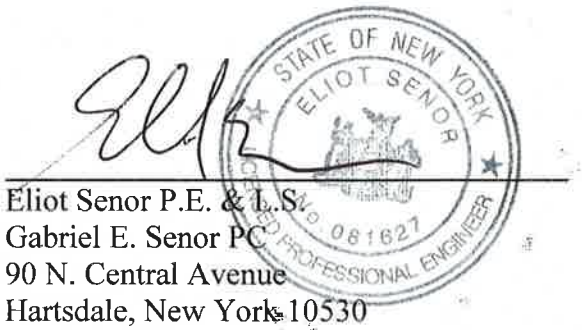
GABRIEL E. SENOR, P.C.
ENGINEERS • PLANNERS • SURVEYORS

90 North Central Avenue
Hartsdale, NY 10530

Tel. (914) 422-0070
Fax (914) 422-3009
info@gesenor.com

Storm Water Pollution Prevention Plan (SWPPP) for 185 Lincoln Avenue Tax Lot 184.21-2-44 Tax Lot 184.21-47 Village of Pelham Tax Lot 5-1483-007 City of New Rochelle Westchester County, New York



Eliot Senor P.E. & L.S.
Gabriel E. Senor PC
90 N. Central Avenue
Hartsdale, New York 10530
914 422 0070
914 422 3009
August 7, 2017

INTRODUCTION

Purpose and Scope

The proposed project is the construction of a six lot subdivision for the construction of townhouse residential homes. There are currently three existing homes on the site. Approximately 0.35 acres of land will be disturbed. Approximately 0.32 acres will be disturbed in the Village of Pelham and 0.03 acres in the City of New Rochelle, Westchester County, New York. The site topography can be characterized as having a relatively flat area for a good portion of the southeast section of the property. This area is bordered by a steep rock cut and has a gently sloped wooded area approximately 10 ft. above the flat area. The flat section of the property was originally developed as a gas station that fronted on the the northerly side of Lincoln Ave.

Construction activities will disturb less than 1 acre of site area. Based on the requirements of Village of Pelham and the scope of site disturbance, this project is subject to the preparation of Stormwater Pollution Prevention Plan (SWPPP)

Summary

The proposed project will be the construction of five single family townhouses on a 0.76 acre parcel in the Village of Pelham, Westchester County, New York. The property is located in the watershed of the Coastal Long Island Sound.

During each phase, erosion controls will be installed and maintained in accordance with the New York Standards and Specifications for Erosion and Sediment Control. Numerous temporary measures will be installed including silt fences, sediment basins, erosion control swales, temporary seeding and mulching, etc. Upon the completion of construction and stabilization, the permanent storm water facilities will be installed. This will be the installation of sub-surface detention systems which will detain surface water occurring from the driveway, patio and roof areas. The systems are constructed with sufficient volume and controlled outflow structures so that post-construction storm flows from the site do not exceed pre-construction runoff for 25, and 100 year storm events from the impervious surfaces. At the completion of construction (i.e., disturbed areas are seeded or landscaped), the temporary erosion controls will be eliminated.

Site Map & Construction Drawings

All construction and soil erosion to conform to plans prepared by Gabriel E Senor P.C. as follows:

Subdivision Map	
Stormwater Pollution Prevention & Erosion Control Plan	S-1
Site and Grading Plan	S-2
Construction Work Plan, Traffic Maneuvering & Area Map	S-3

Soils

Soils present on Site are as follows:

Ulc Urban land – Charlton-Chatfield complex, rolling, very rocky – Paxton percent slopes

Appendix A attached to this report shows the soils present on-site per the United States Department of Agricultural Survey. Soil characteristics are also available in Appendix A

Construction Phasing

Phase I – Roadway Construction

A temporary chain link fence will be placed around the property. Prior to clearing, the site will be secured by installing silt fence around the perimeter of the clearing scope and along the outer edge of the disturbed area limits. Tracking pad will be installed at the proposed driveway entrances. To limit the adverse effect of drainage on adjoining properties during construction, trees and ground vegetation shall remain and be protected until it is necessary for removal.

- Obtain all necessary permits/approvals.
- Install stabilized construction entrance.
- Stake limits of disturbance/set up construction staging area.
- Install erosion controls.
- Commence clearing and grubbing for the driveway.
- Begin general excavation and rock excavation. (Rock excavation and stabilization to be performed by specifications prepared by Geotechnical Engineer.
- Rough grade driveway.
- Install drainage facilities.

Phase II – Indivi

The second phase of construction will entail the construction and erection of the buildings and entry driveways. In conjunction with this construction will be the increase in impervious surfaces. As mentioned above, subsurface detention systems will be installed to capture stormwater runoff from impervious surfaces. (i.e., roof tops, driveway, etc.).The balance of the stormwater runoff system for the lots will be constructed during this phase. Construction of the individual lots is as follows:

- Obtain all necessary permits/approvals.
- Stake clearing limits for residential construction
- Inspect and Install stabilized construction entrance.
- Stake limits of disturbance/set up construction staging area.
- Inspect and Install perimeter erosion controls.
- Commence clearing and grubbing.
- Rough grade building area.
- Construct dwelling.
- Install drainage facilities, utilities and detention systems.
- Contractor to keep systems off-line until all drainage areas tributary to each infiltration system has achieved final stabilization
- Final grade driveway.
- Complete dwelling.
- Re-vegetation of disturbed areas.
- Once the site has achieved final stabilization, the infiltration systems shall be placed on-line.
- Remove sediment and erosion controls upon stabilization.
- Landscaping.
- Final Inspections to obtain certificates of completion and occupancy.

SWPPP REQUIREMENTS (CONSTRUCTION)

When surface soils are exposed during construction, they become subject to erosion. Soil erosion at the site will be minimized by implementing the Soil and Erosion Control plan and details contained in the attached plans by Gabriel E. Senor, P.C. Erosion of surface soils, which are exposed during construction, would be controlled by implementing soil erosion and sedimentation control measures as described below.

Sequence of Disturbance

Within each phase, erosion and sediment controls will be installed in the following sequence:

A. The erosion and sediment control fencing will be established along the perimeter of the area to be cleared on the downhill side(s). The fencing will be "toed-in" using ditching equipment.

B. The site(s) to be cleared will be marked out in orange construction limiting fence.

C. The area to be developed will be cleared of trees (except any individual trees marked for preservation).

D. Construct sub-surface units in accordance with the Gabriel E. Senor, P.C., plans and details. The subsurface retention units shall be kept offline until 90 percent of the lot is stabilized. This shall be accomplished by installing a removable plug in the inflow pipe that shall be removed after 90 percent of each lot is stabilized.

E. The erosion and sediment control fencing will be established along the perimeter of the area to be cleared on the downhill side(s). The fencing will be "toed-in" using ditching equipment.

F. The site will then be grubbed. As needed, all brush and trees will be chipped for later use as mulch. Then, the contractor will grub the root systems and stumps of the cleared vegetation.

G. Topsoil will then be stripped and stockpiled for later use. Topsoil stockpile areas are identified at the site as shown on the Gabriel E. Senor, P.C. site plans. Stockpiled soils will not occur outside the grading clearing limit line. Place silt fence around the perimeter of the topsoil stockpile areas and seed as required. When activities temporarily cease during construction, soil stockpiles should be stabilized by seed, mulch or other appropriate measures as soon as possible, but in no case, more than 14 days after construction activity has ceased.

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H. The site will then be excavated or filled as determined by the project specification. Grading for the driveway will begin with the lowest point and proceed to the highest point. A sub-base course of gravel will be laid and compacted as soon as possible following rough grading and utility trenching/installation for the driveway construction.

I. Once the lot has been graded to a finished condition, or if a roughly graded site is to be open for 14 days or more during the growing season, the area will be seeded to a quick germinating annual/perennial rye or fescue mix. This will occur within one week of such grading. Surfaces in this condition will be considered "stabilized." The annual rye or fescue will constitute 80 percent and perennial rye or fescue will constitute 20 percent of the seed mix. Three (3) to four (4) pounds of the seed mix per 1,000 square feet will be applied. If the site is to be covered with final landscaping within two weeks of final grading, then temporary seeding may be skipped.

K. Alternately, a site may be mulched for temporary erosion control. The site shall be smoothed, disked and raked just prior to mulching to remove all undesirable stones and other debris. A straw mulch at 2 tons per acre or wood fiber mulch at 0.25 to 0.50 tons per acre will be applied. Surfaces in this condition will be considered "stabilized." If the site is to be covered with final landscaping within two weeks of final grading, then temporary seeding may be skipped.

L. Install subsurface detention systems as detailed and shown on the Gabriel E. Senor, P.C. grading and drainage plans as needed for the lot. Sub-surface retention system are to remain offline until the contributing drainage area has been 90 percent stabilized and landscaped.

M. Within 60 days of or at the commencement of the next growing season following final grading and temporary seeding or mulching, final landscaping will be initiated.

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Earthwork

The site will then be excavated or filled as determined by the project specification. Excavation will initially be for access driveway. Followed by excavation for retaining walls, foundations and utility trenching. Grading for the driveway will begin with the lowest point and proceed to the highest point. A sub-base course of gravel will be laid and compacted as soon as possible following rough grading and utility trenching/installation for the driveway construction.

Hours of construction operation shall comply with the Village of Pelham Code.

Construction Debris and Litter

The project will generate a considerable amount of packaging, discarded parts and pieces of lumber, tiles, insulation, etc. At the outset of construction, a dumpster will be provided. All waste materials, which could decompose or otherwise negatively impact the local environment, will be placed in the construction debris containers. The container will be obtained from a licensed operator for such waste disposal. It will be the responsibility of that licensed operator to ensure proper disposal of these wastes off site. As much as possible, organic, woody waste material caused from clearing, such as stumps, will be mulched and re-used on-site to landscape and stabilize the cleared areas. Any cleared vegetation/herbaceous material which is not which is not mulched will be hauled offsite and disposed of properly.

The construction workers will also generate limited amounts of personal garbage (cups, bottles, lunch wrappers, etc.). This garbage will be collected daily and placed in the construction debris container.

In no case will construction debris or personal garbage be disposed of in any area not to be cleared for development. Inevitably, some of these materials will be blown or dragged by storm drainage to the erosion controls, temporary swales, and infiltration basins or into un-cleared areas. Thus, the contractor will undertake weekly inspection of the cleared perimeter. Any garbage or debris will be collected and properly disposed of by placing them in the containers on site.

Fuels and Construction Chemicals

Certain fuels and industrial chemicals will be brought and used on site during the proposed residential construction. These materials are largely liquid and include diesel fuel, No. 2 fuel oil, paint, paint thinners, solvents for copper and PVC piping, etc.

Fuels will be brought on site in bulk to re-fuel the construction equipment. All fuels will be transported in DOT and/or OSHA-approved containers. Fuel will be pumped

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individually to each machine and monitored during the transfer. Any lubricants drained from the machine will be collected and disposed of at approved "recycling" facilities. Absorbent materials (pads, sorbents and/or kitty litter, etc.) will be kept at the project office for use in the event of a fuel spill.

Chemical or solvent storage and use will occur in compliance with labeling provided on the storage containers for such material. No contractor will be allowed to dispose of spent chemicals and solvent on site. Such "spent" materials will be collected in waste disposal containers. Such containers shall be transported off site and the contractor shall dispose such "wastes" as directed by labeling, OSHA or USEPA directive

Temporary Erosion Control Measures

Areas will be cleared and developed in three phases as described above. Stabilized areas include those which (a) are seeded or mulched to specification, (b) are covered with a base course of gravel/asphalt or (c) are landscaped.

Erosion of surface soils, which are exposed during construction, would be controlled by implementing soil erosion and sedimentation control measures. Specifically, the erosion and sedimentation control measures implemented will be as follows:

Anti-Tracking Pads

At the project entrance, at roadway intersections or at the entry to each phase and driveway/lot entrances, an anti-tracking pad will be added. This pad will be constructed with acceptable stone size, which will be from a minimum of 2" stone, or reclaimed or recycled equivalent. The gravel pads will act to strip unconsolidated materials from the tires and tracks of construction equipment. These materials will then be trapped in the interstitial spaces in the gravel for later use on-site. A typical detail of the anti-tracking pad is provided.

Siltation/Screen Fence

Siltation screen/fence will be secured by hardwood or metal posts spaced a maximum of ten feet on center on the downhill side of the trench. The sediment control fabric will be a woven polypropylene material treated to resist degradation from exposure to sunlight. The toe-in flap of fabric will a minimum 6 inches below grade along intended fence line. This silt screen barrier will be combined with hay bales when occurring within 100 feet of critical areas which may be present. A detail of the silt fence is provided. Silt screen/fence with hay bales always will be placed at the driveway to divert and impede runoff.

Removal of deposited silt and resetting of this control measure will be implemented as the construction efforts reveal the locations where such efforts could be needed.

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Inlet and Outlet Protection

Inlets to the storm water systems will be protected by placing silt fence in conjunction with hay bales around each or by providing and excavated area around each inlet and then piling one foot of 3/8 to 3/4 inch gravel at least one foot high entirely around same. Downspout or sump pump discharges must have acceptable outfalls that are protected by splash blocks, sod, or piping as required by site conditions (i.e., no concentrated flow directed over fill slopes).

Stockpiles

The principal staging and stockpile areas for the road construction and each phase are to be located as shown in the attached site plans. Each proposed individual lot would have a smaller stockpile area at a location to be determined during construction. The stockpile areas are to be encircled with a siltation screen/fence as described above (including both hay bales and silt fence) to prevent sediments from being transported into undisturbed areas or to the site's perimeter silt fence or driveway. A typical detail of the stock pile is provided in the attached site plan. When activities temporarily cease during construction, soil stockpiles should be stabilized by seed, mulch or other appropriate measures as soon as possible, but in no case more than 14 days after construction activity has ceased.

Soil Restoration

During periods of relatively low to moderate subsoil moisture, the disturbed subsoils are returned to rough grade and the following Soil Restoration steps applied:

1) Apply 3 inches of compost over subsoil
2) Till compost into subsoil to a depth of at least 12 inches using a cat-mounted ripper, tractor mounted disc, or tiller, mixing, and circulating air and compost into subsoils
3) Rock-pick until uplifted stone/rock materials of four inches and larger size are cleaned off the site
4) Apply topsoil to a depth of 6 inches
5) Vegetate as required by approved plan.

At the end of the project an inspector should be able to push a 3/8" metal bar 12 inches into the soil just with body weight. Tilling should not be performed within the drip line of any existing trees or over utility installations that are within 24 inches of the surface.

Compost shall be aged, from plant derived material for of viable weed seeds, have no visible free water or dust produced when handling, pass through a half inch screen and have a pH suitable to grow desired plants.

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First Year Maintenance

- Initial inspections for the first six months
- Reseeding to repair bare or eroding areas to assure grass stabilization

Maintenance

The erosion control measures will be regularly inspected and maintained, particularly following major storms. Inspections will be conducted by a CPESC certified inspector or inspector as defined in GP-0-10-001. Removal of silt, additional stabilization of any areas exhibiting excessive sedimentation, and repair or replacement of any measures which have been damaged, would be routinely carried out following storm events exceeding 0.5 inches of rain fall in 24-hours. Any significant modifications to the approved plan due to field conditions shall be made only after consultation with and approval by the preparer of the erosion control plan and the appropriate Village official.

The potential impact of the increased quantity and rate of runoff will be negated by the provision of storm water retention on-site. This mitigation is proposed and will occur via sub-surface storage retention basins constructed on site. The use of these features will provide sufficient treatment so that, 25 and 100 year storm events, the rate of runoff and peak discharge from each design point will remain the same or be less than existing conditions.

Storm Water Controls Features

Key goals of the storm water design as applied to the project are as follows:

a. Zero Increase Of Peak Runoff – The peak discharge rate of storm water at each design point, after the completion of development shall not exceed the peak discharge that has been estimated to have been discharged from the site in its existing state.

b. Storms– The storm type and frequencies used as a basis for computing peak rate of discharge and designing storm water detention facilities were NRCC Type C storms expected once every 25 and 100 years with a duration of 24 hours as defined for Westchester County.

c. Technical Approach – The method to be used for estimating peak discharge and resultant volumes for on-site retention shall be NRCC Type C Storm Distribution. These criteria govern the data that is input into the HydroCAD software. The input and output data (hydrographs and tables) is provided in the HydroCAD reports in Appendix B. The hydrologic flow diagrams are presented as Appendix B at the rear of the text.

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d. Rainfall Intensity – Frequency and intensities which have been used in this report are as provided for Westchester County. The peak rate for each storm was based on Extreme Precipitation Tables presented by the Northeast Regional Climate Center.

f. Time of Concentration and Travel Time – The times of concentration (Tc) and travel times (Tt) are calculated by HydroCAD to determine the time of the average hydraulic route within the studied watersheds. These routes include overland (sheet flow), shallow concentrated flow and channel flows of the driveway swale. Post development flows have been determined by grading and conveyance systems shown on the attached site and grading plans.

Surface Hydrology/Drainage Analysis

This drainage analysis was performed to fulfill the SWPPP requirements. The engineering firm of Gabriel E. Senor, P.C. The drainage study examined the impacts of storm water runoff from the generation of impervious surfaces for the house and driveway. Deep test pits and percolation tests were performed for each area of the installation of the drainage systems. Sufficient separation from the infiltration systems to groundwater and rock is present. (See Appendix C for Deep test pit/percolation logs.)

Information and data to run the model and prepare this report was obtained from the following sources:

1. Topographical data from survey locations.
2. Site Plan Sheets as prepared by Gabriel E. Senor, P.C., Hartsdale, N.Y. as derived from CAD calculations of acreage, distance and topography.
3. The site soil information from Westchester County Soil Conservation Service (SCS).
4. Site inspections and test pit observations as carried out by personnel of Gabriel E. Senor, P.C.

The Soil Conservation Service's TR-20 method (a more accurate and precise calculation methodology than TR-55) as incorporated in the HydroCAD software was used to determine the pre-development and post-development runoff rates at each drainage area studied.

Runoff calculations using HydroCAD modeling for pre-development and post-development have been completed and are included herein as prepared Gabriel E. Senor, P.C. Storm water runoff retention system sizes for the project are summarized in Table 1.

The drainage calculations and details of the storm water retention systems results from HydroCAD modeling are included in Appendix B. The drainage study was performed for 25 and 100 year storm events in the pre-development and post-development

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conditions, using a NRCC Type C storm distribution. The HydroCAD modeling was used to combine the flow from all contributing areas.

The potential impact of the increased quantity and rate of runoff will be negated by the provision of storm water retention on-site. This mitigation is proposed and will occur via sub-surface storage retention basins constructed on site. The use of these features will provide sufficient treatment so that (25 and 100 year storm event) the rate of runoff and peak discharge from each design point will remain the same or be less than existing conditions.

MAINTENANCE, RECORD KEEPING AND CERTIFICATIONS

Maintenance During Site Construction

During construction, the developer and the developer's environmental monitor shall inspect those facilities at the commencement of construction and, when substantially completed as to earth work, at least once every 7 to 14 days or following any rainfall events exceeding 0.50 inch of precipitation. Seeding to a conservation mix of rye grasses will occur as previously specified. The principal purpose of such inspection will be to detect any major erosion and/or sedimentation present along the silt fences.

The inspection, must verify that all practices are operational, maintained properly and that sediment is removed from all control structures as provided in the inspection and maintenance requirements set forth in Part IV of GP-0-15-002, including its "qualified inspector" provisions and the inspection schedule set forth in the permit. The inspection, must look for evidence of the soil erosion on the site, potential of pollutants entering drainage systems, problems at discharge points (such as turbidity in receiving water), and signs of soil and mud transport from the site to the public road at the entrance. Routine maintenance must be identified on the schedule and performed on a regular basis or as soon as a problem is identified. A copy of the inspection and quarterly reports will be retained on-site with the SWPPP.

All site drainage structures in place during construction shall be visually inspected for silt and debris weekly. Any silt and debris to be removed

Stabilization construction entrances shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights of way, all sediment spilled, dropped, washed or tracked onto public rights of way must be removed immediately. When washing is required, it shall be done on an area stabilized with stone and which drains into an approved sediment trapping device. Periodic inspection shall be provided after each rain.

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Site shall be inspected for any significant erosion. If such erosion has caused a gully to occur, it will be filled with crushed stone immediately as directed by the consultant and Village Building Department. Along the silt fences, shall be inspected. If they are silted to more than one third the silt fence height, channel depth or pipe diameter, sediments shall be removed to adjacent uplands. Any sediment accumulated in the silt fences will be removed to an upland location at this time. It is expected in most cases that hand labor shall be sufficient to accomplish this task. Exposed soils and/or displaced sediments shall be seeded to a quick germination rye seed mix as soon thereafter as possible. The minimum day to bi-weekly inspections shall continue for the entire construction period and quarterly, written reports will be provided to the Village Engineer Consultant. A copy of the inspection and quarterly reports will be retained on-site with the SWPPP.

A copy of the SWPPP will be maintained on site throughout the construction period and until the site receives "final stabilization".

Maintenance/Monitoring, Post-Construction

The post-construction period begins upon the issuance of the Certificate of Occupancy for the residence. This assumes that the final construction clean out as described previously has been accomplished. The project developer's erosion inspector shall produce a post construction report to identify the permanent structural or non-structural practices that will remain on-site. The inspector shall ensure that the permanent structural or non-structural practices utilized are properly built, cleared out and stabilized to the design and/or to suit the post-construction site conditions. The inspector shall evaluate the post-construction runoff condition on the site to minimize the risk of concentrated flow and erosion. The homeowner will be responsible for the yearly inspection of the stormwater systems. All systems should be cleaned and maintained on a regular basis.

Stormwater Structure Maintenance

Land Owner to visually inspect all stormwater structures for silt and debris during May and November of each year. Any silt and debris to be removed by jet vacuum if within 12" of lowest pipe invert (min 24" sump required.)

The above maintenance efforts should be conducted in the late spring or early summer, following runoff from the winter ice and snow maintenance efforts on project roadways, driveways and sidewalks.

The proposed Roadway will have hoods installed on all outlet pipes in the catch basins. The catch basins will have a 24" sump per detail.

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Certifications

SWPPP Certification

I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

_____ _____

Signature *Title*

_____

Date

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Soil Erosion and Sediment Controls

The Contractor also will be responsible for installing the soil erosion and sediment control fencing per plans for 185 Lincoln Avenue, Gabriel E. Senor P.C.

I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

_____ _____

Signature *Title*

_____

Date

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Installation of Sub Surface Retention Systems

The Contractor also will be responsible for installing the sub surface infiltration systems or equivalent technology per plans for 185 Lincoln Avenue, Gabriel E. Senor P.C. Further,

> I certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP for the construction site identified in such SWPPP as a condition of authorization to discharge storm water. I also understand that the operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for storm water discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards."

_____ _____

Signature *Title*

_____

Date

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Inspections and Reports

The Developer also will be responsible for providing the construction and post-construction monitoring, inspections and reports performed by Gabriel E. Senor P.C. Further,

> I certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP for the construction site identified in such SWPPP as a condition of authorization to discharge storm water. I also understand that the operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for storm water discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards."

_____ _____

Signature *Title*

_____

Date

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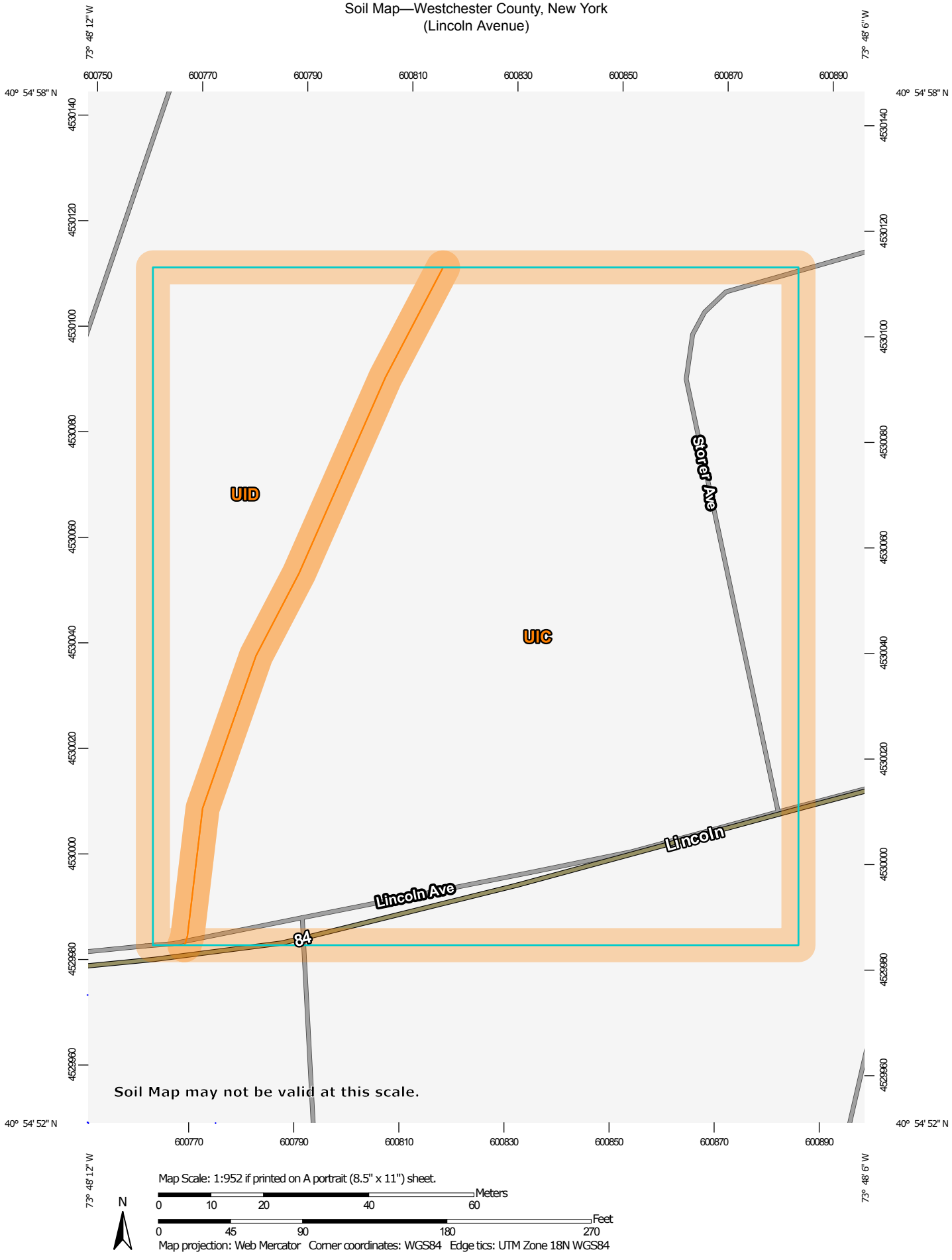
APPENDIX A

Soil Map

Soil Map—Westchester County, New York
(Lincoln Avenue)



Map Scale: 1:952 if printed on A portrait (8.5" x 11") sheet.

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Meters
0 10 20 40 60

Feet
0 45 90 180 270

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

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

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

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

Soil Survey Area: Westchester County, New York
Survey Area Data: Version 12, Sep 24, 2016

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

Date(s) aerial images were photographed: Jul 21, 2014—Aug 27, 2014

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

Map Unit Legend

Westchester County, New York (NY119)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
UIC	Urban land-Charlton-Chatfield complex, rolling, very rocky	3.1	78.6%
UID	Urban land-Charlton-Chatfield complex, hilly, very rocky	0.8	21.4%
Totals for Area of Interest		**3.9**	**100.0%**

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APPENDIX B

Hydrocad Report

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The analysis was performed utilizing the Soil Conservation Service (SCS) TR-20 and TR-55 methodologies due to very slow percolation rates. Rainfall intensity was utilized for 25 Year storm event at 6.37" and 100 Year storm event at 8.96" for a 24 hour rainfall in Westchester County. The development is the construction of a single family residence with associated impervious areas. For purposes of calculations the pre-existing condition of the impervious surface area was examined as un-developed grass area. For the post development condition, excess surface stormwater generated by the impervious surfaces of the building and the driveway areas shall be stored in a drainage detention structures to be constructed on-site which will have a controlled outlet structure entering the existing storm drain system on Graham Road.

Pre-Development 25 Year Storm

The Soil Conservation Service's TR-20 method (a more accurate and precise calculation methodology than TR-55) as incorporated in the HydroCAD software was used to determine the pre-development and post-development runoff rates of the building, driveway and walkway areas.

Areas for building footprint and proposed impervious surfaces were assumed to be Grass Area. The total impervious surfaces and driveway area for the site is 11862 S.F.in accordance to the site plan. Calculated runoff is 0.1.34 cfs for a 25 year storm and 1.28 cfs for a 100 year storm.

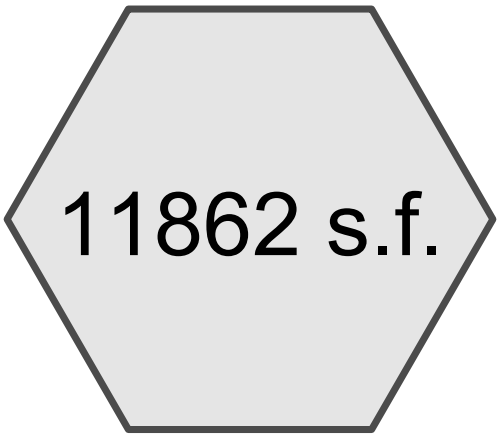
Post-Development 25 Year Storm

Runoff is to be mitigated by a system of 120 L.F. of 36" HDPE which will be connected to the roof leader system of the entire house. The outlet structure will control the outflow of the system which will be connected to the village drainage in Lincoln Avenue.

Table Stormwater Runoff

Design Storm (yr)	Total Pre-development Peak Runoff (cfs)	Total Post-Development Peak Runoff (cfs) basin
25	1.34	1.28
100	2.18	2.25

Given the Post Development basin routing runoff rates for the selected storms shown peak runoff has no significant net increase of those of the Pre Development condition. It is concluded that the proposed design satisfactorily meets the Village regulation of no net increase in the rate of offsite storm water discharge.



Undeveloped 11862 s.f.

Subcat Reach Pond Link

Routing Diagram for Lincoln Avenue
Prepared by Gabriel E. Senor PC, Printed 8/3/2017

Summary for Subcatchment 11862 s.f.: Undeveloped 11862 s.f.

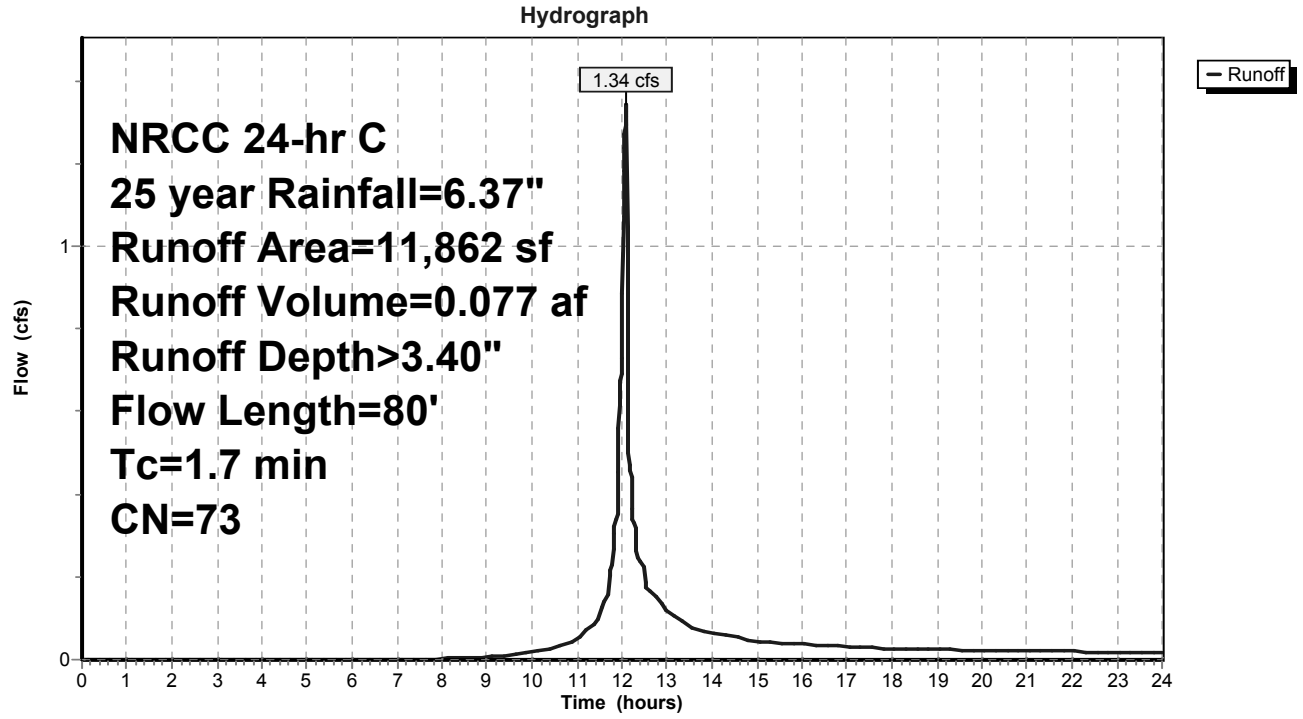
Runoff = 1.34 cfs @ 12.10 hrs, Volume= 0.077 af, Depth> 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 25 year Rainfall=6.37"

Area (sf)	CN	Description
11,862	73	Woods/grass comb., Poor, HSG B
11,862		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	15	0.1400	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
0.3	65	0.0380	3.14		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	80	Total			

Subcatchment 11862 s.f.: Undeveloped 11862 s.f.



Hydrograph for Subcatchment 11862 s.f.: Undeveloped 11862 s.f.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.00	0.00
4.00	0.34	0.00	0.00
4.50	0.39	0.00	0.00
5.00	0.44	0.00	0.00
5.50	0.49	0.00	0.00
6.00	0.55	0.00	0.00
6.50	0.61	0.00	0.00
7.00	0.67	0.00	0.00
7.50	0.75	0.00	0.00
8.00	0.83	0.00	0.00
8.50	0.92	0.01	0.00
9.00	1.01	0.02	0.01
9.50	1.12	0.04	0.01
10.00	1.26	0.06	0.02
10.50	1.42	0.11	0.03
11.00	1.64	0.18	0.05
11.50	1.99	0.32	0.10
12.00	3.03	0.88	**0.69**
12.50	4.38	1.80	**0.23**
13.00	4.73	2.07	0.12
13.50	4.95	2.24	0.08
14.00	5.11	2.37	0.07
14.50	5.25	2.48	0.06
15.00	5.36	2.57	0.04
15.50	5.45	2.64	0.04
16.00	5.54	2.71	0.04
16.50	5.62	2.78	0.03
17.00	5.70	2.84	0.03
17.50	5.76	2.89	0.03
18.00	5.82	2.94	0.03
18.50	5.88	2.99	0.02
19.00	5.93	3.03	0.02
19.50	5.98	3.07	0.02
20.00	6.03	3.12	0.02
20.50	6.08	3.16	0.02
21.00	6.13	3.19	0.02
21.50	6.17	3.23	0.02
22.00	6.22	3.27	0.02
22.50	6.26	3.30	0.02
23.00	6.30	3.34	0.02
23.50	6.33	3.37	0.02
24.00	**6.37**	**3.40**	0.02

Summary for Subcatchment 11862 s.f.: Undeveloped 11862 s.f.

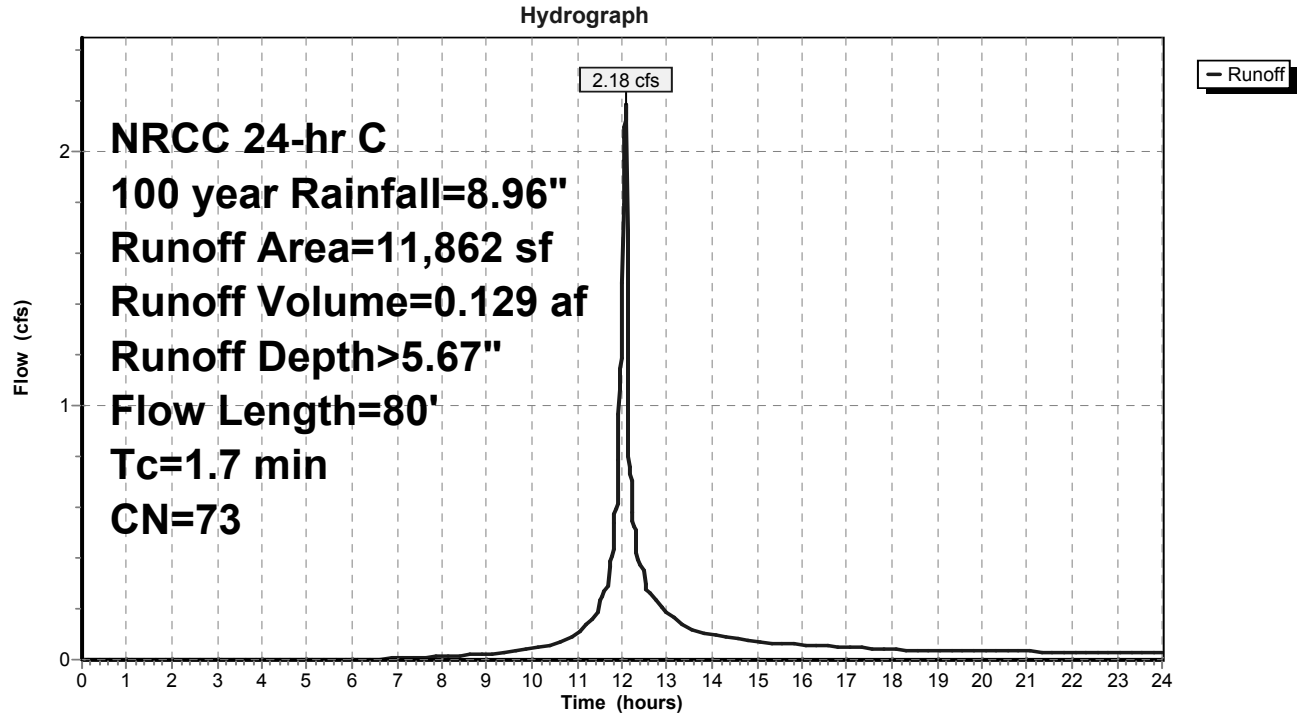
Runoff = 2.18 cfs @ 12.10 hrs, Volume= 0.129 af, Depth> 5.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 100 year Rainfall=8.96"

Area (sf)	CN	Description
11,862	73	Woods/grass comb., Poor, HSG B
11,862		100.00% Pervious Area

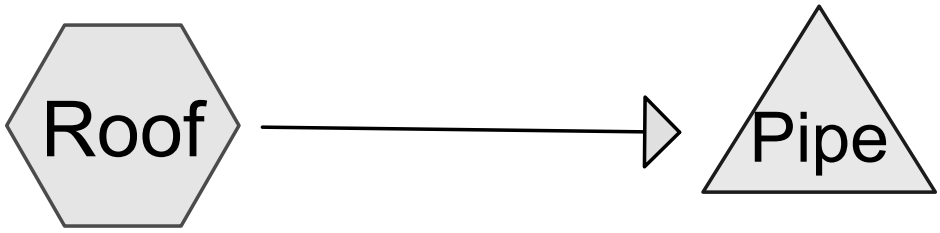
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	15	0.1400	0.18		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.50"
0.3	65	0.0380	3.14		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.7	80	Total			

Subcatchment 11862 s.f.: Undeveloped 11862 s.f.



Hydrograph for Subcatchment 11862 s.f.: Undeveloped 11862 s.f.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.10	0.00	0.00
1.50	0.16	0.00	0.00
2.00	0.22	0.00	0.00
2.50	0.28	0.00	0.00
3.00	0.34	0.00	0.00
3.50	0.41	0.00	0.00
4.00	0.47	0.00	0.00
4.50	0.54	0.00	0.00
5.00	0.62	0.00	0.00
5.50	0.69	0.00	0.00
6.00	0.77	0.00	0.00
6.50	0.85	0.00	0.00
7.00	0.95	0.01	0.01
7.50	1.05	0.02	0.01
8.00	1.16	0.04	0.01
8.50	1.29	0.07	0.02
9.00	1.42	0.11	0.02
9.50	1.58	0.15	0.03
10.00	1.77	0.22	0.04
10.50	2.00	0.32	0.06
11.00	2.31	0.47	0.10
11.50	2.80	0.74	0.19
12.00	4.27	1.72	**1.17**
12.50	6.16	3.22	**0.36**
13.00	6.65	3.64	0.19
13.50	6.96	3.90	0.13
14.00	7.19	4.10	0.10
14.50	7.38	4.27	0.09
15.00	7.54	4.40	0.07
15.50	7.67	4.52	0.06
16.00	7.80	4.63	0.06
16.50	7.91	4.73	0.05
17.00	8.01	4.82	0.05
17.50	8.11	4.90	0.04
18.00	8.19	4.98	0.04
18.50	8.27	5.05	0.04
19.00	8.34	5.12	0.04
19.50	8.42	5.18	0.04
20.00	8.49	5.24	0.03
20.50	8.55	5.30	0.03
21.00	8.62	5.36	0.03
21.50	8.68	5.42	0.03
22.00	8.74	5.47	0.03
22.50	8.80	5.53	0.03
23.00	8.86	5.58	0.03
23.50	8.91	5.62	0.03
24.00	**8.96**	**5.67**	0.02



11862 Impervious surface

Pipe

Subcat Reach Pond Link

Routing Diagram for Lincoln Avenue
Prepared by Gabriel E. Senor PC, Printed 8/3/2017

Summary for Subcatchment Roof: 11862 Impervious surface

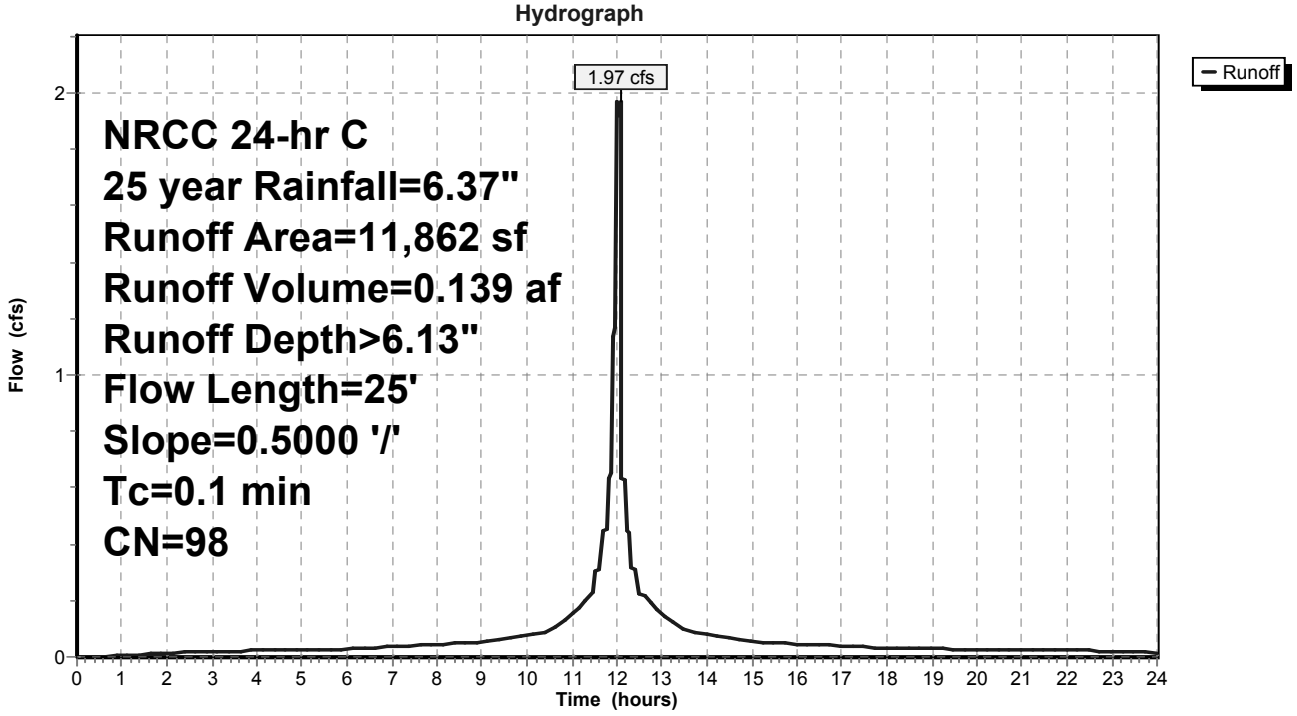
Runoff = 1.97 cfs @ 12.09 hrs, Volume= 0.139 af, Depth> 6.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 25 year Rainfall=6.37"

	Area (sf)	CN	Description
*	11,862	98	Roof
	11,862		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	25	0.5000	3.95		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"

Subcatchment Roof: 11862 Impervious surface



Hydrograph for Subcatchment Roof: 11862 Impervious surface

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.01
1.50	0.11	0.02	0.01
2.00	0.15	0.04	0.01
2.50	0.20	0.07	0.02
3.00	0.24	0.10	0.02
3.50	0.29	0.14	0.02
4.00	0.34	0.18	0.02
4.50	0.39	0.22	0.02
5.00	0.44	0.26	0.03
5.50	0.49	0.31	0.03
6.00	0.55	0.36	0.03
6.50	0.61	0.42	0.03
7.00	0.67	0.48	0.04
7.50	0.75	0.55	0.04
8.00	0.83	0.62	0.04
8.50	0.92	0.71	0.05
9.00	1.01	0.80	0.05
9.50	1.12	0.91	0.07
10.00	1.26	1.04	0.08
10.50	1.42	1.20	0.10
11.00	1.64	1.42	0.15
11.50	1.99	1.77	0.25
12.00	3.03	2.80	**1.42**
12.50	4.38	4.14	**0.28**
13.00	4.73	4.49	0.15
13.50	4.95	4.71	0.10
14.00	5.11	4.87	0.08
14.50	5.25	5.01	0.07
15.00	5.36	5.12	0.06
15.50	5.45	5.22	0.05
16.00	5.54	5.30	0.05
16.50	5.62	5.39	0.04
17.00	5.70	5.46	0.04
17.50	5.76	5.53	0.03
18.00	5.82	5.59	0.03
18.50	5.88	5.64	0.03
19.00	5.93	5.69	0.03
19.50	5.98	5.75	0.03
20.00	6.03	5.80	0.03
20.50	6.08	5.84	0.03
21.00	6.13	5.89	0.02
21.50	6.17	5.93	0.02
22.00	6.22	5.98	0.02
22.50	6.26	6.02	0.02
23.00	6.30	6.06	0.02
23.50	6.33	6.10	0.02
24.00	**6.37**	**6.13**	0.01

Summary for Pond Pipe: Pipe

Inflow Area = 0.272 ac,100.00% Impervious, Inflow Depth > 6.13" for 25 year event
Inflow = 1.97 cfs @ 12.09 hrs, Volume= 0.139 af
Outflow = 1.28 cfs @ 12.10 hrs, Volume= 0.139 af, Atten= 35%, Lag= 0.7 min
Primary = 1.28 cfs @ 12.10 hrs, Volume= 0.139 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 99.53' @ 12.10 hrs Surf.Area= 345 sf Storage= 577 cf

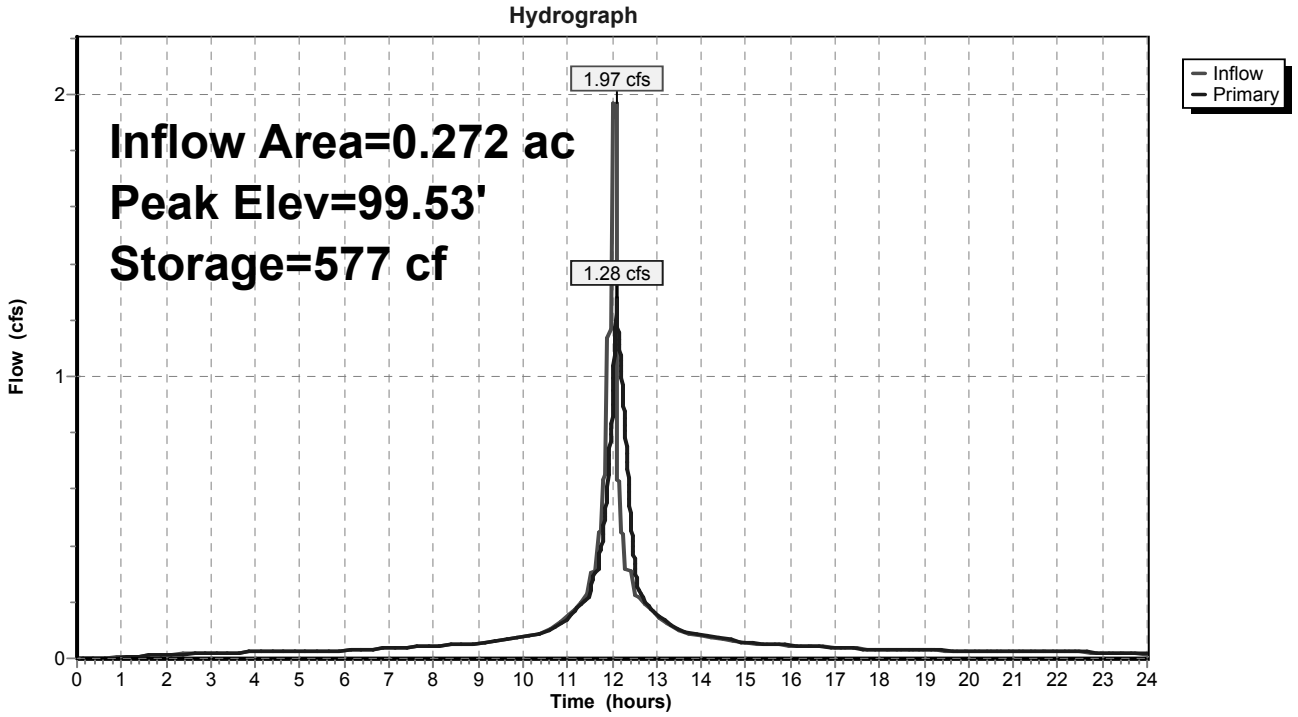
Plug-Flow detention time= 4.5 min calculated for 0.139 af (100% of inflow)
Center-of-Mass det. time= 3.8 min (743.7 - 739.8)

Volume	Invert	Avail.Storage	Storage Description
#1	97.60'	848 cf	**36.0" Round Pipe Storage** L= 120.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	97.60'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	99.40'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	100.70'	**3.0' long x 0.50' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 3.0' Crest Height

Primary OutFlow Max=1.27 cfs @ 12.10 hrs HW=99.53' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 1.22 cfs @ 6.23 fps)
- **2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.21 fps)
- **3=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond Pipe: Pipe



Hydrograph for Pond Pipe: Pipe

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	97.60	0.00
0.50	0.00	0	97.60	0.00
1.00	0.01	2	97.64	0.00
1.50	0.01	3	97.65	0.01
2.00	0.01	4	97.66	0.01
2.50	0.02	5	97.67	0.02
3.00	0.02	6	97.68	0.02
3.50	0.02	6	97.68	0.02
4.00	0.02	7	97.68	0.02
4.50	0.02	7	97.69	0.02
5.00	0.03	7	97.69	0.03
5.50	0.03	8	97.69	0.03
6.00	0.03	8	97.69	0.03
6.50	0.03	9	97.70	0.03
7.00	0.04	10	97.71	0.04
7.50	0.04	11	97.71	0.04
8.00	0.04	12	97.72	0.04
8.50	0.05	12	97.73	0.05
9.00	0.05	13	97.73	0.05
9.50	0.07	16	97.75	0.06
10.00	0.08	18	97.76	0.08
10.50	0.10	21	97.78	0.09
11.00	0.15	29	97.83	0.14
11.50	0.25	43	97.90	0.22
12.00	**1.42**	**271**	**98.67**	**0.86**
12.50	**0.28**	**66**	**97.99**	**0.36**
13.00	0.15	33	97.84	0.16
13.50	0.10	23	97.79	0.10
14.00	0.08	19	97.77	0.08
14.50	0.07	17	97.75	0.07
15.00	0.06	14	97.74	0.06
15.50	0.05	13	97.73	0.05
16.00	0.05	12	97.72	0.05
16.50	0.04	11	97.72	0.04
17.00	0.04	11	97.71	0.04
17.50	0.03	10	97.71	0.04
18.00	0.03	9	97.70	0.03
18.50	0.03	9	97.70	0.03
19.00	0.03	8	97.70	0.03
19.50	0.03	8	97.69	0.03
20.00	0.03	8	97.69	0.03
20.50	0.03	8	97.69	0.03
21.00	0.02	7	97.69	0.03
21.50	0.02	7	97.69	0.02
22.00	0.02	7	97.69	0.02
22.50	0.02	7	97.68	0.02
23.00	0.02	7	97.68	0.02
23.50	0.02	6	97.68	0.02
24.00	0.01	6	97.68	0.02

Summary for Subcatchment Roof: 11862 Impervious surface

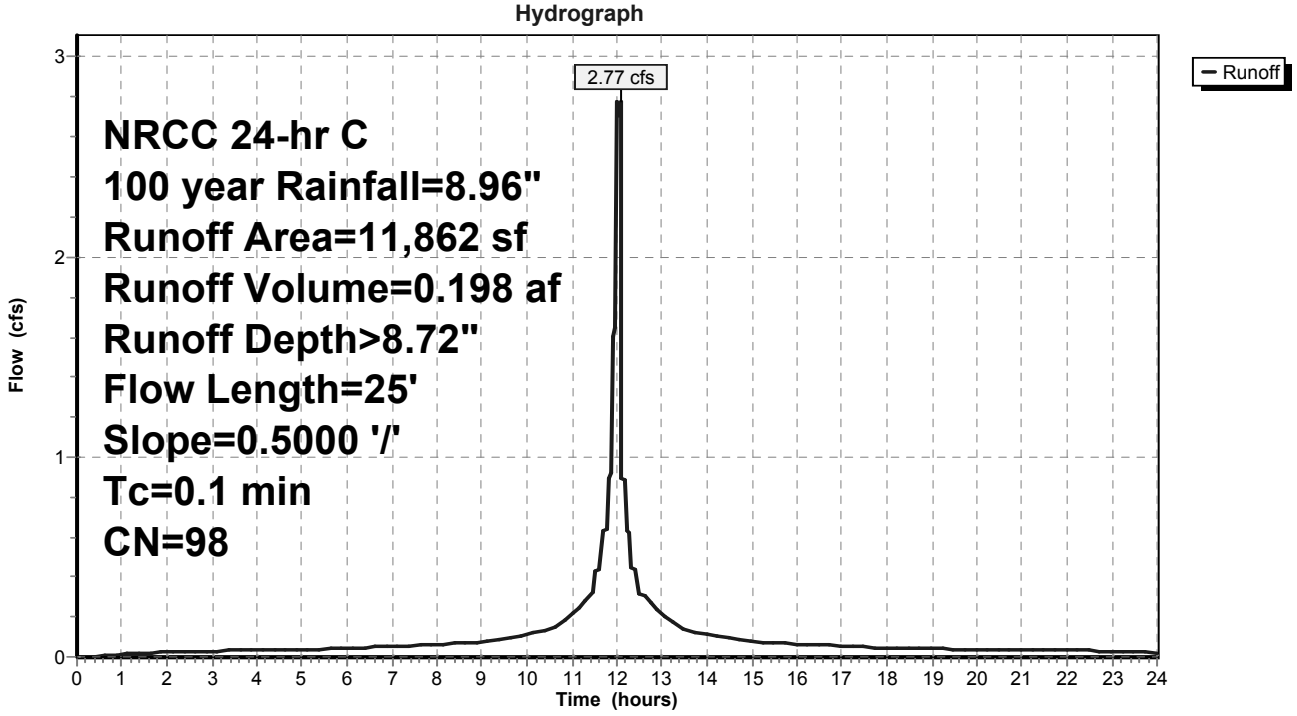
Runoff = 2.77 cfs @ 12.09 hrs, Volume= 0.198 af, Depth> 8.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 100 year Rainfall=8.96"

	Area (sf)	CN	Description
*	11,862	98	Roof
	11,862		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	25	0.5000	3.95		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.50"

Subcatchment Roof: 11862 Impervious surface



Hydrograph for Subcatchment Roof: 11862 Impervious surface

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.05	0.00	0.00
1.00	0.10	0.01	0.01
1.50	0.16	0.04	0.02
2.00	0.22	0.08	0.02
2.50	0.28	0.13	0.03
3.00	0.34	0.18	0.03
3.50	0.41	0.23	0.03
4.00	0.47	0.29	0.03
4.50	0.54	0.36	0.04
5.00	0.62	0.42	0.04
5.50	0.69	0.50	0.04
6.00	0.77	0.57	0.04
6.50	0.85	0.65	0.05
7.00	0.95	0.74	0.05
7.50	1.05	0.84	0.06
8.00	1.16	0.95	0.06
8.50	1.29	1.07	0.07
9.00	1.42	1.20	0.08
9.50	1.58	1.36	0.09
10.00	1.77	1.55	0.11
10.50	2.00	1.77	0.14
11.00	2.31	2.08	0.21
11.50	2.80	2.57	0.35
12.00	4.27	4.03	**2.01**
12.50	6.16	5.92	**0.39**
13.00	6.65	6.41	0.22
13.50	6.96	6.73	0.14
14.00	7.19	6.95	0.12
14.50	7.38	7.14	0.10
15.00	7.54	7.30	0.08
15.50	7.67	7.43	0.07
16.00	7.80	7.56	0.07
16.50	7.91	7.67	0.06
17.00	8.01	7.77	0.05
17.50	8.11	7.87	0.05
18.00	8.19	7.95	0.04
18.50	8.27	8.03	0.04
19.00	8.34	8.10	0.04
19.50	8.42	8.18	0.04
20.00	8.49	8.25	0.04
20.50	8.55	8.31	0.04
21.00	8.62	8.38	0.04
21.50	8.68	8.44	0.03
22.00	8.74	8.50	0.03
22.50	8.80	8.56	0.03
23.00	8.86	8.62	0.03
23.50	8.91	8.67	0.03
24.00	**8.96**	**8.72**	0.02

Summary for Pond Pipe: Pipe

Inflow Area = 0.272 ac,100.00% Impervious, Inflow Depth > 8.72" for 100 year event
Inflow = 2.77 cfs @ 12.09 hrs, Volume= 0.198 af
Outflow = 2.25 cfs @ 12.10 hrs, Volume= 0.198 af, Atten= 19%, Lag= 0.4 min
Primary = 2.25 cfs @ 12.10 hrs, Volume= 0.198 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 100.31' @ 12.10 hrs Surf.Area= 213 sf Storage= 806 cf

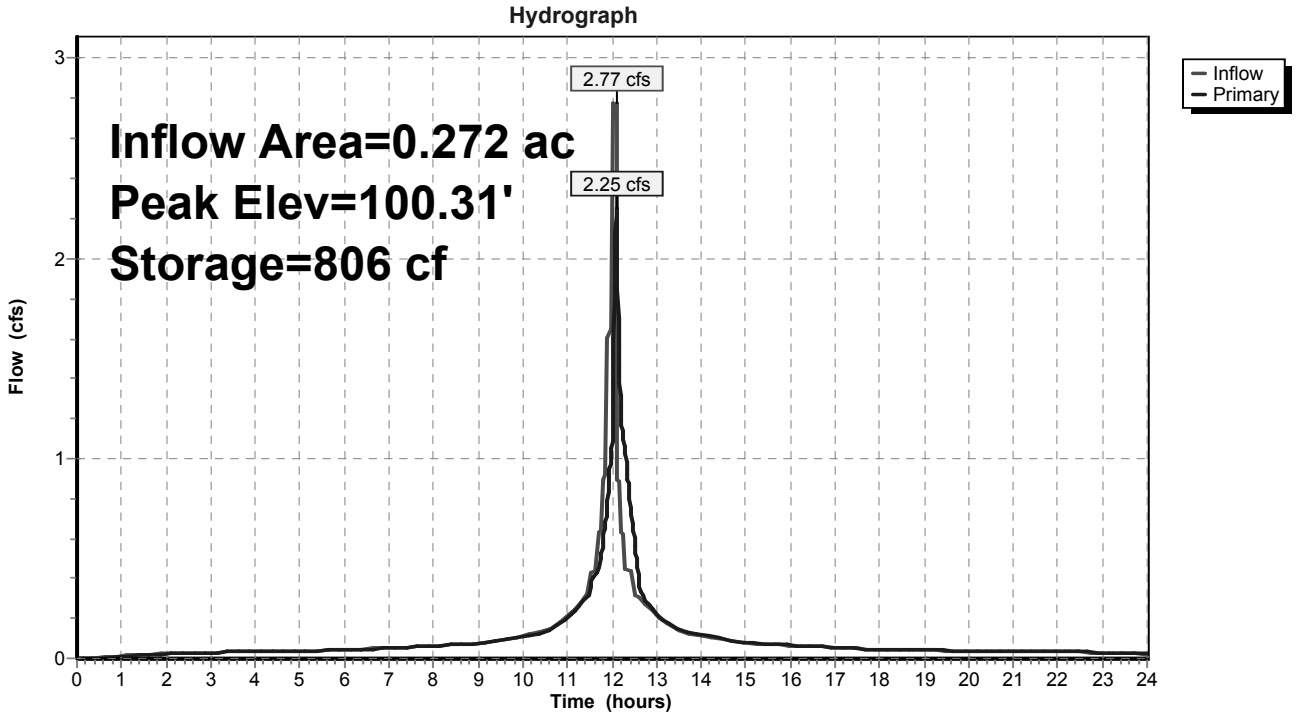
Plug-Flow detention time= 4.5 min calculated for 0.198 af (100% of inflow)
Center-of-Mass det. time= 3.9 min (739.1 - 735.1)

Volume	Invert	Avail.Storage	Storage Description
#1	97.60'	848 cf	**36.0" Round Pipe Storage** L= 120.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	97.60'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	99.40'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	100.70'	**3.0' long x 0.50' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 3.0' Crest Height

Primary OutFlow Max=2.24 cfs @ 12.10 hrs HW=100.30' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 1.48 cfs @ 7.53 fps)
- **2=Orifice/Grate** (Orifice Controls 0.76 cfs @ 3.87 fps)
- **3=Sharp-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond Pipe: Pipe



Hydrograph for Pond Pipe: Pipe

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	97.60	0.00
0.50	0.00	0	97.61	0.00
1.00	0.01	4	97.66	0.01
1.50	0.02	6	97.68	0.02
2.00	0.02	7	97.68	0.02
2.50	0.03	8	97.69	0.03
3.00	0.03	8	97.70	0.03
3.50	0.03	9	97.70	0.03
4.00	0.03	9	97.71	0.03
4.50	0.04	10	97.71	0.04
5.00	0.04	10	97.71	0.04
5.50	0.04	11	97.71	0.04
6.00	0.04	11	97.72	0.04
6.50	0.05	12	97.72	0.05
7.00	0.05	13	97.73	0.05
7.50	0.06	14	97.74	0.06
8.00	0.06	15	97.75	0.06
8.50	0.07	16	97.75	0.07
9.00	0.08	17	97.76	0.07
9.50	0.09	21	97.78	0.09
10.00	0.11	24	97.80	0.11
10.50	0.14	28	97.82	0.13
11.00	0.21	39	97.87	0.20
11.50	0.35	59	97.97	0.32
12.00	**2.01**	**447**	**99.16**	**1.08**
12.50	**0.39**	**135**	**98.25**	**0.60**
13.00	0.22	44	97.90	0.23
13.50	0.14	30	97.83	0.15
14.00	0.12	25	97.80	0.12
14.50	0.10	22	97.79	0.10
15.00	0.08	18	97.77	0.08
15.50	0.07	17	97.76	0.07
16.00	0.07	16	97.75	0.07
16.50	0.06	15	97.74	0.06
17.00	0.05	14	97.74	0.06
17.50	0.05	13	97.73	0.05
18.00	0.04	12	97.72	0.04
18.50	0.04	11	97.72	0.04
19.00	0.04	11	97.72	0.04
19.50	0.04	11	97.71	0.04
20.00	0.04	10	97.71	0.04
20.50	0.04	10	97.71	0.04
21.00	0.04	10	97.71	0.04
21.50	0.03	10	97.71	0.03
22.00	0.03	9	97.70	0.03
22.50	0.03	9	97.70	0.03
23.00	0.03	9	97.70	0.03
23.50	0.03	8	97.70	0.03
24.00	0.02	8	97.69	0.03