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May 9, 2016

Heidi Samokar, AICP
Director of Planning & Development
Town of Tolland
21 Tolland Green,
Tolland, Connecticut 06084

Re: Ground-Mounted Solar Photovoltaic Project, 97 Gerber Drive
Site Plan Application Submission

Dear Heidi:

On behalf of the Applicant, WR-TGC Solar Generation XVI, LLC (TGC), we are pleased to submit the attached Site Plan Application for the proposed solar project at 97 Gerber Drive. Enclosed, please find seven copies of the proposal; a PDF has also been emailed to hsamokar@tolland.org. It is our understanding that, since this is a Town-Owned project, the application fee has been waived. Fees associated with third-party review, if deemed necessary, will be provided by TGC under separate cover upon request by the Town.

The proposed development includes the installation of a 1.3-MW (DC) ground mounted solar array on a Town-Owned parcel of land designated as MBLU 20/K/47. The project is located in the Tolland Business Park zone. The proposed solar array will encompass approximately 6 acres of the 16.88-acre parcel. The estimated area of disturbance during construction is approximately 8.35 acres, and includes areas disturbed by proposed clearing, grading, stormwater management infrastructure, and new impervious area associated with solar panel post installations and the access roadway.

Thank you for your assistance in coordinating the review of this project. We look forward to discussing the project with the Board during the hearing on May 23, 2016. If you have any questions or require additional information, please feel free to contact us.

Sincerely,

WOODARD & CURRAN INC.

Alan Benevides, PE, LSP
Senior Principal

Denise Cameron
Project Manager

Enclosure(s): Site Plan Application, Narrative Report & Appendices (8 copies & PDF via email)

cc: Adam Rasken (TGC)
Ryan Guay (TGC)

TOLLAND PLANNING AND ZONING COMMISSION

SITE PLAN APPLICATION FORM

THIS FORM MUST BE COMPLETELY FILLED OUT

APPLICANT WR-TGC Solar Generation XVI, LLC TEL # 518-791-1116

MAILING ADDRESS 315 Post Road West, Westport, CT 06880

CONTACT EMAIL ADDRESS rguay@distributedassetsolutions.com

OWNER OF RECORD Town of Tolland TEL # 860-871-3600

MAILING ADDRESS 21 Tolland Green, Tolland CT 06084

LOCATION OF SUBJECT PROPERTY:

STREET # 97 Located on the northern side of Gerber Drive, 2,600 feet from the

Intersection of Gerber Drive and Industrial Park Rd W

Assessor's Map 20 Block K Lot 047

As described in the Town Clerks records VOL. 138, PAGE 263

I HEREBY APPLY FOR A SITE PLAN FOR: The installation of a 1.3-MW (DC) ground-mounted solar photovoltaic (PV) arrays and electrical interconnection system and associated site improvements.

Have any previous applications been filed in connection with these premises? _____ yes X no

If yes, describe briefly _____

Former P&Z App. #_____ Date of Previous Action(s) _____

All the above statements and the statements contained in any documents and plans submitted herewith are true, to the best of my knowledge.

_____ _____

Signature of Owner(s) of Record Signature of Applicant(s)

(Certifies authorization for petition and permission to enter the property in connection with the application)

THIS APPLICATION MUST BE ACCOMPANIED WITH THE FOLLOWING:

1. Seven (7) copies and a PDF of the proposal with all the information required by the Zoning Regulations. (E-mail PDF to hsamokar@tolland.org)
2. An application fee in the amount of $ N/A (Town-Owned Project)

DATE OF SUBMISSION (fee and application) _____ FEE RECEIVED $ _____

DATE OF OFFICIAL RECEIPT _____ **P&Z APP. #**_____

Rev. 12/31/2015

WOODARD
&CURRAN

SITE PLAN APPLICATION

TGC – Gerber Drive
Solar Project

97 Gerber Drive
Tolland, CT

228051.02
WR-TGV Solar Generation XVI, LLC
May 2016

woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

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Appendix B: Surveys & Design Drawings (Bound Separately)

Appendix C: Wetland Report

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Appendix E: Soil Erosion and Sediment Control Plan

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Appendix G: Stormwater Figures & Calculations

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Appendix I: Detention Pond Design Letter

1. INTRODUCTION

WR-TGC Solar Generation XVI, LLC, (TGC, Applicant) is proposing to install an approximately 1.3-MW solar photovoltaic (PV) and electrical interconnection system on a Town-owned site located at 97 Gerber Drive, in Tolland, Connecticut (Site). Although Town properties are exempt from Zoning Regulations, the Town felt it was important to provide nearby property owners with the opportunity to understand and provide input regarding the project. Therefore, TGC is submitting this Report in support of the project's application for Site Plan Review. This Report and its attachments address existing and proposed site conditions, natural resources, stormwater management, and compliance with Town regulations.

1.1 PROPERTY OWNERSHIP

The proposed solar array will be located on the site of Town-owned vacant land. The project parcel is designated as MBLU 20/K/47. The proposed solar array will be located on the southern side of the property, near Gerber Drive, and will encompass approximately 6 acres of the 16.88-acre parcel. The Applicant will enter into a lease agreement with the Town for the development and operation of the proposed solar facility.

In accordance with Section 22-3.B of the Zoning Regulations, the following items have been provided for your reference:

- A key map showing location of the property with respect to nearby streets, adjacent properties, municipal boundaries and other landmarks is included on the Drawings in Appendix B;
- A map showing all properties or portions thereof, which fall within 500 feet of any part of the subject property is provided in Appendix A; and
- The names and complete mailing address of all property owners within the 500-foot area, in addition to those south of I-84 that may have views of the Site (as provided by the Town Planner), is also provided in Appendix A.

Letters notifying these abutters of the proposed project were mailed on April 7, 2016.

1.2 EXISTING CONDITIONS

The plans included in Appendix B show the Site's existing conditions. The project Site is an undeveloped, wooded area with an existing gravel access driveway. There is no existing water or sewer infrastructure within the project area. The site's existing impervious area consists of a gravel driveway and exposed ledge.

A topographic ground survey of the Site was performed by James E. Nagle on February 29, 2016, and a boundary survey was performed in 2007 by Kenneth R. Peterson. These surveys depict property boundaries adjacent to the proposed solar array, topography, and applicable property features, and are included in Appendix B for your reference. These surveys were utilized to develop the base plan for the design drawings provided in Appendix B.

1.3 PROPOSED DEVELOPMENT

The proposed project is comprised of the installation of security measures (fencing and locked gate; no barbed wire or razor wire fencing will be utilized), solar panels, inverters, transformers, and an electrical interconnect system. In compliance with the National Electric Code, the solar development will be secured by a 7-foot high chain link fence, which will prevent children and the public from coming into contact with the installation. The proposed site development is depicted on the drawings provided in Appendix B.

Grading on the site is proposed only as necessary to install the gravel access road and to manage stormwater runoff. Existing woodland areas on the site will be cleared only as necessary to avoid shading impacts on the panels; any vegetation not specifically designated for clearing will be protected during construction.

Areas disturbed by the solar panel installation and grading activities will be re-vegetated. The proposed development will result in new impervious area from the gravel access road, concrete equipment pad, and posts associated with the solar panels. Stormwater management on the Site is described further in Section 2 of this Report. No water or sewer service is needed for the Site.

1.3.1 Environmental & Transportation Impact Analysis

The overarching purpose of the proposed project is to provide a renewable source of energy, with minimal impact on the surrounding environment. The solar photovoltaic system is a passive use, which will have no noise, dust, odor, or other pollution or hazardous material concerns during the operation of the facility. Transformers used at PV installations are similar to the ones used throughout the electricity distribution system in cities and towns. Glare from the panels will be negligible since the panels are designed to absorb light as opposed to reflecting light. PV panels are made of tempered glass, which is quite strong. PV panels pass hail tests, and are regularly installed in Arctic and Antarctic conditions.

After construction has been completed, operations traffic will be minimal, consisting only of periodic visits to the Site to inspect the system. Due to electrical code restrictions, access to the Site will be limited strictly to authorized personnel. No traffic impacts are anticipated to result from the proposed development.

A copy of the document providing answers to “Frequently Asked Questions” regarding solar, which was included in the Abutter Notifications sent on April 7, 2016, has been provided in Appendix F for your reference.

1.3.2 Prior Approvals and Additional Permits

In 2013, the Town Council approved participating in the Connecticut Conference of Municipalities’ Energy Solar PV Program in order to identify sites and a solar developer. The Council later approved a contract with TGC and, more recently, the lease for the site. The Planning and Zoning Commission approved the concept of using this site for a solar project in May of 2015.

The estimated area of disturbance during construction is approximately 8.35 acres, which includes areas disturbed by proposed clearing, grading, stormwater management infrastructure, and new impervious area associated with solar panel post installations and the access roadway. According to the Connecticut Department of Energy & Environmental Protection (CTDEEP) Construction General Permit (CGP) for construction activity disturbing greater than one acre, Locally Approvable construction projects with a total disturbed area greater than five acres are required to register with the Department. The proposed project is considered “Locally Approvable”. Soil erosion and sediment control measures will be provided in accordance with the Department of Energy and Environmental Protection 2002 Connecticut Guidelines for Soil Erosion and Sediment Control and a CTDEEP CGP for the proposed development will be obtained.

1.4 NATURAL RESOURCES

Mason & Associates, Inc. conducted a field survey on December 31, 2015, and found no wetland areas on the Site, as outlined by the letter prepared by Joseph P. McCue dated January 11, 2016, which has been provided in Appendix C for your reference. A copy of the wetland report was provided to the Inland Wetlands Commission (IWC) and it was determined that no wetlands permit would be required. The proposed solar development is located within FEMA Flood Zone C, as shown by the Flood Insurance Rate Map provided in Appendix D, which is an area of minimal flood hazard. There are no known protected resource areas within or adjacent to the Site. Appropriate Erosion and Sediment Control measures will be implemented, as specified in the Plan provided in Appendix E of this Report.

2. STORMWATER MANAGEMENT

The following Section describes how the proposed project will comply with the Town of Tolland Low Impact Development and Stormwater Management Design Manual. The proposed development will result in new impervious area from the gravel access road, concrete equipment pad, and posts associated with the solar panels. The Town of Tolland and the State of Connecticut do not currently provide guidance on what components of solar panel arrays should be considered impervious. According to *The Guide to Developing Solar Photovoltaics at Massachusetts Landfills*, the Massachusetts Department of Environmental Protection has indicated that modules should not be considered impervious surfaces.

It is common practice to consider the panel area of a solar photovoltaic facility as pervious cover, as demonstrated by the Pennsylvania Department of Environmental Protection's (PA DEPs) *Information to use in the Determination of Stormwater Management Impacts for Solar Projects*, revised October 4, 2011. Pennsylvania also has a Tri-County Regional Planning Commission that has developed a model ordinance for Pennsylvania communities concerning the development of regulations for solar energy systems. The Tri-County Regional Planning Commission notes that the area beneath solar energy systems is typically not considered impervious cover.

In an article written by Denny L. Howell, a Professional Engineer registered in the States of Pennsylvania, Maryland, Delaware, and North Carolina, on February 23, 2012, titled *Solar Panels: Impervious or Pervious?*, he relates solar panels to raised decks that are typically considered pervious surfaces; he states "solar panels raised above the ground in vegetated areas whether large or small will not generate anymore runoff than the ground did before their installation assuming the ground cover has not changed." Denny Howell also notes that many municipalities and states have adopted laws excluding solar panels from impervious cover calculations. For example, the States of Maryland and New Jersey have enacted statutory laws (Chapter 702 and Chapter 4, respectively) concerning solar panels and impervious surfaces as they relate to stormwater management, which state that solar panels shall not be included in any calculation of impervious surface.

2.1 STORMWATER MANAGEMENT PLAN

This Stormwater Management Plan has been prepared in accordance with the Town of Tolland Low Impact Development (LID) and Stormwater Management Design Manual (Manual). New drainage swales will convey stormwater from the proposed solar array to a new stormwater management system designed to provide treatment and help attenuate peak stormwater flows prior to discharging towards the existing drainage system within Gerber Drive. The stormwater management system consists of an Organic Filter, which will have a pretreatment sediment forebay. Stormwater runoff will enter the sediment forebay via proposed roadway culverts. The sediment forebay will have a flow diversion spillway designed to bypass larger storm events away from the Organic Filter, such that only the Water Quality Volume will be directed to the Organic Filter. Stone check dams and pipe outlet protection measures will be provided to reduce the velocity of runoff on the Site and to prevent erosion.

This Plan consists of the following topics, each of which is discussed in the following sections of this Report:

- Project Information;
- Background Information
- Existing hydrologic conditions at the Site;
- Proposed hydrologic conditions; and

- Stormwater calculations to demonstrate compliance with the requirements of the Town requirements.

Surveys and design drawings showing the Site's existing and proposed conditions, respectively, are provided in Appendix B; a key map of the project site is included on the drawings. Pre- and Post-Development Drainage Area Figures are provided in Appendix G.

2.1.1 Project Information

Project Location:
97 Gerber Drive, Tolland, Connecticut
MBLU 20/K/47

Site Owner:
Town of Tolland
21 Tolland Green
Tolland, CT 06084

Project Engineer:
Woodard & Curran
Alan Benevides, P.E. Senior Principal
1520 Highland Ave., Cheshire, CT 06410
(978) 482-7835
abenevides@woodardcurran.com

Applicant
WR-TGC Solar Generation XVI, LLC, c/o Adam Rasken
18 Kings Highway North, Westport, CT 06880
(212) 376-6114
arasken@truegreencapital.com

2.1.2 Background Information

The project Site is Lot 10 of the Tolland Business Park. In 2008, a large Detention Pond was designed and permitted on Lot 9 of the Business Park to provide stormwater detention for developments on Lots 9, 10 and 11. For your reference, a letter dated May 21, 2007 from Gardner & Peterson Associates, LLC to the Town describing the intent for the Detention Pond is provided in Appendix I. This appendix also contains a copy of the 2008 "Proposed Drainage Area Plan", which shows that the pond was designed to accommodate a business development with five buildings, an access road, and parking lots on Lot 10. Overall, the proposed solar development results in significantly less impervious area than what was assumed in the design of the existing stormwater Detention Pond, as summarized in the Table below:

Impervious Area (Square-Feet)	
Existing Impervious Area	14,370
2008 Proposed Impervious Area Assumed for Pond Design	78,000
Currently Proposed Impervious Area for Solar Development	17,030

2.1.3 Existing Drainage Area

The existing Drainage Area consists of three subwatersheds with three unique study points, as illustrated on the Pre-Development Drainage Area Figures provided in Appendix G. This Appendix includes the following two figures to illustrate the "Pre-Development" Condition:

- Sheet Pre1: Pre-Development Drainage Area Figure of Existing Conditions
- Sheet Pre 2: Pre-Development Drainage Area Figure of 2008 Pond Design

The stormwater calculations considered the following three study points:

- Study Point 1: Study Point 1 is the abutting property on the western side of the proposed development. The subwatershed associated with Study Point 1 is composed primarily of woodland area, with some areas of exposed ledge. Stormwater runoff flows generally in a westerly direction via overland flow towards the abutting property.
- Study Point 2: Study Point 2 is the abutting property on the eastern side of the proposed development. The subwatershed associated with Study Point 2 is composed primarily of woodland area, with some areas of exposed ledge. Stormwater runoff flows generally in an easterly direction via overland flow towards the abutting property.
- Study Point 3: Study Point 3 is the existing drainage system within Gerber Drive, which ultimately discharges to a Detention Pond that was designed in 2008. Assumptions were made regarding the development of the project Site in the design of the Detention Pond, as noted in Section 2.1.2 of this Report. For the purposes of demonstrating that the proposed project will not exceed the flow rates intended for the Detention Pond, the Site Plan utilized in the 2008 design will serve as the basis for the existing subwatershed associated with Study Point 3. This subwatershed is composed primarily of woodland area, with an access roadway, parking, and buildings. Stormwater runoff flows generally in a southerly direction via overland flow towards the drainage system within Gerber Drive before discharging to the Detention Pond.

2.1.4 Proposed Drainage Area

The proposed Drainage Area discharges to the same three study points as in the existing conditions, but is broken up into seven subwatersheds, as illustrated on the Post-Development Drainage Area Figure provided in Appendix G, and as described below:

- Study Point 1: Study Point 1 is the abutting property on the western side of the proposed development. The subwatershed associated with Study Point 1 is composed primarily of grass cover. Stormwater runoff flows generally in a westerly direction via overland flow towards the abutting property.
- Study Point 2: Study Point 2 is the abutting property on the eastern side of the proposed development. The subwatershed associated with Study Point 2 is composed primarily of grass cover, with some areas of exposed ledge. Stormwater runoff flows generally in an easterly direction via overland flow towards the abutting property.
- Study Point 3: Study Point 3 is the existing drainage system within Gerber Drive, which ultimately discharges to a Detention Pond that was designed in 2008. The following four subwatersheds discharge to this Study Point:
    - Subwatershed 3Sa: This subwatershed is composed primarily of a portion of the solar panel area. This area consists predominantly of grass area, with some areas of exposed ledge and impervious area associated with proposed panel posts, gravel access road, and a concrete equipment pad. Stormwater runoff flows generally in westerly and southerly directions via

overland flow and is collected by a drainage swale, which ultimately conveys stormwater runoff to the proposed stormwater treatment system prior to discharging to the existing drainage system within Gerber Drive.

- Subwatershed 3Sb: This subwatershed is composed primarily of a portion of the solar panel area. This area consists predominantly of grass area, with some areas of exposed ledge and impervious area associated with proposed panel posts. Stormwater runoff flows generally in easterly and southerly directions via overland flow and is collected by a drainage swale, which ultimately conveys stormwater runoff to the proposed stormwater treatment system prior to discharging to the existing drainage system within Gerber Drive.
- Subwatershed 3Sc: This subwatershed is composed primarily of grass cover, with some areas of exposed ledge and a portion of the gravel access road. Stormwater runoff flows generally in a southerly direction via overland flow towards the drainage system within Gerber Drive.
- Subwatershed 3Sd: This subwatershed is composed primarily of the proposed stormwater treatment system area. This area consists predominantly of grass cover, with some areas of exposed ledge. Stormwater runoff flows via overland flow into the stormwater treatment system prior to discharging to the existing drainage system within Gerber Drive.

2.1.5 Stormwater Calculations

The stormwater calculations presented in Appendix G were prepared to demonstrate compliance with the Town of Tolland Low Impact Development and Stormwater Management Design Manual, as described in Section 2.2 of this Report. Hydrologic models of the pre-development and post-development conditions were created using the HydroCAD Stormwater Modeling System by Applied Microcomputer Systems.

The existing and proposed subwatersheds were delineated based on topography, and area measurements were utilized to compute weighted (composite) Runoff Curve Numbers (RCNs). The RCN values were calculated by HydroCAD based on cover type and Hydrologic Soil Group B, as mapped by the Natural Resources and Conservation Service Web Soil Survey for the Site. The time of concentration (TC) calculations assume sheet flow and shallow concentrated flow, with a minimum TC of five minutes.

2.2 COMPLIANCE WITH TOWN OF TOLLAND LOW IMPACT DEVELOPMENT AND STORMWATER MANAGEMENT DESIGN MANUAL

The proposed project, initiated by the Town of Tolland, has been designed to utilize LID site strategies to comply with the standards set forth in the Manual where feasible. The following requirements of Section 4 of the Manual apply to commercial/industrial sites which contain greater than two acres of land:

- Environmental Site Design;
- Groundwater Recharge Volume;
- Water Quality Volume;
- Pollutant Renovation;
- Conveyance Flow;
- Flood Protection;
- Water Quality Flow;
- Channel Protection Flow;
- Pollution Prevention; and

- High Pollutant Loads.

The proposed project has been designed to comply with these requirements as described in the Sections below.

2.2.1 Environmental Site Design

The first step in the Environmental Site Design (ESD) process is to evaluate natural resources; this step has been documented in Section 1.4 of this Report. There are no known protected resource areas within the project area. This information is reflected on the base map that was created for the project site.

The Natural Resources and Conservation Service Web Soil Survey for the Site indicates that soils consist of Hydrologic Soil Group B, which have a moderate potential infiltrative capacity. Soil compaction will be minimized on the Site during construction by prohibiting vehicular access over designated stormwater treatment system areas. Existing subwatershed boundaries on the Site have been delineated, as shown on the Pre-Development Drainage Area Figure provided in Appendix G. The generalized vegetative types on the Site are described in the Wetland Reconnaissance Letter provided in Appendix C. Existing woodland areas on the site will be cleared only as necessary to avoid shading impacts on the panels; any trees not specifically designated for clearing will be protected as necessary during construction.

Steep slopes (greater than or equal to 20%) exist on portions of the project area, as shown on the drawings provided in Appendix B. All other areas on the project site are considered "Developable Area". Grading on the site is proposed only as necessary to install the gravel access road and to manage stormwater runoff. Steep slopes outside of the project work area will be preserved. Areas disturbed by the solar panel installation and grading activities will be re-vegetated. LID site design strategies have been implemented to avoid, reduce, and manage impacts from development to the maximum extent practicable, such as:

- Protecting as much undisturbed land as possible to maintain pre-development hydrology;
- Minimizing the disturbance of the land necessary for clearing and grading;
- Utilizing low maintenance landscapes that will encourage the retention and planting of native types of vegetation;
- Minimizing the extent of impervious areas on the site, particularly the directly connected impervious areas; and
- Increasing the "Time of Concentration" for post-development conditions to closely approximate the "Time of Concentration" for pre-development conditions.

As described throughout this Report, the proposed solar development will not involve the application of pollutant causing substances; solar developments pose less risk for contamination than agriculture uses. The proposed site has been designed such that flow velocities are reduced to non-erosive levels (3-5 feet per second).

2.2.2 Groundwater Recharge Volume

According to the Manual's Stormwater Treatment Device Selection Matrix, Organic Filters provide compliance with the Groundwater Recharge Volume (GRV) requirement. The required GRV is defined as a function of the annual pre-development recharge rate for site-specific soil conditions, the 90% rainfall event (1" of rain/24 hrs), and the extent of impervious cover on a site. The proposed development will result in a small amount of new impervious area from the gravel access road, concrete equipment pad, and posts associated with the solar panels. As the Site consists of only one soil type, the required Groundwater Recharge Volume is calculated as follows:

$$GRv = (P)(D)(I)/12$$

Where:

P = 1” (90% rainfall event)

D = Recharge Factor (Table 4.3.a of Manual) = 0.40

I = Impervious area (acres) = 0.391 acres

GRv = Groundwater Recharge Volume required (acre-feet) = 0.013 acre-feet (566 cubic-feet)

As shown in the HydroCAD model of the Organic Filter, which is provided in Appendix G of this Report, an excess of 566 cubic-feet of storage will be provided in the proposed Organic Filter. The proposed sediment forebay will provide pre-treatment in compliance with the Manual.

2.2.3 Water Quality Volume

According to the Manual’s Stormwater Treatment Device Selection Matrix, Organic Filters provide compliance with the Water Quality Volume (WQV) requirement. The WQV is typically calculated as follows:

WQv = (1”)(I)/12

Where:

I = Impervious area (acres) = 0.391 acres

WQv = Water Quality Volume required (acre-feet) = 0.0326 acre-feet (1,420 cubic-feet)

However, the Manual specifies that, for developed sites having little impervious areas, a minimum WQV of 0.2 watershed inches (0.2-inches over the entire disturbed area) is required. The required WQV is therefore calculated as follows:

WQv = (0.2”)(A)/12

Where:

A = Disturbed area (acres) = 8.35 acres

WQv = Water Quality Volume required (acre-feet) = 0.1392 acre-feet (6,060 cubic feet)

According to the Manual’s Required Design Elements for Organic Filters, the Organic Filter, including the pretreatment component, must fully contain 75% of the required WQV, and that storage volume within the media can also be used to meet the WQV requirement. As shown in the HydroCAD model of the Organic Filter, which is provided in Appendix G of this Report, an excess of the required WQV will be provided in the proposed Organic Filter, media, and sediment forebay. The proposed sediment forebay will provide pre-treatment in compliance with the Manual.

2.2.4 Pollutant Renovation Analysis

In accordance with the Manual, a Pollutant Renovation Analysis has been conducted to demonstrate that the proposed stormwater treatment system will comply with the required water quality goals, where feasible. The overarching purpose of the proposed project is to provide a renewable source of energy, with minimal impact on the surrounding environment. The solar photovoltaic system is a passive use, which will have no noise, dust, odor, or other pollution or hazardous material concerns during the operation of the facility. The proposed solar use poses less risk for contamination than agriculture uses.

The proposed development will result in minor increases in the pollutant load for Total Phosphorous, Total Nitrogen, and Dissolved Inorganic Nitrogen. However, it should be noted that the Pollutant Removal Rate for Total Phosphorous and Total Nitrogen provided by the proposed Organic Filter will exceed the minimum required by the Manual and that all new impervious area will be treated. The acceptable treatment

systems listed in the Manual were evaluated and it was determined that, there is no alternative treatment system suitable for the Site that will provide a greater Pollutant Removal Rate for Dissolved Inorganic Nitrogen.

The Natural Resources and Conservation Service Web Soil Survey for the Site indicates that soils consist of Hydrologic Soil Group B. The Manual recommends incorporating an underdrain system if the underlying soils do not consist of Hydrologic Soil Group A. Additionally, areas of ledge are exposed on the Site and were identified in the Test Pits shown on the Boundary Survey, indicating that subsurface bedrock will likely be encountered. Due to the Site's predominant soil types, ledge, and general steepness, it was determined that an Underdrained Organic Filter would be the most suitable treatment system and provide the most water quality benefit for the Site.

The water quality goals for all other pollutants of concern will be met. The calculations are provided in Appendix G.

2.2.5 Conveyance Flow

The proposed open drainage conveyance system has been designed to provide adequate capacity for the flows leading to, from, and through stormwater management systems for the 10-year, 24-hour storm event, as demonstrated by the HydroCAD Report provided in Appendix G of this Report.

2.2.6 Flood Protection

The Flood Protection requirement applies to projects where the post-development Runoff Curve Number (RCN) exceeds the pre-development RCN. Pre- and post-development RCNs have been calculated utilizing HydroCAD and are included in the HydroCAD Reports provided in Appendix G. Woodard & Curran also utilized HydroCAD to confirm that the project will not result in an increase in the peak rate of runoff to any of the Study Points during the 2-year, 10-year, or 100-year, 24-hour storm events. The following sections describe how the Flood Protection requirements will be met at each of the Study Points.

2.2.6.1 Study Points 1 & 2:

The proposed development includes drainage swales that will collect and re-direct runoff away from the properties located at Study Points 1 and 2; however, the post-development RCNs for Study Points 1 and 2 exceed the pre-development RCN associated with those Study Points due to the proposed clearing. The table below summarizes the results of the HydroCAD analysis and demonstrates that the proposed project will not result in an increase in the peak rate of runoff to these Study Points:

Study Point		Peak Rate of Runoff (CFS)		
		2-year, 24-hour Storm	10-year, 24-hour Storm	100-year, 24-hour Storm
1	Pre-	0.3	1.7	4.8
	Post-	0.3	1.5	3.8
2	Pre-	0.4	2.1	5.7
	Post-	0.4	1.7	4.1

2.2.6.2 Study Point 3

The pre-development RCN for Study Point 3, which is based on the Site Plan utilized in the 2008 design of the downstream Detention Pond, is equal to 68. The proposed development will direct a larger area to the downstream Detention Pond than what was assumed in the 2008 design, however the post-development RCN for Study Point 3 is equal to 63. Even though the proposed development will direct a larger area to the downstream Detention Pond than what was assumed in the 2008 design, the post-development RCN will not exceed the pre-development RCN for Study Point 3 because it will result in less impervious area than what was assumed in the 2008 design.

The table below summarizes the results of the HydroCAD analysis and demonstrates that the proposed project will not result in an increase in the peak rate of runoff to from what was originally assumed in the design of the existing Detention Pond:

Study Point		Peak Rate of Runoff (CFS)		
		2-year, 24-hour Storm	10-year, 24-hour Storm	100-year, 24-hour Storm
3	Pre-	4.1	11.0	21.6
	Post-	0.5	6.7	14.7

The appended HydroCAD Reports also provide time of concentration calculations and routing analyses. As described above, the proposed development will comply with the objectives of the Flood Protection requirements.

2.2.7 Water Quality Flow

The Water Quality Flow Requirement applies to projects utilizing off-line treatment systems. Stormwater is delivered to the Organic Filter via pipes. The proposed Organic Filter is therefore considered “off-line” and has been designed in compliance with the Water Quality Flow Requirement, such that a flow diversion spillway within the pre-treatment sediment forebay will be utilized to bypass flows greater than the Water Quality Flow. Water Quality Flow calculations for the water quality storm event (1-inch storm) are provided in Appendix G. As demonstrated by the HydroCAD Report also provided in Appendix G, the peak rate of flow into the Organic Filter during the water quality storm event will not exceed the Water Quality Flow.

2.2.8 Channel Protection Flow

The proposed project will not discharge directly to a natural stream channel and is therefore not subject to this requirement. However, HydroCAD Reports for the pre- and post-development conditions have been provided in Appendix G for your reference, which demonstrate that the proposed development will not result in an increase in the peak rate of runoff from the Site for the 2-year storm; these reports also provide time of concentration calculations, runoff curve numbers, and routing analyses.

2.2.9 Pollution Prevention

The small amount of impervious area on the proposed site is associated with the gravel access, concrete equipment pads, and posts associated with the solar panels, and will not require the application of sand and/or salt. Pollution prevention measures will be implemented during construction, as described in the Soil Erosion and Sediment Control Plan provided in Appendix E, which includes provisions for protecting existing and proposed catch basins. The Contractor will be responsible for implementing pollution prevention measures during construction, and the Applicant will be responsible for maintaining the Site thereafter.

2.2.10 High Density Residential/Commercial/Industrial Redevelopment Projects

The existing Site does not contain high density residential, commercial, or industrial uses. Additionally, the proposed solar use poses less risk for contamination than agriculture uses. Neither the existing or proposed land uses are considered uses with a high pollutant load. These requirements do not apply to the proposed development.

3. COMPLIANCE WITH TOWN OF TOLLAND ZONING REGULATIONS

This section discusses the project's compliance with the Town of Tolland's Zoning Regulations. According to the Town's Zoning Map, the proposed solar development is located within the Tolland Business Park. A summary of each requirement is provided below (in italics) for reference purposes, and a description of the project's compliance with that requirement follows.

3.1 SOIL EROSION AND SEDIMENT CONTROL (ARTICLE IV)

3.1.1 Activities Requiring a Soil Erosion and Sediment Control Plan (Section 4-2)

A soil erosion and sediment control plan (hereinafter called a "control plan") shall be submitted with any application for development when the disturbed area of such development is cumulatively more than one-half (1/2) acre.

A Soil Erosion and Sediment Control Plan has been developed per the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control and is provided in Appendix E of this Report.

3.2 TOLLAND BUSINESS PARK ZONE (ARTICLE XIII)

3.2.1 Lot, Yard and Other Requirements (Section 13-5)

- *Minimum front yard setback:*

  In accordance with Section 17-8.A.4 of the Tolland Zoning Regulations, front yard setbacks for ground-mounted solar arrays in non-residential zones must be at least 75-feet. The proposed front yard setback is greater than 75-feet.

- *Minimum side yard setback:*

  In accordance with Section 17-8.A.4 of the Tolland Zoning Regulations, side yard setbacks for ground-mounted solar arrays in nonresidential zones may be 25 feet. The proposed side yard setback is greater than 25 feet.

- *Minimum rear yard setback:*

  In accordance with Section 17-8.A.4 of the Tolland Zoning Regulations, rear yard setbacks for ground-mounted solar arrays in non-residential zones must be at least 25-feet. The proposed rear yard setback is greater than 25-feet.

- *Reductions in dimensional requirements will be considered by the Commission only in special instances when it will improve overall compatibility of the site to surrounding and/or connecting property and with special attention to one or more of the following criteria: landscaping, building orientation, architecture, linkages to abutting properties and other site amenities but not negatively impacting adjacent residential properties.*

  No reductions in dimensional requirements are proposed.

- *Minimum building size: five thousand (5,000) square feet.*

  No buildings are proposed as part of this project.

- *Maximum impervious lot coverage: fifty percent (50%).*

  The proposed development will result in an impervious lot coverage of approximately 3.88%, well below the Maximum impervious lot coverage standard.

- *Minimum landscaped buffer around building: ten (10) feet not including walkways to building entrances and loading dock areas, unless waived by the Commission due to site or building characteristics or public safety concerns.*

  No buildings are proposed as part of this project. Existing woodland areas on the site will be cleared only as necessary to avoid shading impacts on the panels; any vegetation not specifically designated for clearing will be protected as necessary during construction.

3.2.2 Criteria for Approval (Section 13-6)

In addition to the criteria for approval of special permits and site plans as specified in Article XXII, the Commission shall consider the following in reviewing applications in the TBP Zone:

A. Impact on the water quality.

The proposed development will not negatively impact water quality. Stormwater treatment will be provided, as described in Section 2 of this Report.

B. Architectural quality of the proposal, including how the buildings complement each other and overall characteristics of the neighborhood.

No buildings are proposed as part of this project.

C. How the project fits into and complements the natural environment, including how the plans take advantage of site topography and environmental features, with a minimum of disturbance.

The proposed project has been designed to fit into and complement the natural environment to the maximum extent practicable. Different solar panel racking options were evaluated, and the alternative that would disturb the least amount of area was selected. The estimated area of disturbance during construction is approximately 8.35 acres, which includes areas disturbed by proposed clearing, grading, stormwater management infrastructure, and new impervious area associated with solar panel post installations and the access roadway.

Existing woodland areas on the site will be cleared only as necessary to avoid shading impacts on the panels; any vegetation not specifically designated for clearing will be protected as necessary during construction. Grading on the site is proposed only as necessary to install the gravel access road and to manage stormwater runoff. Areas disturbed by the solar panel installation and grading activities will be re-vegetated.

3.3 ACCESSORY USES AND STRUCTURES (ARTICLE XVII)

3.3.1 Alternative Energy – Solar: Ground-Mounted Solar Arrays (Section 17-8.A.4)

Ground-Mounted Solar Arrays may be accessory uses in all zones. All solar arrays shall comply with the following requirements:

b. Solar Arrays in non-residential zones

1) Solar arrays in the Tolland Business Park and Commercial Industrial Zones may be principal uses by Special Permit approval by the commission and processed according the procedures set forth in Section 22-3.

Although Town properties are exempt from Zoning Regulations, the Town felt it was important to provide nearby property owners with the opportunity to understand and provide input regarding the project. Therefore, this Report is being submitted in support of the project's application for Site Plan Review. It is our understanding that a Special Permit is not required at this time.

2) *Shall not be located in the front yard between the principal structures(s) and the public right-of-way, except in industrial districts or by Special Permit approval by the Commission.*

   The proposed solar array is not located within the front yard setback, as shown on the design drawings provided in Appendix B of this Report.

3) *Shall be located a minimum of twenty-five (25) feet from side and rear property lines.*

   The proposed solar array is located over 25-feet from side and rear property lines, as shown on the design drawings provided in Appendix B of this Report.

4) *The size of accessory solar arrays in non-residential districts shall not exceed one-half of the footprint of the principal structure.*

   There are no principle structures on the Site.

5) *There shall be no size limit on solar arrays as a primary use on a site in the Tolland Business Park and Commercial Industrial Zones. However, the maximum lot coverage of any solar array shall not exceed 80 percent.*

   The proposed solar array will cover approximately 25% of the lot.

3.3.2 Fences and Walls (Section 17-9)

Accessory fences and walls used as fences, with a maximum height of eight feet, shall be exempt from the provisions of this Article, except as may be otherwise required by the Commission.

In compliance with the National Electric Code, the solar development will be secured by a 7-foot high chain link fence, which will prevent children and the public from coming into contact with the installation.

3.4 ZONE CHANGES, SPECIAL PERMITS AND SITE PLANS (ARTICLE XXII)

3.4.1 Site Plan Standards (Section 22-7)

To ensure that structures and the uses of land are arranged in a manner that enhances the public health, safety and general welfare, as a condition of approval the Commission may require such modifications of the proposed plans as it deems necessary to comply with the spirit as well as the letter of these regulations. The Commission shall take into account the following:

A. *Conformity with Section 1-1*

   The proposed project is compatible with Section 1-1 of the Zoning Regulations of the Town of Tolland in that its overarching purpose is to provide a renewable source of energy, to promote the health, safety, and general welfare of the community. Furthermore, the proposed development will be coordinated with the Town and will comply with all applicable standards contained in the Town's Zoning Regulations, as demonstrated herein.

B. *Traffic Considerations*

   After construction has been completed, operations traffic will be minimal, consisting only of periodic visits to the site to inspect the system (monthly or less frequent). Due to electrical code restrictions, access to the Site will be strictly limited to authorized personnel. Due to the low volume of traffic and number of vehicles required on-site, the need for off-street parking is not anticipated. Loading areas will not be required for operations. No traffic impacts are anticipated to result from the proposed development.

C. *Environmental Considerations*

Existing woodland areas on the site will be cleared only as necessary to avoid shading impacts on the panels; any vegetation not specifically designated for clearing will be protected as necessary during construction. Dust and erosion will be managed in accordance with the Connecticut Soil Erosion and Sediment Control Handbook. Measures to be used on site are described in the Soil Erosion and Sediment Control Plan provided in Appendix E. There are no known wetlands or historic structures within the project area. Noise impacts are not anticipated to result from the proposed development as solar panels have no moving parts and do not generate noise. The inverter and transformer equipment make a slight humming noise, but this equipment will be pad mounted in a location greater than 150 feet from nearby buildings. Additionally, no artificial lighting is proposed and Low Impact Development strategies will be utilized to maintain the existing site's hydrology and water quality as described in Section 2 of this Report.

D. Preparer.

The site plan has been prepared, signed, and sealed by Woodard & Curran (engineer).

E. Architectural Plans.

The proposed development does not include any buildings.

F. Off-Site Information

No offsite improvements will be required for the proposed development. Additional off-site information not shown on the drawings provided in Appendix B can be provided upon request.

G. Impact Analysis

As demonstrated throughout this Report, the proposed development will not adversely affect public facilities or the environment.

H. Additional Information

Additional information can be provided upon request.

I. Referrals

Acknowledged.

J. Sites of Archaeological Significance

Per the Town's official archaeological map, the project Site is not located within a high sensitivity area. Additionally, the Town Planner contacted the State Archaeologist on April 12, 2016, and confirmed that the environmental characteristics of the parcel indicate a low archaeological sensitivity, but a potential for rock-shelter sites. The State Archaeologist and the Town Planner conducted a site walk on April 14, 2016, to determine if there is evidence of sites of archaeological significance on the subject property and concluded that the project Site is located within a low sensitivity area. However, the State Archaeologist has requested to be notified if test pits are being conducted. We understand that the Town Planner will coordinate with the State Archaeologist if test pits will be conducted.

3.4.2 Landscaping Requirements (Section 22-8)

3.4.2.1 General Requirements (Section 22-8.C)

1. *The development of the site shall conserve as much of the natural terrain and existing vegetation as possible, shall preserve sensitive environmental land features such as steep slopes, wetlands and large rock outcroppings and shall preserve public scenic views and historically significant features such as stone walls.*

Different solar panel racking options were evaluated, and the alternative that would disturb the least amount of area was selected. The existing vegetation is to be preserved to the maximum extent practicable. Existing woodland areas on the site will be cleared only as necessary to avoid shading impacts on the panels; any vegetation not specifically designated for clearing will be protected as necessary during construction. Wooded areas outside of the limit of work will remain undisturbed. Grading and ledge removal on the site is proposed only as necessary to install the gravel access road and to manage stormwater runoff. Steep slopes outside of the project work area will be preserved. Areas disturbed by the solar panel installation and grading activities will be re-vegetated. There are no known wetlands or historically significant features located within the project area.

2. *No plants listed on the Connecticut Invasive Plants List (as amended from time to time) shall be used. The Planning Staff may also strongly recommend against using other species to account for recent findings that may not be reflected in the Invasive Plant List.*

   The proposed development does not include any new plantings.

3. *Landscaped areas that are designed to intercept and manage stormwater runoff and provide natural infiltration of rainwater in accordance with the Low Impact Development Regulations are encouraged and these landscape areas will be included as part of the overall landscape requirements.*

   Low Impact Development techniques will be utilized to intercept and manage stormwater runoff, as described in Section 2 of this Report.

4. *Existing trees over 12 inches in caliper shall be preserved during the construction period unless approved for removal by the Zoning Enforcement Officer or designated agent and shall be protected by the following recommended measures:*

   a. *There should be no operation of heavy equipment or storage of materials under the tree within the drip line.*

   b. *A fence or other barrier shall be erected to protect the tree within the drip line*

   c. *No more than 6 inches of fill may be added within the drip line unless a tree well or other arrangement designed to maintain the long-term health of the tree has been approved by the Zoning Enforcement Officer or designated agent.*

   Existing woodland areas on the site will be cleared only as necessary to avoid shading impacts on the panels; the proposed clearing limits are shown on the design drawings provided in Appendix B of this Report. Any vegetation not specifically designated for clearing will be protected as necessary during construction.

5. *Approximately 50% of all plantings should be native plants. All others should be proven zone hardy (good to zone 5) and "deer resistant" if possible, especially for residential plantings. All approved plantings should be of #1 quality grade. Consider maturity size at the time of installation of all trees and shrubs, especially street, sidewalk or boulevard trees.*

   The proposed development does not include any new plantings.

6. *All plant material shall be nursery grown and conform to the standards of the American Association of Nurserymen.*

   The proposed development does not include any new plantings.

7. *At the time of planting, trees shall be balled and burlapped and guyed as needed. Plantings should be of a mixture of Ornamentals, Flowering, Broadleaved Evergreen, Deciduous & Conifers and shall be of the following minimum size [caliper measurements to be taken four and one-half (4.5) feet above ground level]:*

a. *Trees: Shade trees shall be two and one half to three inch caliper and 8' to 10' in height;*

b. *Evergreen trees: six-foot height.*

c. *Flowering trees: single stem; two and one half to three inch caliper and 8' to 10' in height; clump forms should be at least eight-feet in height.*

d. *All shrubs shall be a minimum of 3 to 5 gallon size, Juniper and other Ground cover shrubs shall be a minimum of 2 gallon size.*

The proposed development does not include any new plantings.

8. *Trees and shrubs within five (5) feet of any paved areas shall be of such varieties capable of withstanding damage from salt and snow.*

   The proposed development does not include any new trees or shrubs.

9. *Mulched planting beds of an appropriate size shall be placed around all trees and shrubs to retain moisture. Mulching should consist of a premium type #1 grade mulch, such as Pine Bark, Cedar or Hemlock, at least four (4) inches in depth; dyed or industrial type mulch are not natural in appearance and are unacceptable. Acceptable mulching material shall be shredded bark, wood chips or other organic substitute. All new plantings should include a minimum of 6" to 8" of composted soil mix and starter fertilizer. All new beds should include an application of pre-emergent herbicide.*

   The proposed development does not include any new plantings.

10. *Suitable ground cover shall be placed on all disturbed site areas not covered by paving, buildings or mulching for trees, shrubs and perennials. Suitable ground cover shall be grass, turf, or other approved vegetation.*

    Suitable ground cover shall be placed on all disturbed site areas, as specified on the drawings provided in Appendix B. Disturbed areas not designated for concrete or gravel cover will be re-vegetated with grass.

11. *No black top paving shall be located under existing evergreen trees and no more than 20% of the area under any deciduous trees natural drip line may be paved.*

    No black top paving is proposed as part of the project.

12. *Street trees at a minimum of one tree for each 50' or part thereof street frontage shall be provided in all yard areas abutting public streets. The Commission may require street trees on private drives.*

    There is an existing tree line along Gerber Drive that will remain largely undisturbed.

13. *All residential and commercial foundation plantings should require a slightly bermed planting bed and slope away from the existing foundation, leaving not less than 4" to 5" of exposed foundation.*

    The proposed project does not include any new foundation plantings.

3.4.2.2 Screening (Section 22-8.E)

1. *Screening shall be provided for parking areas which are adjacent to residential properties or visible from the street.*

   The proposed development does not include any new parking areas.

2. *Screening shall be provided for any objectionable areas or views as determined by the Commission which are adjacent to residential properties or visible from the street, including but not limited to*

loading areas, dumpsters, storage areas and ground-fixed mechanical equipment. Acceptable screening materials shall include:

a. *Evergreen hedges having a minimum height of six (6) feet at the time of planting,*
b. *Planted earthen berms;*
c. *Solid fences or walls having a minimum height of six (6) feet, if approved by the Commission; or*
d. *Any combination of the above materials.*

The proposed solar development will not include loading areas, dumpsters, storage areas, which require screening.

3. *All plants shall be spaced to provide a dense screen within 5 years.*

No new plantings are proposed. Existing woodland areas on the site will be cleared only as necessary to avoid shading impacts on the panels; any vegetation not specifically designated for clearing will be protected as necessary during construction.

3.4.2.3 Buffers (Section 22-8.F)

A landscaped buffer shall be provided for any use in a nonresidential zone which is adjacent to or across the street from a residential zone, for any multifamily use or for any nonresidential use in a residential zone.

Existing woodland areas on the site will be cleared only as necessary to avoid shading impacts on the panels; any vegetation not specifically designated for clearing will be protected as necessary during construction.

3.4.3 Environmental and Performance Standards (Section 22-11)

The use of land, buildings and other structures shall be conducted in accordance with the following performance standards. All applicants for site plan approval shall demonstrate that the use they propose shall conform to the following standards:

A. *Particulate matter and smoke. No offensive dust, dirt, fly ash or smoke shall be emitted into the atmosphere. In no case shall dust be emitted in excess of one (1) cubic centimeter of settled matter per cubic meter of air. Smoke or other air contaminants shall not be discharged into the atmosphere from any single source of emission for a period or periods aggregating more than three (3) minutes in any one (1) hour which are as dark or darker in shade than that designated as No. 2 on the Ringelmann Chart as published by the United States Bureau of Mines or of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke designated as No. 2 on the Ringelmann Chart.*

The proposed solar development will not result in the emission of particulate matter or smoke.

B. *Odors, gases and fumes. No noxious, toxic or corrosive fumes or gases shall be emitted. Offensive odors noticeable off the premises where the use is located shall not exceed the standards established as a guide by Table III (Odor Thresholds) in Chapter 5, Air Pollution Abatement Manual, Copyright 1951, as amended, by the Manufacturing Chemists Association, Inc., Washington, D.C.*

The proposed solar development will not result in the emission of odors, gases, or fumes.

C. *Water pollution. No discharge into any watercourse, groundwater, wetlands or storm sewers shall be permitted except in accordance with applicable local, state and federal requirements.*

Stormwater management measures will be implemented to provide water quality treatment, as described in Section 2 of this Report.

D. *Vibrations. No vibration noticeable outside the property from which it originates shall exceed the standards of the United States Bureau of Mines, Bulletin No. 442.*

No vibrations will be produced as a result of the proposed solar development.

E. *Hazardous or toxic materials. No hazardous, toxic or other dangerous material, including but not limited to explosives, flammable materials or radioactive materials, shall be permitted except in accordance with applicable local, state and federal requirements.*

No hazardous or toxic materials will be utilized or produced as a result of the proposed solar development.

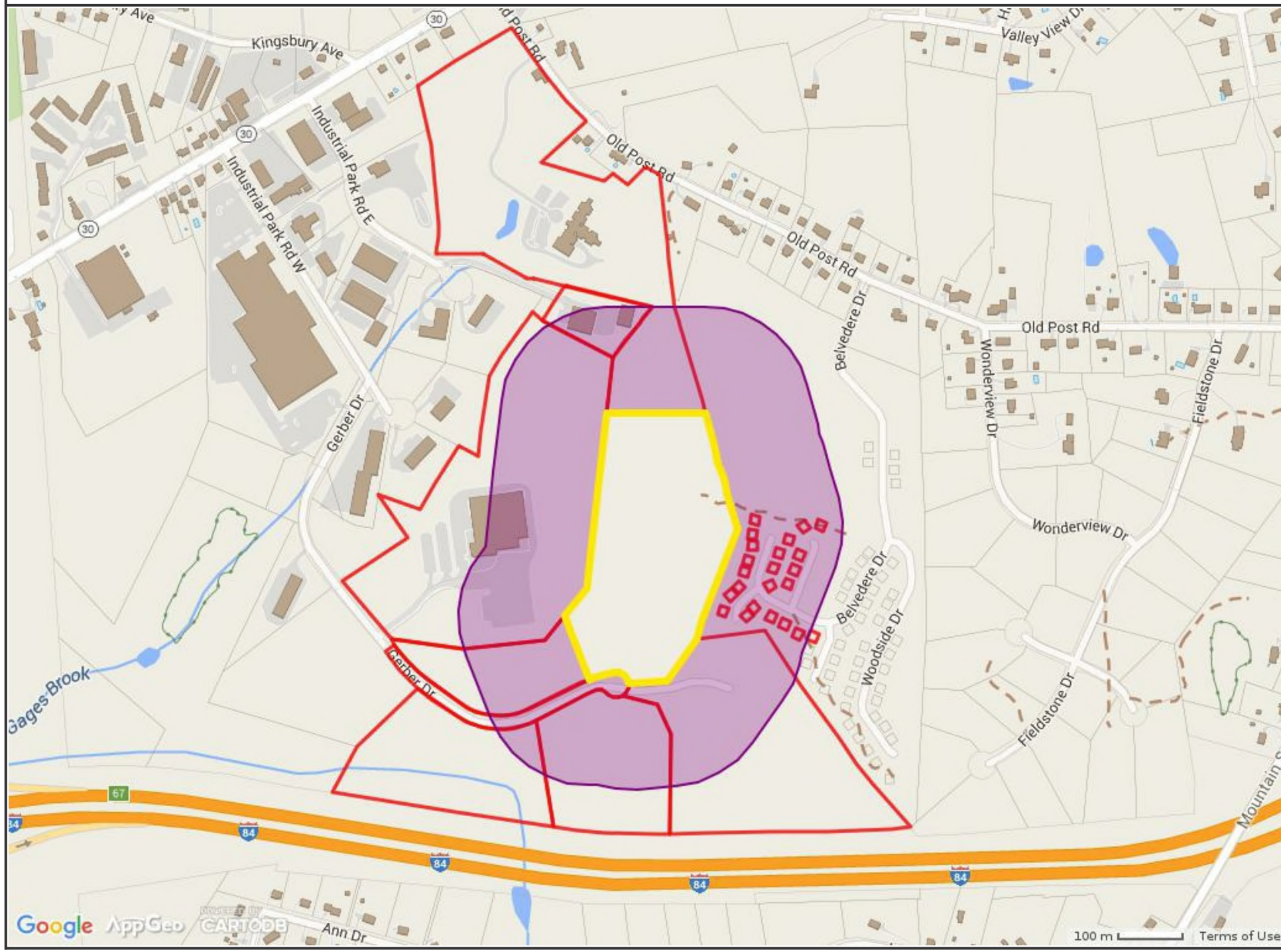
3.5 LOW IMPACT DEVELOPMENT (ARTICLE XXVII)

The Town of Tolland requires that Low Impact Development techniques be implemented on all development projects within the boundaries of the Town to protect high quality wetlands, watercourses, open water bodies and other sensitive areas from the impacts of point and nonpoint sources of storm water due to land development projects.

The proposed project will utilize Low Impact Development techniques per the Town of Tolland Low Impact Development and Stormwater Management Design Manual, as described in Section 2 of this Report.

APPENDIX A: RADIUS MAP & ABUTTER LIST

97 Gerber Drive - Abutters within 500'



Property Information

Property ID 20/K/047

Location 97 GERBER DRIVE

Owner TOWN OF TOLLAND

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Tolland, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Site Address	Owner Name	Owner Address	Owner City	Owner State	Owner Zip
112 LOEHR ROAD	BOOTH GEORGE & SANDRA	112 LOEHR ROAD	TOLLAND	CT	06084
16 ANN DRIVE	KHABIRI BEHFAR & TERESA	16 ANN DRIVE	TOLLAND	CT	06084-0000
16 LOEHR ROAD	HORN OTTO A JR & SHIRLEY	16 LOEHR RD	TOLLAND	CT	06084-0000
2 ANN DRIVE	FAHR DONALD W	2 ANN DRIVE	TOLLAND	CT	06084-0000
20 ANN DRIVE	MIKOLEIT JR THOMAS E	20 ANN DRIVE	TOLLAND	CT	06084-0000
207 REED ROAD	WARNER LAURA E	207 REED RD	TOLLAND	CT	06084-0000
24 LOEHR ROAD	SIPOLSKI SANDRA J	22 MEADOW ST	AGAWAM	MA	01001-2204
80 LOEHR ROAD	ERTEL EDWIN A	24 KING ST	ROCKVILLE	CT	06066-0000
84 LOEHR ROAD	ERTEL EDWIN A & MARY L	24 KING ST	ROCKVILLE	CT	06066-0000
72 LOEHR ROAD	ERTEL MARY L	24 KING ST	ROCKVILLE	CT	06066-0000
26 ANN DRIVE	MCCABE DONALD E	26 ANN DRIVE	TOLLAND	CT	06084
83 GERBER DRIVE	ROUND ROCK LLC	309 WORMWOOD HILL RD	MANSFIELD	CT	06250
32 ANN DRIVE	FERRANTI WAYNE & PESSA(	32 ANN DRIVE	TOLLAND	CT	06084
100 GERBER DRIVE	MJB REALTY LLC	32 EAST MAPLE ST	MANCHESTER	CT	06040
32 LOEHR ROAD	LEIGHTON SARAH S & BROW	32 LOEHR ROAD	TOLLAND	CT	06084
36 Belvedere Drive	KOSTEL ELLEN C & PETER C	36 Belvedere Drive	TOLLAND	CT	06084
36 LOEHR ROAD	ROTH DAVID J & SUSAN W	36 LOEHR RD	TOLLAND	CT	06084-0000
38 Belvedere Drive	CHUN OCK KYOUNG TRUST	38 Belvedere Drive	TOLLAND	CT	06084
50 WOODSIDE DRIVE	BAGIONI ROBERT P & KATHL	50 WOODSIDE DRIVE	TOLLAND	CT	06084
54 WOODSIDE DRIVE	RITTER KATHLEEN & MICHAI	54 WOODSIDE DRIVE	TOLLAND	CT	06084
56 LOEHR ROAD	DINNALL SANDRA T M	56 LOEHR ROAD	TOLLAND	CT	06084
67 + 69 INDUSTRIAL R	TC DUNN REALTY LLC	6 EARL ST	VERNON	CT	06066
60 BELVEDERE DRIVI	BARRETT JOAN C	60 BELVEDERE DRIVE	TOLLAND	CT	06084
62 LOEHR ROAD	LAMBERT LISA & HODDER K	62 LOEHR ROAD	TOLLAND	CT	06084
671 OLD POST ROAD	SUMMERS & SUMMERS REA	671 OLD POST ROAD	TOLLAND	CT	06084
8 ANN DRIVE	PIERCE MELINDA L	8 ANN DRIVE	TOLLAND	CT	06084-0000
15 MARLEN WAY	TOMLEN LLC	805 THIRD AVE 10TH FL	NEW YORK	NY	10022
2 OGDEN COURT	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
81 BELVEDERE DRIVI	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
83 BELVEDERE DRIVI	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
85 BELVEDERE DRIVI	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
3 ALVA COURT	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
6 ALVA COURT	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
8 ALVA COURT	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
4 ALVA COURT	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
2 ALVA COURT	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
91 BELVEDERE DRIVI	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
93 BELVEDERE DRIVI	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
97 BELVEDERE DRIVI	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
101 BELVEDERE DRI\	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
103 BELVEDERE DRI\	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
102 BELVEDERE DRI\	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
98 BELVEDERE DRIVI	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
94 BELVEDERE DRIVI	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
88 BELVEDERE DRIVE	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
3 MARLEN WAY	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
5 MARLEN WAY	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
9 MARLEN WAY	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10023
19 MARLEN WAY	TOMLEN LLC	805 THIRD AVE 10TH FLOOR	NEW YORK	NY	10022
92 LOEHR ROAD	THERIAULT ERIC C	92 LOEHR ROAD	TOLLAND	CT	06084
98 LOEHR ROAD	LOEHR BERNARD J & JEANE	98 LOEHR RD	TOLLAND	CT	06084-0000
55 GERBER DRIVE	SILVAS REAL ESTATE LLC	ONE DARI FARMS WAY	TOLLAND	CT	06084

APPENDIX B: SURVEYS & DESIGN DRAWINGS (BOUND SEPARATELY)

TOWN OF TOLLAND, CT
97 GERBER DRIVE
SOLAR SITE TOPOGRAPHIC SURVEY

NOTES

1. REFERENCE IS HEREBY MADE TO THE FOLLOWING DATA SOURCES:

   A. GIS SYSTEM MAP, TOWN OF TOLLAND, CT.

   B. "LIMITED PROPERTY SURVEY, TOLLAND BUSINESS PARK, LOTS 9, 10 & 11, GERBER DRIVE, TOLLAND CONNECTICUT; REV 11-19-2007...GARDNER & PETERSON ASSOCIATES, LLC, 178 HARTFORD TURNPIKE, TOLLAND, CONNECTICUT...1-18-2007, SHEET 6 OF 8".

   C. "COMPILATION PLAN, SITE PLAN, TOLLAND BUSINESS PARK, LOTS 9, 10 & 11, GERBER DRIVE, INDUSTRIAL PARK ROAD EAST AND INDUSTRIAL PARK ROAD WEST, TOLLAND CONNECTICUT; REV 4-17-2008...GARDNER & PETERSON ASSOCIATES, LLC, 178 HARTFORD TURNPIKE, TOLLAND, CONNECTICUT...4-08-2008, SHEET 1 OF1".

   D. "CONCEPTUAL SOLAR SITE PLAN, 97 GERBER DRIVE, TOLLAND CONNECTICUT; REV 4-17-2008...WOODARD & CURRAN...AUGUST, 2014; FIG. 3"

2. THE HORIZONTAL DATUM OF THE SURVEY DEPICTED HEREON IS NAD 83. THE VERTICAL DATUM OF THE SURVEY DEPICTED HEREON IS NAVD 88. THE POSITIONS AND ELEVATIONS DEPICTED HEREON ARE BASED ON GPS RTK OBSERVATIONS PERFORMED ON 5-23-15.

3. ANY UNDERGROUND UTILITY LINES, STRUCTURES AND FACILITY LOCATIONS DEPICTED AND NOTED HEREON HAVE BEEN COMPILED FROM RECORD MAPPING. AS SUCH, THESE LOCATIONS MUST BE CONSIDERED AS APPROXIMATE IN NATURE. ADDITIONALLY, OTHER SUCH FEATURES MAY EXIST IN THE AREA WHICH ARE UNKNOWN TO THE SIGNER. THE SIZE, LOCATION AND EXISTENCE OF ALL SUCH FEATURES MUST BE FIELD DETERMINED AND VERIFIED BY THE APPROPRIATE AUTHORITIES PRIOR TO ANY CONSTRUCTION. CALL BEFORE YOU DIG 1-800-922-4455.

4. TOTAL AREA OF PARCEL IS 16.88 ACRES ±.

5. THE PROPERTY DEPICTED HEREON IS DESIGNATED AS MBLU 20/K/47 AS DEPICTED ON THE TOLLAND TAX RECORDS.

6. THE PROPERTY DEPICTED HEREON LIES IN ZONE "TBP TOLLAND BUSINESS PARK".

7. NO WETLANDS TYPE SOILS OR VEGETATION WERE FOUND ON THAT PORTION OF THE PARCEL DEPICTED HEREON. THIS STATEMENT IS BASED ON A SITE INVESTIGATION (12-31-2015) PERFORMED BY JOSEPH P. McCUE, ENVIRONMENTAL SCIENTIST, MASON & ASSOCIATES, NORTH SCITUATE, RHODE ISLAND.

8. THE AREA DEPICTED HEREON DOES NOT LIE WITHIN THE FOLLOWING DISTRICT OVERLAY ZONES:
   1. WATER RESOURCE PROTECTION AREA
   2. NATURAL RESOURCE PROTECTION AREA
   3. LAND CONSERVATION AREA
   4. FLOODPLAIN/STREAM BELT ZONE

   SOURCE: GIS SYSTEM MAPPING FROM THE TOWN OF TOLLAND GEOGRAPHIC INFORMATION SYSTEM DATABASE.

9. THE AREA DEPICTED HEREON LIES IN FLOOD ZONE 'C' (AREAS OF MINIMAL FLOODING); SOURCE; FEMA FLOOD MAP "TOWN OF TOLLAND, CONNECTICUT...PANEL 15 OF 20...090171 0015 A; EFFECTIVE DATE, APRIL, 1, 1982".

LEGEND

—— S —— S ——	STORM LINE
—— SS —— SS ——	SANITARY LINE
—— W —— W ——	WATER LINE
—— G —— G ——	GAS LINE
	SURVEY CONTROL POINT
	UTILITY POLE
	WATER GATE
	CATCH BASIN
	LIGHT POLE
	HYDRANT
■	MONUMENT FOUND

I HEREBY DECLARE THAT:

THIS MAP HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300b-1 THROUGH 20-300b-20 AND THE "STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 26, 1996.

THE TYPE OF SURVEY DEPICTED HEREON IS A CLASS T-2 TOPOGRAPHIC SURVEY. THE PURPOSE OF THE SURVEY IS TO DEPICT EXISTING CONDITIONS AT 97 GERBER DRIVE IN TOLLAND, CT. ANY BOUNDARY INFORMATION DEPICTED HEREON IS BASED ON THE TOWN OF TOLLAND GIS DATABASE AND NOT THE RESULT OF A BOUNDARY RETRACEMENT SURVEY.

THE SURVEY DEPICTED HEREON CONFORMS TO CLASS T-2 STANDARDS OF ACCURACY.

TO MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

JAMES E. NAGLE CONN. REG. NO. 15195

Revisions		
No.	Date	Description
1	3/3/16	Original Issue

Project Title

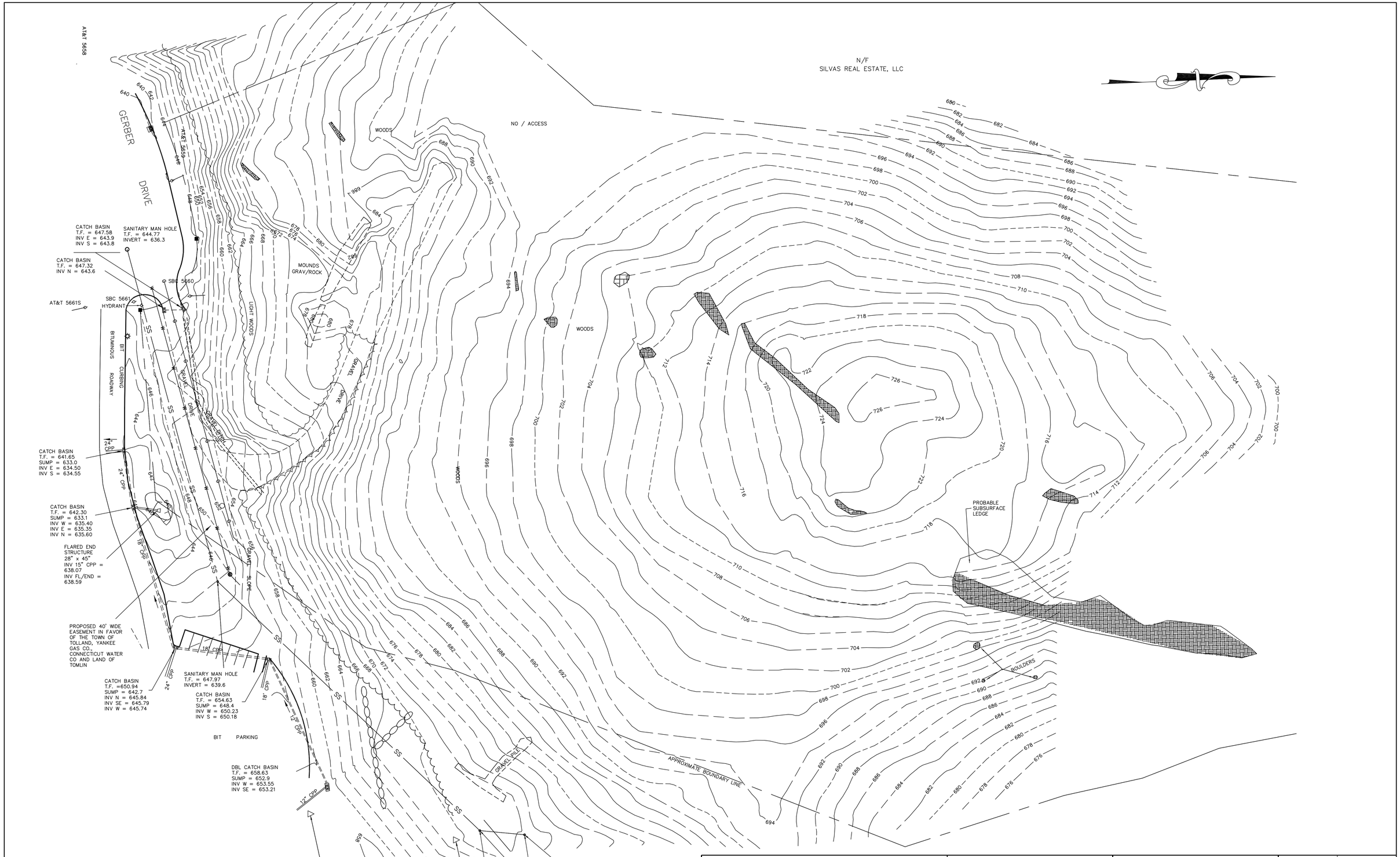
SOLAR ARRAY SITE
GERBER DRIVE
TOLLAND, CONNECTICUT

JAMES E. NAGLE L.S.
CONNECTICUT REG. NO. 15195

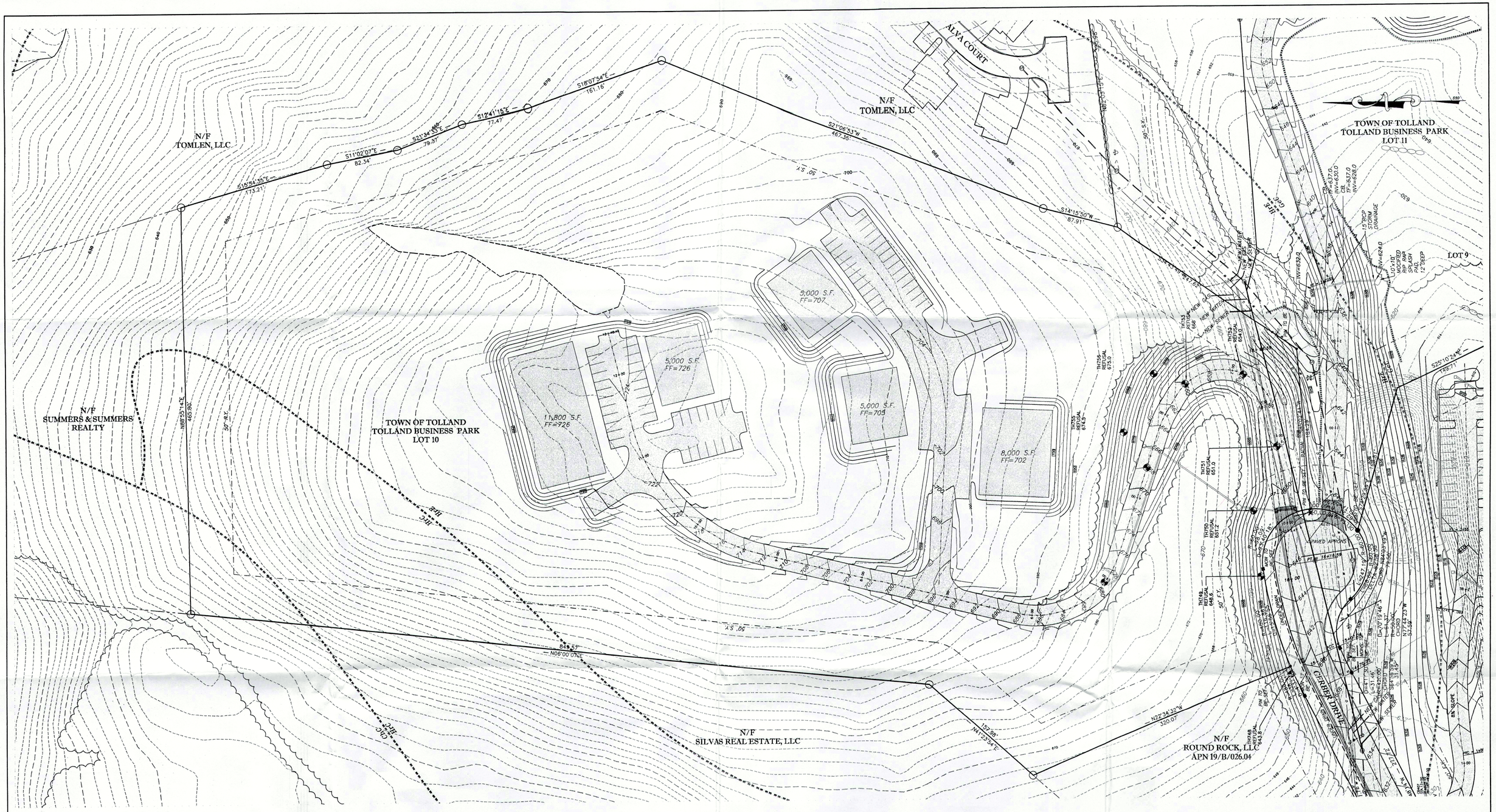
Drawing Title

TOPOGRAPHIC SURVEY

Designed		Sheet No. Date	3/3/16
Drawn	J.E.N.	Scale	1" = 40'
Approved	J.E.N.		1 OF 2
Project No.			
File Name		Sheet No.	



Project Title		Drawing Title		
TOPOGRAPHIC SURVEY	**JAMES E. NAGLE L.S.** CONNECTICUT REG. NO. 15195	**TOPOGRAPHIC SURVEY**	Designed	Sheet No. Date 3/3/16
			Drawn J.E.N.	Scale 1" = 40'
			Approved J.E.N.	
			Project No.	
			File Name	Sheet No.



OWNER:
TOWN OF TOLLAND
21 TOLLAND GREEN
TOLLAND, CT. 06084

APPLICANT:
TOWN OF TOLLAND
ECONOMIC DEVELOPMENT COMMISSION
21 TOLLAND GREEN
TOLLAND, CT. 06084

REFER TO SHEET 1 FOR ADDITIONAL NOTES AND APPROVAL INFORMATION

ZONING TABLE
TOLLAND BUSINESS PARK – TBP

MINIMUM LOT AREA =	*2 ACRES*
MINIMUM LOT FRONTAGE =	*200 FEET*
MINIMUM FRONT YARD =	*50 FEET*
MINIMUM REAR YARD =	*50 FEET*
MINIMUM SIDE YARD =	*50 FEET*
MIN. BUILDING SIZE =	*5,000 SQ. FT.*
MAX. IMPERVIOIS COVERAGE =	*50%*

THE WETLANDS SOILS ON THIS PROPERTY WERE IDENTIFIED IN THE FIELD USING THE CRITERIA REQUIRED BY CGWA, P.A. 72-155 AS AMENDED BY P.A. 73-571 AND ARE ACCURATELY REPRESENTED ON THIS PLAN.

C.S.S.

NOTES:

1. THIS SURVEY AND MAP HAVE BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300b-1 THROUGH 20-300b-20 "MINIMUM STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT". THIS IS A LIMITED PROPERTY SURVEY-RESUBDIVISION PLAN AND IS A DEPENDENT RESURVEY, AND AN ORIGINAL SURVEY OF THE PROPOSED LOTS, CONFORMING TO HORIZONTAL ACCURACY CLASS A-2, PLAN SHEETS DEPICTING CONTOUR LINES CONFORM TO TOPOGRAPHIC ACCURACY CLASS T-2 & T-3.

2. REFER TO SHEET 1 FOR ADDITIONAL NOTES AND APPROVAL INFORMATION.

TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

L.S. 10839

KENNETH R. PETERSON — *REGISTRATION NO.*

REVISIONS
1-22-2007
1-25-2007
1-30-2007
2-12-2007
3-6-2007 LOT LINE 9/11
11-19-2007 TOWN REVIEW

LIMITED PROPERTY SURVEY

TOPOGRAPHIC & EROSION & SEDIMENTATION CONTROL PLAN

TOLLAND BUSINESS PARK

LOTS 9, 10 & 11

GERBER DRIVE

TOLLAND, CONNECTICUT

RECEIVED
DEC 05 2011

GARDNER & PETERSON ASSOCIATES, LLC
178 HARTFORD TURNPIKE
TOLLAND, CONNECTICUT
PROFESSIONAL ENGINEERS — LAND SURVEYORS

BY	SCALE	DATE	SHEET NO.	MAP NO.
S.E.J.	1"=50'	1-18-2007	6 OF 8	9773-TBP2

TGC SOLAR 2

97 GERBER DRIVE
TOLLAND, CT 06084

APPLICANT
WR-TGC SOLAR GENERATION XVI, LLC
C/O TRUE GREEN CAPITAL MANAGEMENT
18 KINGS HIGHWAY NORTH
WESTPORT, CONNECTICUT 06880

LAND OWNER
TOWN OF TOLLAND CONNECTICUT
21 TOLLAND GREEN
TOLLAND CONNECTICUT 06084

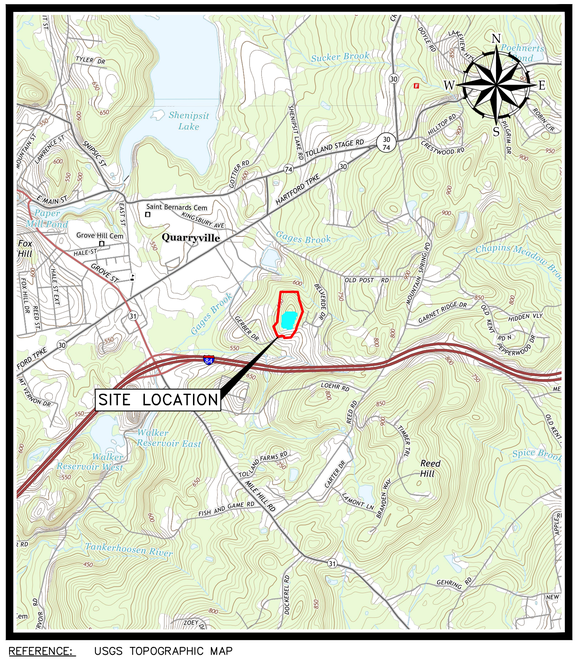
PROPERTY
MBLU 20/K/047

SHEET INDEX

1 G-001 COVER SHEET
2 C-100 EXISTING CONDITIONS PLAN & LEGEND
3 C-101 SITE PLAN, GRADING AND EROSION CONTROL
4 C-102 DETENTION BASIN PLAN
5 D-200 DETAILS – 1
6 D-201 DETAILS – 2

MAY 2016

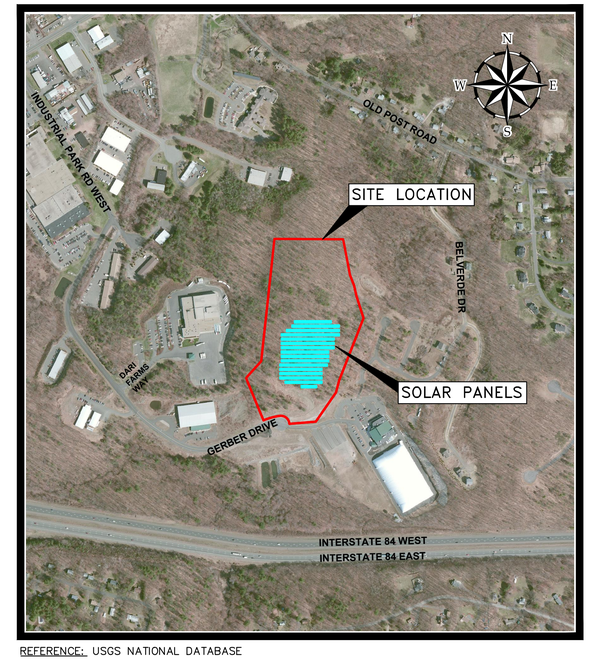
ENGINEER



REFERENCE: USGS TOPOGRAPHIC MAP

SITE LOCATION MAP

SCALE: 1" = 2,000'
2,000 0 2,000 3,000
FEET



REFERENCE: USGS NATIONAL DATABASE

SITE LOCATION AERIAL PHOTO

SCALE: 1" = 500'
500 0 500 1000
FEET

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G-001

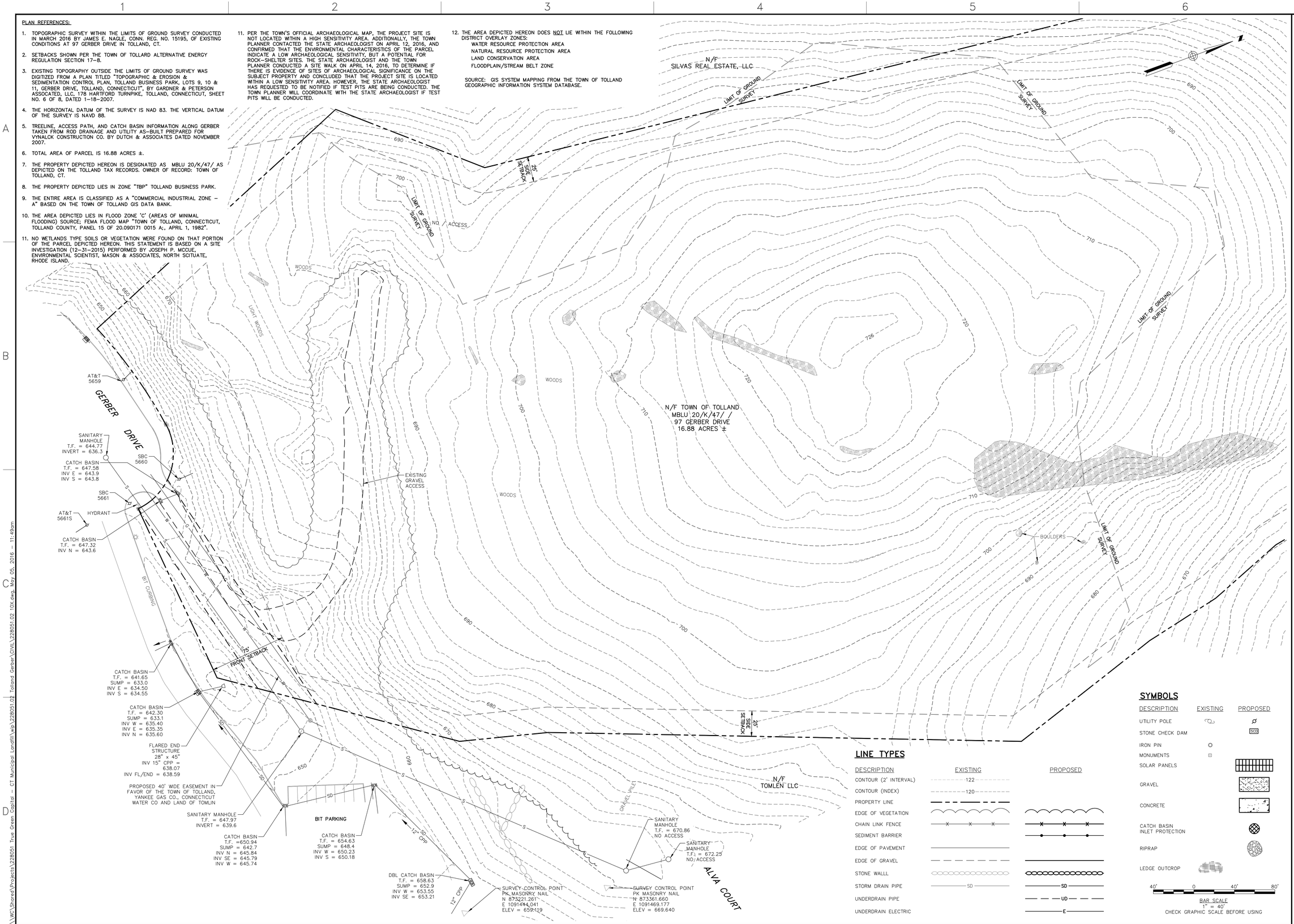
\\WC\Shared\Projects\228051 True Green Capital – CT Municipal Landfill\wip\228051.02 Tolland Gerber\CIVIL\228051.02 G001.dwg, May 05, 2016 – 11:50am

24x36 SHEET
1:1

PLAN REFERENCES:

1. TOPOGRAPHIC SURVEY WITHIN THE LIMITS OF GROUND SURVEY CONDUCTED IN MARCH 2016 BY JAMES E. NAGLE, CONN. REG. NO. 15195, OF EXISTING CONDITIONS AT 97 GERBER DRIVE IN TOLLAND, CT.
2. SETBACKS SHOWN PER THE TOWN OF TOLLARD ALTERNATIVE ENERGY REGULATION SECTION 17–8.
3. EXISTING TOPOGRAPHY OUTSIDE THE LIMITS OF GROUND SURVEY WAS DIGITIZED FROM A PLAN TITLED "TOPOGRAPHIC & EROSION & SEDIMENTATION CONTROL PLAN, TOLLAND BUSINESS PARK, LOTS 9, 10 & 11, GERBER DRIVE, TOLLAND, CONNECTICUT", BY GARDNER & PETERSON ASSOCATED, LLC, 178 HARTFORD TURNPIKE, TOLLAND, CONNECTICUT, SHEET NO. 6 OF 8, DATED 1–18–2007.
4. THE HORIZONTAL DATUM OF THE SURVEY IS NAD 83. THE VERTICAL DATUM OF THE SURVEY IS NAVD 88.
5. TREELINE, ACCESS PATH, AND CATCH BASIN INFORMATION ALONG GERBER TAKEN FROM ROD DRAINAGE AND UTILITY AS–BUILT PREPARED FOR VYNALCK CONSTRUCTION CO. BY DUTCH & ASSOCIATES DATED NOVEMBER 2007.
6. TOTAL AREA OF PARCEL IS 16.88 ACRES ±.
7. THE PROPERTY DEPICTED HEREON IS DESIGNATED AS MBLU 20/K/47/ AS DEPICTED ON THE TOLLAND TAX RECORDS. OWNER OF RECORD: TOWN OF TOLLAND, CT.
8. THE PROPERTY DEPICTED LIES IN ZONE "TBP" TOLLAND BUSINESS PARK.
9. THE ENTIRE AREA IS CLASSIFIED AS A "COMMERCIAL INDUSTRIAL ZONE – A" BASED ON THE TOWN OF TOLLAND GIS DATA BANK.
10. THE AREA DEPICTED LIES IN FLOOD ZONE 'C' (AREAS OF MINIMAL FLOODING) SOURCE; FEMA FLOOD MAP "TOWN OF TOLLAND, CONNECTICUT, TOLLAND COUNTY, PANEL 15 OF 20.090171 0015 A;, APRIL 1, 1982".
11. NO WETLANDS TYPE SOILS OR VEGETATION WERE FOUND ON THAT PORTION OF THE PARCEL DEPICTED HEREON. THIS STATEMENT IS BASED ON A SITE INVESTIGATION (12–31–2015) PERFORMED BY JOSEPH P. MCCUE, ENVIRONMENTAL SCIENTIST, MASON & ASSOCIATES, NORTH SCITUATE, RHODE ISLAND.
11. PER THE TOWN'S OFFICIAL ARCHAEOLOGICAL MAP, THE PROJECT SITE IS NOT LOCATED WITHIN A HIGH SENSITIVITY AREA. ADDITIONALLY, THE TOWN PLANNER CONTACTED THE STATE ARCHAEOLOGIST ON APRIL 12, 2016, AND CONFIRMED THAT THE ENVIRONMENTAL CHARACTERISTICS OF THE PARCEL INDICATE A LOW ARCHAEOLOGICAL SENSITIVITY, BUT A POTENTIAL FOR ROCK–SHELTER SITES. THE STATE ARCHAEOLOGIST AND THE TOWN PLANNER CONDUCTED A SITE WALK ON APRIL 14, 2016, TO DETERMINE IF THERE IS EVIDENCE OF SITES OF ARCHAEOLOGICAL SIGNIFICANCE ON THE SUBJECT PROPERTY AND CONCLUDED THAT THE PROJECT SITE IS LOCATED WITHIN A LOW SENSITIVITY AREA. HOWEVER, THE STATE ARCHAEOLOGIST HAS REQUESTED TO BE NOTIFIED IF TEST PITS ARE BEING CONDUCTED. THE TOWN PLANNER WILL COORDINATE WITH THE STATE ARCHAEOLOGIST IF TEST PITS WILL BE CONDUCTED.
12. THE AREA DEPICTED HEREON DOES NOT LIE WITHIN THE FOLLOWING DISTRICT OVERLAY ZONES:
    WATER RESOURCE PROTECTION AREA
    NATURAL RESOURCE PROTECTION AREA
    LAND CONSERVATION AREA
    FLOODPLAIN/STREAM BELT ZONE

SOURCE: GIS SYSTEM MAPPING FROM THE TOWN OF TOLLAND GEOGRAPHIC INFORMATION SYSTEM DATABASE.



LINE TYPES

DESCRIPTION	EXISTING	PROPOSED
CONTOUR (2' INTERVAL)	122	
CONTOUR (INDEX)	120	
PROPERTY LINE		
EDGE OF VEGETATION		
CHAIN LINK FENCE	X X X	X X X
SEDIMENT BARRIER		
EDGE OF PAVEMENT		
EDGE OF GRAVEL		
STONE WALLL		
STORM DRAIN PIPE	SD	SD
UNDERDRAIN PIPE		UD
UNDERDRAIN ELECTRIC		E

SYMBOLS

DESCRIPTION	EXISTING	PROPOSED
UTILITY POLE		
STONE CHECK DAM		SCD
IRON PIN		
MONUMENTS		
SOLAR PANELS		
GRAVEL		
CONCRETE		
CATCH BASIN INLET PROTECTION		
RIPRAP		
LEDGE OUTCROP		

40' 0 40' 80'
BAR SCALE
1" = 40'
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STATE OF CONNECTICUT
ALAN A. BAGLIO
LICENSED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE

DESIGNED BY: DLC
DRAWN BY: JBC
CHECKED BY: AAB
228051.02 10X.dwg

EXISTING CONDITIONS PLAN & LEGEND

WR–TGC SOLAR GENERATION XVI, LLC
C/O TRUE GREEN CAPITAL MANAGEMENT
1055 WESTPORT HIGHWAY
WESTPORT, CONNECTICUT 06880

TGC SOLAR 2
97 GERBER DRIVE
TOLLAND, CT 06084

JOB NO.: 228051.02
DATE: MAY 2016
SCALE: 1" = 40'
SHEET: 2 OF 6

C-100

\\WC\Shared\Projects\228051 True Green Capital – CT Municipal Landfill\wip\228051.02 Tolland Gerber\CIVIL\228051.02 10X.dwg, May 05, 2016 – 11:49am

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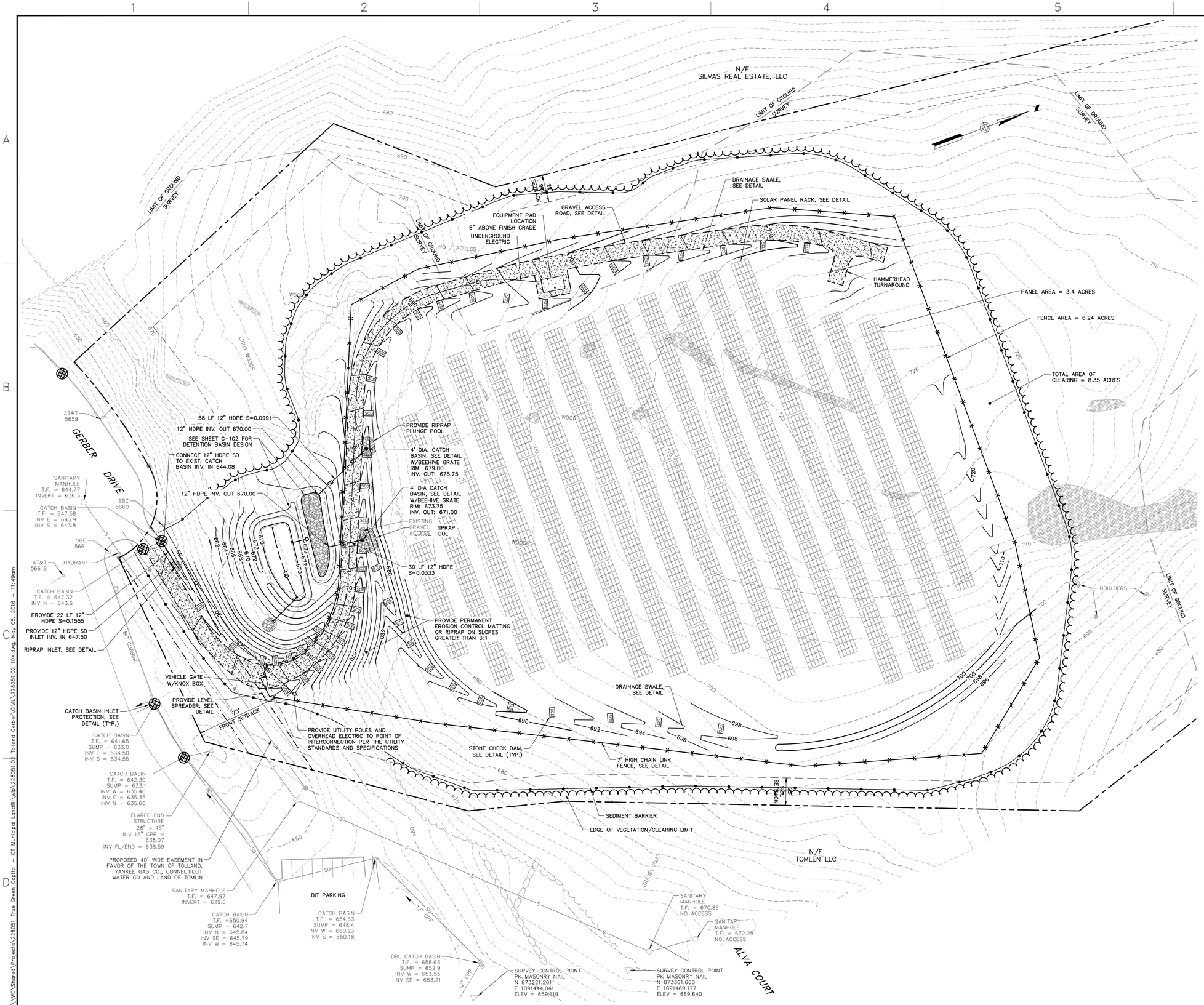

NOTES:

1. STABILIZATION MEASURES (IE. EROSION & SEDIMENT CONTROL) MUST BE IN PLACE PRIOR TO DISTURBANCE OF SOILS, INSPECTED & MAINTAINED DURING CONSTRUCTION ACTIVITIES & UNTIL SITE IS PERMANENTLY STABILIZED. EROSION CONTROL BARRIERS SHALL BE REMOVED ONCE SITE IS STABILIZED & GRASS AREAS REACH 90% COVER. SOIL EROSION AND SEDIMENT CONTROL SHALL BE IN ACCORDANCE WITH THE CONNECTICUT SOIL EROSION AND SEDIMENT CONTROL HANDBOOK, AS AMENDED.
2. ALL CONSTRUCTION STAGING & MATERIAL STOCKPILES MUST BE LOCATED WITHIN THE PANEL AREA. ALL STOCKPILES SHALL BE SURROUNDED BY EROSION CONTROL DEVICES TO MINIMIZE SEDIMENT TRANSPORT DURING CONSTRUCTION.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY DISPOSING OF ALL CONSTRUCTION WASTE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
4. THE UTILITY LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE AND REQUIRE FIELD VERIFICATION BY THE CONTRACTOR PRIOR TO CONSTRUCTION ACTIVITY. NOT ALL EXISTING UTILITIES MAY BE SHOWN.
5. CONTRACTOR SHALL NOTIFY ALL UTILITIES PRIOR TO COMMENCING WORK, ALLOWING SUFFICIENT TIME TO LOCATE AND MARK LOCATION OF BURIED UTILITIES.
6. PROTECT ALL EXISTING MONUMENTS AND PINS. PROPERTY MARKERS DISTURBED BY CONSTRUCTION ACTIVITIES SHALL BE RESET BY A PROFESSIONAL LAND SURVEYOR REGISTERED IN THE STATE OF CONNECTICUT.
7. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE CONNECTICUT FIRE SAFETY CODE, AND LIFE SAFETY CODE, AS AMENDED AND MOST CURRENT.
8. CONTRACTOR TO PROVIDE 4" LOAM AND SEED AT ALL AREAS DISTURBED DURING CONSTRUCTION.
9. EROSION CONTROL MEASURES SHALL BE INSPECTED BY CONTRACTOR ON A WEEKLY BASIS AND AFTER EACH STORM EVENT. SEDIMENT THAT HAS ACCUMULATED TO HALF THE HEIGHT OF THE SEDIMENT BARRIER SHALL BE REMOVED. REPAIR AND REPLACEMENTS SHALL BE MADE PROMPTLY AS NEEDED.
10. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITION OR AS NOTED.
11. UPON COMPLETION OF CONSTRUCTION CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS PREPARED BY A REGISTERED LAND SURVEYOR IN ACCORDANCE WITH THE TOWN OF TOLLAND ZONING REGULATIONS, SECTION 22-7-U.
12. CONTRACTOR SHALL NOT ALLOW SEDIMENT-LADEN STORMWATER RUNOFF TO ENTER THE ORGANIC FILTER; USE ONLY LOW GROUND PRESSURE EQUIPMENT TO CONSTRUCT THE ORGANIC FILTER, AND CONDUCT OPERATIONS SO AS TO AVOID COMPACTION OF EXISTING SOILS.

ZONING:

ZONE: TOLLAND BUSINESS PARK (TBP)

SOLAR INFORMATION

230 WATT PANELS:
FULL RACKS = 26
30 PANELS PER RACK: 780 PANELS = 0.18 MW
330 WATT PANELS:
FULL RACKS = 111
30 PANELS PER RACK: 3,330 PANELS = 1.10 MW
TOTAL
PANEL COUNT = 4,110 = 1.28 MW

ZONE: TOLLAND BUSINESS PARK (TBP)

VARIABLE	REQUIRED	PROPOSED
FRONT YARD	75 FT.	> 75 FT.
SIDE YARD	25 FT.	> 25 FT.
REAR YARD	25 FT.	> 25. FT.
HEIGHT OF SOLAR	25. FT. MAX.	9.5 FT.±

NOTE: YARD SETBACKS ARE PER THE TOWN OF TOLLAND ALTERNATIVE ENERGY REGULATION (SECTION 17-8)

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STATE OF CONNECTICUT
ALAN J. BAGLIO
LICENSED PROFESSIONAL ENGINEER

REV	DESCRIPTION	DATE

DESIGNED BY: DLC
DRAWN BY: JBC
CHECKED BY: AJB
228051.02 10X.dwg

SITE PLAN, GRADING AND EROSION CONTROL

WR-TGC SOLAR GENERATION XVI, LLC
C/O TRUE GREEN CAPITAL MANAGEMENT
1 HIGHWAY 137, BUILDING 1
WESTPORT, CONNECTICUT 06880

TGC SOLAR 2
97 GERBER DRIVE
TOLLAND, CT 06084

JOB NO.: 228051.02
DATE: MAY 2016
SCALE: 1" = 40'
SHEET: 3 OF 6

C-101

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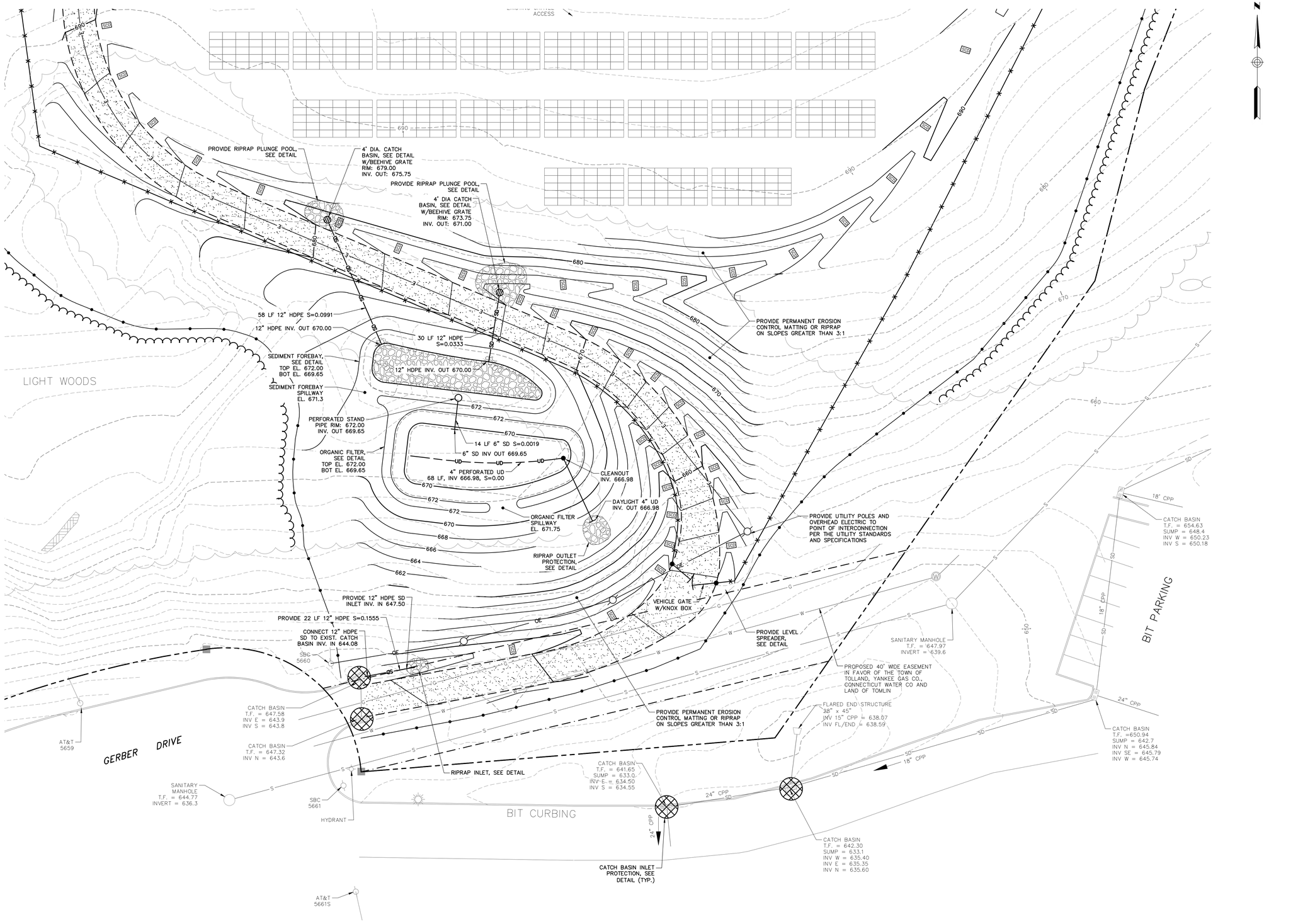

20' 0 20' 40'
BAR SCALE
1" = 20'
CHECK GRAPHIC SCALE BEFORE USING

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STATE OF CONNECTICUT
ALAN J. BAGLIO
LICENSED PROFESSIONAL ENGINEER

REV	DESCRIPTION	DATE

DESIGNED BY: AEA
DRAWN BY: JBC
CHECKED BY: DJC
228051.02 10X.dwg

DETENTION BASIN PLAN

WR-TGC SOLAR GENERATION XVI, LLC
C/O TRUE GREEN CAPITAL MANAGEMENT
1 BOSTON POST ROAD, SUITE 2
WESTPORT, CONNECTICUT 06880

TGC SOLAR 2
97 GERBER DRIVE
TOLLAND, CT 06084

JOB NO.: 228051.02
DATE: MAY 2016
SCALE: 1" = 20'
SHEET: 4 OF 6

C-102

\\WC\Shared\Projects\228051 True Green Capital - CT Municipal Landfill\wsp\228051.02 Tolland Gerber\CIVIL\228051.02 10X.dwg, May 05, 2016 - 1:07pm

24x36 SHEET
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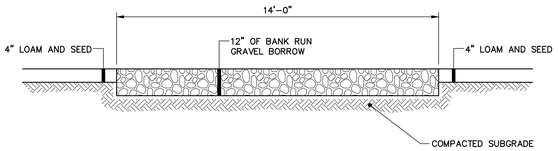

GRAVEL ACCESS ROAD DETAIL
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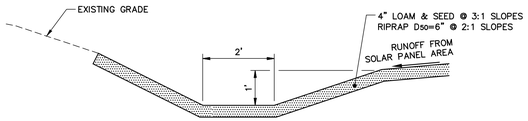

DRAINAGE SWALE
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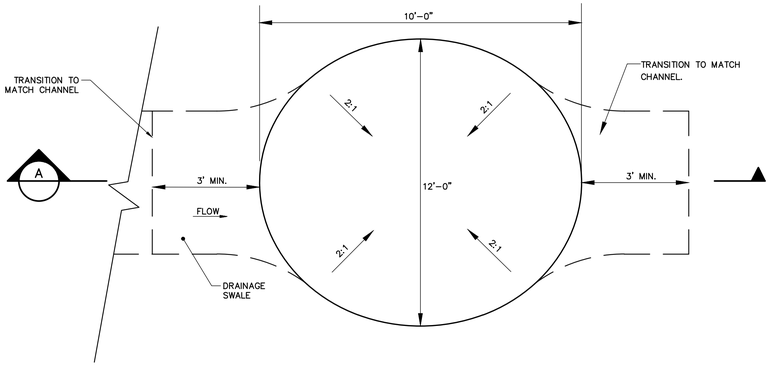
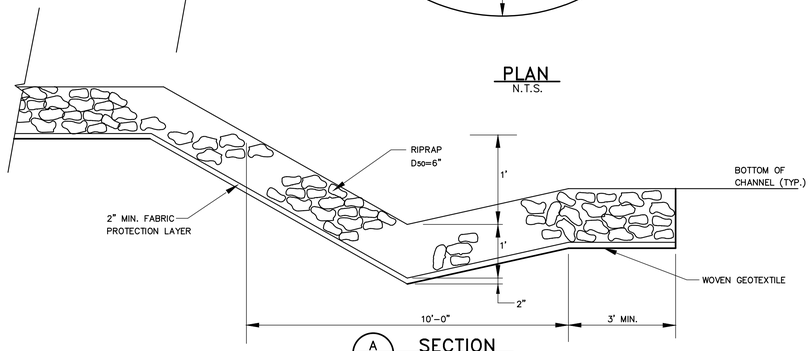
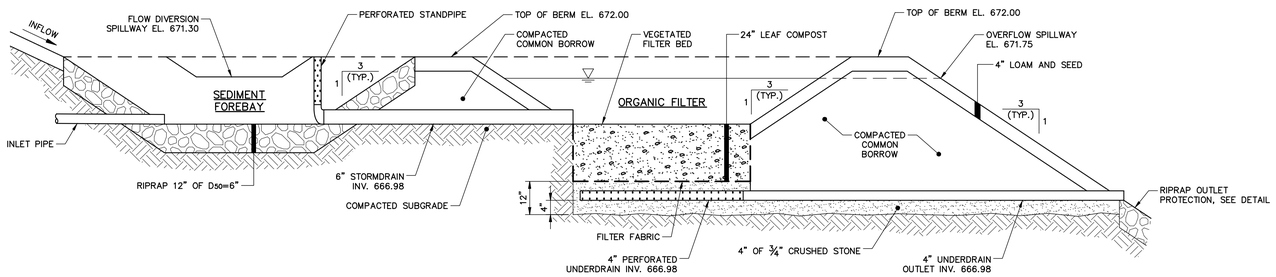


PLAN
N.T.S.



A SECTION
N.T.S.

RIPRAP PLUNGE POOL
N.T.S.



SEDIMENT FOREBAY AND ORGANIC FILTER DETAIL
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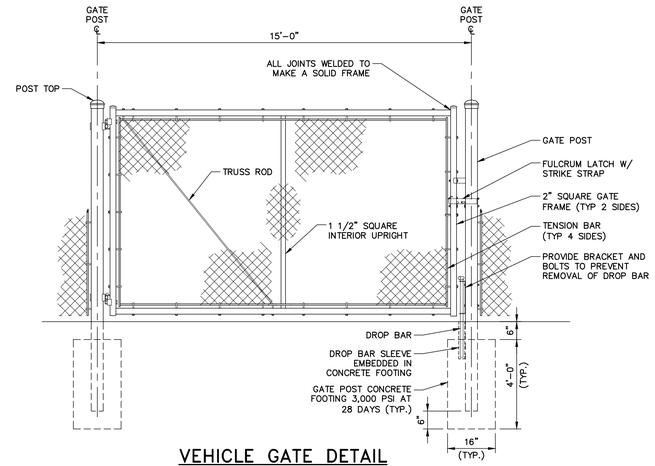
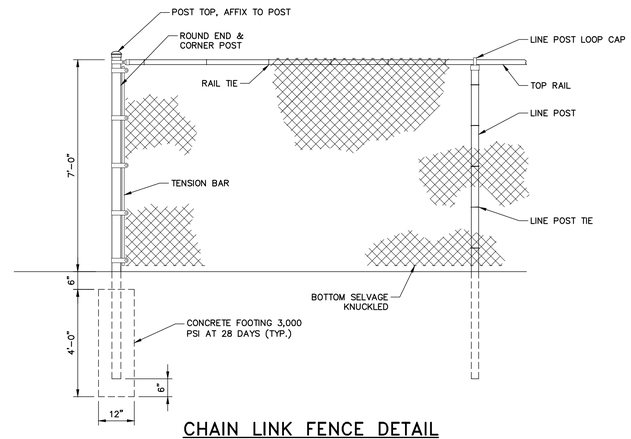
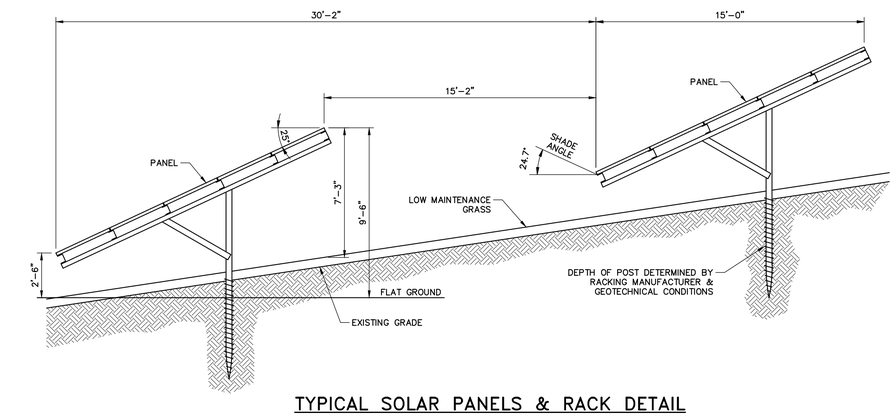


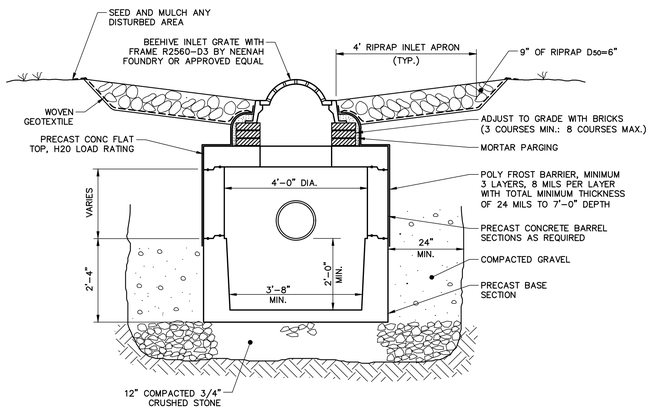
VEHICLE GATE DETAIL
N.T.S.



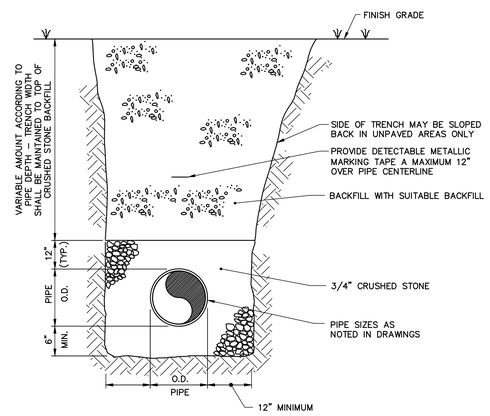
CHAIN LINK FENCE DETAIL
N.T.S.



TYPICAL SOLAR PANELS & RACK DETAIL
N.T.S.



CATCH BASIN W/BEEHIVE GRATE
N.T.S.



NOTES:

1. MAINTAIN UNIFORM TRENCH WIDTH TO 6" OVER PIPE.
2. BRACING AND SHEETING OR OTHER TRENCH PROTECTION TO BE PROVIDED TO MEET APPLICABLE O.S.H.A. SAFETY REGULATIONS. ALL SUCH TRENCH PROTECTION TO BE RESPONSIBILITY OF CONTRACTOR.

SINGLE PIPE TRENCH DETAIL
N.T.S.

1520 Highland Avenue
Cheshire, Connecticut 06410
888.265.5969 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS
WOODARD & CURRAN

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STATE OF CONNECTICUT ALAN J. BAGLIO CUT 29 ENGINEER

REV	DESCRIPTION	DATE

DESIGNED BY: DLC | CHECKED BY: AJB
DRAWN BY: JBC | 228051.02 D20X.dwg

DETAILS – 1

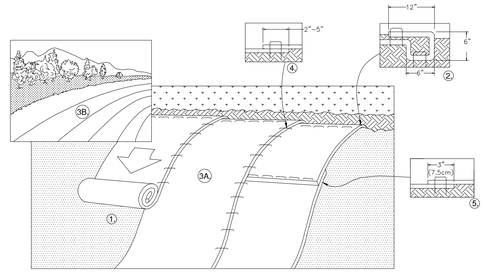
WR-TGC SOLAR GENERATION XVI, LLC
C/O TRUE GREEN CAPITAL MANAGEMENT
1055 WESTPORT HIGHWAY, NORTH
WESTPORT, CONNECTICUT 06880

TGC SOLAR 2
97 GERBER DRIVE
TOLLAND, CT 06084

JOB NO.: 228051.02
DATE: MAY 2016
SCALE: AS NOTED
SHEET: 5 OF 6

D-200

\\WC\Shared\Projects\228051 True Green Capital – CT Municipal Landfill\wip\228051.02 Tolland Gerber\CIVIL\228051.02 D20X.dwg, May 05, 2016 – 11:49am

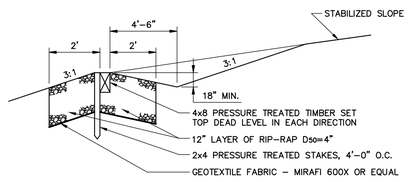


ROLLED EROSION CONTROL BLANKET

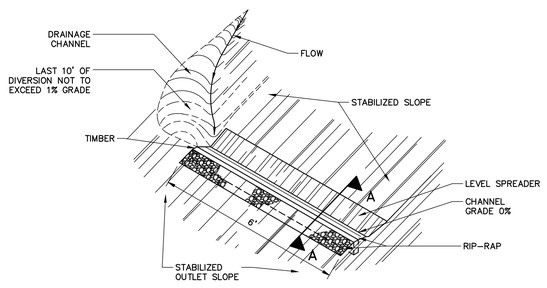
N.T.S.

ROLLED EROSION CONTROL BLANKET NOTES:

1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED AS WELL AS REMOVING ANY PROTRUDING ROCKS, STUMPS OR ROOTS. DURING THE GROWING SEASON (APRIL 15– SEPTEMBER 15) USE RECP'S ON THE BASE OF GRASSED WATERWAYS, SOIL SLOPES HAVING A GRADE GREATER THAT 15%, OR ANYWHERE WHERE HAY MULCH HAS PROVEN TO BE INEFFECTIVE AT CONTROLLING SHEET EROSION. RECP'S ARE A MANUFACTURED COMBINATION OF MULCH AND NETTING DESIGNED TO PREVENT EROSION AND RETAIN SOIL MOISTURE.
2. FOR OVER WINTER PROTECTION, APPLY RECP'S ON THE BASE AND SIDE SLOPES OF GRASSED WATERWAYS AND ON SLOPES STEEPER THAN AN 8% GRADE.
3. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECP's IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF RECP's EXTENDED BEYOND THE UP–SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE RECP's.
4. ROLL THE RECP's (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
5. THE EDGES OF PARALLEL RECP's MUST BE STAPLED WITH APPROXIMATELY 2" – 5" OVERLAP DEPENDING ON RECP's TYPE.
6. CONSECUTIVE RECP's SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE RECP's WIDTH. NOTE: *IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE RECP's.
7. UNTIL GRASS IS ABUNDANT, INSPECT PERIODICALLY AND AFTER EACH RAINSTORM TO CHECK FOR EROSION. IMMEDIATELY REPAIR AND ADD MORE MULCH UNTIL GRASSES ARE FIRMLY ESTABLISHED.
8. DO NOT MOW THE FIRST YEAR.
9. DETAIL SHALL BE CONSIDERED GENERAL GUIDANCE FOR RECP INSTALLATION; CONTRACTOR SHALL INSTALL RECP IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.

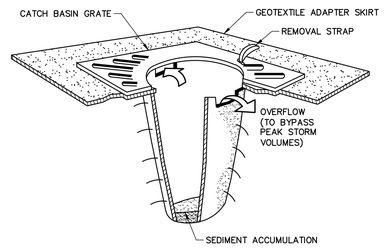


SECTION A–A



LEVEL LIP SPREADER

N.T.S.



NOTES:

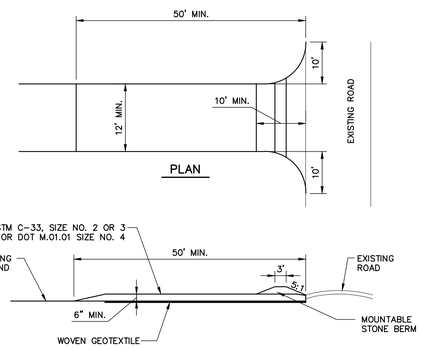
CATCH BASIN PROTECTION TO BE "SILTSACK" (BY ACF ENVIRONMENTAL) OR "STREAM GUARD" (BY FOSS ENVIRONMENTAL SERVICES), OR APPROVED EQUAL.

INSERT TO BE EMPTIED IN AN APPROVED MANNER WHEN IT IS 1/2 FULL OF SEDIMENT.

INSPECT INSERT AFTER ALL RAINFALL EVENTS, REPAIR AND MAINTAIN AS REQUIRED.

CATCH BASIN INLET PROTECTION

N.T.S.



PROFILE

NOTES:

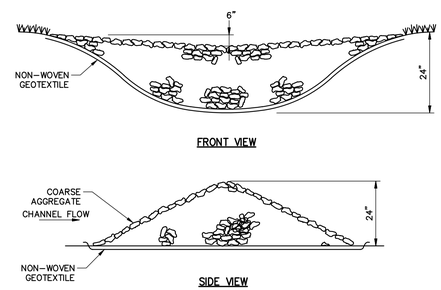
- CONSTRUCTION ENTRANCES MAY BE RELOCATED AS CONSTRUCTION PROGRESSES.
- WHEEL WASH PITS MAY ALSO BE USED, IF APPROVED.

MAINTENANCE: INSPECT FOR EFFECTIVE REMOVAL OF SOIL FROM VEHICLES PRIOR TO LEAVING THE SITE. SWEEP ANY SOIL FROM ADJACENT ROADWAYS.

REMOVAL: AT LEAST ONE CONSTRUCTION ENTRANCE SHALL BE MAINTAINED UNTIL ALL AREAS OF THE SITE ARE STABILIZED.

STABILIZED CONSTRUCTION ENTRANCE DETAIL

N.T.S.

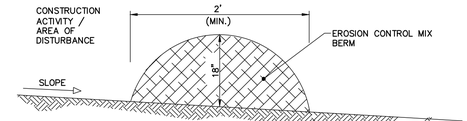


NOTES:

1. SPACING BETWEEN CHECK DAMS AS SHOWN ON PLANS.

STONE CHECK DAM

N.T.S.



NOTES:

EROSION CONTROL MIX BERM MUST CONSIST PRIMARILY OF ORGANIC MATERIAL AND MAY INCLUDE: SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK, OR ACCEPTABLE MANUFACTURED PRODUCTS. WOOD AND BARK CHIPS, GROUND CONSTRUCTION DEBRIS OR REPROCESSED WOOD PRODUCTS WILL NOT BE ACCEPTABLE AS THE ORGANIC COMPONENT OF THE MIX.

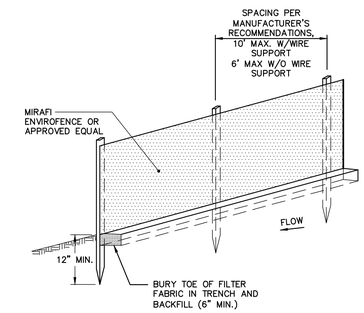
COMPOSITION:

EROSION CONTROL MIX SHALL CONTAIN A WELL–GRADED MIXTURE OF PARTICLE SIZES AND MAY CONTAIN ROCKS LESS THAN 4" IN DIAMETER. EROSION CONTROL MIX MUST BE FREE OF REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH. THE MIX COMPOSITION SHALL MEET THE FOLLOWING STANDARDS:

- THE ORGANIC MATTER CONTENT SHALL BE BETWEEN 80 AND 100%, DRY WEIGHT BASIS.
- PARTICLE SIZE BY WEIGHT SHALL BE 100 % PASSING A 6" SCREEN AND A MINIMUM OF 70%, MAXIMUM OF 85%, PASSING A 0.75" SCREEN.
- THE ORGANIC PORTION NEEDS TO BE FIBROUS AND ELONGATED.
- LARGE PORTIONS OF SILTS, CLAYS OR FINE SANDS ARE NOT ACCEPTABLE IN THE MIX.
- SOLUBLE SALTS CONTENT SHALL BE < 4.0 MMHOS/CM.
- THE PH SHOULD FALL BETWEEN 5.0 AND 8.0.

SEDIMENT BARRIER – EROSION CONTROL MIX BERM

N.T.S.

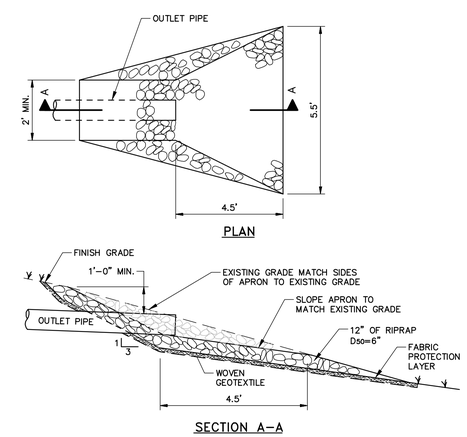


NOTES:

- INSTALL FABRIC ON UPHILL SIDE OF SUPPORT POSTS
- INSTALL SILT FENCE ACROSS SLOPES
- SILT FENCE SHALL NOT BE USED IN DRAINAGE WAYS

SEDIMENT BARRIER – SILTATION FENCE DETAIL

N.T.S.



SECTION A–A

RIPRAP OUTLET PROTECTION

N.T.S.

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WOODARD & CURRAN

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STATE OF CONNECTICUT
ALAN T. BAGLIOS
LICENSED PROFESSIONAL ENGINEER

REV	DESCRIPTION	DATE

DESIGNED BY: DLC
DRAWN BY: JBC
CHECKED BY: AAB
228051.02 D20X.dwg

DETAILS – 2

WR–TGC SOLAR GENERATION XVI, LLC
C/O TRUE GREEN CAPITAL MANAGEMENT
1 BOSTON PLACE, 34TH FLOOR
WESTPORT, CONNECTICUT 06880

TGC SOLAR 2
97 GERBER DRIVE
TOLLAND, CT 06084

JOB NO.: 228051.02
DATE: MAY 2016
SCALE: AS NOTED
SHEET: 6 OF 6

D-201

\\WC\Shared\Projects\228051 True Green Capital – CT Municipal Landfill\wip\228051.02 Tolland Gerber\CIVIL\228051.02 D20X.dwg, May 05, 2016 – 11:49am

APPENDIX C: WETLAND REPORT

MASON & ASSOCIATES, INC.
Environmental Consulting & Projects
771 Plainfield Pike, North Scituate, RI 02857
Tel. (401) 647-3835 Fax (401) 647-5430

11 January 2016

Denise Cameron
Woodard & Curran
33 Broad Street
Providence, RI 02903

Subject: Wetland Reconnaissance
97 Gerber Drive, Portion of AP 20K, Lot 47, Tolland , CT

Dear Ms. Cameron,

This letter presents our findings regarding wetland reconnaissance at 97 Gerber Drive in Tolland, Connecticut (Figure 1). The investigation was done in accordance with the 'Inland Wetlands and Watercourses Regulations of the Town of Tolland' (effective date August 15, 2011) (hereafter referred to as Regulations). Pursuant to Sections 5 and 6 of the Regulations, The Connecticut Department of Energy and Environmental Protection (CTDEEP) regulates certain activities affecting freshwater wetlands in Tolland; and no person shall conduct or maintain a regulated activity without first obtaining a permit for such activity from the Inland Wetlands Commission of the Town of Tolland. My qualifications include over 19 years' experience in the practice of wetland science and environmental impact assessment. I am a Professional Soil Scientist with the Society of Soil Scientists of Southern New England (SSSSNE) and a Professional Wetland Scientist (#2010) certified by the Society of Wetland Scientists (SWS).

The subject property is located north of the Gerber Drive terminus, on AP 20K, Lot 47 (Figure 2). The southern half of the property is considered the project area; however, the entire property was investigated in the field for the presence of freshwater wetlands.

I conducted the site reconnaissance for wetlands on December 31, 2015. At that time I did not observe any areas of freshwater wetland on the property. The Natural Resource Conservation Service's Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx) and the University of Connecticut Map and Geographic Information Center (MAGIC) were consulted as a part of this effort (Figure 2).

The property consists of mature upland forest. Vegetation occurring within the upland forest include red oak (*Quercus rubra*), white oak (*Quercus alba*), black birch (*Betula lenta*), sassafras (*Sassafras albidum*), mountain laurel (*Kalmia latifolia*), sheep laurel (*Kalmia angustifolia*) and bracken fern (*Pteridium aquilinum*).

The Web Soil Survey maps the property as non-hydric soils including Charlton-Chatfield complex, 3 to 15% slopes, very rocky and Canton and Charlton soils, 8 to 15% slopes, very stony. These designations are consistent with the M&A site investigation; M&A did not observe any hydric soils on the subject parcel.

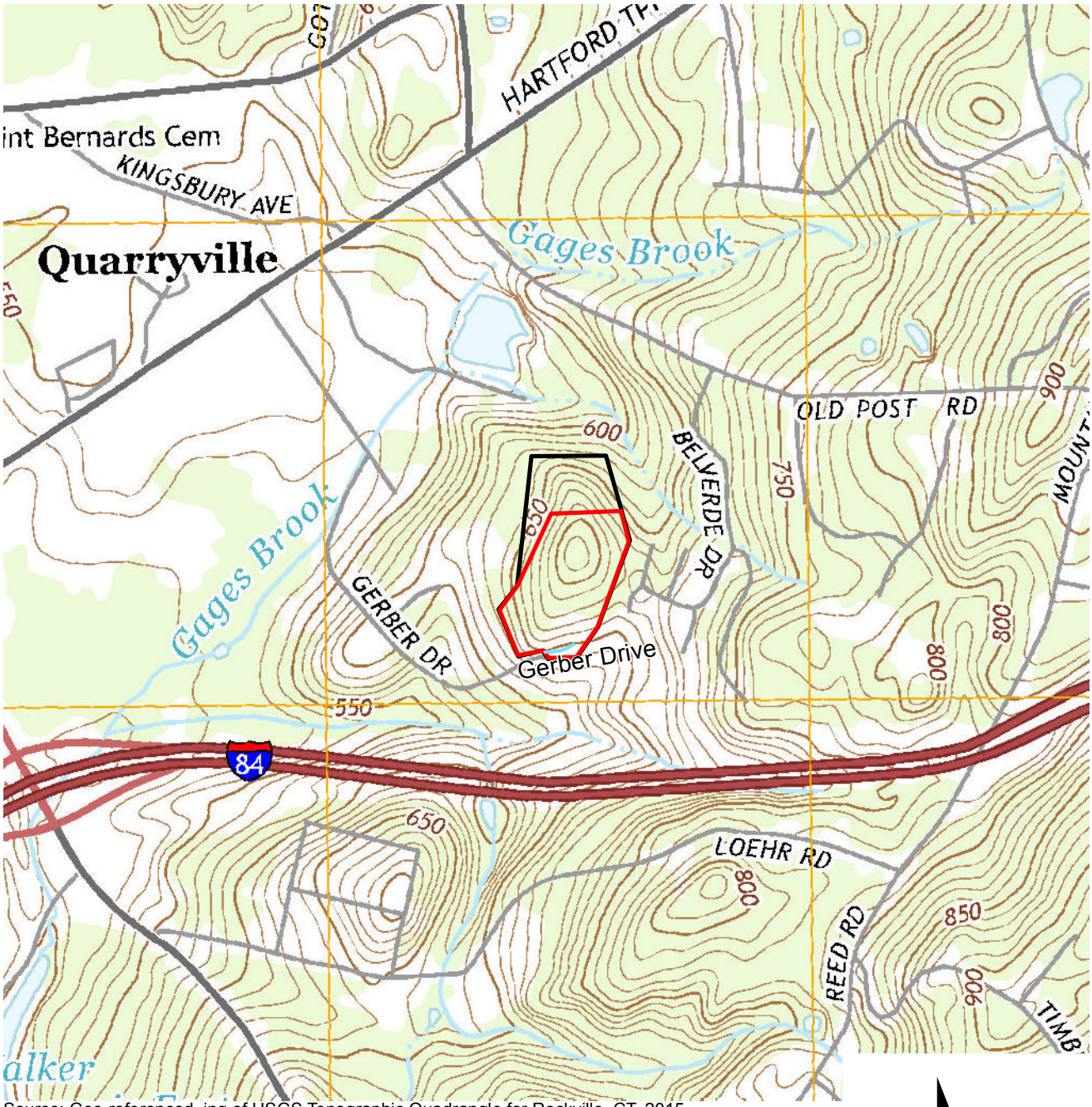
There is an excavated channel in the front (south) of the property that appears to have been created to allow stormwater/snowmelt runoff to be directed into a catch basin at the eastern end of Gerber Drive cul-de-sac. This does not meet any of the criteria in the definition of watercourse as defined in the Regulations in my opinion and should not be considered wetland.

Please note that only the CTDEEP and the Inland Wetlands Commission of the Town of Tolland can determine what is to be known as Freshwater Wetland in Connecticut. As such, the information provided herein represents the best professional judgment of Mason & Associates, Inc., and should not be construed to represent the finding of any regulatory agency.

Thank you for the opportunity to work with you on this project. Please contact us if you have any questions regarding this work, or if you require additional information.

Sincerely yours,
MASON & ASSOCIATES, INC.

Joseph P. McCue, PWS #2010
Professional Soil Scientist (SSSSNE)



Source: Geo-referenced. jpg of USGS Topographic Quadrangle for Rockville, CT, 2015

Approximate Location of:

Property Boundaries

Limit of Field Survey

0 1,000 Feet

Approximate Scale

Gerber Drive, AP 20K, Lot 47
Tolland, Connecticut

MASON & ASSOCIATES, INC.
Environmental Consulting & Projects
771 Plainfield Pike, North Scituate, Rhode Island 02857

PROJECT LOCATION

Project No. 151204

Figure 1

Source: Geo-referenced 2011 Bing Imagery

Approximate Location of:

Property Boundaries

Limit of Field Survey

N

0 200 Feet

Approximate Scale

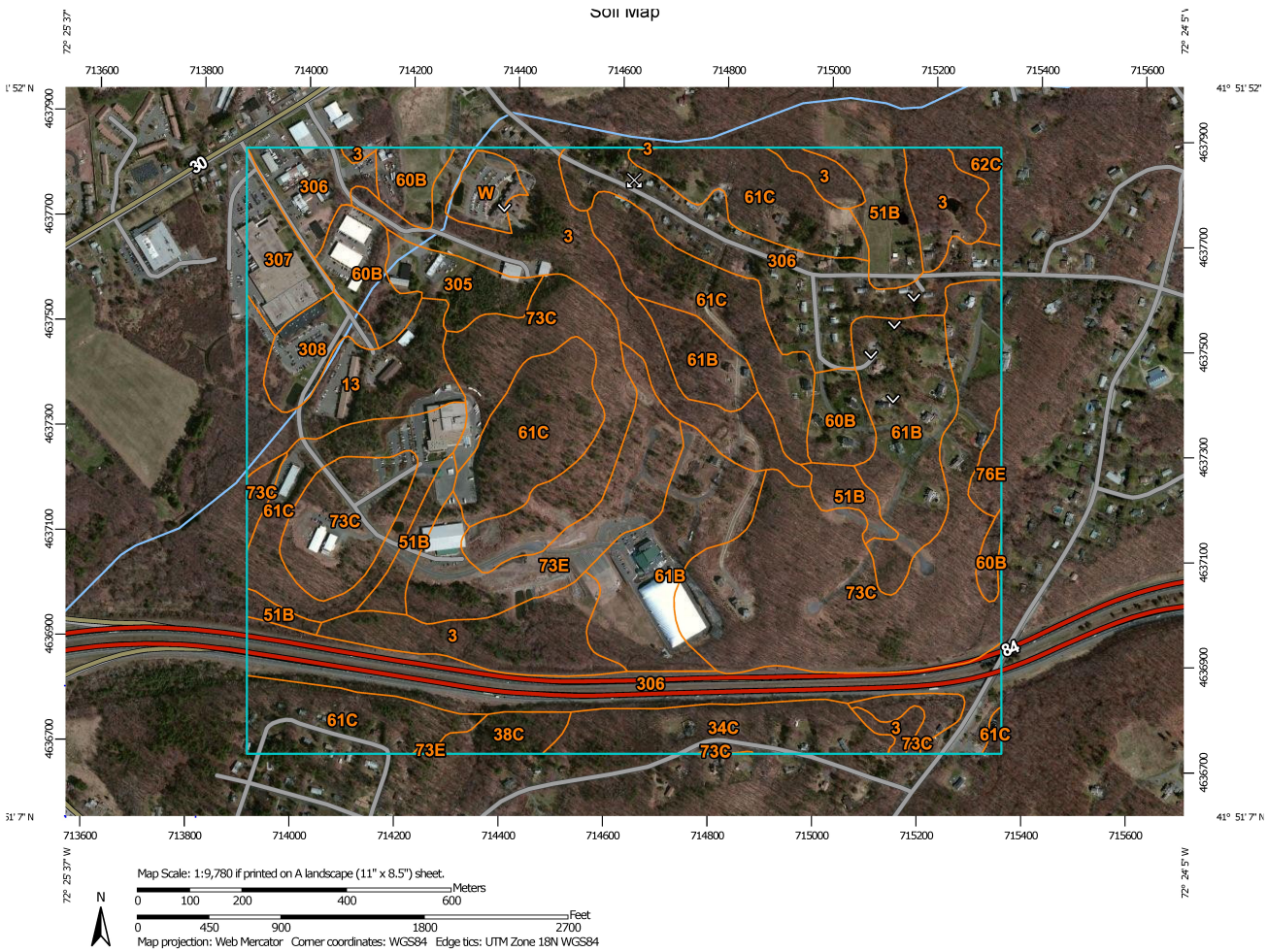
Gerber Drive, AP 20K, Lot 47
Tolland, Connecticut

MASON & ASSOCIATES, INC.
Environmental Consulting & Projects
771 Plainfield Pike, North Scituate, Rhode Island 02857

AERIAL PHOTOGRAPH

Project No. 151204

Figure 2



8

Web Soil Survey Screenshot

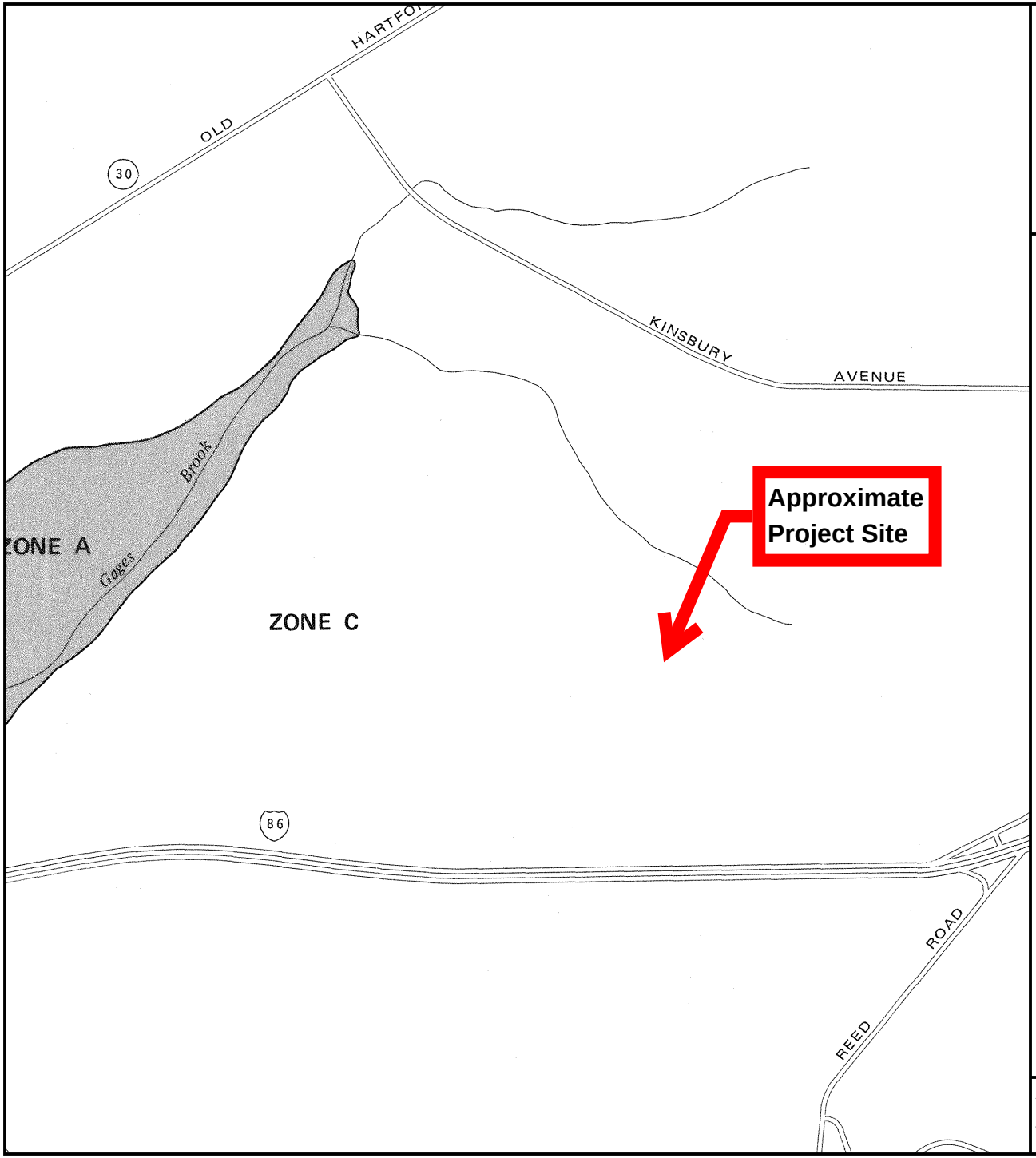
Soil Map Unit Legend for Field Survey Limits:

61C - Canton & Charlton soils, 8 to 15% slopes, very stony; Non-hydric

73C - Charlton-Chatfield complex, 3 to 15% slopes, very rocky; Non-hydric

Gerber Drive, AP 20K, Lot 47 Tolland, Connecticut	**SOIL MAP**
MASON & ASSOCIATES, INC. *Environmental Consulting & Projects* 771 Plainfield Pike, North Scituate, Rhode Island 02857	Project No. 151204 | Figure 3

APPENDIX D: FEMA MAP



APPROXIMATE SCALE

800 0 800 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
TOLLAND,
CONNECTICUT
TOLLAND COUNTY

PANEL 15 OF 20
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
090171 0015 A

EFFECTIVE DATE:
APRIL 1, 1982

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

APPENDIX E: SOIL EROSION AND SEDIMENT CONTROL PLAN

SOIL EROSION & SEDIMENT CONTROL PLAN

TGC – Gerber Drive Solar Project

97 Gerber Drive
Tolland, CT

228051.02
WR-TGV Solar Generation XVI, LLC
April 2016

woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

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APPENDICES

Appendix A: Design Drawings (Bound Separately)

1. INTRODUCTION

1.1 PROPOSED DEVELOPMENT

WR-TGC Solar Generation XVI, LLC, (Applicant) is proposing to install an approximately 1.3-MW solar photovoltaic (PV) and electrical interconnection system on a Town-owned site located at 97 Gerber Drive, in Tolland, Connecticut (Site). The proposed project is comprised of the installation of fencing, solar panels, inverters, transformers, and an electrical interconnect system.

Grading on the site is proposed only as necessary to install the gravel access road and to manage stormwater runoff. Existing woodland areas on the site will be cleared only as necessary to avoid shading impacts on the panels; any vegetation not specifically designated for clearing will be protected as necessary during construction. Areas disturbed by the solar panel installation and grading activities will be re-vegetated. The proposed development will result in new impervious area from the gravel access road, concrete equipment pad, and posts associated with the solar panels.

The proposed site development is depicted on the drawings appended to this Plan, bound separately. The overarching purpose of the proposed project is to provide a renewable source of energy, with minimal impact on the surrounding environment. The solar photovoltaic system is a passive use, which will have no noise, dust, odor, or other pollution or hazardous material concerns during the operation of the facility.

The estimated area of disturbance during construction is approximately 8.35 acres, which includes areas disturbed by proposed clearing, grading, stormwater management infrastructure, and new impervious area associated with solar panel post installations and the access roadway. According to the Connecticut Department of Energy & Environmental Protection (CTDEEP) Construction General Permit (CGP) for construction activity disturbing greater than one acre, Locally Approvable construction projects with a total disturbed area greater than five acres are required to register with the Department. On April 7, 2016 Woodard & Curran confirmed with Chris Stone of the CTDEEP that the solar project is considered "Locally Approvable" because the project is being reviewed by Planning & Zoning Commission and Siting Council approval is not required.

Soil erosion and sediment control measures will be provided in accordance with the Department of Energy and Environmental Protection 2002 Connecticut Guidelines for Soil Erosion and Sediment Control and a CTDEEP CGP for the proposed development will be obtained.

1.2 NATURAL RESOURCES

Mason & Associates, Inc. conducted a field survey on December 31, 2015, and found no wetland areas on the Site, as outlined by the letter prepared by Joseph P. McCue dated January 11, 2016. A copy of the wetland report was provided to the Inland Wetlands Commission (IWC) and it was determined that no wetlands permit would be required. The proposed solar development is located within FEMA Flood Zone C, which is an area of minimal flood hazard. There are no known protected resource areas within or adjacent to the Site.

1.3 SOIL EROSION & SEDIMENTATION CONTROL

The design and construction of this development will be executed in a manner so that it will not cause soil erosion or sedimentation on the property being developed, or on surrounding properties, wetlands, or water courses. Temporary soil erosion and sedimentation control measures for construction are identified on the design drawings appended to this Plan, bound separately. Any areas disturbed by construction shall be restored to existing conditions or as noted on the design drawings. All construction staging and material stockpiles must be located within the solar panel area. All stockpiles shall be surrounded by erosion control devices to minimize sediment transport during construction.

Permanent erosion and sedimentation control will be provided by the stabilized cover of the Site. The majority of the Site area will be covered with grass. A small area will be covered by gravel for the access road and concrete for the equipment pad. Stone check dams and riprap outlet protection will be provided to reduce the velocity of runoff and prevent erosion, as detailed on the design drawings.

2. PROPOSED CONSTRUCTION SCHEDULE

2.1 PROPOSED SEQUENCE FOR CONSTRUCTION ACTIVITIES

The project will be completed in one phase. The sequence for construction activities is as follows:

- Install soil erosion and sediment control measures;
- Clear Site;
- Construct gravel access roadway and stormwater management infrastructure;
- Install solar panel array;
- Stabilize construction site; and
- Remove soil erosion and sediment control measures.

The project is anticipated to begin in the Summer of 2016, and will be completed by the Fall of 2016.

2.2 CONSIDERATIONS FOR STORMWATER MANAGEMENT INFRASTRUCTURE

2.2.1 Organic Filter

The design engineer shall oversee the preparation of the area and the installation of the various components of the organic filter system (gravel storage zone, and media treatment zone) and shall provide a certification that the system was designed in accordance with the specifications found in the Design Manual and installed in accordance with the approved plans. The area of the organic filter should be fenced off during the construction period to prevent disturbance of the soils. Sediment should be removed from the forebay when accumulated depth is six inches.

3. SOIL EROSION & SEDIMENT CONTROL MEASURES

This section of the Erosion Control Plan addresses the installation of temporary soil erosion and sediment control measures and the permanent stabilization of the Site.

3.1 DESIGN CRITERIA

All proposed soil erosion and sediment control measures have been designed in accordance with Chapters 3, 4, and 5 of the Connecticut Guidelines for Soil Erosion and Sediment Control, latest edition, as demonstrated by the plans, notes, and details appended to this Plan.

3.2 CONSTRUCTION DETAILS

Construction details for proposed soil erosion and sediment control measures are contained in the design drawings appended to this Plan.

3.3 INSTALLATION/APPLICATION PROCEDURES

The timing, site preparation, materials, and installation and/or application requirements for all recommended soil erosion and sediment control measures, as specified in the design drawings appended to this Plan, are as follows:

3.3.1 Geotextile Silt Fence (GSF)

3.3.1.1 Materials

3.3.1.1.1 Geotextile Fabric

The geotexitile fabric used for the GSF will be a pervious sheet of polypropylene, nylon, polyester, ethylene, or similar filaments and shall be certified by the manufacturer or supplier as conforming to the minimum requirements specified in the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control. The geotextile shall be non-rotting, acid and alkali resistant and have sufficient strength and permeability for the purpose intended, including handling and backfilling operations. Filaments in the geotextile shall be resistant to absorption. The filament network must be dimensionally stable and resistant to de-lamination. The geotextile shall be free of any chemical treatment or coating that will reduce its permeability. The geotextile shall also be free of any flaws or defects which will alter its physical properties. Torn or punctured geotextiles shall not be used.

3.3.1.1.2 Supporting Posts

Supporting posts shall be at least 42 inches long made of either 1.5 inch square hardwood stakes or steel posts with projections for fastening the geotextile possessing a minimum strength of 0.5 pound per linear foot.

3.3.1.2 Installation

3.3.1.2.1 Trench Excavation

Excavate a trench a minimum of 6 inches deep and 6 inches wide on the up slope side of the fence location. For slope and swale installations, extend the ends of the trench sufficiently up slope such that bottom end of the fence will be higher than the top of the lowest portion of the fence. When trench excavation is obstructed by an occasional stone or tree root, provide a smooth transition between the trench bottom and the obstruction.

3.3.1.2.2 Support Posts

Drive support posts on the down slope side of the trench to a depth of at least 12 inches into original ground. Never install support posts closer than 10 feet apart when concentrated flows are anticipated or when steep contributing slopes and soil conditions are expected to generate larger volumes of sediment. Whenever the geotextile filter fabric that is used exceeds the minimum material specifications contained in this measure, the spacing of the stakes shall be per manufacturer's recommendations.

3.3.1.2.3 Installation of Geotextile Filter Fabric

Staple or secure the geotextile to the support posts per manufacturer's instruction such that at least 6 inches of geotextile lies within the trench, the height of the fence does not exceed 30 inches, and the geotextile is taut between the posts. When the trench is obstructed by stones, tree roots, etc. allow the geotextile to lay over the obstruction such that the bottom of the geotextile points up slope. In the absence of manufacturer's instructions, space wire staples on wooden stakes at a maximum of 4 inches apart and alternate their position from parallel to the axis of the stake to perpendicular. Do not staple the geotextile to living trees. Provide reinforcement for the fence when it can be exposed to high winds. When joints in the geotextile fabric are necessary, splice together only at a support posts, and securely seal (see manufacturer's recommendations).

3.3.1.3 Backfill & Compaction

Backfill the trench with tamped soil or aggregate over the geotextile. When the trench is obstructed by a stone, tree root, etc. make sure the bottom of the geotextile lies horizontal on the ground with the resulting flap on the up slope side of the geotextile and bury the flap 6 inches of tamped soil, or aggregate.

3.3.2 Sediment Barrier – Erosion Control Mix Berm

3.3.2.1 Materials

Erosion Control Mix Berm will consist primarily of organic material and may include: shredded bark, stump grindings, composted bark, or acceptable manufactured products. Ground construction debris or re-processed wood products will not be considered as the organic component of the mix. Provide mix composition in accordance with the detail on the appended drawings.

3.3.2.2 Installation

Provide placement of 18-inch erosion control mix berm per the locations and details shown on the appended drawings.

3.3.3 Construction Entrance (CE)

Utilize the proposed gravel access drive for a construction entrance to the maximum extent practicable. Where access across this drive is not feasible, provide temporary construction entrances. The minimum length of the construction entrance is 50 feet, but where the soils subject to tracking contain less than 80% sand, then the minimum length of the construction entrance is 100 feet. The length of the construction entrance may be reduced by the establishment of an access road with a stable surface that is not subject to soil tracking. For sites containing clay or silty soils, consider developing a construction access road with gravel base, per Chapter 4 of the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control.

3.3.3.1 Surface Materials

3.3.3.1.1 Stone

Use angular stone sized according to the standards set by ASTM C-33, size No. 2 or 3, or DOT Standard Specifications section M.01.01, size #4. Refer to drawings for area of stone and cross-section details.

3.3.4 Permanent Seeding (PS)

Vegetated areas disturbed by construction will be reseeded as specified herein.

3.3.4.1 Timing

Seed with a permanent seed mixture within 7 days after completion of land-disturbing activities or when work within a disturbed area is to be suspended for a period of more than 1 year. Seeding is recommended from April 1 through June 15, and August 15 through October 1.

3.3.4.2 Site Preparation

For areas to be mowed, remove all surface stones 2 inches or larger. Remove all other debris such as wire, cable, tree roots, pieces of concrete, clods, lumps or other unsuitable material.

3.3.4.3 Seedbed Preparation

Inspect the seedbed just before seeding. If the soil is compacted, crusted, or hardened, scarify the area prior to seeding.

3.3.4.4 Seed Application

Apply seed at rates of 60 pounds per acre, or 1.35 pounds per 1,000 square feet, uniformly by hand, cyclone seeder, drill, cultipacker type seeder or hydroseeder. Normal seeding depth is from 0.25 to 0.5 inch. Increase seeding rates by 10% when hydroseeding or frost crack seeding. Apply mulch per the following Section.

3.3.5 Mulch for Seed (MS)

3.3.5.1 Timing

Apply immediately following seeding. Some cellulose fiber may be applied with seed to assist in marking where seed has been sprayed, but expect to apply a second application of cellulose fiber to meet the requirements of mulch for seed; wood chips and bark chips, or shredded bark, are not recommended for use as mulch for seed. The following materials are acceptable for use as temporary soil cover until seeds germinate and grow sufficiently to stabilize soil:

Table 3-1: Mulch Types & Application

Mulch Type	Exposure Period	Application	Limitations/Considerations
Stray/Hay	0-6 months	By hand or blown by machine	• Requires anchoring in windy areas • Hay will supply weed seeds, straw will not • May provide better shading against hot summer sun for seeding done at beginning of summer
Cellulose Fiber	0-6 months	Sprayed in slurry with water	• No volunteer weed seeds, lawn seeding • Wood fiber per unit cost generally more expensive than paper fiber, but requires less product for equivalent coverage • May be used in summer with seed only if adequate irrigation is planned

3.3.5.2 Spreading

Mulch material shall be spread uniformly by hand or machine resulting in 80-95% coverage of the disturbed soil when seeding within the recommended seeding dates. Applications that are uneven can result in excessive mulch smothering the germinating seeds. For hay or straw anticipate an application rate of 2 tons per acre. For cellulose fiber follow manufacturer's recommended application rates. When seeding outside the recommended seeding dates, increase mulch application rate to provide between 95-100% coverage of the disturbed soil. For hay or straw anticipate an application rate of 2.5 to 3 tons per acre. Machine clogging can occur if product is improperly loaded or if leftover product is left in machine without cleaning. Comply with the manufacturer's recommendations for application requirements and mulch material specifications.

3.3.5.3 Anchoring

When needed, mulch anchoring is applied either with the mulch, such as cellulose fiber, or applied immediately following mulch application. Expect the need for mulch anchoring along the shoulders of actively traveled roads, hill tops and long open slopes not protected by wind breaks. When using netting, the most critical aspect is to ensure that the netting maintains substantial contact with the underlying mulch and the mulch, in turn, maintains continuous contact with the soil surface. Without such contact, the material is useless and erosion occurs. Install in accordance with manufacturer's recommendations.

3.3.6 Catch Basin Inlet Protection

Geotextile silt fence or other inlet protection devices, as specified on the design drawings and details, may be used for catch basin and culvert inlet protection.

4. OPERATION & MAINTENANCE PROGRAM

The following operation and maintenance program has been developed in accordance with Chapter 5 of the Connecticut Guidelines for Soil Erosion and Sediment Control, latest edition, for all proposed soil erosion and sediment control measures, as specified by the design drawings appended to this Plan.

4.1 SEDIMENT BARRIERS

Inspect the sediment barriers at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater to determine maintenance needs. Remove the sediment deposits or, if room allows, install a secondary barrier up slope of the existing barrier when sediment deposits reach approximately one half the height of the existing fence. Replace or repair the fence/berm within 24 hours of observed failure. Failure of the barrier has occurred when sediment fails to be retained because: (a) the barrier has been overtopped, undercut, or bypassed by runoff water, (b) the barrier has been moved out of position (knocked over), or (c) the geotextile has decomposed or been damaged. Maintain the barrier until the contributing area is stabilized. After the contributing area is stabilized, determine if sediment contained by the barrier requires removal or regrading and stabilization. If the depth is greater than or equal to 6 inches, regrading or removal of the accumulated sediment is required. No removal or regrading is required if sediment depth is less than 6 inches. Remove the fence by pulling up the support posts and cutting the geotextile at ground level. Regrade or remove sediment as needed, and stabilize disturbed soils.

4.2 CONSTRUCTION ENTRANCE (CE)

Maintain the entrance in a condition which will prevent tracking and washing of sediment onto paved surfaces. Provide periodic top dressing with additional stone or additional length as conditions demand. Repair any measures used to trap sediment as needed. Immediately remove all sediment spilled, dropped, washed or tracked onto paved surfaces. Roads adjacent to a construction site shall be left clean at the end of each day. If the construction entrance is being properly maintained and the action of a vehicle traveling over the stone pad is not sufficient to remove the majority of the sediment, then either (1) increase the length of the construction entrance, (2) modify the construction entrance road surface, or (3) install washing racks and associated settling area or similar devices before the vehicle enters a paved surface.

4.2.1 Washing

If most of the sediment is not removed by travel over the stone, wash tires before vehicles enter a public road. Divert wash water away from the entrance to a settling area to remove sediment.

4.3 PERMANENT SEEDING (PS)

Inspect seeded area at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater during the first growing season. Where seed has been moved or where soil erosion has occurred, determine the cause of the failure. Bird damage may be a problem if mulch was applied too thinly to protect seed. Re-seed and re-mulch. If movement was the result of wind, repair erosion damage (if any), re-apply seed and mulch, and apply mulch anchoring. If failure was caused by concentrated water, (1) install additional measure to control water and sediment movement, (2) repair erosion damage, (3) re-seed and (4) re-apply mulch with anchoring. If there is no erosion, but seed survival is less than 100 plants per square foot after 4 weeks of growth, re-seed as planting season allows. Continue inspections until at least 100 plants per square foot have grown at least 6 inches tall or until the first mowing.

4.4 MULCH FOR SEED (MS)

Inspect mulched areas at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater until the grass has germinated to determine maintenance needs. Where mulch has been moved or where soil erosion has occurred, determine the cause of the failure. If it was the result of wind, then repair erosion damage (if any), re-apply mulch (and seed as needed) and consider applying a netting or tackifier. If mulch failure was caused by concentrating water, install additional measures to control water and sediment movement, repair erosion damage, re-apply mulch and consider applying a netting or tackifier.

4.5 CATCH BASIN INLET PROTECTION

Inspect catch basin inlet protection devices at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater to determine maintenance needs. Remove the sediment deposits when sediment deposits reach approximately one half the depth of the device. Replace or repair the device within 24 hours of observed failure. Failure of the device has occurred when sediment fails to be retained by the device because: (a) the device has been overtopped or bypassed by runoff water, (b) the device has been moved out of position, or (c) the device has decomposed or been damaged. Maintain the device until the contributing area is stabilized. After the contributing area is stabilized, remove sediment and device.

APPENDIX A: DESIGN DRAWINGS (BOUND SEPARATELY)

APPENDIX F: FREQUENTLY ASKED QUESTIONS

Tolland Solar
Frequently Asked Questions

WR-TGC Solar Generation XVI, LLC (TGC) is proposing to construct a solar development on a parcel of land owned by the Town of Tolland and located at 97 Gerber Drive. The development will provide1.3-megawatt (DC) of solar production and consist of approximately 4-acres of solar panels. The Town of Tolland selected TGC to provide this solar development through a competitive proposal process. Once the system is constructed, the Town will receive Net Metering Credits from the utility, which allows the Town to reduce their municipal electric bills based upon the amount of solar energy produced. The following document includes answers to some Frequently Asked Questions regarding solar developments.

1. **Will a natural buffer be maintained and/or landscaping provided?**
   Yes, TGC has designated areas of existing vegetation to remain as natural buffers.

2. **Does the solar development generate noise?**
   The solar panels have no moving parts and do not generate noise. The inverter and transformer equipment makes a slight humming noise, similar to a house fan. This equipment will be pad mounted in a location greater than 150 feet from residential buildings, such that the development will have no noise impact on the community.

3. **Is the public at risk of Electrical Shock or Fire**?
   In compliance with the National Electric Code, the solar development will be secured by a 7-ft high fence which prevents children and the public from coming into contact with the installations. The developer will provide knox boxes at the gate such that access can be provided for fire and emergency responders. Overall, the system is less combustible than the existing natural conditions.

4. **Do solar developments produce Electric and Magnetic Fields (EMF)**?
   PV arrays generate EMF in the same extremely low frequency (ELF) range as electrical appliances and wiring found in most homes and buildings.[1]

5. **Do solar developments produce glare?**
   Solar module glass is designed to absorb (not reflect) light and has less reflectivity than water or window glass. Many projects throughout the US and the world have been installed near airports with no impact on flight operations.[1]

6. **Will the panels break; is there a risk of contamination?**
   Solar panels are made of tempered glass, which is quite strong. They pass hail tests, and are regularly installed in Arctic and Antarctic conditions. Only in the unlikely event of a sufficiently hot fire is there a slight chance that chemicals could be released. This is unlikely because most fires are not hot enough to melt PV components and PV systems must conform to state and federal fire safety, electrical and building codes.[1]

7. **Will there be increased traffic?**
   Solar arrays are remotely monitored and have no discernable impacts on traffic. Once constructed, vehicular trips will consist of one or two vehicles per month to provide system inspections and maintenance.

8. **How long will it take to construct the system?**
   Construction is anticipated to begin in the summer of 2016 and completed in the fall.

9. **What is the life expectancy?**
   A typical solar development has a life expectancy of 20-30 years. As part of the agreement with the Town of Tolland, TGC will provide a Decommissioning Bond posted three years prior to the end of the contract, equal to the cost of the removal of the array and restoration of the site at the end of the term.

[1] MassDEP. "Questions and Answers: Ground-Mounted Solar Photovoltaic Systems." June 2015. Web. 19 February 2016. http://www.mass.gov/eea/docs/doer/renewables/solar/solar-pv-guide.pdf

APPENDIX G: STORMWATER FIGURES & CALCULATIONS

24x36 SHEET
1:1

N/F
SILVAS REAL ESTATE, LLC

SP1

1S

2S

SP2

N/F
TOMLEN LLC

LIMIT OF GROUND SURVEY

NO ACCESS

WOODS

LIGHT WOODS

GRAVEL PILE

BOULDERS

25' SIDE SETBACK

15' FRONT SETBACK

GERBER DRIVE

ALVA COURT

AT&T 5659

SANITARY MANHOLE
T.F. = 644.77
INVERT = 636.3

CATCH BASIN
T.F. = 647.58
INV E = 643.9
INV S = 643.8

SBC 5660

SBC 5661

AT&T 5661S

HYDRANT

CATCH BASIN
T.F. = 647.32
INV N = 643.6

BIT CURBING

CATCH BASIN
T.F. = 641.65
SUMP = 633.0
INV E = 634.50
INV S = 634.55

CATCH BASIN
T.F. = 642.30
SUMP = 633.1
INV W = 635.40
INV E = 635.35
INV N = 635.60

FLARED END STRUCTURE
28" x 45"
INV 15" CPP = 638.07
INV FL/END = 638.59

PROPOSED 40' WIDE EASEMENT IN FAVOR OF THE TOWN OF TOLLAND, YANKEE GAS CO., CONNECTICUT WATER CO AND LAND OF TOMLIN

SANITARY MANHOLE
T.F. = 647.97
INVERT = 639.6

CATCH BASIN
T.F. =650.94
SUMP = 642.7
INV N = 645.84
INV SE = 645.79
INV W = 645.74

BIT PARKING

CATCH BASIN
T.F. = 654.63
SUMP = 648.4
INV W = 650.23
INV S = 650.18

12" CPP

DBL CATCH BASIN
T.F. = 658.63
SUMP = 652.9
INV W = 653.55
INV SE = 653.21

SURVEY CONTROL POINT
PK MASONRY NAIL
N 873221.261
E 1091444.041
ELEV = 659.119

SANITARY MANHOLE
T.F. = 670.86
NO ACCESS

SANITARY MANHOLE
T.F. = 672.25
NO ACCESS

SURVEY CONTROL POINT
PK MASONRY NAIL
N 873361.660
E 1091469.177
ELEV = 669.640

STORMWATER LEGEND

1S	SUBWATERSHED AREAS
	TIME OF CONCENTRATION (Tc) FLOW LINE
	LIMIT OF DRAINAGE AREA
SP1	STUDY POINT

40' 0 40' 80'

BAR SCALE
1" = 40'
CHECK GRAPHIC SCALE BEFORE USING

1520 Highland Avenue
Cheshire, Connecticut 06410
888.265.8969 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS
WOODARD & CURRAN

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STATE OF CONNECTICUT
ALAN J. BAGLIO
LICENSED PROFESSIONAL ENGINEER

REV	DESCRIPTION	DATE

DESIGNED BY: DLC
DRAWN BY: JBC
CHECKED BY: AJB
228051.02 10X.dwg

PRE-DEVELOPMENT DRAINAGE AREA FIGURE EXISTING CONDITIONS

WR-TGC SOLAR GENERATION XVI, LLC
C/O TRUE GREEN CAPITAL MANAGEMENT
1 SOUTH MAIN STREET, 3RD FLOOR
WESTPORT, CONNECTICUT 06880

TGC SOLAR 2
97 GERBER DRIVE
TOLLAND, CT 06084

JOB NO.: 228051.01
DATE: MAY 2016
SCALE: 1" = 40'
SHEET: 1 OF 3

PRE1

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24x36 SHEET
1:1

N/F
SILVAS REAL ESTATE, LLC

LIMIT OF GROUND SURVEY

NO ACCESS

WOODS

LIGHT WOODS

GERBER DRIVE

AT&T 5659

SANITARY MANHOLE
T.F. = 644.77
INVERT = 636.3

CATCH BASIN
T.F. = 647.58
INV E = 643.9
INV S = 643.8

SBC 5660

SP3

SBC 5661

AT&T 5661S

HYDRANT

CATCH BASIN
T.F. = 647.32
INV N = 643.6

BIT CURBING

25' FRONT SETBACK

25' SIDE SETBACK

CATCH BASIN
T.F. = 641.65
SUMP = 633.0
INV E = 634.50
INV S = 634.55

CATCH BASIN
T.F. = 642.30
SUMP = 633.1
INV W = 635.40
INV E = 635.35
INV N = 635.60

FLARED END STRUCTURE
28" x 45"
INV 15" CPP = 638.07
INV FL/END = 638.59

PROPOSED 40' WIDE EASEMENT IN FAVOR OF THE TOWN OF TOLLAND, YANKEE GAS CO., CONNECTICUT WATER CO AND LAND OF TOMLIN

SANITARY MANHOLE
T.F. = 647.97
INVERT = 639.6

BIT PARKING

CATCH BASIN
T.F. =650.94
SUMP = 642.7
INV N = 645.84
INV SE = 645.79
INV W = 645.74

CATCH BASIN
T.F. = 654.63
SUMP = 648.4
INV W = 650.23
INV S = 650.18

DBL CATCH BASIN
T.F. = 658.63
SUMP = 652.9
INV W = 653.55
INV SE = 653.21

12" CPP

SURVEY CONTROL POINT
PK MASONRY NAIL
N 873221.261
E 1091444.041
ELEV = 659.119

SURVEY CONTROL POINT
PK MASONRY NAIL
N 873361.660
E 1091469.177
ELEV = 669.640

GRAVEL PILE

SANITARY MANHOLE
T.F. = 670.86
NO ACCESS

SANITARY MANHOLE
T.F. = 672.25
NO ACCESS

ALVA COURT

N/F
TOMLEN LLC

BOULDERS

3S

A

B

C

STORMWATER LEGEND

1S	SUBWATERSHED AREAS
	TIME OF CONCENTRATION (Tc) FLOW LINE
	LIMIT OF DRAINAGE AREA
SP1	STUDY POINT

40' 0 40' 80'

BAR SCALE
1" = 40'
CHECK GRAPHIC SCALE BEFORE USING

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STATE OF CONNECTICUT
ALAN J. BAGLIERI
EXPIRES 12/31/2017
LICENSED PROFESSIONAL ENGINEER

REV	DESCRIPTION	DATE

DESIGNED BY: DJC
DRAWN BY: JBC
CHECKED BY: AJB
228051.02 10X.dwg

PRE-DEVELOPMENT DRAINAGE AREA FIGURE 2008 POND DESIGN

WR-TGC SOLAR GENERATION XVI, LLC
C/O TRUE GREEN CAPITAL MANAGEMENT
10 MIDDLE STREET, 15TH FLOOR
WESTPORT, CONNECTICUT 06880

TGC SOLAR 2
97 GERBER DRIVE
TOLLAND, CT 06084

JOB NO.: 228051.01
DATE: MAY 2016
SCALE: 1" = 40'
SHEET: 2 OF 3

PRE2

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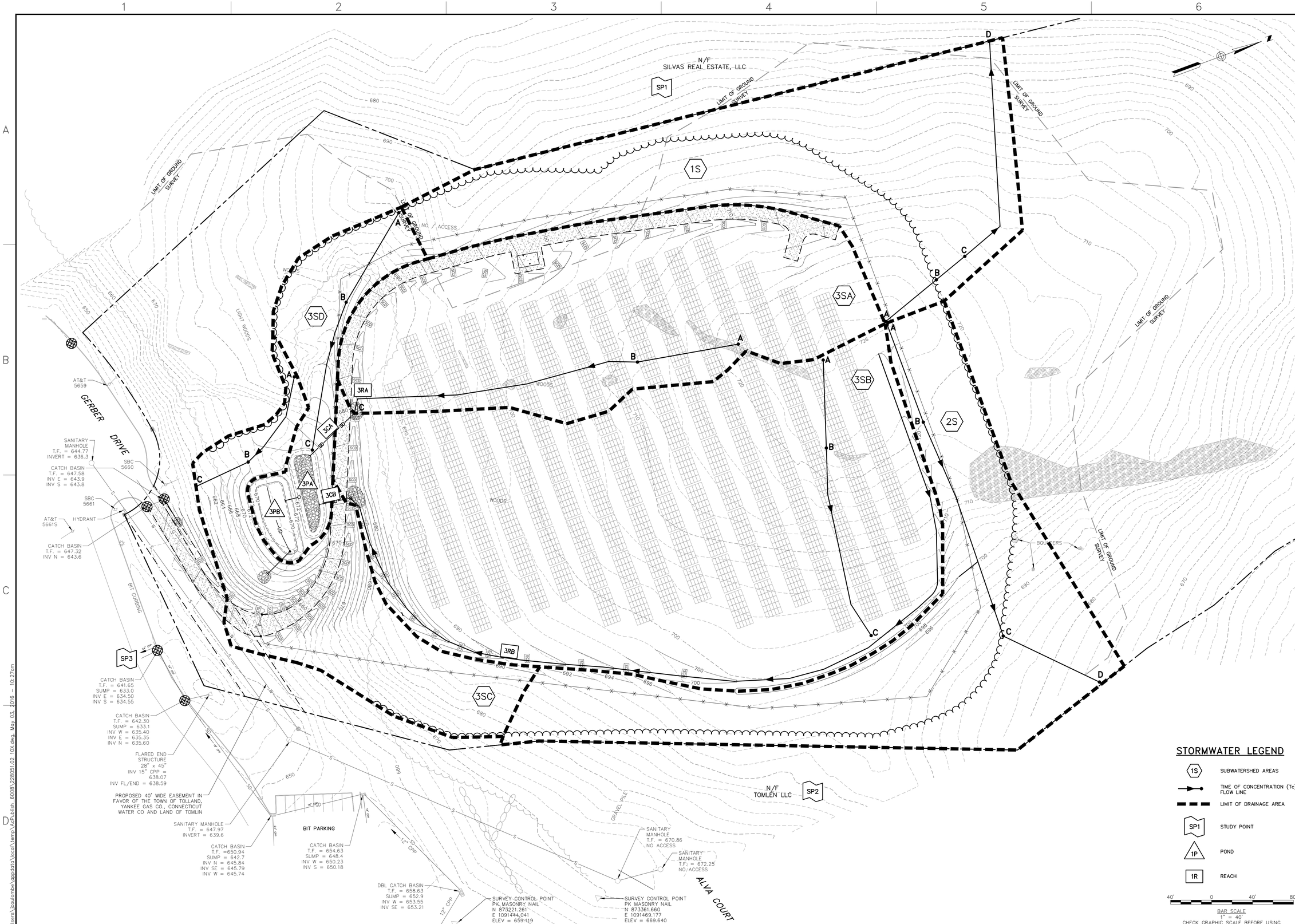

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STATE OF CONNECTICUT
ALAN J. BAGLIO
LICENSED PROFESSIONAL ENGINEER
No. 28461

REV.	DESCRIPTION	DATE

DESIGNED BY: DLC
DRAWN BY: JBC
CHECKED BY: AJB
228051.02_10X.dwg

POST-DEVELOPMENT DRAINAGE AREA FIGURE

WR-TGC SOLAR GENERATION XVI, LLC
C/O TRUE GREEN CAPITAL MANAGEMENT
1 BEACH STREET, SUITE 201
WESTPORT, CONNECTICUT 06880

TGC SOLAR 2
97 GERBER DRIVE
TOLLAND, CT 06084

JOB NO.: 228051.01
DATE: MAY 2016
SCALE: 1" = 40'
SHEET: 3 OF 3

POST

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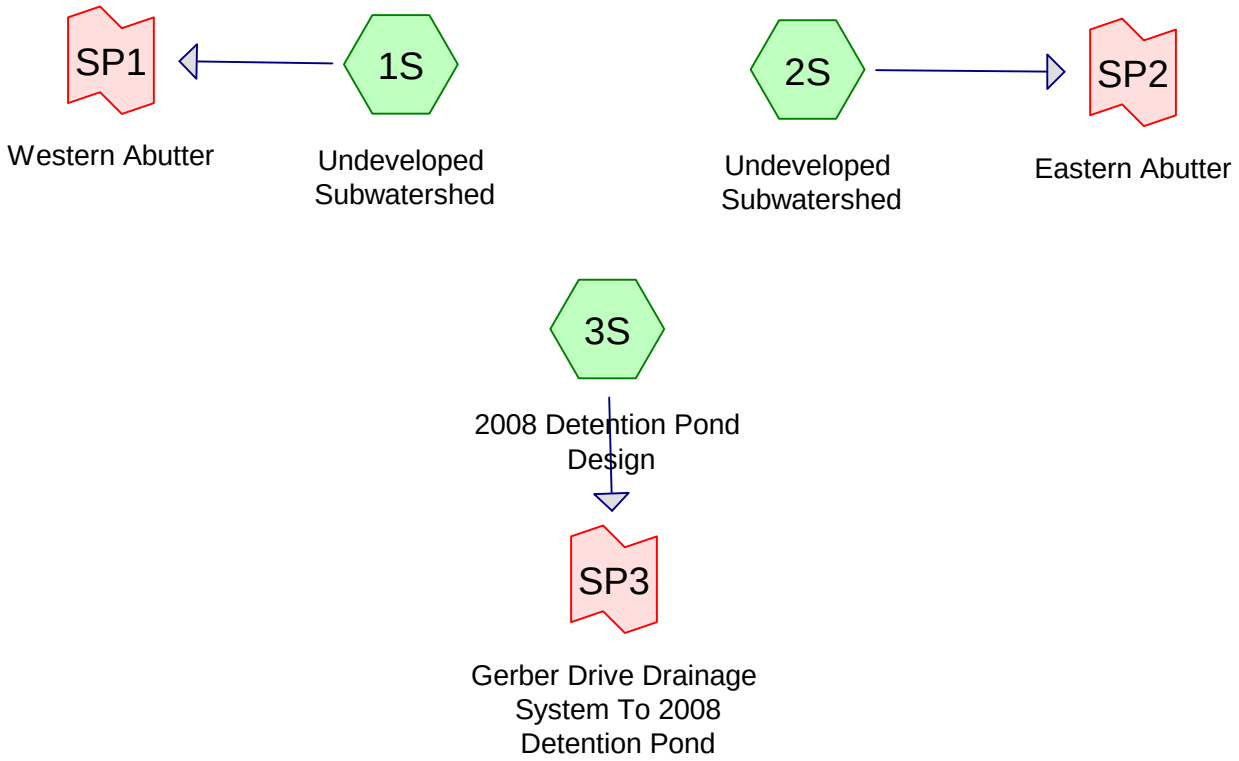
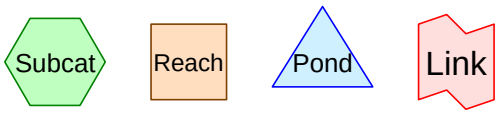




Routing Diagram for 2a. Pre
Prepared by Woodard & Curran, Printed 5/5/2016
HydroCAD® 10.00-15 s/n 01204 © 2015 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Undeveloped Runoff Area=120,388 sf 0.74% Impervious Runoff Depth>0.25"
Flow Length=289' Tc=13.6 min CN=55 Runoff=0.3 cfs 0.057 af

Subcatchment 2S: Undeveloped Runoff Area=153,765 sf 1.21% Impervious Runoff Depth>0.28"
Flow Length=500' Tc=18.8 min CN=56 Runoff=0.4 cfs 0.082 af

Subcatchment 3S: 2008 Detention Pond Runoff Area=250,053 sf 31.18% Impervious Runoff Depth>0.73"
Flow Length=828' Tc=6.5 min CN=68 Runoff=4.1 cfs 0.350 af

Link SP1: Western Abutter Inflow=0.3 cfs 0.057 af
Primary=0.3 cfs 0.057 af

Link SP2: Eastern Abutter Inflow=0.4 cfs 0.082 af
Primary=0.4 cfs 0.082 af

Link SP3: Gerber Drive Drainage System To 2008 Detention Pond Inflow=4.1 cfs 0.350 af
Primary=4.1 cfs 0.350 af

Total Runoff Area = 12.034 ac Runoff Volume = 0.489 af Average Runoff Depth = 0.49"
84.60% Pervious = 10.181 ac 15.40% Impervious = 1.853 ac

Summary for Subcatchment 1S: Undeveloped Subwatershed

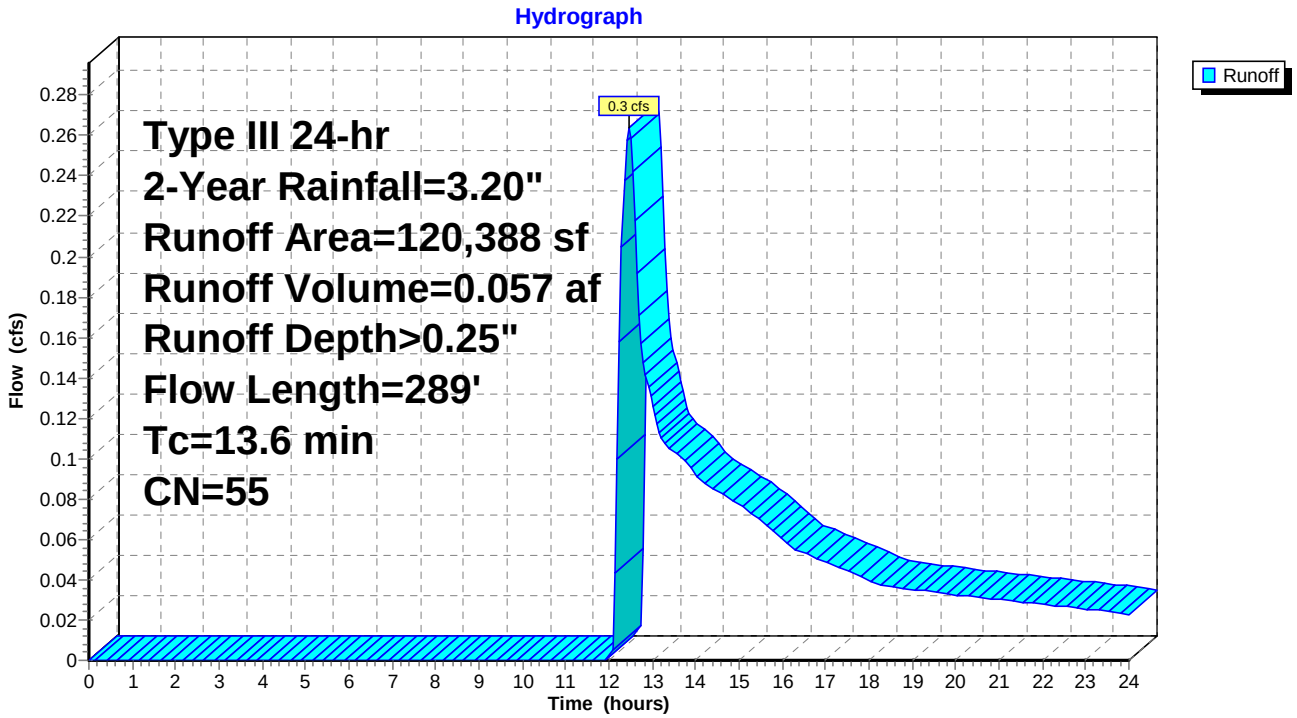
Runoff = 0.3 cfs @ 12.45 hrs, Volume= 0.057 af, Depth> 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

	Area (sf)	CN	Description
	119,501	55	Woods, Good, HSG B
*	887	98	Existing Ledge
	120,388	55	Weighted Average
	119,501		99.26% Pervious Area
	887		0.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0900	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.16"
1.8	189	0.1272	1.78		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
13.6	289	Total			

Subcatchment 1S: Undeveloped Subwatershed



Summary for Subcatchment 2S: Undeveloped Subwatershed

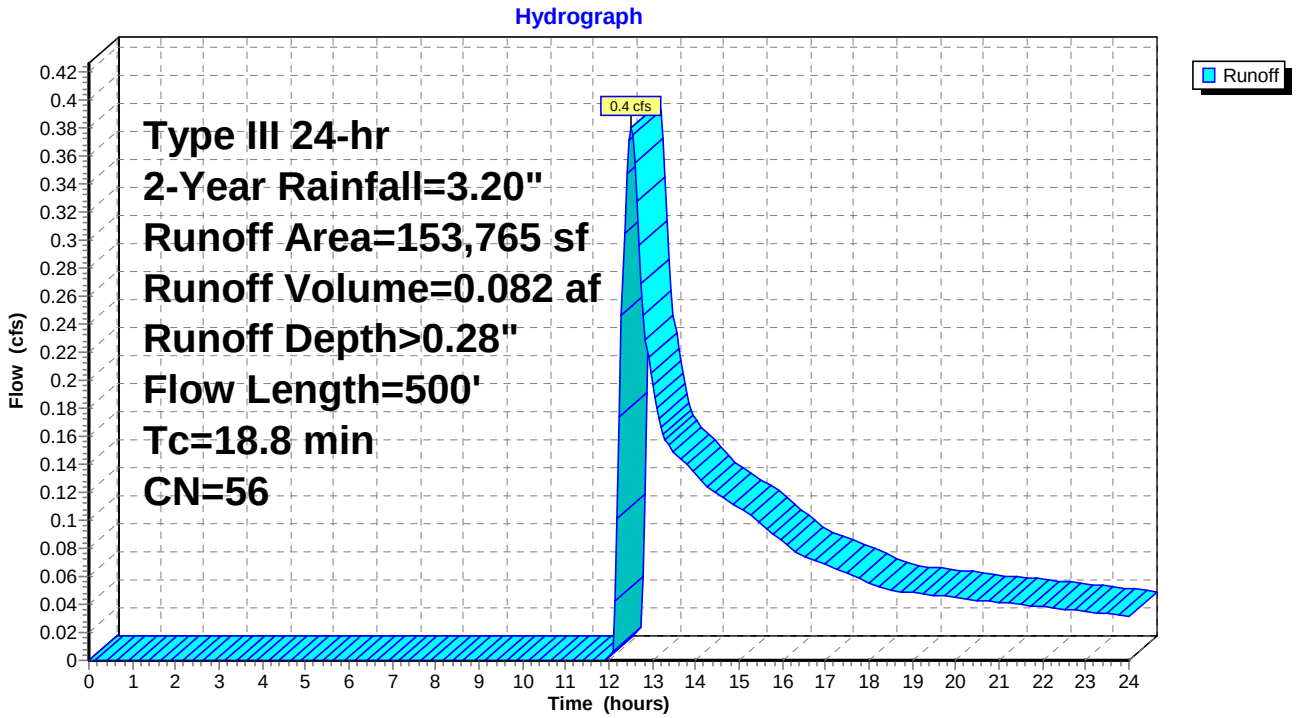
Runoff = 0.4 cfs @ 12.50 hrs, Volume= 0.082 af, Depth> 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

	Area (sf)	CN	Description
	151,898	55	Woods, Good, HSG B
*	1,867	98	Ledge
	153,765	56	Weighted Average
	151,898		98.79% Pervious Area
	1,867		1.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0500	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.16"
3.8	400	0.1233	1.76		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
18.8	500	Total			

Subcatchment 2S: Undeveloped Subwatershed



Summary for Subcatchment 3S: 2008 Detention Pond Design

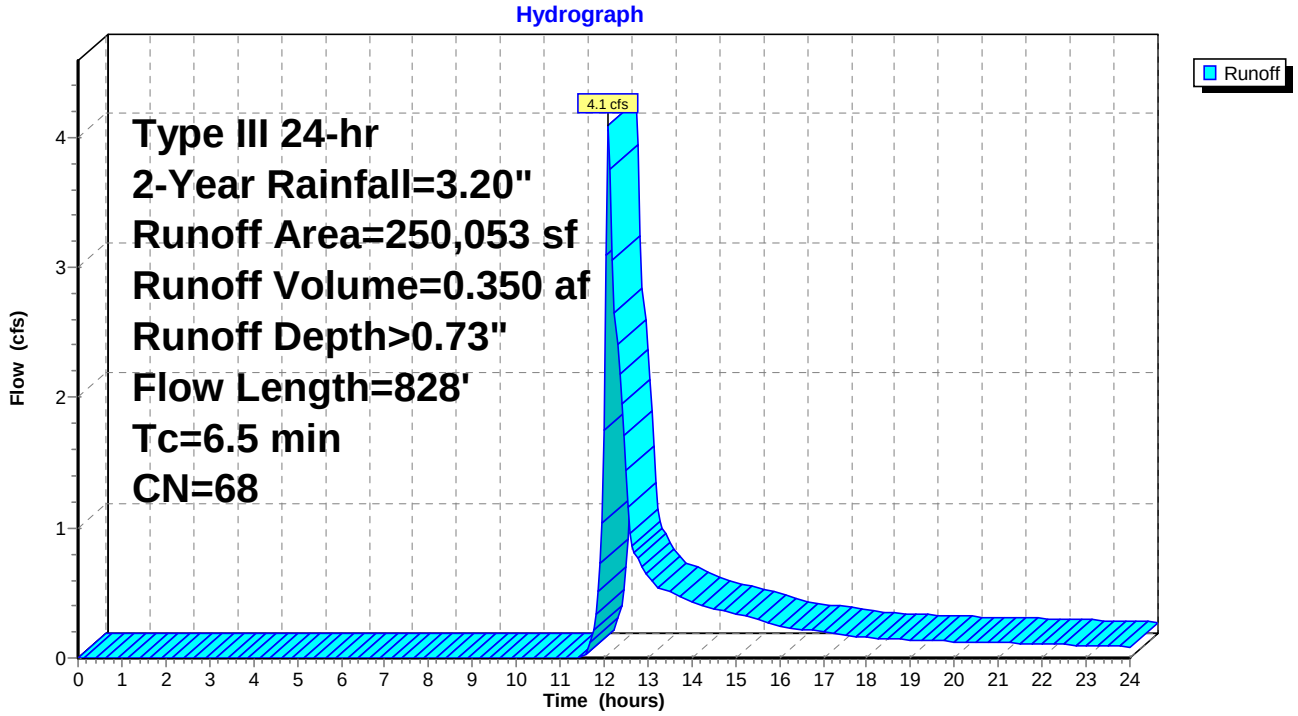
Runoff = 4.1 cfs @ 12.11 hrs, Volume= 0.350 af, Depth> 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

	Area (sf)	CN	Description
	172,087	55	Woods, Good, HSG B
*	77,966	98	Assumed Pavement & Buildings
	250,053	68	Weighted Average
	172,087		68.82% Pervious Area
	77,966		31.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.3	728	0.0769	9.18	36.71	**Trap/Vee/Rect Channel Flow, B-C** Bot.W=1.00' D=1.00' Z= 3.0 '/' Top.W=7.00' n= 0.030 Earth, grassed & winding
6.5	828	Total			

Subcatchment 3S: 2008 Detention Pond Design

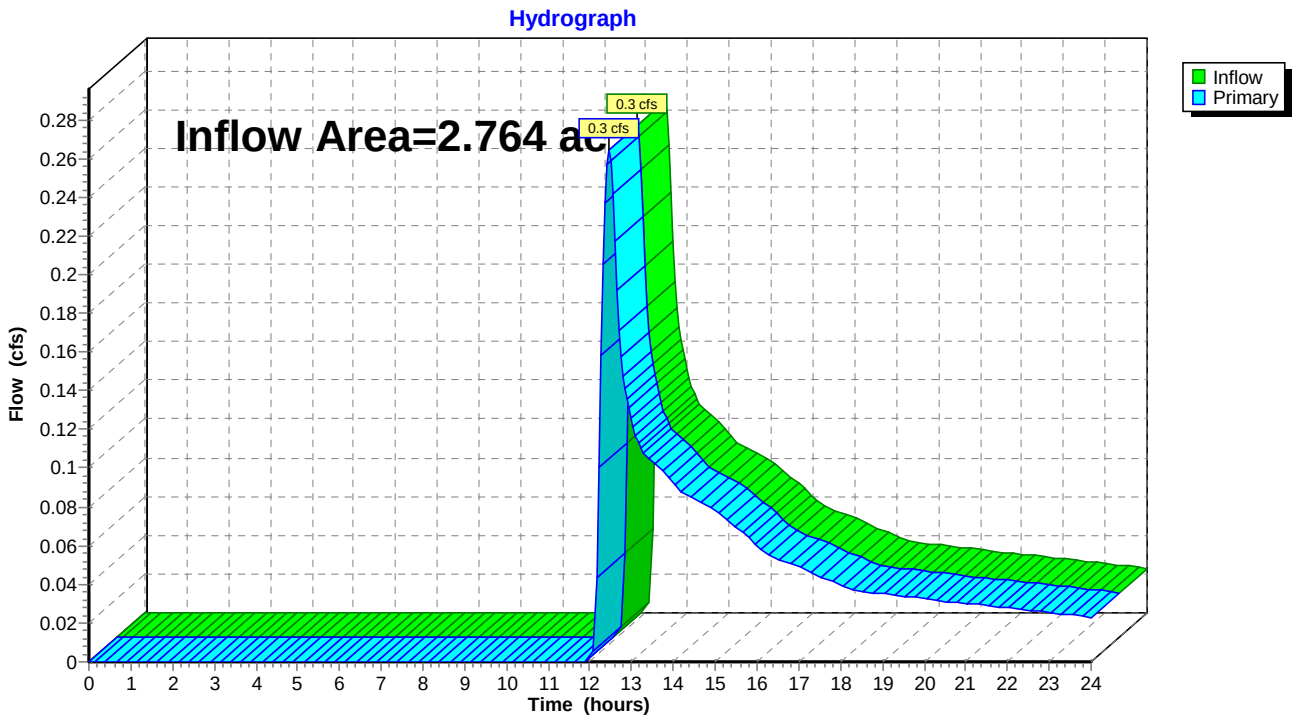


Summary for Link SP1: Western Abutter

Inflow Area = 2.764 ac, 0.74% Impervious, Inflow Depth > 0.25" for 2-Year event
Inflow = 0.3 cfs @ 12.45 hrs, Volume= 0.057 af
Primary = 0.3 cfs @ 12.45 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP1: Western Abutter

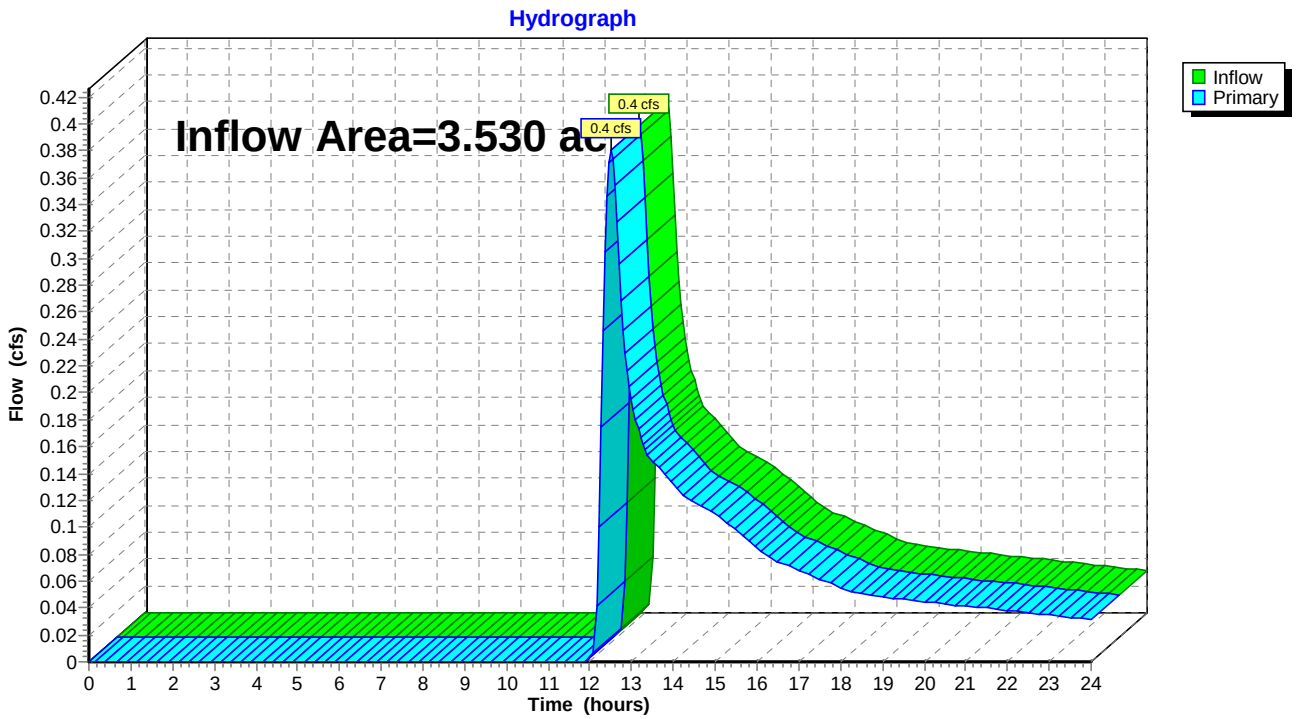


Summary for Link SP2: Eastern Abutter

Inflow Area = 3.530 ac, 1.21% Impervious, Inflow Depth > 0.28" for 2-Year event
Inflow = 0.4 cfs @ 12.50 hrs, Volume= 0.082 af
Primary = 0.4 cfs @ 12.50 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP2: Eastern Abutter

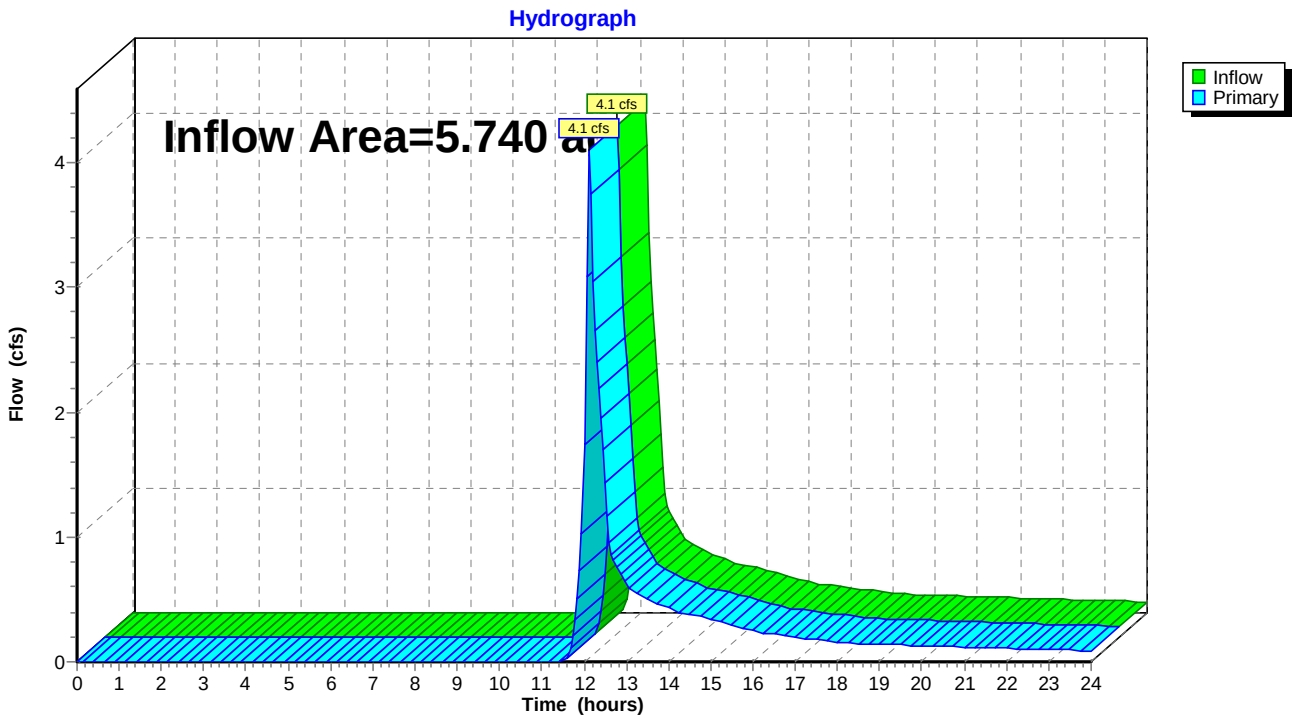


Summary for Link SP3: Gerber Drive Drainage System To 2008 Detention Pond

Inflow Area = 5.740 ac, 31.18% Impervious, Inflow Depth > 0.73" for 2-Year event
Inflow = 4.1 cfs @ 12.11 hrs, Volume= 0.350 af
Primary = 4.1 cfs @ 12.11 hrs, Volume= 0.350 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP3: Gerber Drive Drainage System To 2008 Detention Pond



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Undeveloped Runoff Area=120,388 sf 0.74% Impervious Runoff Depth>0.88"
Flow Length=289' Tc=13.6 min CN=55 Runoff=1.7 cfs 0.202 af

Subcatchment 2S: Undeveloped Runoff Area=153,765 sf 1.21% Impervious Runoff Depth>0.93"
Flow Length=500' Tc=18.8 min CN=56 Runoff=2.1 cfs 0.275 af

Subcatchment 3S: 2008 Detention Pond Runoff Area=250,053 sf 31.18% Impervious Runoff Depth>1.74"
Flow Length=828' Tc=6.5 min CN=68 Runoff=11.0 cfs 0.831 af

Link SP1: Western Abutter Inflow=1.7 cfs 0.202 af
Primary=1.7 cfs 0.202 af

Link SP2: Eastern Abutter Inflow=2.1 cfs 0.275 af
Primary=2.1 cfs 0.275 af

Link SP3: Gerber Drive Drainage System To 2008 Detention Pond Inflow=11.0 cfs 0.831 af
Primary=11.0 cfs 0.831 af

Total Runoff Area = 12.034 ac Runoff Volume = 1.308 af Average Runoff Depth = 1.30"
84.60% Pervious = 10.181 ac 15.40% Impervious = 1.853 ac

Summary for Subcatchment 1S: Undeveloped Subwatershed

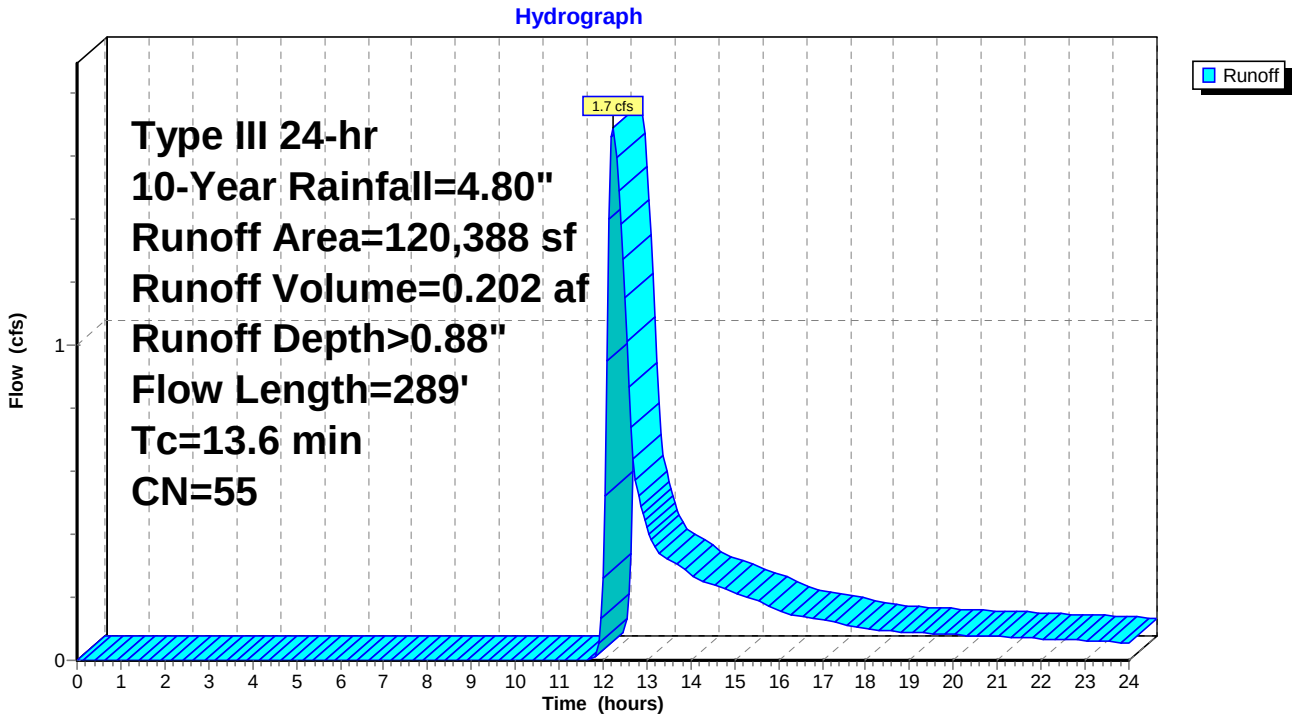
Runoff = 1.7 cfs @ 12.24 hrs, Volume= 0.202 af, Depth> 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (sf)	CN	Description
	119,501	55	Woods, Good, HSG B
*	887	98	Existing Ledge
	120,388	55	Weighted Average
	119,501		99.26% Pervious Area
	887		0.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0900	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.16"
1.8	189	0.1272	1.78		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
13.6	289	Total			

Subcatchment 1S: Undeveloped Subwatershed



Summary for Subcatchment 2S: Undeveloped Subwatershed

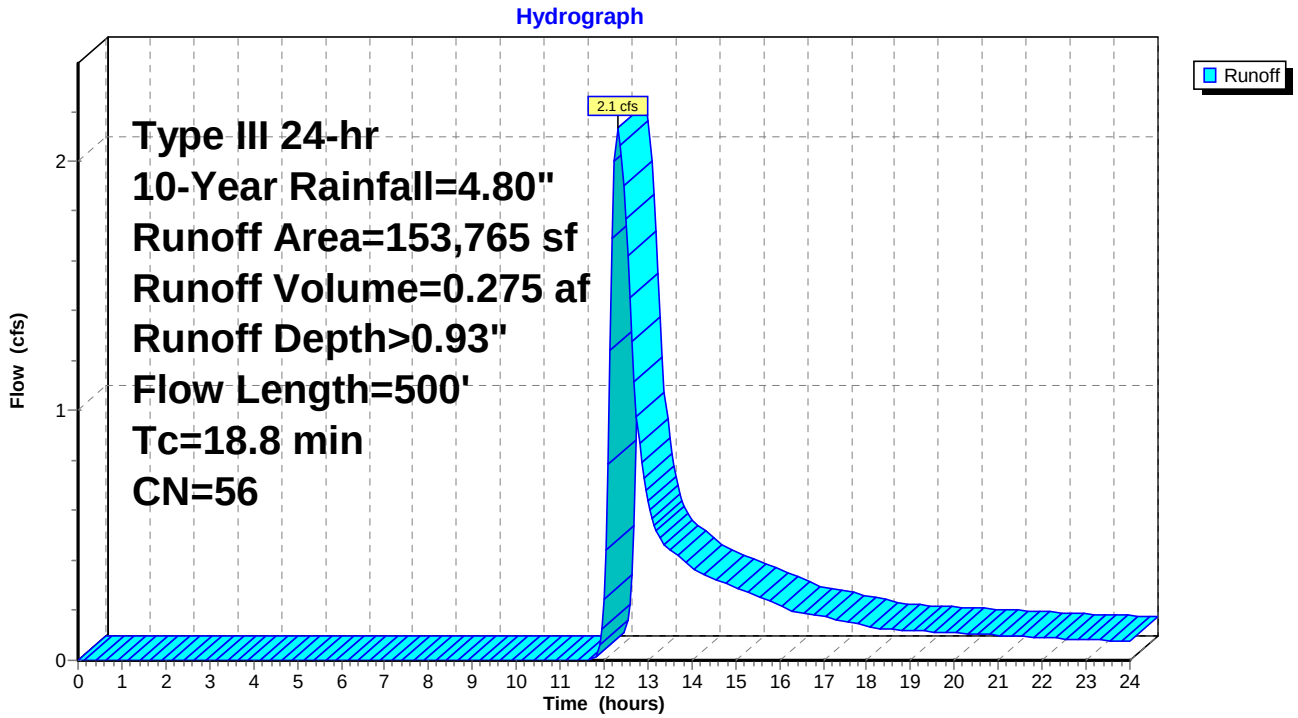
Runoff = 2.1 cfs @ 12.32 hrs, Volume= 0.275 af, Depth> 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (sf)	CN	Description
	151,898	55	Woods, Good, HSG B
*	1,867	98	Ledge
	153,765	56	Weighted Average
	151,898		98.79% Pervious Area
	1,867		1.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0500	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.16"
3.8	400	0.1233	1.76		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
18.8	500	Total			

Subcatchment 2S: Undeveloped Subwatershed



Summary for Subcatchment 3S: 2008 Detention Pond Design

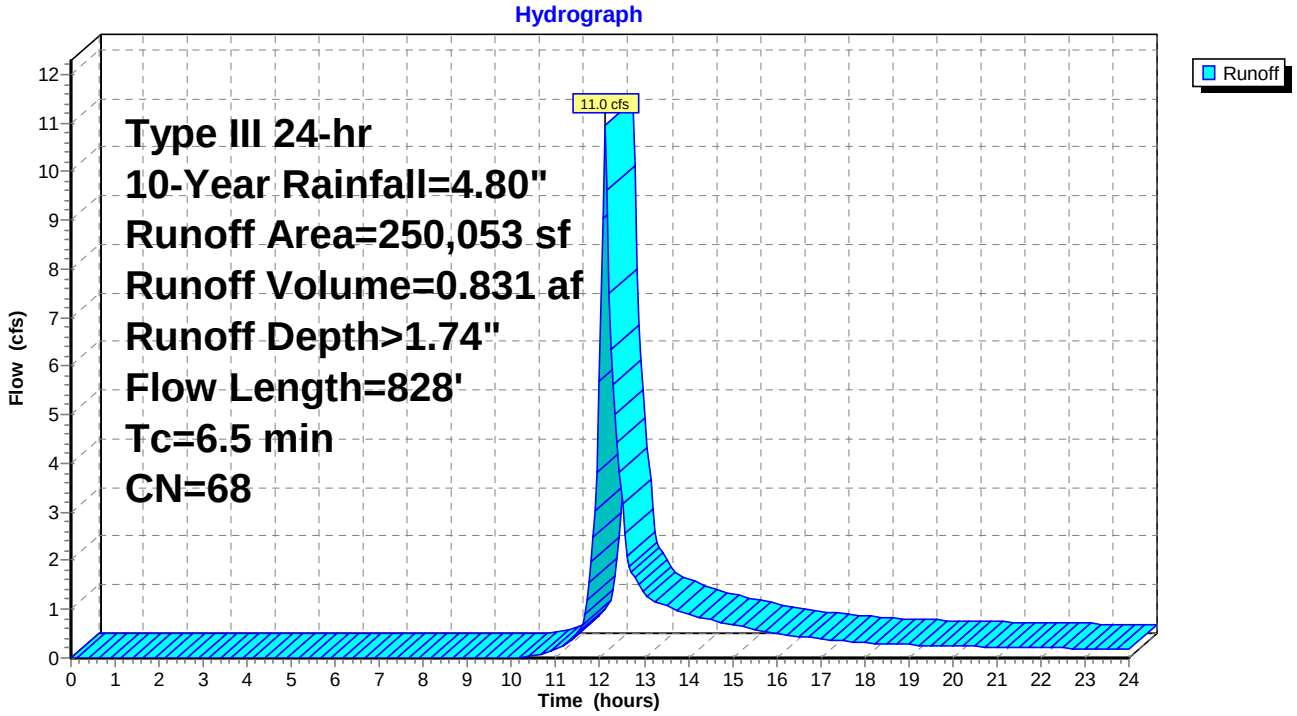
Runoff = 11.0 cfs @ 12.10 hrs, Volume= 0.831 af, Depth> 1.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (sf)	CN	Description
	172,087	55	Woods, Good, HSG B
*	77,966	98	Assumed Pavement & Buildings
	250,053	68	Weighted Average
	172,087		68.82% Pervious Area
	77,966		31.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.3	728	0.0769	9.18	36.71	**Trap/Vee/Rect Channel Flow, B-C** Bot.W=1.00' D=1.00' Z= 3.0 '/' Top.W=7.00' n= 0.030 Earth, grassed & winding
6.5	828	Total			

Subcatchment 3S: 2008 Detention Pond Design

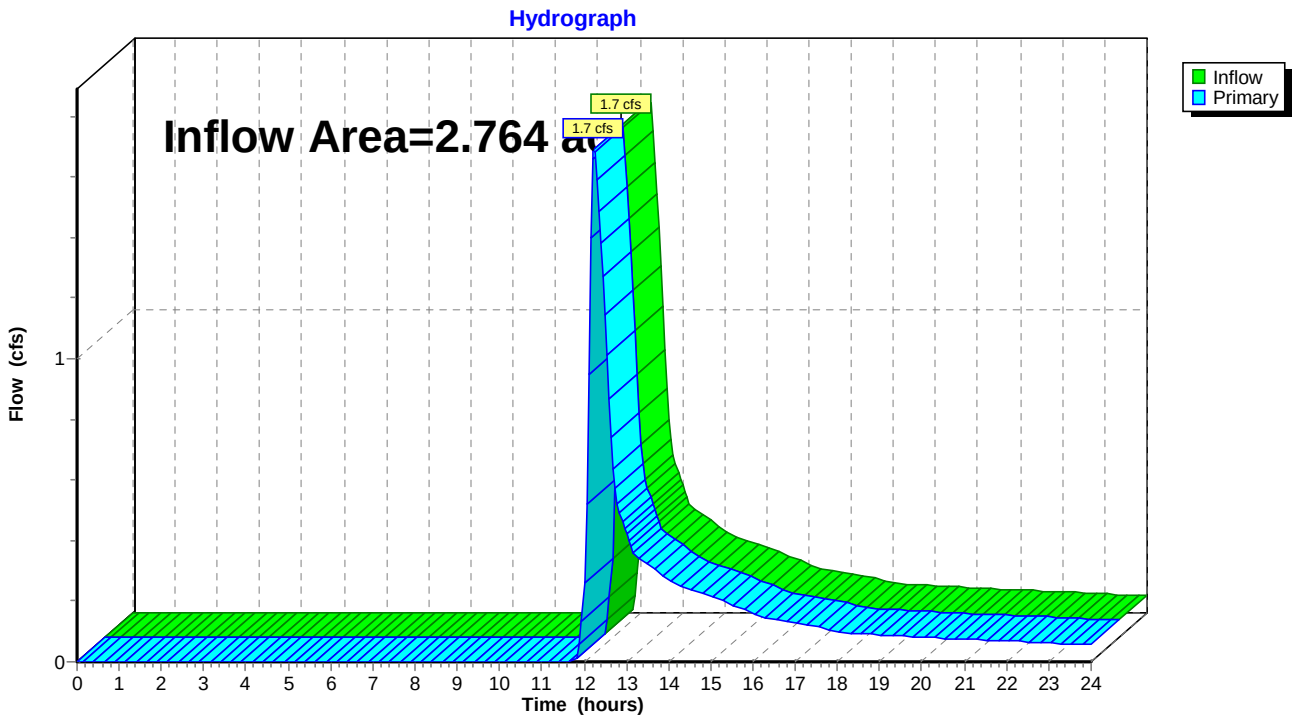


Summary for Link SP1: Western Abutter

Inflow Area = 2.764 ac, 0.74% Impervious, Inflow Depth > 0.88" for 10-Year event
Inflow = 1.7 cfs @ 12.24 hrs, Volume= 0.202 af
Primary = 1.7 cfs @ 12.24 hrs, Volume= 0.202 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP1: Western Abutter

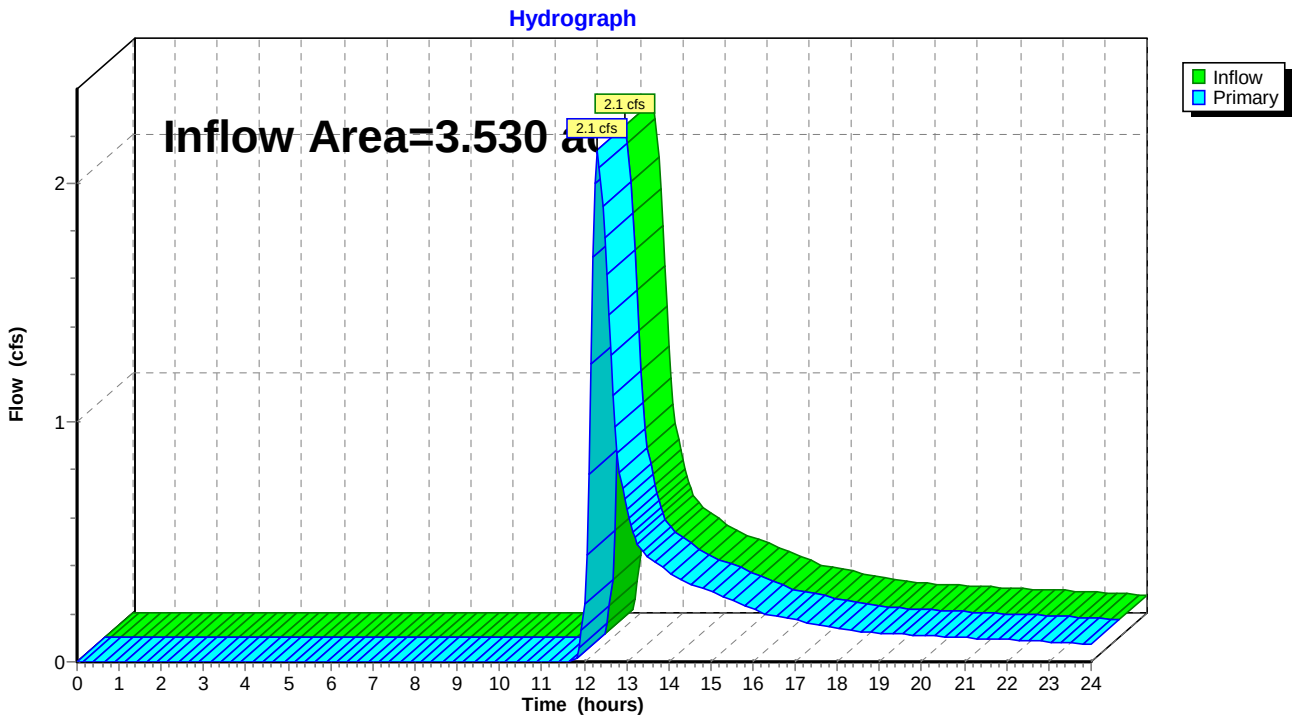


Summary for Link SP2: Eastern Abutter

Inflow Area = 3.530 ac, 1.21% Impervious, Inflow Depth > 0.93" for 10-Year event
Inflow = 2.1 cfs @ 12.32 hrs, Volume= 0.275 af
Primary = 2.1 cfs @ 12.32 hrs, Volume= 0.275 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP2: Eastern Abutter

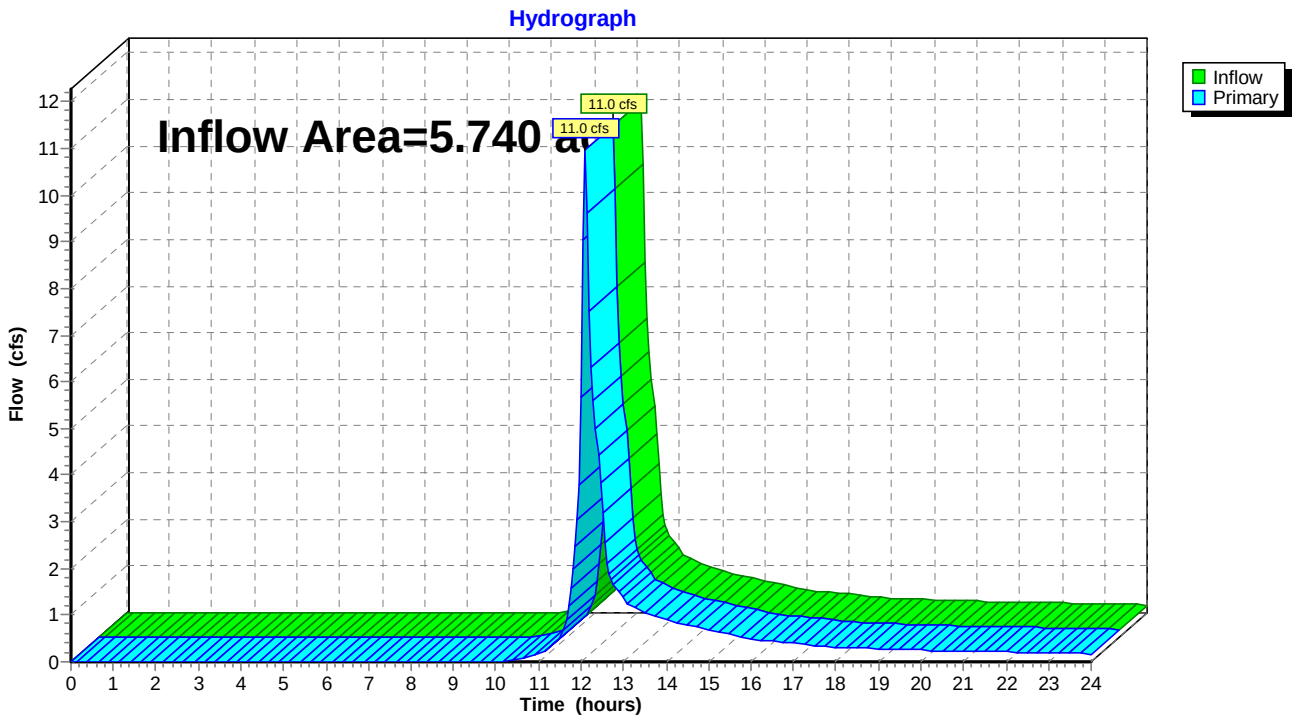


Summary for Link SP3: Gerber Drive Drainage System To 2008 Detention Pond

Inflow Area = 5.740 ac, 31.18% Impervious, Inflow Depth > 1.74" for 10-Year event
Inflow = 11.0 cfs @ 12.10 hrs, Volume= 0.831 af
Primary = 11.0 cfs @ 12.10 hrs, Volume= 0.831 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP3: Gerber Drive Drainage System To 2008 Detention Pond



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Undeveloped Runoff Area=120,388 sf 0.74% Impervious Runoff Depth>2.05"
Flow Length=289' Tc=13.6 min CN=55 Runoff=4.8 cfs 0.473 af

Subcatchment 2S: Undeveloped Runoff Area=153,765 sf 1.21% Impervious Runoff Depth>2.14"
Flow Length=500' Tc=18.8 min CN=56 Runoff=5.7 cfs 0.630 af

Subcatchment 3S: 2008 Detention Pond Runoff Area=250,053 sf 31.18% Impervious Runoff Depth>3.33"
Flow Length=828' Tc=6.5 min CN=68 Runoff=21.6 cfs 1.591 af

Link SP1: Western Abutter Inflow=4.8 cfs 0.473 af
Primary=4.8 cfs 0.473 af

Link SP2: Eastern Abutter Inflow=5.7 cfs 0.630 af
Primary=5.7 cfs 0.630 af

Link SP3: Gerber Drive Drainage System To 2008 Detention Pond Inflow=21.6 cfs 1.591 af
Primary=21.6 cfs 1.591 af

Total Runoff Area = 12.034 ac Runoff Volume = 2.694 af Average Runoff Depth = 2.69"
84.60% Pervious = 10.181 ac 15.40% Impervious = 1.853 ac

Summary for Subcatchment 1S: Undeveloped Subwatershed

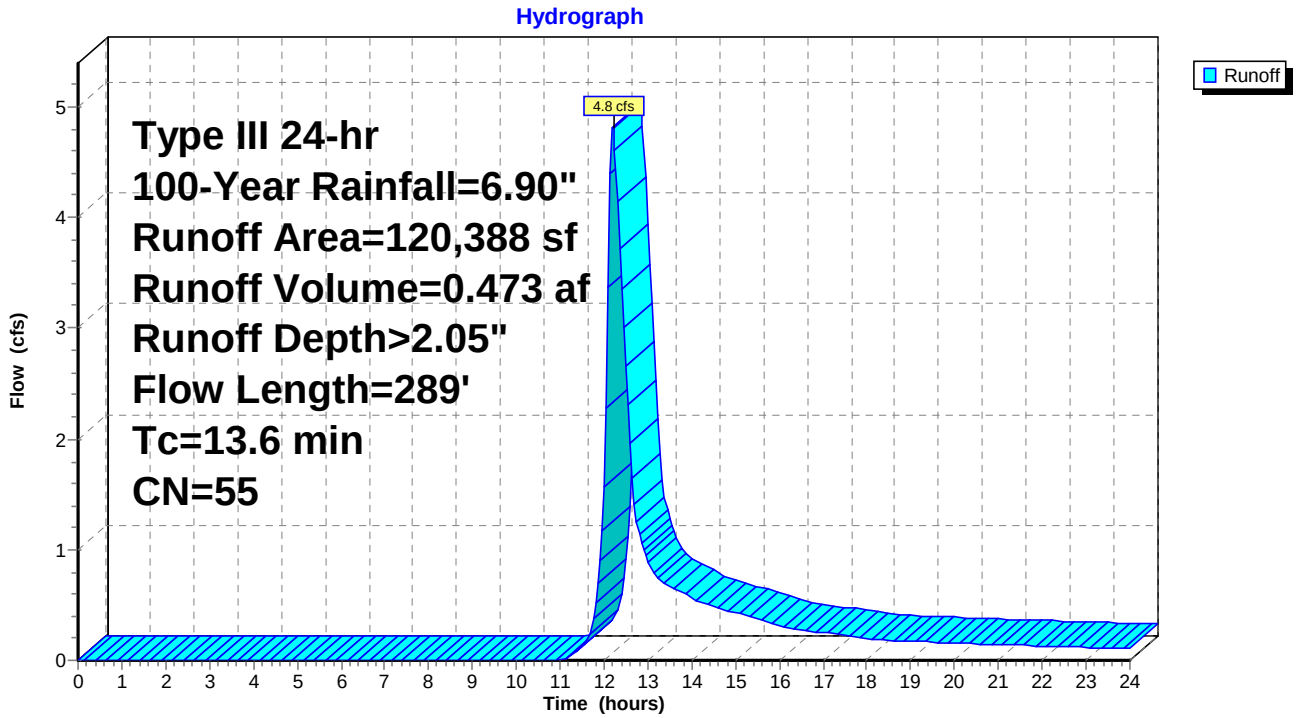
Runoff = 4.8 cfs @ 12.21 hrs, Volume= 0.473 af, Depth> 2.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.90"

	Area (sf)	CN	Description
	119,501	55	Woods, Good, HSG B
*	887	98	Existing Ledge
	120,388	55	Weighted Average
	119,501		99.26% Pervious Area
	887		0.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	100	0.0900	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.16"
1.8	189	0.1272	1.78		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
13.6	289	Total			

Subcatchment 1S: Undeveloped Subwatershed



Summary for Subcatchment 2S: Undeveloped Subwatershed

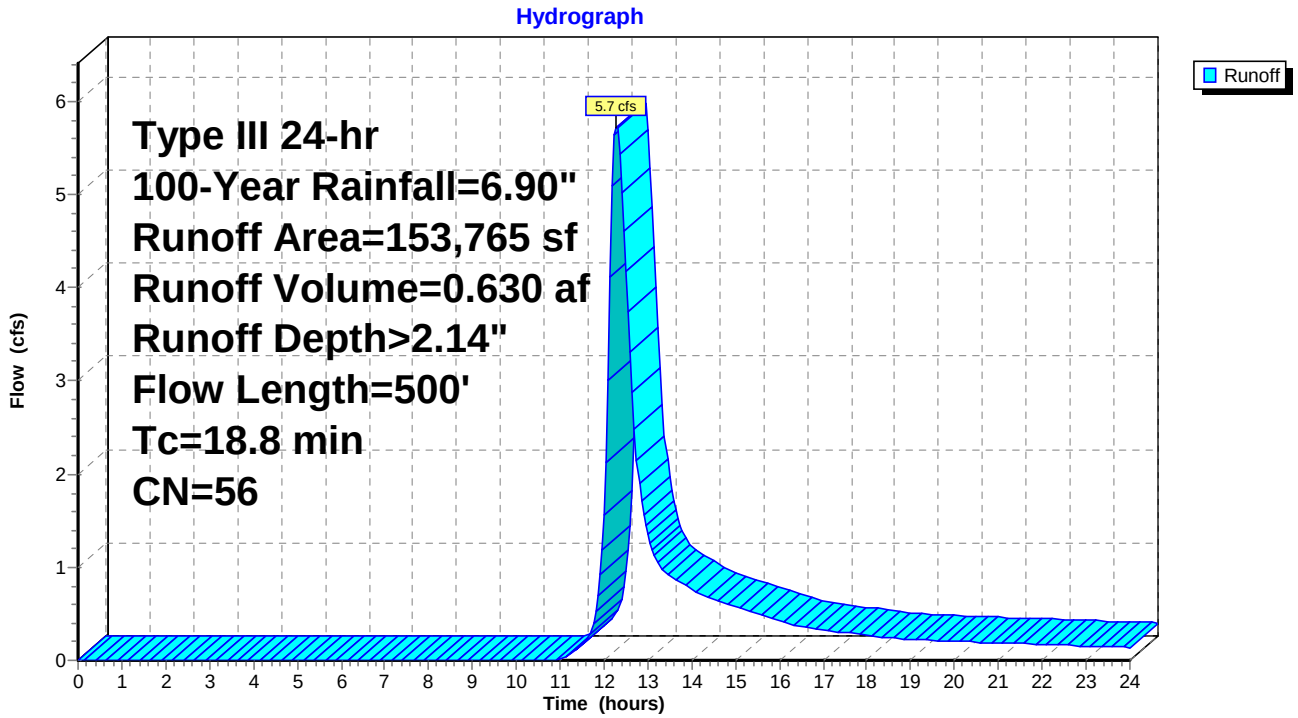
Runoff = 5.7 cfs @ 12.28 hrs, Volume= 0.630 af, Depth> 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.90"

	Area (sf)	CN	Description
	151,898	55	Woods, Good, HSG B
*	1,867	98	Ledge
	153,765	56	Weighted Average
	151,898		98.79% Pervious Area
	1,867		1.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0500	0.11		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.16"
3.8	400	0.1233	1.76		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
18.8	500	Total			

Subcatchment 2S: Undeveloped Subwatershed



Summary for Subcatchment 3S: 2008 Detention Pond Design

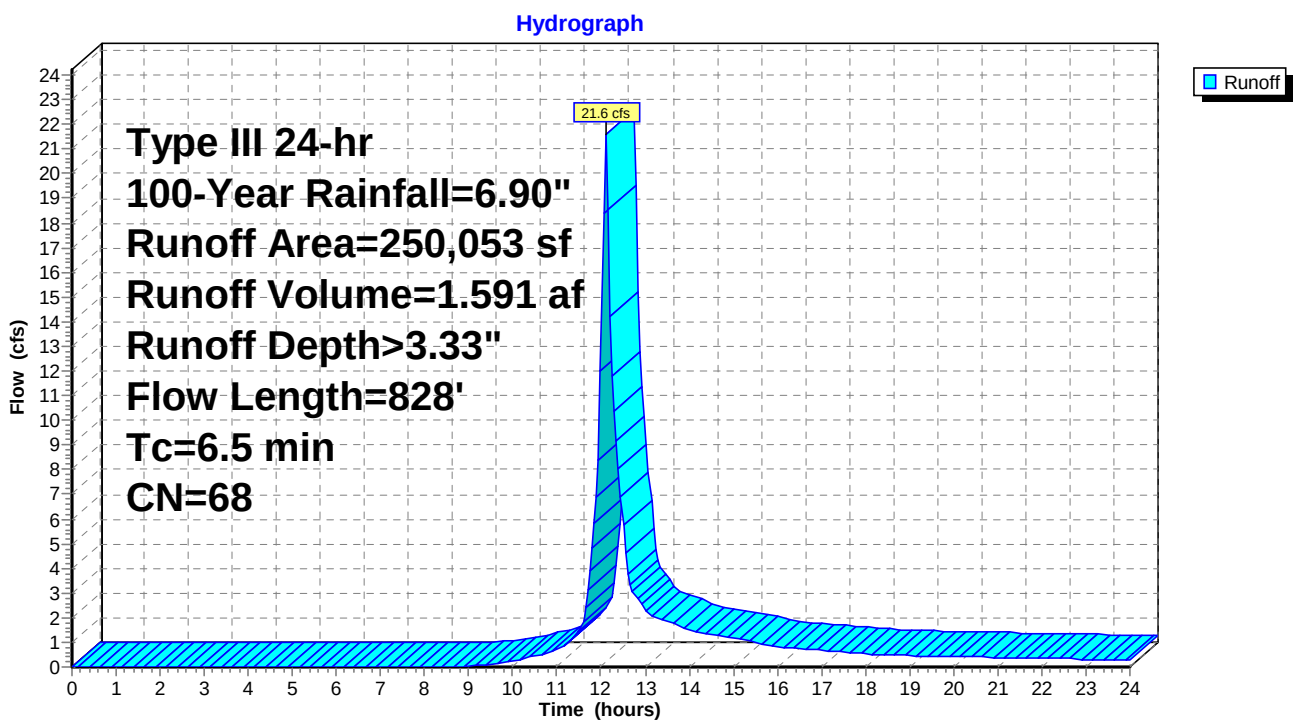
Runoff = 21.6 cfs @ 12.10 hrs, Volume= 1.591 af, Depth> 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.90"

	Area (sf)	CN	Description
	172,087	55	Woods, Good, HSG B
*	77,966	98	Assumed Pavement & Buildings
	250,053	68	Weighted Average
	172,087		68.82% Pervious Area
	77,966		31.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.1000	0.32		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.3	728	0.0769	9.18	36.71	**Trap/Vee/Rect Channel Flow, B-C** Bot.W=1.00' D=1.00' Z= 3.0 '/' Top.W=7.00' n= 0.030 Earth, grassed & winding
6.5	828	Total			

Subcatchment 3S: 2008 Detention Pond Design

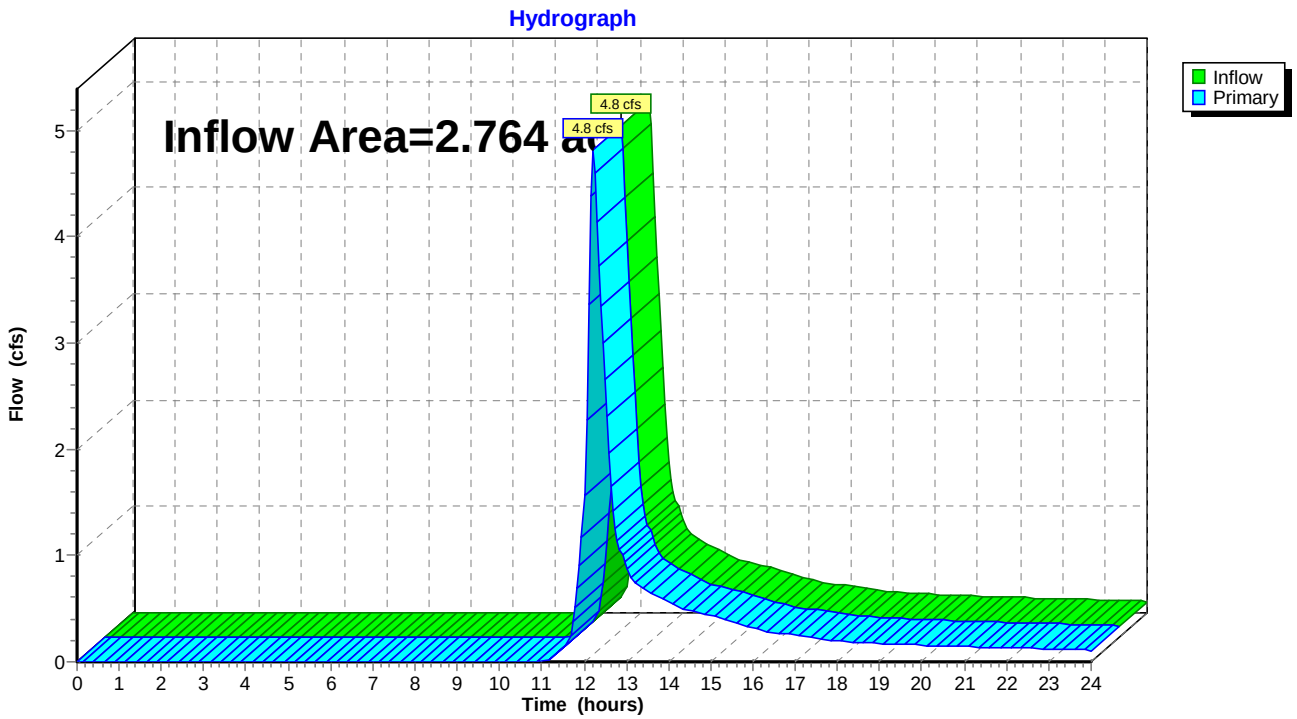


Summary for Link SP1: Western Abutter

Inflow Area = 2.764 ac, 0.74% Impervious, Inflow Depth > 2.05" for 100-Year event
Inflow = 4.8 cfs @ 12.21 hrs, Volume= 0.473 af
Primary = 4.8 cfs @ 12.21 hrs, Volume= 0.473 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP1: Western Abutter

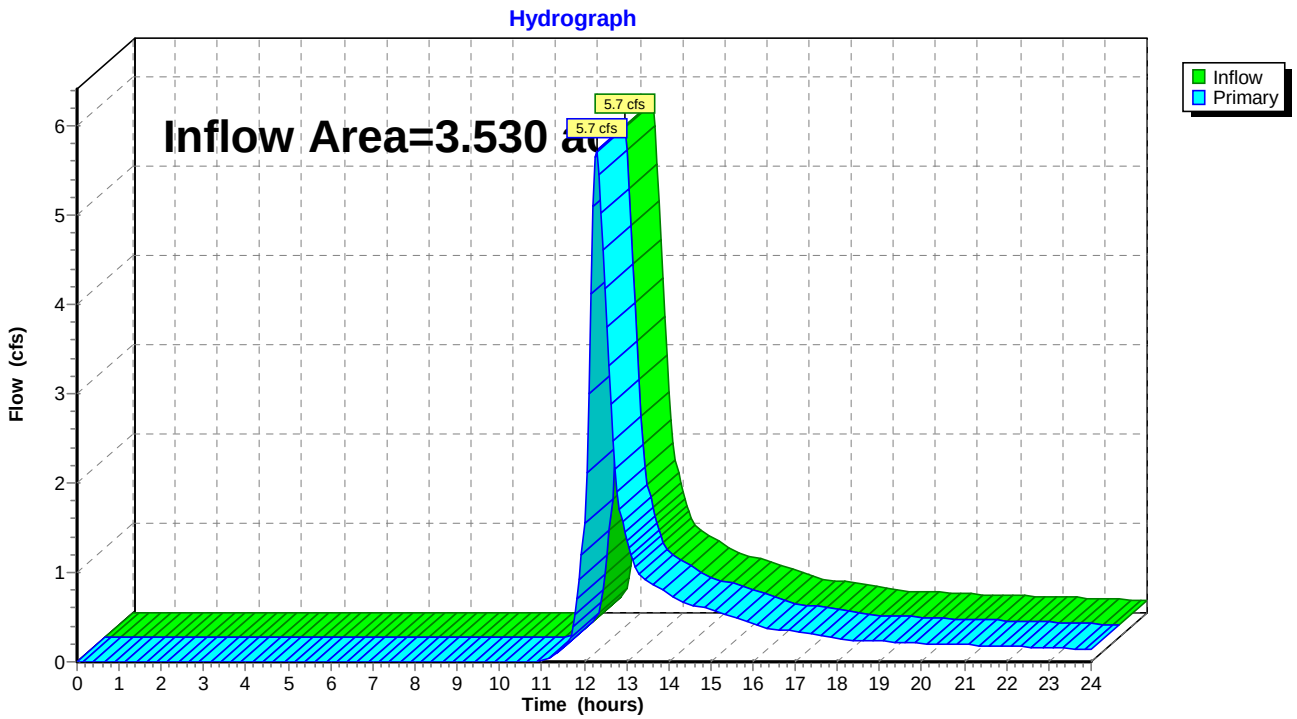


Summary for Link SP2: Eastern Abutter

Inflow Area = 3.530 ac, 1.21% Impervious, Inflow Depth > 2.14" for 100-Year event
Inflow = 5.7 cfs @ 12.28 hrs, Volume= 0.630 af
Primary = 5.7 cfs @ 12.28 hrs, Volume= 0.630 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP2: Eastern Abutter

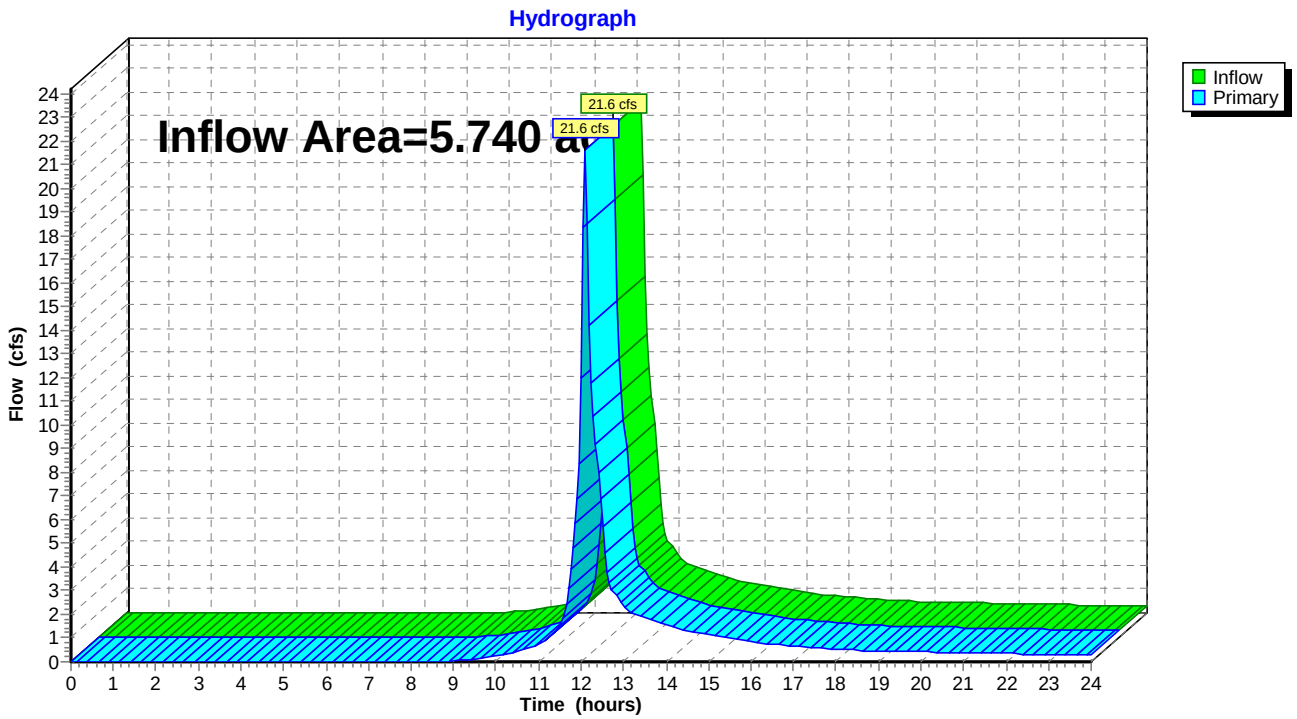


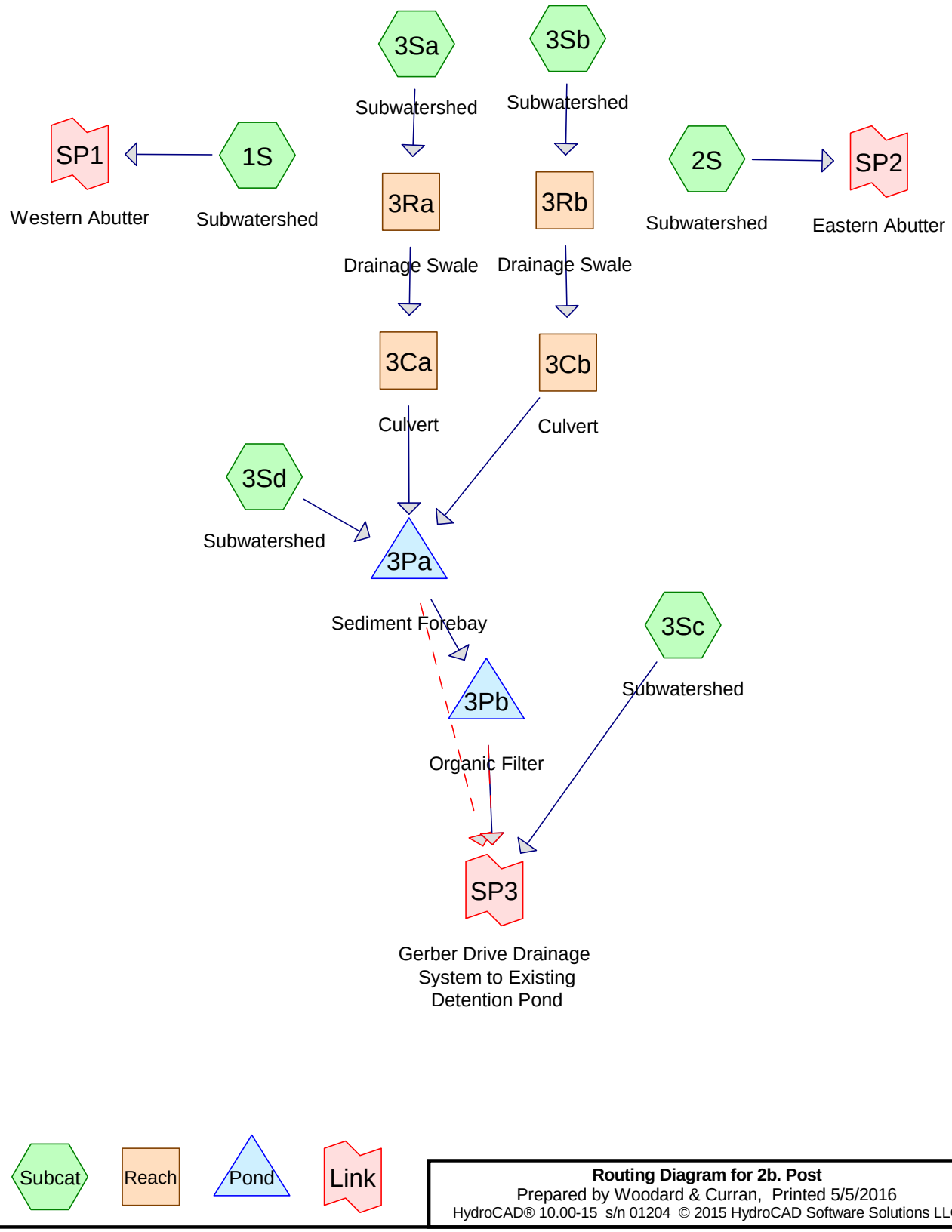
Summary for Link SP3: Gerber Drive Drainage System To 2008 Detention Pond

Inflow Area =	5.740 ac, 31.18% Impervious, Inflow Depth > 3.33" for 100-Year event				
Inflow =	21.6 cfs @ 12.10 hrs, Volume=	1.591 af			
Primary =	21.6 cfs @ 12.10 hrs, Volume=	1.591 af, Atten= 0%, Lag= 0.0 min			

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP3: Gerber Drive Drainage System To 2008 Detention Pond





Routing Diagram for 2b. Post
Prepared by Woodard & Curran, Printed 5/5/2016
HydroCAD® 10.00-15 s/n 01204 © 2015 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subwatershed Runoff Area=74,883 sf 0.00% Impervious Runoff Depth>0.34"
Flow Length=327' Tc=10.8 min CN=58 Runoff=0.3 cfs 0.049 af

Subcatchment 2S: Subwatershed Runoff Area=69,789 sf 2.48% Impervious Runoff Depth>0.41"
Flow Length=432' Tc=8.8 min CN=60 Runoff=0.4 cfs 0.054 af

Subcatchment 3Sa: Subwatershed Runoff Area=79,196 sf 13.17% Impervious Runoff Depth>0.64"
Flow Length=392' Tc=6.9 min CN=66 Runoff=1.1 cfs 0.097 af

Subcatchment 3Sb: Subwatershed Runoff Area=155,406 sf 1.21% Impervious Runoff Depth>0.44"
Flow Length=297' Tc=8.1 min CN=61 Runoff=1.1 cfs 0.132 af

Subcatchment 3Sc: Subwatershed Runoff Area=40,019 sf 7.45% Impervious Runoff Depth>0.56"
Flow Length=156' Tc=5.0 min CN=64 Runoff=0.5 cfs 0.043 af

Subcatchment 3Sd: Subwatershed Runoff Area=21,180 sf 0.00% Impervious Runoff Depth>0.44"
Flow Length=248' Tc=5.5 min CN=61 Runoff=0.2 cfs 0.018 af

Reach 3Ca: Culvert Avg. Flow Depth=0.20' Max Vel=8.78 fps Inflow=1.0 cfs 0.097 af
12.0" Round Pipe n=0.013 L=58.0' S=0.0991 '/' Capacity=11.2 cfs Outflow=1.0 cfs 0.097 af

Reach 3Cb: Culvert Avg. Flow Depth=0.25' Max Vel=5.82 fps Inflow=0.9 cfs 0.130 af
12.0" Round Pipe n=0.013 L=30.0' S=0.0333 '/' Capacity=6.5 cfs Outflow=0.9 cfs 0.130 af

Reach 3Ra: Drainage Swale Avg. Flow Depth=0.14' Max Vel=2.95 fps Inflow=1.1 cfs 0.097 af
n=0.030 L=526.0' S=0.0627 '/' Capacity=44.2 cfs Outflow=1.0 cfs 0.097 af

Reach 3Rb: Drainage Swale Avg. Flow Depth=0.14' Max Vel=2.70 fps Inflow=1.1 cfs 0.132 af
n=0.030 L=955.0' S=0.0526 '/' Capacity=40.4 cfs Outflow=0.9 cfs 0.130 af

Pond 3Pa: Sediment Forebay Peak Elev=670.99' Storage=1,959 cf Inflow=1.8 cfs 0.245 af
Primary=0.8 cfs 0.240 af Secondary=0.0 cfs 0.000 af Outflow=0.8 cfs 0.240 af

Pond 3Pb: Organic Filter Peak Elev=671.69' Storage=5,451 cf Inflow=0.8 cfs 0.240 af
Primary=0.2 cfs 0.135 af Secondary=0.0 cfs 0.000 af Outflow=0.2 cfs 0.135 af

Link SP1: Western Abutter Inflow=0.3 cfs 0.049 af
Primary=0.3 cfs 0.049 af

Link SP2: Eastern Abutter Inflow=0.4 cfs 0.054 af
Primary=0.4 cfs 0.054 af

Link SP3: Gerber Drive Drainage System to Existing Detention Pond Inflow=0.5 cfs 0.178 af
Primary=0.5 cfs 0.178 af

Total Runoff Area = 10.112 ac Runoff Volume = 0.393 af Average Runoff Depth = 0.47"
96.14% Pervious = 9.721 ac 3.86% Impervious = 0.391 ac

Summary for Subcatchment 1S: Subwatershed

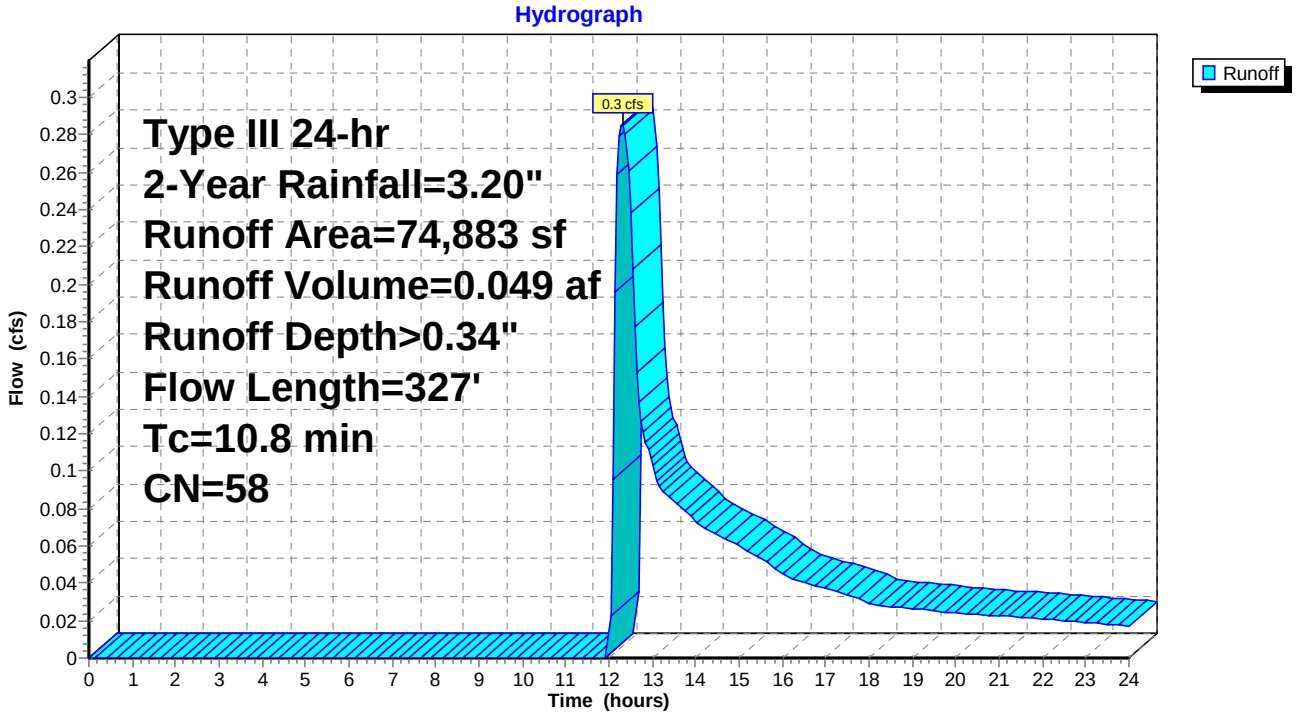
Runoff = 0.3 cfs @ 12.32 hrs, Volume= 0.049 af, Depth> 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (sf)	CN	Description
35,752	61	>75% Grass cover, Good, HSG B
39,131	55	Woods, Good, HSG B
74,883	58	Weighted Average
74,883		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	64	0.1094	0.31		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
5.4	36	0.0830	0.11		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 3.16"
1.9	227	0.1542	1.96		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
10.8	327	Total			

Subcatchment 1S: Subwatershed



Summary for Subcatchment 2S: Subwatershed

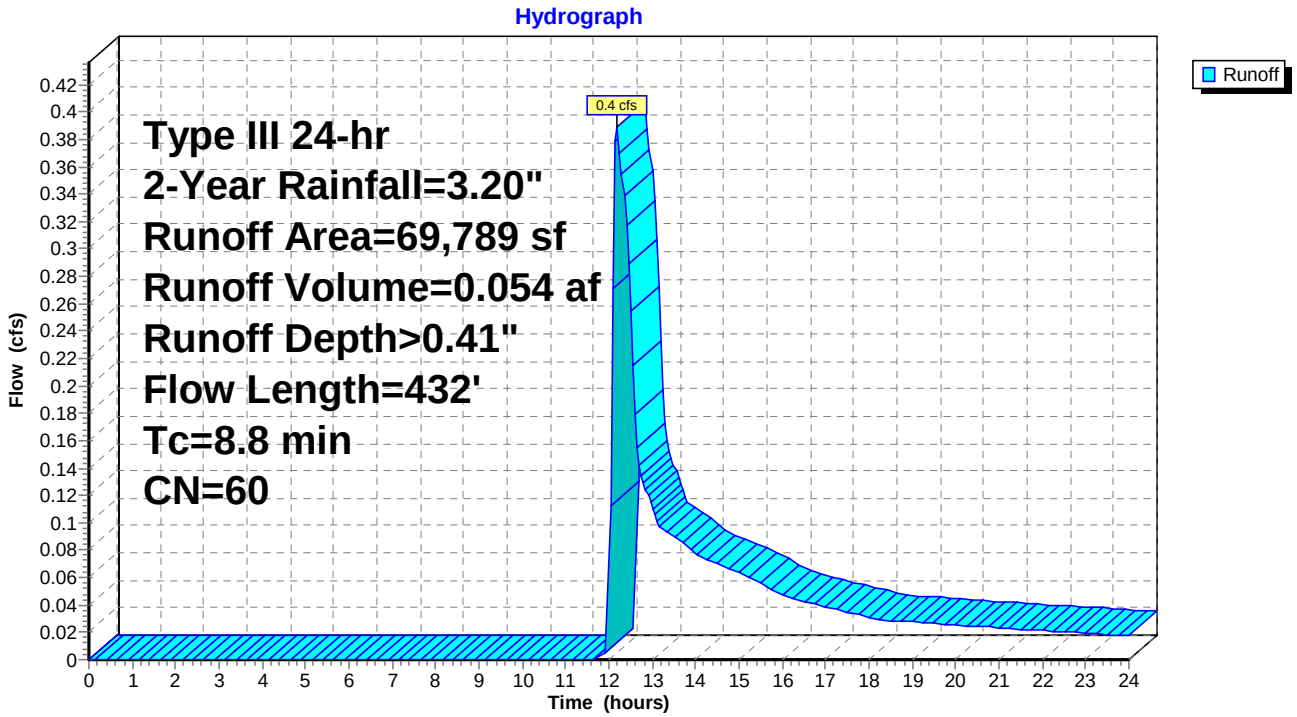
Runoff = 0.4 cfs @ 12.19 hrs, Volume= 0.054 af, Depth> 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

	Area (sf)	CN	Description
*	1,733	98	Ledge
	44,696	61	>75% Grass cover, Good, HSG B
	23,360	55	Woods, Good, HSG B
	69,789	60	Weighted Average
	68,056		97.52% Pervious Area
	1,733		2.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0600	0.26		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.4	225	0.1500	2.71		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
1.0	107	0.1215	1.74		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
8.8	432	Total			

Subcatchment 2S: Subwatershed



Summary for Subcatchment 3Sa: Subwatershed

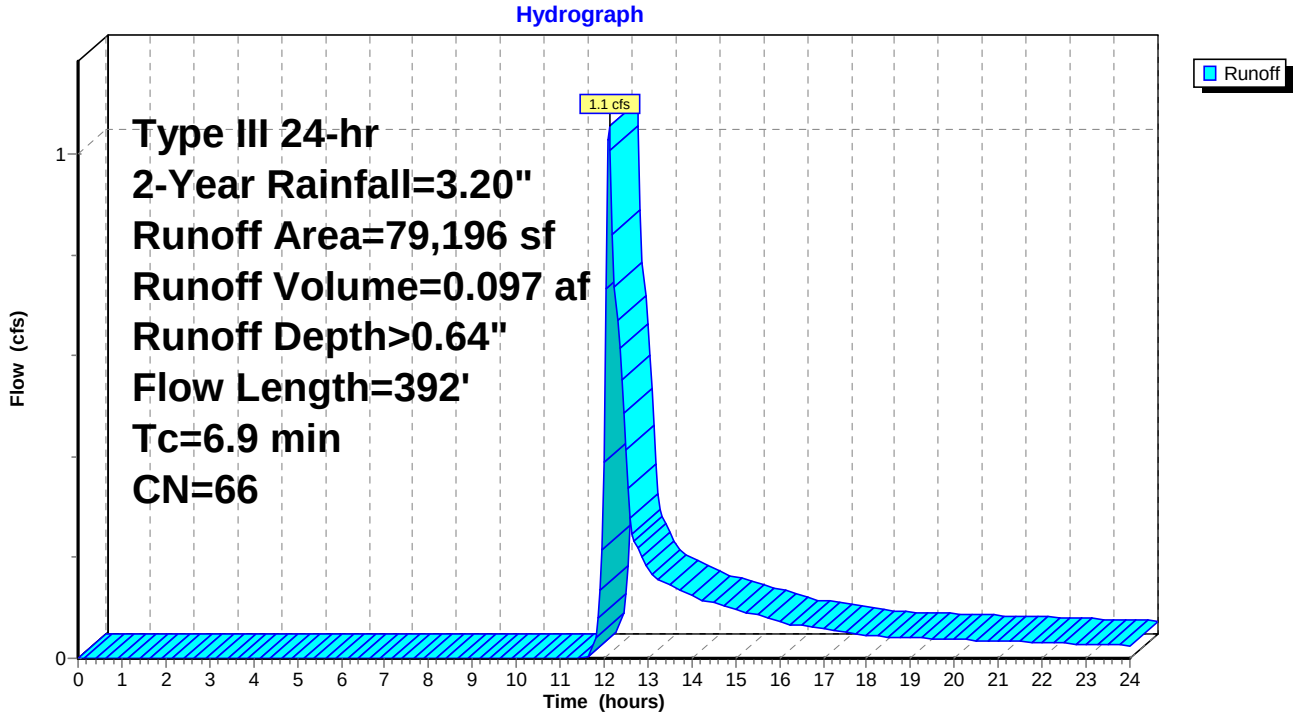
Runoff = 1.1 cfs @ 12.12 hrs, Volume= 0.097 af, Depth> 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

	Area (sf)	CN	Description
	68,767	61	>75% Grass cover, Good, HSG B
*	10,429	98	Ledge, Panel Posts, Equipment Pad, Road
	79,196	66	Weighted Average
	68,767		86.83% Pervious Area
	10,429		13.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	100	0.1200	0.35		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
2.1	292	0.1100	2.32		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.9	392	Total			

Subcatchment 3Sa: Subwatershed



Summary for Subcatchment 3Sb: Subwatershed

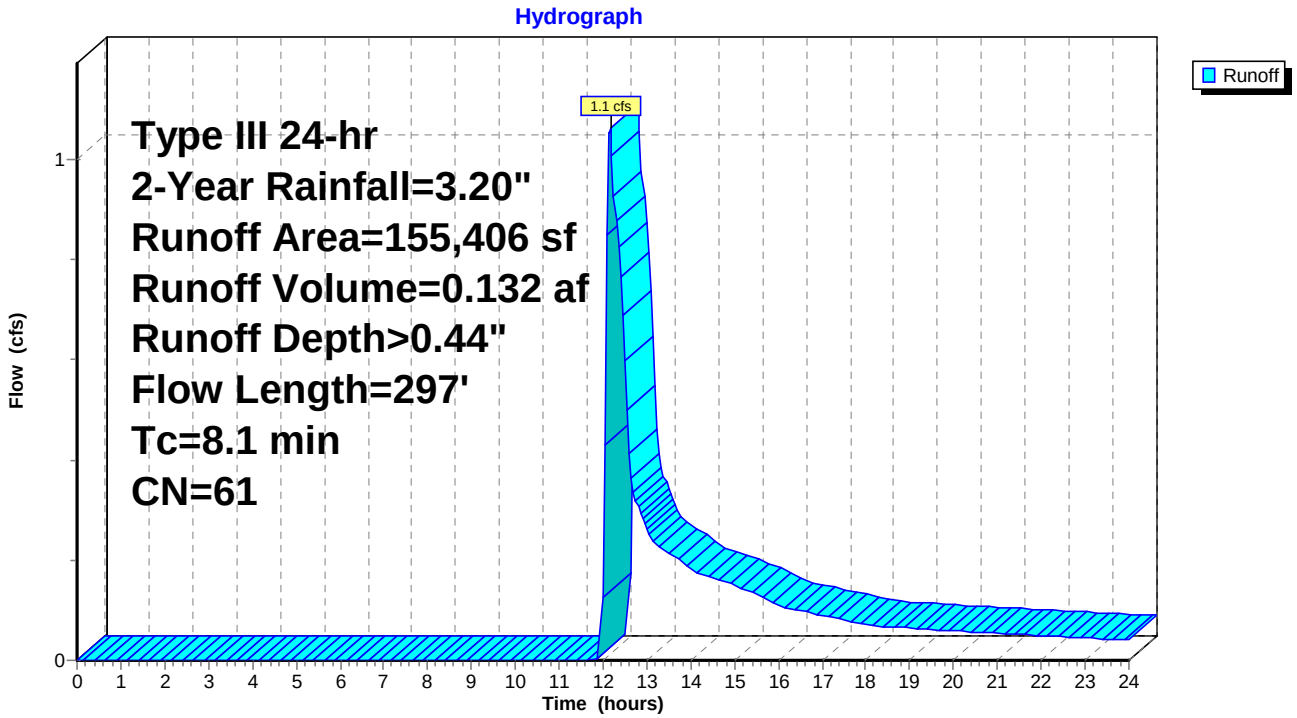
Runoff = 1.1 cfs @ 12.17 hrs, Volume= 0.132 af, Depth> 0.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

	Area (sf)	CN	Description
	153,531	61	>75% Grass cover, Good, HSG B
*	1,875	98	Ledge, panel posts, road
	155,406	61	Weighted Average
	153,531		98.79% Pervious Area
	1,875		1.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.0500	0.24		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.3	197	0.1269	2.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
8.1	297	Total			

Subcatchment 3Sb: Subwatershed



Summary for Subcatchment 3Sc: Subwatershed

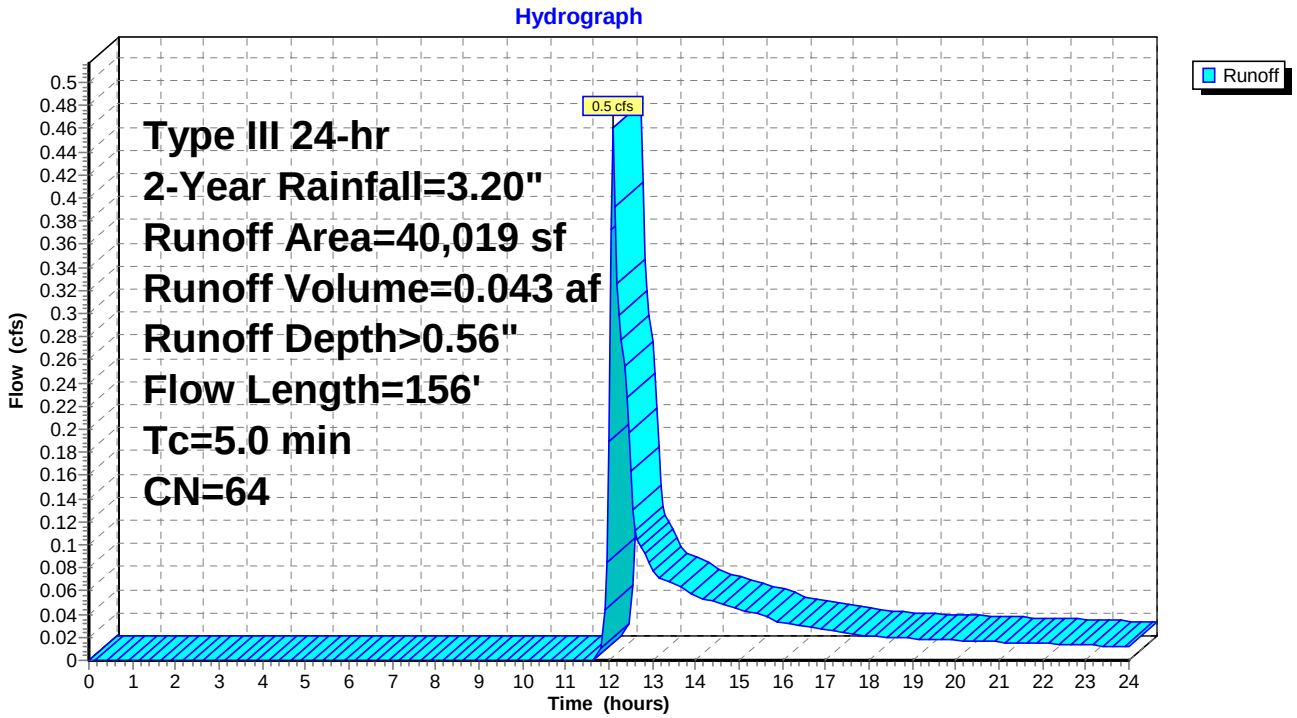
Runoff = 0.5 cfs @ 12.10 hrs, Volume= 0.043 af, Depth> 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

	Area (sf)	CN	Description
	37,036	61	>75% Grass cover, Good, HSG B
*	2,983	98	Access Road
	40,019	64	Weighted Average
	37,036		92.55% Pervious Area
	2,983		7.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	100	0.1600	0.39		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
0.3	56	0.2140	3.24		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
4.6	156	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 3Sc: Subwatershed



Summary for Subcatchment 3Sd: Subwatershed

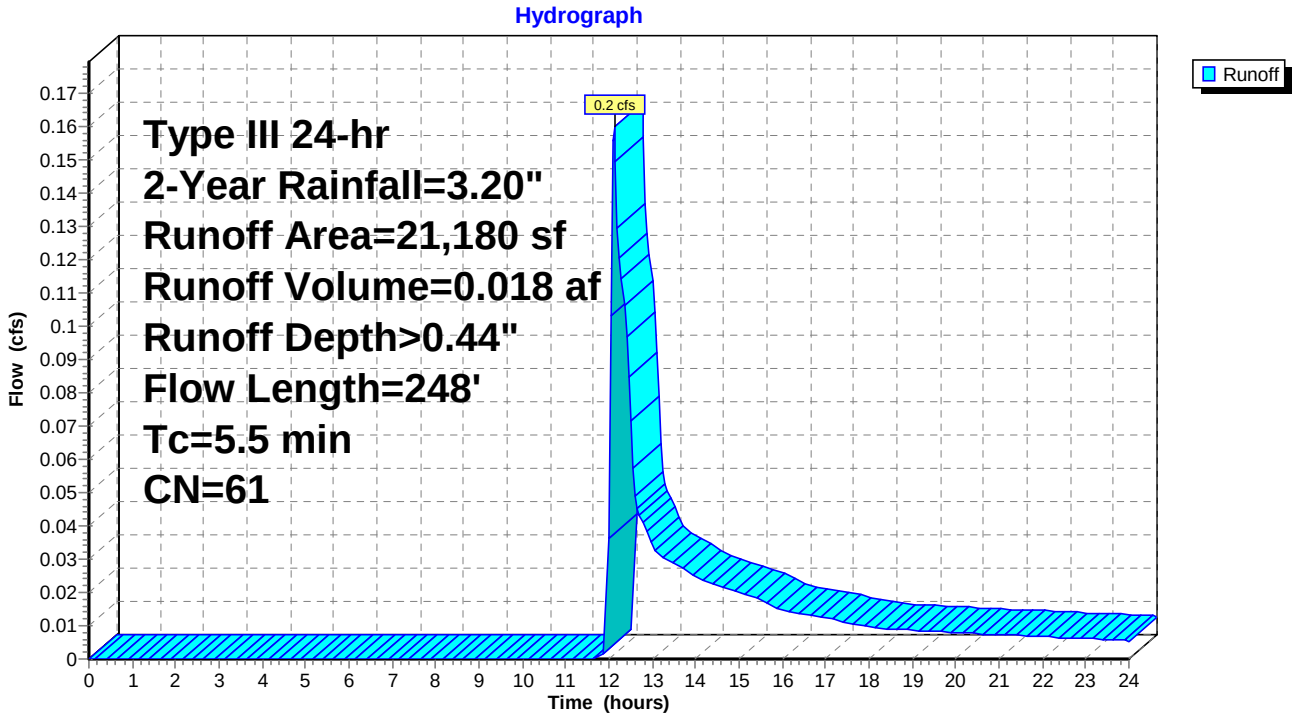
Runoff = 0.2 cfs @ 12.12 hrs, Volume= 0.018 af, Depth> 0.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (sf)	CN	Description
21,180	61	>75% Grass cover, Good, HSG B
21,180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	100	0.1700	0.40		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.3	148	0.0743	1.91		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
5.5	248	Total			

Subcatchment 3Sd: Subwatershed



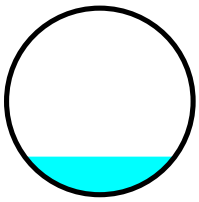
Summary for Reach 3Ca: Culvert

Inflow Area = 1.818 ac, 13.17% Impervious, Inflow Depth > 0.64" for 2-Year event
Inflow = 1.0 cfs @ 12.21 hrs, Volume= 0.097 af
Outflow = 1.0 cfs @ 12.22 hrs, Volume= 0.097 af, Atten= 0%, Lag= 0.2 min

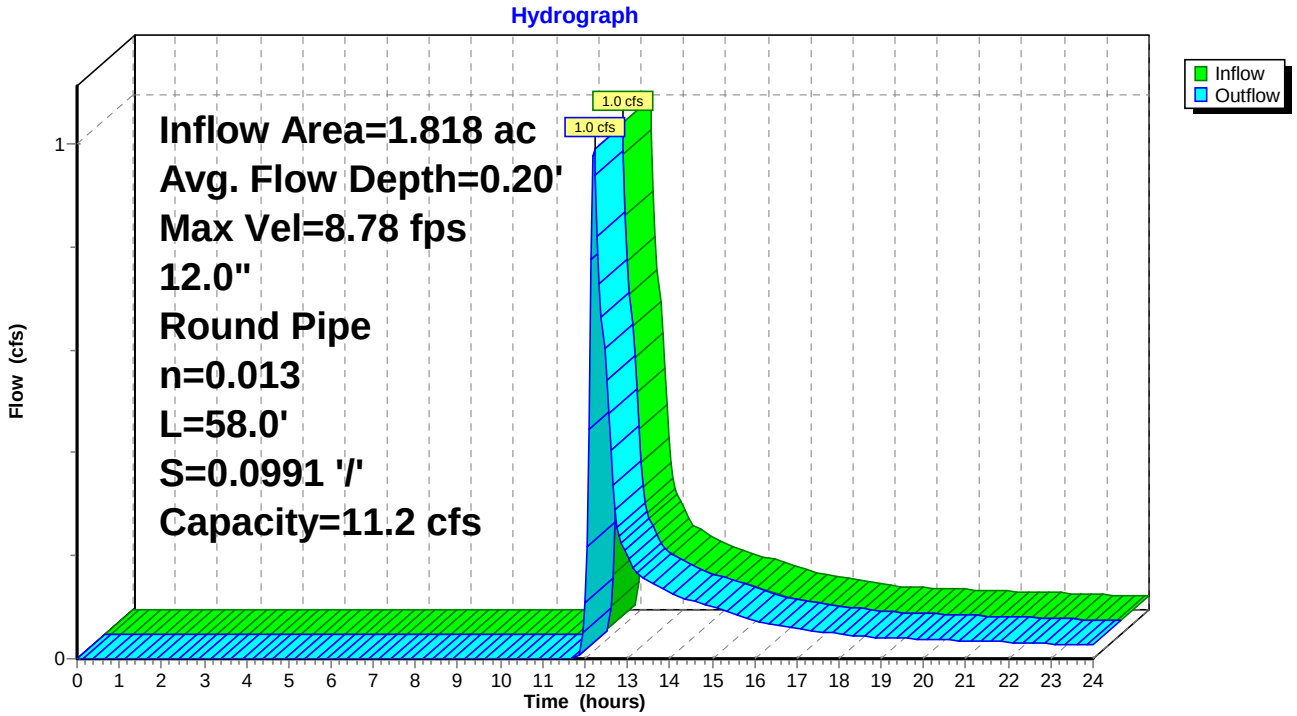
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.78 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.94 fps, Avg. Travel Time= 0.2 min

Peak Storage= 7 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 11.2 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 58.0' Slope= 0.0991 '/'
Inlet Invert= 675.75', Outlet Invert= 670.00'



Reach 3Ca: Culvert



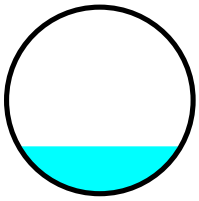
Summary for Reach 3Cb: Culvert

Inflow Area = 3.568 ac, 1.21% Impervious, Inflow Depth > 0.44" for 2-Year event
Inflow = 0.9 cfs @ 12.38 hrs, Volume= 0.130 af
Outflow = 0.9 cfs @ 12.38 hrs, Volume= 0.130 af, Atten= 0%, Lag= 0.3 min

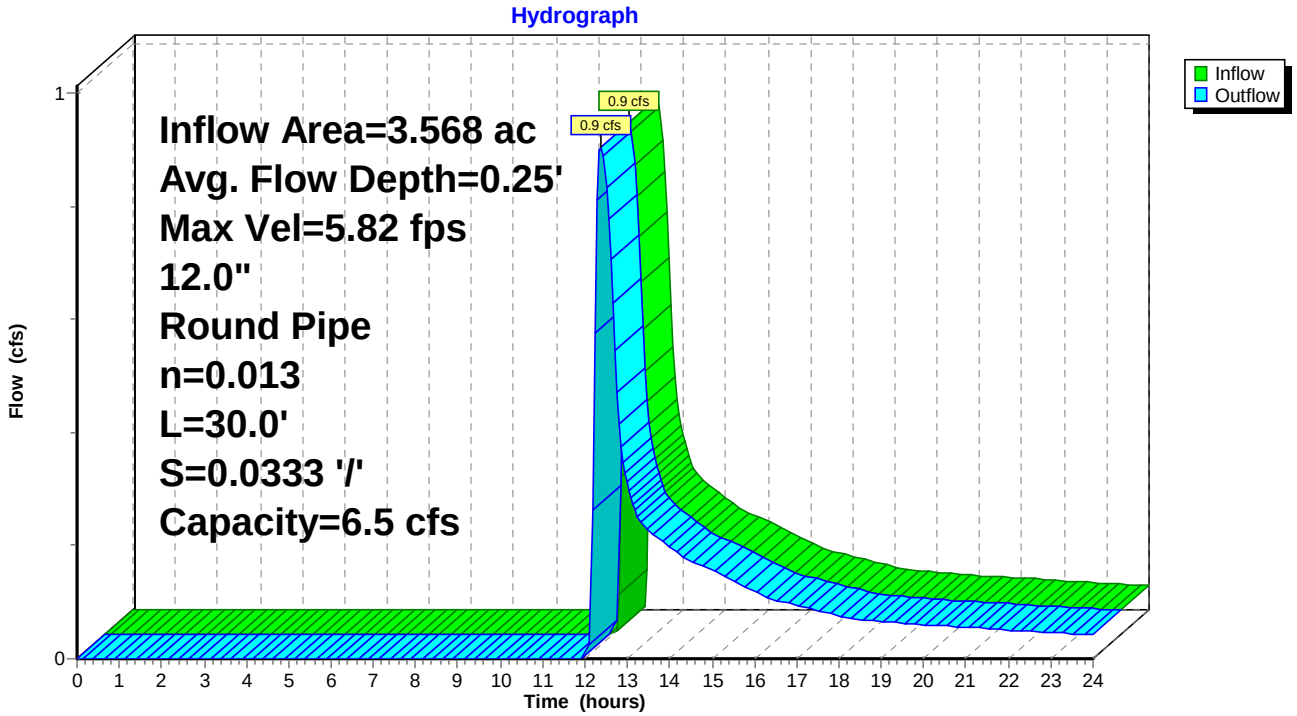
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.82 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.05 fps, Avg. Travel Time= 0.2 min

Peak Storage= 5 cf @ 12.38 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.5 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 30.0' Slope= 0.0333 '/'
Inlet Invert= 671.00', Outlet Invert= 670.00'



Reach 3Cb: Culvert



Summary for Reach 3Ra: Drainage Swale

Inflow Area = 1.818 ac, 13.17% Impervious, Inflow Depth > 0.64" for 2-Year event
Inflow = 1.1 cfs @ 12.12 hrs, Volume= 0.097 af
Outflow = 1.0 cfs @ 12.21 hrs, Volume= 0.097 af, Atten= 6%, Lag= 5.6 min

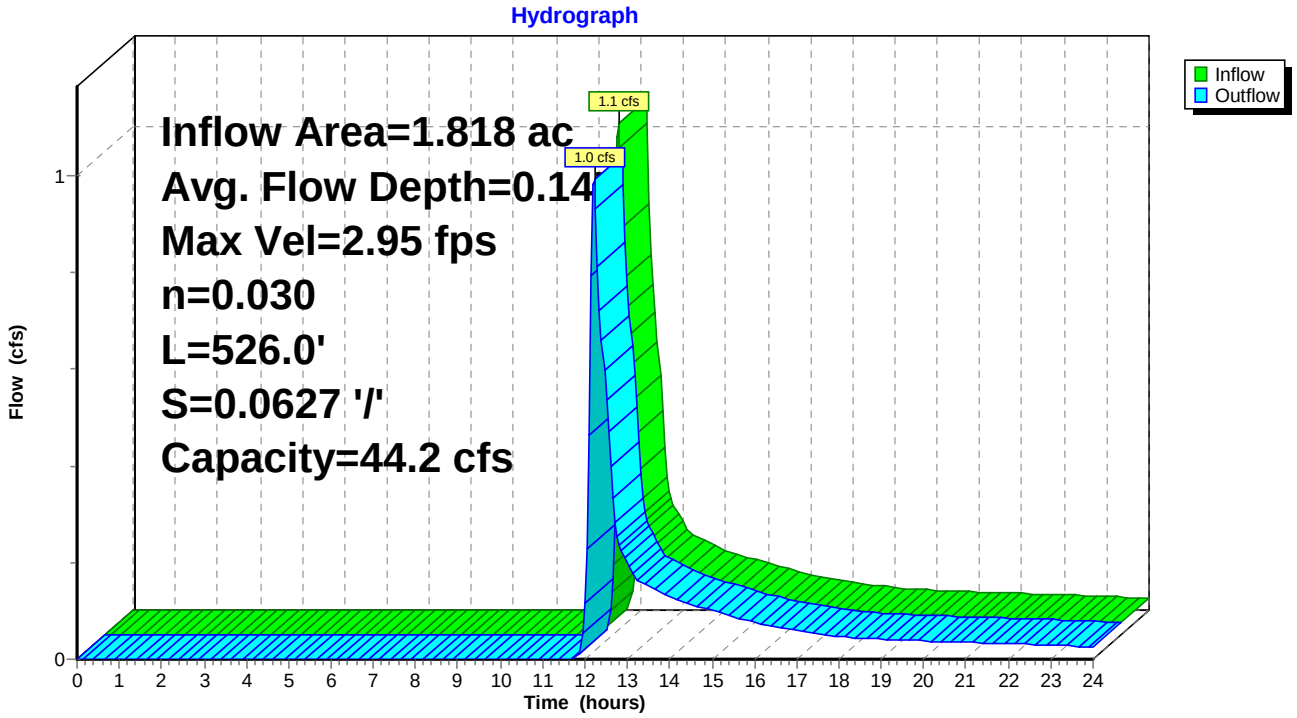
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.95 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 7.6 min

Peak Storage= 177 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 44.2 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 526.0' Slope= 0.0627 '/'
Inlet Invert= 712.00', Outlet Invert= 679.00'

‡

Reach 3Ra: Drainage Swale



Summary for Reach 3Rb: Drainage Swale

Inflow Area = 3.568 ac, 1.21% Impervious, Inflow Depth > 0.44" for 2-Year event
Inflow = 1.1 cfs @ 12.17 hrs, Volume= 0.132 af
Outflow = 0.9 cfs @ 12.38 hrs, Volume= 0.130 af, Atten= 15%, Lag= 12.7 min

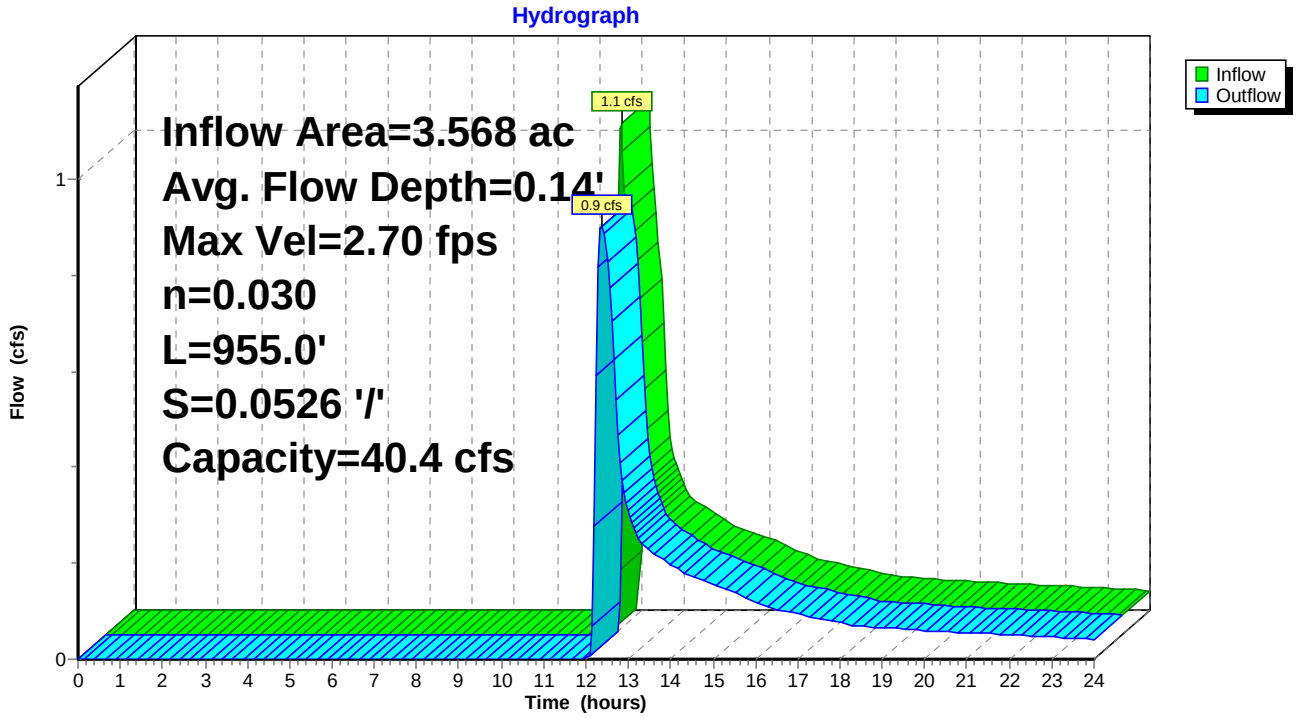
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.70 fps, Min. Travel Time= 5.9 min
Avg. Velocity = 1.26 fps, Avg. Travel Time= 12.7 min

Peak Storage= 319 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 40.4 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 955.0' Slope= 0.0526 '/'
Inlet Invert= 724.00', Outlet Invert= 673.75'

‡

Reach 3Rb: Drainage Swale



Summary for Pond 3Pa: Sediment Forebay

Inflow Area =	5.872 ac,	4.81% Impervious,	Inflow Depth >	0.50"	for 2-Year event
Inflow =	1.8 cfs @	12.32 hrs,	Volume=	0.245 af	
Outflow =	0.8 cfs @	12.75 hrs,	Volume=	0.240 af,	Atten= 56%, Lag= 25.7 min
Primary =	0.8 cfs @	12.75 hrs,	Volume=	0.240 af	
Secondary =	0.0 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 670.99' @ 12.75 hrs Surf.Area= 1,630 sf Storage= 1,959 cf
Flood Elev= 672.00' Surf.Area= 2,205 sf Storage= 3,619 cf

Plug-Flow detention time= 37.6 min calculated for 0.240 af (98% of inflow)
Center-of-Mass det. time= 26.2 min (940.3 - 914.2)

Volume	Invert	Avail.Storage	Storage Description
#1	669.65'	6,150 cf	**Custom Stage Data (Prismatic)** Listed below

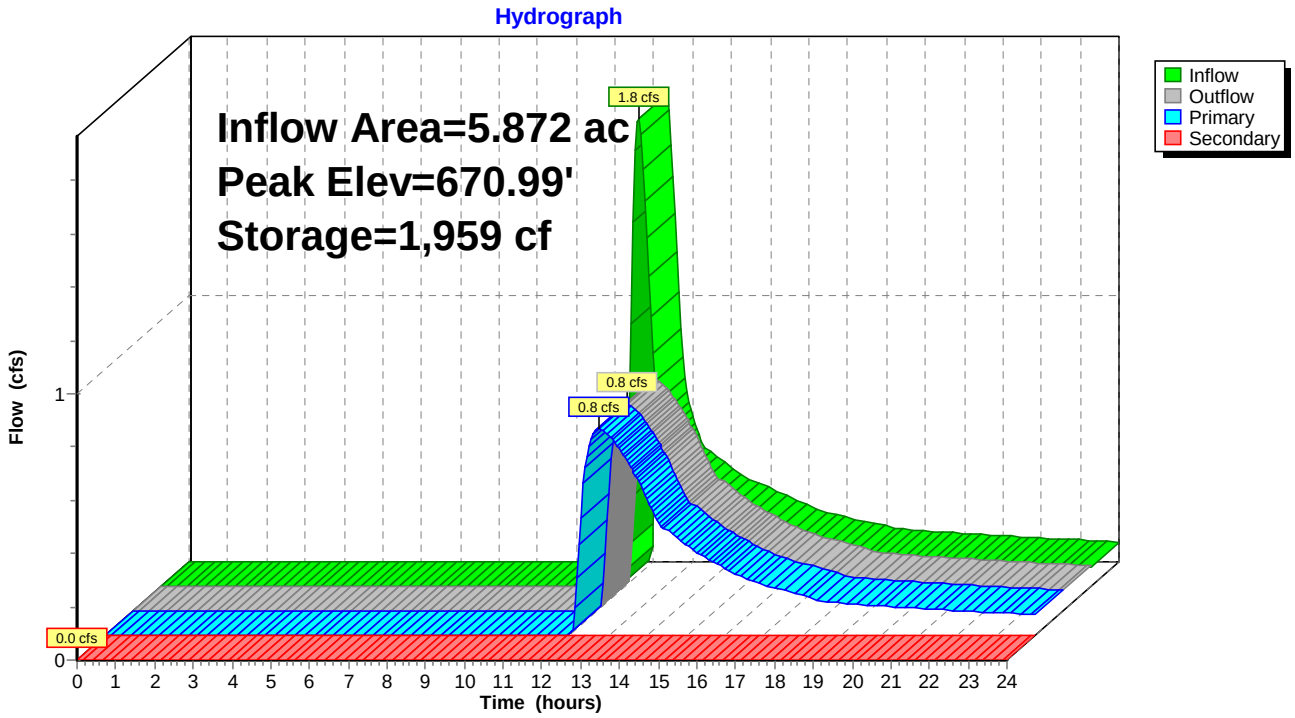
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
669.65	895	0	0
670.00	1,070	344	344
672.00	2,205	3,275	3,619
673.00	2,857	2,531	6,150

Device	Routing	Invert	Outlet Devices
#1	Primary	669.65'	**6.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 669.65' / 669.65' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Secondary	671.30'	**12.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.8 cfs @ 12.75 hrs HW=670.99' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.8 cfs @ 3.96 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=669.65' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 3Pa: Sediment Forebay



Summary for Pond 3Pb: Organic Filter

Inflow Area = 5.872 ac, 4.81% Impervious, Inflow Depth > 0.49" for 2-Year event
Inflow = 0.8 cfs @ 12.75 hrs, Volume= 0.240 af
Outflow = 0.2 cfs @ 17.99 hrs, Volume= 0.135 af, Atten= 81%, Lag= 314.6 min
Primary = 0.2 cfs @ 17.99 hrs, Volume= 0.135 af
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 671.69' @ 17.99 hrs Surf.Area= 2,707 sf Storage= 5,451 cf
Flood Elev= 672.00' Surf.Area= 2,890 sf Storage= 6,159 cf

Plug-Flow detention time= 292.8 min calculated for 0.135 af (57% of inflow)
Center-of-Mass det. time= 161.0 min (1,101.3 - 940.3)

Volume	Invert	Avail.Storage	Storage Description
#1	667.65'	9,388 cf	**Custom Stage Data (Prismatic)** Listed below

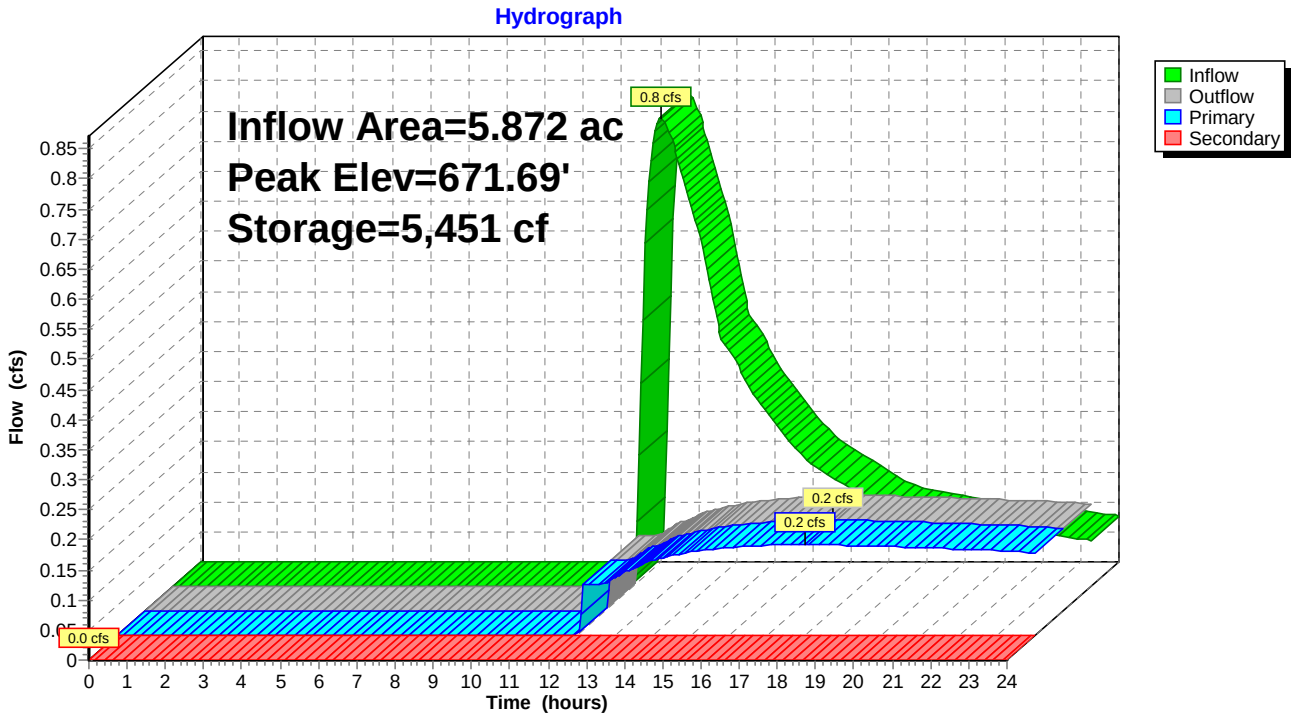
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
667.65	1,519	0.0	0	0
669.65	1,519	33.0	1,003	1,003
670.00	1,703	100.0	564	1,566
672.00	2,890	100.0	4,593	6,159
673.00	3,568	100.0	3,229	9,388

Device	Routing	Invert	Outlet Devices
#1	Primary	666.98'	**4.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 666.98' / 666.98' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Device 1	667.65'	**2.410 in/hr Exfiltration over Surface area**
#3	Secondary	671.75'	**12.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.2 cfs @ 17.99 hrs HW=671.69' (Free Discharge)
└─**1=Culvert** (Passes 0.2 cfs of 0.7 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.2 cfs)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=667.65' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 3Pb: Organic Filter

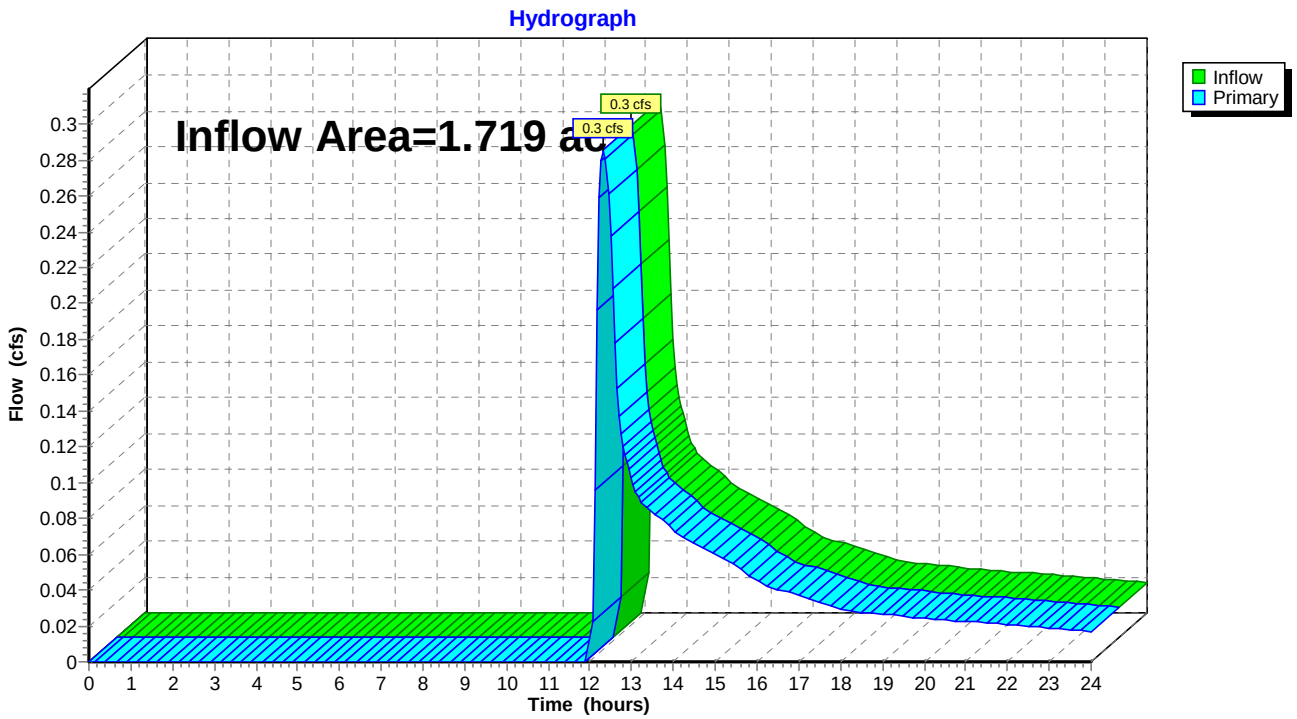


Summary for Link SP1: Western Abutter

Inflow Area = 1.719 ac, 0.00% Impervious, Inflow Depth > 0.34" for 2-Year event
Inflow = 0.3 cfs @ 12.32 hrs, Volume= 0.049 af
Primary = 0.3 cfs @ 12.32 hrs, Volume= 0.049 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP1: Western Abutter

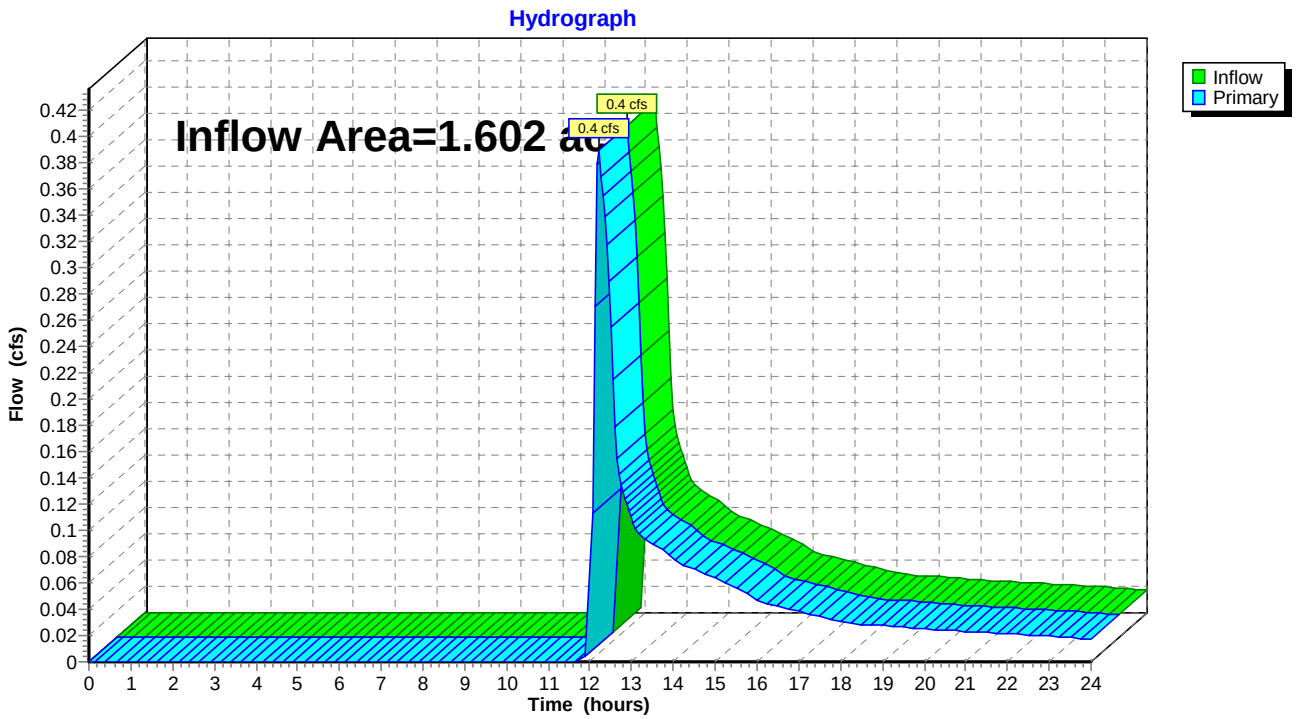


Summary for Link SP2: Eastern Abutter

Inflow Area = 1.602 ac, 2.48% Impervious, Inflow Depth > 0.41" for 2-Year event
Inflow = 0.4 cfs @ 12.19 hrs, Volume= 0.054 af
Primary = 0.4 cfs @ 12.19 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP2: Eastern Abutter

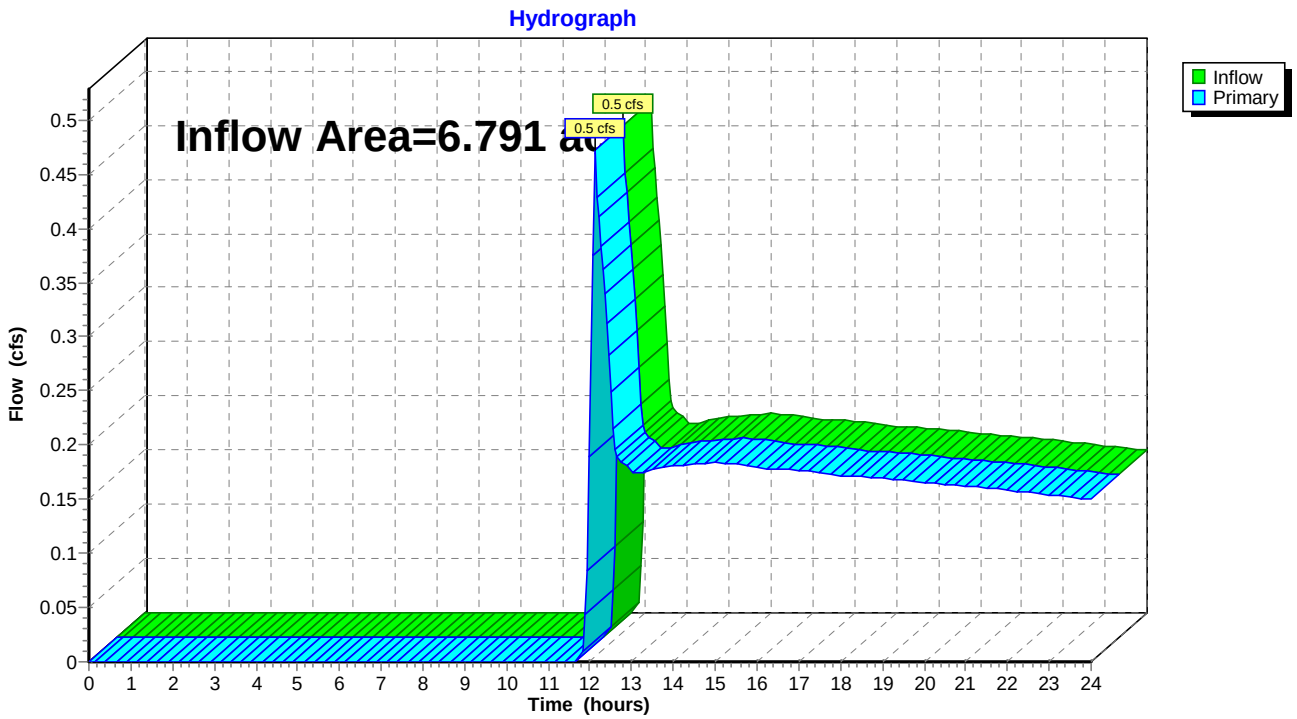


Summary for Link SP3: Gerber Drive Drainage System to Existing Detention Pond

Inflow Area = 6.791 ac, 5.17% Impervious, Inflow Depth > 0.31" for 2-Year event
Inflow = 0.5 cfs @ 12.11 hrs, Volume= 0.178 af
Primary = 0.5 cfs @ 12.11 hrs, Volume= 0.178 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP3: Gerber Drive Drainage System to Existing Detention Pond



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subwatershed Runoff Area=74,883 sf 0.00% Impervious Runoff Depth>1.06"
Flow Length=327' Tc=10.8 min CN=58 Runoff=1.5 cfs 0.151 af

Subcatchment 2S: Subwatershed Runoff Area=69,789 sf 2.48% Impervious Runoff Depth>1.18"
Flow Length=432' Tc=8.8 min CN=60 Runoff=1.7 cfs 0.158 af

Subcatchment 3Sa: Subwatershed Runoff Area=79,196 sf 13.17% Impervious Runoff Depth>1.59"
Flow Length=392' Tc=6.9 min CN=66 Runoff=3.1 cfs 0.241 af

Subcatchment 3Sb: Subwatershed Runoff Area=155,406 sf 1.21% Impervious Runoff Depth>1.25"
Flow Length=297' Tc=8.1 min CN=61 Runoff=4.2 cfs 0.371 af

Subcatchment 3Sc: Subwatershed Runoff Area=40,019 sf 7.45% Impervious Runoff Depth>1.45"
Flow Length=156' Tc=5.0 min CN=64 Runoff=1.5 cfs 0.111 af

Subcatchment 3Sd: Subwatershed Runoff Area=21,180 sf 0.00% Impervious Runoff Depth>1.25"
Flow Length=248' Tc=5.5 min CN=61 Runoff=0.6 cfs 0.051 af

Reach 3Ca: Culvert Avg. Flow Depth=0.34' Max Vel=11.89 fps Inflow=2.9 cfs 0.240 af
12.0" Round Pipe n=0.013 L=58.0' S=0.0991 '/' Capacity=11.2 cfs Outflow=2.9 cfs 0.240 af

Reach 3Cb: Culvert Avg. Flow Depth=0.55' Max Vel=8.63 fps Inflow=3.8 cfs 0.369 af
12.0" Round Pipe n=0.013 L=30.0' S=0.0333 '/' Capacity=6.5 cfs Outflow=3.8 cfs 0.369 af

Reach 3Ra: Drainage Swale Avg. Flow Depth=0.26' Max Vel=4.17 fps Inflow=3.1 cfs 0.241 af
n=0.030 L=526.0' S=0.0627 '/' Capacity=44.2 cfs Outflow=2.9 cfs 0.240 af

Reach 3Rb: Drainage Swale Avg. Flow Depth=0.31' Max Vel=4.26 fps Inflow=4.2 cfs 0.371 af
n=0.030 L=955.0' S=0.0526 '/' Capacity=40.4 cfs Outflow=3.8 cfs 0.369 af

Pond 3Pa: Sediment Forebay Peak Elev=671.63' Storage=3,020 cf Inflow=6.8 cfs 0.660 af
Primary=1.0 cfs 0.467 af Secondary=5.8 cfs 0.185 af Outflow=6.8 cfs 0.652 af

Pond 3Pb: Organic Filter Peak Elev=671.83' Storage=5,777 cf Inflow=1.0 cfs 0.467 af
Primary=0.2 cfs 0.149 af Secondary=0.7 cfs 0.189 af Outflow=0.9 cfs 0.338 af

Link SP1: Western Abutter Inflow=1.5 cfs 0.151 af
Primary=1.5 cfs 0.151 af

Link SP2: Eastern Abutter Inflow=1.7 cfs 0.158 af
Primary=1.7 cfs 0.158 af

Link SP3: Gerber Drive Drainage System to Existing Detention Pond Inflow=6.7 cfs 0.634 af
Primary=6.7 cfs 0.634 af

Total Runoff Area = 10.112 ac Runoff Volume = 1.083 af Average Runoff Depth = 1.29"
96.14% Pervious = 9.721 ac 3.86% Impervious = 0.391 ac

Summary for Subcatchment 1S: Subwatershed

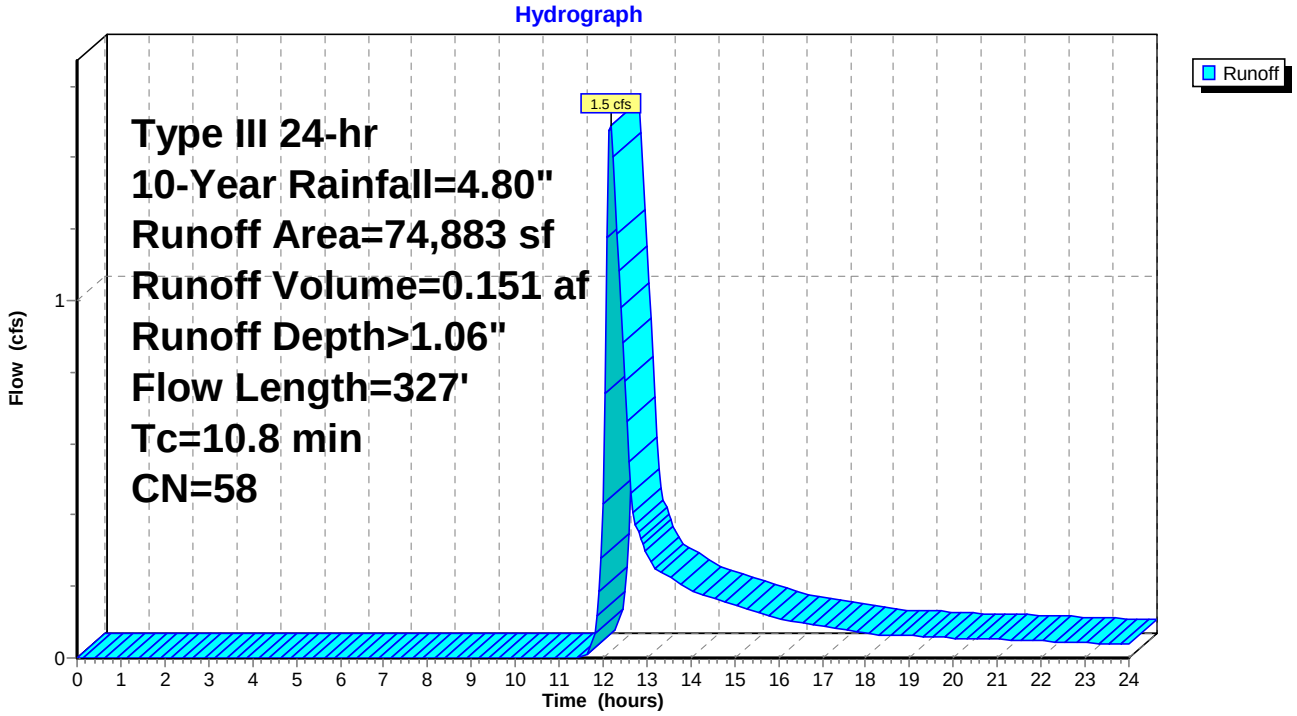
Runoff = 1.5 cfs @ 12.18 hrs, Volume= 0.151 af, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

Area (sf)	CN	Description
35,752	61	>75% Grass cover, Good, HSG B
39,131	55	Woods, Good, HSG B
74,883	58	Weighted Average
74,883		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	64	0.1094	0.31		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
5.4	36	0.0830	0.11		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 3.16"
1.9	227	0.1542	1.96		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
10.8	327	Total			

Subcatchment 1S: Subwatershed



Summary for Subcatchment 2S: Subwatershed

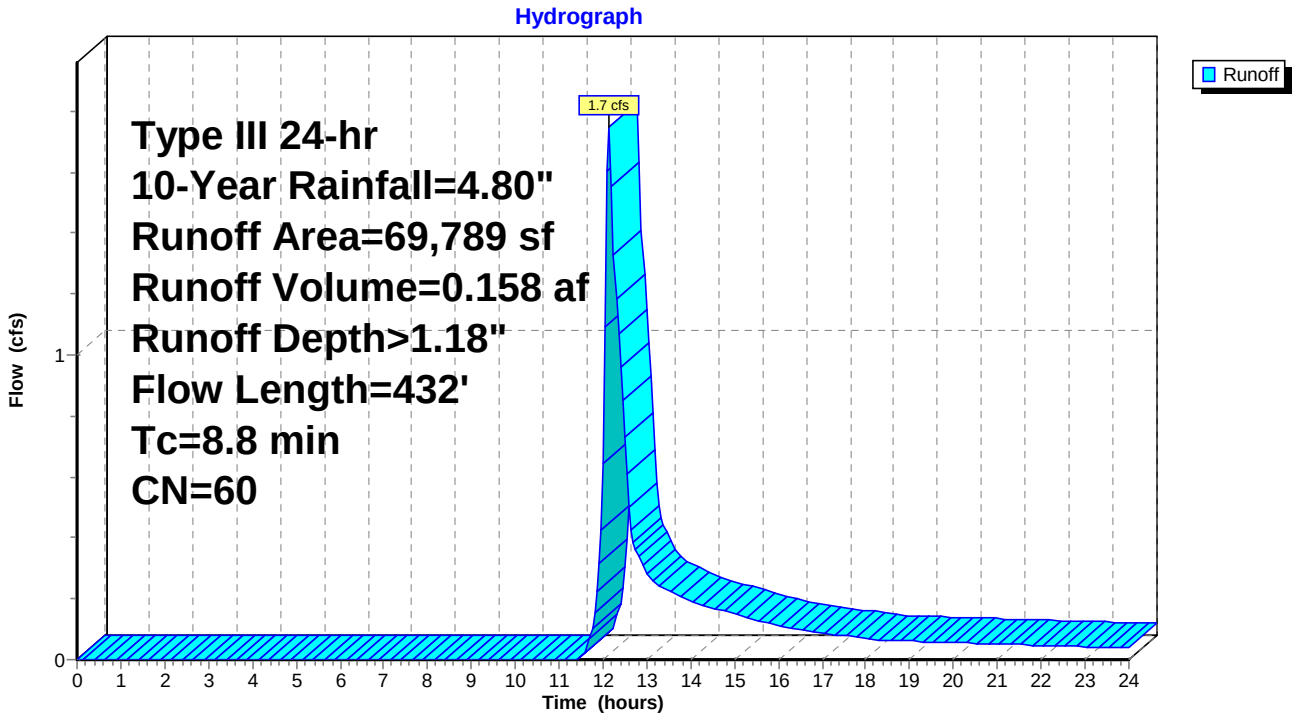
Runoff = 1.7 cfs @ 12.15 hrs, Volume= 0.158 af, Depth> 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (sf)	CN	Description
*	1,733	98	Ledge
	44,696	61	>75% Grass cover, Good, HSG B
	23,360	55	Woods, Good, HSG B
	69,789	60	Weighted Average
	68,056		97.52% Pervious Area
	1,733		2.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0600	0.26		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.4	225	0.1500	2.71		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
1.0	107	0.1215	1.74		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
8.8	432	Total			

Subcatchment 2S: Subwatershed



Summary for Subcatchment 3Sa: Subwatershed

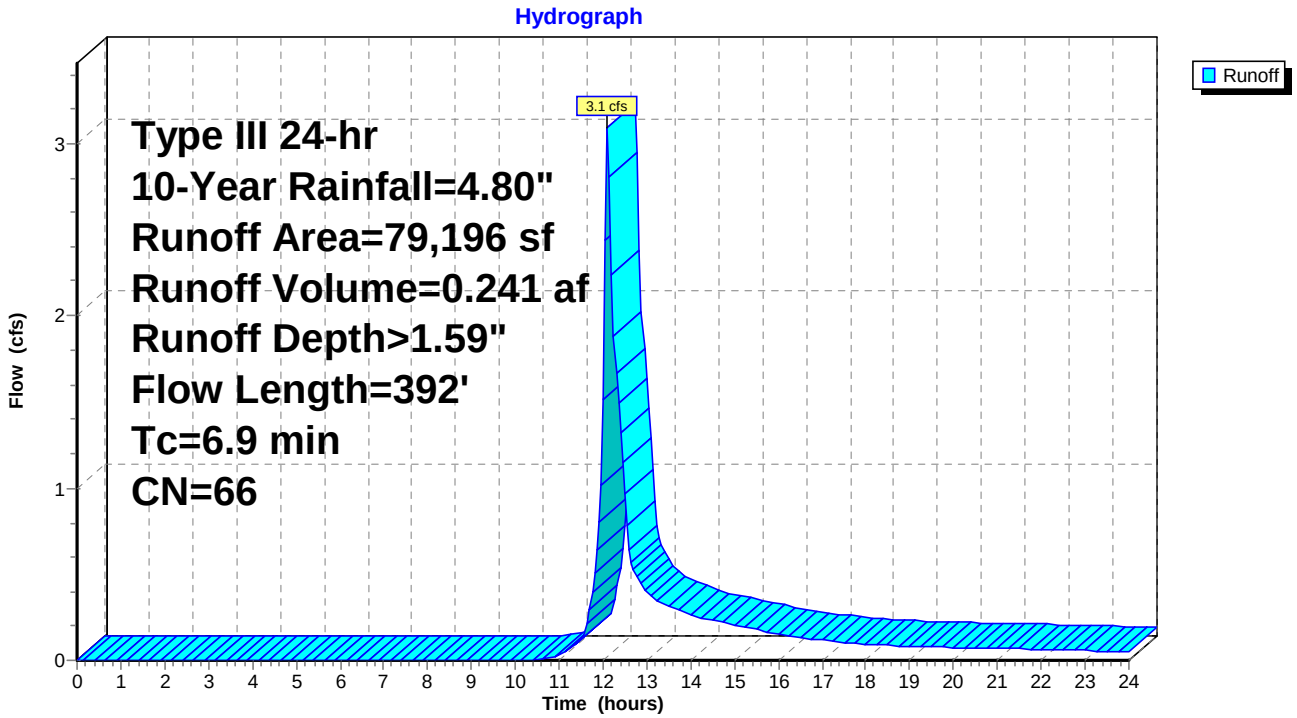
Runoff = 3.1 cfs @ 12.11 hrs, Volume= 0.241 af, Depth> 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (sf)	CN	Description
	68,767	61	>75% Grass cover, Good, HSG B
*	10,429	98	Ledge, Panel Posts, Equipment Pad, Road
	79,196	66	Weighted Average
	68,767		86.83% Pervious Area
	10,429		13.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	100	0.1200	0.35		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
2.1	292	0.1100	2.32		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.9	392	Total			

Subcatchment 3Sa: Subwatershed



Summary for Subcatchment 3Sb: Subwatershed

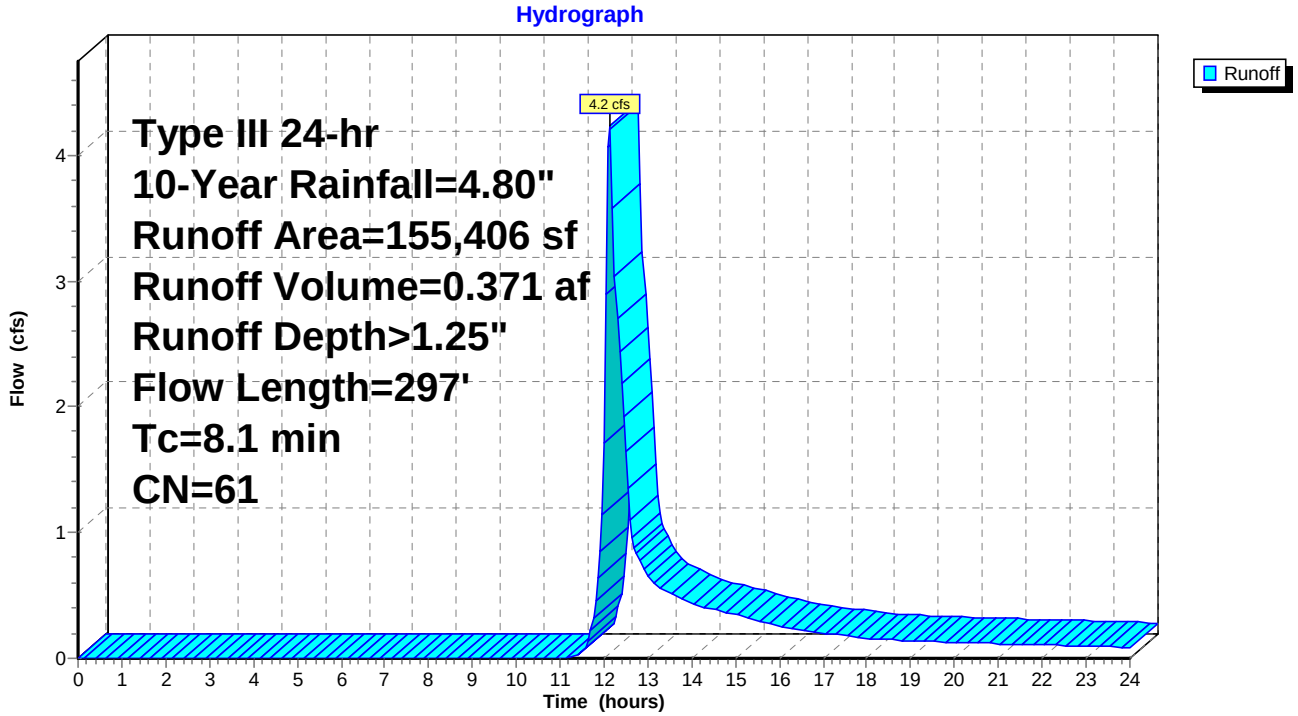
Runoff = 4.2 cfs @ 12.13 hrs, Volume= 0.371 af, Depth> 1.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (sf)	CN	Description
	153,531	61	>75% Grass cover, Good, HSG B
*	1,875	98	Ledge, panel posts, road
	155,406	61	Weighted Average
	153,531		98.79% Pervious Area
	1,875		1.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.0500	0.24		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.3	197	0.1269	2.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
8.1	297	Total			

Subcatchment 3Sb: Subwatershed



Summary for Subcatchment 3Sc: Subwatershed

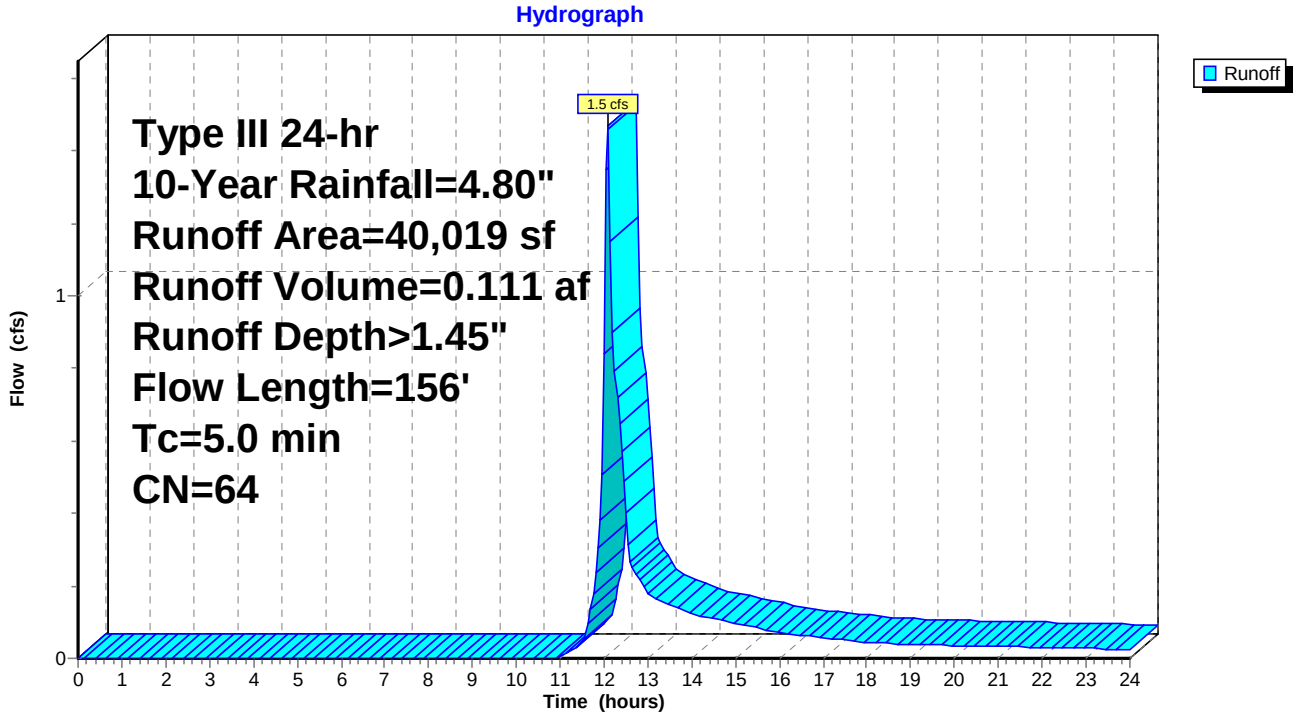
Runoff = 1.5 cfs @ 12.09 hrs, Volume= 0.111 af, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

	Area (sf)	CN	Description
	37,036	61	>75% Grass cover, Good, HSG B
*	2,983	98	Access Road
	40,019	64	Weighted Average
	37,036		92.55% Pervious Area
	2,983		7.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	100	0.1600	0.39		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
0.3	56	0.2140	3.24		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
4.6	156	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 3Sc: Subwatershed



Summary for Subcatchment 3Sd: Subwatershed

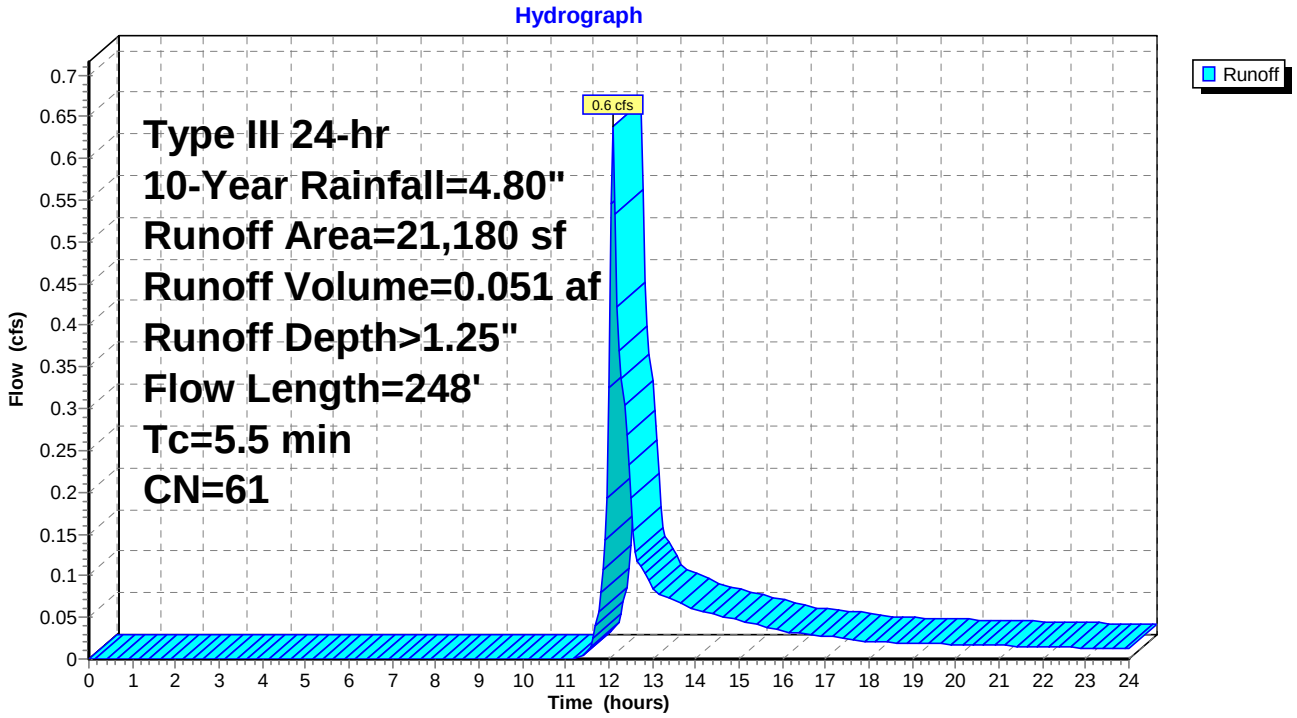
Runoff = 0.6 cfs @ 12.10 hrs, Volume= 0.051 af, Depth> 1.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.80"

Area (sf)	CN	Description
21,180	61	>75% Grass cover, Good, HSG B
21,180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	100	0.1700	0.40		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.3	148	0.0743	1.91		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
5.5	248	Total			

Subcatchment 3Sd: Subwatershed



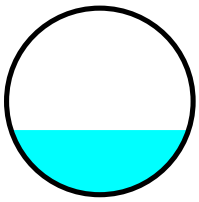
Summary for Reach 3Ca: Culvert

Inflow Area = 1.818 ac, 13.17% Impervious, Inflow Depth > 1.59" for 10-Year event
Inflow = 2.9 cfs @ 12.18 hrs, Volume= 0.240 af
Outflow = 2.9 cfs @ 12.18 hrs, Volume= 0.240 af, Atten= 0%, Lag= 0.2 min

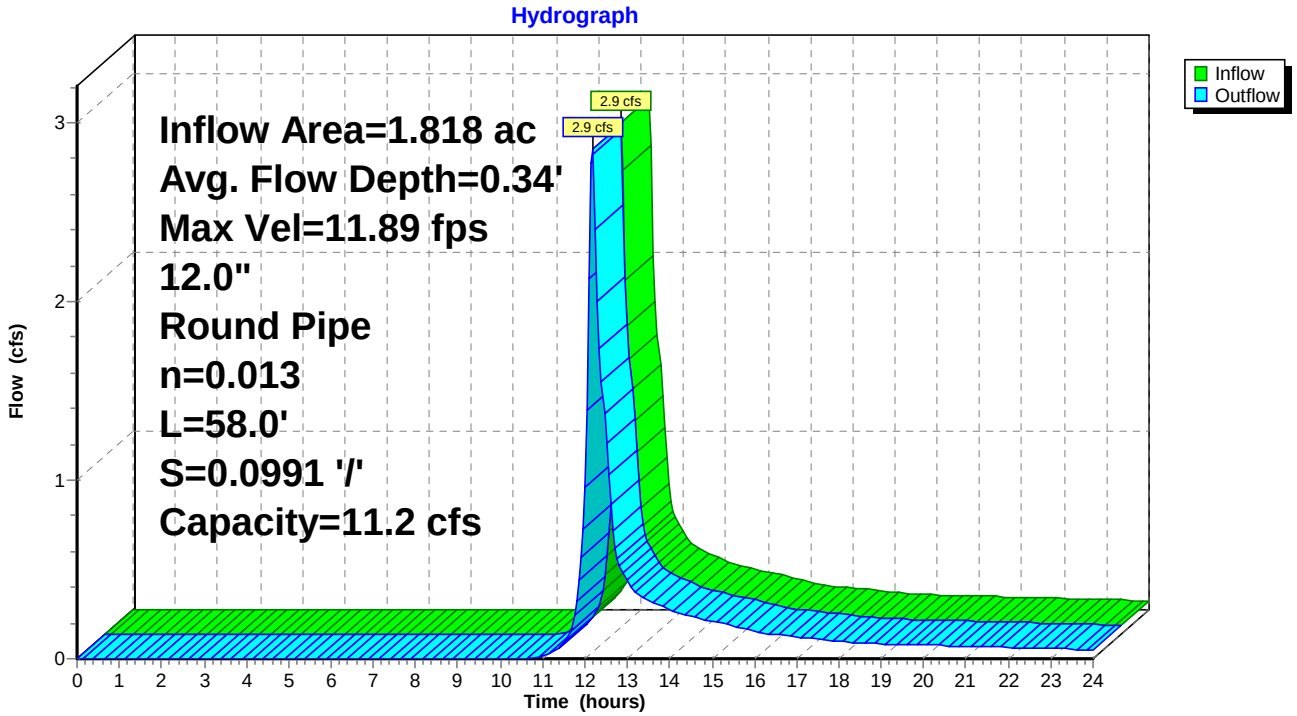
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 11.89 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.88 fps, Avg. Travel Time= 0.2 min

Peak Storage= 14 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.34'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 11.2 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 58.0' Slope= 0.0991 '/'
Inlet Invert= 675.75', Outlet Invert= 670.00'



Reach 3Ca: Culvert



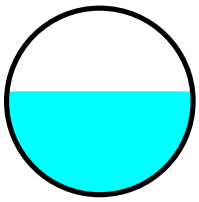
Summary for Reach 3Cb: Culvert

Inflow Area = 3.568 ac, 1.21% Impervious, Inflow Depth > 1.24" for 10-Year event
Inflow = 3.8 cfs @ 12.25 hrs, Volume= 0.369 af
Outflow = 3.8 cfs @ 12.25 hrs, Volume= 0.369 af, Atten= 0%, Lag= 0.1 min

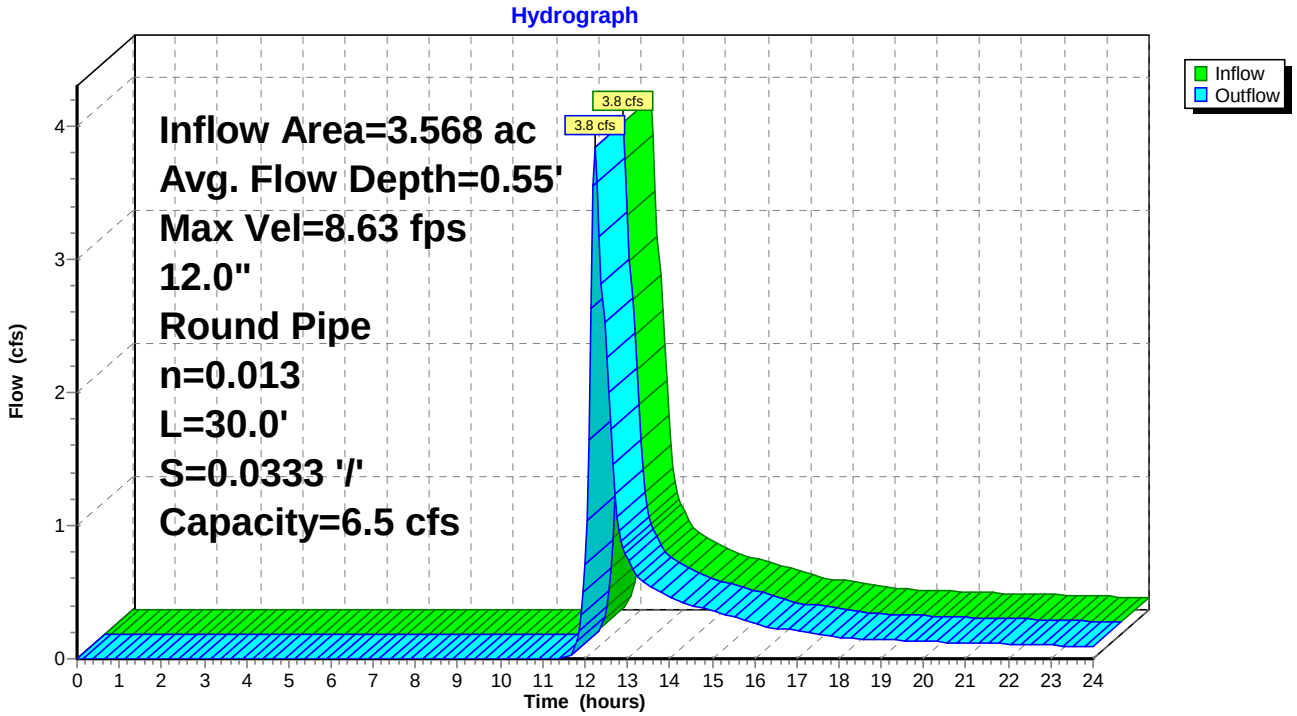
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.63 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.90 fps, Avg. Travel Time= 0.1 min

Peak Storage= 13 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.5 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 30.0' Slope= 0.0333 '/'
Inlet Invert= 671.00', Outlet Invert= 670.00'



Reach 3Cb: Culvert



Summary for Reach 3Ra: Drainage Swale

Inflow Area = 1.818 ac, 13.17% Impervious, Inflow Depth > 1.59" for 10-Year event
Inflow = 3.1 cfs @ 12.11 hrs, Volume= 0.241 af
Outflow = 2.9 cfs @ 12.18 hrs, Volume= 0.240 af, Atten= 7%, Lag= 4.0 min

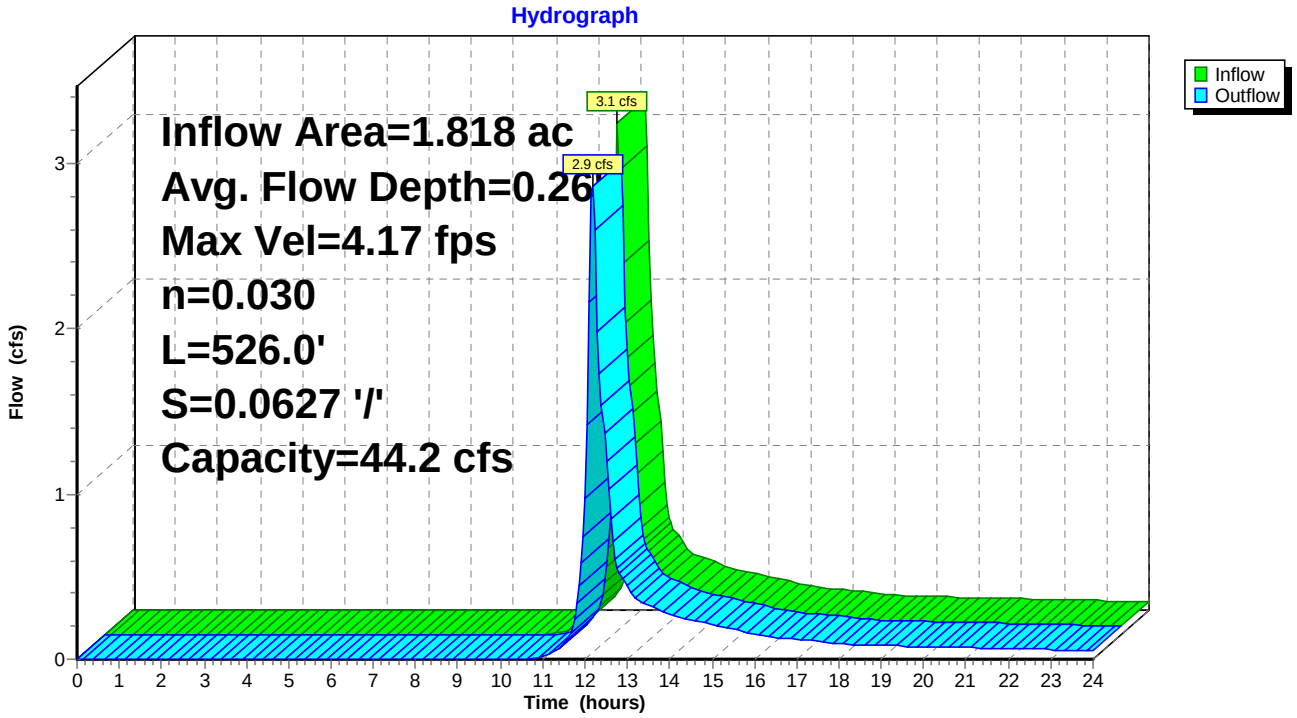
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.17 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 1.49 fps, Avg. Travel Time= 5.9 min

Peak Storage= 371 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 44.2 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 526.0' Slope= 0.0627 '/'
Inlet Invert= 712.00', Outlet Invert= 679.00'

‡

Reach 3Ra: Drainage Swale



Summary for Reach 3Rb: Drainage Swale

Inflow Area = 3.568 ac, 1.21% Impervious, Inflow Depth > 1.25" for 10-Year event
Inflow = 4.2 cfs @ 12.13 hrs, Volume= 0.371 af
Outflow = 3.8 cfs @ 12.25 hrs, Volume= 0.369 af, Atten= 9%, Lag= 7.0 min

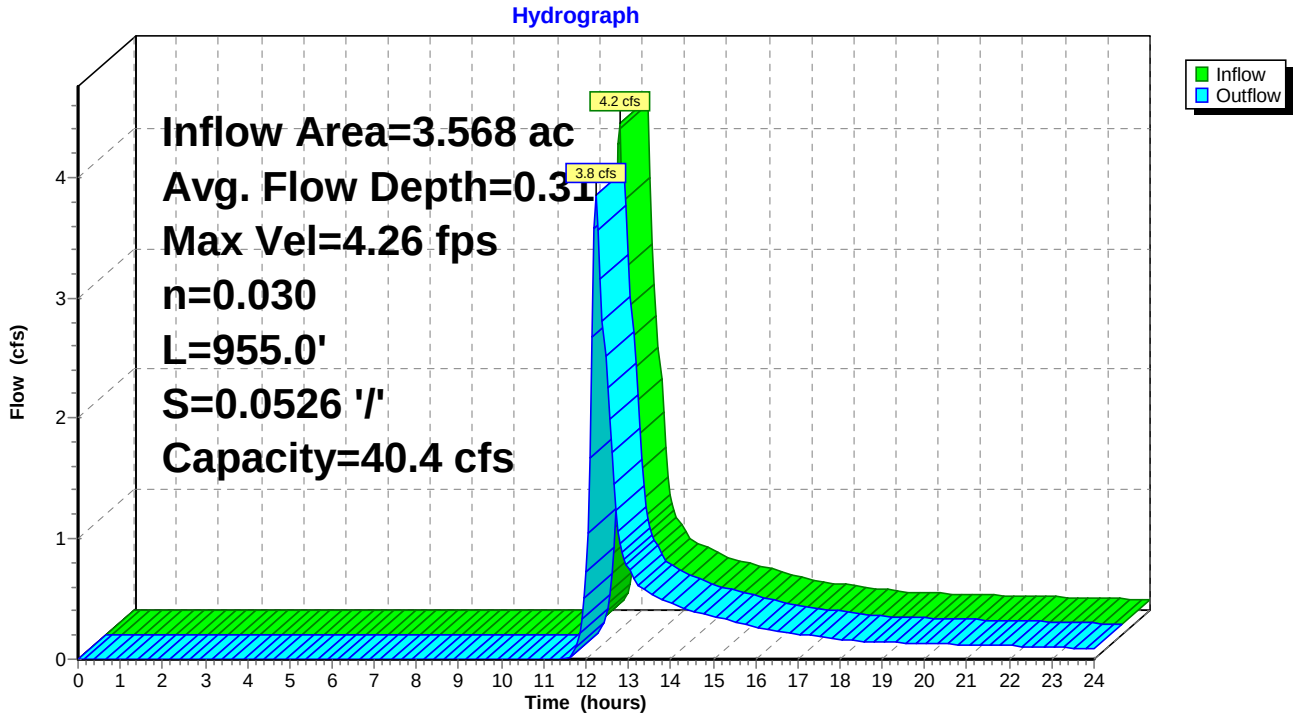
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.26 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 1.70 fps, Avg. Travel Time= 9.4 min

Peak Storage= 871 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.31'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 40.4 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 955.0' Slope= 0.0526 '/'
Inlet Invert= 724.00', Outlet Invert= 673.75'

‡

Reach 3Rb: Drainage Swale



Summary for Pond 3Pa: Sediment Forebay

Inflow Area =	5.872 ac,	4.81% Impervious,	Inflow Depth >	1.35"	for 10-Year event
Inflow =	6.8 cfs @	12.22 hrs,	Volume=	0.660 af	
Outflow =	6.8 cfs @	12.24 hrs,	Volume=	0.652 af,	Atten= 1%, Lag= 1.3 min
Primary =	1.0 cfs @	12.24 hrs,	Volume=	0.467 af	
Secondary =	5.8 cfs @	12.24 hrs,	Volume=	0.185 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 671.63' @ 12.24 hrs Surf.Area= 1,998 sf Storage= 3,020 cf
Flood Elev= 672.00' Surf.Area= 2,205 sf Storage= 3,619 cf

Plug-Flow detention time= 29.0 min calculated for 0.652 af (99% of inflow)
Center-of-Mass det. time= 22.2 min (898.7 - 876.5)

Volume	Invert	Avail.Storage	Storage Description
#1	669.65'	6,150 cf	**Custom Stage Data (Prismatic)** Listed below

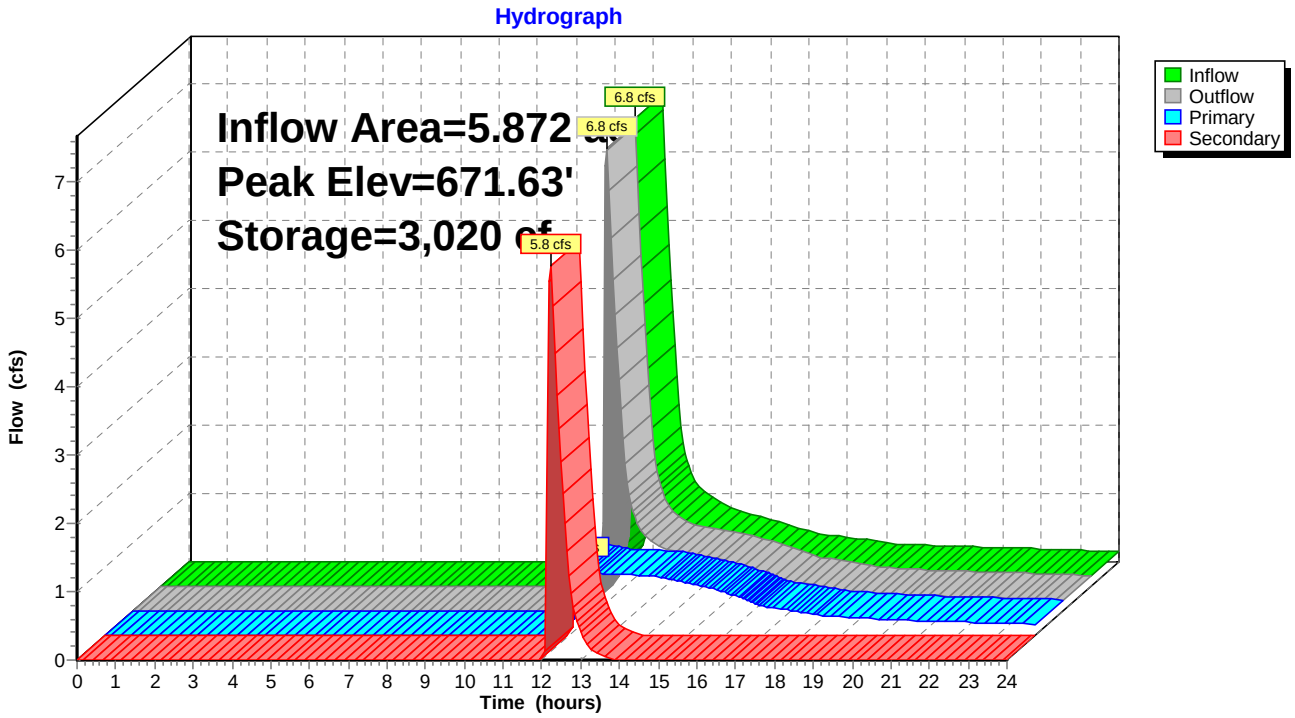
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
669.65	895	0	0
670.00	1,070	344	344
672.00	2,205	3,275	3,619
673.00	2,857	2,531	6,150

Device	Routing	Invert	Outlet Devices
#1	Primary	669.65'	**6.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 669.65' / 669.65' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Secondary	671.30'	**12.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=1.0 cfs @ 12.24 hrs HW=671.63' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.0 cfs @ 5.00 fps)

Secondary OutFlow Max=5.7 cfs @ 12.24 hrs HW=671.63' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 5.7 cfs @ 1.43 fps)

Pond 3Pa: Sediment Forebay



Summary for Pond 3Pb: Organic Filter

Inflow Area = 5.872 ac, 4.81% Impervious, Inflow Depth > 0.95" for 10-Year event
Inflow = 1.0 cfs @ 12.24 hrs, Volume= 0.467 af
Outflow = 0.9 cfs @ 14.22 hrs, Volume= 0.338 af, Atten= 12%, Lag= 119.0 min
Primary = 0.2 cfs @ 14.22 hrs, Volume= 0.149 af
Secondary = 0.7 cfs @ 14.22 hrs, Volume= 0.189 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 671.83' @ 14.22 hrs Surf.Area= 2,791 sf Storage= 5,777 cf
Flood Elev= 672.00' Surf.Area= 2,890 sf Storage= 6,159 cf

Plug-Flow detention time= 170.5 min calculated for 0.338 af (72% of inflow)
Center-of-Mass det. time= 72.3 min (1,030.9 - 958.6)

Volume	Invert	Avail.Storage	Storage Description
#1	667.65'	9,388 cf	**Custom Stage Data (Prismatic)** Listed below

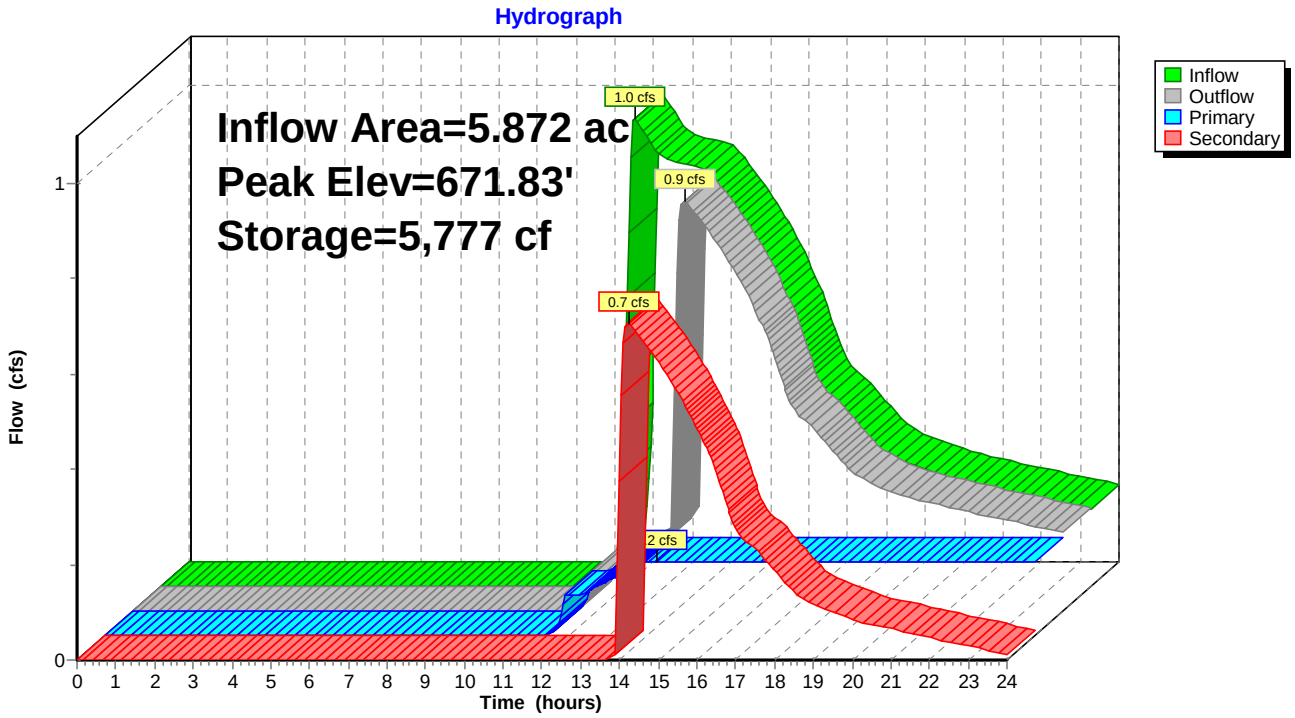
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
667.65	1,519	0.0	0	0
669.65	1,519	33.0	1,003	1,003
670.00	1,703	100.0	564	1,566
672.00	2,890	100.0	4,593	6,159
673.00	3,568	100.0	3,229	9,388

Device	Routing	Invert	Outlet Devices
#1	Primary	666.98'	**4.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 666.98' / 666.98' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Device 1	667.65'	**2.410 in/hr Exfiltration over Surface area**
#3	Secondary	671.75'	**12.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.2 cfs @ 14.22 hrs HW=671.83' (Free Discharge)
└─**1=Culvert** (Passes 0.2 cfs of 0.7 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.2 cfs)

Secondary OutFlow Max=0.7 cfs @ 14.22 hrs HW=671.83' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 0.7 cfs @ 0.69 fps)

Pond 3Pb: Organic Filter

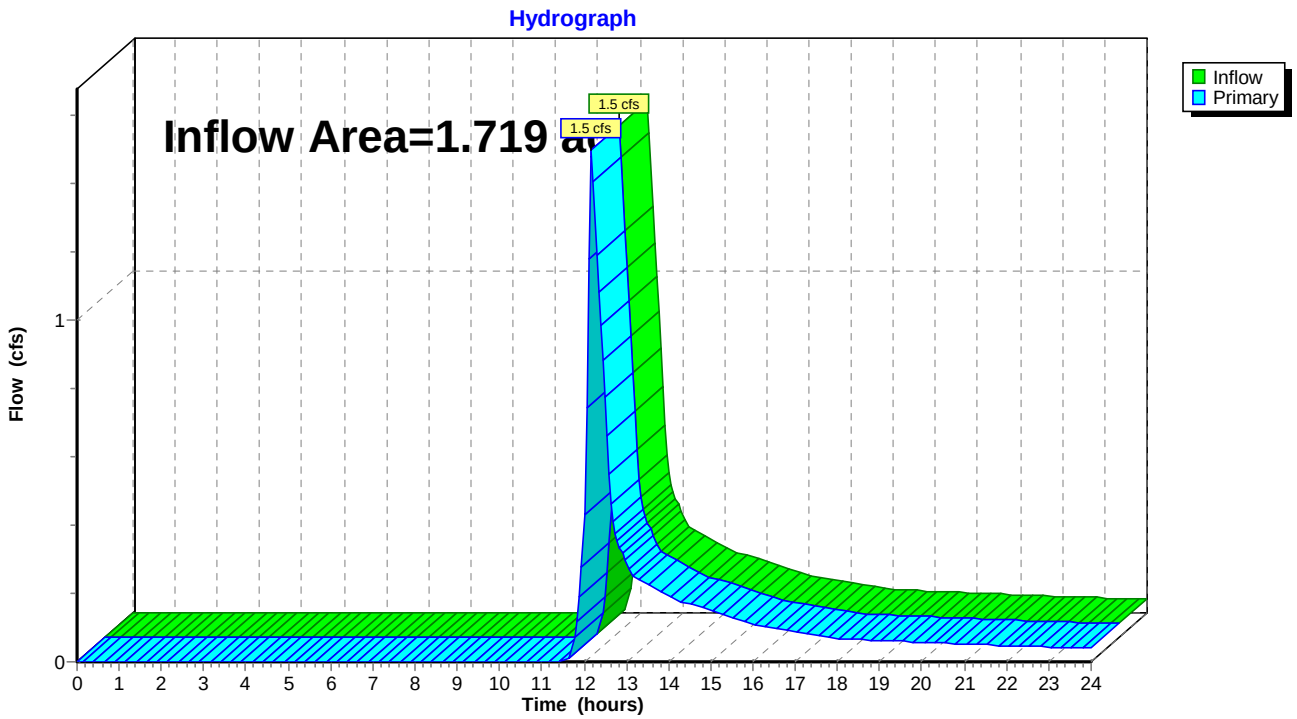


Summary for Link SP1: Western Abutter

Inflow Area = 1.719 ac, 0.00% Impervious, Inflow Depth > 1.06" for 10-Year event
Inflow = 1.5 cfs @ 12.18 hrs, Volume= 0.151 af
Primary = 1.5 cfs @ 12.18 hrs, Volume= 0.151 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP1: Western Abutter

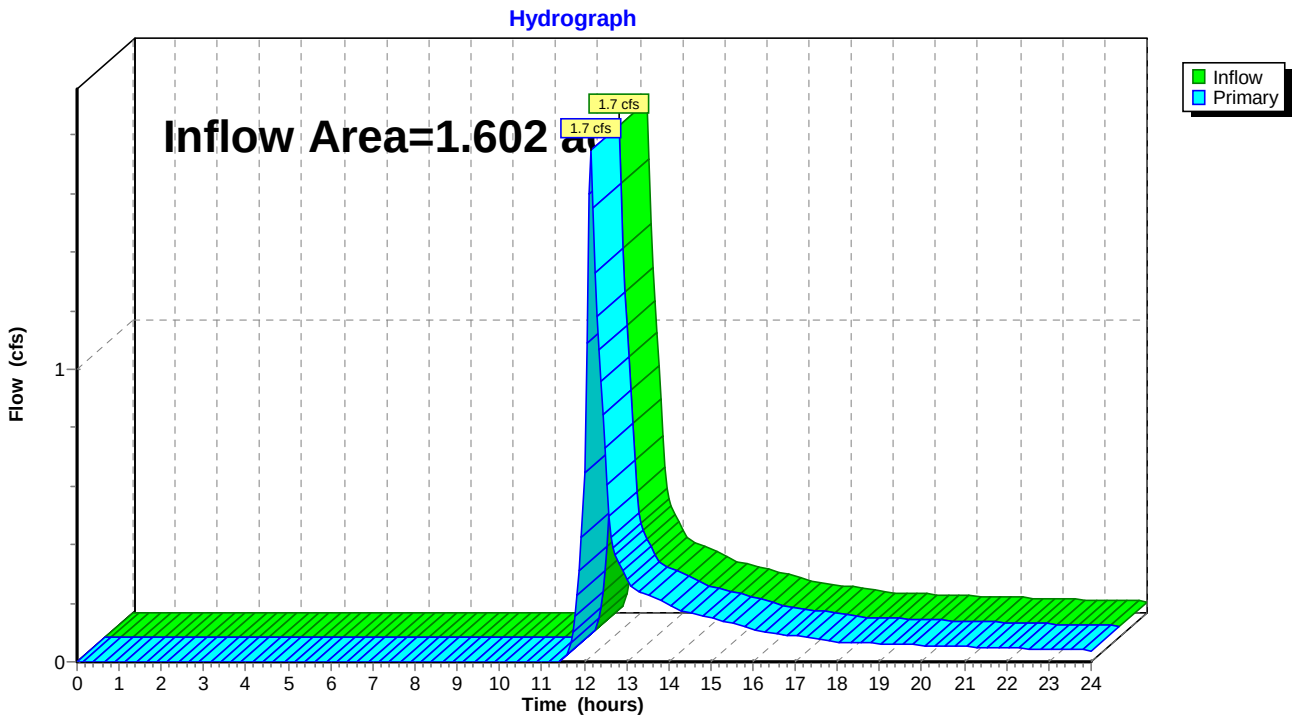


Summary for Link SP2: Eastern Abutter

Inflow Area = 1.602 ac, 2.48% Impervious, Inflow Depth > 1.18" for 10-Year event
Inflow = 1.7 cfs @ 12.15 hrs, Volume= 0.158 af
Primary = 1.7 cfs @ 12.15 hrs, Volume= 0.158 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP2: Eastern Abutter

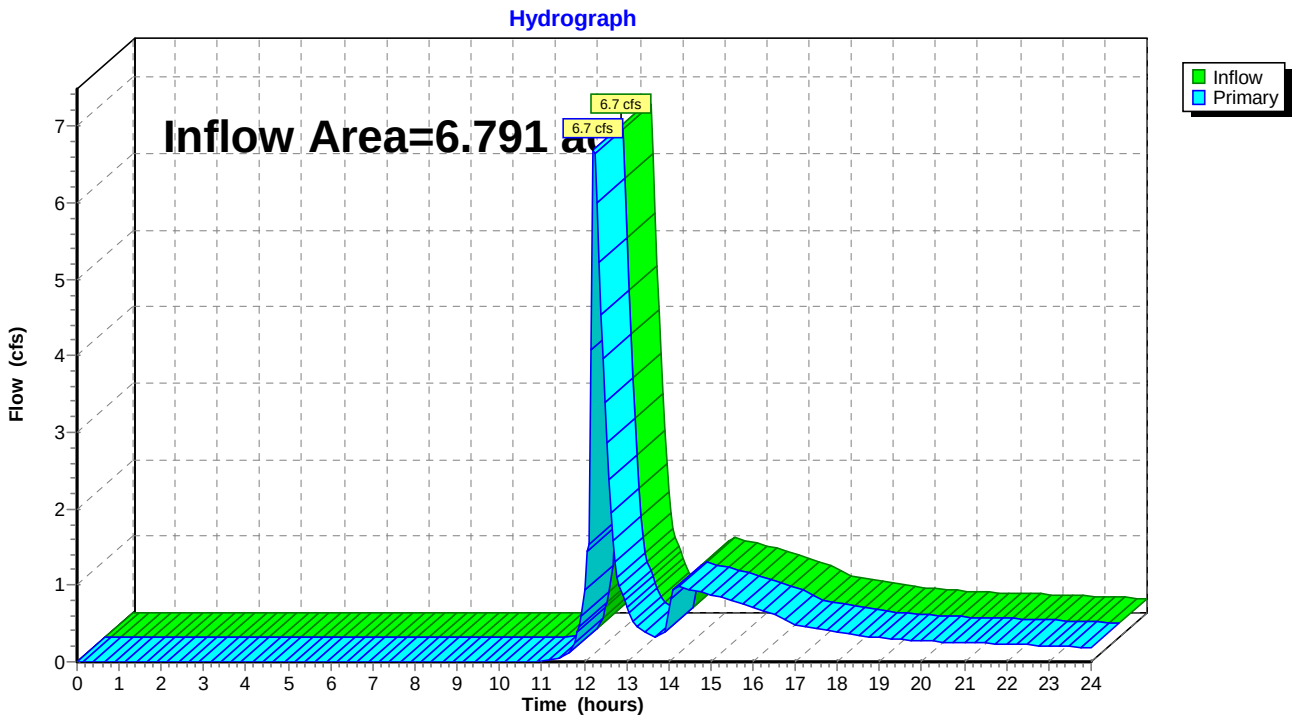


Summary for Link SP3: Gerber Drive Drainage System to Existing Detention Pond

Inflow Area = 6.791 ac, 5.17% Impervious, Inflow Depth > 1.12" for 10-Year event
Inflow = 6.7 cfs @ 12.23 hrs, Volume= 0.634 af
Primary = 6.7 cfs @ 12.23 hrs, Volume= 0.634 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP3: Gerber Drive Drainage System to Existing Detention Pond



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Subwatershed Runoff Area=74,883 sf 0.00% Impervious Runoff Depth>2.34"
Flow Length=327' Tc=10.8 min CN=58 Runoff=3.8 cfs 0.335 af

Subcatchment 2S: Subwatershed Runoff Area=69,789 sf 2.48% Impervious Runoff Depth>2.53"
Flow Length=432' Tc=8.8 min CN=60 Runoff=4.1 cfs 0.338 af

Subcatchment 3Sa: Subwatershed Runoff Area=79,196 sf 13.17% Impervious Runoff Depth>3.12"
Flow Length=392' Tc=6.9 min CN=66 Runoff=6.3 cfs 0.473 af

Subcatchment 3Sb: Subwatershed Runoff Area=155,406 sf 1.21% Impervious Runoff Depth>2.63"
Flow Length=297' Tc=8.1 min CN=61 Runoff=9.8 cfs 0.781 af

Subcatchment 3Sc: Subwatershed Runoff Area=40,019 sf 7.45% Impervious Runoff Depth>2.92"
Flow Length=156' Tc=5.0 min CN=64 Runoff=3.1 cfs 0.224 af

Subcatchment 3Sd: Subwatershed Runoff Area=21,180 sf 0.00% Impervious Runoff Depth>2.63"
Flow Length=248' Tc=5.5 min CN=61 Runoff=1.5 cfs 0.106 af

Reach 3Ca: Culvert Avg. Flow Depth=0.52' Max Vel=14.47 fps Inflow=5.9 cfs 0.472 af
12.0" Round Pipe n=0.013 L=58.0' S=0.0991 '/' Capacity=11.2 cfs Outflow=5.9 cfs 0.472 af

Reach 3Cb: Culvert Avg. Flow Depth=1.00' Max Vel=9.35 fps Inflow=9.2 cfs 0.778 af
12.0" Round Pipe n=0.013 L=30.0' S=0.0333 '/' Capacity=6.5 cfs Outflow=6.5 cfs 0.778 af

Reach 3Ra: Drainage Swale Avg. Flow Depth=0.38' Max Vel=5.14 fps Inflow=6.3 cfs 0.473 af
n=0.030 L=526.0' S=0.0627 '/' Capacity=44.2 cfs Outflow=5.9 cfs 0.472 af

Reach 3Rb: Drainage Swale Avg. Flow Depth=0.49' Max Vel=5.45 fps Inflow=9.8 cfs 0.781 af
n=0.030 L=955.0' S=0.0526 '/' Capacity=40.4 cfs Outflow=9.2 cfs 0.778 af

Pond 3Pa: Sediment Forebay Peak Elev=671.84' Storage=3,354 cf Inflow=13.6 cfs 1.356 af
Primary=1.0 cfs 0.678 af Secondary=12.5 cfs 0.664 af Outflow=13.6 cfs 1.343 af

Pond 3Pb: Organic Filter Peak Elev=671.84' Storage=5,785 cf Inflow=1.0 cfs 0.678 af
Primary=0.2 cfs 0.160 af Secondary=0.8 cfs 0.388 af Outflow=0.9 cfs 0.549 af

Link SP1: Western Abutter Inflow=3.8 cfs 0.335 af
Primary=3.8 cfs 0.335 af

Link SP2: Eastern Abutter Inflow=4.1 cfs 0.338 af
Primary=4.1 cfs 0.338 af

Link SP3: Gerber Drive Drainage System to Existing Detention Pond Inflow=14.7 cfs 1.437 af
Primary=14.7 cfs 1.437 af

Total Runoff Area = 10.112 ac Runoff Volume = 2.256 af Average Runoff Depth = 2.68"
96.14% Pervious = 9.721 ac 3.86% Impervious = 0.391 ac

Summary for Subcatchment 1S: Subwatershed

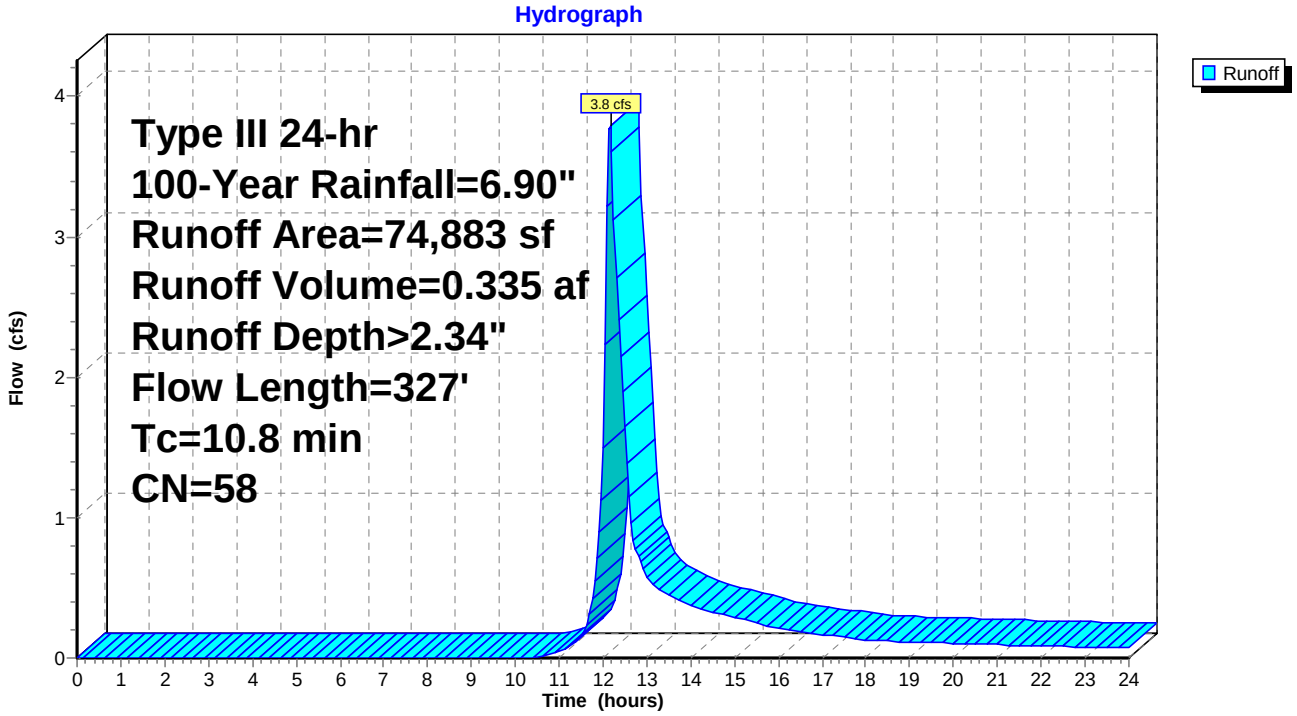
Runoff = 3.8 cfs @ 12.16 hrs, Volume= 0.335 af, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.90"

Area (sf)	CN	Description
35,752	61	>75% Grass cover, Good, HSG B
39,131	55	Woods, Good, HSG B
74,883	58	Weighted Average
74,883		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	64	0.1094	0.31		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
5.4	36	0.0830	0.11		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 3.16"
1.9	227	0.1542	1.96		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
10.8	327	Total			

Subcatchment 1S: Subwatershed



Summary for Subcatchment 2S: Subwatershed

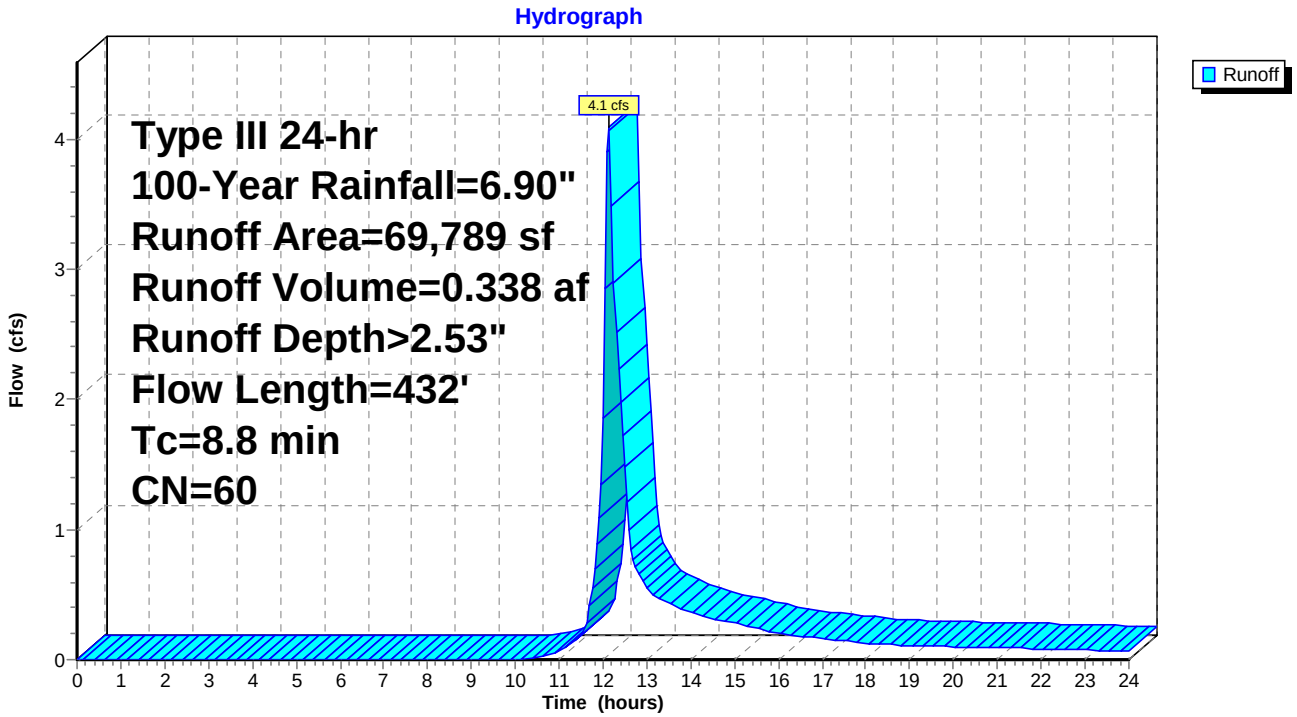
Runoff = 4.1 cfs @ 12.14 hrs, Volume= 0.338 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.90"

	Area (sf)	CN	Description
*	1,733	98	Ledge
	44,696	61	>75% Grass cover, Good, HSG B
	23,360	55	Woods, Good, HSG B
	69,789	60	Weighted Average
	68,056		97.52% Pervious Area
	1,733		2.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0600	0.26		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.4	225	0.1500	2.71		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
1.0	107	0.1215	1.74		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
8.8	432	Total			

Subcatchment 2S: Subwatershed



Summary for Subcatchment 3Sa: Subwatershed

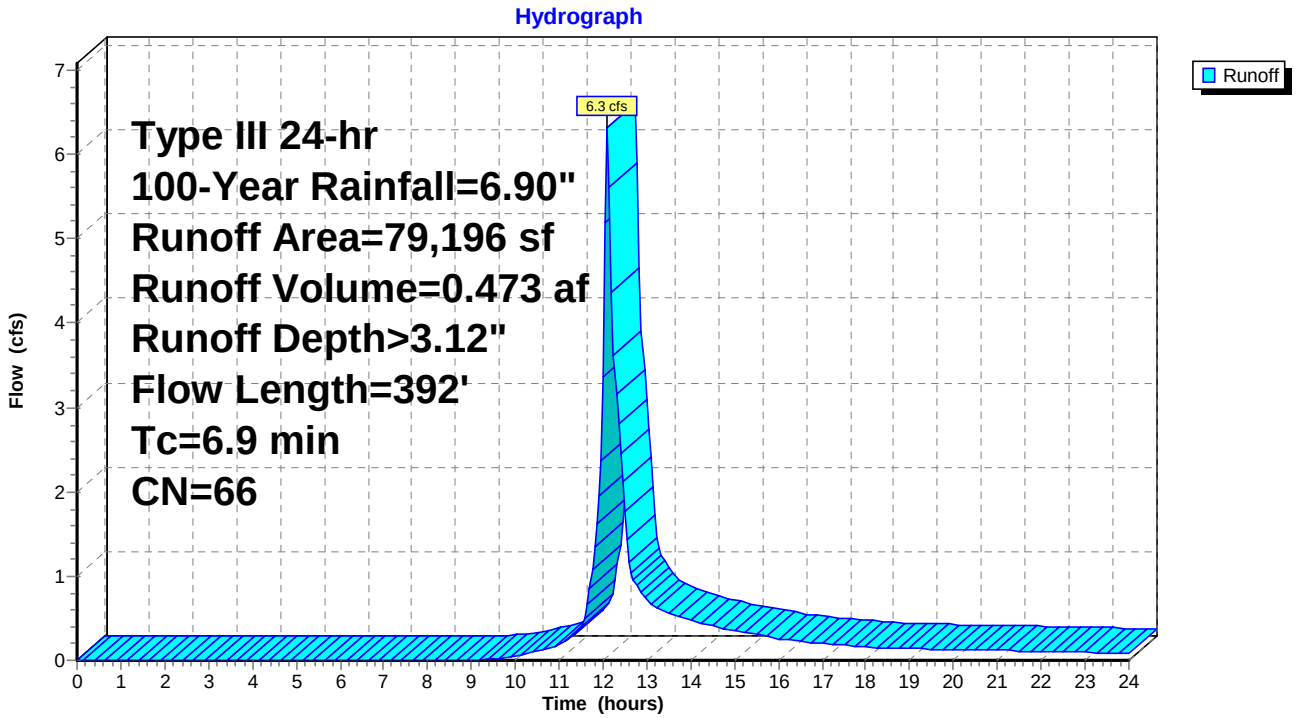
Runoff = 6.3 cfs @ 12.11 hrs, Volume= 0.473 af, Depth> 3.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.90"

	Area (sf)	CN	Description
	68,767	61	>75% Grass cover, Good, HSG B
*	10,429	98	Ledge, Panel Posts, Equipment Pad, Road
	79,196	66	Weighted Average
	68,767		86.83% Pervious Area
	10,429		13.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	100	0.1200	0.35		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
2.1	292	0.1100	2.32		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.9	392	Total			

Subcatchment 3Sa: Subwatershed



Summary for Subcatchment 3Sb: Subwatershed

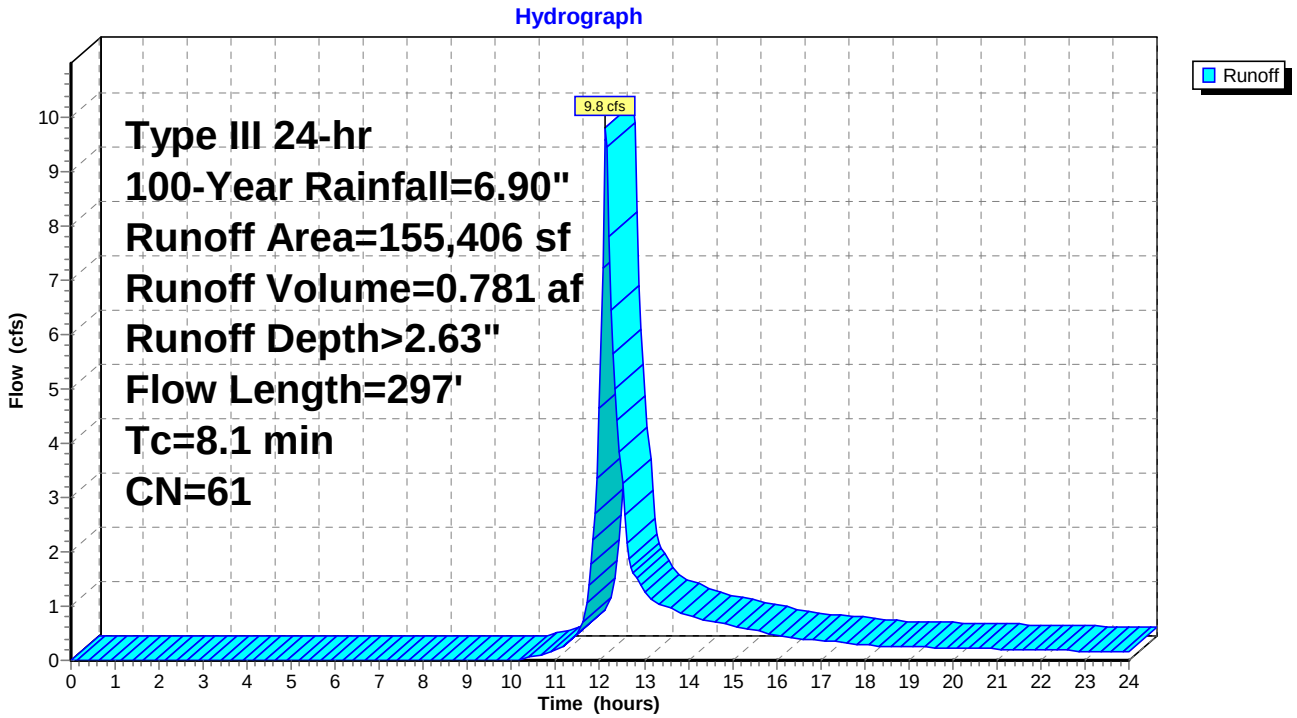
Runoff = 9.8 cfs @ 12.12 hrs, Volume= 0.781 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.90"

	Area (sf)	CN	Description
	153,531	61	>75% Grass cover, Good, HSG B
*	1,875	98	Ledge, panel posts, road
	155,406	61	Weighted Average
	153,531		98.79% Pervious Area
	1,875		1.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	100	0.0500	0.24		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.3	197	0.1269	2.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
8.1	297	Total			

Subcatchment 3Sb: Subwatershed



Summary for Subcatchment 3Sc: Subwatershed

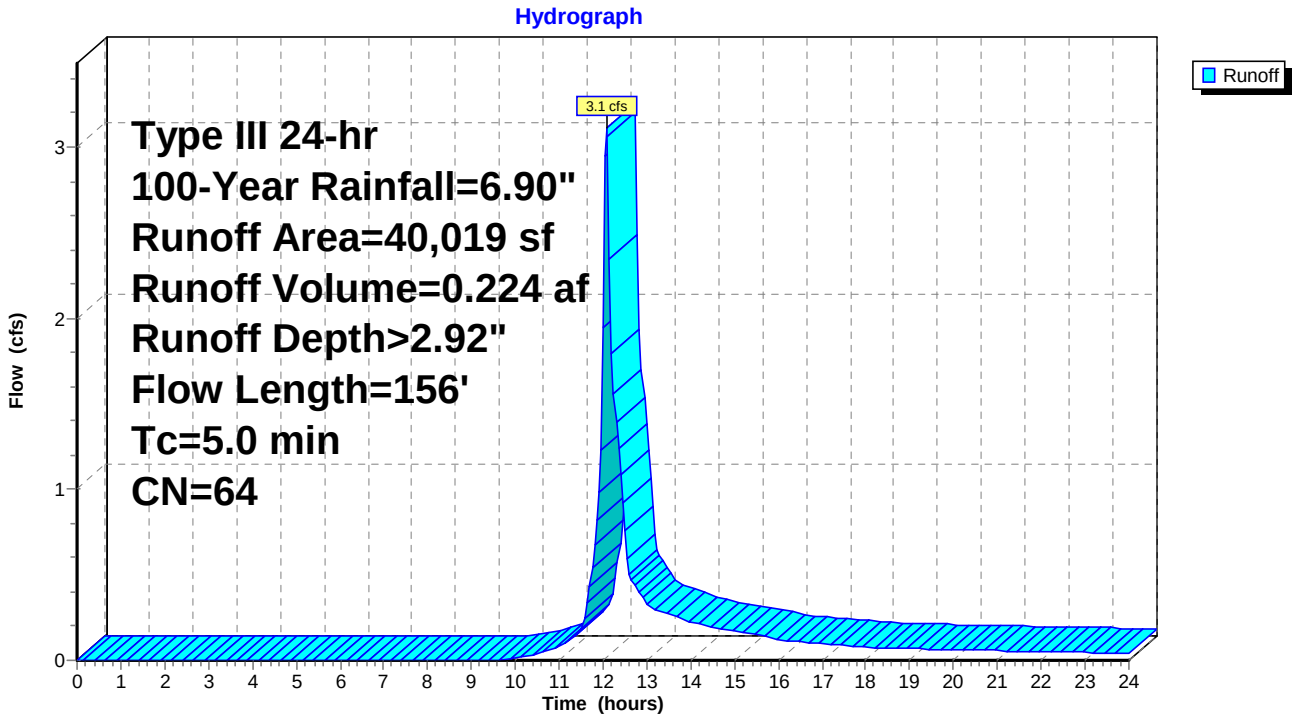
Runoff = 3.1 cfs @ 12.08 hrs, Volume= 0.224 af, Depth> 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.90"

	Area (sf)	CN	Description
	37,036	61	>75% Grass cover, Good, HSG B
*	2,983	98	Access Road
	40,019	64	Weighted Average
	37,036		92.55% Pervious Area
	2,983		7.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	100	0.1600	0.39		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
0.3	56	0.2140	3.24		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
4.6	156	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 3Sc: Subwatershed



Summary for Subcatchment 3Sd: Subwatershed

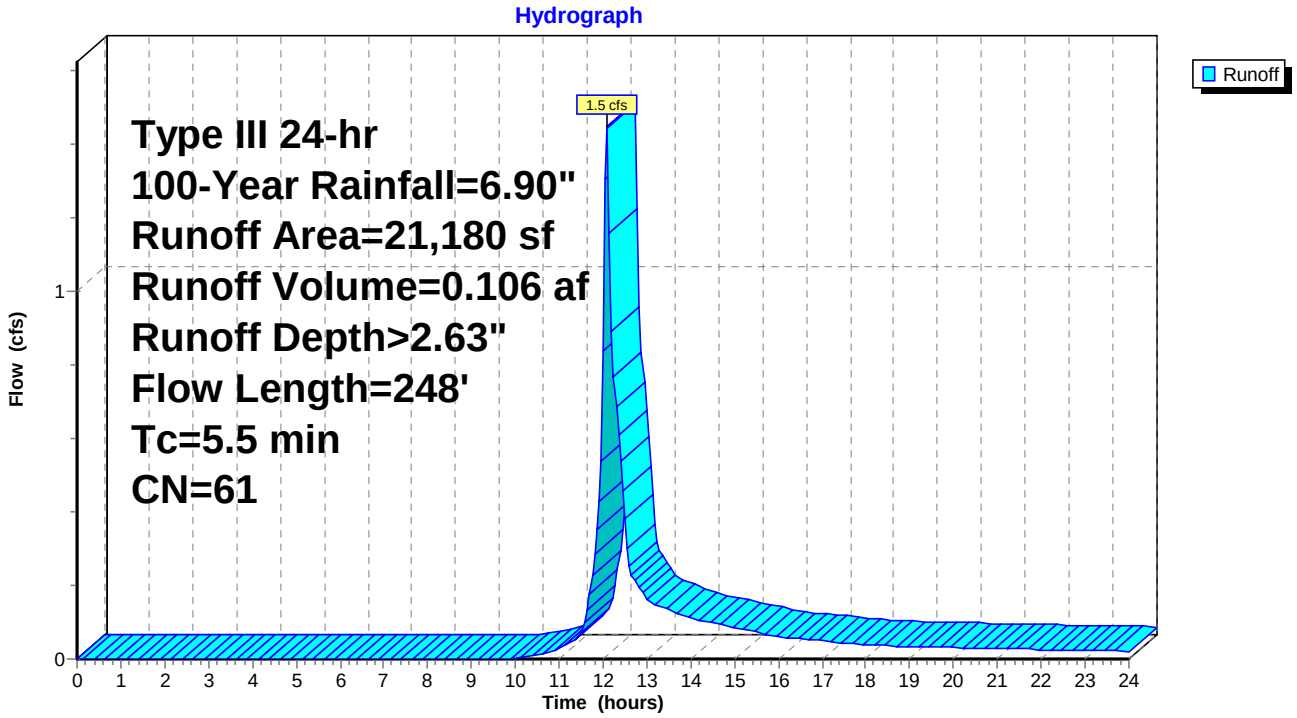
Runoff = 1.5 cfs @ 12.09 hrs, Volume= 0.106 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.90"

Area (sf)	CN	Description
21,180	61	>75% Grass cover, Good, HSG B
21,180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	100	0.1700	0.40		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.16"
1.3	148	0.0743	1.91		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
5.5	248	Total			

Subcatchment 3Sd: Subwatershed



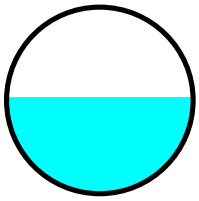
Summary for Reach 3Ca: Culvert

Inflow Area = 1.818 ac, 13.17% Impervious, Inflow Depth > 3.12" for 100-Year event
Inflow = 5.9 cfs @ 12.16 hrs, Volume= 0.472 af
Outflow = 5.9 cfs @ 12.16 hrs, Volume= 0.472 af, Atten= 0%, Lag= 0.1 min

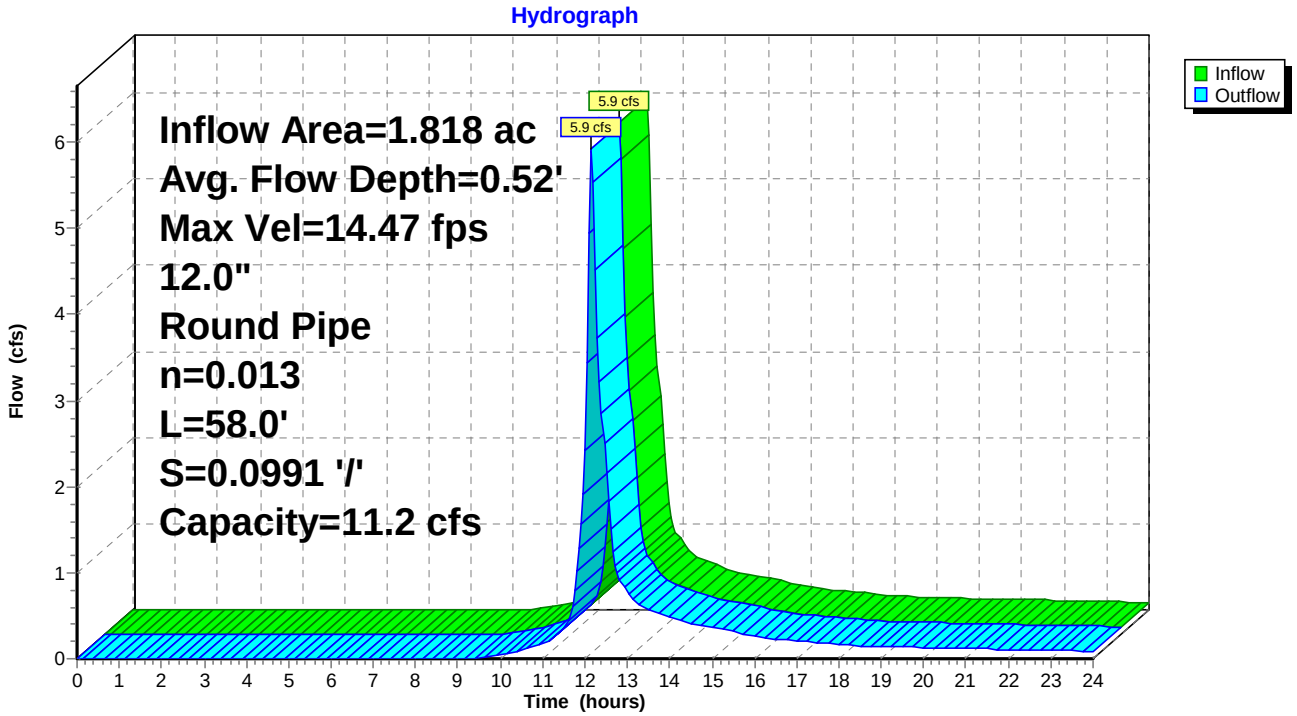
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 14.47 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.68 fps, Avg. Travel Time= 0.2 min

Peak Storage= 24 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.52'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 11.2 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 58.0' Slope= 0.0991 '/'
Inlet Invert= 675.75', Outlet Invert= 670.00'



Reach 3Ca: Culvert



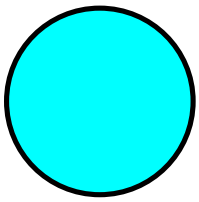
Summary for Reach 3Cb: Culvert

Inflow Area = 3.568 ac, 1.21% Impervious, Inflow Depth > 2.62" for 100-Year event
Inflow = 9.2 cfs @ 12.21 hrs, Volume= 0.778 af
Outflow = 6.5 cfs @ 12.20 hrs, Volume= 0.778 af, Atten= 29%, Lag= 0.0 min

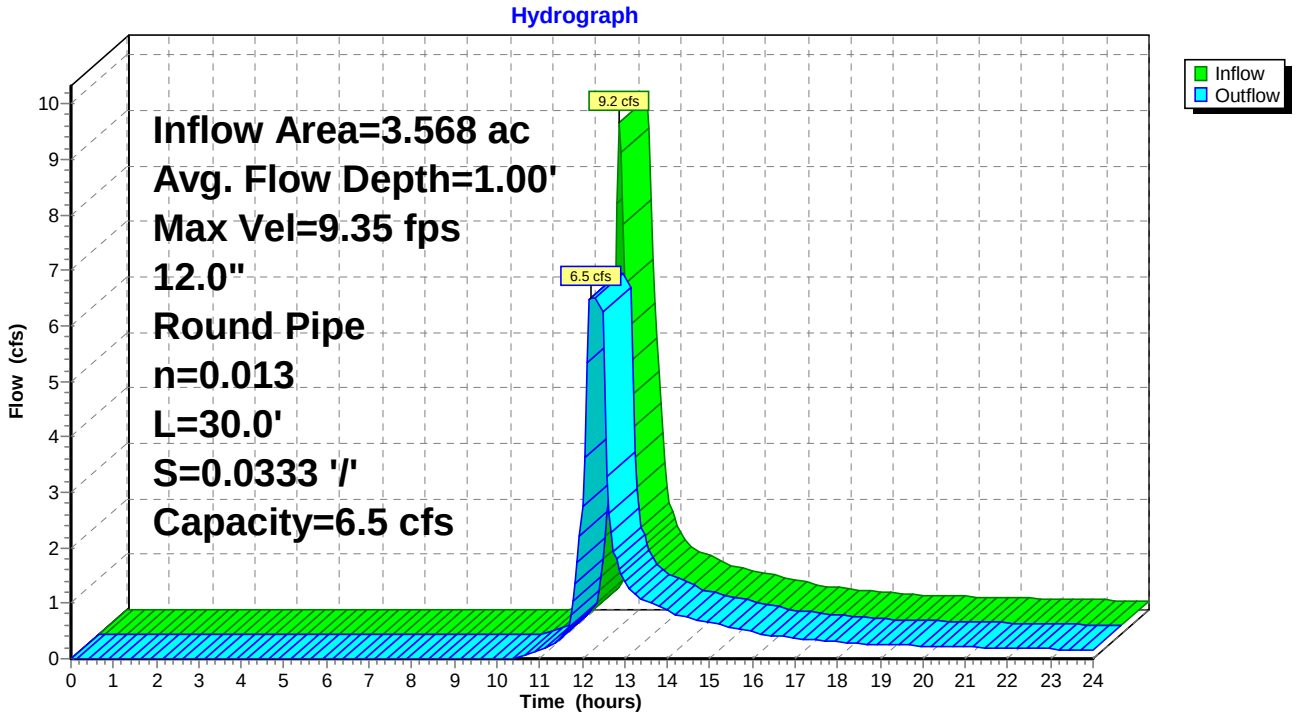
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.35 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.55 fps, Avg. Travel Time= 0.1 min

Peak Storage= 24 cf @ 12.15 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 6.5 cfs

12.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 30.0' Slope= 0.0333 '/'
Inlet Invert= 671.00', Outlet Invert= 670.00'



Reach 3Cb: Culvert



Summary for Reach 3Ra: Drainage Swale

Inflow Area = 1.818 ac, 13.17% Impervious, Inflow Depth > 3.12" for 100-Year event
Inflow = 6.3 cfs @ 12.11 hrs, Volume= 0.473 af
Outflow = 5.9 cfs @ 12.16 hrs, Volume= 0.472 af, Atten= 6%, Lag= 3.2 min

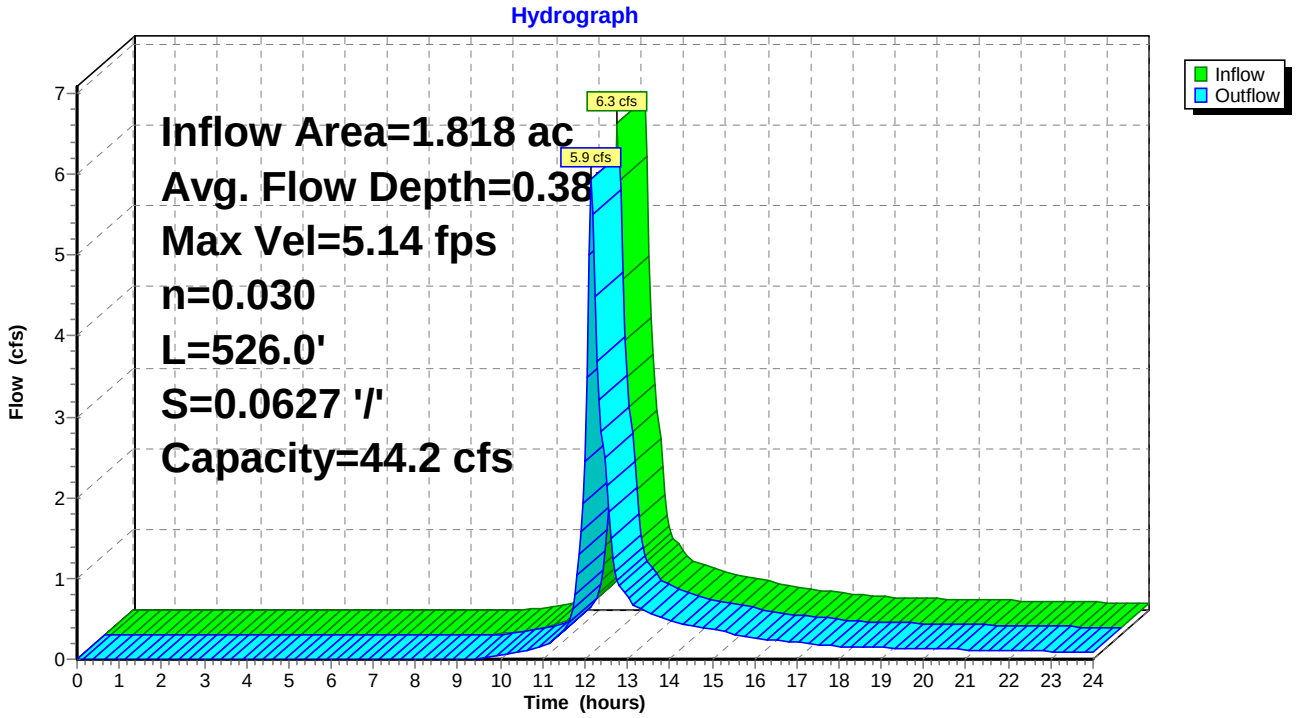
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.14 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.78 fps, Avg. Travel Time= 4.9 min

Peak Storage= 619 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 44.2 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 526.0' Slope= 0.0627 '/'
Inlet Invert= 712.00', Outlet Invert= 679.00'

‡

Reach 3Ra: Drainage Swale



Summary for Reach 3Rb: Drainage Swale

Inflow Area = 3.568 ac, 1.21% Impervious, Inflow Depth > 2.63" for 100-Year event
Inflow = 9.8 cfs @ 12.12 hrs, Volume= 0.781 af
Outflow = 9.2 cfs @ 12.21 hrs, Volume= 0.778 af, Atten= 6%, Lag= 5.4 min

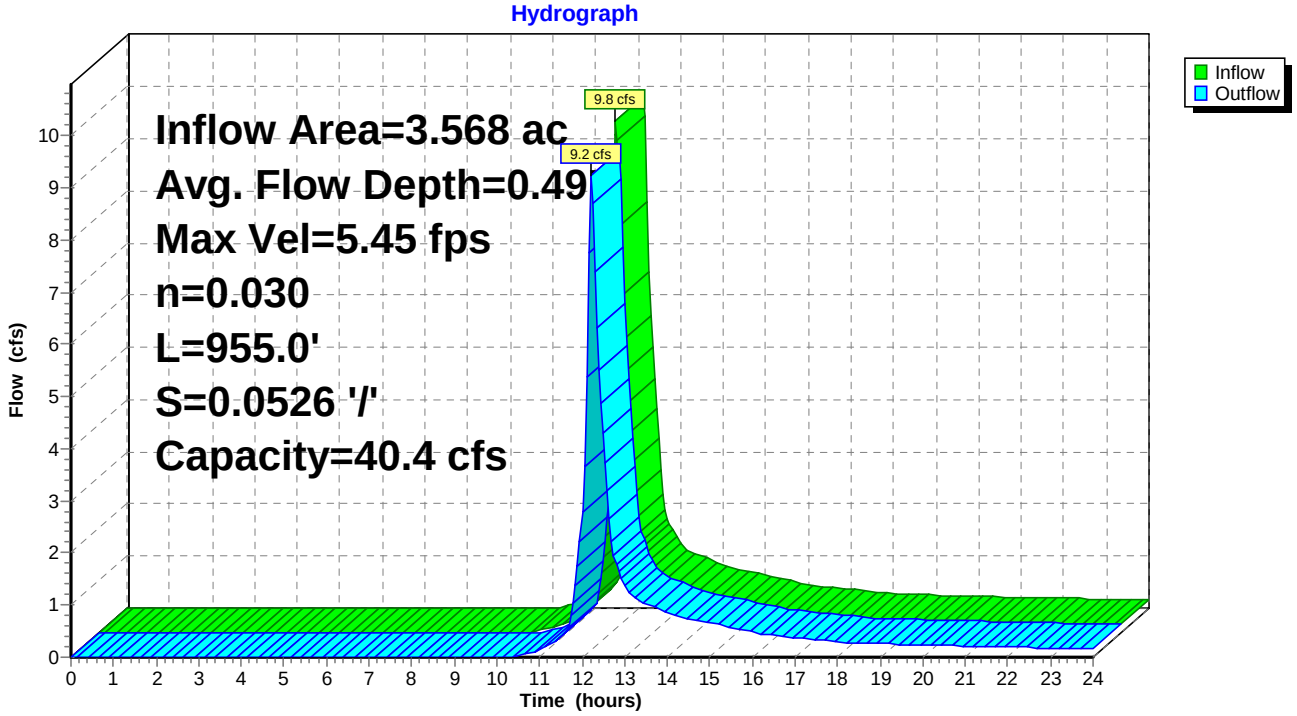
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.45 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 2.06 fps, Avg. Travel Time= 7.7 min

Peak Storage= 1,618 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 1.00' Flow Area= 5.0 sf, Capacity= 40.4 cfs

2.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 8.00'
Length= 955.0' Slope= 0.0526 '/'
Inlet Invert= 724.00', Outlet Invert= 673.75'

‡

Reach 3Rb: Drainage Swale



Summary for Pond 3Pa: Sediment Forebay

Inflow Area =	5.872 ac,	4.81% Impervious,	Inflow Depth >	2.77"	for 100-Year event
Inflow =	13.6 cfs @	12.16 hrs,	Volume=	1.356 af	
Outflow =	13.6 cfs @	12.17 hrs,	Volume=	1.343 af,	Atten= 0%, Lag= 0.7 min
Primary =	1.0 cfs @	12.17 hrs,	Volume=	0.678 af	
Secondary =	12.5 cfs @	12.17 hrs,	Volume=	0.664 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 671.84' @ 12.17 hrs Surf.Area= 2,113 sf Storage= 3,354 cf
Flood Elev= 672.00' Surf.Area= 2,205 sf Storage= 3,619 cf

Plug-Flow detention time= 21.3 min calculated for 1.340 af (99% of inflow)
Center-of-Mass det. time= 15.8 min (869.6 - 853.9)

Volume	Invert	Avail.Storage	Storage Description
#1	669.65'	6,150 cf	**Custom Stage Data (Prismatic)** Listed below

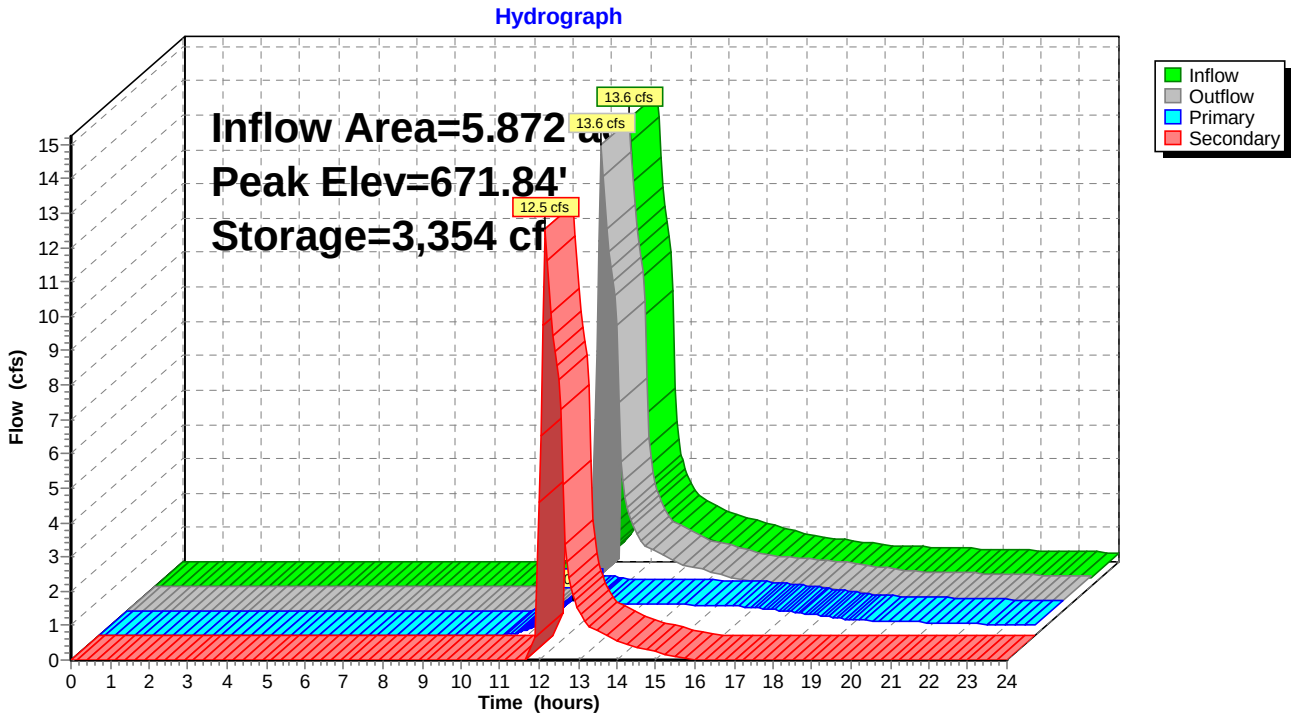
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
669.65	895	0	0
670.00	1,070	344	344
672.00	2,205	3,275	3,619
673.00	2,857	2,531	6,150

Device	Routing	Invert	Outlet Devices
#1	Primary	669.65'	**6.0" Round Culvert** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 669.65' / 669.65' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Secondary	671.30'	**12.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=1.0 cfs @ 12.17 hrs HW=671.83' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.0 cfs @ 5.28 fps)

Secondary OutFlow Max=12.2 cfs @ 12.17 hrs HW=671.83' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 12.2 cfs @ 1.92 fps)

Pond 3Pa: Sediment Forebay



Summary for Pond 3Pb: Organic Filter

Inflow Area = 5.872 ac, 4.81% Impervious, Inflow Depth > 1.39" for 100-Year event
Inflow = 1.0 cfs @ 12.17 hrs, Volume= 0.678 af
Outflow = 0.9 cfs @ 13.71 hrs, Volume= 0.549 af, Atten= 12%, Lag= 92.4 min
Primary = 0.2 cfs @ 13.71 hrs, Volume= 0.160 af
Secondary = 0.8 cfs @ 13.71 hrs, Volume= 0.388 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 671.84' @ 13.71 hrs Surf.Area= 2,793 sf Storage= 5,785 cf
Flood Elev= 672.00' Surf.Area= 2,890 sf Storage= 6,159 cf

Plug-Flow detention time= 133.1 min calculated for 0.548 af (81% of inflow)
Center-of-Mass det. time= 58.0 min (1,038.8 - 980.8)

Volume	Invert	Avail.Storage	Storage Description
#1	667.65'	9,388 cf	**Custom Stage Data (Prismatic)** Listed below

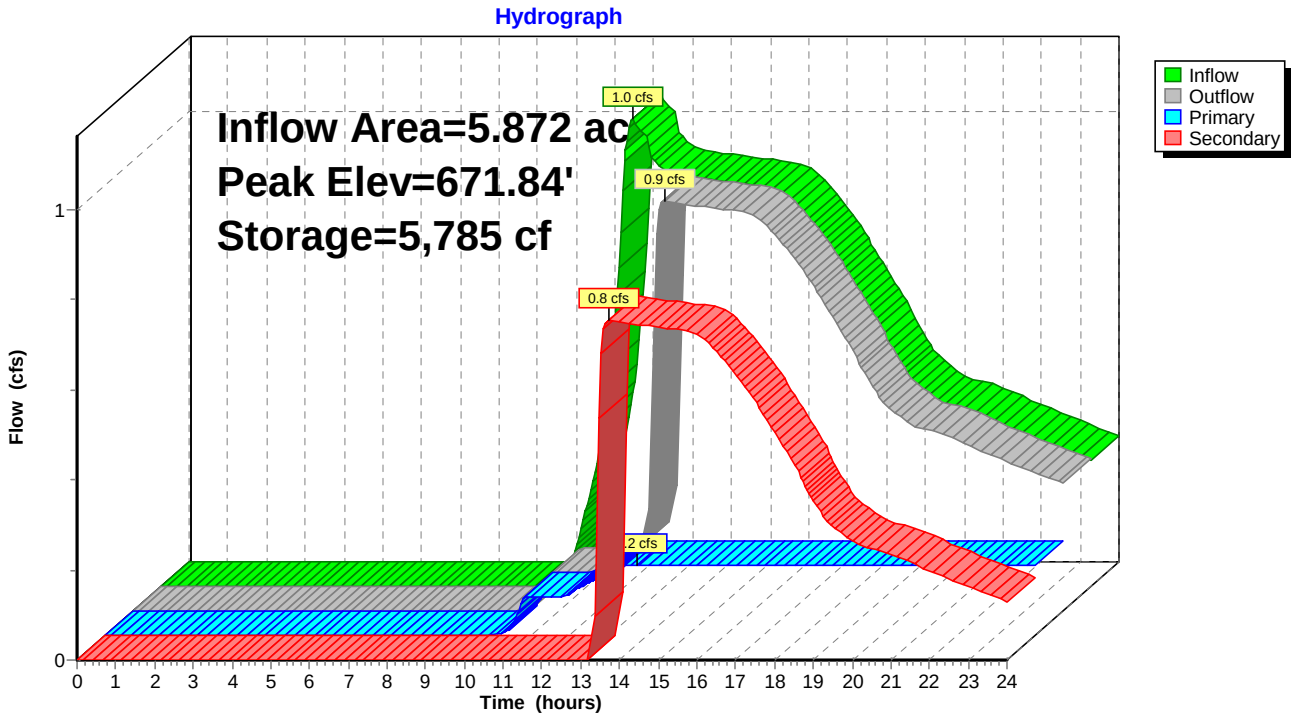
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
667.65	1,519	0.0	0	0
669.65	1,519	33.0	1,003	1,003
670.00	1,703	100.0	564	1,566
672.00	2,890	100.0	4,593	6,159
673.00	3,568	100.0	3,229	9,388

Device	Routing	Invert	Outlet Devices
#1	Primary	666.98'	**4.0" Round Culvert** L= 30.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 666.98' / 666.98' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.09 sf
#2	Device 1	667.65'	**2.410 in/hr Exfiltration over Surface area**
#3	Secondary	671.75'	**12.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=0.2 cfs @ 13.71 hrs HW=671.84' (Free Discharge)
└─**1=Culvert** (Passes 0.2 cfs of 0.7 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.2 cfs)

Secondary OutFlow Max=0.7 cfs @ 13.71 hrs HW=671.84' (Free Discharge)
└─**3=Broad-Crested Rectangular Weir** (Weir Controls 0.7 cfs @ 0.70 fps)

Pond 3Pb: Organic Filter

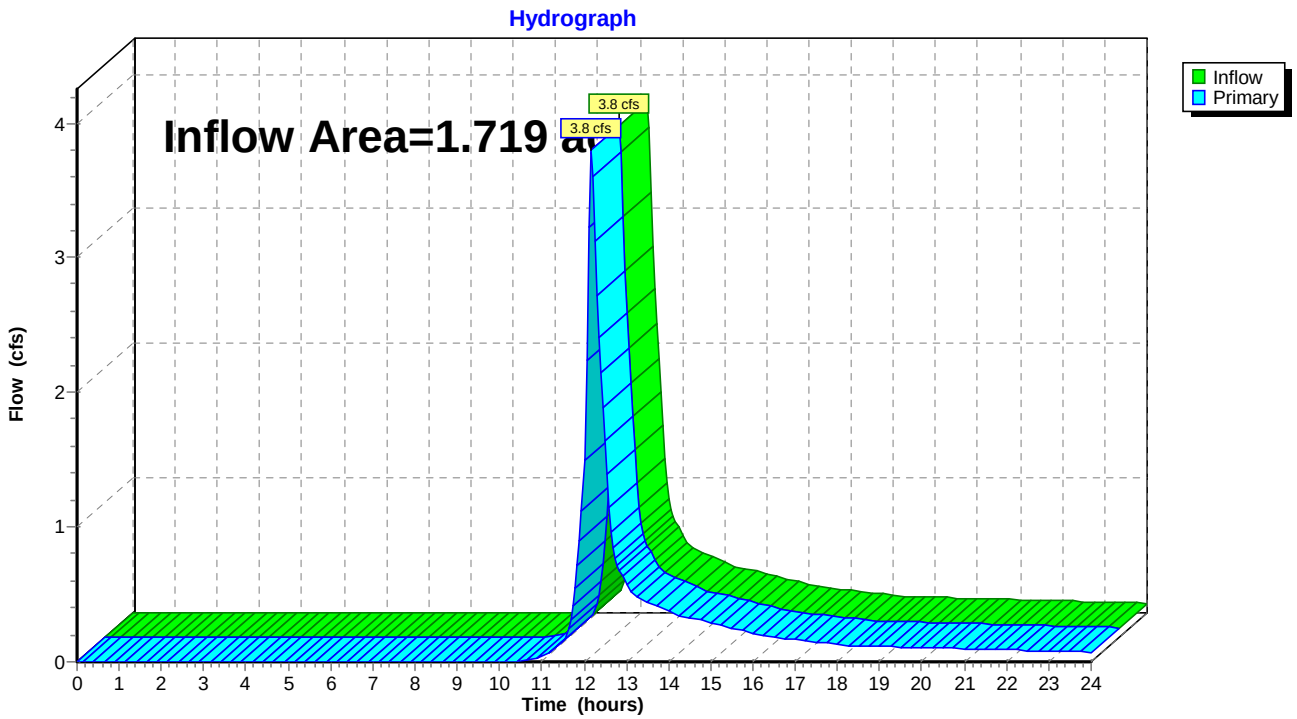


Summary for Link SP1: Western Abutter

Inflow Area = 1.719 ac, 0.00% Impervious, Inflow Depth > 2.34" for 100-Year event
Inflow = 3.8 cfs @ 12.16 hrs, Volume= 0.335 af
Primary = 3.8 cfs @ 12.16 hrs, Volume= 0.335 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP1: Western Abutter

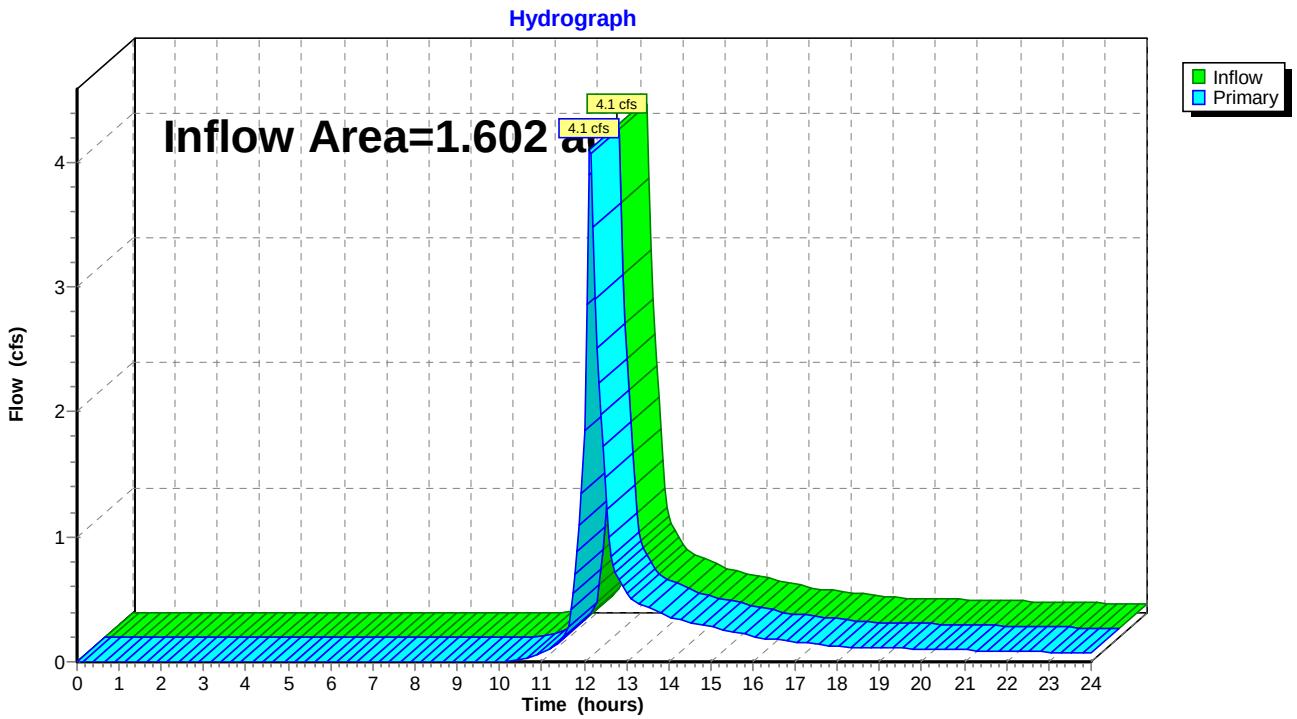


Summary for Link SP2: Eastern Abutter

Inflow Area = 1.602 ac, 2.48% Impervious, Inflow Depth > 2.53" for 100-Year event
Inflow = 4.1 cfs @ 12.14 hrs, Volume= 0.338 af
Primary = 4.1 cfs @ 12.14 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP2: Eastern Abutter

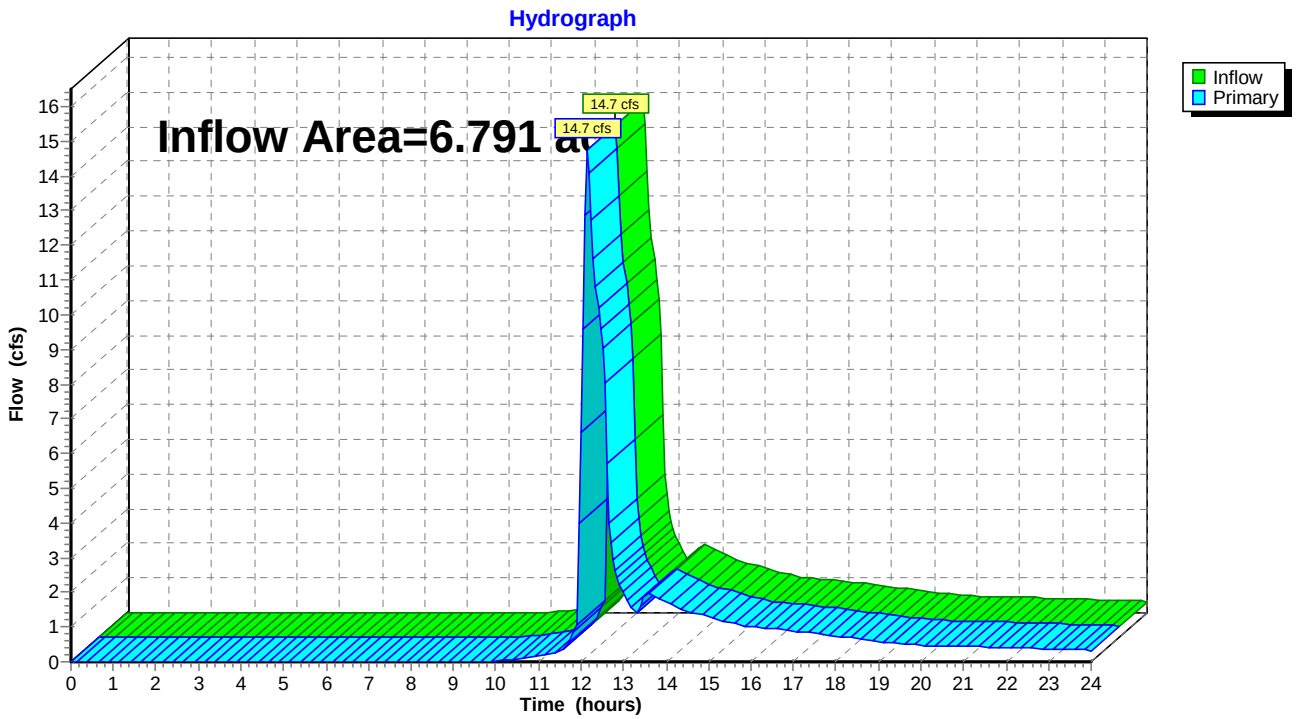


Summary for Link SP3: Gerber Drive Drainage System to Existing Detention Pond

Inflow Area = 6.791 ac, 5.17% Impervious, Inflow Depth > 2.54" for 100-Year event
Inflow = 14.7 cfs @ 12.16 hrs, Volume= 1.437 af
Primary = 14.7 cfs @ 12.16 hrs, Volume= 1.437 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link SP3: Gerber Drive Drainage System to Existing Detention Pond



WOODARD & CURRAN

CLIENT TGC
PROJECT Gerber Drive Solar
DESIGNED BY AEA DATE 5-7-16
CHECKED BY DATE
PROJECT NO. 228051.02 SHEET NO. 1 OF 2

Pollutant Renovation Analysis - Requirement #4
Tolland LID & SW Design Manual

$L = 0.226(P)(P_j)(R_v)(C)(A)$ = Pollutant Load (lbs)

P = rainfall Depth = 1"

P_j = correction factor = 0.9

R_v = Runoff Coefficient

$= 0.05 + 0.009(I)$

→ Pre-Development = 0.0856

→ Post-Development:

Untreated = 0.0896

Treated = 0.0932

I = Site Impervious Coverage (%)

→ Pre-Development = $\frac{0.33\ ac}{8.35\ ac}$ = 3.95%

→ Post-Development:

Untreated = $\frac{0.109\ ac}{2.48\ ac}$ = 4.4%

Treated = $\frac{0.282\ ac}{5.87\ ac}$ = 4.8%

C = Pollutant Concentration (mg/L)
(from table 4.5.a of Manual)

→ Pre-Development Land Use = Forest

→ Post-Development Land Use = Pasture

A = Area

→ Pre-Development = 8.35 ac

→ Post-Development:

Untreated = 2.48 ac

Treated = 5.87 ac

CLIENT TGC
PROJECT Gerber Drive Solar
DESIGNED BY AEA DATE 5-3-16
CHECKED BY DATE
PROJECT NO. 228051.02 SHEET NO. 2 OF 2

.1113

Pollutant	Pre-C	Pre-L	Post-C	Post-L Untreated	Organic Filter Removal Efficiency	Post-L Treated	Post-L Total	Post ≤ Pre?
TSS	90	13.09	145	6.53	88%	1.937	8.47	YES
TP	0.1	0.01454	0.38	0.0171	61%	0.01649	0.0336	MAXIMUM EXTENT FEASIBLE*
TN	1.5	0.218	2.2	0.099	41%	0.1445	0.244	MAXIMUM EXTENT FEASIBLE*
Zn	Ø	Ø	Ø	Ø	89%	Ø	Ø	Yes
TPH	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Yes
DIN	0.215	0.0313	0.65	0.0293	35%	0.047	0.0763	MAXIMUM EXTENT FEASIBLE*

WOODARD & CURRAN

* Note: In accordance with the Manual, new development projects initiated by the Town itself shall comply with the standards set forth in the Manual only where feasible.

WOODARD & CURRAN

CLIENT TGC
PROJECT Gerber Drive Solar
DESIGNED BY AEA DATE 4-12-16
CHECKED BY _____ DATE _____
PROJECT NO. 228051.02 SHEET NO. 1 OF 1

Water Quality Flow - Requirement #8
Tolland LID & Stormwater Design Manual

$$\text{Modified } CN = \frac{1{,}000}{\left(10 + 5P + 10Q - 10\sqrt{Q^2 + 1.25QP}\right)}$$

P = rainfall depth = 1.2"

$$Q = \text{Runoff Volume} = \frac{WQ\cancel{V}}{A} = \frac{6{,}060 \text{ CF}}{8.35 \text{ Acres}} = 0.1999''$$

$\rightarrow CN = 82.2$

① $I_a = \frac{200}{CN} - 2 = 0.433$

② $\frac{I_a}{P} = 0.361$

③ qu from TR-55 Exhibit 4-III using $T_c = 8.4$ minutes:

Approximately 60 cfs/mi²/inch

④ $WQf = (qu)AQ$

$$= (60 \text{ cfs/mi}^2\text{/in})(0.01305 \text{ mi}^2)(0.1999'') \Rightarrow 0.1565 \text{ cfs}$$

APPENDIX H: O&M PLAN

OPERATION & MAINTENANCE PLAN

TGC – Gerber Drive Solar Project

97 Gerber Drive
Tolland, CT

228051.02
WR-TGV Solar Generation XVI, LLC
May 2016

woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

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APPENDICES

Appendix A: Organic Filter Inspection Checklist

1. INTRODUCTION

1.1 BACKGROUND

This Operations & Maintenance Plan (Plan) outlines measures that are essential for maintaining an effective solar facility, including site access and stormwater management systems, located at 97 Gerber Drive in Tolland, Connecticut (the Site). Periodic and scheduled inspections and maintenance measures are recommended to prevent deficiencies and to ensure proper performance of the facility and its associated stormwater management system.

1.2 RESPONSIBLE PARTIES

A Ground Lease Agreement will be executed between the Town of Tolland (Lessor) and WR-TGC Solar Generation XVI, LLC, (TGC, Lessee) outlining the responsibilities described below. TGC is the Operator of the Site, and will be the responsible party for implementing this Plan within the limits of the leased premises, which includes the following operations and maintenance activities:

- Maintaining and monitoring the solar/electrical system;
- Maintaining the access road to the Site;
- Snow removal and plowing, as necessary to accommodate operations and maintenance activities;
- Grounds maintenance, including the maintenance of grass cover;
- Mowing of the grass cover as needed on an annual basis; and
- Inspecting, monitoring, and maintaining the drainage swales, stone check dams, level spreader, field drains, culverts, sediment forebay, and organic filter.

1.2.1 Contact Information

Land Owner (Lessor):	Town of Tolland 21 Tolland Green Tolland, CT 06084 Tel: 860-871-3600
Site Operator (Lessee):	WR-TGC Solar Generation XVI, LLC 18 Kings Highway North Westport, CT 06880 Tel: 212-376-6114
Site Contractor	Winter Hill Farm & Solar Joseph Hollenbeck 11 Syd Smith Road Westminster, MA 01473 978-424-6422

2. MAINTENANCE MEASURES

Maintenance activities shall be implemented in a manner that minimizes impacts to the surrounding environment. All components of the Site shall be operated and maintained in accordance with the design plans, and as outlined below.

2.1 SOLAR PHOTOVOLTAIC SYSTEM

The Operator shall provide the labor, equipment, and software necessary to monitor, respond to, and maintain the system. The Operator will provide maintenance and monitoring of the solar/electrical equipment, including annual checks of wiring, inverters, system performance, etc. This work will be performed in addition to the work associated with the grounds maintenance as described herein. All work will be conducted in conformance with the warranties, provisions, and requirements established in the Agreement with the Town of Tolland.

The facility will be operated in compliance with prudent industry practices and in accordance with applicable law. The Operator shall obtain and maintain the required licenses and permits required to operate and maintain the system; basic services include specific activities, if any, required by the license or permit governing the operation of the system. The Operator shall provide additional system information as requested by the Owner.

2.2 SITE ACCESS

Remove snow such that the road access remains open for operations and maintenance actives.

2.3 PERVIOUS AREAS

Pervious areas include all grassed or landscaped areas associated with the Site and the stormwater management system. For one year following construction, water the newly seeded areas, reseed areas that become barren, and repair gullies to establish adequate vegetation quickly to reduce the potential for erosion and to ensure the functionality of the stormwater management system. Continue to maintain grass cover and revegetate areas that become barren after the first year. Inspect pervious areas at least annually for evidence of sediment deposition and vegetation dieback. Remove any deposited sediment and revegetate as necessary. Replace any eroded soil from the qualifying pervious area. Mow grass annually or as needed such that vegetation is maintained. Remove wooded plants which exceed one inch in diameter.

2.4 STORMWATER MANAGEMENT SYSTEM

2.4.1 Drainage Swales & Stone Check Dams

Frequently inspect the drainage swale and associated stone check dams during the first few months after construction and annually thereafter to make sure vegetation is adequate and to check for signs of rilling and gullying; remove debris, replace dead vegetation, and repair any rills or gullies. Inspections shall also check for slope integrity, soil moisture, vegetative health, soil stability, soil compaction, soil erosion, ponding, and sediment accumulation. Mow and reseed drainage swales as necessary. Remove sediment and debris manually, as needed.

2.4.2 Level Spreader

Conduct inspections and provide preventative maintenance to confirm the level spreader is stabilized and functioning properly after every major storm during the first 3 months of operation and annually thereafter. Note and repair any erosion or low spots in the spreader. Mow and reseed as necessary. Remove sediment and debris manually, as needed.

2.4.3 Organic Filter

The surface of the organic filter shall be inspected every six months and trash/debris shall be removed as needed. If water is ponding for more than four days, the surface has likely become clogged with fine sediment. The top six inches (minimum) of material shall be removed and replaced with new media meeting the design specification and re-planted. The Filter shall be inspected annually for proper growth of grass material. The height of vegetation on the surface of an organic filter shall not exceed 18 inches. Sediment should be removed from the forebay when accumulated depth is 6 inches.

A sample inspection checklist has been provided in Appendix A.

3. SPILL PREVENTION

The proposed solar development will not utilize hazardous materials on the Site. Solar panels do not require cleaning with detergents; if needed, panels shall be cleaned with water. Transformers will be housed on concrete pads.

The only potential hazards for the Site will be the occasional maintenance vehicles. Spills and leaks shall be avoided through frequent inspection of equipment. Heavy equipment and other vehicles used at the Site shall be routinely inspected for leaks and repaired as necessary. Appropriate cleanup procedures and supplies shall be made available on-site and should be clearly marked so that all personnel can locate and access these supplies quickly.

Spills shall be cleaned up immediately following proper response procedures and in accordance with any applicable regulatory requirements. At no time shall spills be cleaned and flushed down storm drains or into any environmentally sensitive area (i.e. stream, pond, wetland, etc.).

Equipment/vehicle fueling and repair/maintenance operations or hazardous material storage shall not take place on Site. Designated areas shall be approved by the Owner.

APPENDIX A: ORGANIC FILTER INSPECTION CHECKLIST

Filtering Practices – Sand and Organic Filters

Project/Location: _____

"As Built" Plans Available? _____

Date/Time: _____

Days Since Previous Rainfall and Rainfall Amount: _____

Inspector: _____

Maintenance Item	Satisfactory	Unsatisfactory	Comments
1. Debris Cleanout			
○ Filtration facility clean of debris			
○ Inlet and outlets clear of debris			
2. Oil and Grease			
○ No evidence of filter surface clogging			
○ Activities in drainage area minimize oil and grease entry			
3. Vegetation			
○ Contributing drainage area stabilized			
○ No evidence of erosion			
○ Area mowed and clipping removed			
4. Water Retention			
○ Water holding chambers at normal pool			
○ Filter chamber dewaters between storms			
○ No evidence of leakage			
5. Sediment Accumulation			
○ Approximate depth of accumulated sediment			
○ Depth of sediment in forebay or sump should not be more than 12 inches or 10 percent of the pretreatment volume			
○ Sediment accumulation on filter bed does not exceed 1" or drawdown time does not exceed 36 to 48 hours			
6. Structural Components			
○ No evidence of structural deterioration			
○ Grates are in good condition			
○ No evidence of spalling or cracking of structural parts			
7. Outlet/Overflow Spillway			
○ Good condition, no need for repairs			
○ No evidence of erosion (if draining into a natural channel)			

Maintenance Item	Satisfactory	Unsatisfactory	Comments
8. Overall Function of Facility			
○ No evidence of flow bypassing facility			
○ No noticeable odors outside facility			
Actions to Be Taken:			
To Be Completed By (Date):			

Source: Adapted from Watershed Management Institute, Inc. 1997. Operation, Maintenance, and Management of Stormwater Management Systems, in cooperation with U.S. Environmental Protection Agency, Office of Water. Washington, D.C.

APPENDIX I: DETENTION POND DESIGN LETTER

GARDNER & PETERSON ASSOCIATES, LLC

PROFESSIONAL ENGINEERS • LAND SURVEYORS

178 HARTFORD TURNPIKE
TOLLAND, CONNECTICUT 06084

TELEPHONE (860) 871-0808
FAX (860) 875-2086
EMAIL info@GardnerPeterson.com

BARRY D. CLARKE, L.S.
SUSAN E. JAMAITUS, L.S.
ERIC R. PETERSON, P.E.
KENNETH R. PETERSON, L.S.
MARK A. PETERSON, P.E.
HENRY P. TORCELLINI, P.E.

EVERETT O. GARDNER, P.E., L.S. Emeritus

R.O.R. 53

May 21, 2007

Mr. Steve Werbner, Town Manager
Town of Tolland
21 Tolland Green
Tolland, CT 06084

Re: Tolland Business Park
Stormwater Management System

Dear Steve:

At this time, I have submitted site plans and drainage calculations for the Star Hill Family Athletic Center located on Lot 11 within the Tolland Business Park.

The storm drainage system for Lot 11 incorporates an infiltration/detention system, grass swales and a hydrodynamic separator prior to discharge in the proposed detention basin located on Lot 9. The conveyance system is designed to handle runoff from a 15 year design storm as required by Town regulations. The detention basin will collect runoff from Lots 9, 10 and 11 and approximately 500' of the extension of Gerber Drive. This basin includes a sediment forebay and is designed to provide zero increase in runoff from a 2,5,10, 15, 25, 50 and 99 year storm frequency.

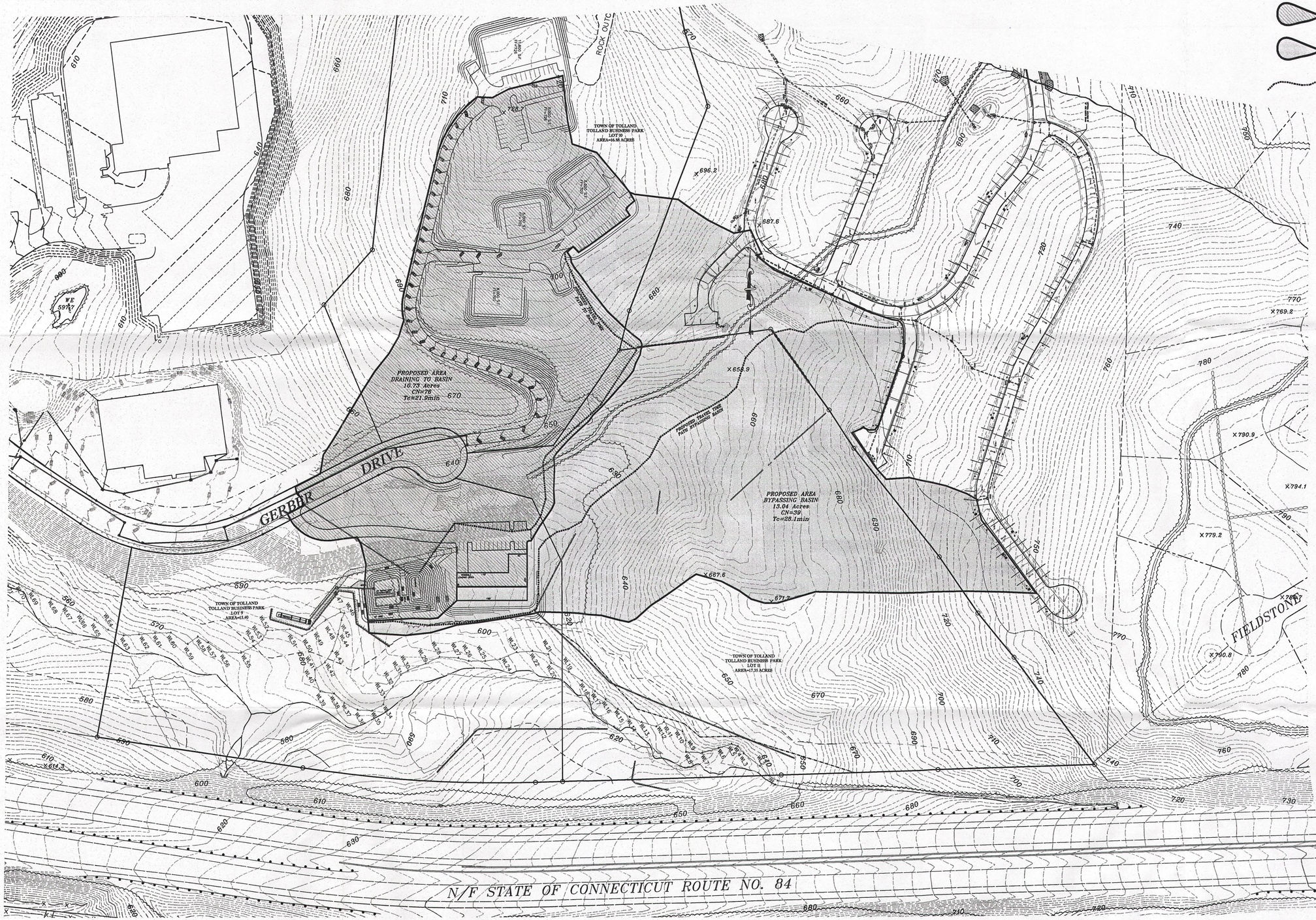
If you have any questions, please contact me.

Sincerely,

Mark A. Peterson, P.E.

MAP:jml
Enclosures

10249.doc



PROPOSED DRAINAGE AREA PLAN
TOLLAND BUSINESS PARK
LOTS 9 & 10
GERBER DRIVE
TOLLAND, CONNECTICUT

REVISIONS

GARDNER & PETERSON ASSOCIATES, LLC
178 HARTFORD TURNPIKE
TOLLAND, CONNECTICUT
PROFESSIONAL ENGINEERS LAND SURVEYORS

BY	SCALE	DATE	SHEET NO.	MAP NO.
E.R.P.	1"=100'	11-10-2008	1 OF 1	9773-9-10-DPR