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# Mudslingers Drive-Thru Coffee

## STORMWATER MANAGEMENT REPORT

Town of Canandaigua, NY


**PREPARED FOR:**
Clay Van Doren
6000 Goff Road
Canandaigua, NY 14424

**PREPARED BY:**
Bergmann
280 East Broad Street, Suite 200
Rochester, NY 14604

March, 2018

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# Section 1

## GENERAL INFORMATION

### A. PROJECT DESCRIPTION

This Stormwater Management Report is for the proposed Mudslingers Drive-thru Coffee kiosk to be located at 3134 Townline Road (C.R. 10) in the Town of Canandaigua, NY. The project site is approximately 2.175 acres with a disturbed area of approximately 0.74 acres, bounded by Townline Road (C.R. 10) to the east and vacant commercial property to the south, west and north.

This proposed design will mitigate the increase in peak flow created by the proposed development. This is done by reducing the undetained drainage area and through peak flow attenuation. This approach will alleviate impacts to existing downstream structures and properties from the proposed site improvements.

### B. SOIL CLASSIFICATION

According to the Natural Resources Conservation Service website (NRCS), the majority of the onsite soil is classified as 126B (Palmyra gravelly loam) and 128B (Palmyra gravelly sandy loam. These soil types slope at approximately 3 to 8 percent. These soils are well drained.

# Section 2

## HYDROLOGY

### A. METHODOLOGY

Stormwater runoff rates discharged from the site under the existing conditions provide the basis on which to compare the impacts of the proposed site improvements. Analysis points are established where runoff exits the site to provide a fixed location at which existing and proposed stormwater quantities can be compared. The areas draining to each analysis point are delineated using topographic survey maps, grading plans and utility plans. HydroCAD 9.1 by HydroCAD Software Solutions LLC was used to model the existing and proposed condition. This program simulates the USDA Soil Conservations Service's TR-20 hydrologic model to analyze discharges from drainage areas and retention basins.

The parameters required to calculate stormwater runoff are area, curve number, and time of concentration. Each drainage area is evaluated using the guidelines described in USDA Soil Conservation Service's TR-55 to determine the curve number and time of concentration.

The runoff curve number (CN) is based on a weighted average of ground cover and soil type. The underlying soil types are described in county soil maps. Site and grading plans and survey maps outline existing and proposed ground cover. CN values for specific locations are determined from the tables presented in TR-55.

Time of concentration (Tc) represents the amount of time it takes for runoff to travel from the hydraulically most distant point of the watershed to the point of analysis. Surface roughness, slope, channel shape and flow patterns are the factors that affect the time of concentration. Stormwater runoff flows through the drainage area as sheet flow, shallow concentrated flow, open channel flow, or concentrated flow (such as in storm sewers). For this report sheet flow will become shallow concentrated flow after a maximum of 150 feet for the existing condition and 100 feet for the proposed condition. The sum of the travel times over the various

surfaces within the assumed flow path for a specific drainage area determines that area's time of concentration. The figures and formulas in TR-55 are employed to compute travel times for sheet flow and shallow concentrated flow. Manning's equation is used to determine flow velocities through pipes.

The stage-storage-discharge relationship for the proposed detention area is determined from topographical data and outlet structure characteristics. Discharge rates and storage volumes at various elevations (stage) are represented by this relationship. The pond storage capacity is calculated by determining the surface area at various elevations.

## B. EXISTING CONDITIONS

The existing drainage area, DR-1, comprises a total of 0.932 acres. The parcel to be developed consists of sparse grass with some brush and some trees. The site sheet flow drains to the south west towards an existing drainage swale along the northerly boundary of the existing commercial plaza to the south.

Table II

Existing Conditions Summary

| Drainage Area | Description | Size (ac) | Composite Cn | Tc (min) |
|---|---|---|---|---|
| Area DR-1 | Drainage Area DR-1, consists of 0.932 acres This area consists of grass, a couple of trees some brush and a small section of the existing asphalt drive that runs along the northerly boundary line of the site. This area sheet flow drains to the south west towards an existing drainage swale along the northerly boundary of the existing commercial plaza to the south | 0.932 | 67 | 10 |

## C. PROPOSED CONDITIONS

The Proposed drainage area comprises a total of 0.932 acres. Proposed parking lot impervious areas will drain via sheet flow, swales and storm sewer to a proposed storm water basin which discharges to the existing road side swale to the north of the site.

The overall drainage area was divided into two sub areas for analysis purposes, labeled DR-10 and DR-20 as shown on DR-PR, the Proposed Conditions Drainage Plan in Appendix B.

Drainage Area DR-10, consisting of 0.157 acres, includes the northerly portion of the disturbed area. This area consists of lawn area and a portion of the existing asphalt drive to the north. This area sheet drains to the west to a proposed dry pond which discharges through a storm pipe to the proposed dry pond to the south.

Drainage Area DR-20, consisting of 0.775 acres, includes the remainder of the disturbed area including the asphalt drives, parking, the kiosk and lawn area. This area sheet drains to the south west to the proposed dry pond. This pond discharges through a storm pipe to the existing hillside leading to an existing roadside drainage swale.

Water quality is not required as the site only has 8,200+/- s.f. of new impervious surface. Water quality is is required for developments that create more than 10,000 s.f. of impervious surface.

Table III summarizes the hydrologic characteristics of the drainage areas described above. See Appendix A for computations for the existing drainage conditions.

**Table III**

**Proposed Conditions Summary**

| Drainage Area | Description | Size (ac) | Composite Cn | Tc (min) |
|---|---|---|---|---|
| Area DR-10 | Drainage Area DR-10, consisting of 0.157 acres, includes the northerly portion of the disturbed area. This area consists of lawn area and a portion of the existing asphalt drive to the north. This area sheet drains to the west to a proposed dry pond which discharges through a storm pipe to the proposed dry pond to the south. | 0.157 | 67 | 5 |
| Area DR-20 | Drainage Area DR-20, consisting of 0.775 acres, includes the remainder of the disturbed area including the asphalt drives, parking, the kiosk and lawn area. This area sheet drains to the south west to the proposed dry pond. This pond discharges through a storm pipe to the existing hillside leading to an existing roadside drainage swale. | 0.775 | 74 | 5 |

# Section 3

## SUMMARY OF FINDINGS

### A. SUMMARY OF RESULTS

Table IV and Table V depicts the peak discharges from the site for each of the design storms for the existing and proposed conditions. Table VI depicts the peak elevation of the swales during the design storm events.

**Table IV-Existing and Proposed Peak Discharge for the 10-Year Storm (cfs)**

| 10 yr. Design Storm Discharge | |
|---|---|
| **Existing** | **Proposed** |
| 1.13 | 0.48 |

**Table V-Existing and Proposed Peak Discharge for the 100-Year Storm (cfs)**

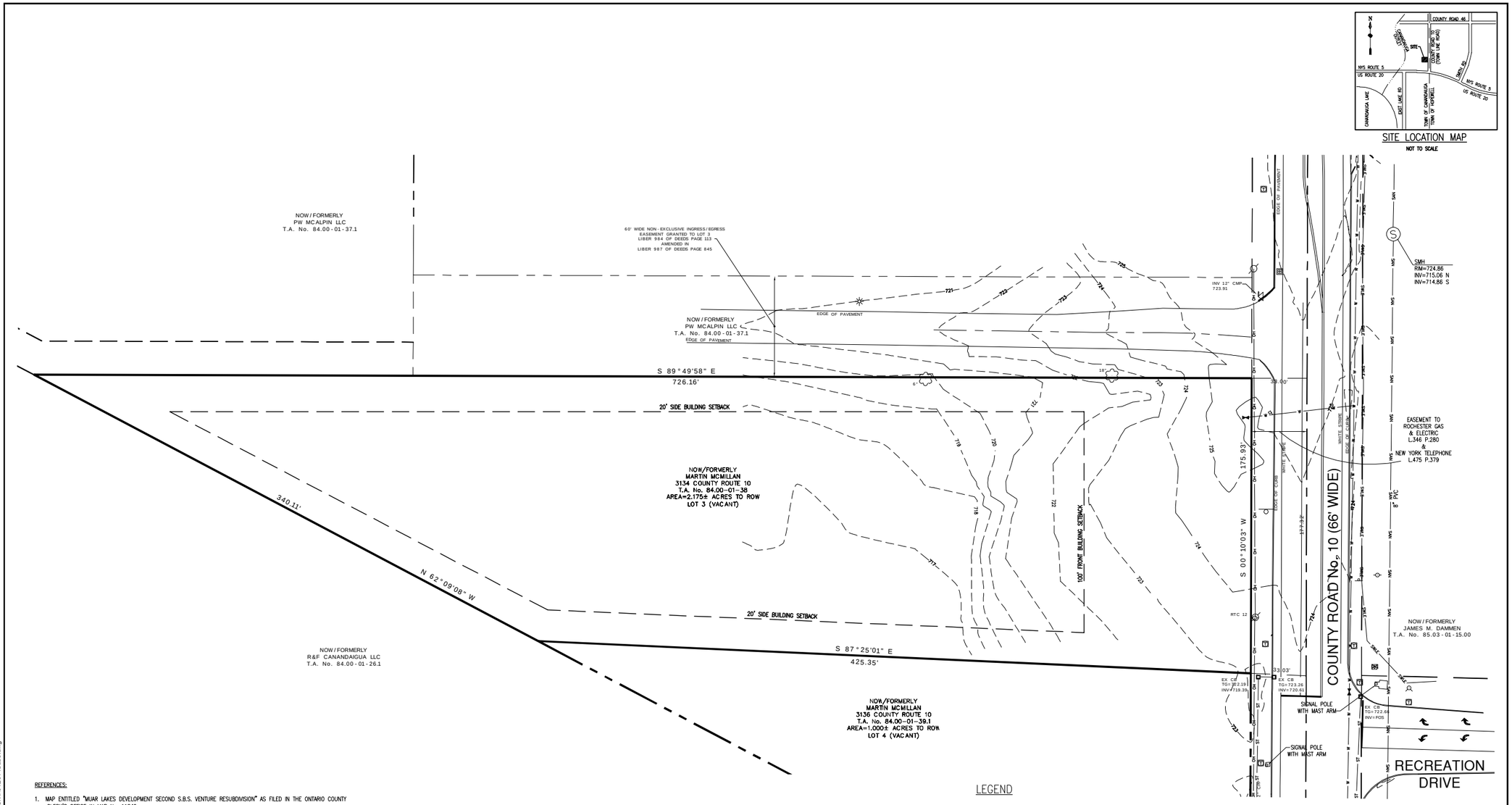
| 100 yr. Design Storm Discharge | |
|---|---|
| **Existing** | **Proposed** |
| 3.30 | 0.76 |

**Table VI-Peak Swale Elevations**

| Design Storm | Pond P1 | Pond P2 |
|---|---|---|
| **10 Year** | 718.87 | 714.31 |
| **100 Year** | 719.43 | 715.39 |

# APPENDIX A

# EXISTING CONDITIONS MAP AND HYDROGRAPH REPORT




REFERENCES:

1. MAP ENTITLED "MUAR LAKES DEVELOPMENT SECOND S.B.S. VENTURE RESUBDIVISION" AS FILED IN THE ONTARIO COUNTY CLERK'S OFFICE IN MAP No. 11240.
2. MAP ENTITLED "LAND TO BE CONVEYED TO DONALD E. COURTNEY" AS FILED IN THE ONTARIO COUNTY CLERK'S OFFICE IN MAP No. 13029.
3. MAP ENTITLED "DISTANT HILLS PARK" AS FILED IN THE ONTARIO COUNTY CLERK'S OFFICE IN MAP No. 20922.
4. MAP ENTITLED "PLAN OF LANDS OF JOSEPH & SUZANNE MASCITTI D/B/A/ COMATTIS PROPERTIES & KIMBERLY ANN MASCITTI" AS FILED IN THE ONTARIO COUNTY CLERK'S OFFICE IN MAP No. 22181.
5. MAP ENTITLED "LOMENZO SUBDIVISION" AS FILED IN THE ONTARIO COUNTY CLERK'S OFFICE IN MAP No. 22436.
6. MAP ENTITLED "FINAL SUBDIVISION CORTLAND L. BROVITZ" AS FILED AT THE ONTARIO COUNTY CLERK'S OFFICE IN MAP No. 29215.
7. THE FOLLOWING DEEDS FILED IN THE ONTARIO COUNTY CLERKS OFFICE:
   LIBER 962, PAGE 486
   LIBER 966, PAGE 828
   LIBER 983, PAGE 554
   LIBER 984, PAGE 113
   LIBER 984, PAGE 381
   LIBER 1052, PAGE 644
8. ABSTRACTS OF THE TITLE PREPARED BY CROSSROADS ABSTRACT (SEARCH NUMBERS 0121803 & 0121802)

NOTES:

1. BEARINGS SHOWN HEREON ARE REFERENCED TO NEW YORK STATE PLANE COORDINATE SYSTEM (CENTERAL ZONE) NAD 83, A CLOCKWISE ROTATION OF 07°-56'-28" IS REQUIRED TO CONVERT TO THE BEARINGS SHOWN ON REFERENCE No. 3. THE CONTOURS SHOWN HEREON ARE REFERENCED TO NAVD 88 THROUGH GPS OBSERVATIONS.
2. PROPERTY IS LOCATED IN ZONE X (AREAS OUTSIDE 500 YEAR FLOOD) AS SHOWN ON FIRM MAP INDEX FOR THE TOWN OF CANANDAIGUA, COUNTY OF ONTARIO, COMMUNITY NUMBER 360598 0020 C, EFFECTIVE DATE MARCH 3, 1997.
3. THE UTILITIES SHOWN HEREON ARE BASED ON AN INSTRUMENT LOCATION OF THE ABOVE GROUND FEATURES (MANHOLES, VALVES, HYDRANTS, ETC.). THE UNDERGROUND UTILITIES (WATER LINES, GAS LINES, ETC.) ARE BASED ON THE ABOVE GROUND FEATURES AND RECORD UTILITY PLANS AND STAKEOUT IN THE FIELD BY THEIR RESPECTIVE COMPANIES. UNDERGROUND UTILITIES ARE NOT CERTIFIED TO THEIR LOCATION OR COMPLETENESS.
4. PROPERTY HAS ACCESS TO COUNTY ROAD No. 10 EXCLUSIVELY VIA THE 60' WIDE NON EXCLUSIVE INGRESS/EGRESS EASEMENT AS STATED IN REFERENCE No. 3 AND CONVEYED IN LIBER 984 OF DEEDS PAGE 113.
5. PARCEL SUBJECT TO A RG&E POLE LINE UTILITY EASEMENT ALONG THE RIGHT OF WAY BOUNDARY OF TOWN LINE ROAD PER LIBER 346 OF DEEDS PAGE 280, AS FILED IN THE ONTARIO COUNTY CLERKS OFFICE. WIDTH OF THE EASEMENT IS INDETERMINATE.
6. PARCEL SUBJECT TO A NEW YORK TELEPHONE UTILITY EASEMENT ALONG THE RIGHT OF WAY BOUNDARY OF TOWN LINE ROAD PER LIBER 475 OF DEEDS PAGE 379, AS FILED IN THE ONTARIO COUNTY CLERKS OFFICE. WIDTH OF THE EASEMENT IS INDETERMINATE.

## ZONING DATA:

| | | |
|---|---|---|
| 1. | EXISTING ZONING | CC COMMUNITY COMMERCIAL |
| 2. | SETBACKS: | |
| | FRONT | 100' |
| | SIDE | 20' |
| 3. | MAX. BUILDING HEIGHT: | 35' |
| 4. | MAX. BUILDING COVERAGE: | 35% |
| 5. | GREEN SPACE REQUIRED: | 30% |
| 6. | PARKING: | 1/150 GROSS SF |

## LEGEND

- BOLLARD/POST
- ELECTRICAL BOX
- GAS METER
- GAS VALVE
- CATCH BASIN
- HYDRANT
- LIGHT POLE (PEDESTAL)
- WATER MANHOLE
- PIN/REBAR (FOUND)
- ONE POST SIGN
- TWO POST SIGN
- TRAFFIC CONTROL BOX
- UTILITY POLE
- WATER VALVE
- GUY WIRE
- PIN/REBAR (TO BE SET)
- BORING LOCATION

- OHE = OVERHEAD ELECTRIC
- = PARCEL BOUNDARY
- = ADJOINING PARCEL BOUNDARY
- = EASEMENT
- ST = STORM/DRAINAGE LINE
- SAN = SANITARY LINE
- SWALE = CENTERLINE OF SWALE/DITCH
- XXX = MAJOR CONTOUR (5' INTERVAL)
- XXX = MINOR CONTOUR (1' INTERVAL)
- W = UNDERGROUND WATER LINE

GRID NORTH

0 30 60 90 FT
SCALE BAR
1" = 30'

WE, BERGMANN ASSOCIATES, DO HEREBY CERTIFY THAT THIS MAP WAS MADE FROM THE NOTES OF AN INSTRUMENT SURVEY LAST DATED 1/29/18 AND FROM THE REFERENCES LISTED HEREON.

KEVIN M. SULLIVAN, L.S. No. 049963 DATE

# Mudslingers Drive-Thru Coffee

Townline Road
Town of Canandaigua

## Clay Van Doren

6000 Goff Road
Canandaigua, NY 14424

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REVISIONS

| NO. | DATE | DESCRIPTION | REV. | CK'D |
|---|---|---|---|---|



| | |
|---|---|
| Project Manager: B. Burri | Checked By: K. Sullivan |
| Designed By: | Drawn By: T. Bolt |
| Date Issued: 02/12/18 | Scale: 1" = 30' |
| Project Number: 12611.00 | |

# EXISTING CONDITIONS PLAN

Drawing Number:

# EX-1


# DR-1

Subcat Reach Pond Link

**Routing Diagram for EXIST**
Prepared by VRTHOR2012, Printed 3/7/2018

## Area Listing (selected nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 0.871 | 69 | 50-75% Grass cover, Fair, HSG B (DR-1) |
| 0.061 | 98 | Paved parking, HSG B (DR-1) |
| **0.932** | **71** | **TOTAL AREA** |

## Summary for Subcatchment DR-1: DR-1

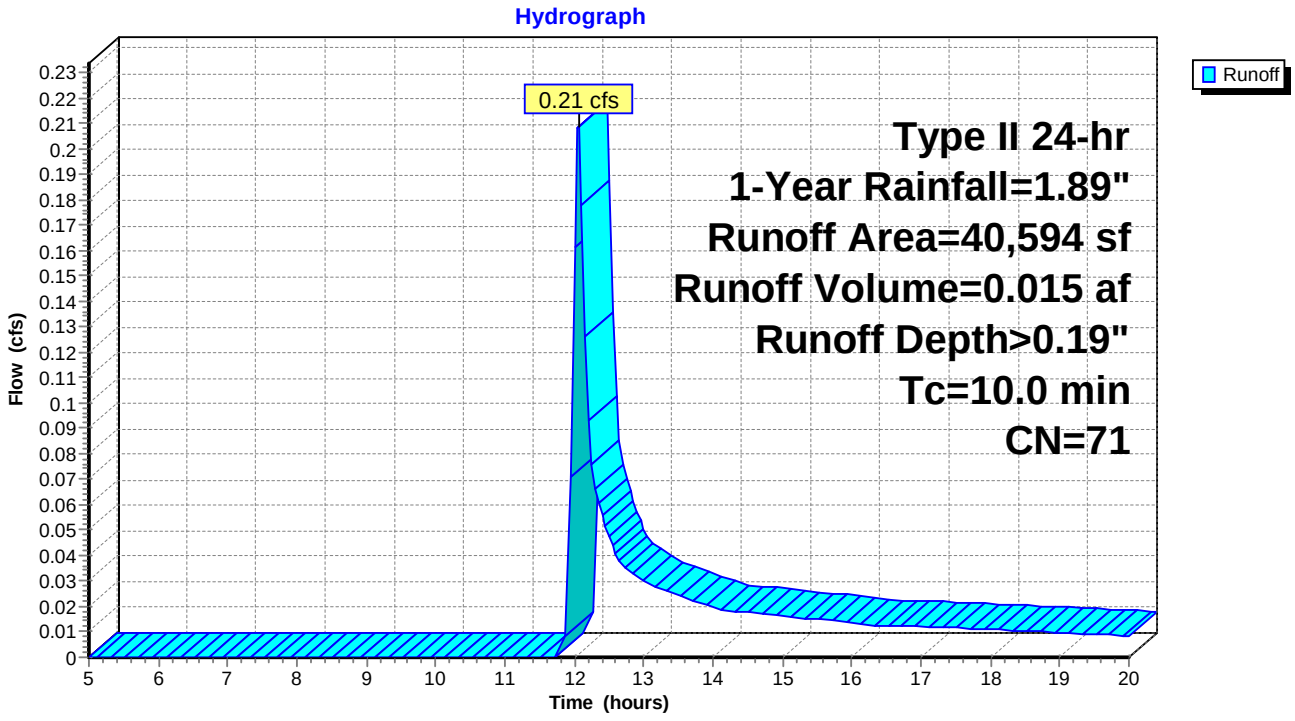
Runoff = 0.21 cfs @ 12.06 hrs, Volume= 0.015 af, Depth> 0.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=1.89"

| Area (sf) | CN | Description |
|---|---|---|
| 2,668 | 98 | Paved parking, HSG B |
| 37,926 | 69 | 50-75% Grass cover, Fair, HSG B |
| 40,594 | 71 | Weighted Average |
| 37,926 | | 93.43% Pervious Area |
| 2,668 | | 6.57% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.0 | | | | | **Direct Entry,** |

## Subcatchment DR-1: DR-1



## Summary for Subcatchment DR-1: DR-1

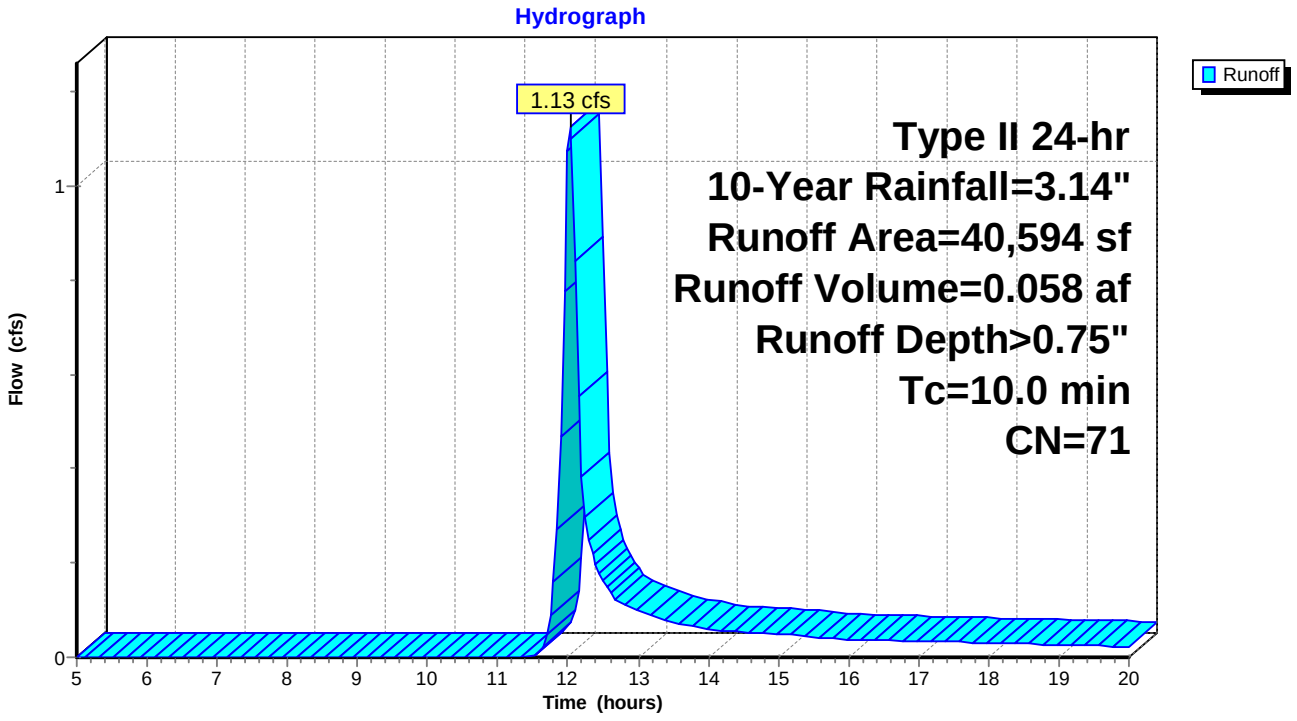
Runoff = 1.13 cfs @ 12.03 hrs, Volume= 0.058 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=3.14"

| Area (sf) | CN | Description |
|---|---|---|
| 2,668 | 98 | Paved parking, HSG B |
| 37,926 | 69 | 50-75% Grass cover, Fair, HSG B |
| 40,594 | 71 | Weighted Average |
| 37,926 | | 93.43% Pervious Area |
| 2,668 | | 6.57% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.0 | | | | | **Direct Entry,** |

## Subcatchment DR-1: DR-1



## Summary for Subcatchment DR-1: DR-1

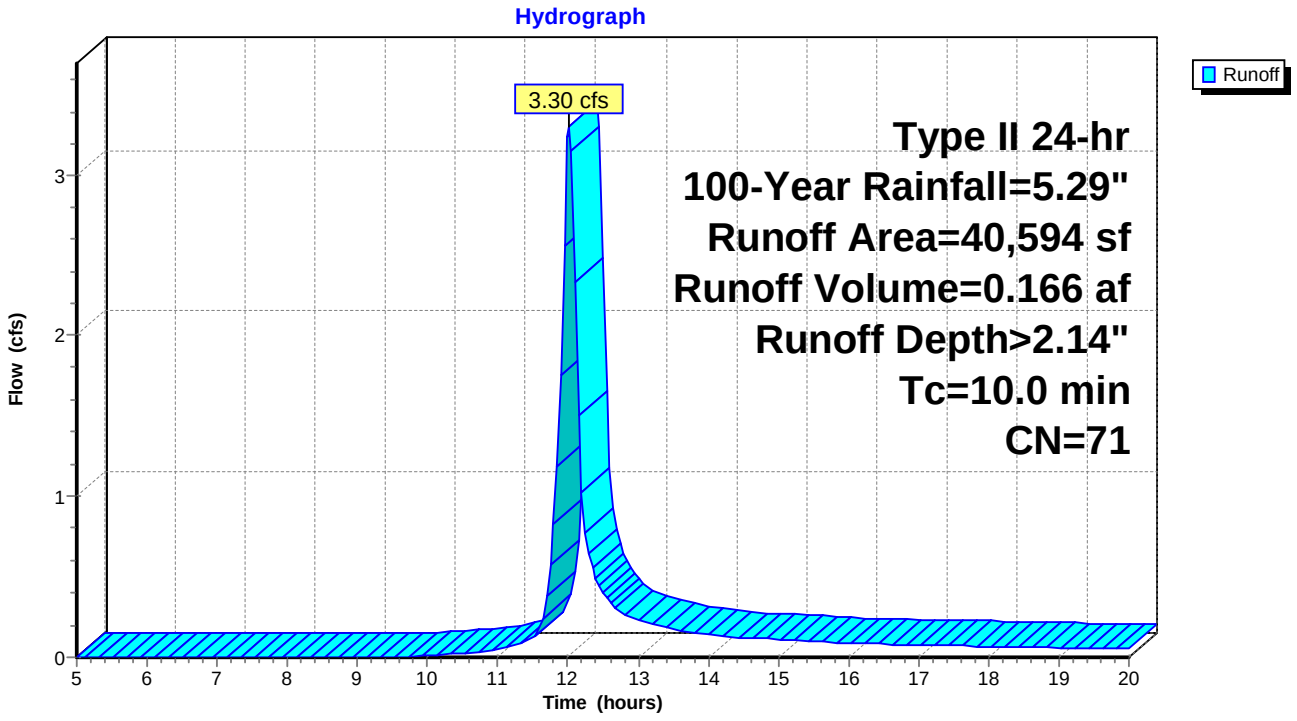
Runoff = 3.30 cfs @ 12.02 hrs, Volume= 0.166 af, Depth> 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.29"

| Area (sf) | CN | Description |
|---|---|---|
| 2,668 | 98 | Paved parking, HSG B |
| 37,926 | 69 | 50-75% Grass cover, Fair, HSG B |
| 40,594 | 71 | Weighted Average |
| 37,926 | | 93.43% Pervious Area |
| 2,668 | | 6.57% Impervious Area |

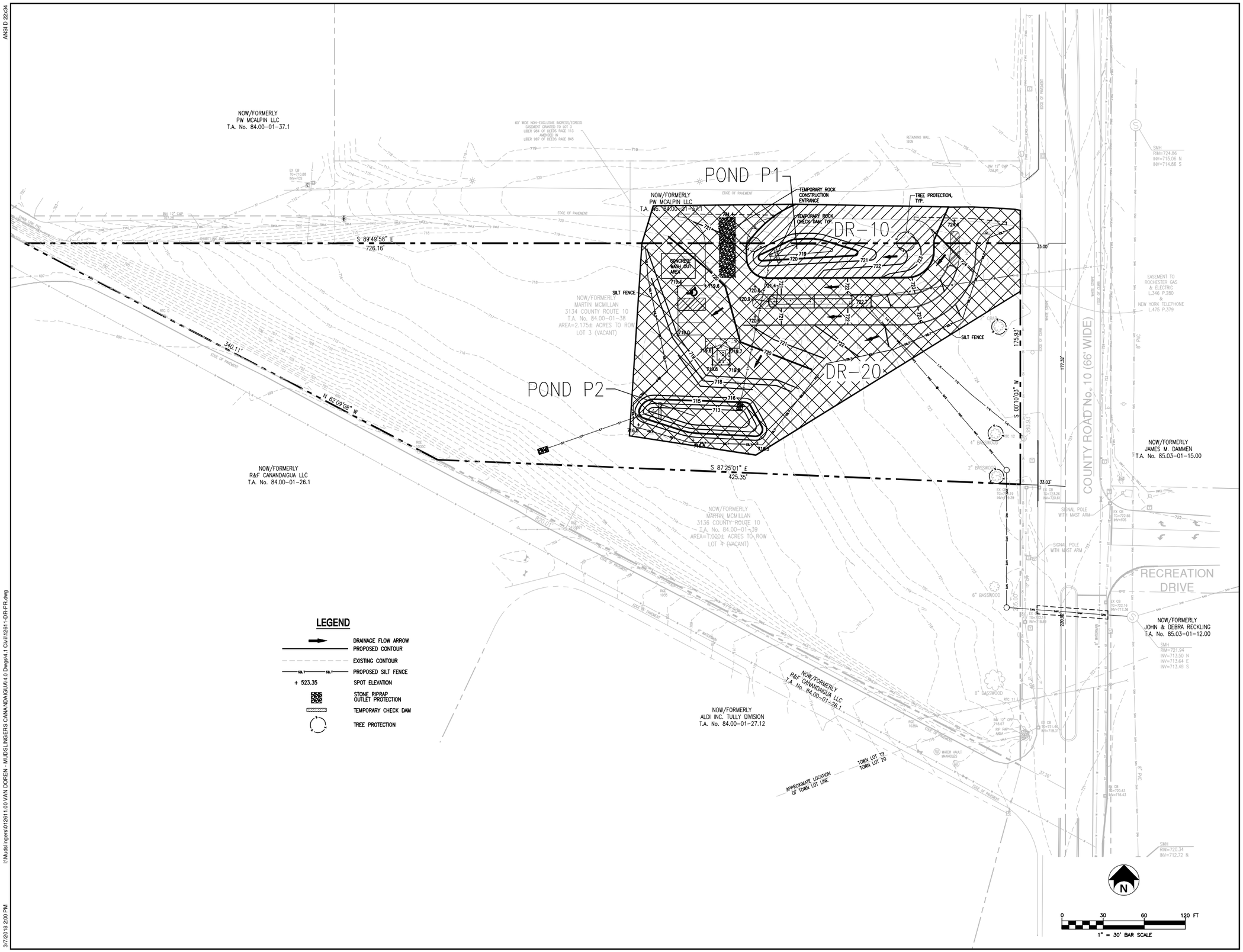
| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 10.0 | | | | | **Direct Entry,** |

## Subcatchment DR-1: DR-1



# APPENDIX B

# PROPOSED CONDITIONS DRAINAGE MAP AND HYDROGRAPH REPORT




## LEGEND

- DRAINAGE FLOW ARROW
- PROPOSED CONTOUR
- EXISTING CONTOUR
- PROPOSED SILT FENCE
- + 523.35 SPOT ELEVATION
- STONE RIPRAP OUTLET PROTECTION
- TEMPORARY CHECK DAM
- TREE PROTECTION

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| DATE | DESCRIPTION |
|---|---|

NOT APPROVED:
THIS PLAN HAS NOT RECEIVED FINAL APPROVAL OF ALL REVIEWING AGENCIES. THIS PLAN IS SUBJECT TO REVISIONS UNTIL ALL APPROVALS ARE OBTAINED AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES



| | |
|---|---|
| Project Manager: B. Burri | Checked By: B. Burri |
| Designed By: T. Bolt | Drawn By: T. Bolt |
| Scale: | Project Number: 12611.00 |
| Date Issued: 03/06/18 | |

# PROPOSED DRAINAGE AREAS PLAN

Drawing Number:

# DR-PR

4 of 6

ANSI D 22x34

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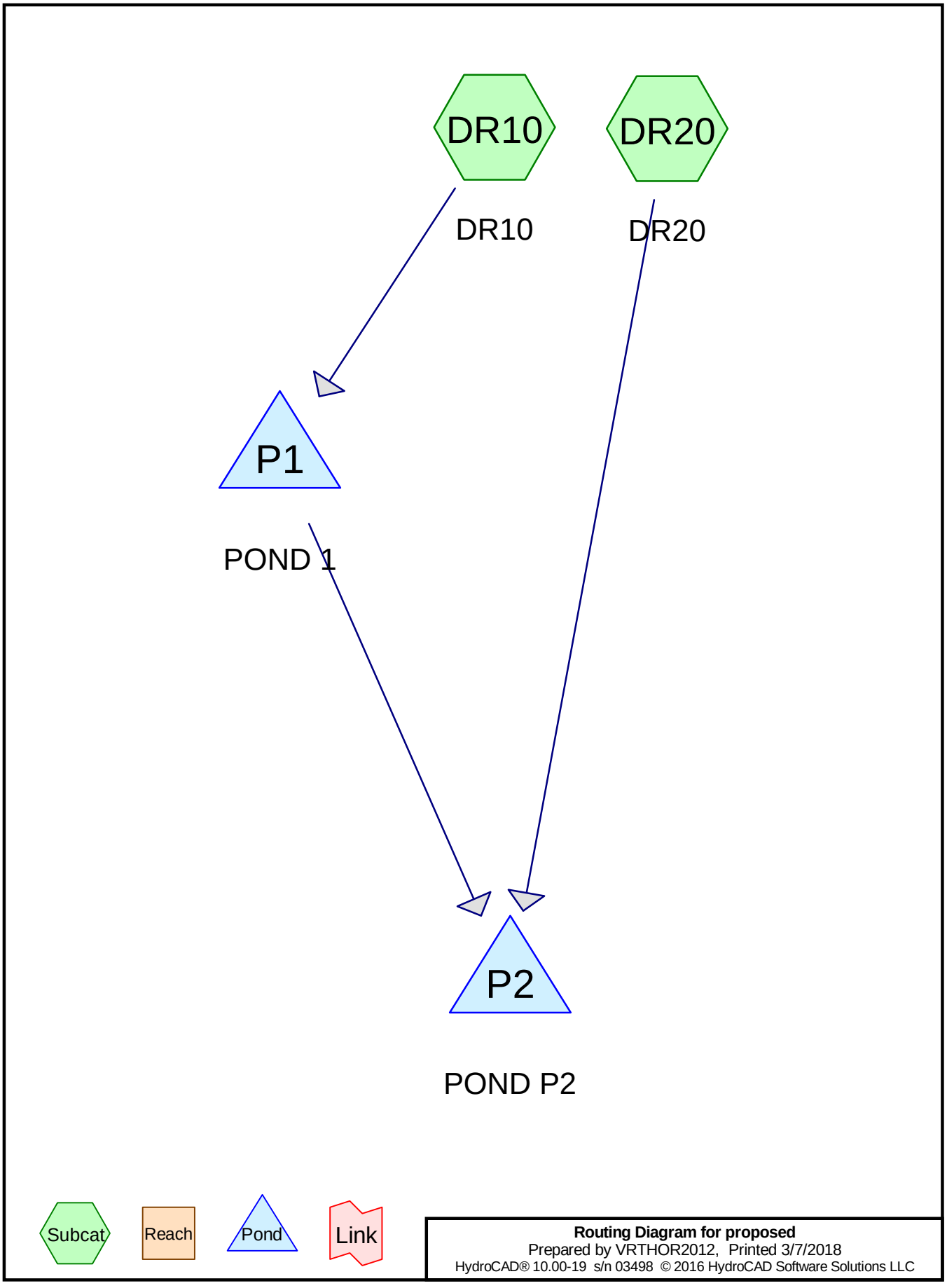
3/7/2018 2:00 PM




**Routing Diagram for proposed**
Prepared by VRTHOR2012, Printed 3/7/2018

## Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 0.629 | 61 | >75% Grass cover, Good, HSG B (DR10, DR20) |
| 0.303 | 98 | Paved parking, HSG B (DR10, DR20) |
| **0.932** | **73** | **TOTAL AREA** |

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Pond P1: POND 1** Peak Elev=718.63' Storage=6 cf Inflow=0.02 cfs 0.002 af
4.0" Round Culvert w/ 1.0" inside fill n=0.013 L=110.0' S=0.0318 '/' Outflow=0.01 cfs 0.001 af

**Pond P2: POND P2** Peak Elev=713.80' Storage=127 cf Inflow=0.35 cfs 0.018 af
6.0" Round Culvert n=0.013 L=80.0' S=0.0050 '/' Outflow=0.16 cfs 0.018 af

## Summary for Pond P1: POND 1

Inflow Area = 0.157 ac, 16.81% Impervious, Inflow Depth > 0.12" for 1-Year event
Inflow = 0.02 cfs @ 12.01 hrs, Volume= 0.002 af
Outflow = 0.01 cfs @ 12.11 hrs, Volume= 0.001 af, Atten= 51%, Lag= 6.1 min
Primary = 0.01 cfs @ 12.11 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 718.63' @ 12.11 hrs Surf.Area= 74 sf Storage= 6 cf

Plug-Flow detention time= 30.2 min calculated for 0.001 af (94% of inflow)
Center-of-Mass det. time= 13.0 min ( 893.6 - 880.6 )

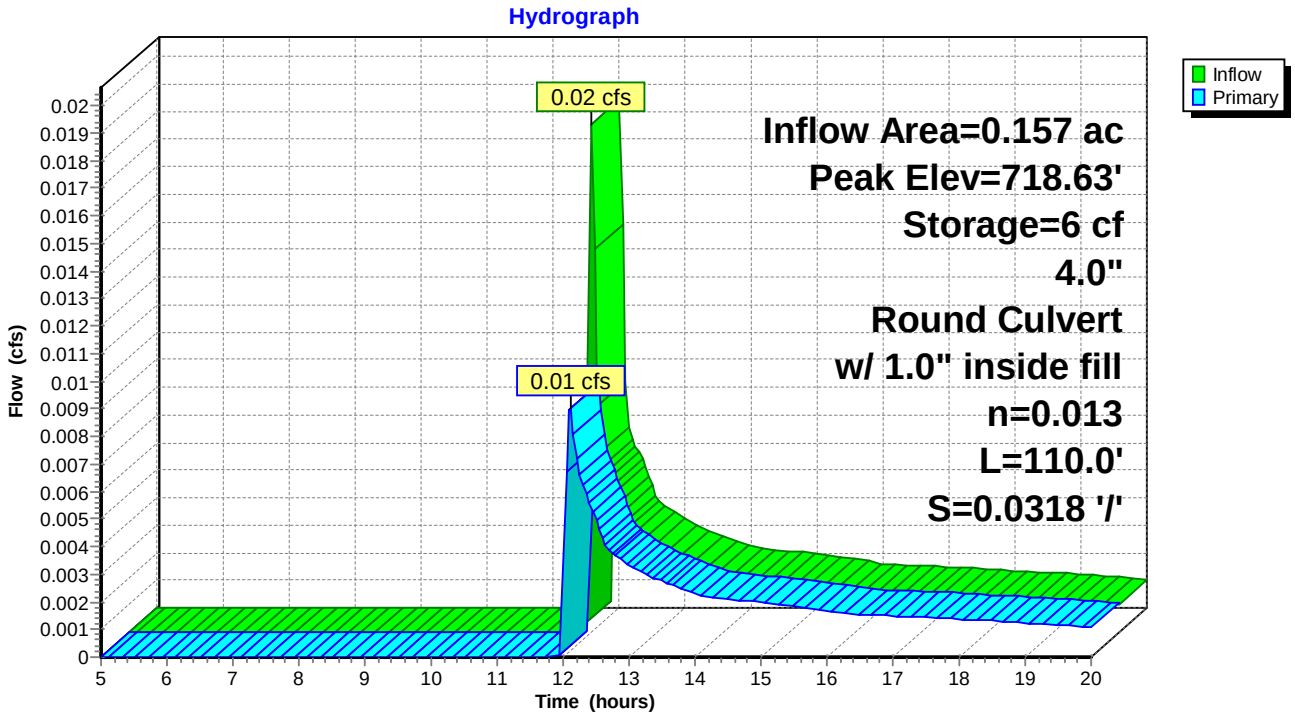
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 718.50' | 1,654 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 718.50 | 20 | 0 | 0 |
| 719.00 | 231 | 63 | 63 |
| 720.00 | 734 | 483 | 545 |
| 721.00 | 1,484 | 1,109 | 1,654 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 718.58' | **4.0" Round Culvert w/ 1.0" inside fill** L= 110.0' Ke= 0.600<br>Inlet / Outlet Invert= 718.50' / 715.00' S= 0.0318 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.07 sf |

**Primary OutFlow** Max=0.01 cfs @ 12.11 hrs HW=718.63' (Free Discharge)
**1=Culvert** (Inlet Controls 0.01 cfs @ 0.63 fps)

## Pond P1: POND 1



## Summary for Pond P2: POND P2

Inflow Area = 0.932 ac, 32.48% Impervious, Inflow Depth > 0.23" for 1-Year event
Inflow = 0.35 cfs @ 11.98 hrs, Volume= 0.018 af
Outflow = 0.16 cfs @ 12.08 hrs, Volume= 0.018 af, Atten= 54%, Lag= 5.7 min
Primary = 0.16 cfs @ 12.08 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 713.80' @ 12.08 hrs Surf.Area= 774 sf Storage= 127 cf

Plug-Flow detention time= 15.1 min calculated for 0.018 af (98% of inflow)
Center-of-Mass det. time= 10.1 min ( 854.0 - 843.9 )

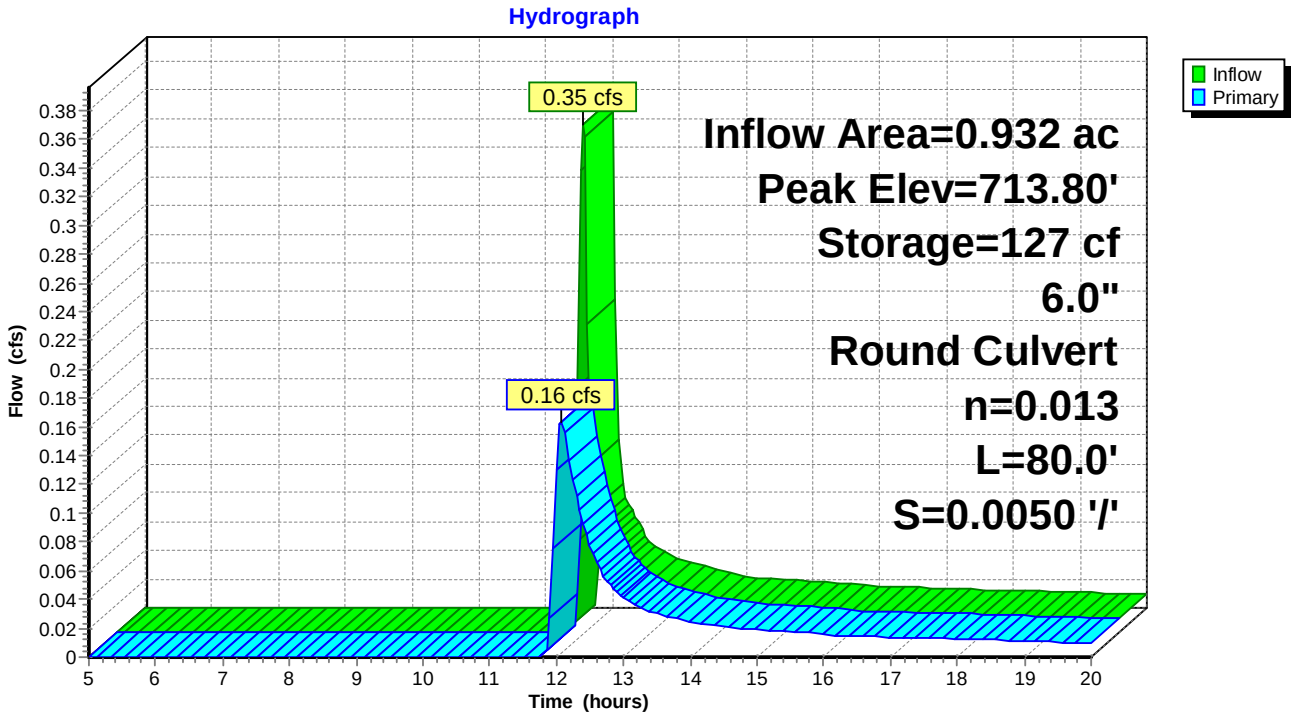
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 713.50' | 4,021 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 713.50 | 75 | 0 | 0 |
| 714.00 | 1,242 | 329 | 329 |
| 715.00 | 1,834 | 1,538 | 1,867 |
| 716.00 | 2,474 | 2,154 | 4,021 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 713.50' | **6.0" Round Culvert** L= 80.0' Ke= 0.400<br>Inlet / Outlet Invert= 713.50' / 713.10' S= 0.0050 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Primary OutFlow** Max=0.16 cfs @ 12.08 hrs HW=713.80' (Free Discharge)
**1=Culvert** (Barrel Controls 0.16 cfs @ 1.91 fps)

## Pond P2: POND P2



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Pond P1: POND 1** Peak Elev=718.87' Storage=36 cf Inflow=0.17 cfs 0.008 af
4.0" Round Culvert w/ 1.0" inside fill n=0.013 L=110.0' S=0.0318 '/' Outflow=0.13 cfs 0.007 af

**Pond P2: POND P2** Peak Elev=714.31' Storage=742 cf Inflow=1.48 cfs 0.066 af
6.0" Round Culvert n=0.013 L=80.0' S=0.0050 '/' Outflow=0.48 cfs 0.065 af

## Summary for Pond P1: POND 1

Inflow Area = 0.157 ac, 16.81% Impervious, Inflow Depth > 0.58" for 10-Year event
Inflow = 0.17 cfs @ 11.97 hrs, Volume= 0.008 af
Outflow = 0.13 cfs @ 12.03 hrs, Volume= 0.007 af, Atten= 24%, Lag= 3.1 min
Primary = 0.13 cfs @ 12.03 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 718.87' @ 12.03 hrs Surf.Area= 176 sf Storage= 36 cf

Plug-Flow detention time= 9.5 min calculated for 0.007 af (98% of inflow)
Center-of-Mass det. time= 4.6 min ( 831.6 - 827.0 )

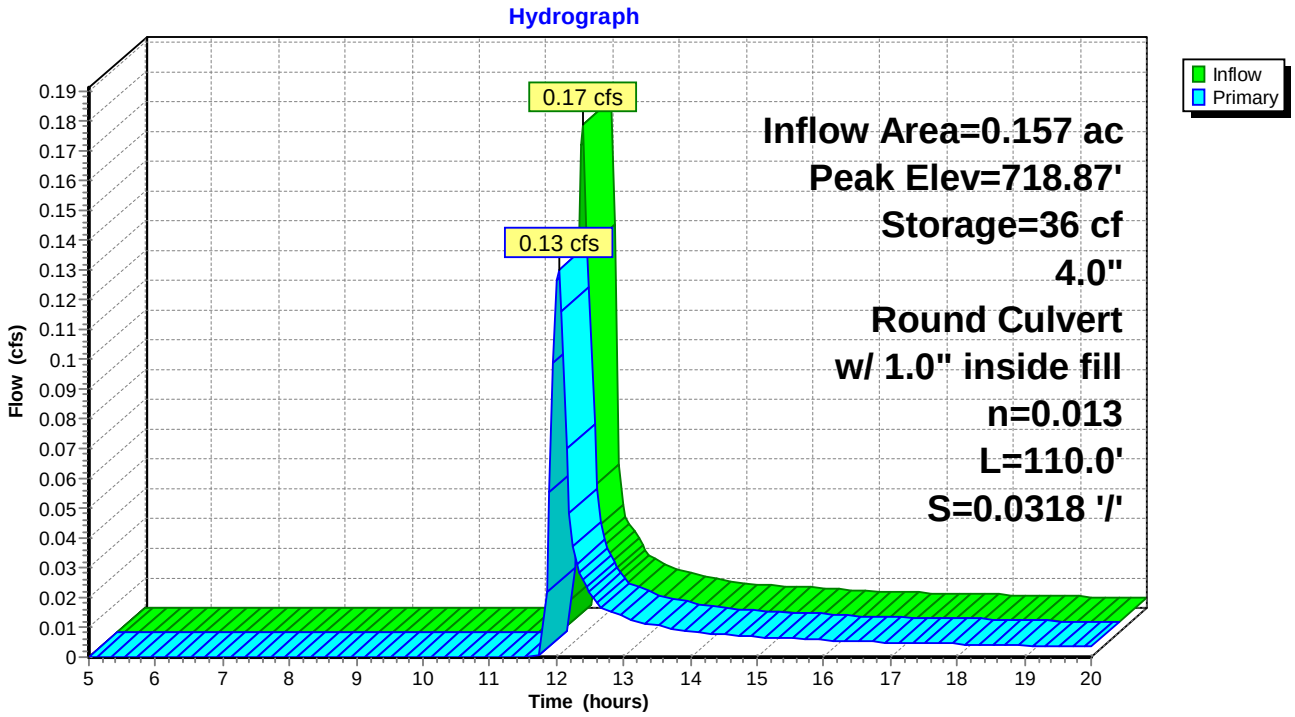
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 718.50' | 1,654 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 718.50 | 20 | 0 | 0 |
| 719.00 | 231 | 63 | 63 |
| 720.00 | 734 | 483 | 545 |
| 721.00 | 1,484 | 1,109 | 1,654 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 718.58' | **4.0" Round Culvert w/ 1.0" inside fill** L= 110.0' Ke= 0.600<br>Inlet / Outlet Invert= 718.50' / 715.00' S= 0.0318 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.07 sf |

**Primary OutFlow** Max=0.13 cfs @ 12.03 hrs HW=718.86' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.13 cfs @ 1.81 fps)

## Pond P1: POND 1



## Summary for Pond P2: POND P2

Inflow Area = 0.932 ac, 32.48% Impervious, Inflow Depth > 0.84" for 10-Year event
Inflow = 1.48 cfs @ 11.97 hrs, Volume= 0.066 af
Outflow = 0.48 cfs @ 12.11 hrs, Volume= 0.065 af, Atten= 68%, Lag= 8.4 min
Primary = 0.48 cfs @ 12.11 hrs, Volume= 0.065 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 714.31' @ 12.11 hrs Surf.Area= 1,425 sf Storage= 742 cf

Plug-Flow detention time= 16.8 min calculated for 0.065 af (99% of inflow)
Center-of-Mass det. time= 13.7 min ( 825.0 - 811.3 )

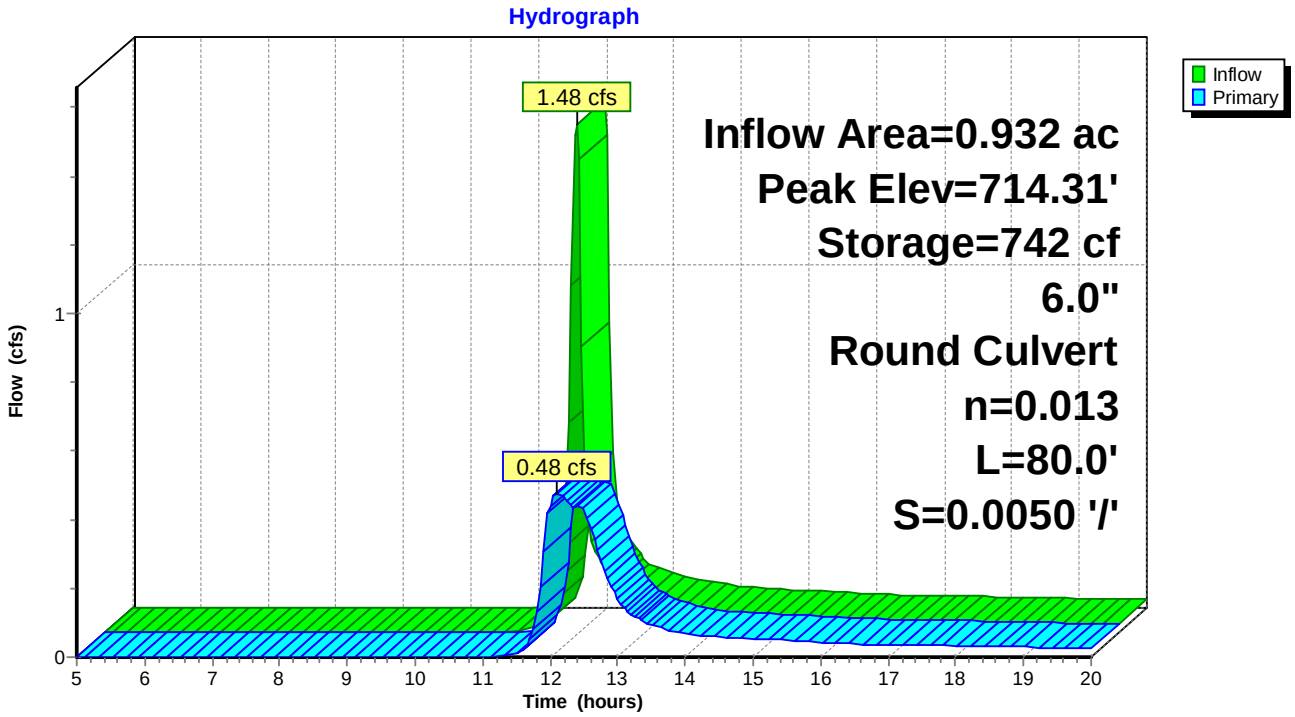
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 713.50' | 4,021 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 713.50 | 75 | 0 | 0 |
| 714.00 | 1,242 | 329 | 329 |
| 715.00 | 1,834 | 1,538 | 1,867 |
| 716.00 | 2,474 | 2,154 | 4,021 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 713.50' | **6.0" Round Culvert** L= 80.0' Ke= 0.400<br>Inlet / Outlet Invert= 713.50' / 713.10' S= 0.0050 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

**Primary OutFlow** Max=0.48 cfs @ 12.11 hrs HW=714.31' (Free Discharge)
**1=Culvert** (Barrel Controls 0.48 cfs @ 2.43 fps)

## Pond P2: POND P2



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Pond P1: POND 1** Peak Elev=719.43' Storage=207 cf Inflow=0.57 cfs 0.024 af
4.0" Round Culvert w/ 1.0" inside fill n=0.013 L=110.0' S=0.0318 '/' Outflow=0.25 cfs 0.024 af

**Pond P2: POND P2** Peak Elev=715.39' Storage=2,640 cf Inflow=3.86 cfs 0.178 af
6.0" Round Culvert n=0.013 L=80.0' S=0.0050 '/' Outflow=0.76 cfs 0.177 af

## Summary for Pond P1: POND 1

Inflow Area = 0.157 ac, 16.81% Impervious, Inflow Depth > 1.83" for 100-Year event
Inflow = 0.57 cfs @ 11.96 hrs, Volume= 0.024 af
Outflow = 0.25 cfs @ 12.06 hrs, Volume= 0.024 af, Atten= 55%, Lag= 6.1 min
Primary = 0.25 cfs @ 12.06 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 719.43' @ 12.06 hrs Surf.Area= 446 sf Storage= 207 cf

Plug-Flow detention time= 8.3 min calculated for 0.024 af (99% of inflow)
Center-of-Mass det. time= 6.2 min ( 807.0 - 800.8 )

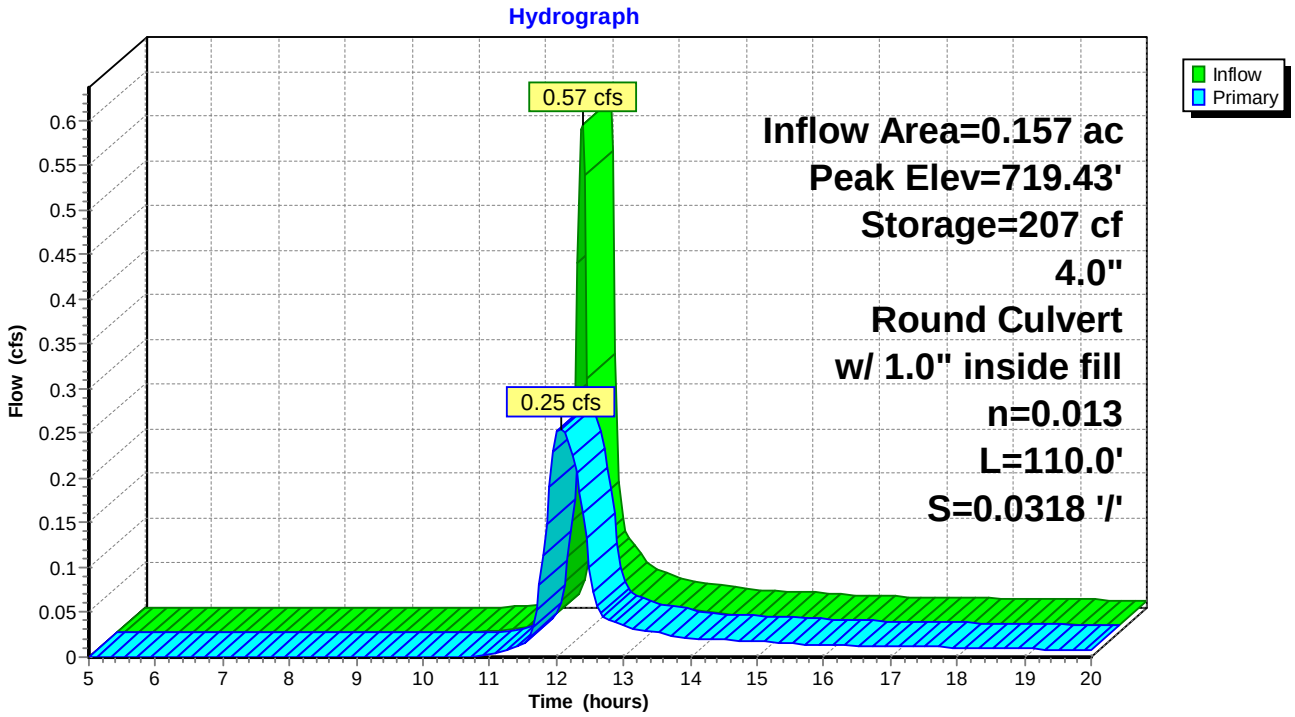
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 718.50' | 1,654 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 718.50 | 20 | 0 | 0 |
| 719.00 | 231 | 63 | 63 |
| 720.00 | 734 | 483 | 545 |
| 721.00 | 1,484 | 1,109 | 1,654 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 718.58' | **4.0" Round Culvert w/ 1.0" inside fill** L= 110.0' Ke= 0.600<br>Inlet / Outlet Invert= 718.50' / 715.00' S= 0.0318 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.07 sf |

**Primary OutFlow** Max=0.25 cfs @ 12.06 hrs HW=719.42' (Free Discharge)
**1=Culvert** (Barrel Controls 0.25 cfs @ 3.62 fps)

## Pond P1: POND 1



## Summary for Pond P2: POND P2

[79] Warning: Submerged Pond P1 Primary device # 1 OUTLET by 0.31'

Inflow Area = 0.932 ac, 32.48% Impervious, Inflow Depth > 2.29" for 100-Year event
Inflow = 3.86 cfs @ 11.96 hrs, Volume= 0.178 af
Outflow = 0.76 cfs @ 12.20 hrs, Volume= 0.177 af, Atten= 80%, Lag= 14.6 min
Primary = 0.76 cfs @ 12.20 hrs, Volume= 0.177 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 715.39' @ 12.20 hrs Surf.Area= 2,086 sf Storage= 2,640 cf

Plug-Flow detention time= 32.9 min calculated for 0.177 af (99% of inflow)
Center-of-Mass det. time= 30.6 min ( 821.2 - 790.6 )

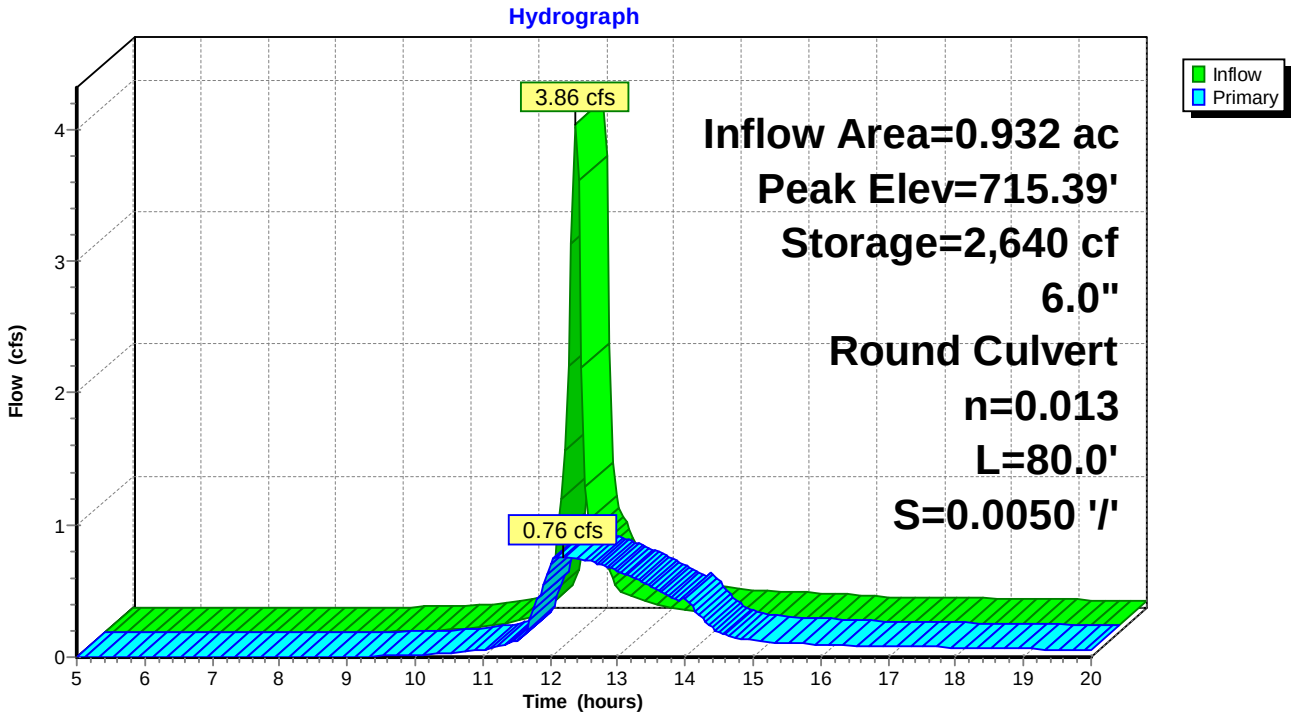
| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 713.50' | 4,021 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 713.50 | 75 | 0 | 0 |
| 714.00 | 1,242 | 329 | 329 |
| 715.00 | 1,834 | 1,538 | 1,867 |
| 716.00 | 2,474 | 2,154 | 4,021 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 713.50' | **6.0" Round Culvert** L= 80.0' Ke= 0.400<br>Inlet / Outlet Invert= 713.50' / 713.10' S= 0.0050 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf |

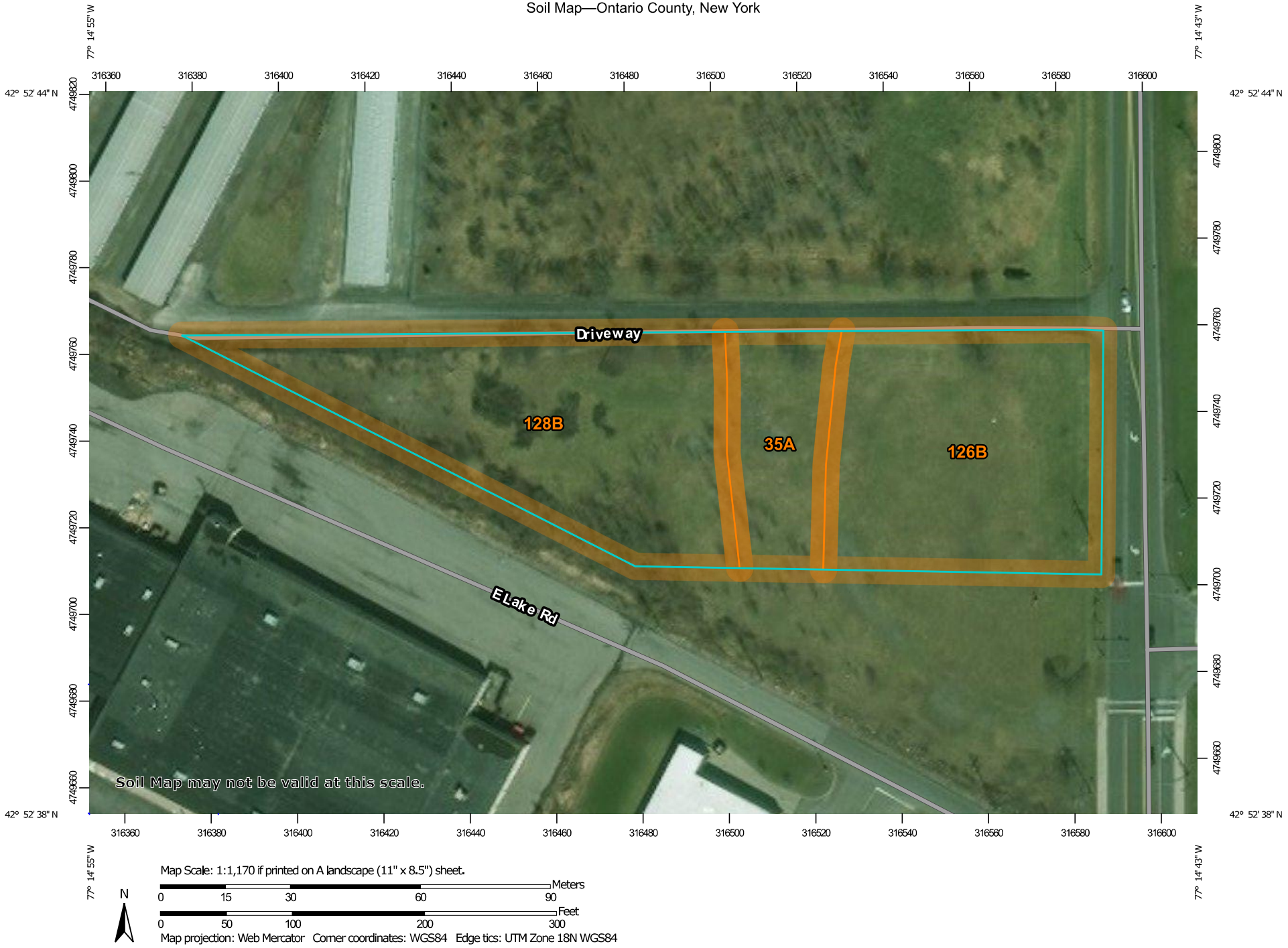
**Primary OutFlow** Max=0.76 cfs @ 12.20 hrs HW=715.39' (Free Discharge)
**1=Culvert** (Barrel Controls 0.76 cfs @ 3.87 fps)

## Pond P2: POND P2



# APPENDIX C

# SOILS




Map Scale: 1:1,170 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

- Area of Interest (AOI)

**Soils**

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

**Special Line Features**

**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 1:12,000.

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: Ontario County, New York
Survey Area Data: Version 14, Oct 8, 2017

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

Date(s) aerial images were photographed: Apr 22, 2013—Oct 11, 2016

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.

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| 35A | Odessa silt loam, 0 to 3 percent slopes | 0.3 | 14.3% |
| 126B | Palmyra gravelly loam, 3 to 8 percent slopes | 0.9 | 40.1% |
| 128B | Palmyra gravelly sandy loam, 3 to 8 percent slopes | 1.0 | 45.6% |
| **Totals for Area of Interest** | | **2.2** | **100.0%** |