STORMWATER POLLUTION PREVENTION PLAN

FOR

Suresky & Sons

Elkay Drive

TOWN OF CHESTER
ORANGE COUNTY, NEW YORK

PREPARED BY

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs
71 Clinton Street
Montgomery, NY 12549

JULY 2015
REVISED AUGUST 2017

W.O. 1081.02

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1.0 INTRODUCTION

Engineering & Surveying Properties, PC has prepared this report summarizing the impact of the proposed development of the property, known as Suresky & Sons, will have on downstream properties and receiving waters.

1.1 PURPOSE

The purpose of the Stormwater Pollution Prevention Plan (SWPPP) is to:

a. Maintain existing drainage patterns and continue the conveyance of upland watershed runoff;

b. Mitigate potential stormwater quality and peak stormwater flow impacts, and prevent soil erosion and sedimentation resulting from stormwater runoff.

c. Incorporate Green Technologies to effectively treat water quality and reintroduce runoff back into the ground to the maximum extent possible.

1.2 SCOPE

The scope of the SWPPP for Suresky & Sons described herein is as follows:

a. Describe and estimate existing stormwater runoff conditions;

b. Describe and estimate proposed stormwater runoff conditions;

c. Describe and evaluate stormwater management practices planned as part of the proposed project.

2.0 PROJECT DESCRIPTION

The project site is ±15.87 acres in size and is located on Elkay Drive in the Town of Chester, Orange County, New York. The site is better described as Town of Chester tax lots Section 6 Block 1 Lot 70.12. A site location map is included as Figure 1 in Appendix 1.

As proposed, the Suresky & Sons project involves the development of the aforementioned vacant lot into a vehicle storage and prep facility. Multiple stormwater management facilities will be constructed within the project limits to mitigate stormwater runoff impacts to the greatest extent practical and to reduce peak rate stormwater flows to or below pre-development levels.

The project site is an irregular shaped area of land that is bordered by industrial, commercial and residential properties. The current site topography consists of varying slopes. The site has a high point elevation to the east of the site and slopes downward in

all directions eventually to low points along Kings Highway and to an existing culvert at the property line of an adjacent property along Elkay Drive.

3.0 TOPOGRAPHY AND SOILS

The site consists of slopes varying from steep to relatively flat. Information assembled by the U.S. Department of Agriculture Soil Conservation Service printed in the Soil Survey of Orange County identifies the presence of Erie gravelly silt loam (ErA), Hoosic gravelly sandy loam (HoC), Madalin silt loam (Ma), Mardin gravelly silt loam (MdC), Pits, gravel (Pt), Raynham silt loam (Ra) and Rock outcrop Nassau complex (RSF) which are designated as hydrologic group “D” soils. There is also Hoosic gravelly sandy loam (HoC) which is designated as an “A” soils group. A soils map and soil classifications are included as Appendix 2.

4.0 METHODOLOGY

The methodology utilized for this analysis is based upon the U.S.D.A. Soil Conservation Service’s Technical Release No. 20 and Technical Release No. 55, as utilized by the software entitled Hydraflow Hydrographs.

Hydraflow Hydrographs, developed by Intelisolve of Alpharetta, Georgia, is a Microsoft Windows based program used to analyze hydrology and hydraulics for modeling stormwater runoff. The model utilizes the latest techniques to predict the stormwater flows from any given storm event.

Hydraflow Hydrographs has the capability of computing hydrographs (representing discharge rates for specific watershed conditions, precipitation and geologic factors), combining hydrographs, and routing flows through pipes, streams and ponds. A drainage model can consist of four different components - subareas, combinations, reaches and reservoirs.

A subarea consists of a relatively homogeneous area of land, which produces a volume and rate of runoff unique to that watershed. A subarea combination is the hydrologic addition of two subareas in order to determine the peak runoff at a design point. A reach is a channelized conveyance structure which routes the runoff from one point to another. A reservoir consists of a natural or man-made impoundment which temporarily stores stormwater runoff and that empties in a manner determined by various hydraulic structures located at its outlet.

The SWPPP for Suresky & Sons was based upon the New York State Stormwater Management Design Manual (NYSSMDM) published by the New York State Department of Environmental Conservation (NYSDEC) last revised January 2015. Criteria set forth by this manual, requires analysis and determination of the required Water Quality Volume (Wqv), to provide extended detention of the 1-year storm event for Stream Channel Protection (Cpv), to control the peak discharge of the 10-year storm event also known as Overbank Flood Protection Criteria (Qp), and to control the peak discharge and safely pass the 100-year storm event otherwise known as Extreme Flood Control Criteria (Qf).

The SWPPP for Suresky & Sons was developed utilizing the "six step" process for Stormwater Site Planning and Practice Selection. The six steps consist of site planning, determination of the water quality treatment volume, runoff reduction volumes applied through the use of "green technologies", application of standard stormwater management practices (SMP's) for remaining water quality volumes, and application of volume and peak rate control methods as required. Each of the six "steps" is further discussed in detail within this report.

5.0 STORMWATER MANAGEMENT PLANNING

5.1 INITIAL SITE PLANNING

Initial site planning included the development of a map showing existing natural resources and drainage patterns. The map was created utilizing actual site visits and a boundary survey completed by Engineering and Surveying Properties, PC on June 5, 2015 and a previous topography survey completed for the property owner. This existing conditions map is included as Figure 2 in Appendix 1.

The hydrologic and hydraulic analysis was performed by delineating the tributary watershed to the design point and then dividing the tributary areas into relatively homogeneous subareas. The separation of the watershed into subareas was dictated by watershed conditions, methods of collection, conveyance and point of discharge. Watershed characteristics for each subarea were then assessed from topographical maps, soil surveys, site investigations and land use maps.

5.1.1 EXISTING CONDITIONS

The existing watershed within the site and areas contributory to the site's surface water runoff discharge to several different design points. A design point represents the point at which stormwater, generated within a

watershed, will exit the project site via either sheet flow along a linear boundary or as a point discharge. Figure 2 in Appendix 1 identifies the watershed boundaries along with each design point. Each watershed has been modeled to determine the existing runoff characteristics to ensure that the proposed project will not have an adverse impact once completed. The characteristics of the existing watersheds are detailed in Table 1 below.

The watersheds were delineated and a contributory area, a curve number (CN) and time of concentration (Tc) were determined. Calculations for the CN's and Tc's are included in Appendices 3 and 4, respectively. It should be noted that the total contributory area is not equal to the total lot area. This is due to the fact that the parcel being developed is within a larger watershed that has a contributory area outside of the project boundary limits.

TABLE 1: EXISTING DRAINAGE AREA CHARACTERISTICS

DRAINAGE AREA DESIGNATION	DRAINAGE AREA SIZE (Ac.)	CN	Tc (min)
EX A	7.64	75	18.60
EX B	13.05	76	25.80
EX C	8.77	77	19.80
TOTAL	**29.46**		

The watershed peak rate discharges for the 1, 10 and 100 year - 24 hour storm events were computed and evaluated at the design point. The peak rates are presented in Table 9. Stormwater computations are attached at the end of this report in Appendices 7, 8 and 9.

5.1.2 PROPOSED CONDITIONS

For this analysis, the post-development watershed was broken down into a network consisting of five (5) subareas, one (1) reach, and two (2) proposed stormwater facilities. The subareas under the proposed development are identified in Figure 3. This report then re-analyzes the proposed condition for curve number (CN) and time of concentration (Tc) on the project site. The characteristics of each proposed subarea is detailed in Table 2 below.

TABLE 2: PROPOSED DRAINAGE AREA CHARACTERISTICS

DRAINAGE AREA DESIGNATION	DRAINAGE AREA SIZE (Ac.)	CN	Tc (min)
PR-A	7.51	75	18.60
PR-B	9.77	87	19.80
PR-C1	9.34	77	22.20
PR-C2	1.35	81	15.00
PR-C3	1.49	93	1.80
TOTAL	**29.46**		

The watershed peak rate discharges for the 1, 10 and 100 year - 24 hour storm events were computed and evaluated at the design point. The peak rates are presented in Table 9. Stormwater computations are attached at the end of this report in Appendices 7, 8 and 9.

5.2 WATER QUALITY VOLUME

The second step of the Stormwater Site Planning process is determination of the required water quality treatment volume (WQ_v). WQ_v is calculated using the 90% Rule as defined by NYSDEC Stormwater Management Design Manual. The 90% Rule is defined as:

$$WQ_v = [(P)(R_v)(A)] / 12$$

Where: P is the 90% Rainfall Event Number
R_v is equal to 0.05 + 0.009*I *(Minimum 0.2)*
I is the Impervious Cover in percent
A is the subarea total acreage

There are multiple stormwater management practices (SMP's) included in this SWPPP to treat the quality of stormwater runoff prior to discharging from the site. Possible pollutants that may be present are expected to be from but not limited to sediment deposited on newly created impervious surfaces, possible erosion due to construction, and airborne particles created by wind during construction.

The WQ_v was calculated for the entire watershed within the area of development; the results are included in Table 3 below.

TABLE 3: REQUIRED WATER QUALITY VOLUME

WATERSHED	WQ_v (Ac-ft)
PR-B	0.554
PR-C	0.125

5.3 RUNOFF REDUCTION VOLUME

Step three of the Stormwater Site Planning process is the incorporation of "green infrastructure technologies" and standard SMP's with runoff reduction volume (RR_v) capacity. The intended result of RR_v, is to treat 100% of the WQ_v and replicate pre-development hydrology, however if unattainable, provide the minimum RR_v required and provide additional treatment for the remaining WQ_v. Each of the following green technologies and standard SMP's with RR_v capacity were analyzed for implementation along with an explanation of how they are used or unable to be used on this project.

Green Technologies

- Conservation of Natural Areas
  - A portion of the site will remain unaffected by the proposed project; this area is protected by zoning laws that state that a 50 foot wide buffer be provided on all property lines adjacent to a residential property. These areas were not accounted for in the RRv calculations to provide a more conservative design.
- Sheet flow to Riparian Buffers / Filter Areas
  - Riparian buffers were not considered since all "point discharges" discharge to an existing storm system.
- Vegetated Open Swales
  - Due to the limitations set forth by the contributory areas along with the existing and proposed topography of the site, no vegetative swales were incorporated into the design although several small vegetative swales are used for conveyance to standard stormwater practices on site.
- Tree Planting / Tree Box

  - The proposed site design will include a landscaping design however the planting strips will not be utilized for the treatment of WQ_v and area therefore not applied to this project.

- Disconnection of Rooftop runoff
  - Rooftop disconnect will not be utilized as an area reduction; however the stormwater contributory to the rooftop of the proposed structure will be treated through other green technologies and in standard SMP's.
- Stream Daylighting
  - There are no closed drainage courses on site, and therefore the practice of stream daylighting was not utilized.
- Rain Gardens
  - The limitation of contributory drainage areas result in rain gardens not being utilized as a green technology for this project.
- Green Roof
  - Green roofs are not proposed on the proposed structures for the following reasons:
    - Cold Climate restricts, planting type and survival.
    - Maintenance procedures
    - Limited access provisions
- Stormwater Planters
  - Stormwater planters are suitable for small runoff areas such as rooftops or plaza and courtyards. Stormwater planters work very well within urban redevelopment projects with appropriate soils. Therefore, the green technology of stormwater planters was not implemented.
- Rain Tanks/Cistern
  - Rain Tanks and cisterns are well-suited to treat rooftop runoff, however as previously stated, the rooftop runoff will be treated through standard SMP's. In addition, there are cold climate concerns associated with rain tanks and cisterns that could cause problems if used at this site.

- Porous Pavement
    - The anticipated high volume of vehicular movement and issues associated with snow removal can not be supported. Therefore, porous pavement technology was not included in the design of the project.

Standard SMP's with RR_v Capacity

- Infiltration Practice
    - The project proposes the use of two (2) infiltration basins, one near the proposed building, with the second located near Kings Highway.
- Bio-Retention Practice
    - A bio-retention facility was not considered for this site due to limitations set forth by the natural grading of the site. The use of underdrains would not be feasible as there would not be sufficient elevation to daylight the underdrains to a discharge point.
- Dry Swale (Open Channel Practice)
    - Similarly to vegetative swale, dry swales were not considered for this project due to limitations created by the contributory area requirements and the varying topography of the site. Any such swales would create a larger area of disturbance for the project.

The RR_v for each of the green technology used as stated above has been calculated for the Design Point. The total RR_v was calculated and compared to the WQ_v for the Design Point. The green technologies proposed were able to reduce the tributary WQ_v by 100%.

Step four of the process is to determine the $RR_{v(min)}$ is based upon the hydrological soil group (HSG) classification within the watershed and has a defined Specific Reduction Factor (*S*). The reduction factors for each HSG are shown below in Table 4. Based upon the $RR_{v(min)}$ a revised WQ_v was then calculated to determine the WQ_v required to be treated by standard SMP's.

TABLE 4: SPECIFIC REDUCTION FACTOR (S)

HSG	*S*
A	0.55
B	0.40
C	0.30
D	0.20

$RR_{v(min)}$ is then compared to the total RR_v provided to ensure that the green technologies proposed provide the minimum reduction of the WQ_v as RR_v. The $RR_{v(min)}$, the total RR_v provided and the revised required WQ_v to be provided by standard SMP's are shown below in Table 5. The calculations for the required and adjusted water quality volumes along with the runoff reduction volumes are shown in Appendix 5.

TABLE 5: RUNOFF REDUCTION VOLUMES & REVISED WQ_v

WATERSHED	RR_v MIN (Ac-ft)	Total RR_v (Ac-ft)	Revised WQ_v (Ac-ft)
PR-B	0.105	0.499	0.000
PR-C	0.025	0.112	0.000

5.4 APPLICATION OF STANDARD SMP'S FOR THE REVISED WQ_v

The RR_v does reduce the required WQ_v treatment however; it does not completely eliminate the need to provide treatment through standard stormwater management practices. Continuing with the Stormwater Site Planning process, step five is to ensure that the remaining WQ_v is provided. WQ_v is provided within each of the proposed stormwater management facilities. The WQ_v provided in each of the standard stormwater management practices is shown below in Table 6.

TABLE 6: WQ_v PROVIDED IN STANDARD SMP'S

WATERSHED	Revised Required WQ_v (Ac-ft)	WQ_v Provided (Ac-ft)
PR-B	0.000	0.570
PR-C	0.000	0.321

5.5 VOLUME AND PEAK RATE CONTROL

The sixth and final step of the Stormwater Site Planning process is to apply volume and peak rate control through the use of standard stormwater management

practices. Two (2) on-site stormwater facilities, Infiltration Basins (I-2) are proposed to mitigate any increase in peak runoff from the proposed site improvements. The basins have been designed to provide both water quality and peak rate control in accordance with NYSDEC Phase II stormwater guidelines. The following NYSDEC stormwater design criteria are achieved:

- All pretreatment ponds are to be lined with clay, or impermeable fabric, to prevent potential infiltration of water quality contaminants into the aquifer.
- Infiltration practices cannot be located on areas with natural slopes greater than 15%
- Infiltration practices cannot be located in fill soils.
- The bottom of the infiltration facility shall be separated by at least three (3) feet vertically from the seasonally high water table or bedrock layer.
- Infiltration practices shall be located at least 100 feet horizontally from any water supply well.
- Infiltration basins shall be setback 25 feet down gradient from structures and septic systems.
- All infiltration systems shall be designed to fully de-water the entire WQ_V within 48 hours after the storm event.
- If the f_c for the underlying soils is greater than 5.00 inches per hour, 100% of the WQ_V shall be pretreated prior to entry into an infiltration facility.

5.5.1 CHANNEL PROTECTION VOLUME

The required volume control consists of Channel Protection Volume (Cp_v) which is designed to protect downstream channels from erosion. The Cp_v is achieved through providing extended detention of the 1-year storm event for any volume not previously reduced through runoff reduction volume reduction (RR_v), for a period of 24 hours. The calculated 1 year storm event runoff volume along with the required Cp_v volume provided are shown in Table 7. The Cp_v detention time is shown in Table 8 below and the calculated results are shown in Appendix 9.

TABLE 7: CALCULATED CHANNEL PROTECTION VOLUME (Cp_v)

BASIN	1-Yr Runoff Volume (Ac-ft)	RR_v Provided (Ac-ft)	Cp_v Required (Ac-ft)	Cp_v Provided (Ac-ft)
POND B	1.170	0.499	0.671	1.170
POND C	0.224	0.112	0.112	0.224

TABLE 8: Cp_v EXTENDED DETENTION TIMES

FACILITY	Cp_v ED Time (hrs)
POND B	> 24 *
POND C	> 24 *

* These infiltration basins are adequately sized to infiltrate the entire 1 year storm event runoff volume

5.5.2 PEAK RATE CONTROL

The peak discharge rate is controlled utilizing the storage volume available in the stormwater ponds and controlling discharge through an outlet structure releasing the runoff over a greater period of time. The watershed responses to the 1, 10 and 100 year - 24 hour storm events were computed and evaluated at the aforementioned design point. The peak rates of runoff realized at the design points are presented in Table 9. Stormwater computations are attached at the end of this report.

The total peak runoff rates at the design point for the existing condition as well as the final proposed condition have been calculated and shown below in Table 9. The peak runoff rates have been reduced in the proposed conditions during the 1, 10 and 100 year design storms.

TABLE 9: SUMMARY OF RESULTS AT THE DESIGN POINTS

Criteria		DP-A	DP-B	DP-C
1 – YEAR (Cp_v)	Existing (cfs)	4.29	6.99	5.67
	Proposed (cfs)	4.18	0.00	1.27
	Reduction (cfs)	**-0.11**	**-6.99**	**-4.40**
	Reduction (%)	**-2.6%**	**-100%**	**-77.6%**
10 – YEAR (Q_p)	Existing (cfs)	14.26	22.55	17.64
	Proposed (cfs)	14.01	4.30	3.47
	Reduction (cfs)	**-0.25**	**-18.25**	**-14.17**
	Reduction (%)	**-1.8%**	**-80.9%**	**-80.3%**
100 – YEAR (Q_f)	Existing (cfs)	34.45	53.62	41.12
	Proposed (cfs)	33.86	28.29	32.18
	Reduction (cfs)	**-0.59**	**-25.33**	**-8.94**
	Reduction (%)	**-1.7%**	**-47.2%**	**-21.7%**

Post construction stormwater peak runoff rates have been proven to decrease in comparison to the pre-development conditions for all storm events, therefore the proposed development is in accordance with the requirements of the NYSDEC Stormwater Design Manual.

5.6 STORMWATER RUNOFF AND NATURAL RESOURCE MANAGEMENT

The implemented SWPPP for Suresky and Sons will also incorporate the following water and natural resource management objectives.

a. Prevent increases in flooding and flood damage through the reduction of the rate of runoff from the total drainage basin.

b. Reduce the erosion potential from the development through the reduction of the rate of runoff from the project site and through the implementation of the soil and erosion control measures outlined on the project plans and as highlighted herein.

c. Decreases non-point source pollution and water quality degradation through the use of multiple “green technologies” including vegetated open swales, tree plantings, and roof top connections.

6.0 EROSION AND SEDIMENT CONTROL MEASURES

Soil erosion and sediment control measures have been detailed in specifics on the design and summarized herein. The following are general measures that should be implemented:

a. Damage to surface waters resulting from erosion and sedimentation shall be minimized by stabilizing disturbed areas and by removing sediment from construction site discharge.

b. Following the completion of construction activities in any portion of the site, permanent vegetation shall be re-established on all exposed soils within 14 days. Also, in areas where construction will temporarily cease for 21 days or more, the site shall be stabilized within 7 days of the last construction activity. After completion of final rough grading, topsoil shall be spread to a depth of 6 inches or more and tested for nutrient and soil composition. The topsoil shall be amended as necessary to encourage successful growth of proposed vegetation.

c. Site preparation activities shall be planned to minimize the area and duration of soil disturbance. The plans approved for construction contains a detailed "Erosion Control Plan" which depicts the limits of grading along with the required earth cut and fill locations (including stockpile locations if necessary). In addition, any additional site specific erosion control measures required are shown on the approved plans for construction. The proposed project site construction will require the disturbance of +/-9.7 acres. There are extensive cuts and fills required to achieve proposed finish grade, therefore a waiver will be requested from the MS4 allowing the applicant to disturb more than the 5 acres as allowed by the current NYSDEC Stormwater Design Manual. The following additional requirements shall be met upon receipt of such waiver:

- The required site inspections by the qualified inspector shall occur two (2) times every seven (7) days.
- In areas where disturbance has temporarily or permanently ceased, stabilization shall be implemented within seven (7) days from the ceasing of soil disturbance activity.

d. Permanent traffic corridors shall be established and “routes of convenience” shall be avoided. Offsite sediment tracking shall be minimized through regularly scheduled sweeping and good housekeeping of construction vehicles.

e. A qualified professional shall inspect and log the erosion and sediment control measures once every seven days once earth disturbance has commenced and continue until the site has achieved final stabilization. During times of possible inactivity (i.e. winter months), upon the site being temporarily stabilized, the professional shall perform inspections monthly. The professional shall make recommendations to the operator on how to maintain the integrity and function of all temporary erosion control measures throughout the duration of the development process. Any deficiencies in the measures shall be corrected as soon as possible by the operator.

f. An up to date Construction Site Log Book which includes this SWPPP for Suresky & Sons shall be maintained on site at all times during construction. The Construction Site Log Book shall also include the items found in the most recent version of the New York Standards and Specifications for Erosion and Sediment Control.

In particular, the following erosion and sediment control measures will be implemented:

a. Pre-Construction Installation: Prior to any disturbance on site, silt fence shall be installed in accordance with the approved plans in the area of disturbance. A stabilized construction entrance shall be established as shown on the Erosion Control Plans. Siltation barriers shall be maintained in good condition and reinforced, extended, repaired or replaced as necessary.

b. Temporary Sediment Basins: Temporary sediment basins shall be constructed as shown on the plans to intercept sediment filled runoff prior to discharge from the disturbed area into existing storm drainage systems or other natural features. Each sediment basin shall be sized appropriately in accordance with the NYS Standards and Specifications for Erosion and Sediment Control. The proposed contributory drainage area to the proposed sediment basin has been

calculated and the proposed size of the sediment basin is shown in Appendix 9.

c. Stone Check Dams: Until such time as final site stabilization is completed, only temporary swales/ditches shall receive treatment with stone check dams so as to effectively trap sediment and minimize its release off-site. Stone check dams shall be constructed within each ditch beginning at its downstream terminus and should be placed at intervals of less than 250 feet.

d. In no case shall erodible materials be stockpiled within 25 feet of any ditch, stream or other surface water body.

e. Permanent vegetative cover: Immediately following the completion of construction activity in any portion of the site, permanent vegetation shall be established on all exposed soils by properly seeding at a coverage rate as noted on the approved plans and covered with straw. Water shall be applied to newly seeded areas as needed until grass cover is well established.

f. Washouts shall be immediately repaired, reseeded and protected from further erosion. All accumulated sediment shall be removed and contained in appropriate spoil areas. To effectively control wind erosion, water shall be applied to all exposed soils as necessary.

7.0 LONG TERM MAINTENANCE OF WATER QUALITY FACILITIES

Upon completion of the project, the stormwater facilities shall be maintained by the owner. The project owner shall be responsible to ensure that the facilities operate and function as designed through proper maintenance as follows.

a. Regular inspection and maintenance of the proposed facilities is required to ensure its long term water quality and quantity reduction functions. Maintenance requirements for the facilities are as follows:

    i. The pretreatment ponds of each facility shall have accumulated sediment removed every five to six years or when the accumulation level has reached 50% of the pond's capacity. The 50% level will be measured and indicated by the permanent sediment marker installed in each pond.

ii. All outlet structures shall be inspected annually for debris and operability. Any deficiencies shall be repaired or removed immediately.

iii. The side slopes of the facilities shall be mowed at a minimum of twice a year.

iv. Street sweeping shall be performed annually or when conditions require cleaning.

b. A removable trash rack to be provided on the outlet structure top.

8.0 SUMMARY OF FINDINGS AND CONCLUSIONS

This SWPPP has been designed in accordance with criteria as set forth in the New York State Stormwater Management Design Manual. Post-development peak discharge rates will be reduced below pre-development peak discharge rates or their impacts minimized. Sediment and erosion control measures are designed to minimize erosion loss and downstream sediment deposits.

This SWPPP has been prepared by a professional engineer and is conformance with all the requirements set forth by the NYSDEC GP-0-15-002 and is eligible for coverage under GP-0-15-002 5 days after upon filing of the Notice of Intent.

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APPENDIX 1

FIGURES

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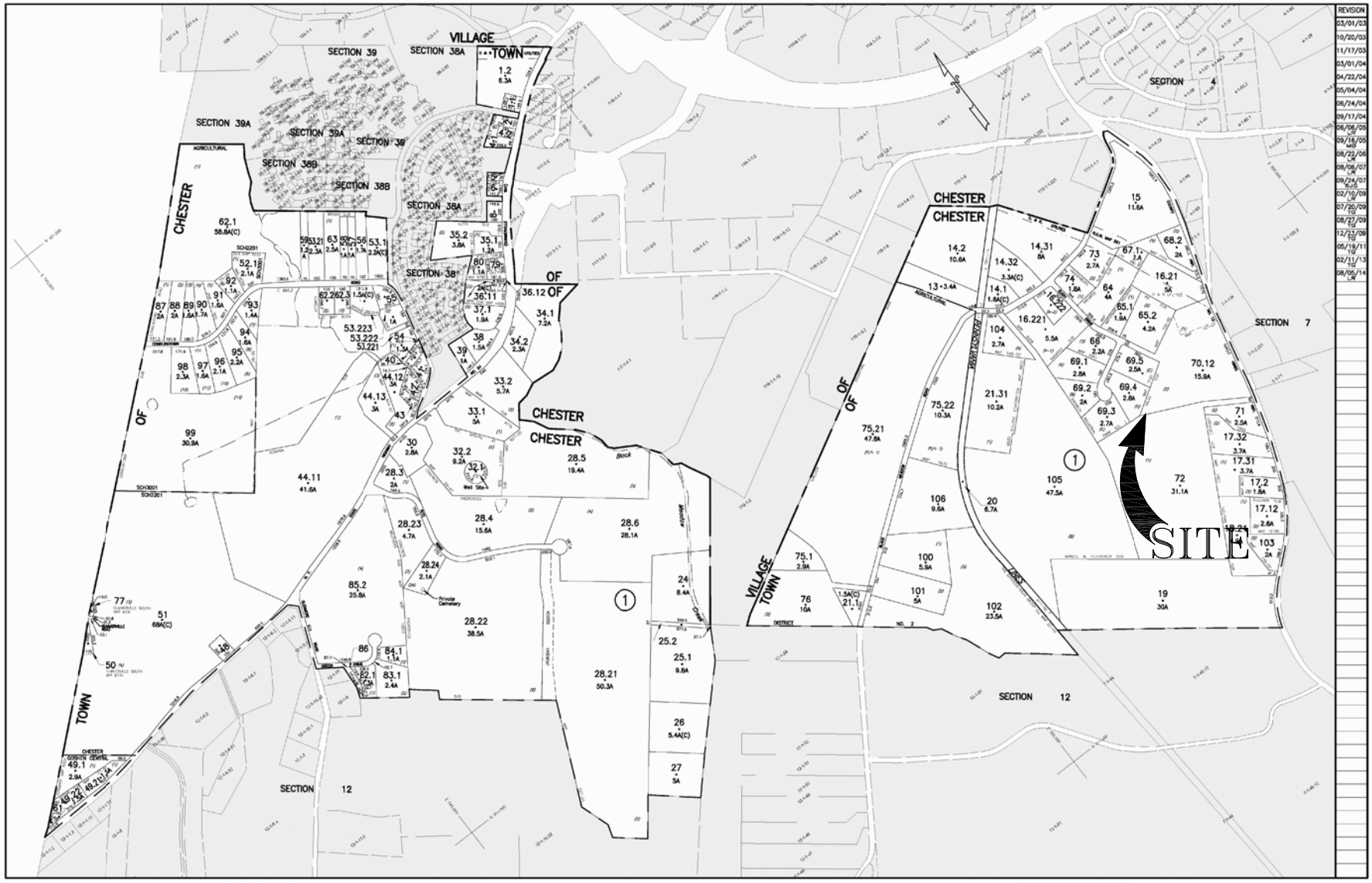

LEGEND

STATE OR COUNTY LINE	FILED PLAN LOT LINE	TAX MAP BLOCK NO.	FILED PLAN BLOCK NO.		
CITY TOWN OR VILLAGE	EASEMENT LINE	TAX MAP PARCEL NO. 32	FILED PLAN LOT NO. (3) or (P/o 2)		
BLOCK OR SECTION LIMIT	MATCH LINE	AREAS [DEED] 11.1A or [CALCULATED] 11.0A(C)	STATE HIGHWAYS	N Y STATE HWY NO 17	
SPECIAL DISTRICT LINE	WATER FEATURES	DIMENSIONS [DEED] 66 or [CALCULATED] 75S	COUNTY HIGHWAYS	COUNTY ROAD NO 4	
PROPERTY LINE	GRID COORDINATE/CONTROID	PORTION OF TAX LOT F/o 1-1-1	TOWN ROADS	TOWN ROAD 1	

ORANGE COUNTY—NEW YORK

Prepared by
Orange County Tax Map Department
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Phone 845.291.2498 Fax 845.291.2499

NOTICE
MAINTENANCE, ALTERATION, SALE OR DISTRIBUTION OF ANY PORTION OF THE ORANGE COUNTY TAX MAP IS PROHIBITED WITHOUT WRITTEN PERMISSION OF THE O.C. REAL PROPERTY TAX SERVICE AGENCY

NOT TO BE REPRODUCED FOR COMMERCIAL PURPOSES FOR TAX PURPOSES ONLY
NOT TO BE USED FOR CONVEYANCE

ADJOINING REFERENCE

332289
TOWN OF CHESTER

Scale 1" = 400' Section No. 6

TAX YEAR 2015

SITE LOCATION MAP	SURESKY & SONS 39 ELKAY DRIVE TOWN OF CHESTER ORANGE COUNTY, NEW YORK	DATE: JULY 2015	JOB # 1081.02	ENGINEERING & SURVEYING PROPERTIES Achieving Successful Results with Innovative Designs
		SCALE: NTS	SHEET # F-1	71 CLINTON STREET MONTGOMERY, NY 12549 Ph: (845) 457-7727 Fx: (845) 457-1899

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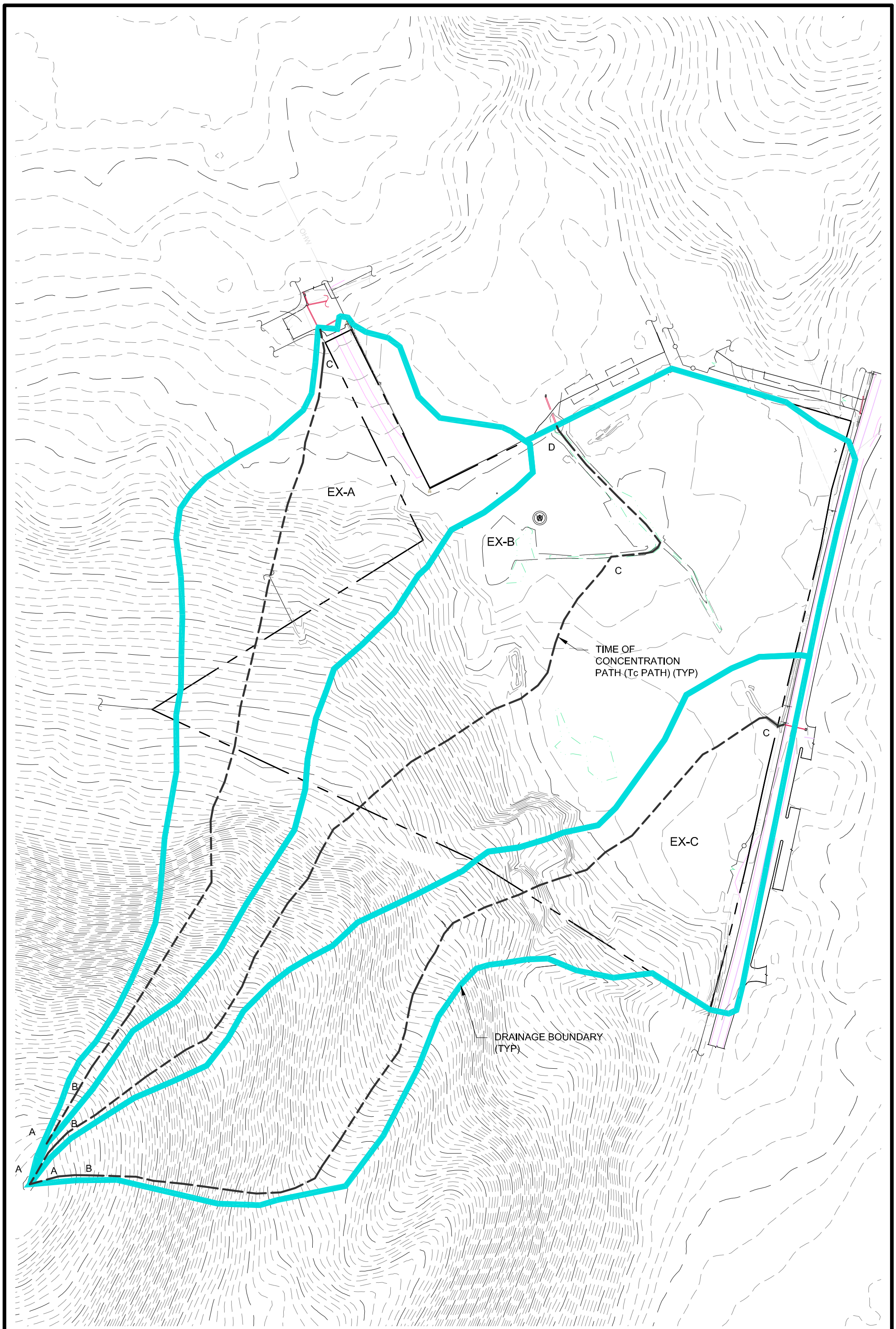

EXISTING CONDITIONS	SURESKY & SONS 39 ELKAY DRIVE TOWN OF CHESTER ORANGE COUNTY, NEW YORK	DATE: JULY 2015 SCALE: 1" = 150'	JOB # 1081.02 SHEET # F-2	ENGINEERING & SURVEYING PROPERTIES Achieving Successful Results with Innovative Designs

71 CLINTON STREET
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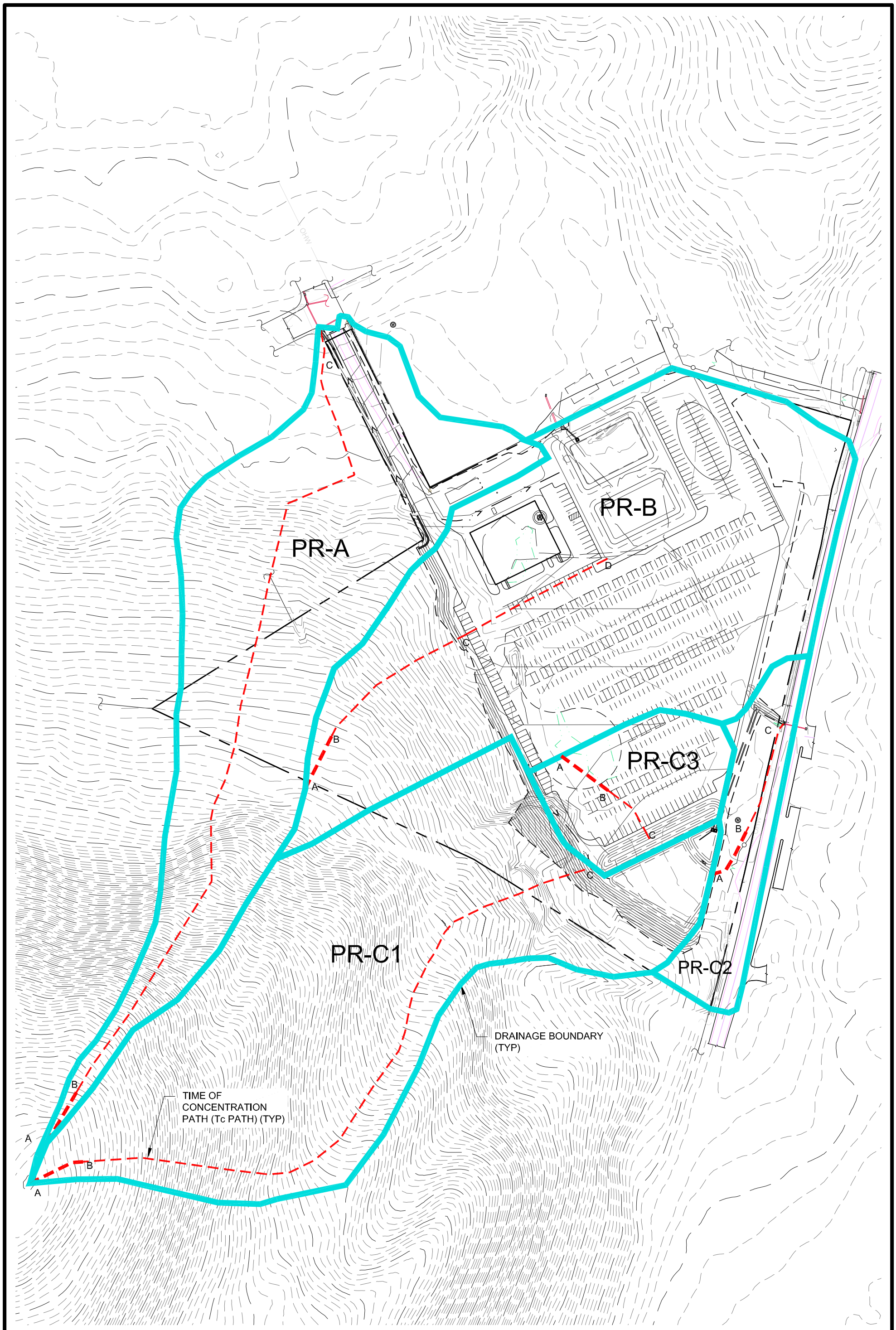

PROPOSED CONDITIONS	SURESKY & SONS 39 ELKAY DRIVE TOWN OF CHESTER ORANGE COUNTY, NEW YORK	DATE: 08/08/17	JOB # 1081.02	ENGINEERING & SURVEYING PROPERTIES Achieving Successful Results with Innovative Designs	71 CLINTON STREET MONTGOMERY, NY 12549 Ph: (845) 457-7727 Fx: (845) 457-1899
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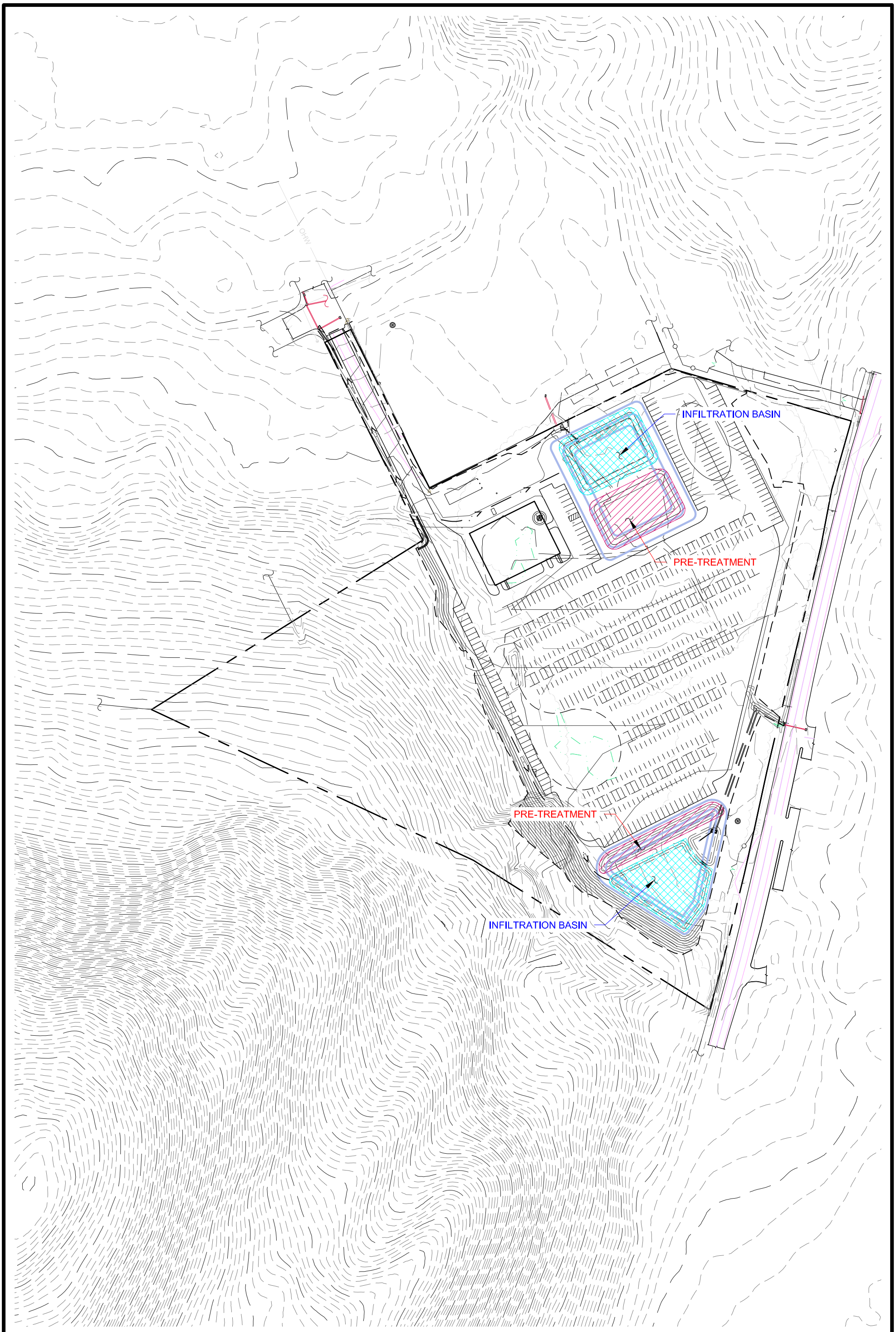

GREEN INFRASTRUCTURE	SURESKY & SONS 39 ELKAY DRIVE TOWN OF CHESTER ORANGE COUNTY, NEW YORK	DATE: 08/08/17 SCALE: 1" = 150'	JOB # 1081.02 SHEET # F-4	ENGINEERING & SURVEYING PROPERTIES Achieving Successful Results with Innovative Designs

71 CLINTON STREET
MONTGOMERY, NY 12549
Ph: (845) 457-7727
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APPENDIX 2

SOILS MAP AND

CLASSIFICATIONS

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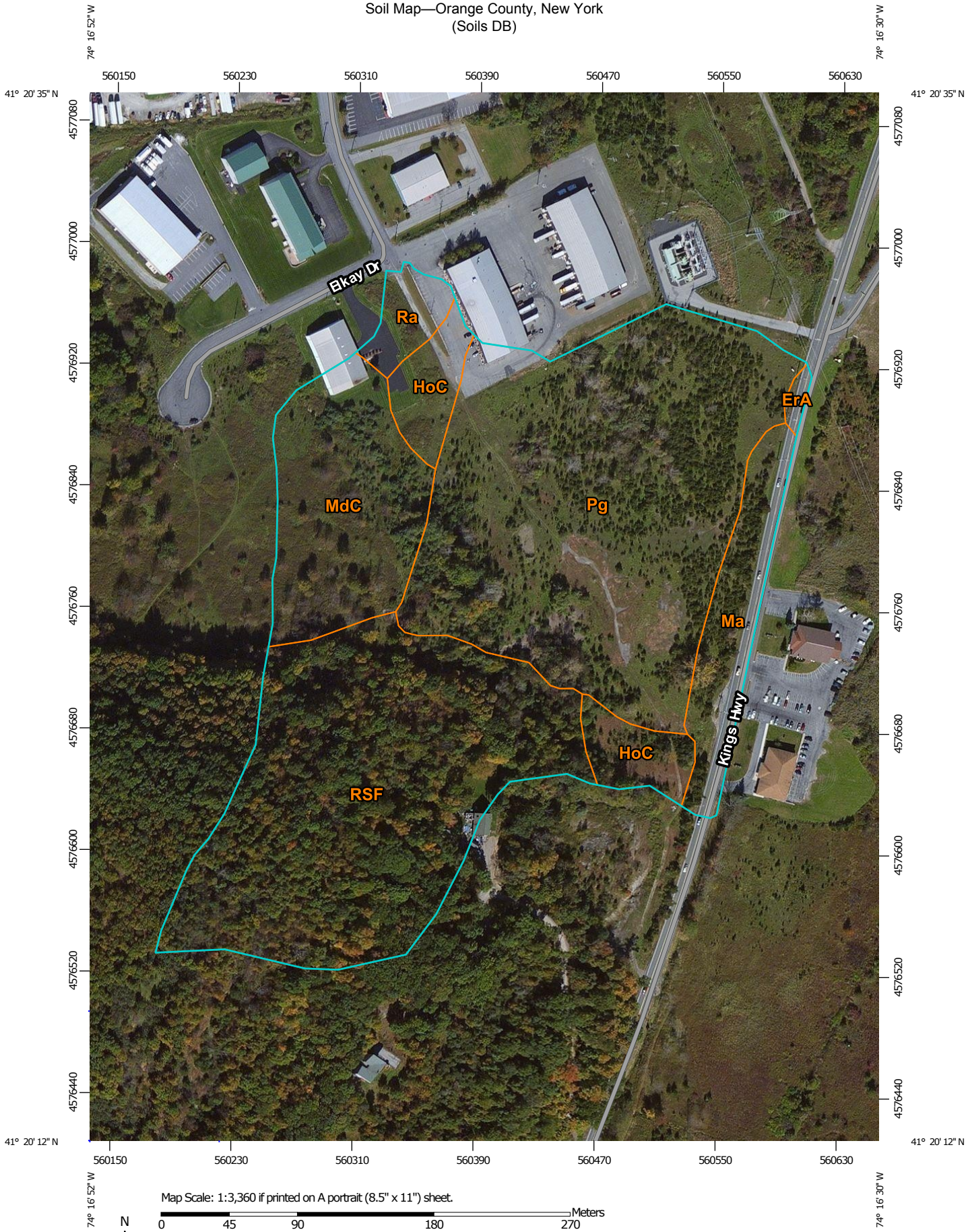
Soil Map—Orange County, New York
(Soils DB)



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 1:15,800.

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: http://websoilsurvey.nrcs.usda.gov
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: Orange County, New York
Survey Area Data: Version 15, Sep 17, 2014

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

Date(s) aerial images were photographed: Mar 20, 2011—Oct 10, 2011

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

Orange County, New York (NY071)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
ErA	Erie gravelly silt loam, 0 to 3 percent slopes	0.1	0.4%
HoC	Hoosic gravelly sandy loam, 8 to 15 percent slopes	1.6	5.4%
Ma	Madalin silt loam	1.9	6.3%
MdC	Mardin gravelly silt loam, 8 to 15 percent slopes	3.7	12.7%
Pg	Pits, gravel	11.7	39.8%
Ra	Raynham silt loam	0.6	2.1%
RSF	Rock outcrop-Nassau complex, very steep	9.8	33.4%
Totals for Area of Interest		**29.5**	**100.0%**

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APPENDIX 3

CURVE NUMBER

CALCULATIONS

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ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

CURVE NUMBER (CN) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**1**	**8**

PROJECT TITLE: **Suresky & Sons**
LOCATION: **Town of Chester**
CALCULATED BY: **KW**
APPROVED BY: **JS**
REF DRAWING(S):

1. Runoff curve number (CN) [Existing] Proposed Subarea: **EX-A**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
	Impervious	98	1.05	102.90
A	Lawn - good	39	0.11	4.29
D	Lawn - good	80	0.26	20.80
A	Brush - good	30	0.48	14.40
D	Brush - good	73	3.38	246.74
D	Woods - good	77	2.36	181.72
		TOTAL =	7.64	570.85

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{570.85}{7.64}$$

CN (weighted) = 74.719 Use CN= **75**

2. Runoff S = 3.33

		Storm #1	*Storm #2*	*Storm #3*
Frequency	yr			
Rainfall, P	in			
Runoff, Q	in			

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

CURVE NUMBER (CN) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**2**	**8**

PROJECT TITLE: **Suresky & Sons**
LOCATION: **Town of Chester**
CALCULATED BY: **KW**
APPROVED BY: **JS**
REF DRAWING(S):

1. Runoff curve number (CN) Existing Proposed Subarea: **EX-B**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
	Impervious	98	0.10	9.80
D	Woods - good	77	9.99	769.23
D	Brush - good	73	2.96	216.08
		TOTAL =	13.05	995.11

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{995.11}{13.05}$$

CN (weighted) = 76.254 Use CN= **76**

2. Runoff S = 3.16

		Storm #1	*Storm #2*	*Storm #3*
Frequency	yr			
Rainfall, P	in			
Runoff, Q	in			

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

CURVE NUMBER (CN) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**3**	**8**

PROJECT TITLE: **Suresky & Sons**
LOCATION: **Town of Chester**
CALCULATED BY: **KW**
APPROVED BY: **JS**
REF DRAWING(S):

1. Runoff curve number (CN) Existing Proposed Subarea: **EX-C**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
	Impervious	98	0.30	29.40
D	Woods - good	77	7.13	549.01
D	Brush - good	73	1.34	97.82
		TOTAL =	8.77	676.23

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{676.23}{8.77}$$

CN (weighted) = 77.107 Use CN= **77**

2. Runoff S = 2.99

		Storm #1	*Storm #2*	*Storm #3*
Frequency	yr			
Rainfall, P	in			
Runoff, Q	in			

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

CURVE NUMBER (CN) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**4**	**8**

PROJECT TITLE: **Suresky & Sons**
LOCATION: **Town of Chester**
CALCULATED BY: **KW**
APPROVED BY: **JS**
REF DRAWING(S):

1. Runoff curve number (CN) Existing [Proposed] Subarea: **PR-A**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
	Impervious	98	1.13	110.74
A	Lawn - good	39	0.13	5.07
D	Lawn - good	80	0.50	40.00
A	Brush - good	30	0.42	12.60
D	Brush - good	73	2.97	216.81
D	Woods - good	77	2.36	181.72
		TOTAL =	7.51	566.94

$$CN\ (weighted) = \frac{\text{total product}}{\text{total area}} = \frac{566.94}{7.51}$$

CN (weighted) = 75.491 Use CN= **75**

2. Runoff S = 3.33

		Storm #1	*Storm #2*	*Storm #3*
Frequency	yr			
Rainfall, P	in			
Runoff, Q	in			

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

CURVE NUMBER (CN) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**5**	**8**

PROJECT TITLE: **Suresky & Sons**

LOCATION: **Town of Chester**

CALCULATED BY: **KW**

APPROVED BY: **JS**

REF DRAWING(S):

1. Runoff curve number (CN) Existing [Proposed] Subarea: **PR-B**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
	Impervious	98	4.73	463.54
D	Lawn - good	80	1.92	153.60
D	Brush - good	73	1.21	88.33
D	Woods - good	77	1.91	147.07
		TOTAL =	9.77	852.54

$$CN\ (weighted) = \frac{\text{total product}}{\text{total area}} = \frac{852.54}{9.77}$$

CN (weighted) = 87.261 Use CN= **87**

2. Runoff S = 1.49

		Storm #1	*Storm #2*	*Storm #3*
Frequency	yr			
Rainfall, P	in			
Runoff, Q	in			

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

CURVE NUMBER (CN) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**6**	**8**

PROJECT TITLE: **Suresky & Sons**
LOCATION: **Town of Chester**
CALCULATED BY: **KW**
APPROVED BY: **JS**
REF DRAWING(S):

1. Runoff curve number (CN) Existing [Proposed] Subarea: **PR-C1**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
D	Lawn - good	80	0.67	53.60
D	Brush - good	73	0.36	26.28
D	Woods - good	77	8.31	639.87
		TOTAL =	9.34	719.75

$$CN\ (weighted) = \frac{\text{total product}}{\text{total area}} = \frac{719.75}{9.34}$$

CN (weighted) = 77.061 Use CN= **77**

2. Runoff S = 2.99

		Storm #1	*Storm #2*	*Storm #3*
Frequency	yr			
Rainfall, P	in			
Runoff, Q	in			

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

CURVE NUMBER (CN) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**7**	**8**

PROJECT TITLE: **Suresky & Sons**
LOCATION: **Town of Chester**
CALCULATED BY: **KW**
APPROVED BY: **JS**
REF DRAWING(S):

1. Runoff curve number (CN) Existing | Proposed | Subarea: **PR-C2**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
	Impervious	98	0.30	29.40
D	Lawn - good	80	0.09	7.20
D	Brush - good	73	0.41	29.93
D	Woods - good	77	0.55	42.35
	TOTAL =		1.35	108.88

$$CN\ (weighted) = \frac{\text{total product}}{\text{total area}} = \frac{108.88}{1.35}$$

CN (weighted) = 80.652 Use CN= **81**

2. Runoff S = 2.35

		Storm #1	*Storm #2*	*Storm #3*
Frequency	yr			
Rainfall, P	in			
Runoff, Q	in			

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

CURVE NUMBER (CN) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**8**	**8**

PROJECT TITLE: **Suresky & Sons**
LOCATION: **Town of Chester**
CALCULATED BY: **KW**
APPROVED BY: **JS**
REF DRAWING(S):

1. Runoff curve number (CN) Existing [Proposed] Subarea: **PR-C1**

Soil Name & Hydrologic Group	Cover Description (cover type, treatment & conditions)	CN	Area (acres)	Product of CN x Area
	Impervious	98	1.11	108.78
D	Lawn - good	80	0.38	30.40
		TOTAL =	1.49	139.18

$$CN\ (weighted) = \frac{\text{total product}}{\text{total area}} = \frac{139.18}{1.49}$$

CN (weighted) = 93.409 Use CN= **93**

2. Runoff S = 0.75

		Storm #1	*Storm #2*	*Storm #3*
Frequency	yr			
Rainfall, P	in			
Runoff, Q	in			

(Use P and CN with table 2-1, fig 2-1, or eqns. 2-3 and 2-4)

APPENDIX 4

TIME OF CONCENTRATION

CALCULATIONS

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ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

TIME OF CONCENTRATION (Tc) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**1**	**8**

PROJECT TITLE: **Suresky & Sons**
LOCATION: **Town of Chester**
CALCULATED BY: **KW**
APPROVED BY: **JS**
REF DRAWING(S):

Existing / Proposed Area: **EX-A**

1. Sheet Flow

		Segment ID	A - B				
Surface Description (table 3-1)			Woods: D				
Manning's roughness coeff., 'n' (table 3-1)			0.80				
Flow length, L (total L ≤ 300 ft)	ft		100				
Two-year 24-hour rainfall, P_2	in		3.50				
Land Slope, s	ft/ft		0.160				
$T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,s^{0.4}}$	hr		0.259				0.259

2. Shallow Concentrated Flow

		Segment ID	B - C				
Surface description (paved or unpaved)			Unpaved				
Flow length, L	ft		1,490.0				
Watercourse slope, s	ft/ft		0.220				
Average velocity, V (figure 3-1)	ft/s		7.568				
$T_t = \frac{L}{3600\,V}$	hr		0.055				0.055

3. Channel Flow

		Segment ID					
Cross sectional flow area, a	ft^2						
Wetted perimeter, p_w	ft						
Hydraulic radius, $r = a/p_w$	ft						
Channel slope, s	ft/ft						
Manning's roughness coefficient, n							
$V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$	ft/s						
Flow Length, L	ft						
$T_t = \frac{L}{3600\,V}$	hr						

Total Tc For Watershed or Subarea (Add Steps 6, 11, and 19) hr = **0.31**

min = **18.60**

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

TIME OF CONCENTRATION (Tc) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**2**	**8**

PROJECT TITLE: **Suresky & Sons**
LOCATION: **Town of Chester**
CALCULATED BY: **KW**
APPROVED BY: **JS**
REF DRAWING(S):

Existing | Proposed Area: **EX-B**

1. Sheet Flow

		Segment ID	A - B				
Surface Description (table 3-1)			Woods: D				
Manning's roughness coeff., 'n' (table 3-1)			0.80				
Flow length, L (total L ≤ 300 ft)	ft		100				
Two-year 24-hour rainfall, P_2	in		3.50				
Land Slope, s	ft/ft		0.080				
$T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,s^{0.4}}$	hr		0.342				0.342

2. Shallow Concentrated Flow

		Segment ID	B - C				
Surface description (paved or unpaved)			Unpaved				
Flow length, L	ft		1,417.0				
Watercourse slope, s	ft/ft		0.220				
Average velocity, V (figure 3-1)	ft/s		7.568				
$T_t = \frac{L}{3600\,V}$	hr		0.052				0.052

3. Channel Flow

		Segment ID	C - D				
Cross sectional flow area, a	ft^2		1.77				
Wetted perimeter, p_w	ft		4.71				
Hydraulic radius, $r = a/p_w$	ft		0.38				
Channel slope, s	ft/ft		0.008				
Manning's roughness coefficient, n			0.025				
$V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$	ft/s		2.776				
Flow Length, L	ft		362.0				
$T_t = \frac{L}{3600\,V}$	hr		0.036				0.036

Total Tc For Watershed or Subarea (Add Steps 6, 11, and 19) hr = **0.43**

min = **25.80**

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

TIME OF CONCENTRATION (Tc) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**3**	**8**

PROJECT TITLE: **Suresky & Sons**
LOCATION: **Town of Chester**
CALCULATED BY: **KW**
APPROVED BY: **JS**
REF DRAWING(S):

Existing | Proposed Area: **EX-C**

1. Sheet Flow

		Segment ID	A - B				
Surface Description (table 3-1)			Woods: D				
Manning's roughness coeff., 'n' (table 3-1)			0.80				
Flow length, L (total L ≤ 300 ft)	ft		100				
Two-year 24-hour rainfall, P_2	in		3.50				
Land Slope, s	ft/ft		0.150				
$T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,s^{0.4}}$	hr		0.266				0.266

2. Shallow Concentrated Flow

		Segment ID	B - C				
Surface description (paved or unpaved)			Unpaved				
Flow length, L	ft		1,621.0				
Watercourse slope, s	ft/ft		0.188				
Average velocity, V (figure 3-1)	ft/s		6.996				
$T_t = \frac{L}{3600\,V}$	hr		0.064				0.064

3. Channel Flow

		Segment ID					
Cross sectional flow area, a	ft^2						
Wetted perimeter, p_w	ft						
Hydraulic radius, $r = a/p_w$	ft						
Channel slope, s	ft/ft						
Manning's roughness coefficient, n							
$V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$	ft/s						
Flow Length, L	ft						
$T_t = \frac{L}{3600\,V}$	hr						

Total Tc For Watershed or Subarea (Add Steps 6, 11, and 19) hr = **0.33**

min = **19.80**

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

TIME OF CONCENTRATION (Tc) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**4**	**8**

PROJECT TITLE: **Suresky & Sons**
LOCATION: **Town of Chester**
CALCULATED BY: **KW**
APPROVED BY: **JS**
REF DRAWING(S):

Existing [Proposed] Area: **PR-A**

1. Sheet Flow

		Segment ID	A - B				
Surface Description (table 3-1)			Woods: D				
Manning's roughness coeff., 'n' (table 3-1)			0.80				
Flow length, L (total L ≤ 300 ft)	ft		100				
Two-year 24-hour rainfall, P_2	in		3.50				
Land Slope, s	ft/ft		0.160				
$T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,s^{0.4}}$	hr		0.259				0.259

2. Shallow Concentrated Flow

		Segment ID	B - C				
Surface description (paved or unpaved)			Unpaved				
Flow length, L	ft		1,490.0				
Watercourse slope, s	ft/ft		0.220				
Average velocity, V (figure 3-1)	ft/s		7.568				
$T_t = \frac{L}{3600\,V}$	hr		0.055				0.055

3. Channel Flow

		Segment ID					
Cross sectional flow area, a	ft^2						
Wetted perimeter, p_w	ft						
Hydraulic radius, $r = a/p_w$	ft						
Channel slope, s	ft/ft						
Manning's roughness coefficient, n							
$V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$	ft/s						
Flow Length, L	ft						
$T_t = \frac{L}{3600\,V}$	hr						

Total Tc For Watershed or Subarea (Add Steps 6, 11, and 19) **hr =** **0.31**

min = **18.60**

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

TIME OF CONCENTRATION (Tc) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**5**	**8**

PROJECT TITLE: **Suresky & Sons**
LOCATION: **Town of Chester**
CALCULATED BY: **KW**
APPROVED BY: **JS**
REF DRAWING(S):

Existing [Proposed] Area: **PR-B**

1. Sheet Flow

		Segment ID: A - B				
Surface Description (table 3-1)		Woods: D				
Manning's roughness coeff., 'n' (table 3-1)		0.80				
Flow length, L (total L ≤ 300 ft)	ft	100				
Two-year 24-hour rainfall, P_2	in	3.50				
Land Slope, s	ft/ft	0.120				
$T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,s^{0.4}}$	hr	0.291				0.291

2. Shallow Concentrated Flow

		Segment ID: B - C	C - D			
Surface description (paved or unpaved)		Unpaved	Paved			
Flow length, L	ft	297.0	275.9			
Watercourse slope, s	ft/ft	0.224	0.013			
Average velocity, V (figure 3-1)	ft/s	7.636	2.318			
$T_t = \frac{L}{3600\,V}$	hr	0.011	0.033			0.044

3. Channel Flow

		Segment ID				
Cross sectional flow area, a	ft^2					
Wetted perimeter, p_w	ft					
Hydraulic radius, $r = a/p_w$	ft					
Channel slope, s	ft/ft					
Manning's roughness coefficient, n						
$V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$	ft/s					
Flow Length, L	ft					
$T_t = \frac{L}{3600\,V}$	hr					

Total Tc For Watershed or Subarea (Add Steps 6, 11, and 19) hr = **0.33**

min = **19.80**

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

TIME OF CONCENTRATION (Tc) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**6**	**8**

PROJECT TITLE: **Suresky & Sons**

LOCATION: **Town of Chester**

CALCULATED BY: **KW**

APPROVED BY: **JS**

REF DRAWING(S):

Existing | Proposed — Area: **PR-C1**

1. Sheet Flow

		Segment ID	A - B				
Surface Description (table 3-1)			Woods: D				
Manning's roughness coeff., 'n' (table 3-1)			0.80				
Flow length, L (total L ≤ 300 ft)	ft		100				
Two-year 24-hour rainfall, P_2	in		3.50				
Land Slope, s	ft/ft		0.090				
$T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,s^{0.4}}$	hr		0.326				0.326

2. Shallow Concentrated Flow

		Segment ID	B - C				
Surface description (paved or unpaved)			Unpaved				
Flow length, L	ft		1,253.6				
Watercourse slope, s	ft/ft		0.241				
Average velocity, V (figure 3-1)	ft/s		7.921				
$T_t = \frac{L}{3600\,V}$	hr		0.044				0.044

3. Channel Flow

		Segment ID					
Cross sectional flow area, a	ft^2						
Wetted perimeter, p_w	ft						
Hydraulic radius, $r = a/p_w$	ft						
Channel slope, s	ft/ft						
Manning's roughness coefficient, n							
$V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$	ft/s						
Flow Length, L	ft						
$T_t = \frac{L}{3600\,V}$	hr						

Total Tc For Watershed or Subarea (Add Steps 6, 11, and 19) **hr =** **0.37**

min = **22.20**

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

TIME OF CONCENTRATION (Tc) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**7**	**8**

PROJECT TITLE: **Suresky & Sons**
LOCATION: **Town of Chester**
CALCULATED BY: **KW**
APPROVED BY: **JS**
REF DRAWING(S):

Existing | Proposed Area: **PR-C2**

1. Sheet Flow

		Segment ID	A - B				
Surface Description (table 3-1)			Grass: D				
Manning's roughness coeff., 'n' (table 3-1)			0.24				
Flow length, L (total L ≤ 300 ft)	ft		100				
Two-year 24-hour rainfall, P_2	in		3.50				
Land Slope, s	ft/ft		0.020				
$T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,s^{0.4}}$	hr		0.227				0.227

2. Shallow Concentrated Flow

		Segment ID	B - C				
Surface description (paved or unpaved)			Unpaved				
Flow length, L	ft		200.0				
Watercourse slope, s	ft/ft		0.020				
Average velocity, V (figure 3-1)	ft/s		2.282				
$T_t = \frac{L}{3600\,V}$	hr		0.024				0.024

3. Channel Flow

		Segment ID					
Cross sectional flow area, a	ft^2						
Wetted perimeter, p_w	ft						
Hydraulic radius, $r = a/p_w$	ft						
Channel slope, s	ft/ft						
Manning's roughness coefficient, n							
$V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$	ft/s						
Flow Length, L	ft						
$T_t = \frac{L}{3600\,V}$	hr						

Total Tc For Watershed or Subarea (Add Steps 6, 11, and 19) hr = **0.25**

min = **15.00**

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

TIME OF CONCENTRATION (Tc) WORKSHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**July '15**	**08/08/17**	**8**	**8**

PROJECT TITLE: **Suresky & Sons**
LOCATION: **Town of Chester**
CALCULATED BY: **KW**
APPROVED BY: **JS**
REF DRAWING(S):

Existing | Proposed Area: **PR-C3**

1. Sheet Flow

		Segment ID	A - B				
Surface Description (table 3-1)			Paved				
Manning's roughness coeff., 'n' (table 3-1)			0.01				
Flow length, L (total L ≤ 300 ft)	ft		100				
Two-year 24-hour rainfall, P_2	in		3.50				
Land Slope, s	ft/ft		0.020				
$T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,s^{0.4}}$	hr		0.019				0.019

2. Shallow Concentrated Flow

		Segment ID	B - C				
Surface description (paved or unpaved)			Paved				
Flow length, L	ft		112.3				
Watercourse slope, s	ft/ft		0.050				
Average velocity, V (figure 3-1)	ft/s		4.546				
$T_t = \frac{L}{3600\,V}$	hr		0.007				0.007

3. Channel Flow

		Segment ID					
Cross sectional flow area, a	ft^2						
Wetted perimeter, p_w	ft						
Hydraulic radius, $r = a/p_w$	ft						
Channel slope, s	ft/ft						
Manning's roughness coefficient, n							
$V = \frac{1.49\,r^{2/3}\,s^{1/2}}{n}$	ft/s						
Flow Length, L	ft						
$T_t = \frac{L}{3600\,V}$	hr						

Total Tc For Watershed or Subarea (Add Steps 6, 11, and 19) hr = **0.03**

min = **1.80**

APPENDIX 5

WATER QUALITY VOLUME & RUNOFF REDUCTION VOLUME CALCULATIONS

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ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

WATER QUALITY VOLUME (WQ_v) CALCULATION SHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**JULY '15**	**08/08/17**	**1**	**2**

PROJECT TITLE	LOCATION
Suresky & Sons	**Town of Chester**
CALCULATED BY: **KW** / APPROVED BY: **JS**	Stormwater Management Design Point Designation: **PR-B**

$WQ_v = (P * R_v * A) / (12)$

must use min value of 0.2 for Rv

Drainage Area	90% Rainfall Event # (**P**)	Total Drainage Area (**A**)	Total Impervious Area (**I**)	**R_v** (0.05 + 0.009*I%)	**WQ_v** Required (Ac-ft)	**WQv** Required (ft^3)
PR-B	1.40	9.77	4.73	0.486	0.554	24,132.2

HSG	**Area (Ac.)**	**%**	**S**
A	0.00	0%	0.55
B	0.00	0%	0.40
C	0.00	0%	0.30
D	9.77	100%	0.20

Minimum RRv = (P * 0.95 * S * I) / (12)

P = 1.40
S = 0.20
I = 4.73
$RR_{v\ MIN}$ **0.105** Ac-ft

Green Technology	**Implemented ? Yes**	**No**	Drainage Area Reduction	Contributing Drainage Area Reduction	Total Drainage Area Reduction	Total Impervious Area Reduction
Area Reduction Practices						
Conservation of Natural Areas	☐	☑	-	-	-	-
Sheet Flow to Riparian Buffers or Filter Strips	☐	☑	-	-	-	-
Tree Planting / Tree Box	☐	☑	-	-	-	-
		Subtotals			0.00	0.00

Revised WQ_v after Area Deductions	**P**	**A**	**I**	**R_v**	**WQ_v**	**$RR_{v\ AREA}$**
	1.40	9.77	4.73	0.486	0.554	**0.000**

Disconnection of Rooftop Runoff — Impervious Area Reduction: 0.00 Acres

Revised WQ_v after Impervious Disconnect	**P**	**A**	**I**	**R_v**	**WQ_v**	**$RR_{v\ IMP}$**
	1.40	9.77	4.73	0.486	0.554	**0.000**

Source Control WQ_v Treatment Practices	**Yes**	**No**	**WQ_v**	**$RR_{v\ SC}$***	**(A)** Reduction	**(I)** Reduction
Vegetated Open Swales	☐	☑	-	-	-	-
Rain Garden	☐	☑	-	-	-	-
Green Roof	☐	☑	-	-	-	-
Stormwater Planters	☐	☑	-	-	-	-
Rain Tanks / Cisterns	☐	☑	-	-	-	-
Porous Pavement	☐	☑	-	-	-	-
Standard SMP's with RRv Capacity						
Infiltration	☑	☐	0.554	0.498	9.77	4.73
Bio-Retention	☐	☑	-	-	-	-
Dry Swale (Open Channel)	☐	☑	-	-	-	-
		Subtotals	0.554	**0.498**	9.77	4.73

Is The Total **RR_v** ($RR_{v\ AREA}$ + $RR_{v\ IMP}$ + $RR_{v\ SC}$)	**0.499**	**≥ $RR_{v\ MIN}$?**	**0.105**	**YES**

WQ_v Required by Standard Practices	**P**	**A**	**I**	**R_v**	**WQ_v (Ac-ft)**	**WQ_v (ft^3)**
	1.40	0.00	0.00	0.00	0.000	0.0

** For Source Control (if used) RRv calculations see attached Green Technology RRv Calculation Sheets*

ENGINEERING & SURVEYING PROPERTIES
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RUNOFF REDUCTION VOLUME (RRv) CALCULATION SHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**JULY '15**	**8/8/2017**	**2**	**2**

PROJECT TITLE		LOCATION
Suresky & Sons		**Town of Chester**
CALCULATED BY	APPROVED BY	Stormwater Management Design Point Designation
KW	**JS**	**PR-B**

INFILTRATION PRACTICES

Requirement Checks	Yes	No	Notes:
Infiltration rate (k) $\geq$ 0.5"/$_{hr}$	☑	☐	
Pretreatment provided	☑	☐	
Design Complies with Required Elements of Practice	☑	☐	
Infiltration designed to exfiltrate through bottom of practice only?	☑	☐	

Drainage Area (Ac.)	9.77	
Impervious Area (Ac.)	4.73	
Rainfall Event # (P)	1.40	
Rv	0.486	
$WQv_{REQ'D}$	0.554	
A_t (ft^2)		Surface area of infiltration trench
d_t (ft)		depth of trench
n	0.400	porosity
V_t (ft^3)		Design Volume of Trench (WQ_v Provided)
$V_t > WQv_{REQ'D}$		
A_b (ft^2)	8,283.0	Surface area of infiltration basin
D_b (ft)	3.0	depth of basin
V_b (ft^3)	24,849.0	Design Volume of basin (WQ_v Provided)
V_b (ac-ft)	0.570	Design Volume of basin (WQ_v Provided)
$V_t > WQv_{REQ'D}$	**YES**	
RRv	0.498	

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

WATER QUALITY VOLUME (WQ_v) CALCULATION SHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**JULY '15**	**08/08/17**	**1**	**2**

PROJECT TITLE	LOCATION
Suresky & Sons	**Town of Chester**
CALCULATED BY: **KW** / APPROVED BY: **JS**	Stormwater Management Design Point Designation: **PR-C**

$WQ_v = (P * R_v * A) / (12)$

must use min value of 0.2 for Rv

Drainage Area	90% Rainfall Event # (**P**)	Total Drainage Area (**A**)	Total Impervious Area (**I**)	**R_v** (0.05 + 0.009*I%)	**WQ_v** Required (Ac-ft)	**WQv** Required (ft^3)
PR-C	1.40	1.49	1.11	0.720	0.125	5,445.0

HSG	**Area (Ac.)**	**%**	**S**
A	0.00	0%	0.55
B	0.00	0%	0.40
C	0.00	0%	0.30
D	1.49	100%	0.20

Minimum RRv = (P * 0.95 * S * I) / (12)

P = 1.40
S = 0.20
I = 1.11
$RR_{v\ MIN}$ **0.025** Ac-ft

Green Technology	**Implemented ? Yes**	**Implemented ? No**	Drainage Area Reduction	Contributing Drainage Area Reduction	Total Drainage Area Reduction	Total Impervious Area Reduction
Area Reduction Practices						
Conservation of Natural Areas	☐	☑	-	-	-	-
Sheet Flow to Riparian Buffers or Filter Strips	☐	☑	-	-	-	-
Tree Planting / Tree Box	☐	☑	-	-	-	-
		Subtotals			0.00	0.00

Revised WQ_v after Area Deductions	**P**	**A**	**I**	**R_v**	**WQ_v**	**$RR_{v\ AREA}$**
	1.40	1.49	1.11	0.720	0.125	**0.000**

Disconnection of Rooftop Runoff — Impervious Area Reduction: 0.00 Acres

Revised WQ_v after Impervious Disconnect	**P**	**A**	**I**	**R_v**	**WQ_v**	**$RR_{v\ IMP}$**
	1.40	1.49	1.11	0.720	0.125	**0.000**

Source Control WQ_v Treatment Practices	**Yes**	**No**	**WQ_v**	**$RR_{v\ SC}$***	**(A)** Reduction	**(I)** Reduction
Vegetated Open Swales	☐	☑	-	-	-	-
Rain Garden	☐	☑	-	-	-	-
Green Roof	☐	☑	-	-	-	-
Stormwater Planters	☐	☑	-	-	-	-
Rain Tanks / Cisterns	☐	☑	-	-	-	-
Porous Pavement	☐	☑	-	-	-	-
Standard SMP's with RRv Capacity						
Infiltration	☑	☐	0.125	0.113	1.49	1.11
Bio-Retention	☐	☑	-	-	-	-
Dry Swale (Open Channel)	☐	☑	-	-	-	-
		Subtotals	0.125	**0.113**	1.49	1.11

Is The Total **RR_v** ($RR_{v\ AREA}$ + $RR_{v\ IMP}$ + $RR_{v\ SC}$)	**0.112**	**≥ $RR_{v\ MIN}$?**	**0.025**	**YES**

WQ_v Required by Standard Practices	**P**	**A**	**I**	**R_v**	**WQ_v (Ac-ft)**	**WQ_v (ft^3)**
	1.40	0.00	0.00	0.00	0.000	0.0

** For Source Control (if used) RRv calculations see attached Green Technology RRv Calculation Sheets*

ENGINEERING & SURVEYING PROPERTIES
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RUNOFF REDUCTION VOLUME (RRv) CALCULATION SHEET

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**JULY '15**	**8/8/2017**	**2**	**2**

PROJECT TITLE		LOCATION
Suresky & Sons		**Town of Chester**
CALCULATED BY	APPROVED BY	Stormwater Management Design Point Designation
KW	**JS**	**PR-C**

INFILTRATION PRACTICES

Requirement Checks	Yes	No	Notes:
Infiltration rate (k) $\geq$ 0.5"/$_{hr}$	☑	☐	
Pretreatment provided	☑	☐	
Design Complies with Required Elements of Practice	☑	☐	
Infiltration designed to exfiltrate through bottom of practice only?	☑	☐	

Drainage Area (Ac.)	1.49	
Impervious Area (Ac.)	1.11	
Rainfall Event # (P)	1.40	
Rv	0.720	
$WQv_{REQ'D}$	0.125	
A_t (ft^2)		Surface area of infiltration trench
d_t (ft)		depth of trench
n	0.400	porosity
V_t (ft^3)		Design Volume of Trench (WQ_v Provided)
$V_t > WQv_{REQ'D}$		
A_b (ft^2)	11,721.0	Surface area of infiltration basin
D_b (ft)	1.5	depth of basin
V_b (ft^3)	17,581.5	Design Volume of basin (WQ_v Provided)
V_b (ac-ft)	0.404	Design Volume of basin (WQ_v Provided)
$V_t > WQv_{REQ'D}$	**YES**	
RRv	0.113	

APPENDIX 6

HYDROGRAPH

SUMMARIES & DIAGRAMS

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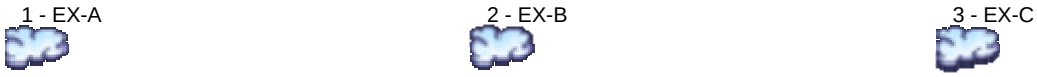
Watershed Model Schematic

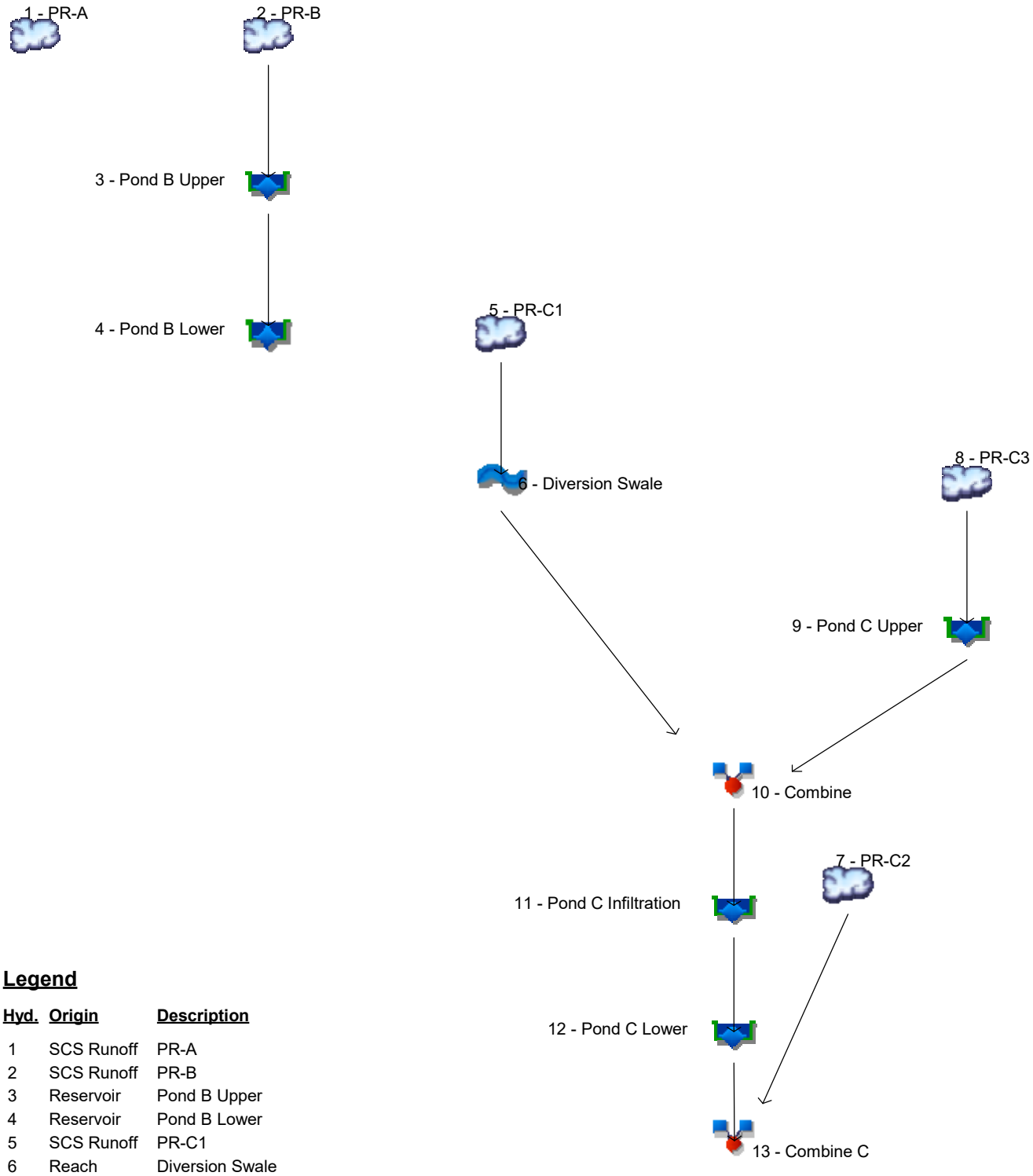
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3



Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)							Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	4.248	-------	-------	-------	14.26	-------	-------	34.45	EX-A
2	SCS Runoff	------	6.993	-------	-------	-------	22.55	-------	-------	53.62	EX-B
3	SCS Runoff	------	5.671	-------	-------	-------	17.64	-------	-------	41.12	EX-C

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	SCS Runoff	PR-A
2	SCS Runoff	PR-B
3	Reservoir	Pond B Upper
4	Reservoir	Pond B Lower
5	SCS Runoff	PR-C1
6	Reach	Diversion Swale
7	SCS Runoff	PR-C2
8	SCS Runoff	PR-C3
9	Reservoir	Pond C Upper
10	Combine	Combine
11	Reservoir	Pond C Infiltration
12	Reservoir	Pond C Lower
13	Combine	Combine C

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)							Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	------	4.176	-------	-------	-------	14.01	-------	-------	33.86	PR-A
2	SCS Runoff	------	11.56	-------	-------	-------	26.75	-------	-------	53.38	PR-B
3	Reservoir	2	11.25	-------	-------	-------	26.34	-------	-------	52.81	Pond B Upper
4	Reservoir	3	0.000	-------	-------	-------	4.303	-------	-------	28.29	Pond B Lower
5	SCS Runoff	------	5.649	-------	-------	-------	17.57	-------	-------	40.96	PR-C1
6	Reach	5	5.602	-------	-------	-------	17.46	-------	-------	40.79	Diversion Swale
7	SCS Runoff	------	1.274	-------	-------	-------	3.474	-------	-------	7.564	PR-C2
8	SCS Runoff	------	3.502	-------	-------	-------	6.993	-------	-------	12.94	PR-C3
9	Reservoir	8	3.020	-------	-------	-------	6.264	-------	-------	11.95	Pond C Upper
10	Combine	6, 9	6.792	-------	-------	-------	19.83	-------	-------	45.18	Combine
11	Reservoir	10	0.000	-------	-------	-------	2.196	-------	-------	28.76	Pond C Infiltration
12	Reservoir	11	0.000	-------	-------	-------	1.900	-------	-------	28.70	Pond C Lower
13	Combine	7, 12	1.274	-------	-------	-------	3.474	-------	-------	32.18	Combine C

APPENDIX 7

1-YEAR DESIGN STORM

HYDROGRAPHS

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Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Tuesday, 07 / 21 / 2015

Hyd. No. 1

EX-A

Hydrograph type	= SCS Runoff	Peak discharge	= 4.248 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.27 hrs
Time interval	= 1 min	Hyd. volume	= 20,519 cuft
Drainage area	= 7.640 ac	Curve number	= 75.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.6 min
Total precip.	= 2.65 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 50.00% of Qp.)

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
12.07	2.223	12.37	3.925
12.08	2.476	12.38	3.828
12.10	2.735	12.40	3.719
12.12	2.993	12.42	3.600
12.13	3.244	12.43	3.471
12.15	3.482	12.45	3.333
12.17	3.699	12.47	3.188
12.18	3.887	12.48	3.039
12.20	4.036	12.50	2.890
12.22	4.143	12.52	2.743
12.23	4.210	12.53	2.603
12.25	4.244	12.55	2.472
12.27	4.248	12.57	2.350
12.28	4.229	12.58	2.236
12.30	4.193	12.60	2.129
12.32	4.145	*...End*	
12.33	4.084		
12.35	4.010		

<<

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Tuesday, 07 / 21 / 2015

Hyd. No. 2

EX-B

Hydrograph type	= SCS Runoff	Peak discharge	= 6.993 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.35 hrs
Time interval	= 1 min	Hyd. volume	= 37,575 cuft
Drainage area	= 13.050 ac	Curve number	= 76.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 25.8 min
Total precip.	= 2.65 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 50.00% of Qp.)

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
12.10	3.599	12.40	6.911	12.70	3.843
12.12	3.927	12.42	6.850	12.72	3.646
12.13	4.258	12.43	6.772		
12.15	4.592	12.45	6.677	*...End*	
12.17	4.926	12.47	6.566		
12.18	5.256	12.48	6.439		
12.20	5.577	12.50	6.297		
12.22	5.881	12.52	6.140		
12.23	6.160	12.53	5.969		
12.25	6.404	12.55	5.785		
12.27	6.606	12.57	5.591		
12.28	6.760	12.58	5.386		
12.30	6.871	12.60	5.173		
12.32	6.943	12.62	4.953		
12.33	6.982	12.63	4.727		
12.35	6.993	12.65	4.500		
		12.67	4.274		
12.37	6.983				
		12.68	4.054		
12.38	6.956				

<<

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Tuesday, 07 / 21 / 2015

Hyd. No. 3

EX-C

Hydrograph type	= SCS Runoff	Peak discharge	= 5.671 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.25 hrs
Time interval	= 1 min	Hyd. volume	= 26,614 cuft
Drainage area	= 8.770 ac	Curve number	= 77.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 19.8 min
Total precip.	= 2.65 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 50.00% of Qp.)

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
12.07	3.138	12.37	5.147
12.08	3.469	12.38	5.008
12.10	3.805	12.40	4.854
12.12	4.138	12.42	4.688
12.13	4.460	12.43	4.509
12.15	4.763	12.45	4.320
12.17	5.036	12.47	4.123
12.18	5.269	12.48	3.923
12.20	5.449	12.50	3.722
12.22	5.572	12.52	3.527
12.23	5.644	12.53	3.342
12.25	5.671	12.55	3.170
12.27	5.660	12.57	3.010
12.28	5.618	12.58	2.861
12.30	5.556	*...End*	
12.32	5.477		
12.33	5.383		
12.35	5.272		

<<

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	4.176	1	736	20,170	------	------	------	PR-A
2	SCS Runoff	11.56	1	734	50,982	------	------	------	PR-B
3	Reservoir	11.25	1	737	50,982	2	511.19	30,868	Pond B Upper
4	Reservoir	0.000	1	716	0	3	508.66	10,421	Pond B Lower
5	SCS Runoff	5.649	1	738	28,091	------	------	------	PR-C1
6	Reach	5.602	1	740	28,090	5	------	------	Diversion Swale
7	SCS Runoff	1.274	1	731	5,149	------	------	------	PR-C2
8	SCS Runoff	3.502	1	722	9,741	------	------	------	PR-C3
9	Reservoir	3.020	1	724	9,740	8	512.61	9,327	Pond C Upper
10	Combine	6.792	1	738	37,830	6, 9	------	------	Combine
11	Reservoir	0.000	1	732	0	10	511.40	4,831	Pond C Infiltration
12	Reservoir	0.000	1	n/a	0	11	511.00	0.001	Pond C Lower
13	Combine	1.274	1	731	5,149	7, 12	------	------	Combine C

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 1

PR-A

Hydrograph type	= SCS Runoff	Peak discharge	= 4.176 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.27 hrs
Time interval	= 1 min	Hyd. volume	= 20,170 cuft
Drainage area	= 7.510 ac	Curve number	= 75.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.6 min
Total precip.	= 2.65 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs)	Outflow cfs)	
12.18	3.821	
12.20	3.967	
12.22	4.072	
12.23	4.139	
12.25	4.171	
12.27	4.176	<<
12.28	4.157	
12.30	4.122	
12.32	4.075	
12.33	4.015	
12.35	3.942	
12.37	3.858	
12.38	3.763	

...End

Hydrograph Report

Hyd. No. 2

PR-B

Hydrograph type	= SCS Runoff	Peak discharge	= 11.56 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.23 hrs
Time interval	= 1 min	Hyd. volume	= 50,982 cuft
Drainage area	= 9.770 ac	Curve number	= 87.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 19.8 min
Total precip.	= 2.65 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs)	Outflow cfs)	
12.17	10.83	
12.18	11.18	
12.20	11.41	
12.22	11.54	
12.23	11.56	<<
12.25	11.49	
12.27	11.35	
12.28	11.16	
12.30	10.94	
12.32	10.68	
12.33	10.40	

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 3

Pond B Upper

Hydrograph type	= Reservoir	Peak discharge	= 11.25 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.28 hrs
Time interval	= 1 min	Hyd. volume	= 50,982 cuft
Inflow hyd. No.	= 2 - PR-B	Reservoir name	= Pond B Upper
Max. Elevation	= 511.19 ft	Max. Storage	= 30,868 cuft

Storage Indication method used. Wet pond routing start elevation = 511.00 ft.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.20	11.41	511.18	-----	-----	-----	-----	10.37	-----	-----	-----	-----	10.37
12.22	11.54	511.19	-----	-----	-----	-----	10.73	-----	-----	-----	-----	10.73
12.23	11.56 <<	511.19	-----	-----	-----	-----	11.00	-----	-----	-----	-----	11.00
12.25	11.49	511.19	-----	-----	-----	-----	11.17	-----	-----	-----	-----	11.17
12.27	11.35	511.19	-----	-----	-----	-----	11.25	-----	-----	-----	-----	11.25
12.28	11.16	511.19 <<	-----	-----	-----	-----	11.25	-----	-----	-----	-----	11.25
<<												
12.30	10.94	511.19	-----	-----	-----	-----	11.19	-----	-----	-----	-----	11.19
12.32	10.68	511.19	-----	-----	-----	-----	11.06	-----	-----	-----	-----	11.06
12.33	10.40	511.19	-----	-----	-----	-----	10.89	-----	-----	-----	-----	10.89
12.35	10.10	511.19	-----	-----	-----	-----	10.68	-----	-----	-----	-----	10.68
12.37	9.776	511.18	-----	-----	-----	-----	10.44	-----	-----	-----	-----	10.44
12.38	9.429	511.18	-----	-----	-----	-----	10.17	-----	-----	-----	-----	10.16

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 4

Pond B Lower

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.93 hrs
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 3 - Pond B Upper	Reservoir name	= Pond B Lower
Max. Elevation	= 508.66 ft	Max. Storage	= 10,421 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
11.93	2.933	509.41 <<	-----	-----	-----	-----	-----	-----	-----	-----	6.066	0.000 <<
11.98	3.827	509.41 <<	-----	-----	-----	-----	-----	-----	-----	-----	6.066	0.000 <<
13.78	1.286	509.41 <<	-----	-----	-----	-----	-----	-----	-----	-----	6.066	0.000 <<
14.03	1.168	509.41 <<	-----	-----	-----	-----	-----	-----	-----	-----	6.066	0.000 <<
14.12	1.129	509.41 <<	-----	-----	-----	-----	-----	-----	-----	-----	6.066	0.000 <<
14.22	1.085	509.41 <<	-----	-----	-----	-----	-----	-----	-----	-----	6.066	0.000 <<

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 5

PR-C1

Hydrograph type	= SCS Runoff	Peak discharge	= 5.649 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.30 hrs
Time interval	= 1 min	Hyd. volume	= 28,091 cuft
Drainage area	= 9.340 ac	Curve number	= 77.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.2 min
Total precip.	= 2.65 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)
12.22	5.245
12.23	5.409
12.25	5.528
12.27	5.604
12.28	5.642
12.30	5.649
12.32	5.630
12.33	5.592
12.35	5.539
12.37	5.472
12.38	5.390
12.40	5.294
12.42	5.184

<<

...End

Hydrograph Report

Hyd. No. 6

Diversion Swale

Hydrograph type	= Reach	Peak discharge	= 5.602 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.33 hrs
Time interval	= 1 min	Hyd. volume	= 28,090 cuft
Inflow hyd. No.	= 5 - PR-C1	Section type	= Trapezoidal
Reach length	= 244.0 ft	Channel slope	= 1.00 %
Manning's n	= 0.040	Bottom width	= 4.00 ft
Side slope	= 2.0:1	Max. depth	= 1.00 ft
Rating curve x	= 1.478	Rating curve m	= 1.216
Ave. velocity	= 0.00 ft/s	Routing coeff.	= 0.4382

Modified Att-Kin routing method used.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Outflow cfs
12.25	5.528	5.146
12.27	5.604	5.313
12.28	5.642	5.440
12.30	5.649 <<	5.529
12.32	5.630	5.581
12.33	5.592	5.602
<<		
12.35	5.539	5.598
12.37	5.472	5.572
12.38	5.390	5.528
12.40	5.294	5.467
12.42	5.184	5.391
12.43	5.060	5.300
12.45	4.924	5.195
12.47	4.776	5.077

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 7

PR-C2

Hydrograph type	= SCS Runoff	Peak discharge	= 1.274 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.18 hrs
Time interval	= 1 min	Hyd. volume	= 5,149 cuft
Drainage area	= 1.350 ac	Curve number	= 81.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.0 min
Total precip.	= 2.65 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- Outflow (hrs cfs)	
12.12	1.150
12.13	1.209
12.15	1.249
12.17	1.270
12.18	1.274
12.20	1.264
12.22	1.242
12.23	1.212
12.25	1.176

<<

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 8

PR-C3

Hydrograph type	= SCS Runoff	Peak discharge	= 3.502 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.03 hrs
Time interval	= 1 min	Hyd. volume	= 9,741 cuft
Drainage area	= 1.490 ac	Curve number	= 93.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.0 min
Total precip.	= 2.65 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Outflow (cfs)	
12.02	3.398	
12.03	3.502	<<
12.05	3.344	

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 9

Pond C Upper

Hydrograph type	= Reservoir	Peak discharge	= 3.020 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.07 hrs
Time interval	= 1 min	Hyd. volume	= 9,740 cuft
Inflow hyd. No.	= 8 - PR-C3	Reservoir name	= Pond C Upper
Max. Elevation	= 512.61 ft	Max. Storage	= 9,327 cuft

Storage Indication method used. Wet pond routing start elevation = 512.50 ft.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.05	3.344	512.61	-----	-----	-----	-----	2.940	-----	-----	-----	-----	2.940
12.07	3.024	512.61 <<	-----	-----	-----	-----	3.020	-----	-----	-----	-----	3.020
12.08	2.650	512.61	-----	-----	-----	-----	2.960	-----	-----	-----	-----	2.960
12.10	2.268	512.61	-----	-----	-----	-----	2.796	-----	-----	-----	-----	2.796

<<

...End

Hydrograph Report

Hyd. No. 10

Combine

Hydrograph type	= Combine	Peak discharge	= 6.792 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.30 hrs
Time interval	= 1 min	Hyd. volume	= 37,830 cuft
Inflow hyds.	= 6, 9	Contrib. drain. area	= 0.000 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 9 = (cfs)	Outflow (cfs)
12.20	4.440	1.709	6.149
12.22	4.702	1.611	6.312
12.23	4.940	1.526	6.466
12.25	5.146	1.451	6.597
12.27	5.313	1.384	6.697
12.28	5.440	1.322	6.762
12.30	5.529	1.264	6.792
<<			
12.32	5.581	1.208	6.789
12.33	5.602 <<	1.155	6.757
12.35	5.598	1.103	6.701
12.37	5.572	1.052	6.624
12.38	5.528	1.002	6.530
12.40	5.467	0.952	6.419
12.42	5.391	0.902	6.294
12.43	5.300	0.861	6.161

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 11

Pond C Infiltration

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.20 hrs
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 10 - Combine	Reservoir name	= Pond C Infiltrati
Max. Elevation	= 511.40 ft	Max. Storage	= 4,831 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.20	6.149	512.50 <<	-----	-----	-----	-----	-----	-----	-----	-----	8.063	0.000
13.20	1.349	512.50 <<	-----	-----	-----	-----	-----	-----	-----	-----	8.063	0.000

...End

Hydrograph Report

Hyd. No. 12

Pond C Lower

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 1 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 11 - Pond C Infiltration	Reservoir name	= Pond C Lower
Max. Elevation	= 511.00 ft	Max. Storage	= 0 cuft

Storage Indication method used.

...End

Hydrograph Report

Hyd. No. 13

Combine C

Hydrograph type	= Combine	Peak discharge	= 1.274 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.18 hrs
Time interval	= 1 min	Hyd. volume	= 5,149 cuft
Inflow hyds.	= 7, 12	Contrib. drain. area	= 1.350 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 = (cfs)	Outflow (cfs)
12.12	1.150	0.000 <<	1.150
12.13	1.209	0.000 <<	1.209
12.15	1.249	0.000 <<	1.249
12.17	1.270	0.000 <<	1.270
12.18	1.274 <<	0.000 <<	1.274
12.20	1.264	0.000 <<	1.264
12.22	1.242	0.000 <<	1.242
12.23	1.212	0.000 <<	1.212
12.25	1.176	0.000 <<	1.176

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APPENDIX 8

10-YEAR DESIGN STORM

HYDROGRAPHS

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Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Tuesday, 07 / 21 / 2015

Hyd. No. 1

EX-A

Hydrograph type	= SCS Runoff	Peak discharge	= 14.26 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.23 hrs
Time interval	= 1 min	Hyd. volume	= 63,234 cuft
Drainage area	= 7.640 ac	Curve number	= 75.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.6 min
Total precip.	= 4.79 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 50.00% of Qp.)

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
12.03	7.495	12.33	12.99
12.05	8.215	12.35	12.64
12.07	8.969	12.37	12.26
12.08	9.742	12.38	11.84
12.10	10.52	12.40	11.41
12.12	11.27	12.42	10.94
12.13	11.99	12.43	10.46
12.15	12.65	12.45	9.951
12.17	13.22	12.47	9.438
12.18	13.69	12.48	8.925
12.20	14.01	12.50	8.420
12.22	14.20	12.52	7.936
12.23	14.26	12.53	7.485
12.25	14.21	*...End*	
12.27	14.07		
12.28	13.86		
12.30	13.60		
12.32	13.32		

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Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Tuesday, 07 / 21 / 2015

Hyd. No. 2

EX-B

Hydrograph type	= SCS Runoff	Peak discharge	= 22.55 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.32 hrs
Time interval	= 1 min	Hyd. volume	= 112,840 cuft
Drainage area	= 13.050 ac	Curve number	= 76.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 25.8 min
Total precip.	= 4.79 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 50.00% of Qp.)

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
12.07	11.98	12.37	22.12	12.67	11.99
12.08	12.95	12.38	21.86	12.68	11.31
12.10	13.92	12.40	21.55		
12.12	14.90	12.42	21.20	*...End*	
12.13	15.87	12.43	20.80		
12.15	16.83	12.45	20.37		
12.17	17.78	12.47	19.89		
12.18	18.70	12.48	19.37		
12.20	19.57	12.50	18.81		
12.22	20.37	12.52	18.22		
12.23	21.08	12.53	17.60		
12.25	21.66	12.55	16.95		
12.27	22.10	12.57	16.28		
12.28	22.38	12.58	15.59		
12.30	22.53	12.60	14.88		
12.32	22.55	12.62	14.15		
		12.63	13.42		
12.33	22.48				
		12.65	12.70		
12.35	22.33				

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Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Tuesday, 07 / 21 / 2015

Hyd. No. 3

EX-C

Hydrograph type	= SCS Runoff	Peak discharge	= 17.64 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.23 hrs
Time interval	= 1 min	Hyd. volume	= 77,942 cuft
Drainage area	= 8.770 ac	Curve number	= 77.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 19.8 min
Total precip.	= 4.79 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 50.00% of Qp.)

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
12.03	9.482	12.33	15.97
12.05	10.37	12.35	15.52
12.07	11.29	12.37	15.03
12.08	12.23	12.38	14.51
12.10	13.18	12.40	13.96
12.12	14.10	12.42	13.38
12.13	14.97	12.43	12.77
12.15	15.77	12.45	12.14
12.17	16.45	12.47	11.50
12.18	17.00	12.48	10.87
12.20	17.38	12.50	10.24
12.22	17.59	12.52	9.646
12.23	17.64	12.53	9.091
12.25	17.55	*...End*	
12.27	17.36		
12.28	17.09		
12.30	16.76		
12.32	16.38		

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Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	14.01	1	734	62,158	------	------	------	PR-A
2	SCS Runoff	26.75	1	733	119,515	------	------	------	PR-B
3	Reservoir	26.34	1	735	119,515	2	511.34	32,803	Pond B Upper
4	Reservoir	4.303	1	756	3,937	3	510.69	33,447	Pond B Lower
5	SCS Runoff	17.57	1	736	82,267	------	------	------	PR-C1
6	Reach	17.46	1	738	82,266	5	------	------	Diversion Swale
7	SCS Runoff	3.474	1	730	13,724	------	------	------	PR-C2
8	SCS Runoff	6.993	1	722	20,241	------	------	------	PR-C3
9	Reservoir	6.264	1	724	20,241	8	512.69	9,785	Pond C Upper
10	Combine	19.83	1	737	102,507	6, 9	------	------	Combine
11	Reservoir	2.196	1	757	2,341	10	512.72	22,985	Pond C Infiltration
12	Reservoir	1.900	1	761	2,330	11	511.76	1,056	Pond C Lower
13	Combine	3.474	1	730	16,054	7, 12	------	------	Combine C

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 1

PR-A

Hydrograph type	= SCS Runoff	Peak discharge	= 14.01 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.23 hrs
Time interval	= 1 min	Hyd. volume	= 62,158 cuft
Drainage area	= 7.510 ac	Curve number	= 75.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.6 min
Total precip.	= 4.79 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- Outflow (hrs cfs)	
12.17	13.00
12.18	13.45
12.20	13.78
12.22	13.96
12.23	14.01
12.25	13.96
12.27	13.83
12.28	13.62
12.30	13.37
12.32	13.09
12.33	12.77

<<

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 2

PR-B

Hydrograph type	= SCS Runoff	Peak discharge	= 26.75 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.22 hrs
Time interval	= 1 min	Hyd. volume	= 119,515 cuft
Drainage area	= 9.770 ac	Curve number	= 87.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 19.8 min
Total precip.	= 4.79 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs)	Outflow cfs)
12.15	24.58
12.17	25.48
12.18	26.17
12.20	26.59
12.22	26.75
12.23	26.68
12.25	26.41
12.27	26.00
12.28	25.46
12.30	24.85
12.32	24.18

<<

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 3

Pond B Upper

Hydrograph type	= Reservoir	Peak discharge	= 26.34 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.25 hrs
Time interval	= 1 min	Hyd. volume	= 119,515 cuft
Inflow hyd. No.	= 2 - PR-B	Reservoir name	= Pond B Upper
Max. Elevation	= 511.34 ft	Max. Storage	= 32,803 cuft

Storage Indication method used. Wet pond routing start elevation = 511.00 ft.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.18	26.17	511.33	-----	-----	-----	-----	24.36	-----	-----	-----	-----	24.36
12.20	26.59	511.33	-----	-----	-----	-----	25.20	-----	-----	-----	-----	25.20
12.22	26.75 <<	511.34	-----	-----	-----	-----	25.81	-----	-----	-----	-----	25.81
12.23	26.68	511.34	-----	-----	-----	-----	26.19	-----	-----	-----	-----	26.19
12.25	26.41	511.34 <<	-----	-----	-----	-----	26.34	-----	-----	-----	-----	26.34
<<												
12.27	26.00	511.34	-----	-----	-----	-----	26.28	-----	-----	-----	-----	26.28
12.28	25.46	511.34	-----	-----	-----	-----	26.05	-----	-----	-----	-----	26.05
12.30	24.85	511.34	-----	-----	-----	-----	25.68	-----	-----	-----	-----	25.68
12.32	24.18	511.33	-----	-----	-----	-----	25.19	-----	-----	-----	-----	25.19
12.33	23.47	511.33	-----	-----	-----	-----	24.62	-----	-----	-----	-----	24.62
12.35	22.70	511.32	-----	-----	-----	-----	23.98	-----	-----	-----	-----	23.98

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 4

Pond B Lower

Hydrograph type	= Reservoir	Peak discharge	= 4.303 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.60 hrs
Time interval	= 1 min	Hyd. volume	= 3,937 cuft
Inflow hyd. No.	= 3 - Pond B Upper	Reservoir name	= Pond B Lower
Max. Elevation	= 510.69 ft	Max. Storage	= 33,447 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.57	13.05	510.68	4.087	-----	-----	-----	4.087	-----	-----	-----	7.419	4.087
12.58	12.37	510.68	4.254	-----	-----	-----	4.253	-----	-----	-----	7.425	4.253
12.60	11.71	510.69 <<	4.304	-----	-----	-----	4.303	-----	-----	-----	7.427	4.303
12.62	11.09	510.68	4.258	-----	-----	-----	4.257	-----	-----	-----	7.425	4.257
12.63	10.50	510.68	4.135	-----	-----	-----	4.135	-----	-----	-----	7.421	4.134
12.65	9.937	510.68	3.951	-----	-----	-----	3.950	-----	-----	-----	7.414	3.950

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 5

PR-C1

Hydrograph type	= SCS Runoff	Peak discharge	= 17.57 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.27 hrs
Time interval	= 1 min	Hyd. volume	= 82,267 cuft
Drainage area	= 9.340 ac	Curve number	= 77.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.2 min
Total precip.	= 4.79 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs)	Outflow cfs)
12.18	15.86
12.20	16.46
12.22	16.95
12.23	17.29
12.25	17.49
12.27	17.57
12.28	17.53
12.30	17.40
12.32	17.20
12.33	16.95
12.35	16.66
12.37	16.33
12.38	15.97

<<

...End

Hydrograph Report

Hyd. No. 6

Diversion Swale

Hydrograph type	= Reach	Peak discharge	= 17.46 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.30 hrs
Time interval	= 1 min	Hyd. volume	= 82,266 cuft
Inflow hyd. No.	= 5 - PR-C1	Section type	= Trapezoidal
Reach length	= 244.0 ft	Channel slope	= 1.00 %
Manning's n	= 0.040	Bottom width	= 4.00 ft
Side slope	= 2.0:1	Max. depth	= 1.00 ft
Rating curve x	= 1.478	Rating curve m	= 1.216
Ave. velocity	= 0.00 ft/s	Routing coeff.	= 0.5112

Modified Att-Kin routing method used.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Outflow cfs
12.22	16.95	15.83
12.23	17.29	16.40
12.25	17.49	16.86
12.27	17.57 <<	17.18
12.28	17.53	17.38
12.30	17.40	17.46
<<		
12.32	17.20	17.43
12.33	16.95	17.31
12.35	16.66	17.13
12.37	16.33	16.89
12.38	15.97	16.61
12.40	15.57	16.28
12.42	15.14	15.92

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 7

PR-C2

Hydrograph type	= SCS Runoff	Peak discharge	= 3.474 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.17 hrs
Time interval	= 1 min	Hyd. volume	= 13,724 cuft
Drainage area	= 1.350 ac	Curve number	= 81.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.0 min
Total precip.	= 4.79 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)	
12.12	3.235	
12.13	3.365	
12.15	3.445	
12.17	3.474	<<
12.18	3.458	
12.20	3.405	
12.22	3.323	
12.23	3.219	

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 8

PR-C3

Hydrograph type	= SCS Runoff	Peak discharge	= 6.993 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.03 hrs
Time interval	= 1 min	Hyd. volume	= 20,241 cuft
Drainage area	= 1.490 ac	Curve number	= 93.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.0 min
Total precip.	= 4.79 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)	
12.02	6.818	
12.03	6.993	<<
12.05	6.648	

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 9

Pond C Upper

Hydrograph type	= Reservoir	Peak discharge	= 6.264 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 1 min	Hyd. volume	= 20,241 cuft
Inflow hyd. No.	= 8 - PR-C3	Reservoir name	= Pond C Upper
Max. Elevation	= 512.69 ft	Max. Storage	= 9,785 cuft

Storage Indication method used. Wet pond routing start elevation = 512.50 ft.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.03	6.993 <<	512.68	-----	-----	-----	-----	5.879	-----	-----	-----	-----	5.878
12.05	6.648	512.68	-----	-----	-----	-----	6.231	-----	-----	-----	-----	6.232
12.07	5.988	512.69 <<	-----	-----	-----	-----	6.264	-----	-----	-----	-----	6.264
12.08	5.228	512.68	-----	-----	-----	-----	6.019	-----	-----	-----	-----	6.018

...End

Hydrograph Report

Hyd. No. 10

Combine

Hydrograph type	= Combine	Peak discharge	= 19.83 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.28 hrs
Time interval	= 1 min	Hyd. volume	= 102,507 cuft
Inflow hyds.	= 6, 9	Contrib. drain. area	= 0.000 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 9 = (cfs)	Outflow (cfs)
12.20	15.16	3.144	18.31
12.22	15.83	2.964	18.79
12.23	16.40	2.813	19.21
12.25	16.86	2.681	19.54
12.27	17.18	2.562	19.75
12.28	17.38	2.454	19.83
<<			
12.30	17.46 <<	2.369	19.83
12.32	17.43	2.282	19.71
12.33	17.31	2.193	19.51
12.35	17.13	2.103	19.23
12.37	16.89	2.012	18.90
12.38	16.61	1.920	18.53
12.40	16.28	1.827	18.11

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 11

Pond C Infiltration

Hydrograph type	= Reservoir	Peak discharge	= 2.196 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.62 hrs
Time interval	= 1 min	Hyd. volume	= 2,341 cuft
Inflow hyd. No.	= 10 - Combine	Reservoir name	= Pond C Infiltrati
Max. Elevation	= 512.72 ft	Max. Storage	= 22,985 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.57	12.24	512.71	-----	-----	-----	-----	2.048	-----	-----	-----	8.298	2.048
12.58	11.59	512.72	-----	-----	-----	-----	2.138	-----	-----	-----	8.304	2.138
12.60	10.96	512.72	-----	-----	-----	-----	2.186	-----	-----	-----	8.308	2.186
12.62	10.36	512.72 <<	-----	-----	-----	-----	2.195	-----	-----	-----	8.309	2.196
12.63	9.798	512.72	-----	-----	-----	-----	2.171	-----	-----	-----	8.307	2.171
12.65	9.270	512.72	-----	-----	-----	-----	2.118	-----	-----	-----	8.303	2.117
12.67	8.783	512.71	-----	-----	-----	-----	2.037	-----	-----	-----	8.297	2.038

<<

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 12

Pond C Lower

Hydrograph type	= Reservoir	Peak discharge	= 1.900 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.68 hrs
Time interval	= 1 min	Hyd. volume	= 2,330 cuft
Inflow hyd. No.	= 11 - Pond C Infiltration	Reservoir name	= Pond C Lower
Max. Elevation	= 511.76 ft	Max. Storage	= 1,056 cuft

Storage Indication method used.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.67	2.038	511.76	1.824	0.138	-----	-----	-----	1.684	-----	-----	-----	1.822
12.68	1.936	511.76 <<	1.903	0.137	-----	-----	-----	1.763	-----	-----	-----	1.900
12.70	1.821	511.76	1.892	0.137	-----	-----	-----	1.752	-----	-----	-----	1.890
12.72	1.701	511.76	1.831	0.138	-----	-----	-----	1.691	-----	-----	-----	1.829
12.73	1.569	511.75	1.737	0.139	-----	-----	-----	1.598	-----	-----	-----	1.737

...End

Hydrograph Report

Hyd. No. 13

Combine C

Hydrograph type	= Combine	Peak discharge	= 3.474 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.17 hrs
Time interval	= 1 min	Hyd. volume	= 16,054 cuft
Inflow hyds.	= 7, 12	Contrib. drain. area	= 1.350 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 = (cfs)	Outflow (cfs)
12.12	3.235	0.000	3.235
12.13	3.365	0.000	3.365
12.15	3.445	0.000	3.445
12.17	3.474 <<	0.000	3.474
12.18	3.458	0.000	3.458
12.20	3.405	0.000	3.405
12.22	3.323	0.000	3.323
12.23	3.219	0.000	3.219

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APPENDIX 9

100-YEAR DESIGN STORM HYDROGRAPHS

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Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Tuesday, 07 / 21 / 2015

Hyd. No. 1

EX-A

Hydrograph type	= SCS Runoff	Peak discharge	= 34.45 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.22 hrs
Time interval	= 1 min	Hyd. volume	= 152,647 cuft
Drainage area	= 7.640 ac	Curve number	= 75.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.6 min
Total precip.	= 8.51 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 50.00% of Qp.)

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
12.02	18.22	12.32	31.38
12.03	19.80	12.33	30.49
12.05	21.48	12.35	29.53
12.07	23.22	12.37	28.50
12.08	24.99	12.38	27.43
12.10	26.74	12.40	26.29
12.12	28.44	12.42	25.12
12.13	30.03	12.43	23.89
12.15	31.46	12.45	22.64
12.17	32.67	12.47	21.38
12.18	33.60	12.48	20.14
12.20	34.19	12.50	18.92
12.22	34.45	12.52	17.77
12.23	34.41	*...End*	
12.25	34.11		
12.27	33.61		
12.28	32.96		
12.30	32.21		

<<

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Tuesday, 07 / 21 / 2015

Hyd. No. 2

EX-B

Hydrograph type	= SCS Runoff	Peak discharge	= 53.62 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.30 hrs
Time interval	= 1 min	Hyd. volume	= 268,504 cuft
Drainage area	= 13.050 ac	Curve number	= 76.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 25.8 min
Total precip.	= 8.51 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 50.00% of Qp.)

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
12.05	28.88	12.35	52.51	12.65	28.09
12.07	31.05	12.37	51.81		
12.08	33.27	12.38	51.01	*...End*	
12.10	35.49	12.40	50.11		
12.12	37.69	12.42	49.12		
12.13	39.87	12.43	48.03		
12.15	42.01	12.45	46.86		
12.17	44.10	12.47	45.60		
12.18	46.11	12.48	44.26		
12.20	47.99	12.50	42.85		
12.22	49.68	12.52	41.37		
12.23	51.13	12.53	39.83		
12.25	52.28	12.55	38.24		
12.27	53.08	12.57	36.60		
12.28	53.51	12.58	34.93		
12.30	53.62	12.60	33.23		
		12.62	31.51		
12.32	53.46				
		12.63	29.78		
12.33	53.08				

<<

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Tuesday, 07 / 21 / 2015

Hyd. No. 3

EX-C

Hydrograph type	= SCS Runoff	Peak discharge	= 41.12 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.22 hrs
Time interval	= 1 min	Hyd. volume	= 182,866 cuft
Drainage area	= 8.770 ac	Curve number	= 77.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 19.8 min
Total precip.	= 8.51 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 50.00% of Qp.)

Time (hrs)	Outflow (cfs)	Time (hrs)	Outflow (cfs)
12.02	22.03	12.32	37.32
12.03	23.90	12.33	36.23
12.05	25.89	12.35	35.07
12.07	27.95	12.37	33.84
12.08	30.05	12.38	32.54
12.10	32.12	12.40	31.18
12.12	34.13	12.42	29.76
12.13	36.00	12.43	28.30
12.15	37.67	12.45	26.80
12.17	39.09	12.47	25.29
12.18	40.17	12.48	23.80
12.20	40.85	12.50	22.36
12.22	41.12	12.52	20.99
12.23	41.04	*...End*	
12.25	40.66		
12.27	40.05		
12.28	39.25		
12.30	38.33		

<<

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	33.86	1	733	150,050	------	------	------	PR-A
2	SCS Runoff	53.38	1	733	246,374	------	------	------	PR-B
3	Reservoir	52.81	1	734	246,374	2	511.55	35,434	Pond B Upper
4	Reservoir	28.29	1	744	55,885	3	511.86	51,759	Pond B Lower
5	SCS Runoff	40.96	1	735	193,012	------	------	------	PR-C1
6	Reach	40.79	1	737	193,012	5	------	------	Diversion Swale
7	SCS Runoff	7.564	1	730	30,505	------	------	------	PR-C2
8	SCS Runoff	12.94	1	722	38,887	------	------	------	PR-C3
9	Reservoir	11.95	1	723	38,886	8	512.79	10,423	Pond C Upper
10	Combine	45.18	1	737	231,898	6, 9	------	------	Combine
11	Reservoir	28.76	1	746	58,427	10	513.74	39,240	Pond C Infiltration
12	Reservoir	28.70	1	747	58,415	11	513.76	5,707	Pond C Lower
13	Combine	32.18	1	745	88,920	7, 12	------	------	Combine C

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 1

PR-A

Hydrograph type	= SCS Runoff	Peak discharge	= 33.86 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.22 hrs
Time interval	= 1 min	Hyd. volume	= 150,050 cuft
Drainage area	= 7.510 ac	Curve number	= 75.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 18.6 min
Total precip.	= 8.51 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs)	Outflow cfs)
12.15	30.92
12.17	32.11
12.18	33.03
12.20	33.61
12.22	33.86
12.23	33.82
12.25	33.53
12.27	33.04
12.28	32.40
12.30	31.66
12.32	30.85

<<

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 2

PR-B

Hydrograph type	= SCS Runoff	Peak discharge	= 53.38 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.22 hrs
Time interval	= 1 min	Hyd. volume	= 246,374 cuft
Drainage area	= 9.770 ac	Curve number	= 87.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 19.8 min
Total precip.	= 8.51 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs)	Outflow cfs)	
12.15	49.58	
12.17	51.25	
12.18	52.48	
12.20	53.19	
12.22	53.38	<<
12.23	53.11	
12.25	52.47	
12.27	51.53	
12.28	50.37	
12.30	49.06	

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 3

Pond B Upper

Hydrograph type	= Reservoir	Peak discharge	= 52.81 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.23 hrs
Time interval	= 1 min	Hyd. volume	= 246,374 cuft
Inflow hyd. No.	= 2 - PR-B	Reservoir name	= Pond B Upper
Max. Elevation	= 511.55 ft	Max. Storage	= 35,434 cuft

Storage Indication method used. Wet pond routing start elevation = 511.00 ft.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.17	51.25	511.52	-----	-----	-----	-----	48.13	-----	-----	-----	-----	48.13
12.18	52.48	511.53	-----	-----	-----	-----	49.95	-----	-----	-----	-----	49.95
12.20	53.19	511.54	-----	-----	-----	-----	51.41	-----	-----	-----	-----	51.41
12.22	53.38 <<	511.54	-----	-----	-----	-----	52.36	-----	-----	-----	-----	52.36
12.23	53.11	511.55 <<	-----	-----	-----	-----	52.81	-----	-----	-----	-----	52.81
<<												
12.25	52.47	511.55	-----	-----	-----	-----	52.80	-----	-----	-----	-----	52.80
12.27	51.53	511.55	-----	-----	-----	-----	52.40	-----	-----	-----	-----	52.40
12.28	50.37	511.54	-----	-----	-----	-----	51.66	-----	-----	-----	-----	51.66
12.30	49.06	511.53	-----	-----	-----	-----	50.67	-----	-----	-----	-----	50.67
12.32	47.65	511.53	-----	-----	-----	-----	49.50	-----	-----	-----	-----	49.50
12.33	46.15	511.52	-----	-----	-----	-----	48.25	-----	-----	-----	-----	48.25

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 4

Pond B Lower

Hydrograph type	= Reservoir	Peak discharge	= 28.29 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.40 hrs
Time interval	= 1 min	Hyd. volume	= 55,885 cuft
Inflow hyd. No.	= 3 - Pond B Upper	Reservoir name	= Pond B Lower
Max. Elevation	= 511.86 ft	Max. Storage	= 51,759 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.33	48.25	511.83	11.36	-----	-----	-----	11.34	-----	14.80	-----	12.93	26.14
12.35	46.85	511.85	11.39	-----	-----	-----	11.33	-----	15.94	-----	13.82	27.27
12.37	45.34	511.86	11.41	-----	-----	-----	11.34	-----	16.63	-----	14.35	27.97
12.38	43.74	511.86	11.41	-----	-----	-----	11.35	-----	16.94	-----	14.58	28.29
12.40	42.04	511.86 <<	11.41	-----	-----	-----	11.35	-----	16.94	-----	14.59	28.29
12.42	40.28	511.86	11.41	-----	-----	-----	11.34	-----	16.71	-----	14.41	28.05
12.43	38.49	511.85	11.40	-----	-----	-----	11.33	-----	16.28	-----	14.08	27.61
12.45	36.70	511.84	11.39	-----	-----	-----	11.33	-----	15.72	-----	13.65	27.05
12.47	34.83	511.83	11.37	-----	-----	-----	11.34	-----	15.06	-----	13.13	26.40
12.48	32.93	511.82	11.35	-----	-----	-----	11.34	-----	14.30	-----	12.54	25.64

<<

...End

Hydrograph Report

Hyd. No. 5

PR-C1

Hydrograph type	= SCS Runoff	Peak discharge	= 40.96 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.25 hrs
Time interval	= 1 min	Hyd. volume	= 193,012 cuft
Drainage area	= 9.340 ac	Curve number	= 77.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.2 min
Total precip.	= 8.51 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs)	Outflow cfs)
12.18	37.91
12.20	39.13
12.22	40.07
12.23	40.68
12.25	40.96
12.27	40.95
12.28	40.69
12.30	40.23
12.32	39.61
12.33	38.88
12.35	38.07
12.37	37.18

<<

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 6

Diversion Swale

Hydrograph type	= Reach	Peak discharge	= 40.79 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.28 hrs
Time interval	= 1 min	Hyd. volume	= 193,012 cuft
Inflow hyd. No.	= 5 - PR-C1	Section type	= Trapezoidal
Reach length	= 244.0 ft	Channel slope	= 1.00 %
Manning's n	= 0.040	Bottom width	= 4.00 ft
Side slope	= 2.0:1	Max. depth	= 1.00 ft
Rating curve x	= 1.478	Rating curve m	= 1.216
Ave. velocity	= 0.00 ft/s	Routing coeff.	= 0.5706

Modified Att-Kin routing method used.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Outflow cfs
12.20	39.13	36.75
12.22	40.07	38.11
12.23	40.68	39.23
12.25	40.96 <<	40.06
12.27	40.95	40.57
12.28	40.69	40.79
<<		
12.30	40.23	40.73
12.32	39.61	40.45
12.33	38.88	39.97
12.35	38.07	39.35
12.37	37.18	38.62
12.38	36.22	37.80
12.40	35.19	36.90

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 7

PR-C2

Hydrograph type	= SCS Runoff	Peak discharge	= 7.564 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.17 hrs
Time interval	= 1 min	Hyd. volume	= 30,505 cuft
Drainage area	= 1.350 ac	Curve number	= 81.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.0 min
Total precip.	= 8.51 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)	
12.12	7.144	
12.13	7.394	
12.15	7.534	
12.17	7.564	<<
12.18	7.498	
12.20	7.355	
12.22	7.150	
12.23	6.902	

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 8

PR-C3

Hydrograph type	= SCS Runoff	Peak discharge	= 12.94 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 1 min	Hyd. volume	= 38,887 cuft
Drainage area	= 1.490 ac	Curve number	= 93.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.0 min
Total precip.	= 8.51 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs	Outflow cfs)	
12.02	12.64	
12.03	12.94	<<
12.05	12.28	

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 9

Pond C Upper

Hydrograph type	= Reservoir	Peak discharge	= 11.95 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.05 hrs
Time interval	= 1 min	Hyd. volume	= 38,886 cuft
Inflow hyd. No.	= 8 - PR-C3	Reservoir name	= Pond C Upper
Max. Elevation	= 512.79 ft	Max. Storage	= 10,423 cuft

Storage Indication method used. Wet pond routing start elevation = 512.50 ft.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.03	12.94 <<	512.78	-----	-----	-----	-----	11.40	-----	-----	-----	-----	11.41
12.05	12.28	512.79 <<	-----	-----	-----	-----	11.94	-----	-----	-----	-----	11.95
12.07	11.04	512.78	-----	-----	-----	-----	11.82	-----	-----	-----	-----	11.81
12.08	9.621	512.77	-----	-----	-----	-----	11.15	-----	-----	-----	-----	11.15

<<

...End

Hydrograph Report

Hyd. No. 10

Combine

Hydrograph type	= Combine	Peak discharge	= 45.18 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.28 hrs
Time interval	= 1 min	Hyd. volume	= 231,898 cuft
Inflow hyds.	= 6, 9	Contrib. drain. area	= 0.000 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 9 = (cfs)	Outflow (cfs)
12.18	35.21	5.885	41.10
12.20	36.75	5.522	42.27
12.22	38.11	5.231	43.34
12.23	39.23	4.985	44.21
12.25	40.06	4.766	44.82
12.27	40.57	4.565	45.14
12.28	40.79 <<	4.395	45.18
12.30	40.73	4.229	44.96
12.32	40.45	4.061	44.51
12.33	39.97	3.892	43.86
12.35	39.35	3.721	43.07
12.37	38.62	3.550	42.17
12.38	37.80	3.378	41.18

<<

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 11

Pond C Infiltration

Hydrograph type	= Reservoir	Peak discharge	= 28.76 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.43 hrs
Time interval	= 1 min	Hyd. volume	= 58,427 cuft
Inflow hyd. No.	= 10 - Combine	Reservoir name	= Pond C Infiltrati
Max. Elevation	= 513.74 ft	Max. Storage	= 39,240 cuft

Storage Indication method used. Exfiltration extracted from Outflow.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.33	43.86	513.66	-----	-----	-----	-----	26.06	-----	-----	-----	9.339	26.06
12.35	43.07	513.69	-----	-----	-----	-----	26.97	-----	-----	-----	9.365	26.97
12.37	42.17	513.71	-----	-----	-----	-----	27.68	-----	-----	-----	9.386	27.68
12.38	41.18	513.73	-----	-----	-----	-----	28.21	-----	-----	-----	9.401	28.21
12.40	40.11	513.74	-----	-----	-----	-----	28.56	-----	-----	-----	9.411	28.56
12.42	38.96	513.74	-----	-----	-----	-----	28.74	-----	-----	-----	9.416	28.74
12.43	37.74	513.74 <<	-----	-----	-----	-----	28.76	-----	-----	-----	9.416	28.76
12.45	36.45	513.74	-----	-----	-----	-----	28.64	-----	-----	-----	9.413	28.64
12.47	35.11	513.73	-----	-----	-----	-----	28.38	-----	-----	-----	9.405	28.38
12.48	33.73	513.72	-----	-----	-----	-----	27.99	-----	-----	-----	9.394	27.99
12.50	32.30	513.70	-----	-----	-----	-----	27.49	-----	-----	-----	9.380	27.49
12.52	30.82	513.69	-----	-----	-----	-----	26.89	-----	-----	-----	9.363	26.89
12.53	29.30	513.67	-----	-----	-----	-----	26.19	-----	-----	-----	9.342	26.19

<<

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 12

Pond C Lower

Hydrograph type	= Reservoir	Peak discharge	= 28.70 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.45 hrs
Time interval	= 1 min	Hyd. volume	= 58,415 cuft
Inflow hyd. No.	= 11 - Pond C Infiltration	Reservoir name	= Pond C Lower
Max. Elevation	= 513.76 ft	Max. Storage	= 5,707 cuft

Storage Indication method used.

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.38	28.21	513.73	18.57	0.024	-----	-----	6.198	12.33	-----	8.664	-----	27.21
12.40	28.56	513.74	18.63	0.023	-----	-----	6.341	12.23	-----	9.468	-----	28.07
12.42	28.74	513.75	18.66	0.023	-----	-----	6.410	12.19	-----	9.877	-----	28.50
12.43	28.76 <<	513.75	18.67	0.023	-----	-----	6.438	12.18	-----	10.06	-----	28.70
12.45	28.64	513.75 <<	18.67	0.023	-----	-----	6.438	12.18	-----	10.06	-----	28.70
12.47	28.38	513.75	18.66	0.023	-----	-----	6.417	12.19	-----	9.918	-----	28.55
12.48	27.99	513.75	18.65	0.023	-----	-----	6.374	12.21	-----	9.658	-----	28.27
12.50	27.49	513.74	18.62	0.023	-----	-----	6.310	12.25	-----	9.295	-----	27.88
12.52	26.89	513.73	18.58	0.024	-----	-----	6.225	12.31	-----	8.817	-----	27.37
12.53	26.19	513.72	18.54	0.024	-----	-----	6.123	12.37	-----	8.243	-----	26.76
12.55	25.41	513.71	18.49	0.024	-----	-----	6.006	12.45	-----	7.581	-----	26.06

<<

...End

Hydrograph Report

Hyd. No. 13

Combine C

Hydrograph type	= Combine	Peak discharge	= 32.18 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.42 hrs
Time interval	= 1 min	Hyd. volume	= 88,920 cuft
Inflow hyds.	= 7, 12	Contrib. drain. area	= 1.350 ac

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 = (cfs)	Outflow (cfs)
12.37	4.440	25.26	29.70
12.38	4.157	27.21	31.37
12.40	3.904	28.07	31.97
12.42	3.683	28.50	32.18
12.43	3.488	28.70	32.18
12.45	3.313	28.70 <<	32.01
12.47	3.152	28.55	31.70
12.48	3.000	28.27	31.27
12.50	2.851	27.88	30.73
12.52	2.701	27.37	30.08
12.53	2.553	26.76	29.32

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APPENDIX 10

RESERVOIR REPORTS,

CHANNEL PROTECTION

VOLUME CALCULATIONS,

SEDIMENT BASIN CALCS

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Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Pond No. 1 - Pond B Upper

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 508.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	508.00	7,121	0	0
1.00	509.00	8,571	7,834	7,834
2.00	510.00	10,191	9,368	17,202
2.50	510.50	11,161	5,336	22,538
3.00	511.00	12,165	5,829	28,367
3.75	511.75	13,649	9,674	38,041

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 50.00	0.00	0.00	0.00
Crest El. (ft)	= 511.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	508.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.00	7,834	509.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.00	17,202	510.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.50	22,538	510.50	---	---	---	---	0.00	---	---	---	---	---	0.000
3.00	28,367	511.00	---	---	---	---	0.00	---	---	---	---	---	0.000
3.75	38,041	511.75	---	---	---	---	84.44	---	---	---	---	---	84.44

Pond Report

Pond No. 2 - Pond B Lower

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 507.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	507.50	8,283	0	0
0.50	508.00	8,654	4,233	4,233
1.50	509.00	10,202	9,416	13,650
2.50	510.00	11,940	11,059	24,708
3.00	510.50	12,971	6,225	30,934
3.50	511.00	14,037	6,750	37,683
4.25	511.75	15,608	11,111	48,794
4.50	512.00	39,530	6,664	55,458

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 507.50	0.00	0.00	0.00
Length (ft)	= 30.00	0.00	0.00	0.00
Slope (%)	= 0.30	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 16.00	0.00	30.00	0.00
Crest El. (ft)	= 510.50	0.00	511.50	0.00
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Rect	---	Broad	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 24.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	507.50	0.00	---	---	---	0.00	---	0.00	---	0.000	---	0.000
0.50	4,233	508.00	0.00	---	---	---	0.00	---	0.00	---	4.808	---	4.808
1.50	13,650	509.00	0.00	---	---	---	0.00	---	0.00	---	5.668	---	5.668
2.50	24,708	510.00	0.00	---	---	---	0.00	---	0.00	---	6.633	---	6.633
3.00	30,934	510.50	0.00	---	---	---	0.00	---	0.00	---	7.206	---	7.206
3.50	37,683	511.00	9.90 ic	---	---	---	9.90 s	---	0.00	---	7.798	---	17.70
4.25	48,794	511.75	11.24 ic	---	---	---	11.20 s	---	9.75	---	8.671	---	29.62
4.50	55,458	512.00	11.62 ic	---	---	---	11.60 s	---	27.58	---	21.961	---	61.14

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Pond No. 4 - Pond C Upper

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 510.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	510.00	1,212	0	0
1.00	511.00	2,985	2,033	2,033
2.00	512.00	4,879	3,893	5,926
2.50	512.50	5,860	2,681	8,607
3.00	513.00	6,865	3,178	11,784

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 30.00	0.00	0.00	0.00
Crest El. (ft)	= 512.50	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	510.00	---	---	---	---	0.00	---	---	---	---	---	0.000
1.00	2,033	511.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.00	5,926	512.00	---	---	---	---	0.00	---	---	---	---	---	0.000
2.50	8,607	512.50	---	---	---	---	0.00	---	---	---	---	---	0.000
3.00	11,784	513.00	---	---	---	---	27.58	---	---	---	---	---	27.58

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Pond No. 6 - Pond C Infiltration

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 511.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	511.00	11,721	0	0
0.50	511.50	12,624	6,084	6,084
1.00	512.00	13,556	6,543	12,627
1.50	512.50	14,514	7,015	19,643
2.00	513.00	15,505	7,503	27,145
2.50	513.50	16,522	8,005	35,150
3.00	514.00	17,409	8,481	43,631

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 8.00	0.00	0.00	0.00
Crest El. (ft)	= 512.50	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 24.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	511.00	---	---	---	---	0.00	---	---	---	0.000	---	0.000
0.50	6,084	511.50	---	---	---	---	0.00	---	---	---	7.013	---	7.013
1.00	12,627	512.00	---	---	---	---	0.00	---	---	---	7.531	---	7.531
1.50	19,643	512.50	---	---	---	---	0.00	---	---	---	8.063	---	8.063
2.00	27,145	513.00	---	---	---	---	7.35	---	---	---	8.614	---	15.97
2.50	35,150	513.50	---	---	---	---	20.80	---	---	---	9.179	---	29.98
3.00	43,631	514.00	---	---	---	---	38.21	---	---	---	9.672	---	47.88

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Pond No. 5 - Pond C Lower

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 511.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	511.00	1,127	0	0
0.50	511.50	1,429	637	637
1.00	512.00	1,761	796	1,433
1.50	512.50	2,123	969	2,403
2.00	513.00	2,515	1,158	3,561
2.50	513.50	2,936	1,361	4,922
3.00	514.00	3,224	1,539	6,461

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	3.00	0.00	0.00
Span (in)	= 18.00	3.00	0.00	0.00
No. Barrels	= 2	1	0	0
Invert El. (ft)	= 511.00	511.00	0.00	0.00
Length (ft)	= 210.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 24.00	8.00	0.00	30.00
Crest El. (ft)	= 513.30	511.60	0.00	513.50
Weir Coeff.	= 3.33	3.33	3.33	2.60
Weir Type	= Rect	Rect	---	Broad
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	511.00	0.00	0.00	---	---	0.00	0.00	---	0.00	---	---	0.000
0.50	637	511.50	0.14 ic	0.14 ic	---	---	0.00	0.00	---	0.00	---	---	0.145
1.00	1,433	512.00	5.91 ic	0.11 ic	---	---	0.00	5.72 s	---	0.00	---	---	5.829
1.50	2,403	512.50	13.02 oc	0.09 ic	---	---	0.00	12.92 s	---	0.00	---	---	13.01
2.00	3,561	513.00	15.06 oc	0.06 ic	---	---	0.00	15.00 s	---	0.00	---	---	15.06
2.50	4,922	513.50	17.56 oc	0.03 ic	---	---	3.41 s	14.11 s	---	0.00	---	---	17.55
3.00	6,461	514.00	19.66 oc	0.02 ic	---	---	8.45 s	11.14 s	---	27.58	---	---	47.19

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Hydrograph Report

Hyd. No. 2

PR-B

Hydrograph type	= SCS Runoff	Peak discharge	= 11.56 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.23 hrs
Time interval	= 1 min	Hyd. volume	= 50,982 cuft
Drainage area	= 9.770 ac	Curve number	= 87.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 19.8 min
Total precip.	= 2.65 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time -- (hrs)	Outflow cfs)	
12.17	10.83	
12.18	11.18	
12.20	11.41	
12.22	11.54	
12.23	11.56	<<
12.25	11.49	
12.27	11.35	
12.28	11.16	
12.30	10.94	
12.32	10.68	
12.33	10.40	

...End

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Tuesday, 08 / 15 / 2017

Hyd. No. 8

PR-C3

Hydrograph type	= SCS Runoff	Peak discharge	= 3.502 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.03 hrs
Time interval	= 1 min	Hyd. volume	= 9,741 cuft
Drainage area	= 1.490 ac	Curve number	= 93.000
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 2.0 min
Total precip.	= 2.65 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Discharge Table

(Printed values >= 90.00% of Qp.)

Time (hrs)	Outflow (cfs)	
12.02	3.398	
12.03	3.502	<<
12.05	3.344	

...End

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

POND STAGE STORAGE CALCULATIONS

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**08/08/17**		**1**	**5**

PROJECT TITLE	LOCATION
Suresky & Sons	**Town of Chester**

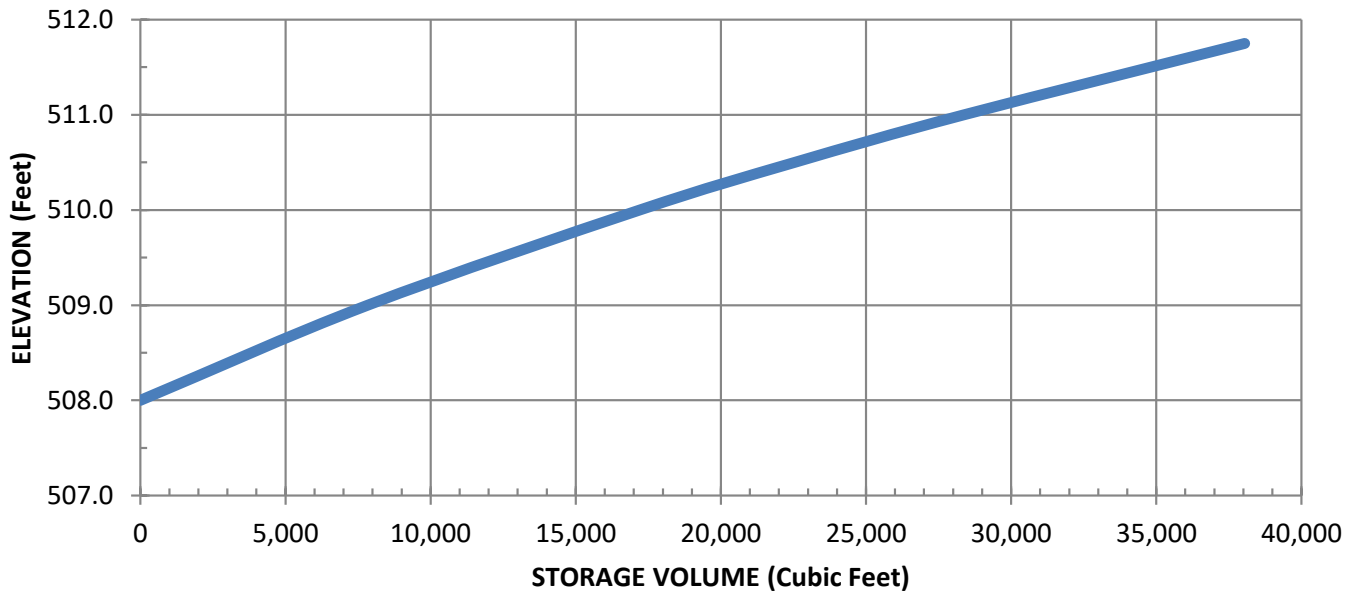
CALCULATED BY	APPROVED BY	REF DRAWING(S)
KW	**JS**	**DWG LAST REV. XX/XX/XX**

Pond: **B Upper** Drainage Area: N/A acres

Required Total Storage Volume: N/A cubic feet (Drainage Area x 2,000)

Water Surface Elevation (Feet)	Surface Area (Square Feet)	Conic Area (Square Feet)	Difference in Elevation (Feet)	Incremental Storage (Cubic Feet)	Total Storage Volume (Cubic Feet)
508.0	7,121.0	--	--	--	0.0
509.0	8,571.0	7,834.8	1.0	7,834.8	7,834.8
510.0	10,191.0	9,369.3	1.0	9,369.3	17,204.1
510.5	11,161.0	10,672.3	0.5	5,336.2	22,540.3
511.0	12,165.0	11,659.4	0.5	5,829.7	28,370.0
511.75	13,649.0	12,899.9	0.8	9,674.9	38,044.9

Stage Storage Curve



ENGINEERING & SURVEYING PROPERTIES
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POND STAGE STORAGE CALCULATIONS

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**08/08/17**		**2**	**5**

PROJECT TITLE	LOCATION
Suresky & Sons	**Town of Chester**

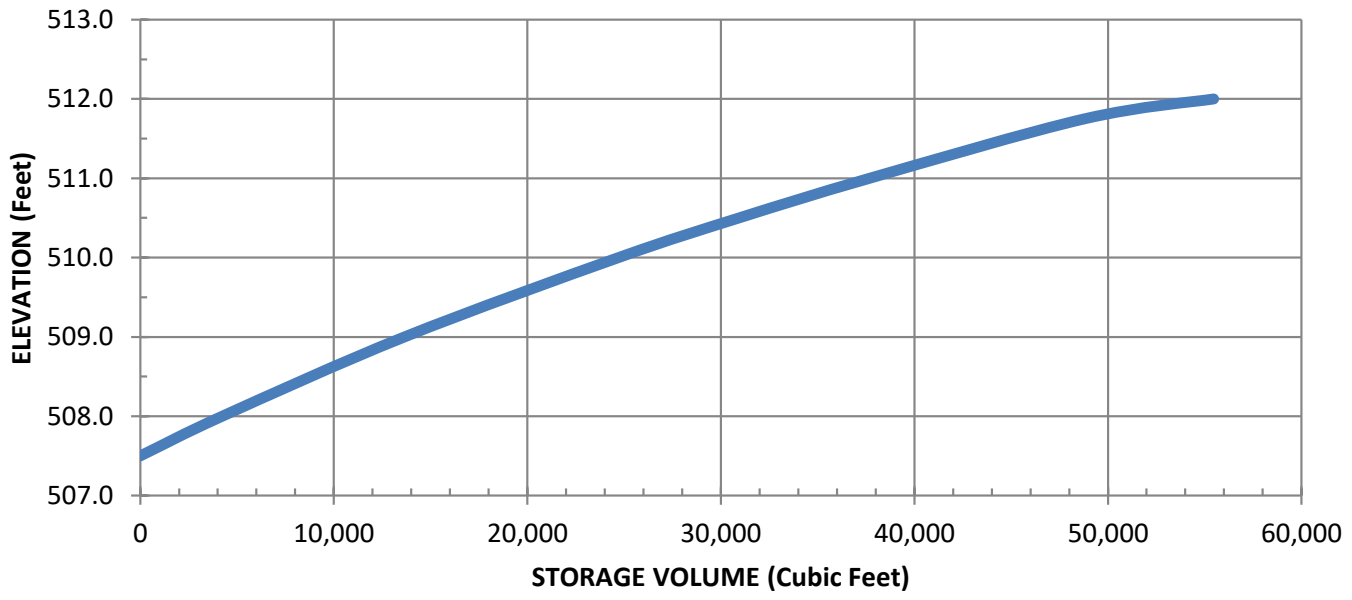
CALCULATED BY	APPROVED BY	REF DRAWING(S)
KW	**JS**	**DWG LAST REV. XX/XX/XX**

Pond: **B Lower** Drainage Area: N/A acres

Required Total Storage Volume: N/A cubic feet (Drainage Area x 2,000)

Water Surface Elevation (Feet)	Surface Area (Square Feet)	Conic Area (Square Feet)	Difference in Elevation (Feet)	Incremental Storage (Cubic Feet)	Total Storage Volume (Cubic Feet)
507.5	8,283.0	--	--	--	0.0
508.0	8,654.0	8,467.8	0.5	4,233.9	4,233.9
509.0	10,202.0	9,417.4	1.0	9,417.4	13,651.3
510.0	11,940.0	11,059.6	1.0	11,059.6	24,710.9
510.5	12,971.0	12,451.9	0.5	6,226.0	30,936.9
511.0	14,037.0	13,500.5	0.5	6,750.2	37,687.1
511.75	15,608.0	14,815.6	0.8	11,111.7	48,798.8
512.0	39,530.0	26,659.1	0.3	6,664.8	55,463.6

Stage Storage Curve



ENGINEERING & SURVEYING PROPERTIES
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POND STAGE STORAGE CALCULATIONS

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**08/08/17**		**3**	**5**

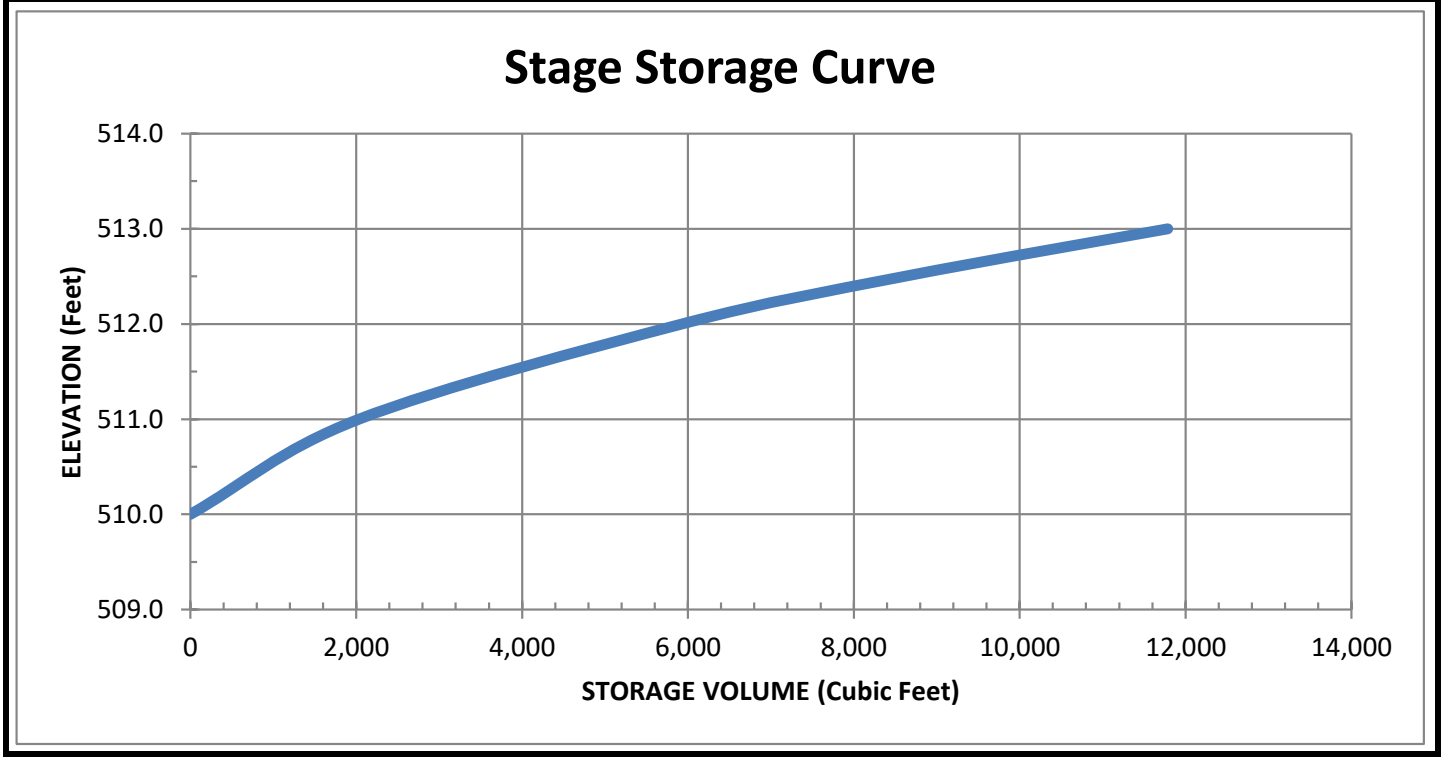
PROJECT TITLE	LOCATION
Suresky & Sons	**Town of Chester**

CALCULATED BY	APPROVED BY	REF DRAWING(S)
KW	**JS**	**DWG LAST REV. XX/XX/XX**

Pond: **C Upper** Drainage Area: N/A acres

Required Total Storage Volume: N/A cubic feet (Drainage Area x 2,000)

Water Surface Elevation (Feet)	Surface Area (Square Feet)	Conic Area (Square Feet)	Difference in Elevation (Feet)	Incremental Storage (Cubic Feet)	Total Storage Volume (Cubic Feet)
510.0	1,212.0	--	--	--	0.0
511.0	2,985.0	2,033.0	1.0	2,033.0	2,033.0
512.0	4,879.0	3,893.4	1.0	3,893.4	5,926.4
512.5	5,860.0	5,362.0	0.5	2,681.0	8,607.4
513.0	6,865.0	6,355.9	0.5	3,177.9	11,785.4



ENGINEERING & SURVEYING PROPERTIES
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POND STAGE STORAGE CALCULATIONS

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**08/08/17**		**4**	**5**

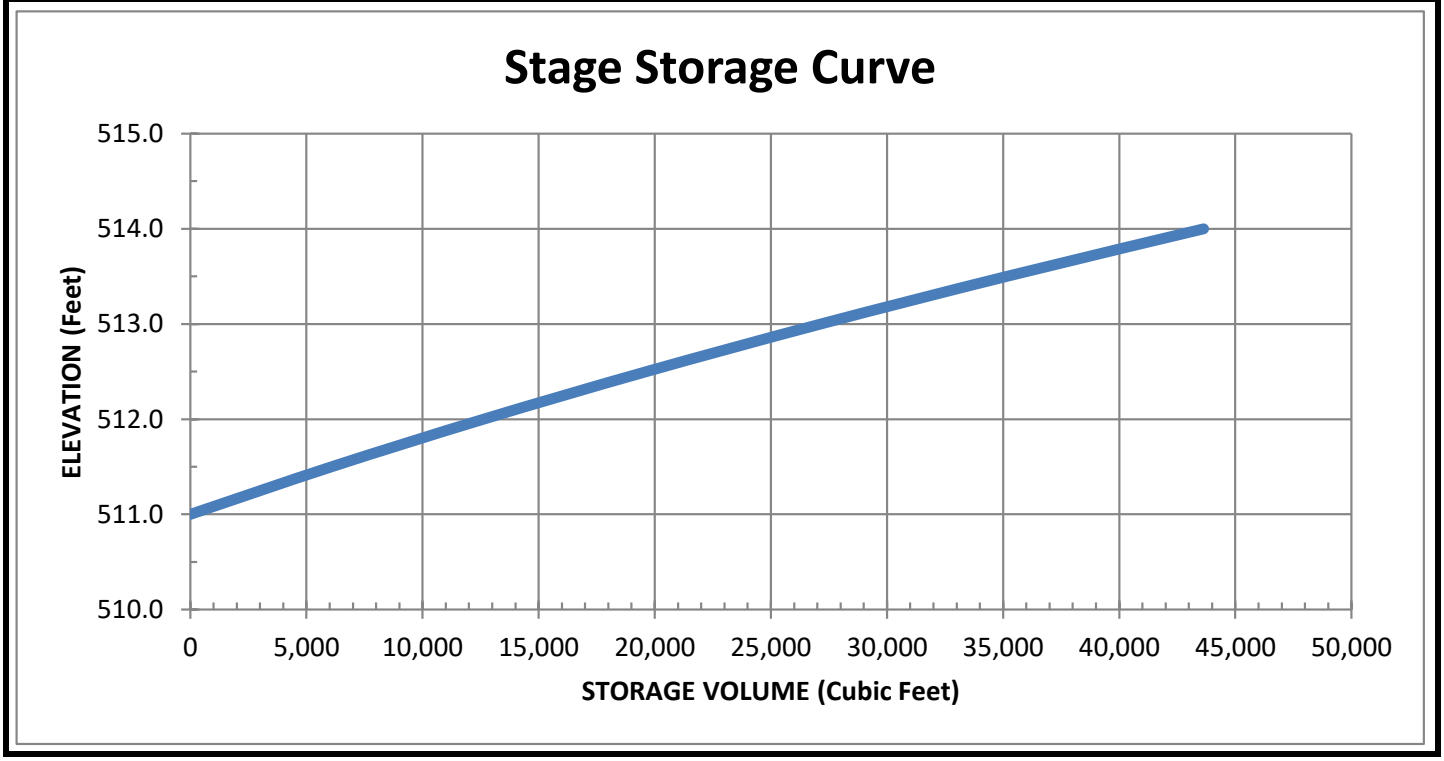
PROJECT TITLE	LOCATION
Suresky & Sons	**Town of Chester**

CALCULATED BY	APPROVED BY	REF DRAWING(S)
KW	**JS**	**DWG LAST REV. XX/XX/XX**

Pond: **C Infiltration** Drainage Area: N/A acres

Required Total Storage Volume: N/A cubic feet (Drainage Area x 2,000)

Water Surface Elevation (Feet)	Surface Area (Square Feet)	Conic Area (Square Feet)	Difference in Elevation (Feet)	Incremental Storage (Cubic Feet)	Total Storage Volume (Cubic Feet)
511.0	11,721.0	--	--	--	0.0
511.5	12,624.0	12,169.7	0.5	6,084.9	6,084.9
512.0	13,556.0	13,087.2	0.5	6,543.6	12,628.5
512.5	14,514.0	14,032.3	0.5	7,016.1	19,644.6
513.0	15,505.0	15,006.8	0.5	7,503.4	27,148.0
513.5	16,522.0	16,010.8	0.5	8,005.4	35,153.4
514.0	17,409.0	16,963.6	0.5	8,481.8	43,635.2



ENGINEERING & SURVEYING PROPERTIES
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POND STAGE STORAGE CALCULATIONS

WO. NO.	DATE	REVISED	SHEET	OF
1081.02	**08/08/17**		**5**	**5**

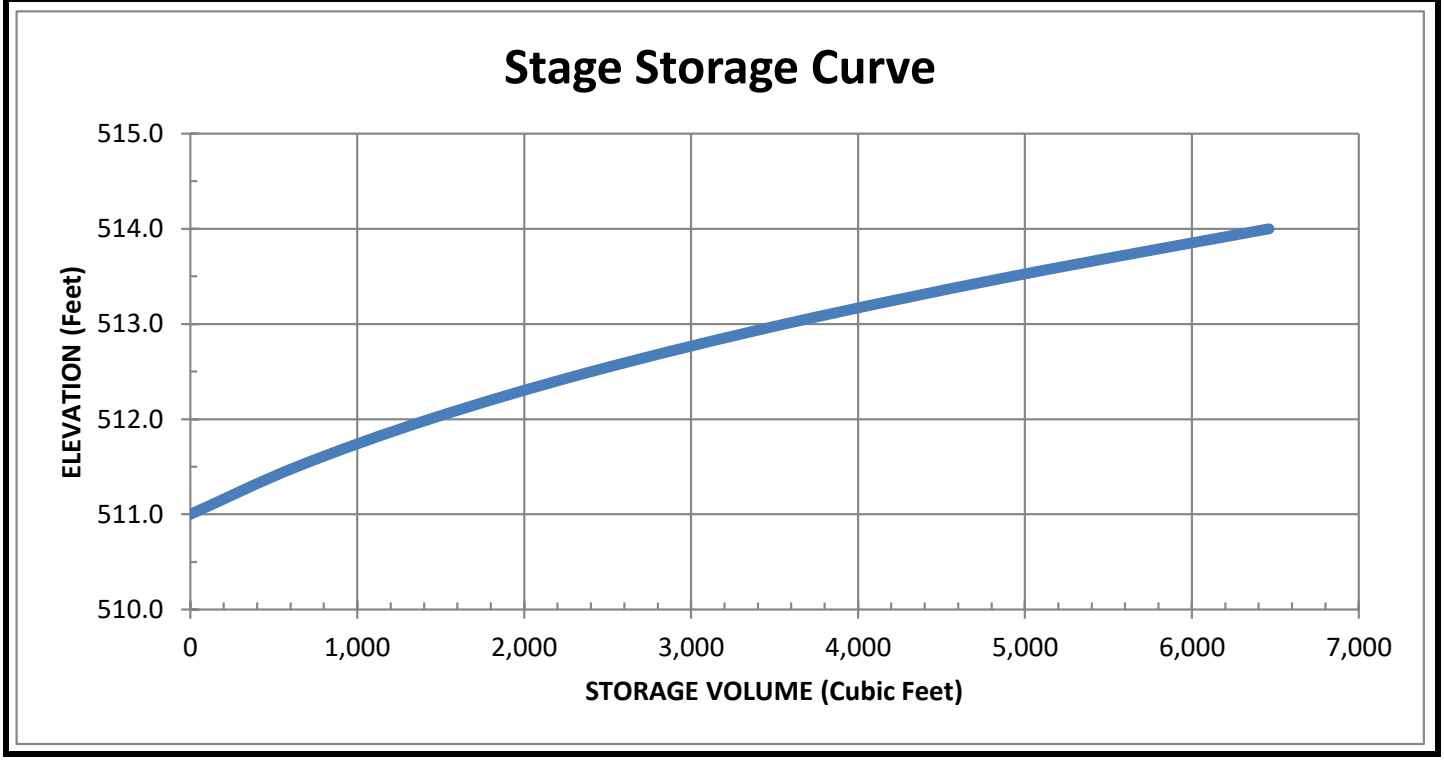
PROJECT TITLE	LOCATION
Suresky & Sons	**Town of Chester**

CALCULATED BY	APPROVED BY	REF DRAWING(S)
KW	**JS**	**DWG LAST REV. XX/XX/XX**

Pond: **C Lower** Drainage Area: N/A acres

Required Total Storage Volume: N/A cubic feet (Drainage Area x 2,000)

Water Surface Elevation (Feet)	Surface Area (Square Feet)	Conic Area (Square Feet)	Difference in Elevation (Feet)	Incremental Storage (Cubic Feet)	Total Storage Volume (Cubic Feet)
511.0	1,127.0	--	--	--	0.0
511.5	1,429.0	1,275.0	0.5	637.5	637.5
512.0	1,761.0	1,592.1	0.5	796.1	1,433.6
512.5	2,123.0	1,939.2	0.5	969.6	2,403.2
513.0	2,515.0	2,316.2	0.5	1,158.1	3,561.3
513.5	2,936.0	2,722.8	0.5	1,361.4	4,922.7
514.0	3,224.0	3,078.9	0.5	1,539.4	6,462.1



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APPENDIX 11

CONSTRUCTION SITE

INSPECTION FORM,

NOTICE OF INTENT,

AND MS4 ACCEPTANCE

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SWPPP INSPECTION REPORT

ENGINEERING & SURVEYING PROPERTIES
Achieving Successful Results with Innovative Designs

W.O. No.:	Date:	Greater than 5 Ac. Of Disturbance? Waiver?	Page Of
Project Name:		Weather Conditions: ☐ Dry ☐ Rain ☐ Snow	
		Soil Conditions: ☐ Dry ☐ Wet ☐ Saturated	
Location:		Arrival Time :	Photographs Taken? ☐ Yes ☐ No
		Departing Time:	

Owner:	**Phone:**	**Documents on-site?**		SWPPP:	
Contractor:	**Phone:**	Weekly Inspections:		NOI:	

1. Description of current activities onsite and phase of construction (attach sketch showing areas of stabilization, current work, and photo locations):

2. Description of the condition of the runoff at all points of discharge from the construction site (including onsite conveyance systems):	3. Description of the condition of all natural surface water bodies located within, or immediately adjacent to the construction site:

4. Identify all erosion and sediment control practices that require repair and/or maintenance:	5. Identify all erosion and sediment control practices that were not installed properly or are not functioning as designed:

6. Identify current status of construction for all post-construction stormwater management practices:	7. Corrective action(s) required to erosion and sediment control measures and post-construction stormwater management practices:

Was the owner and contractor(s) notified of the deficiencies and repairs needed within one (1) business day? ☐ Yes ☐ No

Qualified Inspector

Notice:

This inspection was performed solely for the purpose of determining compliance with NYSDEC SPDES General Permit:

☐ GP-02-01
☐ GP-08-001
☐ GP-10-001

Name and Title

Signature

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0806372691

NOTICE OF INTENT

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NYR _____
(for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-15-002

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

-IMPORTANT-
RETURN THIS FORM TO THE ADDRESS ABOVE

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)
Suresky & Sons

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

Owner/Operator Contact Person First Name

Owner/Operator Mailing Address
2 Hatfield Lane

City
Goshen

State
NY

Zip
10924-____

Phone (Owner/Operator)
845-294-5177

Fax (Owner/Operator)
___-___-____

Email (Owner/Operator)

FED TAX ID
__-_____ (not required for individuals)

Project Site Information

Project/Site Name
Suresky & Sons Chester

Street Address (NOT P.O. BOX)
39 Elkay Drive

Side of Street
○ **North** ● **South** ○ **East** ○ **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)
Town of Chester

State: NY
Zip: 10918-
County: Orange
DEC Region: 3

Name of Nearest Cross Street
Black Meadow Road

Distance to Nearest Cross Street (Feet)
950

Project In Relation to Cross Street
● **North** ○ **South** ○ **East** ○ **West**

Tax Map Numbers
Section-Block-Parcel
6-1-70.12

Tax Map Numbers

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.ny.gov/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site, go to the tool boxes on the top and choose "i"(identify). Then click on the center of your site and a new window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting): 560439

Y Coordinates (Northing): 4576947

2. What is the nature of this construction project?

● **New Construction**

○ **Redevelopment with increase in impervious area**

○ **Redevelopment with no increase in impervious area**

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use

- ● FOREST
- ○ PASTURE/OPEN LAND
- ○ CULTIVATED LAND
- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY
- ○ PARKING LOT
- ○ OTHER

Post-Development Future Land Use

- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION — Number of Lots
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ● COMMERCIAL
- ○ MUNICIPAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY (water, sewer, gas, etc.)
- ○ PARKING LOT
- ○ CLEARING/GRADING ONLY
- ○ DEMOLITION, NO REDEVELOPMENT
- ○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
- ○ OTHER

***Note**: for gas well drilling, non-high volume hydraulic fractured wells only

4. In accordance with the larger common plan of development or sale, enter the total project site area; the total area to be disturbed; existing impervious area to be disturbed (for redevelopment activities); and the future impervious area constructed within the disturbed area. (Round to the nearest tenth of an acre.)

Total Site Area	Total Area To Be Disturbed	Existing Impervious Area To Be Disturbed	Future Impervious Area Within Disturbed Area
15.9	9.9	1.0	6.4

5. Do you plan to disturb more than 5 acres of soil at any one time? ● **Yes** ○ **No**

6. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	B	C	D
3 %	%	%	97 %

7. Is this a phased project? ● **Yes** ○ **No**

8. Enter the planned start and end dates of the disturbance activities.

Start Date	End Date
12/01/2015	05/31/2016

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Name

Wetland (WR-eleven)

9a. Type of waterbody identified in Question 9?

- ○ Wetland / State Jurisdiction On Site (Answer 9b)
- ● Wetland / State Jurisdiction Off Site
- ○ Wetland / Federal Jurisdiction On Site (Answer 9b)
- ○ Wetland / Federal Jurisdiction Off Site
- ○ Stream / Creek On Site
- ○ Stream / Creek Off Site
- ○ River On Site
- ○ River Off Site
- ○ Lake On Site
- ○ Lake Off Site
- ○ Other Type On Site
- ○ Other Type Off Site

9b. How was the wetland identified?

- ○ Regulatory Map
- ○ Delineated by Consultant
- ○ Delineated by Army Corps of Engineers
- ○ Other (identify)

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-15-002? ○ **Yes** ● **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-15-002? ○ **Yes** ● **No**

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? ○ **Yes** ● **No**
If no, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey? ○ **Yes** ○ **No**
If Yes, what is the acreage to be disturbed?

.

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? ○ **Yes** ● **No**

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)? ◉ **Yes** ○ **No** ○ **Unknown**

16. What is the name of the municipality/entity that owns the separate storm sewer system?

Orange County Department of Public Works

17. Does any runoff from the site enter a sewer classified as a Combined Sewer? ○ **Yes** ◉ **No** ○ **Unknown**

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law? ○ **Yes** ◉ **No**

19. Is this property owned by a state authority, state agency, federal government or local government? ○ **Yes** ◉ **No**

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.) ○ **Yes** ◉ **No**

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)? ◉ **Yes** ○ **No**

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)? ◉ **Yes** ○ **No**
If No, skip questions 23 and 27-39.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual? ◉ **Yes** ○ **No**

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

- ● **Professional Engineer (P.E.)**
- ○ **Soil and Water Conservation District (SWCD)**
- ○ **Registered Landscape Architect (R.L.A)**
- ○ **Certified Professional in Erosion and Sediment Control (CPESC)**
- ○ **Owner/Operator**
- ○ **Other**

SWPPP Preparer
Engineering & Surveying Properties, PC

Contact Name (Last, Space, First)
Samuelson, Jay

Mailing Address
71 Clinton Street

City
Montgomery

State Zip
NY 12549-

Phone
845-457-7727

Fax
845-457-1899

Email
jay@ep-pc.com

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-15-002. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First Name
Jay

MI

Last Name
Samuelson

Signature

Date
/ /

25. Has a construction sequence schedule for the planned management practices been prepared? ○ Yes ○ No

26. Select **all** of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural

- ○ Check Dams
- ○ Construction Road Stabilization
- ○ Dust Control
- ○ Earth Dike
- ○ Level Spreader
- ○ Perimeter Dike/Swale
- ○ Pipe Slope Drain
- ○ Portable Sediment Tank
- ○ Rock Dam
- ○ Sediment Basin
- ● Sediment Traps
- ● Silt Fence
- ● Stabilized Construction Entrance
- ○ Storm Drain Inlet Protection
- ○ Straw/Hay Bale Dike
- ○ Temporary Access Waterway Crossing
- ○ Temporary Stormdrain Diversion
- ○ Temporary Swale
- ○ Turbidity Curtain
- ○ Water bars

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

- ○ Brush Matting
- ○ Dune Stabilization
- ○ Grassed Waterway
- ● Mulching
- ○ Protecting Vegetation
- ○ Recreation Area Improvement
- ● Seeding
- ○ Sodding
- ○ Straw/Hay Bale Dike
- ○ Streambank Protection
- ○ Temporary Swale
- ● Topsoiling
- ○ Vegetating Waterways

Permanent Structural

- ○ Debris Basin
- ○ Diversion
- ○ Grade Stabilization Structure
- ○ Land Grading
- ○ Lined Waterway (Rock)
- ○ Paved Channel (Concrete)
- ○ Paved Flume
- ○ Retaining Wall
- ○ Riprap Slope Protection
- ○ Rock Outlet Protection
- ○ Streambank Protection

Other

Post-construction Stormwater Management Practice (SMP) Requirements

Important: Completion of Questions 27-39 is not required if response to Question 22 is No.

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.

- ● **Preservation of Undisturbed Areas**
- ● **Preservation of Buffers**
- ● **Reduction of Clearing and Grading**
- ○ **Locating Development in Less Sensitive Areas**
- ○ **Roadway Reduction**
- ○ **Sidewalk Reduction**
- ○ **Driveway Reduction**
- ○ **Cul-de-sac Reduction**
- ● **Building Footprint Reduction**
- ○ **Parking Reduction**

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).

- ● All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).
- ○ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout).

Total WQv Required

0.964 **acre-feet**

29. Identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity in Table 1 (See Page 9) that were used to reduce the Total WQv Required(#28).

Also, provide in Table 1 the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use Tables 1 and 2 to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

Table 1 - Runoff Reduction (RR) Techniques and Standard Stormwater Management Practices (SMPs)

	Total Contributing Area (acres)		Total Contributing Impervious Area(acres)
RR Techniques (Area Reduction)			
● Conservation of Natural Areas (RR-1)	9.51	and/or	0.00
○ Sheetflow to Riparian Buffers/Filters Strips (RR-2)		and/or	
○ Tree Planting/Tree Pit (RR-3)		and/or	
○ Disconnection of Rooftop Runoff (RR-4)		and/or	
RR Techniques (Volume Reduction)			
○ Vegetated Swale (RR-5)			
○ Rain Garden (RR-6)			
○ Stormwater Planter (RR-7)			
○ Rain Barrel/Cistern (RR-8)			
● Porous Pavement (RR-9)			0.221
○ Green Roof (RR-10)			
Standard SMPs with RRv Capacity			
○ Infiltration Trench (I-1)			
○ Infiltration Basin (I-2)			
○ Dry Well (I-3)			
○ Underground Infiltration System (I-4)			
○ Bioretention (F-5)			
○ Dry Swale (O-1)			
Standard SMPs			
○ Micropool Extended Detention (P-1)			
○ Wet Pond (P-2)			
● Wet Extended Detention (P-3)			
○ Multiple Pond System (P-4)			
○ Pocket Pond (P-5)			0.505
○ Surface Sand Filter (F-1)			
○ Underground Sand Filter (F-2)			
○ Perimeter Sand Filter (F-3)			
○ Organic Filter (F-4)			
○ Shallow Wetland (W-1)			
○ Extended Detention Wetland (W-2)			
○ Pond/Wetland System (W-3)			
○ Pocket Wetland (W-4)			
○ Wet Swale (O-2)			

Table 2 - Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)

Alternative SMP	Total Contributing Impervious Area(acres)
○ **Hydrodynamic**	
○ **Wet Vault**	
○ **Media Filter**	
○ **Other**	

Provide the name and manufacturer of the Alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Name

Manufacturer

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29.

Total RRv provided

0.284 **acre-feet**

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28).

○ **Yes** ● **No**

If Yes, go to question 36.
If No, go to question 32.

32. Provide the Minimum RRv required based on HSG.
[Minimum RRv Required = (P)(0.95)(Ai)/12, Ai=(S)(Aic)]

Minimum RRv Required

0.175 **acre-feet**

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?

● **Yes** ○ **No**

If Yes, go to question 33.
Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. Identify the Standard SMPs in Table 1 and, if applicable, the Alternative SMPs in Table 2 that were used to treat the remaining total WQv(=Total WQv Required in 28 - Total RRv Provided in 30).

Also, provide in Table 1 and 2 the total impervious area that contributes runoff to each practice selected.

Note: Use Tables 1 and 2 to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question 29.

WQv Provided

0.798 **acre-feet**

Note: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - RRv provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a). 1.082

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)? ◉ **Yes** ○ **No**

If Yes, go to question 36.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv) required and provided or select waiver (36a), if applicable.

CPv Required

1.736 **acre-feet**

CPv Provided

3.116 **acre-feet**

36a. The need to provide channel protection has been waived because:

○ Site discharges directly to tidal waters or a fifth order or larger stream.

○ Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (37a), if applicable.

Total Overbank Flood Control Criteria (Qp)

Pre-Development

54.40 **CFS**

Post-development

39.35 **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development

129.19 **CFS**

Post-development

107.26 **CFS**

37a. The need to meet the Qp and Qf criteria has been waived because:

- ○ Site discharges directly to tidal waters or a fifth order or larger stream.
- ○ Downstream analysis reveals that the Qp and Qf controls are not required

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ● **Yes** ○ **No**

If Yes, Identify the entity responsible for the long term Operation and Maintenance

Suresky & Sons

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required(#28). (See question 32a) This space can also be used for other pertinent project information.

40. Identify other DEC permits, existing and new, that are required for this project/facility.

- ○ Air Pollution Control
- ○ Coastal Erosion
- ○ Hazardous Waste
- ○ Long Island Wells
- ○ Mined Land Reclamation
- ○ Solid Waste
- ○ Navigable Waters Protection / Article 15
- ○ Water Quality Certificate
- ○ Dam Safety
- ○ Water Supply
- ○ Freshwater Wetlands/Article 24
- ○ Tidal Wetlands
- ○ Wild, Scenic and Recreational Rivers
- ○ Stream Bed or Bank Protection / Article 15
- ○ Endangered or Threatened Species(Incidental Take Permit)
- ○ Individual SPDES
- ○ SPDES Multi-Sector GP [N][Y][R][ ][ ][ ][ ][ ]
- ○ Other [ ]
- ○ None

41. Does this project require a US Army Corps of Engineers Wetland Permit? ○ **Yes** ● **No**
If Yes, Indicate Size of Impact. [ ][ ][ ][ ][ ].[ ]

42. Is this project subject to the requirements of a regulated, traditional land use control MS4? ● **Yes** ○ **No**
(If No, skip question 43)

43. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ● **Yes** ○ **No**

44. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. [N][Y][R][ ][ ][ ][ ][ ][ ]

Owner/Operator Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Print First Name **MI**

Print Last Name

Owner/Operator Signature

Date / /

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

*(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

I. Project Owner/Operator Information
1. Owner/Operator Name: Suresky and Sons
2. Contact Person: TO BE PROVIDED
3. Street Address: 2 Hatfield Lane
4. City/State/Zip: Goshen, NY 10924
II. Project Site Information
5. Project/Site Name: Suresky and Sons Chester
6. Street Address: 39 Elkay Drive
7. City/State/Zip: Town of Chester, NY 10918
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information
8. SWPPP Reviewed by:
9. Title/Position:
10. Date Final SWPPP Reviewed and Accepted:
IV. Regulated MS4 Information
11. Name of MS4:
12. MS4 SPDES Permit Identification Number: NYR20A _____
13. Contact Person:
14. Street Address:
15. City/State/Zip:
16. Telephone Number:

(NYS DEC - MS4 SWPPP Acceptance Form - January 2010)

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s).
Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

APPENDIX 12

CONSTRUCTION WASTE MANAGEMENT & SPILL PREVENTION PLANS

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CONSTRUCTION WASTE MANAGEMENT & SPILL PREVENTION PLAN

Early in the construction activities, land clearing materials will be collected and recycled either off site or re-used on site as erosion control materials. During early phase construction activities, cardboard, concrete, metal, wood and general trash collection dumpsters will be on site for collection and processing. As the project progresses, concrete dumpsters will be changed over to drywall collection, site clearing dumpsters will be changed over to finish material containers, etc. Typically, (4) open top containers will be on site for the duration of the project. General waste and cardboard/paper containers will be on site for the duration of the project. The contractor will be responsible for organizing and placing containers on site and timely removal/replacement when containers are filled to capacity. As necessary, the contractor will provide areas of collection or hoppers for subcontractors to utilize for intermediate storage of construction and demolition (CD) materials. All containers will be clearly identified with signage indicating stored materials.

Those CD materials generated on this project will be salvaged and re-processed as listed. The contractor will research available processing sources specific to the job site and make all trades aware of project qualifying CD recyclable materials as follows:

Brick: Materials will be stored on site and palletized by processor who will resell as product.

Cardboard: Materials will be separated on the jobsite and stored within dedicated on-site dumpster and delivered loose to processor. Processor will bale materials and deliver/resell to end market users.

Concrete: Scrap and loose materials will either be crushed on site and used for aggregate or stored within dedicated on-site dumpster and delivered to processor. Processor will reuse or resell materials as clean fill back or crush and use for aggregate.

Metals: Materials will be sorted and stored within dedicated on-site dumpster and delivered to processor. Processor will sell materials to metal recyclers (steel, aluminum, brass, copper, lead, stainless).

Stone and Granite: Materials will be collected on site in piles or containers and processor will palletize and haul materials. Processor will re-sell as product or crushed and use as aggregate.

Plastic, paper goods, and aluminum cans: Materials will be collected on job site within construction trailers, cantina areas, etc. and stored in on-site trailers. Materials will be hauled/recycled by processor.

Drywall: Waste materials will be sorted and collected in dedicated on-site containers or materials will be ground on site and used as an erosion control product. Hauled materials to processor will be processed as a soil amendment or used in alternate fuel mixture.

Wood or Lumber: Materials will be sorted and stored on-site within dedicated on-site containers and either resold as retail lumber by processor or ground and mixed with commercial land

clearing and/or approved materials for erosion control applications. Lumber will need to be clean, no paint or other wood treatment.

Land Clearing Debris: Woody materials (stumps, large limbs) will be ground on-site and used for soil erosion control products or hauled to processor to be ground as re-sold as erosion control products.

Roofing Shingles: Materials will be stored on site and processed as temporary road base, mixed into hot asphalt mix or used as alternate fuel blend or hauled offsite via appropriate methods to an authorized disposal/recycling facility.

Fuel Tanks: On site storage of fuel chemicals shall be equipped with a spill kit. The contractor must provide secondary containment for storing any hazardous chemicals on site.
Equipment storage: All equipment stored on site shall be inspected daily by the contractor for any oil or lubricant spills or leaks. Any leaks shall be repaired immediately. In addition all equipment must be closely inspected prior to working in the Town R.O.W.

Spill Response: The contractor shall clean all spills immediately and shall report all spills to the New York State Department of Environmental Conservation.
This Plan will be displayed in the construction jobsite trailer at all times.