independent of the requirements under paragraph 3 above, the City of Waukesha, or its designee, is authorized to access the property as necessary to conduct inspections of the storm water management practices or drainage easements to ascertain compliance with the intent of this Agreement and the activities prescribed in Exhibit C. The City of Waukesha may require work to be done which differs from the report described in paragraph 3 above, if the City of Waukesha reasonably concludes that such work is necessary and consistent with the intent of this agreement. Upon notification by the City of Waukesha of required maintenance or repairs, the Owner(s) shall complete the specified maintenance or repairs within a reasonable time frame determined by the City of Waukesha.
5. If the Owner(s) do not complete an inspection under 3. above or required maintenance or repairs under 4. above within the specified time period, the City of Waukesha is authorized, but not required, to perform the specified inspections, maintenance or repairs. In the case of an emergency situation, as determined by the City of Waukesha, no notice shall be required prior to the City of Waukesha performing emergency maintenance or repairs. The City of Waukesha may levy the costs and expenses of such inspections, maintenance or repair related actions as a special charge against the Property and collected as such in accordance with the procedures under s. 66.0627 Wis. Stats. or subch. VII of ch. 66 Wis. Stats.

6. This Agreement shall run with the Property and be binding upon all heirs, successors and assigns. After the Owner records the addendum noted above, the City of Waukesha shall have the sole authority to modify this agreement upon a 30-day notice to the current Owner(s).

Dated this ___ day of _____, 20___.

**Owner:**
**Dominic J & Elayne M Albanese Living Trust**

_____ (sign)

_____ (print)

_____ (title)

## Acknowledgements

State of Wisconsin:
County of Waukesha

Personally came before me this ____ day of _____, 20___, the above named _____ to me known to be the person who executed the foregoing instrument and acknowledged the same.

_____ (sign)
_____ (print)
Notary Public, Waukesha County, WI
My commission expires:_____.

**This document was drafted by:**

**JSD Professional Services, Inc**
**W238N1610 Busse Rd., Suite 100**
**Waukesha WI, 53188**

*For Certification Stamp*

City of Waukesha Common Council Approval

Dated this ___ day of _____, 20___.

_____
Shawn N. Reilly, Mayor

_____
Gina Kozlik, City Clerk

## Acknowledgements

State of Wisconsin:
County of Waukesha

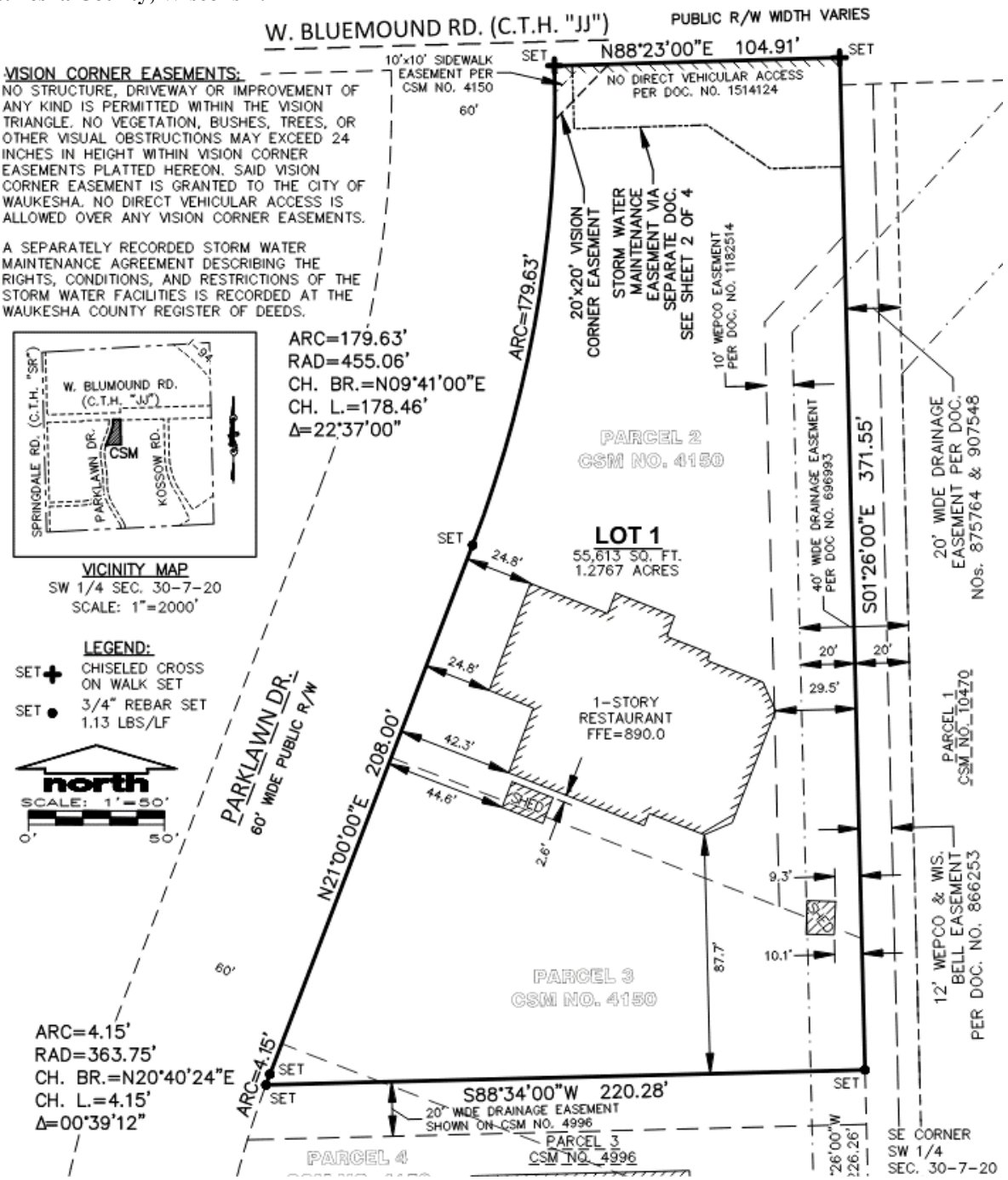
Personally came before me this ____ day of _____, 20__, the above named _____ to me known to be the person who executed the foregoing instrument and acknowledged the same.

_____ (sign)
_____ (print)
Notary Public, Waukesha County, WI
My commission expires:_____.

# Exhibit A – Legal Description

The following description and reduced copy map identifies the land parcel(s) affected by this Agreement. For a larger scale view of the referenced document, contact the Waukesha County Register of Deeds office.

Project Identifier: **Jilly's Car Wash** Acres**: 1.28**
Date of Recording: _____
Map Produced By: **JSD Professional Services, W238N1610 Busse Road, Ste 100, Waukesha, WI**
Legal Description: **Certified Survey Map No. _____, recorded in Waukesha County Register of Deeds Office on _____ day of _____, 20___ as Document No. _____, being a redivision of all of parcel 2 and part of parcel 3 and 4 of Certified Survey Map No. 4150, located in the Southwest 1/4 and Northwest 1/4 of the Southwest 1/4 of Section 30, Township 7 North, Range 20 East, City of Waukesha, Waukesha County, Wisconsin.**

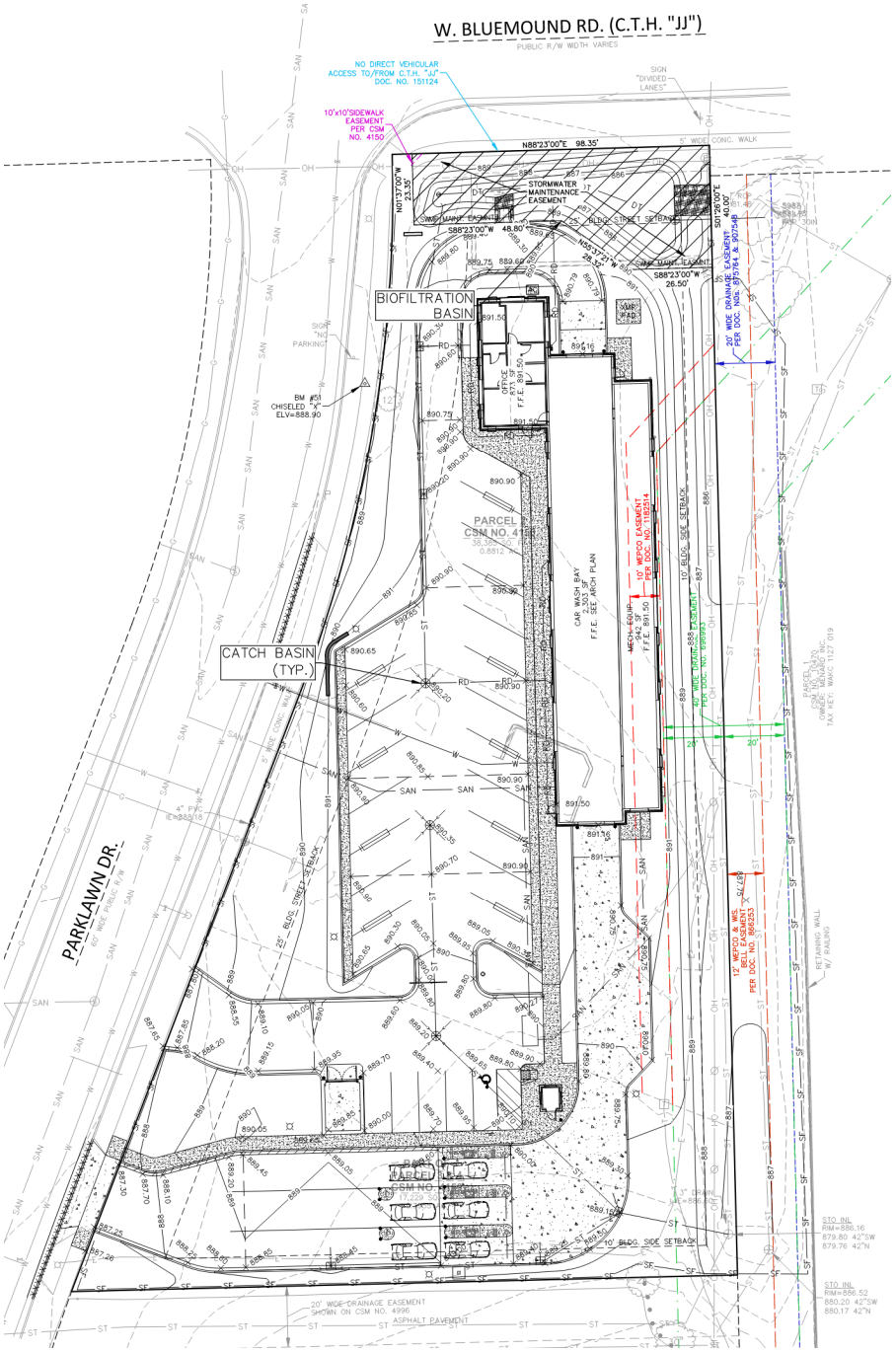


# Exhibit B - Location Map
## Storm Water Management Practices Covered by this Agreement

The storm water management practices covered by this Agreement are depicted in the reduced copy of a portion of the construction plans, as shown below. The practices include catch basin, a biofiltration basin and all associated pipes, spillways, earthen berms and other components of these practices. All of the noted storm water management practices are located within Lot 1 of CSM _____ as noted in Exhibit A.

Development Name: **Jilly's Car Wash**
Storm water Practices: **Catch Basins and Biofiltration Basin**
Location of Practices: **Lot 1 of CSM_____:**

## Figure 1
Plan View of Storm Water Practices



# Exhibit C
# Storm Water Practice Maintenance Plan

This exhibit explains the basic function of each of the storm water practices listed in Exhibit B and prescribes the minimum maintenance requirements to remain compliant with this Agreement. The maintenance activities listed below are aimed to ensure these practices continue serving their intended functions in perpetuity. The list of activities is not all inclusive, but rather indicates the minimum type of maintenance that can be expected for this particular site. Any failure of a storm water practice that is caused by a lack of maintenance will subject the Owner(s) to enforcement of the provisions listed on page 1 of this Agreement by the City of Waukesha.

***System Description***:
The biofiltration basin and catch basins are designed to trap 40% of sediment in runoff and maintain pre-development downstream peak flows. The biofiltration basin and catch basins will trap finer suspended sediment. To do this, the basin footprint, engineered soil mix, and outlet structure must be maintained as specified in this Agreement (see Figures 1 and 2).

The biofiltration basin receives runoff from a 0.38-acre drainage area. During high rainfall or snow melt events, water will temporarily rise before infiltrating into the soil and flowing through the top of the outlet control structure. Outflow from the basin is controlled by a 6-inch draintile within the sand storage layer and a 24-inch diameter standpipe at the east end of the basin (see Figure 1). "As-built" construction drawings of the basin, showing actual dimensions, elevations, outlet structures, etc. will be recorded as an addendum(s) to this agreement within 60 days after City of Waukesha accepts verification of construction from the project engineer.

***Minimum Maintenance Requirements***:
To ensure the proper long-term function of the storm water management practices described above, the following activities must be completed:

1. Outlet pipes must be checked monthly to ensure there is no blockage from debris or ice. Any blockage must be removed immediately.
2. Grass swales, inlets and outlets must be checked after heavy rains (minimum of annually) for signs of erosion. Any eroding areas must be repaired immediately to prevent premature sediment build-up in the downstream storm sewer system or basin. Erosion matting is recommended for repairing grassed areas.
3. No trees are to be planted or allowed to grow on the earthen berms. Tree root systems can reduce soil compaction and cause berm failure. The berms must be inspected annually and any woody vegetation removed.
4. Invasive plant and animal species shall be managed in compliance with Wisconsin Administrative Code Chapter NR 40. This may require eradication of invasive species in some cases.
5. No grading or filling of the basin or berm other than for sediment removal is allowed, unless otherwise approved by the City of Waukesha.
6. Any other repair or maintenance needed to ensure the continued function of the storm water practices or as ordered by the City of Waukesha under the provisions listed on page 1 of this Agreement.
7. The titleholder(s) or their designee must document all inspections as specified above. Documentation shall include as a minimum: (a) Inspectors Name, Address and Telephone Number, (b) Date of Inspections, (c) Condition Report of the Storm Water Management Practice, (d) Corrective Actions to be Taken and Time Frame for Completion, (e) Follow-up Documentation after Completion of the Maintenance Activities. All documentation is to be delivered to the attention of the City Engineer at the City of Waukesha Engineering Department on January 10th and July 10th each year.

# Addendum 1
# Storm Water Management Practice Maintenance Agreement

Document number

The purpose of this addendum is to record verified "as-built" construction details, supporting design data and permit termination documentation for the storm water management practice(s) located on Lot 1 of Certified Survey Map No. _____, recorded in Waukesha County Register of Deeds Office on _____ day of _____, 20___ as Document No. _____, being a redivision of all of parcel 2 and part of parcel 3 and 4 of Certified Survey Map No. 4150, located in the Southwest 1/4 and Northwest 1/4 of the Southwest 1/4 of Section 30, Township 7 North, Range 20 East, City of Waukesha, Waukesha County, Wisconsin. This document shall serve as an addendum to document # _____, herein referred to as the "Maintenance Agreement". This addendum includes all of the following exhibits:

**Exhibit D:** Design Summary – contains a summary of key engineering calculations and other data used to design the wet detention basin.
**Exhibit E:** As-built Survey – shows detailed "as-built" cross-section and plan view of the wet detention basin.
**Exhibit F**: Engineering/Construction Verification – provides verification from the project engineer that the design and construction of the wet detention basin complies with all applicable technical standards and Waukesha County ordinance requirements.
**Exhibit G:** Storm Water Management & Erosion Control Permit Termination – provides certification by the City of Waukesha that the Storm Water and Erosion Control Permit for the above noted site has been terminated.

Name and Return Address

City of Waukesha
201 Delafield Street
Waukesha, WI 53188

WAKC 097-4992, WAKC 097-4993,
WAKC 097-4994
Parcel Identification Number(s) – (PIN)

Dated this ___ day of _____, 201_.

**Owner:**

_____
(sign)

_____
(typed)

## Acknowledgements

State of Wisconsin County of Waukesha

Personally came before me this ____ day of _____, 20__, the above named _____ to me known to be the person who executed the foregoing instrument and acknowledged the same.

_____.
Notary Public, Waukesha County, WI
My commission expires:_____.

**This document was drafted by:**

**JSD Professional Services, Inc**
**W238N1610 Busse Rd., Suite 100**
**Waukesha WI, 53188**

# Exhibit D
# Design Summaries for Wet Detention Basin

**Project Identifier:** Jilly's Car Wash **Project Size:** 1.28 Acres **No. of Lots:** 1
**Number of Runoff Discharge Points**: 3 **Watershed (ultimate discharge)**: Poplar Creek
**Watershed Area**: 1.28 acres

**Watershed Data Summary**. The following table summarizes the watershed data used to determine peak flows and runoff volumes required to design wet detention basin

| Summary Data Elements | Subwatershed A | | Subwatershed B | | Subwatershed C | |
|---|---|---|---|---|---|---|
| | **Pre-develop** | **Post-develop** | **Pre-develop** | **Post-develop** | **Pre-develop** | **Post-develop** |
| **Watershed Areas** ***(in acres) (see attached map)*** | 0.672 acres | 0.378 acres | 0.287 acres | 0.241 acres | 0.318 acres | 0.657 acres |
| **Average Watershed Slopes (%)** | 3% | 1.5%-2.2 % | 2.5% | 5.5% | 3.4% | 1.6%-2.2% |
| **Land Uses** ***(% of each) (see attached map)*** | 76% Paved<br>9% Roof<br>15% Grass | 51% Paved<br>28% Roof<br>21% Grass | 79% Paved<br>8% Roof<br>13% Grass | 26% Paved<br>74% Grass | 66% Paved<br>22% Roof<br>12% Grass | 56% Paved<br>6% Roof<br>38% Grass |
| **Runoff Curve Numbers** | 92 | 90 | 93 | 70 | 94 | 84 |
| **Conveyance Systems Types** | Sheet flow | Sheet flow, Storm sewer | Sheet flow | Sheet flow | Sheet flow | Sheet flow, Storm sewer |
| **Summary of Average Conveyance System Data** | 3% grade | 2% sheet flow, 0.35% sewer | 2.5% grade | 5.5% | 3.4% grade | 2% sheet flow, 0.35% sewer |
| **Time of Concentration** ***(Tc) (see attached map & worksheets)*** | 6.0 min. | 6.0 min. | 6.0 min. | 6.0 min. | 6.0 min. | 6.0 min. |
| **25% of 2-yr 24-hr post-dev runoff volume** | N/A | 0.01 ac. ft. | N/A | 0.00 ac. ft. | N/A | 0.02 ac. ft. |
| **1-year/24 hour Runoff Volume** | 0.09 ac. ft. | 0.05 ac. ft. | 0.04 ac. ft. | 0.01 ac. ft. | 0.05 ac. ft. | 0.06 ac. ft. |
| **2-yr./24 hour Peak Flow** | 2.26 cfs | 1.18 cfs | 1.00 cfs | 0.23 cfs | 1.15 cfs | 1.56 cfs |
| **10-yr./24 hour Peak Flow** | 3.44 cfs | 1.84 cfs | 1.50 cfs | 0.53 cfs | 1.70 cfs | 2.67 cfs |
| **100-yr./24 hour Peak Flow** | 5.92 cfs | 3.25 cfs | 2.56 cfs | 1.33 cfs | 2.86 cfs | 5.12 cfs |

# Exhibit D (continued)

**Practice Design Summary**. The following table summarizes the data used to design the biofiltration basin.

| Design Element | Design Data |
|---|---|
| **Site assessment data: (see attached maps)** | |
| Contributing drainage area to basin | 0.378 acres |
| Distance to nearest private well (including off-site wells) | > 100 feet |
| Distance to municipal well (including off-site wells) | > 1200 feet |
| Wellhead protection area involved? | No |
| Ground slope at site of proposed basin | 0% |
| Any buried or overhead utilities in the area? | Overhead nearby |
| Proposed outfall conveyance system/discharge (w/ distances) | 30 ft. – 12" HDPE |
| Any downstream roads or other structures? (describe) | Yes – 30" RCP end section |
| Floodplain, shoreland or wetlands? | No |
| **Soil investigation data (see attached map & soil logs):** | |
| Number of soil investigations completed | 0 |
| Do elevations of test holes extend 3 ft. below proposed bottom? | N/A |
| Average soil texture at pond bottom elevation (USDA) | Silt loam |
| Distance from basin bottom to bedrock | > 5 feet |
| Distance from basin bottom to seasonal water table | > 5 feet |
| **General basin design data (see attached detailed drawings):** | |
| Basin surface area | 672 square feet |
| Design basin surface elevation | elev. 886.0 |
| Top of berm elevation (after settling) and width | elev. 888.0 / 5 feet wide |
| Length/width (dimensions/ratio) | 60 ft. (L) x 25 ft. (W) = 2.4:1 |
| Safety shelf design (length, grade, max. depth) | N/A |
| Ave. water depth (minus safety shelf/sediment) | N/A |
| Sediment forebay size & depth | N/A |
| Sediment storage depth & design maintenance | N/A |

**Design Basin Inflow, Outflow & Storage Data**
**(see attached hydrographs and detail drawings)**

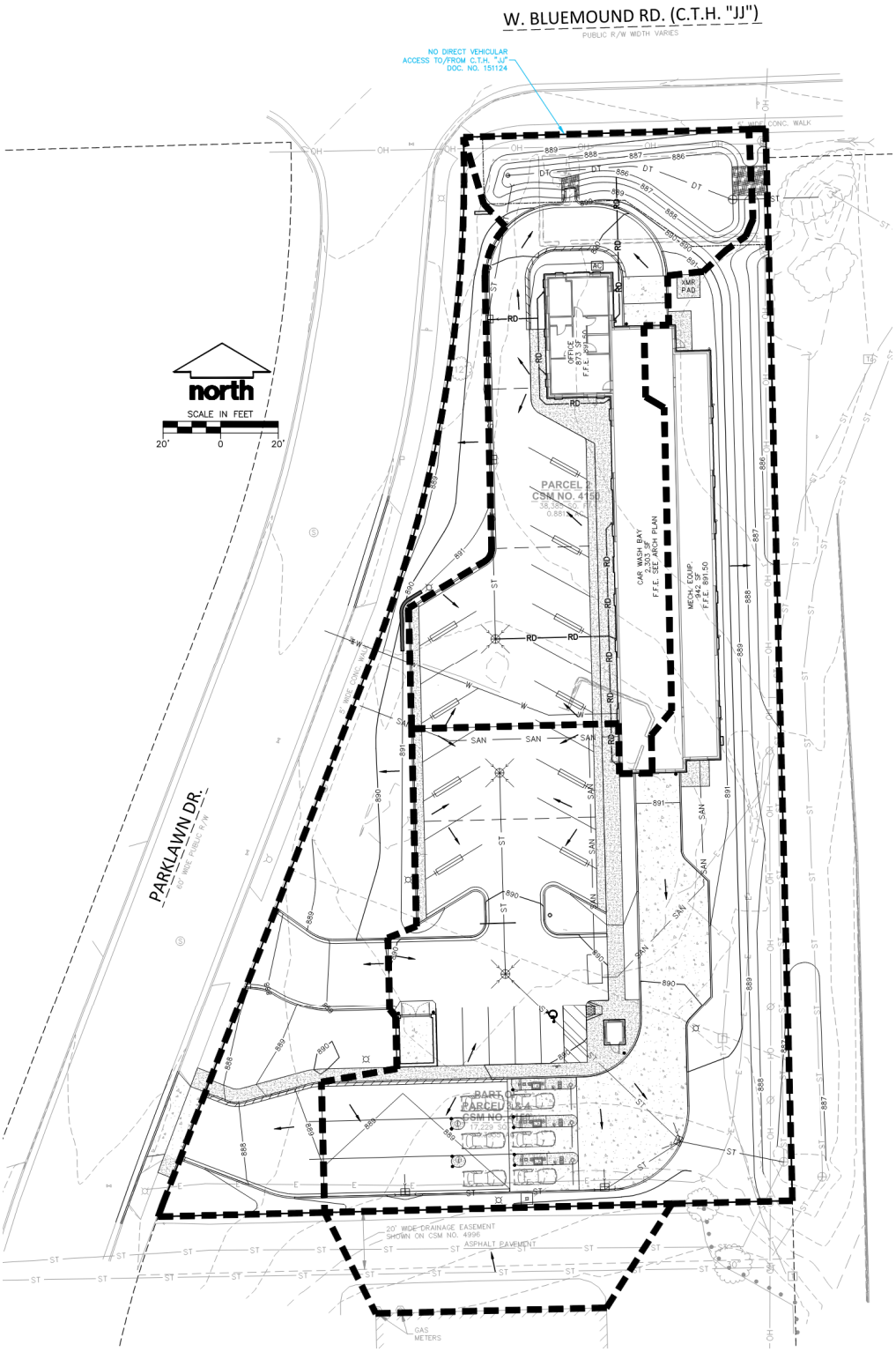
| Inflow Peak/Volume | Maximum Outflow Rate | Max. Water Elevation | Storage Volume at Max. Elev. (above perm. pool) | Outflow Control Structures* |
|---|---|---|---|---|
| 1-yr./24 hr. (volume) | 0.01 cfs | 886.39 ft. | 0.04 acre feet | #1 |
| (Post 2-yr./24 hr. peak) | 0.03 cfs | 886.60 ft. | 0.04 acre feet | #1 and #2 |
| (Post 10-yr./24 hr. peak) | 0.88 cfs | 886.72 ft. | 0.04 acre feet | #1 and #2 |
| (Post 100-yr./24 hr. peak) | 3.15 cfs | 886.88 ft. | 0.05 acre feet | #1 and #2 |

* #1 = 6 inch PVC draintile @ 883.50
#2 = 24 inch diameter horizontal orifice @ 886.60

# Exhibit D (continued)

**Watershed Map**. The watershed map shown below was used to determine the post-development data contained in this exhibit. The total post-developed watershed areas are the same as the total pre-development watershed areas for this project.

**Figure 1**

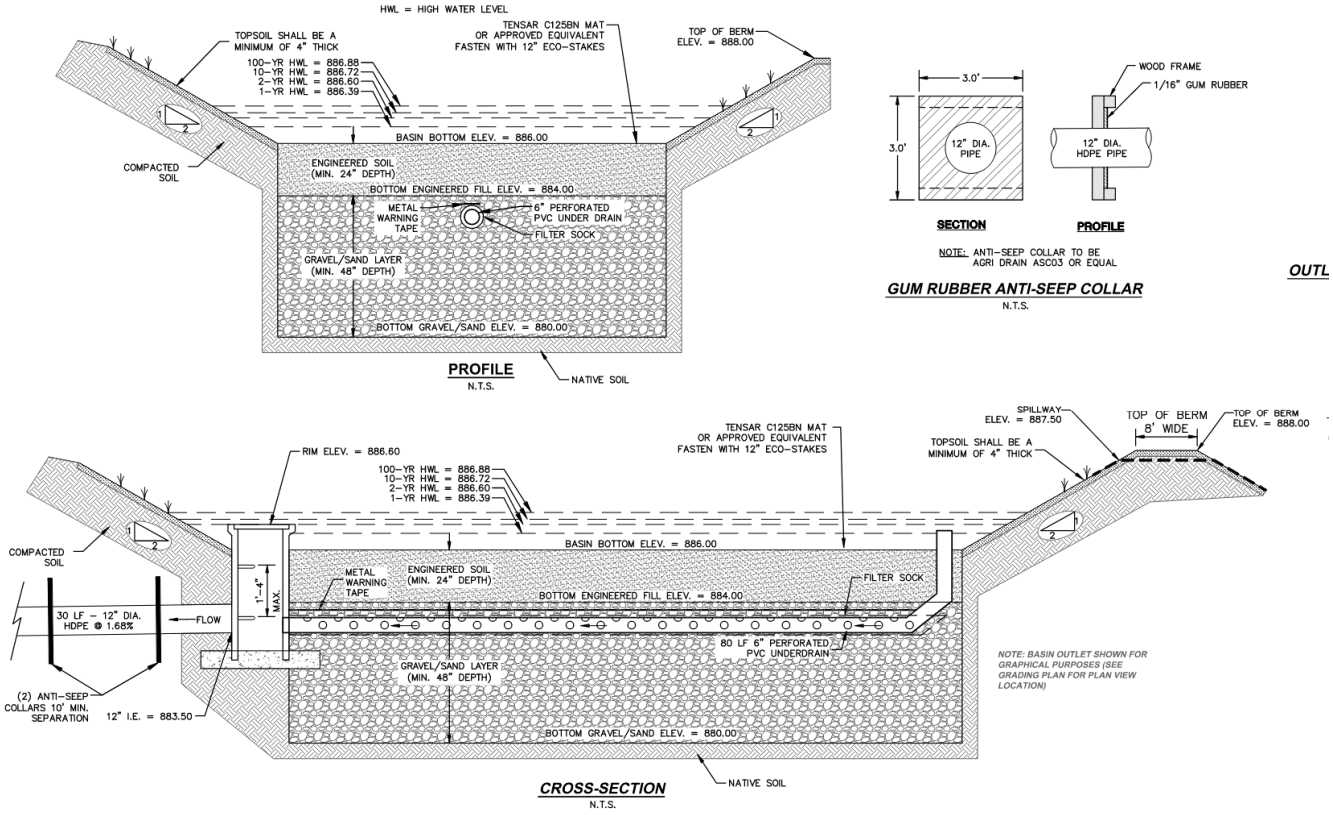


# Exhibit E
# As-built Survey for Biofiltration Basin

The biofiltration basin depicted in Figure 1 is a reduced copy of the as-built plan.

Project Identifier**:** **Jilly's Car Wash**
Storm water Practice**:** **Biofiltration Basin**
Location of Practice**:** **Lot 1 of CSM _____:**
Owners of Outlot 1: **Dominic J & Elayne M Albanese Living Trust**

## Figure 2


HWL = HIGH WATER LEVEL
TOPSOIL SHALL BE A MINIMUM OF 4" THICK
TENSAR C125BN MAT OR APPROVED EQUIVALENT FASTEN WITH 12" ECO-STAKES
TOP OF BERM ELEV. = 888.00
100-YR HWL = 886.88
10-YR HWL = 886.72
2-YR HWL = 886.60
1-YR HWL = 886.39
BASIN BOTTOM ELEV. = 886.00
COMPACTED SOIL
ENGINEERED SOIL (MIN. 24" DEPTH)
BOTTOM ENGINEERED FILL ELEV. = 884.00
METAL WARNING TAPE
6" PERFORATED PVC UNDER DRAIN
FILTER SOCK
GRAVEL/SAND LAYER (MIN. 48" DEPTH)
BOTTOM GRAVEL/SAND ELEV. = 880.00
NATIVE SOIL
PROFILE
N.T.S.
3.0'
12" DIA. PIPE
SECTION
WOOD FRAME
1/16" GUM RUBBER
12" DIA. HDPE PIPE
PROFILE
NOTE: ANTI-SEEP COLLAR TO BE AGRI DRAIN ASC03 OR EQUAL
GUM RUBBER ANTI-SEEP COLLAR
N.T.S.
OUTL
RIM ELEV. = 886.60
SPILLWAY ELEV. = 887.50
TOP OF BERM 8' WIDE
TOP OF BERM ELEV. = 888.00
TOPSOIL SHALL BE A MINIMUM OF 4" THICK
1'-4" MAX.
30 LF - 12" DIA. HDPE @ 1.68%
FLOW
(2) ANTI-SEEP COLLARS 10' MIN. SEPARATION
12" I.E. = 883.50
80 LF 6" PERFORATED PVC UNDERDRAIN
NOTE: BASIN OUTLET SHOWN FOR GRAPHICAL PURPOSES (SEE GRADING PLAN FOR PLAN VIEW LOCATION)
CROSS-SECTION
N.T.S.

# Exhibit "F"
# Engineering/Construction Verification

DATE: _____

TO: City of Waukesha

FROM: Rizal W. Iskandarsjach, P.E.
JSD Professional Services
W238N1610 Busse Rd., Suite 100
Waukesha, WI 53188

RE: Engineering/Construction Verification for the following project:

Project Name: Jilly's Car Wash

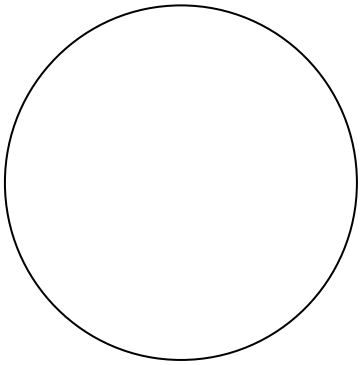
Section 30, City of Waukesha

Storm Water Management & Erosion Control Permit # _____

Storm Water Management Practices: Biofiltration basin and all associated pipes, catch basins, outlet structures, spillway, earthen berms and other components of these practices.

For the above-referenced project and storm water management practices, this correspondence shall serve as verification that: 1) all site inspections outlined in approved inspection plans have been successfully completed; and 2) the storm water management practice design data presented in Exhibit D, and the "as-built" construction documentation presented in Exhibit E comply with all applicable state and local technical standards, in accordance with the City of Waukesha Storm Water Management and Erosion Control Ordinance.

Any design or construction changes from the originally approved construction plans are documented in Exhibits D and E and have been approved by the City of Waukesha.



# Exhibit G
# Storm Water Management and Erosion Control Permit Termination

Project Identifier: Jilly's Car Wash

Location: Lot 1 of Certified Survey Map No. _____, being a redivision of all of parcel 2 and part of parcel 3 and 4 of Certified Survey Map No. 4150, located in the Southwest 1/4 and Northwest 1/4 of the Southwest 1/4 of Section 30, Township 7 North, Range 20 East, City of Waukesha, Waukesha County, Wisconsin.

Storm Water Management and Erosion Control Permit Holder's Name:

_____

Storm Water Management & Erosion Control Permit #: _____

Chapter 32 – City of Waukesha Storm Water Management and Erosion Control requires that all newly constructed storm water management practices be maintained by the Storm Water and Erosion Control Permit Holder until permit termination, after which maintenance responsibilities shall be transferred to the responsible party identified on the CSM and referenced in this Maintenance Agreement.

Upon execution below, this exhibit shall serve to certify that the Storm Water Permit Holder has satisfied all requirements of the Storm Water Management and Erosion Control Ordinance and that the City of Waukesha has terminated the Storm Water Management and Erosion Control Permit for the property covered by this Maintenance Agreement.

Dated this ___ day of _____, 20__.

City of Waukesha representative:

_____
(Signature)

_____

(Typed Name and Title)

## Acknowledgements

State of Wisconsin
County of Waukesha

Personally came before me this ____ day of _____, 20__, the above named ___ _____ ____ to me known to be the person who executed the foregoing instrument and acknowledged the same.

_____.
[Name]
Notary Public, Waukesha County, WI
My commission expires: _____