5 Centennial Drive, Peabody, MA 01960 (HQ)
Tel: 978.532.1900

Wayland- Loker Conservation and Recreation Area
WSE Project No. 2180076.C.2

July 18, 2018

Wayland Conservation Commission
41 Cochituate Road
Wayland, MA 01778

Re: NOI Filing
Loker Conservation and Recreation Area
Wayland, MA

Dear Members of the Commission:

On behalf of the Town of Wayland, Weston & Sampson Engineers, Inc. is hereby enclosing two (2) copies (including original) of the Notice of Intent submittal (including plans) to fulfill the requirements of the Massachusetts Wetlands Protection Act, M.G.L. Chapter 131, Section 40 submittal requirements and the Town of Wayland submittal requirements. This submittal is a formal Notice of Intent for the multi-purpose athletic field at Loker Conservation and Recreation Area.

As part of the filing, we have attached the following:

Appendix A: Project Description
Appendix B: Alternatives Analysis
Appendix C: Stormwater Report
Appendix D: Project Maps
Appendix E: Contract Specifications
Appendix F: Abutters List / Notice to Abutters
Appendix G: Wetlands Memorandum
Appendix H: Tree Memorandum

If you have any questions regarding this submittal, please contact me at (978) 532-1900.

Very truly yours,

WESTON & SAMPSON

Mel Higgins, PWS
Senior Environmental Scientist

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

City/Town

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

1. Signature of Applicant	2. Date
3. Signature of Property Owner (if different)	4. Date
5. Signature of Representative (if any)	6. Date

For Conservation Commission:
Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:
One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:
If the applicant has checked the “yes” box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

Wayland Wetlands and Water Resources Bylaw, Chapter 194 Application

1. Applicant:

Ben Keefe
Name (PLEASE PRINT) — Email Address (if applicable)

41 Cochituate Road, Facilities Dept 2nd Flr | Wayland | MA | 01778
Mailing Address | City/Town | State | Zip Code

Phone Number — Fax Number (if applicable)

2. Representative:

Weston & Sampson Engineers | Mel Higgins
Firm/Business Name — Contact Name

5 Centennial Drive | Peabody | MA | 01960
Mailing Address | City/Town | State | Zip Code

(978) 532-1900 x2332
Phone Number — Fax Number (if applicable)

3. Property Owner(s)

Town of Wayland
Property Owner (PLEASE PRINT) — Email Address (if applicable)

41 Cochituate Road | Wayland | MA | 01778
Address | City/Town | State | Zip Code

Phone Number — Fax Number (if applicable)

4. Type of Application

[ ] Request for a Determination of Applicability (RDA)
[ ] Abbreviated NOI
[ ] Notice of Resource Area Delineation
[ ] After the Fact Amendment (AFA)
[ ] Amendment to Order of Conditions
[x] Notice of Intent (NOI)
[ ] Extension of O.O.C.
[ ] Certificate of Compliance
[ ] After the Fact Filing (AFF)

5. Project

412 Commonwealth Road | 49 | 064B
Location Address | Assessors Map(s) | Parcel(s)

Project Description (PLEASE PRINT): Addition of a multi-purpose athletic field to Loker Conservation and Recreation Area (see Appendix A for additional information)

6. Title/Date of Plan(s)

7. Bylaw Application Fee: **$** exempt

8. Application filed pursuant to MGL Chapter 131, Section 40 [x] Yes [ ] No

9. Signature of Applicant Date

Signature of Property Owner Date

(NOTE: This application shall be signed by the property owner as well as the applicant. Signature of the property owner on this application shall be deemed permission granted to the Conservation Commission and their agents to go upon the subject property.)

PROJECT DESCRIPTION

Background

The Town of Wayland Recreation Department is currently faced with a deficit of rectangular athletic fields and striving to meet the current demands and needs of the Town's recreational programs. As such, the proposed installation of a new synthetic turf multi-purpose rectangular field within the limits of recreation area of the Loker Conservation and Recreation would tremendously benefit demand for recreational programs. The project includes, but not limited to earthwork, tree removal, field installation, lighting, parking, and the a stormwater management system. Refer to Appendix D for proposed conditions plans and details.

Project Location

Loker Conservation and Recreation Area is located at the corner of Commonwealth Road and Rice Road. There is currently a paved access drive at Commonwealth Road that is remnant of the sites previous use as a Dow company facility. The designated recreation area itself consists of a steeply sloped open field surrounded by wooded areas on all sides. North Pond is located north of the existing designated parking area and West and East Pond are located to the south, on either side of the access drive, north of Commonwealth Road.

Project Description

The proposed improvements to the delineated recreation parcel of the Loker Conservation and Recreation property is to provide the Town of Wayland Recreation Department with a new 195 x 300-ft. synthetic turf multi-purpose athletic field and parking lot.

The site currently consists of a steep sloped open lawn area encompassed by thickly vegetated forest and abandoned asphalt pavement drive. In addition, there is a non-ADA compliant parking area that will also be renovated, improved and expanded to allow for 62 total parking spaces including accessible parking spaces and additional parking for both the new athletic field and the conservation area. In addition, both the new field and parking lot, new lighting will be added to allow for expanded field use hours and safety. The existing asphalt drive will be replaced with a new emergency access drive to the field. To account for the new athletic field and parking lot being added to the site, a stormwater management system will be installed. Refer C for additional stormwater information.

Prior to the commencement of any work, erosion control barriers must be installed around the limit of work to prevent any sediment migration from the work area into nearby resource areas. With best efforts to minimize the extent of both the earthwork disturbance and the total number of trees to be removed within the project area, a tree assessment was conducted in conjunction the Town of Wayland Chapter 193 Stormwater Management and Land Disturbance Bylaw. Approximately 56 trees will be removed within the 100-ft. wetland buffer zone and 335 trees outside the wetland resource area as part of the clearing process. Refer to Appendix H for the Tree Assessment Report.

Water Quality

The effects of turf fields (artificial or natural) on water quality include both:

1) the ability of the turf system to remove pollutants associated with rainwater or incoming stormwater and
2) the potential for pollutants to be generated by turf systems through processes such as erosion or leaching.

Many studies have been conducted on the potential water quality impacts associated with both artificial and natural turf fields. The focus of the artificial turf studies centers on the potential for heavy metals such as lead and/or zinc to leach from the crumb rubber infill material. Several studies were reviewed for this project to address the public's concerns regarding the potential for heavy metals such as lead or zinc to be leached from the crumb rubber into the stormwater and discharged either as surface water into a local wetland or directly into the groundwater system. The studies reviewed were performed by:

- New York State Department of Environmental Conservation and New York State Department of Health (2009)
- Connecticut Department of Environmental Protection (2010)
- Maryland – Montgomery County Staff Work Group (2011)
- California Department of Resources Recycling and Recovery (2010)

The conclusions of all the studies reviewed suggest that artificial turf fields are unlikely to generate pollutant at concentrations above water quality limits. The perception is that zinc can be a potential issue for aquatic life since the water quality standard for aquatic life in surface water (120 μg/L) is significantly lower than the GW-1 groundwater standard (5,000 μg/L). A review of the leachate sampling for the existing crumb rubber artificial turf field at the Wayland High School was also conducted in an effort to understand if any potential concerns were raised in the existing field that has been in place for 11 years. The results of the water quality sampling also revealed that the four stormwater samples collected and analyzed for zinc were well below the EPA Freshwater Chronic Criterion Concentration for fresh surface water of 120 μg/L. Based on previous studies in the northeast, Atlantic coast, western states, and the Town of Wayland, Weston & Sampson believes there will be no water quality impact to either surface water or groundwater from the construction of an artificial turf field at the Loker Conservation and Recreation Area.

Environmental Considerations

There will be no impacts to wetland resource area protected under the wetlands protection act. There will be certain areas that will be within the 100-foot wetlands buffer zone. This work includes tree removal and earthwork including the northeast corner of the athletic field, northern portion of the proposed parking lot and access drive improvements

ALTERNATIVES ANALYSIS

Basis for Alternatives Analysis

The following is a presentation of alternatives that were evaluated for addressing the improvements at Loker Conservation and Recreation Area. The primary objective is to provide a design strategy that minimizes the amount of disturbance and environmental impact to the site while also providing sufficient facilities and amenities that meet the town's recreation needs. This includes evaluating the number of athletic facilities proposed, the size of the field footprints, as well as alternative layouts and orientations for the field and parking lot.

Alternative Analysis

During the design process for improvements to the Loker Conservation and Recreation Area, the number of field footprints were investigated to evaluate the amount of disturbance and environmental impact on site in relation to the town's recreation facility needs. The town also investigated different field footprint sizes and parking lot layouts to determine the configuration with the least amount of disturbance and impact. It is important to note the property has an interior area designated for recreation use. This is one of the significant constraints on potential footprint locations, sizes, and orientation.

Alternatives Investigation 1 – Quantity and Size of Field Footprints

The number of recreation field footprints were evaluated that maximize the quantity of facilities within the property limits designated for recreation use. This resulted in an additional 180' x 300' field footprint to the southeast of North Pond. The area beyond these extents would be disturbed in order to meet existing grades. As part of this exercise, the size of field(s) were also evaluated.

Advantages:
The additional 180' x 300' field footprint maximizes the area within the property designated for recreation use. A second field helps alleviate the town-wide deficit in multi-purpose rectangular fields that has been identified in several independent studies performed by the town. Smaller field footprints resulted smaller disturbed areas and lessened the environmental impact to the site.

Disadvantages:
The second field footprint increases the area of disturbance in the 100' wetland buffers of North Pond and East Pond. This would also increase the total number of trees needing removed to accommodate the additional field footprint and increase the volume of stormwater captured and treated. The smaller footprints did not provide enough play area to satisfy the Recreation Department's programming needs.

Conclusion:
It was determined that limiting the proposed design to one field footprint significantly reduces the amount of disturbance and environmental impact to the Loker Conservation and Recreation Area while also positively impacting the town-wide recreation field shortage. One field footprint also reduces the amount of stormwater captured on site.

Alternatives Investigation 2 – Layout and Orientation of Field Footprint and Parking Lot

Alternative layouts of the multi-purpose rectangular field footprint were tested. It is important to note that the limit within the property designated for recreational use severely constrains the number of viable configurations.

Advantages:
One alternative layout provided a field and parking lot that were parallel and at the same approximate finish grade. This drastically improved the pedestrian access between the parking area and the athletic field.

Disadvantages:
The alternative layout resulted in larger areas of disturbance and environmental impact, particularly within wetland buffer areas. This was primarily due to the amount of cutting and filling required to tie in the field and parking lot finish grades to existing grades.

Conclusion:
The proposed layout and configuration of the field and parking lot works with existing grades and takes advantage of areas disturbed by the site's former use as a Dow Chemical research facility. This includes locating proposed improvements where the former Dow building was located, the old parking areas still visible on site, and the existing access/maintenance drives. The proposed design also incorporates retaining walls to further minimize the area of disturbance with the 100' wetland buffer.

Stormwater Report

Conservation Commission
Wayland, Massachusetts

Loker Field Improvements

Notice of Intent
Massachusetts Wetland Protection Act
M.G.L. c. 131 § 40

July 11, 2018

JOB NO: 2180076

Weston & Sampson
5 Centennial Drive
Peabody, MA 01960

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Tel: 978-532-1900 Fax: 978-977-0100

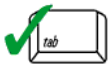
Table of Contents

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

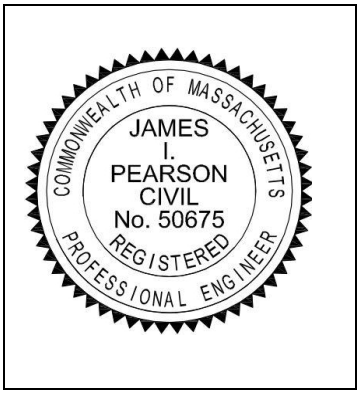
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



7/12/2018

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☐ Redevelopment

☒ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☐ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☐ Use of "country drainage" versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): _____

Standard 1: No New Untreated Discharges

☐ No new untreated discharges

☐ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☐ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☐ Static ☒ Simple Dynamic ☐ Dynamic Field[1]

☒ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☒ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☒ Description and delineation of public safety features;
- ☒ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

Stormwater Report

To Be Submitted with the Notice of Intent

Applicant/Project Name: Town of Wayland – Loker Field Improvements

Project Address: Commonwealth Road, Wayland MA

Application Prepared by:
Firm: Weston & Sampson, Inc.
Registered PE: James Pearson

Below is an explanation concerning Standards 1-10 as they apply to the Town of Wayland Loker Field Imprvement project, located on Commonwealth Road:

General:

Due to the increased need for town athletic facilities, the Town of Wayland is proposing the installation of a multi-purpose athletic field within the Loker Conservation and Recreation Area. The project includes field installation, field lighting, parking, trail improvements, and the addition of a stormwater management system. There would also be improvements to the existing emergency access road and parking area. The goal of this project is to utilize the Loker Conservation and Recreation Area to provide the Town of Wayland with a multi-purpose athletic field. Currently there is existing open field space on the property. By expanding this open space there will be room for the new athletic field. There is also an existing parking lot that will also be expanded on to allow for additional parking. In addition to the field and parking lot, new lighting will be added to allow for field use after daylight hours. The existing emergency access road will also be improved upon to allow for easier use, and miscellaneous paved areas in various locations of the site will be removed and converted to grassed space.

Standard 1: No New Untreated Discharges

The proposed project will create no new untreated discharges. Total impervious area post-development will be decreased in comparison with existing conditions.

Standard 2: Peak Rate Attenuation

Both existing and proposed conditions were modeled using HydroCAD computer software. The results of this analysis are presented in Table 1.

Table 1: Total Peak Runoff Rate

Point of Interest	Storm Frequency	Storm Depth (in)	Peak Flow (cfs) Pre-Development	Peak Flow (cfs) Post-Development
P1				
	2 Year	3.00	0.04	0.00
	10 Year	4.60	0.60	0.13
	25 Year	5.30	1.25	0.37
	100 Year	6.50	2.48	0.83
P2				
	2 Year	3.00	2.52	0.34
	10 Year	4.60	8.64	4.09
	25 Year	5.30	13.17	8.95
	100 Year	6.50	20.78	18.11

The proposed design is such that peak runoff rates do not exceed rates of runoff under existing conditions even in the 100-year storm scenario. For regulatory purposes the existing site condition serves as the benchmark for peak discharges that must not be exceeded under the re-developed condition. Peak discharges are mitigated by using the proposed underground chambers to provide stormwater detention benefit. Please refer to existing and proposed conditions in HydroCAD model printouts included in Attachment D for additional details.

To ensure that the work incorporates the performance standards recommended in the DEP's Stormwater Management Policy, necessary erosion and sedimentation control measures will be utilized during construction. These measures will include compost filter tubes, catch basin protection, and a stabilized construction entrance, as depicted on the site plans.

Standard 3: Recharge

Overall, the site is being redeveloped such that the impervious area under proposed conditions will be less that existing conditions. As such, stormwater recharge has been provided to the maximum extent practicable. The reduction of impervious surfaces will in itself improve recharge characteristics of the site, but an underground stormwater chamber system has been designed in the parking lot area to provide additional recharge. Recharge Volume (Appendix E) has been calculated based on the amount of impervious area contributing runoff to the underground chambers.

Standard 4: Water Quality

As discussed under Standard 3, the total impervious area onsite is being decreased. Stormwater Quality treatment is being provide to the maximum extent practicable. Treatment will be provided for the improved parking lot area. Runoff from the parking lot area does not presently undergo treatment, but under proposed conditions runoff from this area will be directed through deep sump hooded catch basins and into the underground stormwater chambers. All of the stormwater from impervious areas on the site will undergo treatment to bring TSS levels within regulated limits (>80% removal). During construction of the project, appropriate temporary stormwater BMPs will be used to minimize sedimentation and soil erosion.

Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs)

This project will not create a land use with higher potential pollutant load.

Standard 6: Critical Areas

There will be no new discharge to critical areas.

Standard 7: Redevelopments and Other Projects Subject to the Standards Only to the Maximum Extent Practicable

The project is a mix of new development and redevelopment. Certain standards for redeveloped areas have been met to the maximum extent practicable as described herein.

Standard 8: Construction Period Pollution Prevention and Erosion and Sediment Control

A detailed Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan is included in Attachment G. To ensure that the work incorporates the performance standards recommended in the DEP's Stormwater Management Policy, necessary erosion and sedimentation control measures will be utilized during construction. These measures will include compost filter tubes, silt fence, catch basin protection, and a stabilized construction entrance.

Standard 9: Operation and Maintenance Plan

An operations and maintenance plan is included in Attachment H.

Standard 10: Prohibition of Illicit Discharges

An illicit discharge compliance statement has been included in Attachment I.

Registered Professional Engineer's Certification

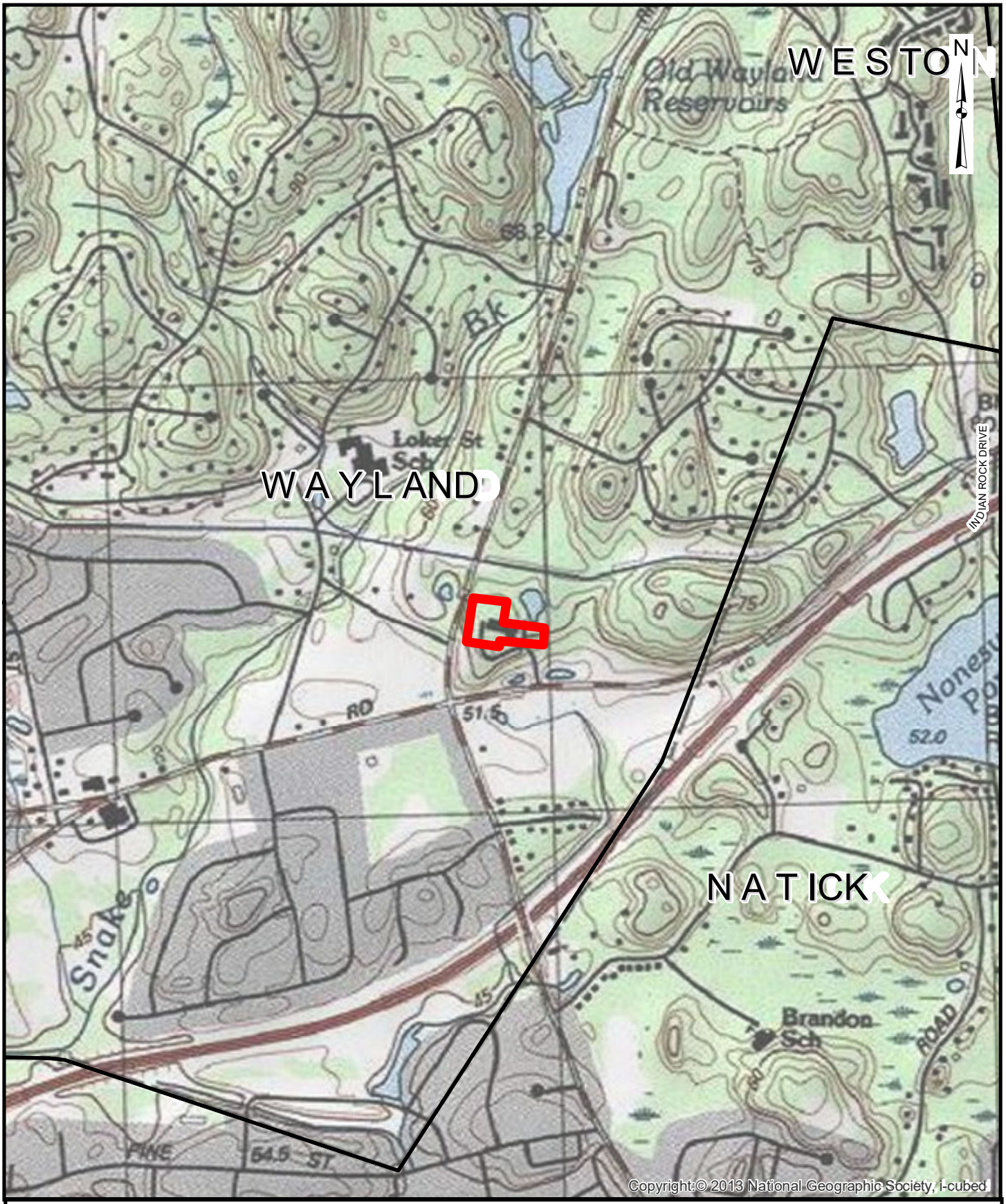
I have reviewed the Stormwater Report, including any relevant soil evaluations, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan, the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

7/12/2018

Signature and Date

Attachment A - Locus Map



Attachment A
Loker Conservation & Recreation Area
Wayland, Massachusetts

Locus Map

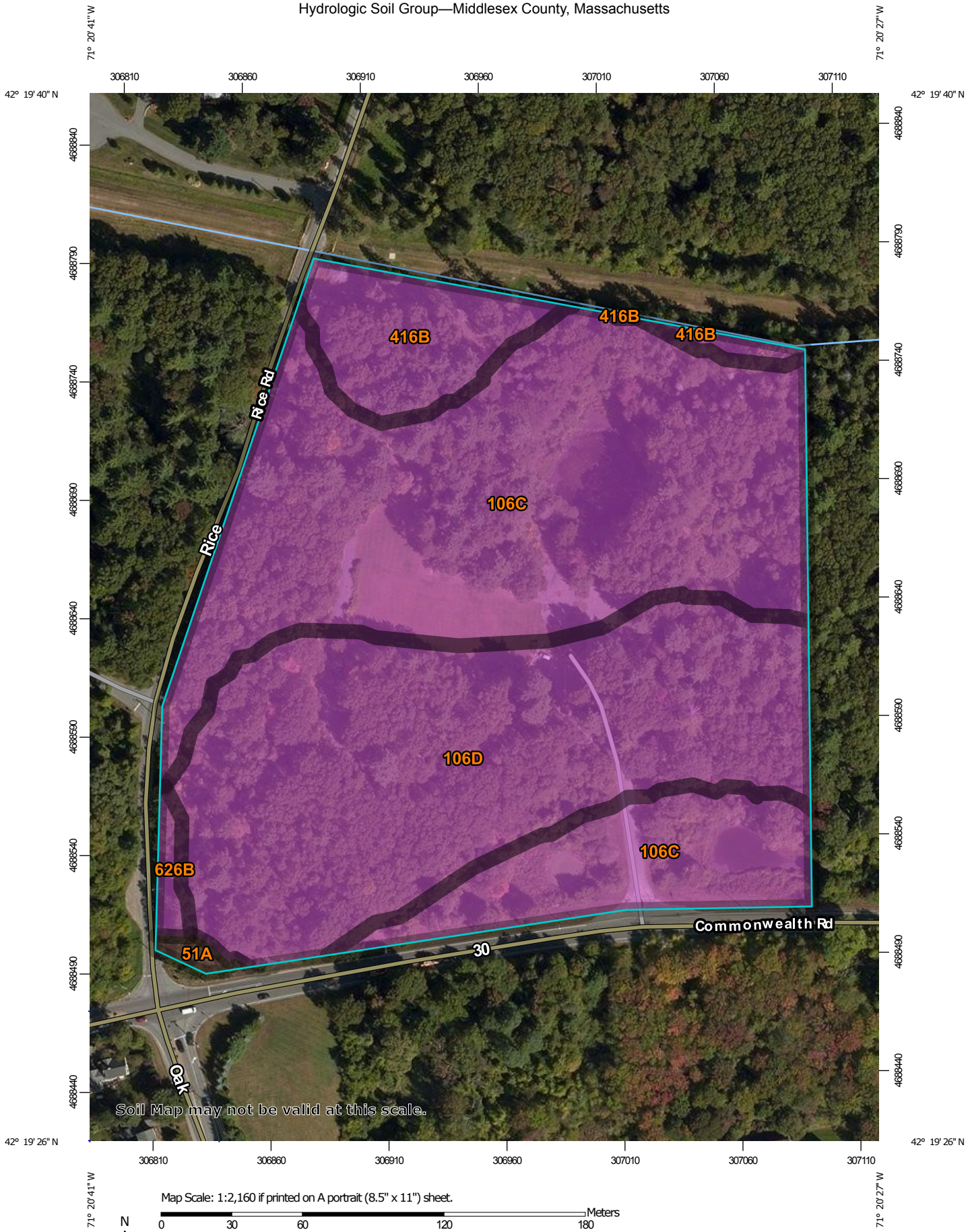
Work Area

600 0 600
Scale In Feet

Weston & Sampson

Path: \\wse03.local\WSE\Projects\MA\Wayland MA\Wayland High School Athletic Facilities\GIS\Loker Field\Figure 1 - Locus.mxd User: GasparA Saved: 7/5/2018 1:25:35 PM Opened: 7/5/2018 1:26:15 PM

Attachment B - NRCS Soils Map, Soils Report, and HSG Classifications



Map Scale: 1:2,160 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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: Middlesex County, Massachusetts
Survey Area Data: Version 17, Oct 6, 2017

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

Date(s) aerial images were photographed: Sep 12, 2014—Sep 28, 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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
51A	Swansea muck, 0 to 1 percent slopes	B/D	0.1	0.5%
106C	Narragansett-Hollis-Rock outcrop complex, 3 to 15 percent slopes	A	8.9	52.4%
106D	Narragansett-Hollis-Rock outcrop complex, 15 to 25 percent slopes	A	6.5	38.5%
416B	Narragansett silt loam, 3 to 8 percent slopes, very stony	A	1.3	7.6%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	0.2	0.9%
Totals for Area of Interest			**16.9**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Attachment C - Test Pit Summary and Logs

NOTES:

1. THIS FIGURE IS BASED ON AN EXISTING AND PROPOSED CONDITIONS SURVEY PLAN PREPARED BY WESTON & SAMPSON ENGINEERS, INC. DATED MARCH 2018.
2. ELEVATIONS REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
3. BORINGS WERE COMPLETED BY TECHNICAL DRILLING SERVICES, INC. OF STERLING, MA AND OBSERVED BY WESTON & SAMPSON ENGINEERS, INC. ON MARCH 12, 2018.
4. TEST PITS WERE COMPLETED BY THE TOWN OF WAYLAND AND OBSERVED BY WESTON & SAMPSON ENGINEERS, INC. ON MARCH 21, 2018.
5. BORING LOCATIONS SHOWN ARE APPROXIMATE AND WERE LOCATED IN THE FIELD BY WESTON & SAMPSON ENGINEERS, INC. USING A HANDHELD GPS DEVICE.
6. LOCATIONS OF UNDERGROUND UTILITIES AND STRUCTURES SHOWN HAVE BEEN COMPILED, IN PART, FROM RECORD MAPPING AND OTHER DATA SUPPLIED BY THE RESPECTIVE UTILITY COMPANIES AND/OR OTHER SOURCES. THESE LOCATIONS MUST BE CONSIDERED APPROXIMATE.

LEGEND:

B-1-L — BORING DESIGNATION AND APPROXIMATE LOCATION.

TP-1 — TEST PIT DESIGNATION AND APPROXIMATE LOCATION.

60 30 0 60 120

SCALE: 1"=60'

FIGURE 1
LOKER SITE PLAN

WAYLAND HIGH SCHOOL ATHLETIC FACILITIES
WAYLAND, MA

DESIGNED BY: MJZ	CHECKED BY:	DATE: APRIL 2018

Weston & Sampson

P:\MA\Wayland MA\Wayland High School Athletic Facilities\Geotech\Plan\Loker Site Plan.dwg

Weston & Sampson

BORING NUMBER: **B-1A-L**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/12/2018 **END DATE:** 3/12/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/12/2018	Not observed	

DEPTH (ft.) / Elevation	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0	S-1	0.0	11/24	2 4 4 11	8				FILL	6" Organics (Wood, leaves, pine needles, roots); moist. Loose, light brown, fine to coarse SAND, some fine to coarse gravel, little silt; moist. [FILL]	P.I.D. - 0.8 ppm
	S-2	2.0	13/14	14 36 120/2"					SAND & GRAVEL	Very dense, tan, gravelly fine to coarse SAND, little silt; moist.	P.I.D. - 0.1 ppm - Auger grinding at approximately 2 ft.
5	S-3	4.0	6/11	27 120/5"						Very dense, gray, fine to coarse GRAVEL, some fine to coarse sand, little silt; moist.	P.I.D. - 0.4 ppm - Heavy auger grinding and rig chatter at approximately 5 - 7 ft.

Auger refusal at 7 ft. End of boring at 7 ft. Offset boring approximately 5 ft. west to B-1B-L and re-attempt.

MATERIAL DESCRIPTION
(see guide below for soil classification based on constituent percentage)

Mineral Soil	Organic Soil
GRAVEL, SAND, SILT, CLAY: >50%	PEAT: 50-100%
gravelly, sandy, silty, clayey: 35-50%	organic (soil): 15-50%
some: 20-35%	with some organics: 5-15%
little: 10-20%	
trace: 0-10%	

SAMPLE		GRANULAR SOILS		COHESIVE SOILS	
SYMBOL	TYPE	N-Value	Density	N-VALUE	CONSISTENCY
S	Split spoon	0-4	Very Loose	< 2	Very Soft
ST	Shelby tube	4-10	Loose	2-4	Soft
AG	Auger grab	10-30	Med. Dense	4-8	Med. Stiff
NX	Rock core	30-50	Dense	8-15	Stiff
GP	Direct push	> 50	Very Dense	15-30	Very Stiff
				> 30	Hard

GENERAL NOTES:

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.

2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 3/30/18 10:11 - P:\MA\WAYLAND MA\WAYLAND HIGH SCHOOL ATHLETIC FACILITIES\GEOTECH\FIELDBORING & TEST PIT LOGS\GINT LOGS - WAYLAND H.S. ATHLETIC FACILITIES.GPJ

Weston & Sampson SM

BORING NUMBER: **B-1B-L**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/12/2018 **END DATE:** 3/12/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/12/2018	Not observed	

DEPTH (ft.) *Elevation*	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0										See log for B-1A-L for soil descriptions.	B-1B is offset approximately 5 ft. west of B-1A-L.
5											

Auger refusal at 7 ft. End of boring at 7 ft.

MATERIAL DESCRIPTION
(see guide below for soil classification based on constituent percentage)

Mineral Soil	Organic Soil
GRAVEL, SAND, SILT, CLAY: >50%	PEAT: 50-100%
gravelly, sandy, silty, clayey: 35-50%	organic (soil): 15-50%
some: 20-35%	with some organics: 5-15%
little: 10-20%	
trace: 0-10%	

SAMPLE		GRANULAR SOILS		COHESIVE SOILS	
SYMBOL	TYPE	N-Value	Density	N-VALUE	CONSISTENCY
S	Split spoon	0-4	Very Loose	< 2	Very Soft
ST	Shelby tube	4-10	Loose	2-4	Soft
AG	Auger grab	10-30	Med. Dense	4-8	Med. Stiff
NX	Rock core	30-50	Dense	8-15	Stiff
GP	Direct push	> 50	Very Dense	15-30	Very Stiff
				> 30	Hard

GENERAL NOTES:

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.

2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 3/30/18 10:11 - P:\MA\WAYLAND MA\WAYLAND HIGH SCHOOL ATHLETIC FACILITIES\GEOTECH\FIELDBORING & TEST PIT LOGS\GINT LOGS - WAYLAND H.S. ATHLETIC FACILITIES.GPJ

Weston & Sampson

BORING NUMBER: **B-2A-L**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/12/2018 **END DATE:** 3/12/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/12/2018	Not observed	

DEPTH (ft.) / Elevation	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0	S-1	0.0	3/24	2 3 4 8	7				FILL	Loose, brown, coarse GRAVEL, little silt, little fine to coarse sand, little organics (roots, leaves); moist. [FILL]	- Coarse gravel fragment in tip of spoon.
	S-2	2.0	12/14	28 35 120/2"					SAND & GRAVEL	Very dense, light brown, gravelly fine to coarse SAND, trace silt; moist.	P.I.D. - 0.1 ppm
5	S-3	4.0	12/12	55 33 120/0"						Very dense, gray-brown, fine to coarse GRAVEL, little fine to medium sand, trace silt; moist.	P.I.D. - 0.9 ppm

Auger refusal at 5 ft. End of boring at 5 ft. Offset boring approximately 2 ft. northwest to B-2B-L and re-attempt.

MATERIAL DESCRIPTION (see guide below for soil classification based on constituent percentage)

Mineral Soil	Organic Soil
GRAVEL, SAND, SILT, CLAY: >50%	PEAT: 50-100%
gravelly, sandy, silty, clayey: 35-50%	organic (soil): 15-50%
some: 20-35%	with some organics: 5-15%
little: 10-20%	
trace: 0-10%	

SAMPLE		GRANULAR SOILS		COHESIVE SOILS	
SYMBOL	TYPE	N-Value	Density	N-VALUE	CONSISTENCY
S	Split spoon	0-4	Very Loose	< 2	Very Soft
ST	Shelby tube	4-10	Loose	2-4	Soft
AG	Auger grab	10-30	Med. Dense	4-8	Med. Stiff
NX	Rock core	30-50	Dense	8-15	Stiff
GP	Direct push	> 50	Very Dense	15-30	Very Stiff
				> 30	Hard

GENERAL NOTES:

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.

2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 3/30/18 10:11 - P:\MA\WAYLAND MA\WAYLAND HIGH SCHOOL ATHLETIC FACILITIES\GEOTECH\FIELDBORING & TEST PIT LOGS\GINT LOGS - WAYLAND H.S. ATHLETIC FACILITIES.GPJ

Weston & Sampson

BORING NUMBER: **B-2B-L**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/12/2018 **END DATE:** 3/12/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/12/2018	Not observed	

DEPTH (ft.) *Elevation*	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0										(see guide below for soil classification based on constituent percentage) Mineral Soil: GRAVEL, SAND, SILT, CLAY: >50%; gravelly, sandy, silty, clayey: 35-50%; some: 20-35%; little: 10-20%; trace: 0-10% Organic Soil: PEAT: 50-100%; organic (soil): 15-50%; with some organics: 5-15%	
5										See log for B-2A-L for soil descriptions.	B-2B-L is offset approximately 5 ft. northwest of B-2A-L.

Auger refusal at 5 ft. End of boring at 5 ft.

SAMPLE		GRANULAR SOILS		COHESIVE SOILS		GENERAL NOTES:
SYMBOL	TYPE	N-Value	Density	N-VALUE	CONSISTENCY	1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
S	Split spoon	0-4	Very Loose	< 2	Very Soft	
ST	Shelby tube	4-10	Loose	2-4	Soft	
AG	Auger grab	10-30	Med. Dense	4-8	Med. Stiff	2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.
NX	Rock core	30-50	Dense	8-15	Stiff	
GP	Direct push	> 50	Very Dense	15-30	Very Stiff	
				> 30	Hard	

W&S BORING LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 3/30/18 10:11 - P:\MA\WAYLAND MA\WAYLAND HIGH SCHOOL ATHLETIC FACILITIES\GEOTECH\FIELDBORING & TEST PIT LOGS\GINT LOGS - WAYLAND H.S. ATHLETIC FACILITIES.GPJ

Weston & Sampson

BORING NUMBER: **B-3A-L**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/12/2018 **END DATE:** 3/12/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/12/2018	Not observed	

DEPTH (ft.) / Elevation	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0	S-1	0.0	18/24	1 5 11 12	16				FILL	5" Topsoil Very stiff, orange-brown, sandy SILT, little fine to coarse gravel, trace roots; moist. [FILL]	P.I.D. - 6.2 ppm
	S-2	2.0	7/8	25 120/2"					SAND & GRAVEL	Very dense, gray-brown, gravelly fine to coarse SAND, little silt; moist.	P.I.D. - 4.3 ppm - Auger grinding approximately 2 - 4 ft.
5	S-3	4.0	8/9	25 120/3"						Very dense, gray, fine to coarse GRAVEL, some fine to coarse sand, little silt; moist.	- Heavy auger grinding and rig chatter at approximately 4 - 7 ft. Auger cuttings are primarily gray gravel from approximately 4 - 7 ft.

Auger refusal at 7 ft. End of boring at 7 ft. Offset boring approximately 2.7 ft. east to B-3B-L and re-attempt.

MATERIAL DESCRIPTION
(see guide below for soil classification based on constituent percentage)

Mineral Soil	Organic Soil
GRAVEL, SAND, SILT, CLAY: >50%	PEAT: 50-100%
gravelly, sandy, silty, clayey: 35-50%	organic (soil): 15-50%
some: 20-35%	with some organics: 5-15%
little: 10-20%	
trace: 0-10%	

SAMPLE		GRANULAR SOILS		COHESIVE SOILS	
SYMBOL	TYPE	N-Value	Density	N-VALUE	CONSISTENCY
S	Split spoon	0-4	Very Loose	< 2	Very Soft
ST	Shelby tube	4-10	Loose	2-4	Soft
AG	Auger grab	10-30	Med. Dense	4-8	Med. Stiff
NX	Rock core	30-50	Dense	8-15	Stiff
GP	Direct push	> 50	Very Dense	15-30	Very Stiff
				> 30	Hard

GENERAL NOTES:

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.

2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 3/30/18 10:11 - P:\MA\WAYLAND MA\WAYLAND HIGH SCHOOL ATHLETIC FACILITIES\GEOTECH\FIELDBORING & TEST PIT LOGS\GINT LOGS - WAYLAND H.S. ATHLETIC FACILITIES.GPJ

Weston & Sampson

BORING NUMBER: **B-3A-L**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/12/2018 **END DATE:** 3/12/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/12/2018	Not observed	

DEPTH (ft.) / Elevation	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0	S-1	0.0	18/24	1 5 11 12	16				FILL	5" Topsoil Very stiff, orange-brown, sandy SILT, little fine to coarse gravel, trace roots; moist. [FILL]	P.I.D. - 6.2 ppm
	S-2	2.0	7/8	25 120/2"					SAND & GRAVEL	Very dense, gray-brown, gravelly fine to coarse SAND, little silt; moist.	P.I.D. - 4.3 ppm - Auger grinding approximately 2 - 4 ft.
5	S-3	4.0	8/9	25 120/3"						Very dense, gray, fine to coarse GRAVEL, some fine to coarse sand, little silt; moist.	- Heavy auger grinding and rig chatter at approximately 4 - 7 ft. Auger cuttings are primarily gray gravel from approximately 4 - 7 ft.

Auger refusal at 7 ft. End of boring at 7 ft. Offset boring approximately 2.7 ft. east to B-3B-L and re-attempt.

MATERIAL DESCRIPTION
(see guide below for soil classification based on constituent percentage)

Mineral Soil	Organic Soil
GRAVEL, SAND, SILT, CLAY: >50%	PEAT: 50-100%
gravelly, sandy, silty, clayey: 35-50%	organic (soil): 15-50%
some: 20-35%	with some organics: 5-15%
little: 10-20%	
trace: 0-10%	

SAMPLE		GRANULAR SOILS		COHESIVE SOILS	
SYMBOL	TYPE	N-Value	Density	N-VALUE	CONSISTENCY
S	Split spoon	0-4	Very Loose	< 2	Very Soft
ST	Shelby tube	4-10	Loose	2-4	Soft
AG	Auger grab	10-30	Med. Dense	4-8	Med. Stiff
NX	Rock core	30-50	Dense	8-15	Stiff
GP	Direct push	> 50	Very Dense	15-30	Very Stiff
				> 30	Hard

GENERAL NOTES:

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.

2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

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Weston & Sampson SM

BORING NUMBER: **B-3B-L**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/12/2018 **END DATE:** 3/12/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/12/2018	Not observed	

DEPTH (ft.) *Elevation*	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0										(see guide below for soil classification based on constituent percentage) Mineral Soil: GRAVEL, SAND, SILT, CLAY: >50%; gravelly, sandy, silty, clayey: 35-50%; some: 20-35%; little: 10-20%; trace: 0-10% Organic Soil: PEAT: 50-100%; organic (soil): 15-50%; with some organics: 5-15%	B-3B-L is offset approximately 2.7 ft. east of B-3A-L. See log for B-3A-L for soil descriptions. - Auger grinding and rig chatter at approximately 2 - 6.5 ft. - Auger cuttings are primarily gray gravel from approximately 4 - 7 ft.
5											

Auger refusal at 6.5 ft. End of boring at 6.5 ft.

SAMPLE		GRANULAR SOILS		COHESIVE SOILS		GENERAL NOTES:
SYMBOL	TYPE	N-Value	Density	N-VALUE	CONSISTENCY	1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.
S	Split spoon	0-4	Very Loose	< 2	Very Soft	
ST	Shelby tube	4-10	Loose	2-4	Soft	
AG	Auger grab	10-30	Med. Dense	4-8	Med. Stiff	2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.
NX	Rock core	30-50	Dense	8-15	Stiff	
GP	Direct push	> 50	Very Dense	15-30	Very Stiff	
				> 30	Hard	

W&S BORING LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 3/30/18 10:11 - P:\MA\WAYLAND MA\WAYLAND HIGH SCHOOL ATHLETIC FACILITIES\GEOTECH\FIELDBORING & TEST PIT LOGS\GINT LOGS - WAYLAND H.S. ATHLETIC FACILITIES.GPJ

Weston & Sampson

BORING NUMBER: **B-4A-L**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/12/2018 **END DATE:** 3/12/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/12/2018	Not observed	

DEPTH (ft.) / Elevation	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION	COMMENTS
0	S-1	0.0	12/24	5 4 4 5	8				FILL	3" Topsoil Loose, light brown, fine to medium SAND, little fine to coarse gravel, trace silt; moist. [FILL]	
	S-2	2.0	7/24	6 5 6 6	11					Medium dense, light brown, fine to medium SAND, little fine gravel, little silt; moist. [FILL]	
5	S-3	4.0	6/7	9 120/1"					SAND & GRAVEL	Very dense, gray-brown, fine to coarse SAND, some fine to coarse gravel, little silt; moist.	

Auger refusal at 7 ft. End of boring at 7 ft. Offset boring approximately 5 ft. northeast to B-4B-L and re-attempt.

MATERIAL DESCRIPTION
(see guide below for soil classification based on constituent percentage)

Mineral Soil	Organic Soil
GRAVEL, SAND, SILT, CLAY: >50%	PEAT: 50-100%
gravelly, sandy, silty, clayey: 35-50%	organic (soil): 15-50%
some: 20-35%	with some organics: 5-15%
little: 10-20%	
trace: 0-10%	

SAMPLE		GRANULAR SOILS		COHESIVE SOILS	
SYMBOL	TYPE	N-Value	Density	N-VALUE	CONSISTENCY
S	Split spoon	0-4	Very Loose	< 2	Very Soft
ST	Shelby tube	4-10	Loose	2-4	Soft
AG	Auger grab	10-30	Med. Dense	4-8	Med. Stiff
NX	Rock core	30-50	Dense	8-15	Stiff
GP	Direct push	> 50	Very Dense	15-30	Very Stiff
				> 30	Hard

GENERAL NOTES:

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.

2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 3/30/18 10:11 - P:\MA\WAYLAND MA\WAYLAND HIGH SCHOOL ATHLETIC FACILITIES\GEOTECH\FIELDBORING & TEST PIT LOGS\GINT LOGS - WAYLAND H.S. ATHLETIC FACILITIES.GPJ

Weston & Sampson SM

BORING NUMBER: **B-4B-L**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/12/2018 **END DATE:** 3/12/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/12/2018	Not observed	

DEPTH (ft.) *Elevation*	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION (see guide below for soil classification based on constituent percentage)	COMMENTS
0											B-4B-L is offset approximately 5 ft. northeast of B-4A-L. See log for B-4A-L for soil descriptions.
5											

Mineral Soil
GRAVEL, SAND, SILT, CLAY: >50%
gravelly, sandy, silty, clayey: 35-50%
some: 20-35%
little: 10-20%
trace: 0-10%

Organic Soil
PEAT: 50-100%
organic (soil): 15-50%
with some organics: 5-15%

Auger refusal at 8 ft. End of boring at 8 ft.

SAMPLE SYMBOL	SAMPLE TYPE
S	Split spoon
ST	Shelby tube
AG	Auger grab
NX	Rock core
GP	Direct push

GRANULAR SOILS N-Value	Density
0-4	Very Loose
4-10	Loose
10-30	Med. Dense
30-50	Dense
> 50	Very Dense

COHESIVE SOILS N-VALUE	CONSISTENCY
< 2	Very Soft
2-4	Soft
4-8	Med. Stiff
8-15	Stiff
15-30	Very Stiff
> 30	Hard

GENERAL NOTES:

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.

2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 3/30/18 10:11 - P:\MA\WAYLAND MA\WAYLAND HIGH SCHOOL ATHLETIC FACILITIES\GEOTECH\FIELDBORING & TEST PIT LOGS\GINT LOGS - WAYLAND H.S. ATHLETIC FACILITIES.GPJ

Weston & Sampson SM

BORING NUMBER: **B-5-L**

CLIENT: Town of Wayland
PROJECT NUMBER: 2180076
PROJECT NAME: Wayland High School Athletic Facilities
PROJECT LOCATION: Wayland, Massachusetts

DRILLER: Brett Balyk - Technical Drilling Services
LOGGED / CHECKED BY: M. Zanchi, EIT /
RIG TYPE / DRILLING METHODS: ATV / hollow-stem auger (HSA)
CASING DIAMETER: 4-1/4" ID
SAMPLING METHODS: Standard penetration test (SPT)
SAMPLER TYPE: Standard 24" long x 2" OD (1-3/8" ID) split-spoon
SAMPLER HAMMER: 140-lb. automatic hammer
OTHER:

BORING LOCATION: See attached plan.
GROUND ELEVATION: Not available **DATUM:** Unknown
DRILLING START DATE: 3/12/2018 **END DATE:** 3/12/2018

GROUNDWATER OBSERVATIONS

DATE	DEPTH	COMMENTS
3/12/2018	Not observed	

DEPTH (ft.) *Elevation*	SAMPLE INFORMATION: TYPE - NO.	DEPTH (ft.)	REC./PEN. (in.)	SPT BLOWS/6"	SPT N-VALUE	% MOISTURE	% FINES (P200)	GRAPHIC LOG	STRATA NAME	MATERIAL DESCRIPTION (see guide below for soil classification based on constituent percentage)	COMMENTS
0	S-1	0.0	9/24	4 7 13 12	20				FILL	1" Topsoil Medium dense, brown, fine to coarse SAND, little fine gravel, trace silt; moist. [FILL]	
	S-2	2.0	15/24	13 12 9 11	21					Top 4" - Brown, fine to coarse SAND, little fine gravel, trace silt; moist. [FILL] Bottom 11" - Medium dense, orange-brown, silty fine SAND, little fine to coarse gravel; moist. [FILL]	
5	S-3	4.0	10/24	9 17 18 30	35				SAND & GRAVEL	Dense, brown, sandy fine to coarse GRAVEL, trace silt; moist.	

End of boring at 6 ft.

Mineral Soil
GRAVEL, SAND, SILT, CLAY: >50%
gravelly, sandy, silty, clayey: 35-50%
some: 20-35%
little: 10-20%
trace: 0-10%

Organic Soil
PEAT: 50-100%
organic (soil): 15-50%
with some organics: 5-15%

SAMPLE SYMBOL	SAMPLE TYPE
S	Split spoon
ST	Shelby tube
AG	Auger grab
NX	Rock core
GP	Direct push

GRANULAR SOILS N-Value	Density
0-4	Very Loose
4-10	Loose
10-30	Med. Dense
30-50	Dense
> 50	Very Dense

COHESIVE SOILS N-VALUE	CONSISTENCY
< 2	Very Soft
2-4	Soft
4-8	Med. Stiff
8-15	Stiff
15-30	Very Stiff
> 30	Hard

GENERAL NOTES:

1. The stratification lines represent the approximate boundary between soil types; actual transitions may be gradual.

2. Water level readings have been made in the drill holes at the times and conditions stated on the boring log. Fluctuations in the level of groundwater may occur due to other factors than those presented at the time measurements are made.

W&S BORING LOG - DATA TEMPLATE - WSE STANDARD LOGS.GDT - 3/30/18 10:11 - P:\MA\WAYLAND MA\WAYLAND HIGH SCHOOL ATHLETIC FACILITIES\GEOTECH\FIELDBORING & TEST PIT LOGS\GINT LOGS - WAYLAND H.S. ATHLETIC FACILITIES.GPJ

TEST PIT LOG

PROJECT NAME/NO.	Wayland High School Athletic Facilities			**TEST PIT NUMBER**	
LOCATION	Wayland, Massachusetts			TP-1	
CLIENT	Town of Wayland			GROUND SURFACE	
CONTRACTOR	Town of Wayland	FOREMAN:	Todd	ELEVATION	--
OBSERVED BY	Sarah Rocklin	DATE	3/21/18	DEPTH TO GROUNDWATER	
CHECKED BY		DATE			Not observed

DEPTH BELOW GROUND SURFACE (ft.)	SOIL DESCRIPTION	STRATUM DESCRIPTION
Surface	Grass at surface	
1	0 - 1.3' - Dark brown, fine SAND, trace fine to coarse gravel, trace silt, trace organics; moist. [TOPSOIL]	**TOPSOIL**
2	1.3' - 2.7' - Yellow-brown, fine to coarse SAND, some fine to coarse gravel, trace silt; moist. [FILL]	**FILL**
3	2.7' - 5.0' - Coarse GRAVEL, sub-rounded; moist. [SEPTIC FIELD]	**SEPTIC FIELD [FILL]**
4	- 6" diameter broken clay pipe observed at approximately 3.0'	
5		
6	5.0' - 6.7' - Gray-brown, gravelly fine to coarse SAND, trace silt; moist.	**SAND & GRAVEL**
7	Possible bedrock (GRANITE) encountered at 6.7'. End of test pit at 6.7'.	**BEDROCK**
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20		

NOTES: Coordinates: 42.3265 Lat., -71.3433 Long.

TEST PIT NUMBER
TP-1

Weston & Sampson

TEST PIT LOG

PROJECT NAME/NO.	Wayland High School Athletic Facilities			**TEST PIT NUMBER**	
LOCATION	Wayland, Massachusetts			TP-2	
CLIENT	Town of Wayland			GROUND SURFACE	
CONTRACTOR	Town of Wayland	FOREMAN:	Todd	ELEVATION	--
OBSERVED BY	Sarah Rocklin	DATE	3/21/18	DEPTH TO GROUNDWATER	
CHECKED BY		DATE			Not observed

DEPTH BELOW GROUND SURFACE (ft.)	SOIL DESCRIPTION	STRATUM DESCRIPTION
Surface	Grass at surface	
1	0 - 1.3' - Dark brown, fine to medium SAND, trace fine to coarse gravel, trace silt, trace organics; moist. [TOPSOIL]	**TOPSOIL**
2	1.3' - 2.7' - Brown, gravelly fine to coarse SAND, trace silt; moist. [FILL] - Concrete wall at west corner of test pit at approximately 2.5'	**FILL**
3	2.7' - 5.0' - Coarse GRAVEL, sub-rounded; moist. [SEPTIC FIELD]	**SEPTIC FIELD [FILL]**
4	- 6" diameter broken clay pipe observed at approximately 2.7'	
5		
6	5.0' - 6.0' - Yellow-brown, fine to coarse SAND, some fine to coarse gravel, trace silt; moist.	**SAND & GRAVEL**
7	6.0' - 7.6' - Gray-brown, fine to coarse SAND, some fine to coarse gravel, trace silt; moist.	
8	Possible bedrock (GRANITE) encountered at 7.6'. End of test pit at 7.6'.	**BEDROCK**
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17		
18		
19		
20		

NOTES: Coordinates: 42.3264 Lat., -71.3434 Long.

TEST PIT NUMBER
TP-2

Weston & Sampson

TEST PIT LOG

PROJECT NAME/NO.	Wayland High School Athletic Facilities			**TEST PIT NUMBER**	
LOCATION	Wayland, Massachusetts			TP-3	
CLIENT	Town of Wayland			GROUND SURFACE	
CONTRACTOR	Town of Wayland	FOREMAN:	Todd	ELEVATION	--
OBSERVED BY	Sarah Rocklin	DATE	3/21/18	DEPTH TO GROUNDWATER	
CHECKED BY		DATE			Not observed

DEPTH BELOW GROUND SURFACE (ft.)	SOIL DESCRIPTION	STRATUM DESCRIPTION
Surface	Grass at surface	
1	0 - 0.7' - Dark brown, fine SAND, trace fine to coarse gravel, trace silt, trace organics; moist. [TOPSOIL]	**TOPSOIL**
2	0.7' - 1.3' - Brown, fine to medium SAND, trace fine to coarse gravel, trace silt, trace organics; moist. [FILL]	**FILL**
3	- 1" diameter electrical conduit at 1.0'. 1.3' - 2.7' - Brown, fine to coarse SAND, some fine to coarse gravel, trace silt; moist. [FILL]	
4	2.7' - 5.7' - Gray-brown, gravelly fine to coarse SAND, trace silt; moist.	**SAND & GRAVEL**
5		
6	Possible bedrock (GRANITE) encountered at 5.7'. End of test pit at 5.7'.	**BEDROCK**
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20		

NOTES: Coordinates: 42.3259 Lat., -71.3437 Long.

TEST PIT NUMBER
TP-3

Weston & Sampson℠

TEST PIT LOG

PROJECT NAME/NO.	Wayland High School Athletic Facilities			**TEST PIT NUMBER**	
LOCATION	Wayland, Massachusetts			TP-4	
CLIENT	Town of Wayland			GROUND SURFACE	
CONTRACTOR	Town of Wayland	FOREMAN:	Todd	ELEVATION	--
OBSERVED BY	Sarah Rocklin	DATE	3/21/18	DEPTH TO GROUNDWATER	
CHECKED BY		DATE			Not observed

DEPTH BELOW GROUND SURFACE (ft.)	SOIL DESCRIPTION	STRATUM DESCRIPTION
Surface	Grass at surface on pavement	
	4" Asphalt Pavement	**PAVEMENT**
1	0.3' - 1.3' - Dark brown, fine SAND, trace fine to coarse gravel, trace silt, trace organics (roots, grass); moist. [BURIED TOPSOIL]	**BURIED TOPSOIL**
2	1.3' - 2.0' - Light brown, fine to coarse SAND, some fine to coarse gravel, trace silt; moist. [FILL]	**FILL**
3	2.0' - 4.8' - Light brown, gravelly fine to coarse SAND, trace silt; moist.	**SAND & GRAVEL**
4		
5		
6	Possible bedrock (GRANITE) encountered at 4.8'. End of test pit at 4.8'.	**BEDROCK**
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8		
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NOTES: Coordinates: 42.3262 Lat., -71.3432 Long.

TEST PIT NUMBER
TP-4

Weston & Sampson SM

P:\MA\Wayland MA\Wayland High School Athletic Facilities\Geotech\Field\Boring & Test Pit Logs\[Loker Site Test Pit Logs 2018.03.26.xls]TP-3

TEST PIT LOG

PROJECT NAME/NO.	Wayland High School Athletic Facilities			**TEST PIT NUMBER**	
LOCATION	Wayland, Massachusetts			TP-5	
CLIENT	Town of Wayland			GROUND SURFACE	
CONTRACTOR	Town of Wayland	FOREMAN:	Todd	ELEVATION	--
OBSERVED BY	Sarah Rocklin	DATE	3/21/18	DEPTH TO GROUNDWATER	
CHECKED BY		DATE			5.0'

DEPTH BELOW GROUND SURFACE (ft.)	SOIL DESCRIPTION	STRATUM DESCRIPTION
Surface	Asphalt Pavement	
	4" Asphalt Pavement	**PAVEMENT**
1	0.3' - 1.3' - Brown, gravelly fine to coarse SAND, trace silt, trace organics; moist. [FILL]	**FILL**
2	1.3' - 4.0' - Gray-brown, fine to coarse SAND, some gravel, trace silt; moist.	**SAND & GRAVEL**
3		
4		
5	4.0' - 5.0' - Brown, gravelly fine to coarse SAND, some silt; moist to wet.	
6	End of test pit at 5.6'.	
7		
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NOTES: Coordinates: 42.3262 Lat., -71.3427 Long.

TEST PIT NUMBER
TP-5

Weston & Sampson

P:\MA\Wayland MA\Wayland High School Athletic Facilities\Geotech\Field\Boring & Test Pit Logs\[Loker Site Test Pit Logs 2018.03.26.xls]TP-3

TEST PIT LOG

PROJECT NAME/NO.	Wayland High School Athletic Facilities			**TEST PIT NUMBER**	
LOCATION	Wayland, Massachusetts			TP-6	
CLIENT	Town of Wayland			GROUND SURFACE	
CONTRACTOR	Town of Wayland	FOREMAN:	Todd	ELEVATION	--
OBSERVED BY	Sarah Rocklin	DATE	3/21/18	DEPTH TO GROUNDWATER	
CHECKED BY		DATE			Not observed

DEPTH BELOW GROUND SURFACE (ft.)	SOIL DESCRIPTION	STRATUM DESCRIPTION
Surface	Asphalt Pavement	
	4" Asphalt Pavement	**PAVEMENT**
1	0.3' - 1.3' - Brown, fine to medium SAND, trace silt; moist. [FILL]	**FILL**
2	1.3' - 7.3' - Gray-brown, gravelly fine to coarse SAND, trace silt; moist.	**SAND & GRAVEL**
3		
4		
5		
6		
7		
8	End of test pit at 7.3'.	
9		
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14		
15		
16		
17		
18		
19		
20		

NOTES: Coordinates: 42.3260 Lat., -71.3422 Long.

TEST PIT NUMBER
TP-6

Weston & Sampson SM

Attachment D - Stormwater Modeling

LEGEND

- IMPERVIOUS
- WOODLAND
- GRASSED/LANDSCAPE AREAS

ANALYSIS POINT OF INTEREST (TYP.)

N

PLAN

SCALE: 1" = 100'

FIGURE 1		
TOWN OF WAYLAND MA LOKER RECREATION AREA		
HYDROLOGY MAP EXISTING CONDITIONS		
DESIGNED BY: JIP	CHECKED BY: JIP	DATE: DECEMBER 21, 2017

Weston & Sampson

\\wse03.local\WSE\Projects\MA\Wayland MA\Wayland High School Athletic Facilities\CAD\0_Current_LOKER\FIGURES\HydroCAD-EX.dwg

LEGEND

- IMPERVIOUS
- WOODLAND
- GRASSED/LANDSCAPE AREAS

ANALYSIS POINT OF INTEREST (TYP.)

P1
S1
S2A
S2C
S2B
1P
P2

N

PLAN

SCALE: 1" = 100'

FIGURE 2

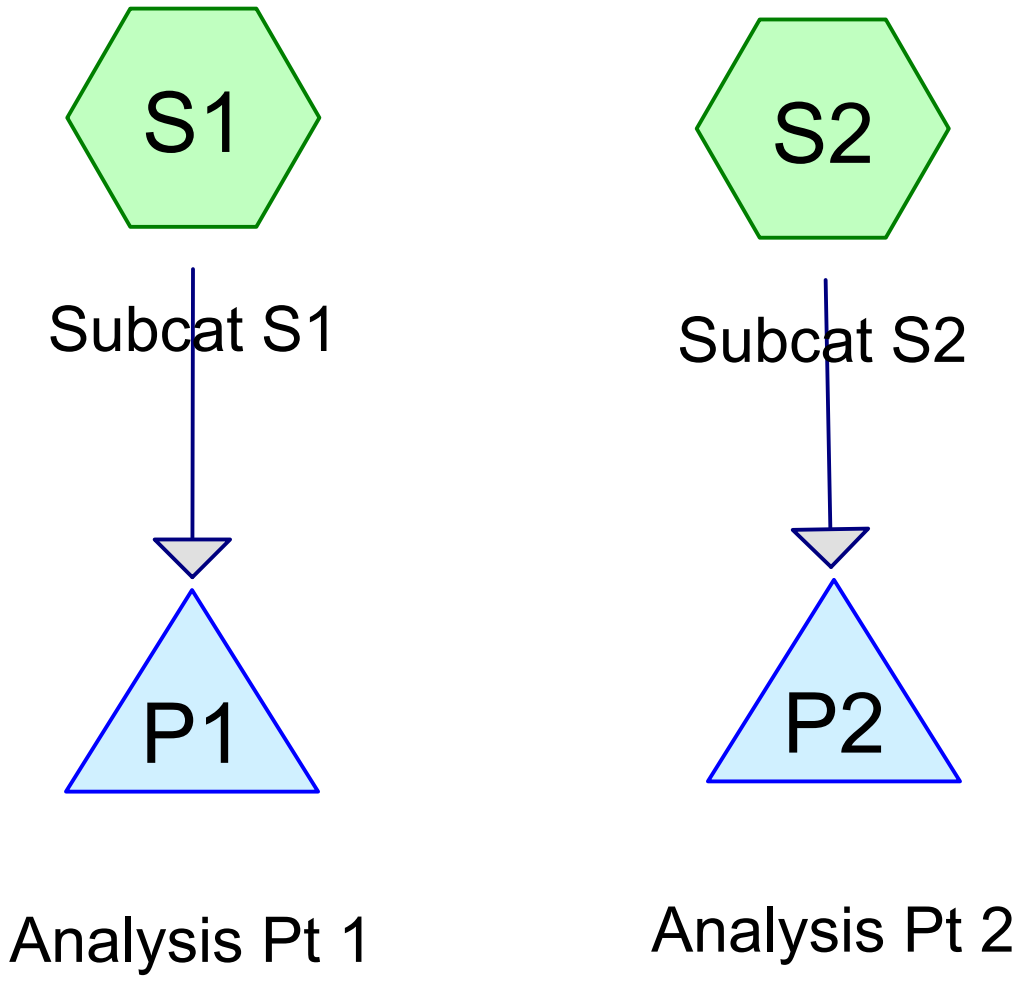
TOWN OF WAYLAND
LOKER RECREATION AREA

HYDROLOGY MAP
PROPOSED CONDITIONS

DESIGNED BY: JIP	CHECKED BY: JIP	DATE: JULY 11, 2018

Weston & Sampson

\\wse03.local\WSE\Projects\MA\Wayland MA\Wayland High School Athletic Facilities\CAD\0_Current_LOKER\FIGURES\HydroCAD-PR.dwg



Subcat Reach Pond Link

Routing Diagram for HydroCAD-EX
Prepared by Hewlett-Packard Company, Printed 7/12/2018
HydroCAD® 10.00-15 s/n 00455 © 2015 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
14,777	39	Pasture/grassland/range, Good, HSG A (S1, S2)
97,879	98	Paved parking, HSG A (S1, S2)
101,413	30	Woods, Good, HSG A (S1, S2)
214,069	**62**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
214,069	HSG A	S1, S2
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
214,069		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
14,777	0	0	0	0	14,777	Pasture/grassland/range, Good
97,879	0	0	0	0	97,879	Paved parking
101,413	0	0	0	0	101,413	Woods, Good
214,069	**0**	**0**	**0**	**0**	**214,069**	**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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 S1: Subcat S1 Runoff Area=0.965 ac 29.06% Impervious Runoff Depth=0.15"
Tc=5.0 min CN=50 Runoff=0.04 cfs 532 cf

Subcatchment S2: Subcat S2 Runoff Area=172,032 sf 49.79% Impervious Runoff Depth=0.61"
Tc=0.0 min CN=64 Runoff=2.52 cfs 8,764 cf

Pond P1: Analysis Pt 1 Inflow=0.04 cfs 532 cf
Primary=0.04 cfs 532 cf

Pond P2: Analysis Pt 2 Inflow=2.52 cfs 8,764 cf
Primary=2.52 cfs 8,764 cf

Total Runoff Area = 214,069 sf Runoff Volume = 9,295 cf Average Runoff Depth = 0.52"
54.28% Pervious = 116,190 sf 45.72% Impervious = 97,879 sf

Summary for Subcatchment S1: Subcat S1

[49] Hint: Tc<2dt may require smaller dt

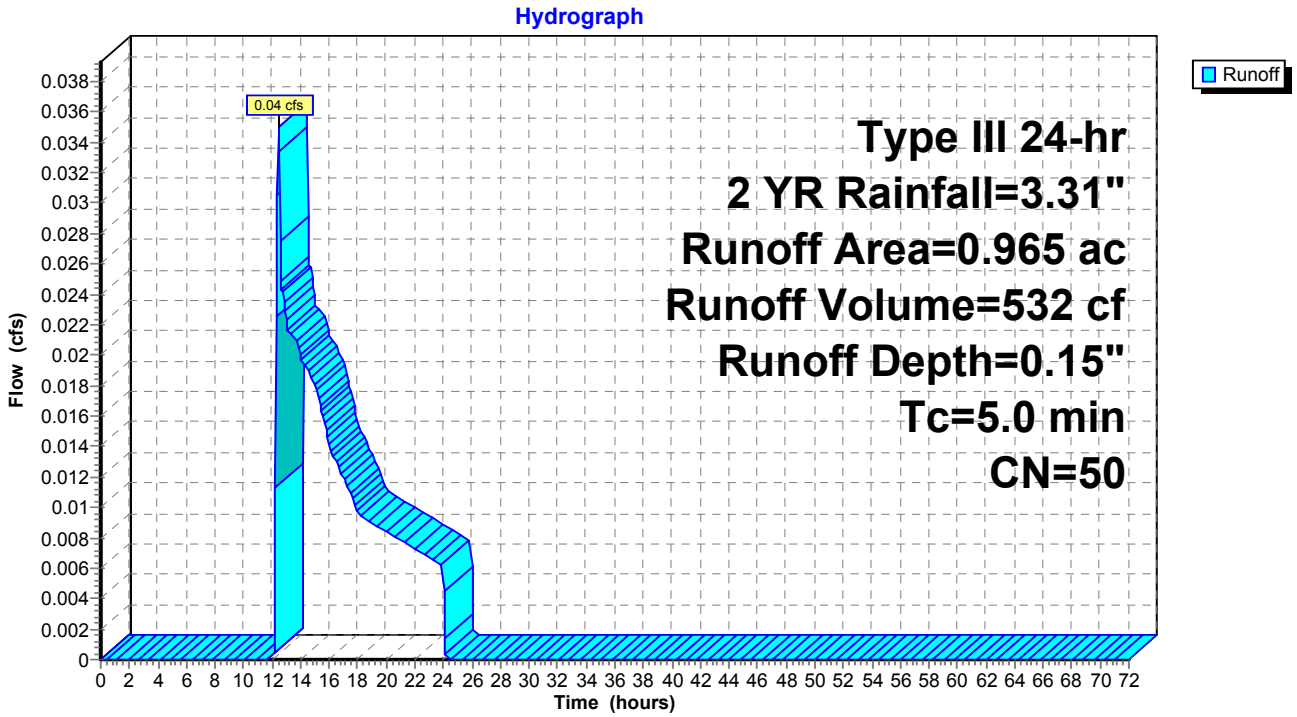
Runoff = 0.04 cfs @ 12.43 hrs, Volume= 532 cf, Depth= 0.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (ac)	CN	Description
0.089	30	Woods, Good, HSG A
0.446	30	Woods, Good, HSG A
0.099	98	Paved parking, HSG A
0.078	30	Woods, Good, HSG A
0.181	98	Paved parking, HSG A
0.072	39	Pasture/grassland/range, Good, HSG A
0.965	50	Weighted Average
0.685		70.94% Pervious Area
0.280		29.06% Impervious Area

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

Subcatchment S1: Subcat S1



Summary for Subcatchment S2: Subcat S2

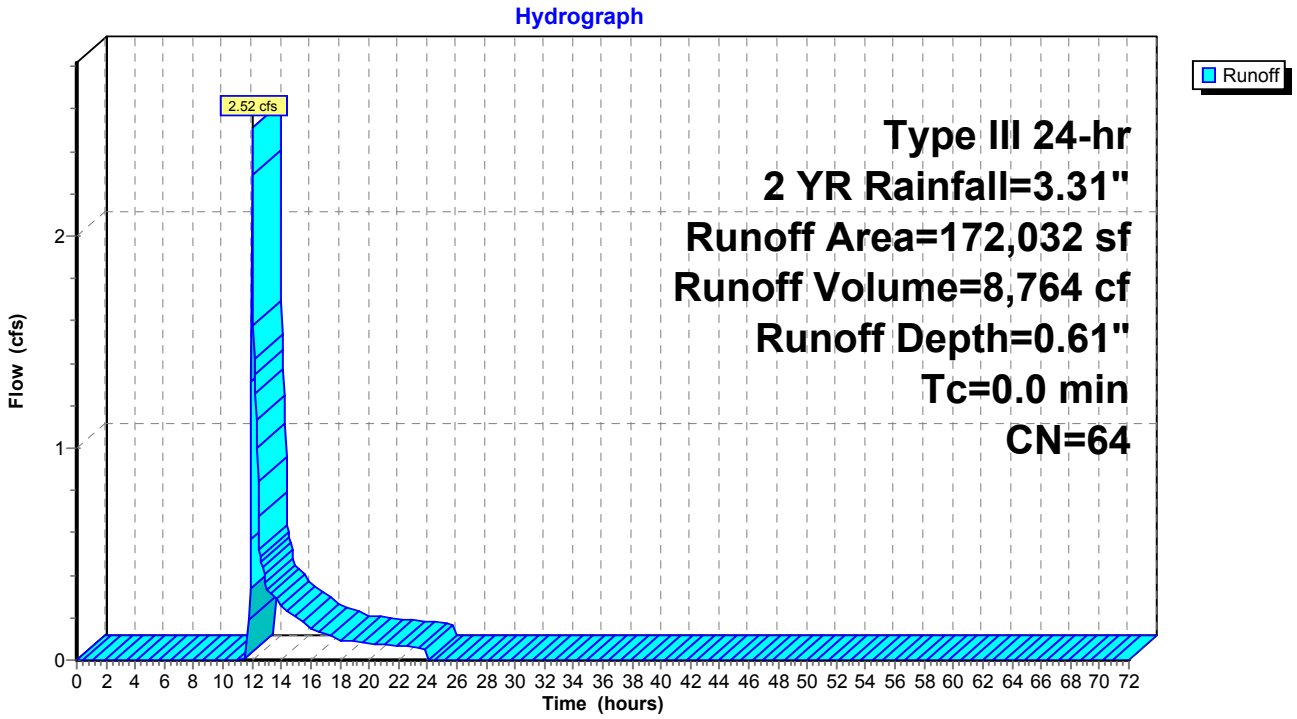
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.52 cfs @ 12.02 hrs, Volume= 8,764 cf, Depth= 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (sf)	CN	Description
9	39	Pasture/grassland/range, Good, HSG A
4,136	39	Pasture/grassland/range, Good, HSG A
7,507	39	Pasture/grassland/range, Good, HSG A
19,333	30	Woods, Good, HSG A
2,869	30	Woods, Good, HSG A
360	30	Woods, Good, HSG A
41,133	98	Paved parking, HSG A
52	98	Paved parking, HSG A
16,428	30	Woods, Good, HSG A
2,840	30	Woods, Good, HSG A
32,889	30	Woods, Good, HSG A
44,476	98	Paved parking, HSG A
172,032	64	Weighted Average
86,371		50.21% Pervious Area
85,661		49.79% Impervious Area

Subcatchment S2: Subcat S2



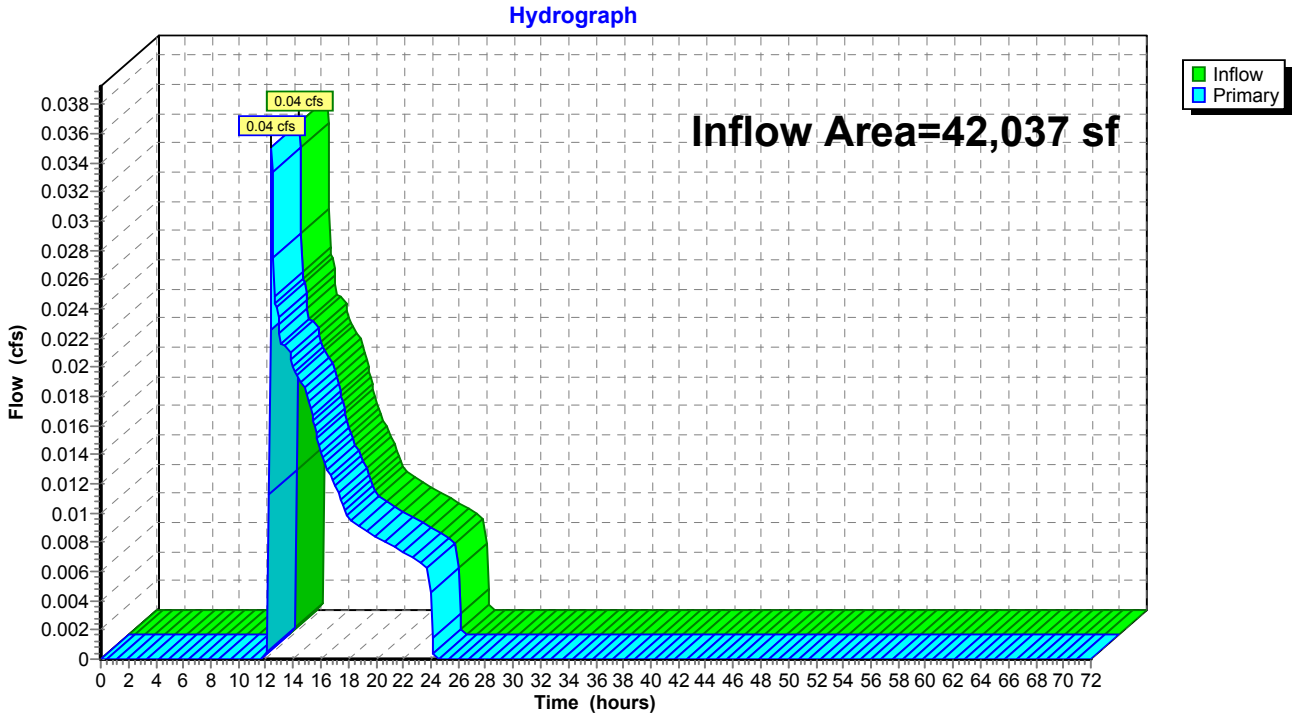
Summary for Pond P1: Analysis Pt 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 42,037 sf, 29.06% Impervious, Inflow Depth = 0.15" for 2 YR event
Inflow = 0.04 cfs @ 12.43 hrs, Volume= 532 cf
Primary = 0.04 cfs @ 12.43 hrs, Volume= 532 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P1: Analysis Pt 1



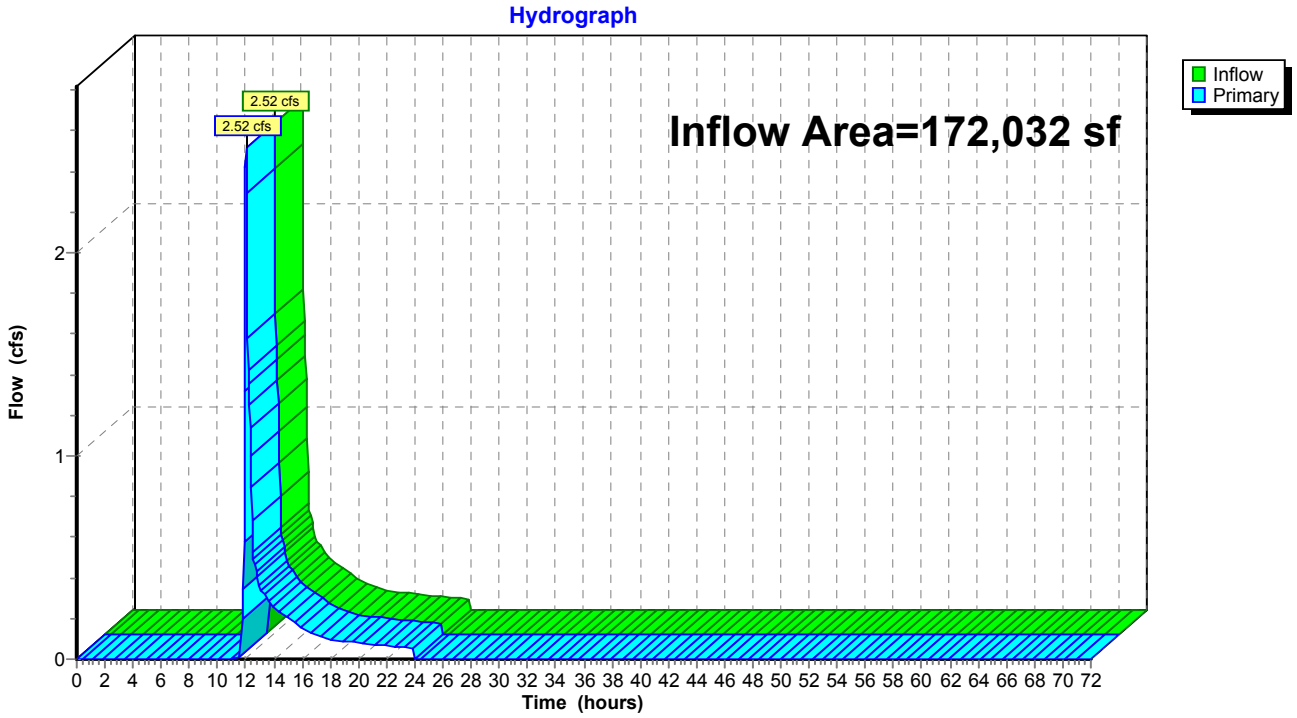
Summary for Pond P2: Analysis Pt 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 172,032 sf, 49.79% Impervious, Inflow Depth = 0.61" for 2 YR event
Inflow = 2.52 cfs @ 12.02 hrs, Volume= 8,764 cf
Primary = 2.52 cfs @ 12.02 hrs, Volume= 8,764 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P2: Analysis Pt 2



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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 S1: Subcat S1 Runoff Area=0.965 ac 29.06% Impervious Runoff Depth=0.77"
Tc=5.0 min CN=50 Runoff=0.60 cfs 2,703 cf

Subcatchment S2: Subcat S2 Runoff Area=172,032 sf 49.79% Impervious Runoff Depth=1.71"
Tc=0.0 min CN=64 Runoff=8.64 cfs 24,447 cf

Pond P1: Analysis Pt 1 Inflow=0.60 cfs 2,703 cf
Primary=0.60 cfs 2,703 cf

Pond P2: Analysis Pt 2 Inflow=8.64 cfs 24,447 cf
Primary=8.64 cfs 24,447 cf

Total Runoff Area = 214,069 sf Runoff Volume = 27,150 cf Average Runoff Depth = 1.52"
54.28% Pervious = 116,190 sf 45.72% Impervious = 97,879 sf

Summary for Subcatchment S1: Subcat S1

[49] Hint: Tc<2dt may require smaller dt

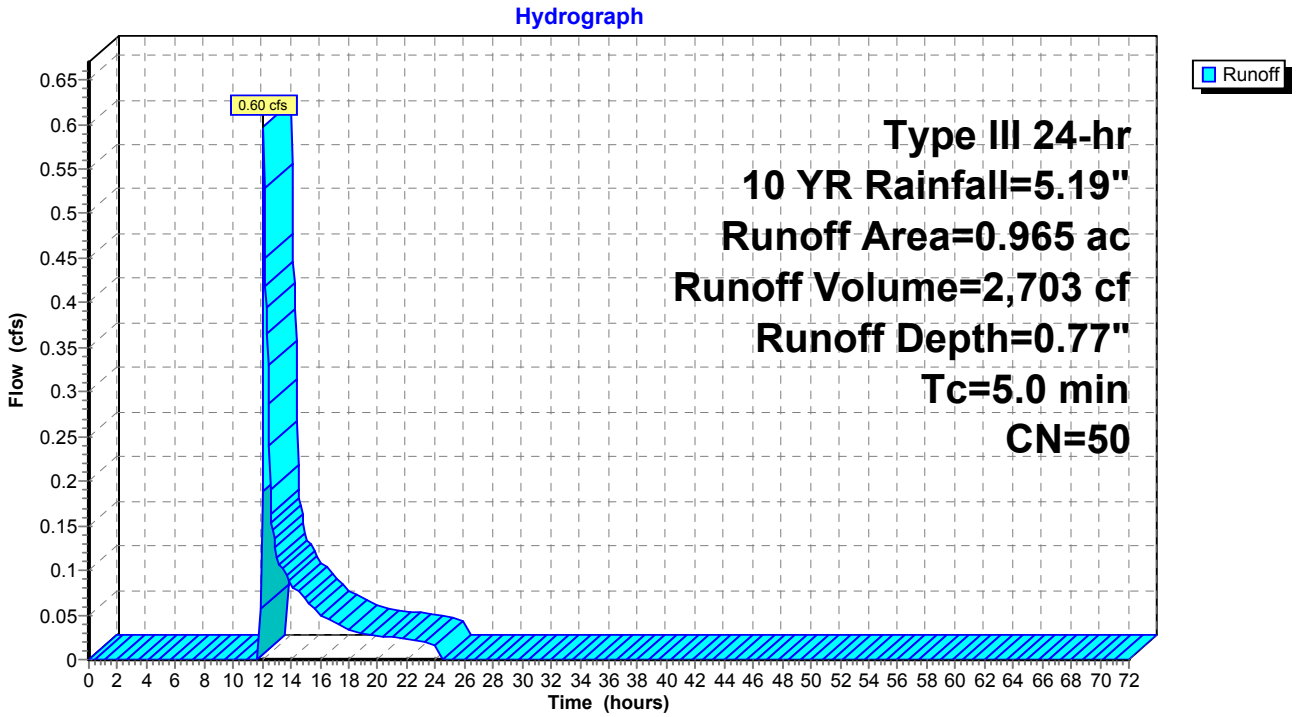
Runoff = 0.60 cfs @ 12.11 hrs, Volume= 2,703 cf, Depth= 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.19"

Area (ac)	CN	Description
0.089	30	Woods, Good, HSG A
0.446	30	Woods, Good, HSG A
0.099	98	Paved parking, HSG A
0.078	30	Woods, Good, HSG A
0.181	98	Paved parking, HSG A
0.072	39	Pasture/grassland/range, Good, HSG A
0.965	50	Weighted Average
0.685		70.94% Pervious Area
0.280		29.06% Impervious Area

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

Subcatchment S1: Subcat S1



Summary for Subcatchment S2: Subcat S2

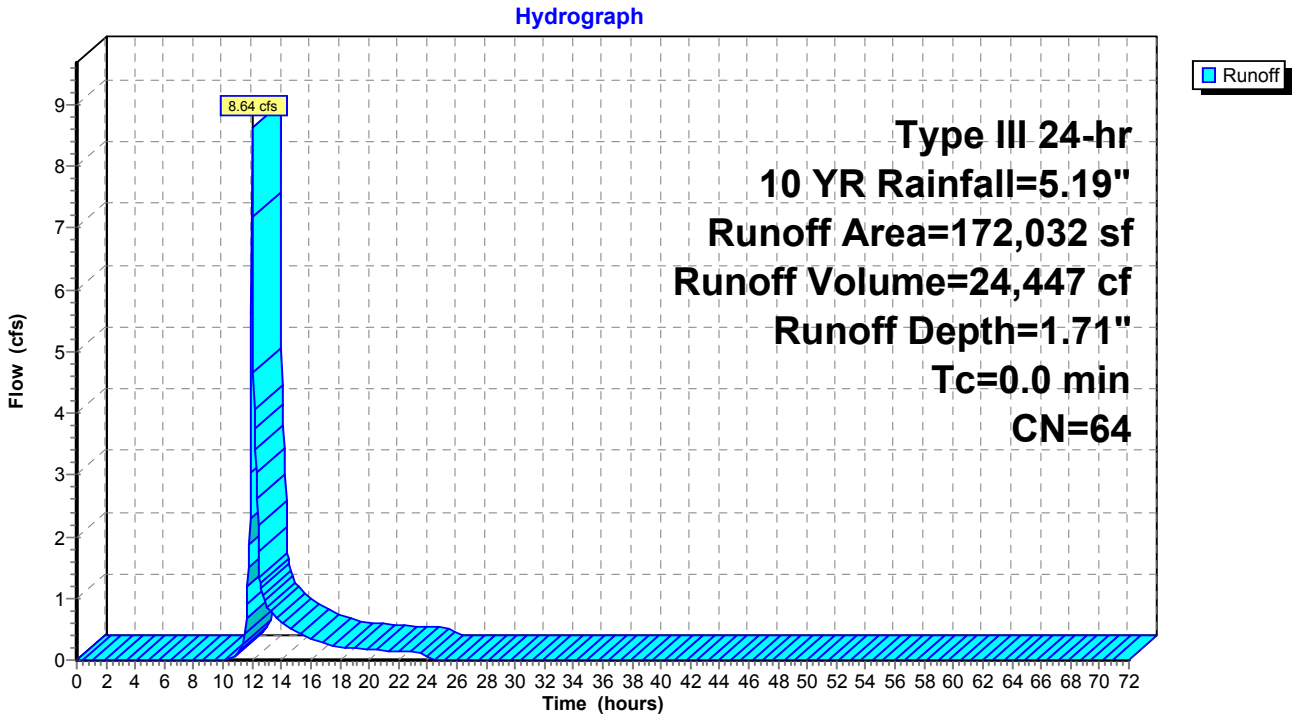
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 8.64 cfs @ 12.01 hrs, Volume= 24,447 cf, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.19"

Area (sf)	CN	Description
9	39	Pasture/grassland/range, Good, HSG A
4,136	39	Pasture/grassland/range, Good, HSG A
7,507	39	Pasture/grassland/range, Good, HSG A
19,333	30	Woods, Good, HSG A
2,869	30	Woods, Good, HSG A
360	30	Woods, Good, HSG A
41,133	98	Paved parking, HSG A
52	98	Paved parking, HSG A
16,428	30	Woods, Good, HSG A
2,840	30	Woods, Good, HSG A
32,889	30	Woods, Good, HSG A
44,476	98	Paved parking, HSG A
172,032	64	Weighted Average
86,371		50.21% Pervious Area
85,661		49.79% Impervious Area

Subcatchment S2: Subcat S2



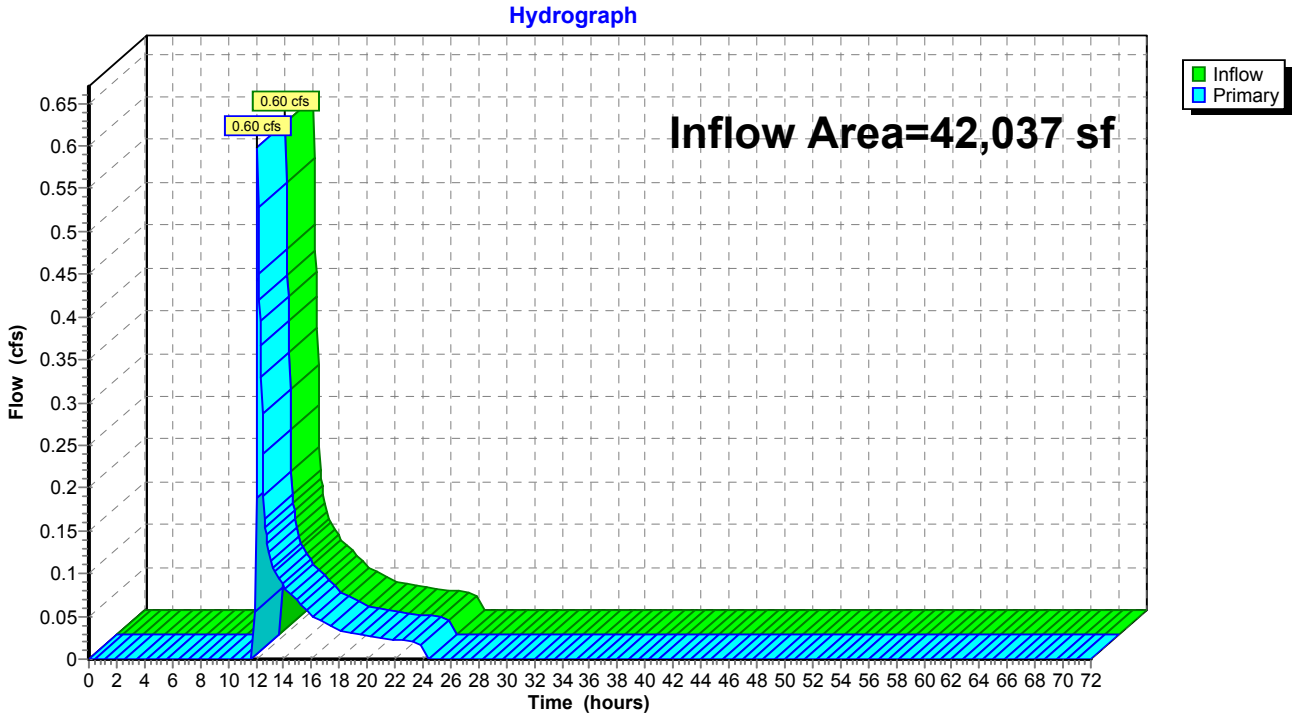
Summary for Pond P1: Analysis Pt 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 42,037 sf, 29.06% Impervious, Inflow Depth = 0.77" for 10 YR event
Inflow = 0.60 cfs @ 12.11 hrs, Volume= 2,703 cf
Primary = 0.60 cfs @ 12.11 hrs, Volume= 2,703 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P1: Analysis Pt 1



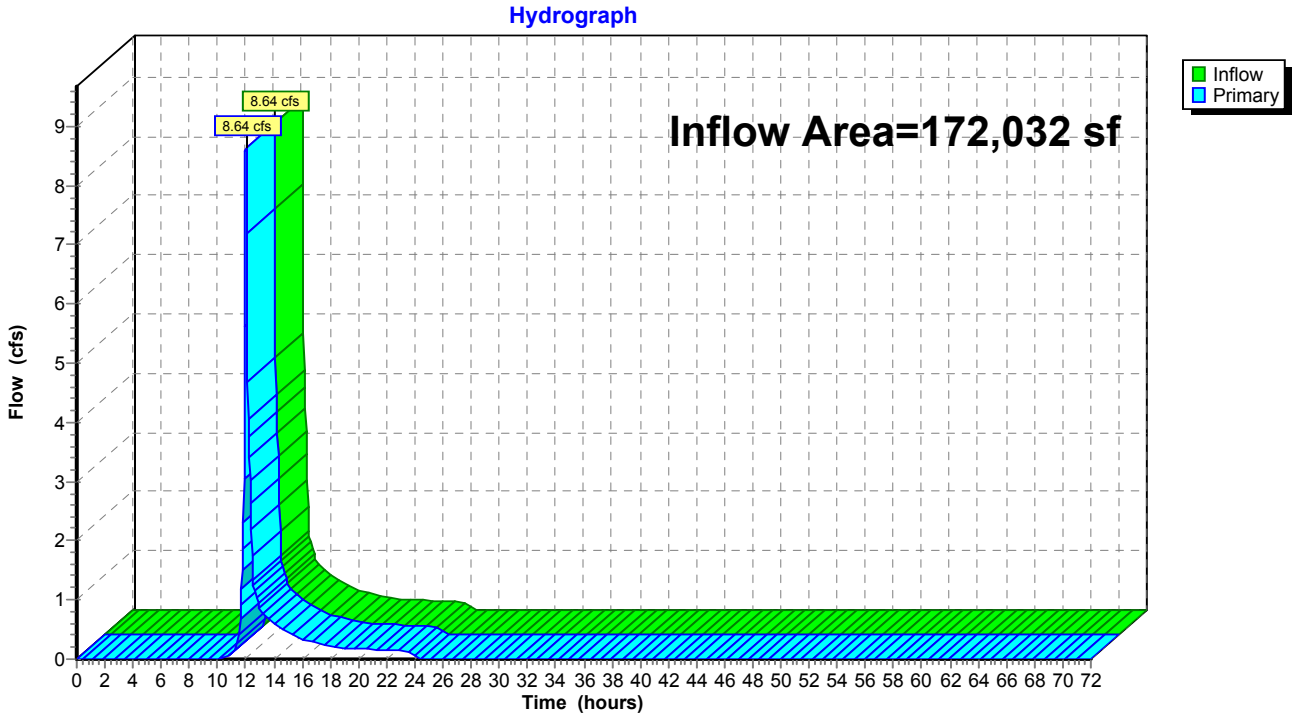
Summary for Pond P2: Analysis Pt 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 172,032 sf, 49.79% Impervious, Inflow Depth = 1.71" for 10 YR event
Inflow = 8.64 cfs @ 12.01 hrs, Volume= 24,447 cf
Primary = 8.64 cfs @ 12.01 hrs, Volume= 24,447 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P2: Analysis Pt 2



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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 S1: Subcat S1 Runoff Area=0.965 ac 29.06% Impervious Runoff Depth=1.32"
Tc=5.0 min CN=50 Runoff=1.25 cfs 4,637 cf

Subcatchment S2: Subcat S2 Runoff Area=172,032 sf 49.79% Impervious Runoff Depth=2.52"
Tc=0.0 min CN=64 Runoff=13.17 cfs 36,177 cf

Pond P1: Analysis Pt 1 Inflow=1.25 cfs 4,637 cf
Primary=1.25 cfs 4,637 cf

Pond P2: Analysis Pt 2 Inflow=13.17 cfs 36,177 cf
Primary=13.17 cfs 36,177 cf

Total Runoff Area = 214,069 sf Runoff Volume = 40,814 cf Average Runoff Depth = 2.29"
54.28% Pervious = 116,190 sf 45.72% Impervious = 97,879 sf

Summary for Subcatchment S1: Subcat S1

[49] Hint: Tc<2dt may require smaller dt

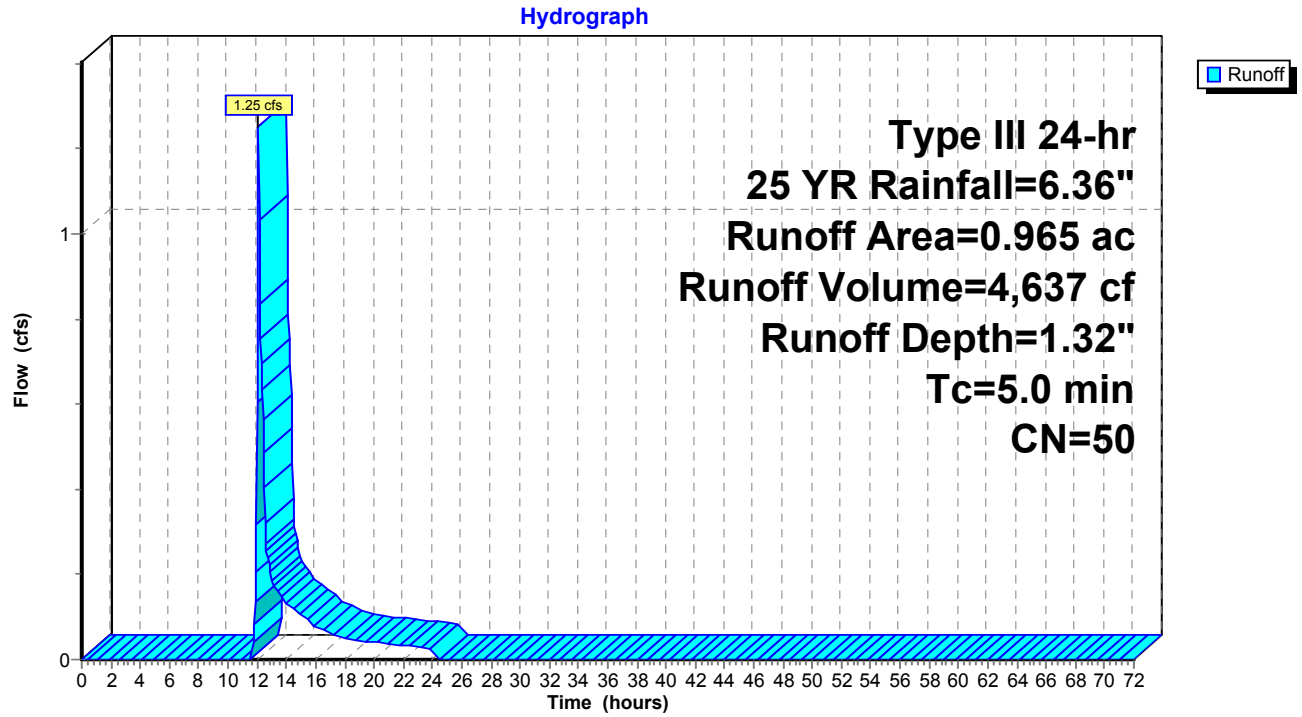
Runoff = 1.25 cfs @ 12.10 hrs, Volume= 4,637 cf, Depth= 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.36"

Area (ac)	CN	Description
0.089	30	Woods, Good, HSG A
0.446	30	Woods, Good, HSG A
0.099	98	Paved parking, HSG A
0.078	30	Woods, Good, HSG A
0.181	98	Paved parking, HSG A
0.072	39	Pasture/grassland/range, Good, HSG A
0.965	50	Weighted Average
0.685		70.94% Pervious Area
0.280		29.06% Impervious Area

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

Subcatchment S1: Subcat S1



Summary for Subcatchment S2: Subcat S2

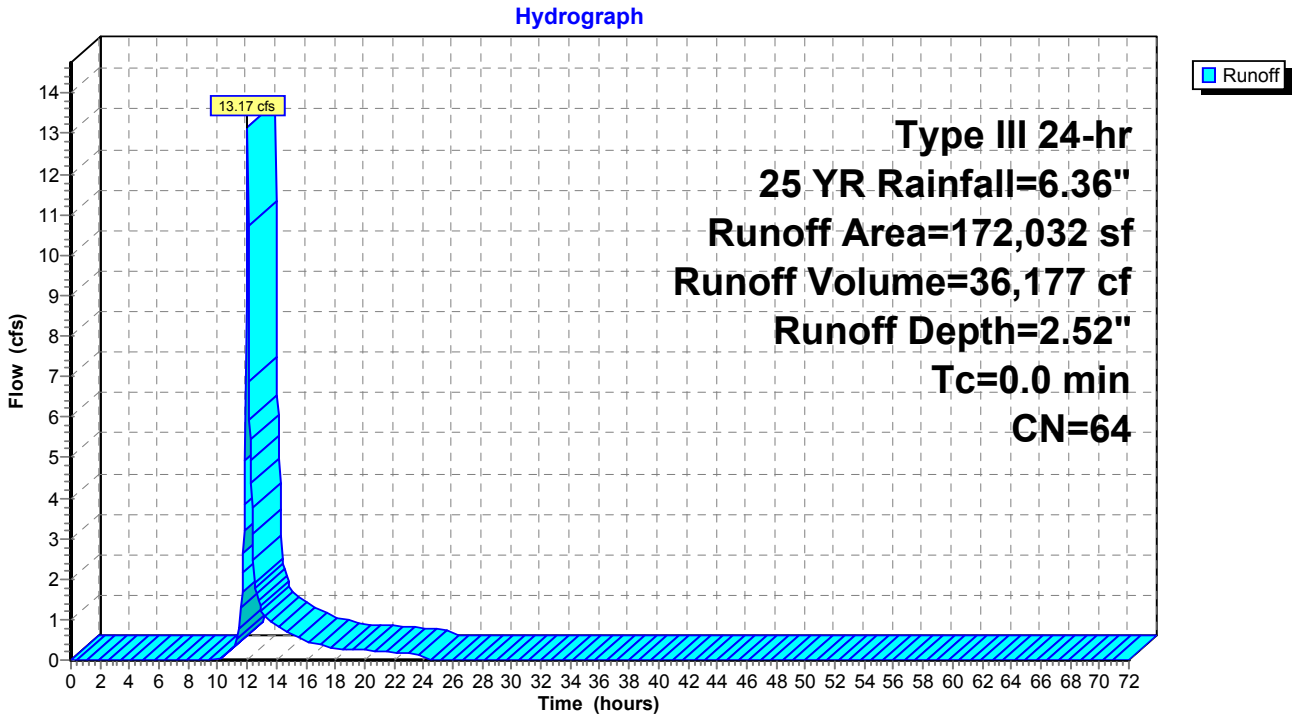
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 13.17 cfs @ 12.01 hrs, Volume= 36,177 cf, Depth= 2.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.36"

Area (sf)	CN	Description
9	39	Pasture/grassland/range, Good, HSG A
4,136	39	Pasture/grassland/range, Good, HSG A
7,507	39	Pasture/grassland/range, Good, HSG A
19,333	30	Woods, Good, HSG A
2,869	30	Woods, Good, HSG A
360	30	Woods, Good, HSG A
41,133	98	Paved parking, HSG A
52	98	Paved parking, HSG A
16,428	30	Woods, Good, HSG A
2,840	30	Woods, Good, HSG A
32,889	30	Woods, Good, HSG A
44,476	98	Paved parking, HSG A
172,032	64	Weighted Average
86,371		50.21% Pervious Area
85,661		49.79% Impervious Area

Subcatchment S2: Subcat S2



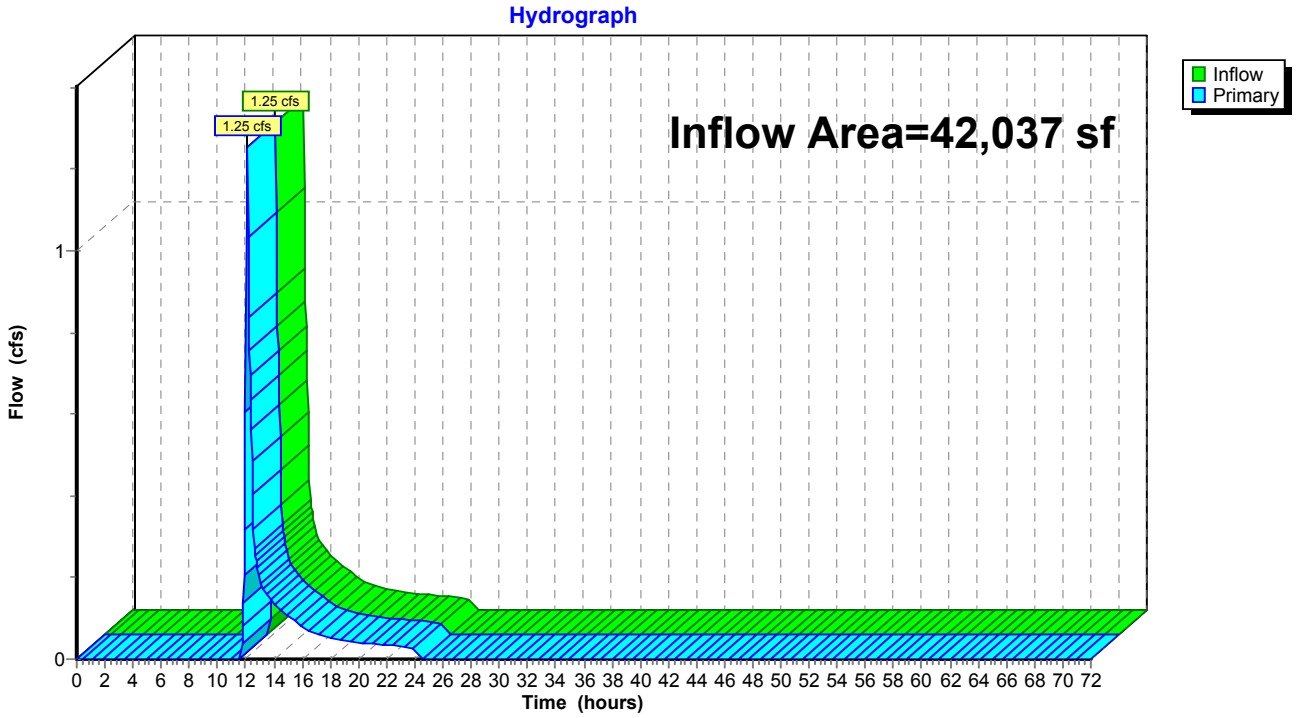
Summary for Pond P1: Analysis Pt 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 42,037 sf, 29.06% Impervious, Inflow Depth = 1.32" for 25 YR event
Inflow = 1.25 cfs @ 12.10 hrs, Volume= 4,637 cf
Primary = 1.25 cfs @ 12.10 hrs, Volume= 4,637 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P1: Analysis Pt 1



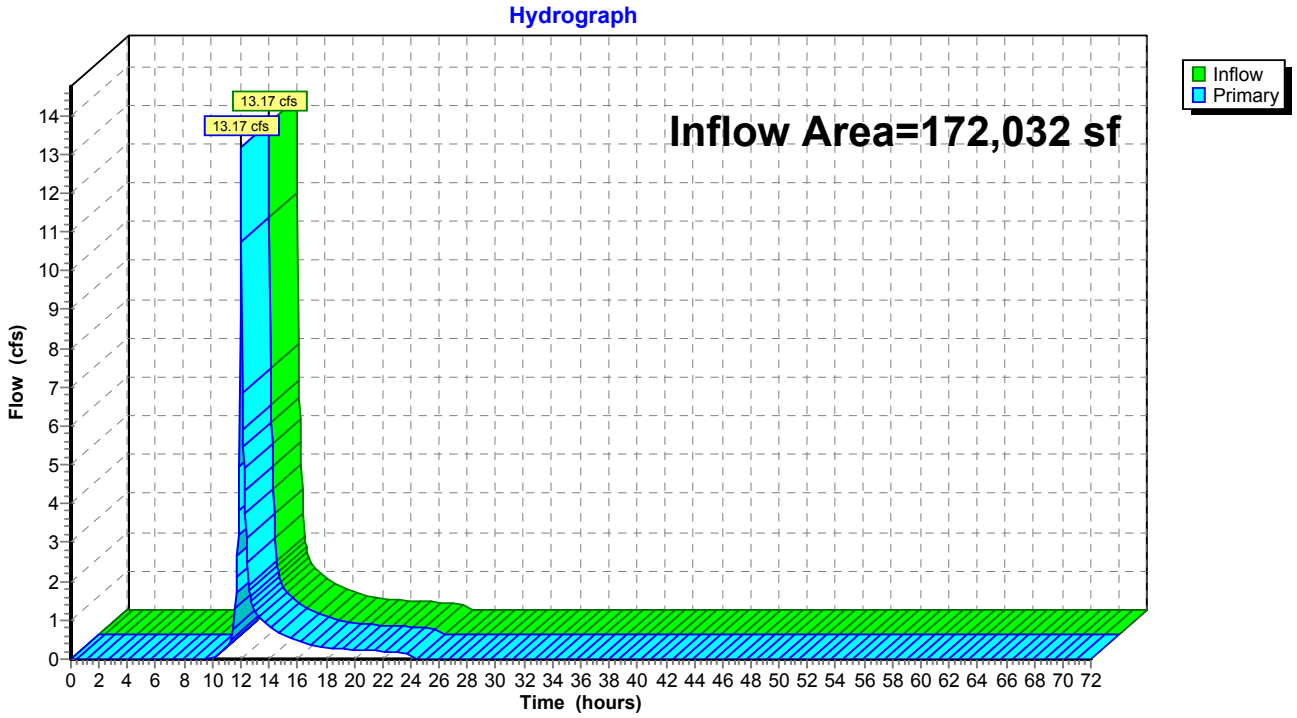
Summary for Pond P2: Analysis Pt 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 172,032 sf, 49.79% Impervious, Inflow Depth = 2.52" for 25 YR event
Inflow = 13.17 cfs @ 12.01 hrs, Volume= 36,177 cf
Primary = 13.17 cfs @ 12.01 hrs, Volume= 36,177 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P2: Analysis Pt 2



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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 S1: Subcat S1 Runoff Area=0.965 ac 29.06% Impervious Runoff Depth=2.35"
Tc=5.0 min CN=50 Runoff=2.48 cfs 8,247 cf

Subcatchment S2: Subcat S2 Runoff Area=172,032 sf 49.79% Impervious Runoff Depth=3.92"
Tc=0.0 min CN=64 Runoff=20.78 cfs 56,158 cf

Pond P1: Analysis Pt 1 Inflow=2.48 cfs 8,247 cf
Primary=2.48 cfs 8,247 cf

Pond P2: Analysis Pt 2 Inflow=20.78 cfs 56,158 cf
Primary=20.78 cfs 56,158 cf

Total Runoff Area = 214,069 sf Runoff Volume = 64,406 cf Average Runoff Depth = 3.61"
54.28% Pervious = 116,190 sf 45.72% Impervious = 97,879 sf

Summary for Subcatchment S1: Subcat S1

[49] Hint: Tc<2dt may require smaller dt

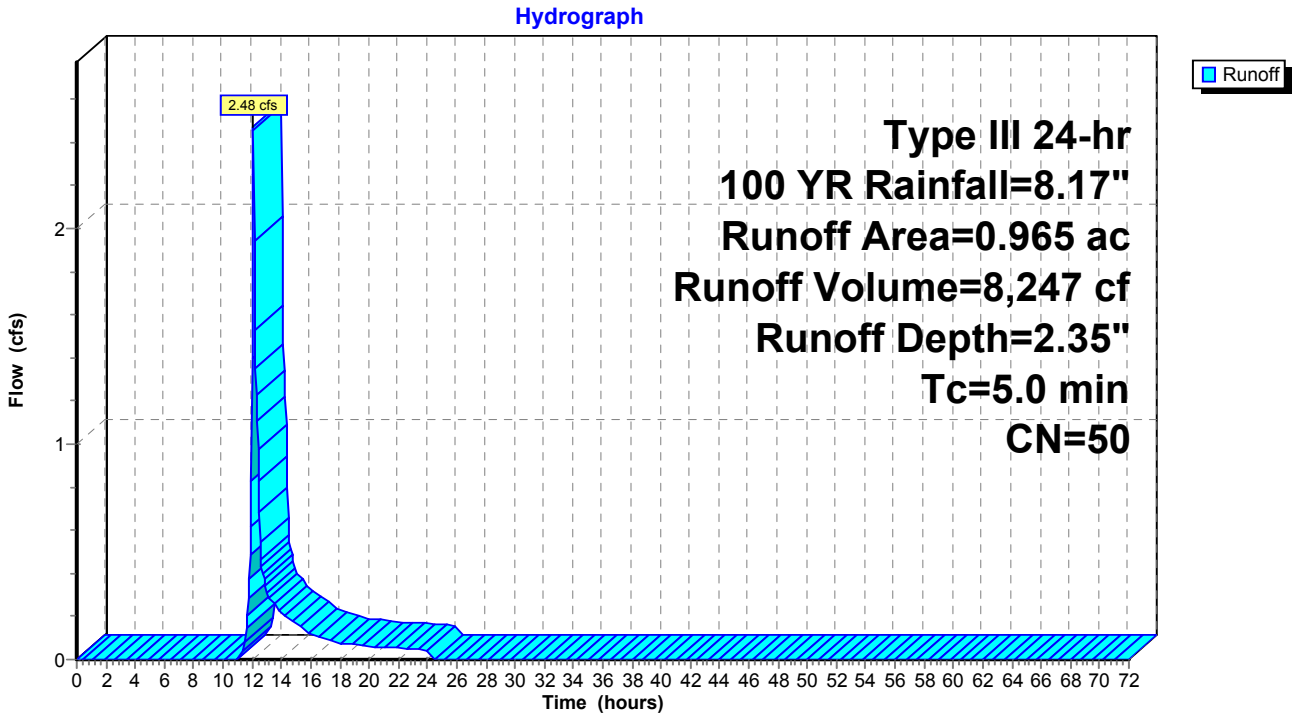
Runoff = 2.48 cfs @ 12.09 hrs, Volume= 8,247 cf, Depth= 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.17"

Area (ac)	CN	Description
0.089	30	Woods, Good, HSG A
0.446	30	Woods, Good, HSG A
0.099	98	Paved parking, HSG A
0.078	30	Woods, Good, HSG A
0.181	98	Paved parking, HSG A
0.072	39	Pasture/grassland/range, Good, HSG A
0.965	50	Weighted Average
0.685		70.94% Pervious Area
0.280		29.06% Impervious Area

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

Subcatchment S1: Subcat S1



Summary for Subcatchment S2: Subcat S2

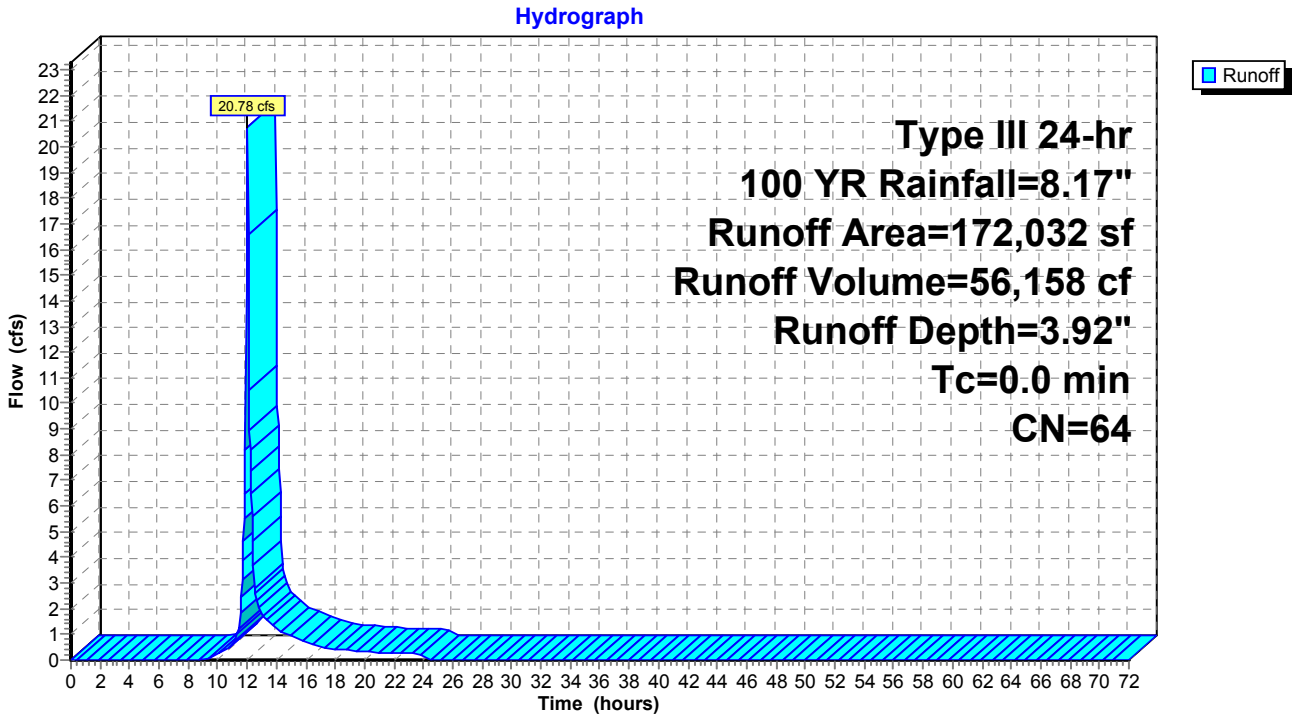
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 20.78 cfs @ 12.01 hrs, Volume= 56,158 cf, Depth= 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.17"

Area (sf)	CN	Description
9	39	Pasture/grassland/range, Good, HSG A
4,136	39	Pasture/grassland/range, Good, HSG A
7,507	39	Pasture/grassland/range, Good, HSG A
19,333	30	Woods, Good, HSG A
2,869	30	Woods, Good, HSG A
360	30	Woods, Good, HSG A
41,133	98	Paved parking, HSG A
52	98	Paved parking, HSG A
16,428	30	Woods, Good, HSG A
2,840	30	Woods, Good, HSG A
32,889	30	Woods, Good, HSG A
44,476	98	Paved parking, HSG A
172,032	64	Weighted Average
86,371		50.21% Pervious Area
85,661		49.79% Impervious Area

Subcatchment S2: Subcat S2



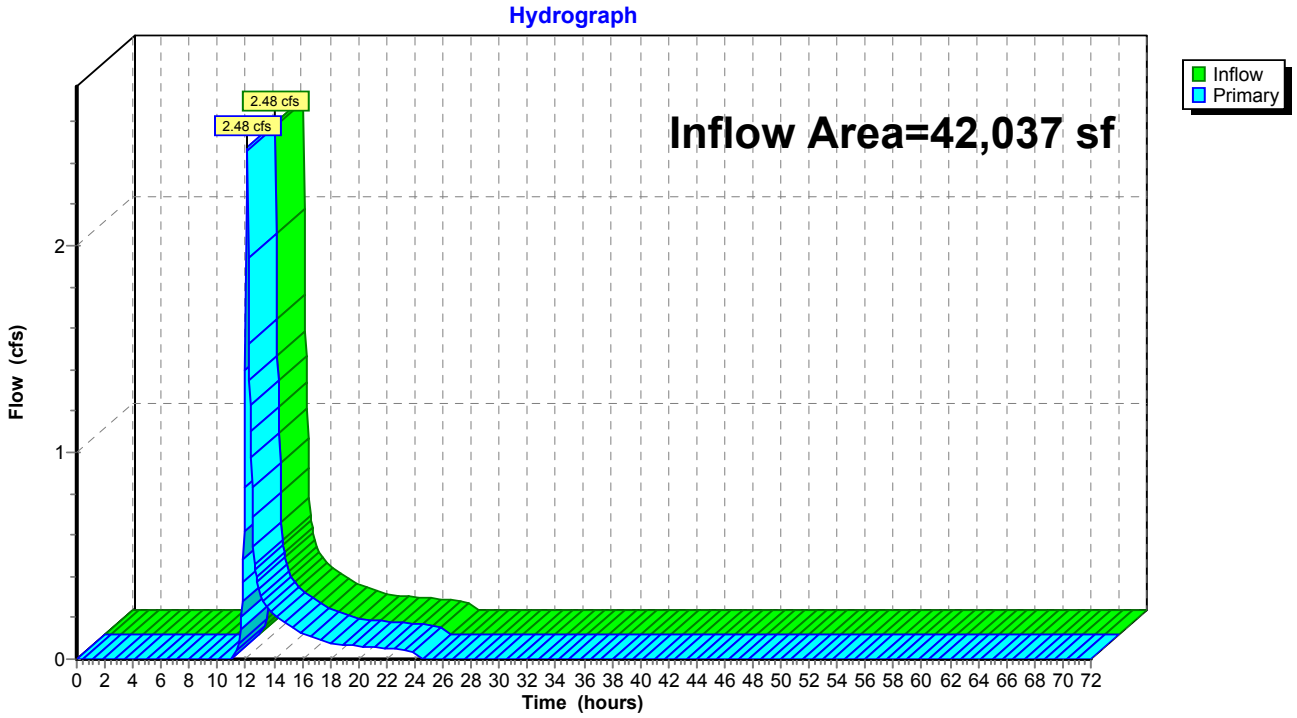
Summary for Pond P1: Analysis Pt 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 42,037 sf, 29.06% Impervious, Inflow Depth = 2.35" for 100 YR event
Inflow = 2.48 cfs @ 12.09 hrs, Volume= 8,247 cf
Primary = 2.48 cfs @ 12.09 hrs, Volume= 8,247 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P1: Analysis Pt 1



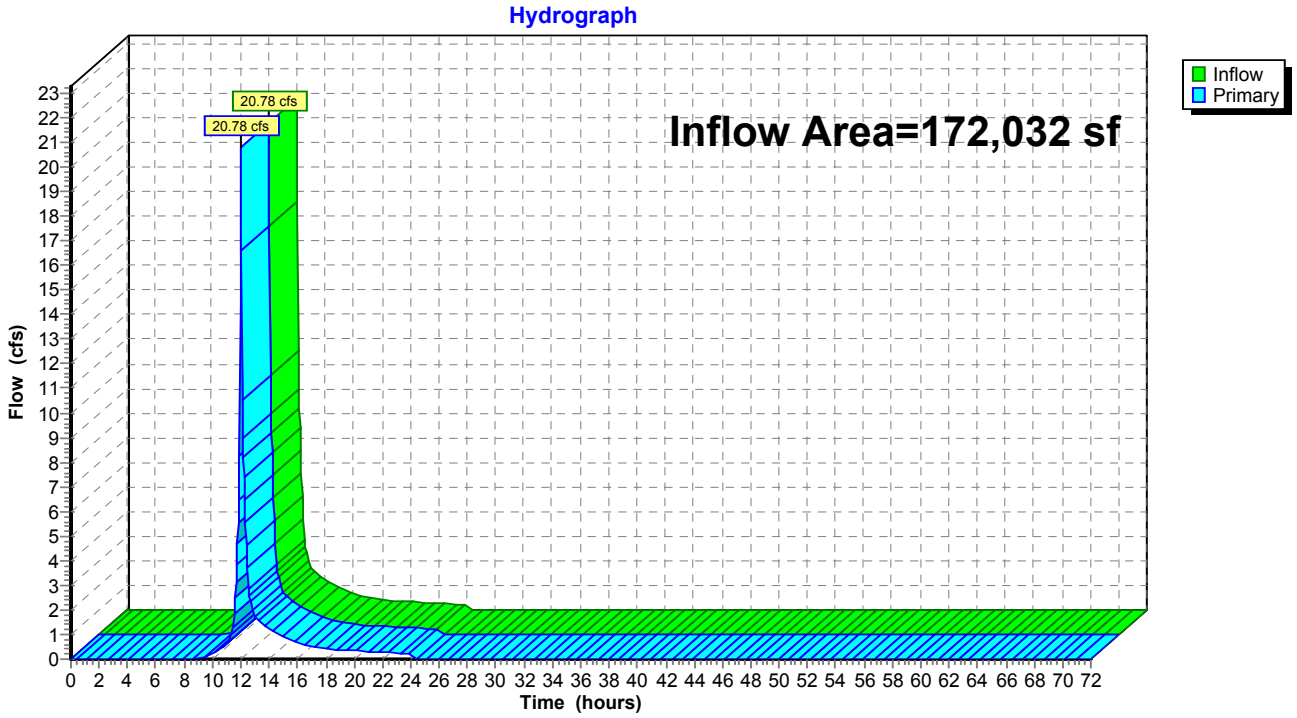
Summary for Pond P2: Analysis Pt 2

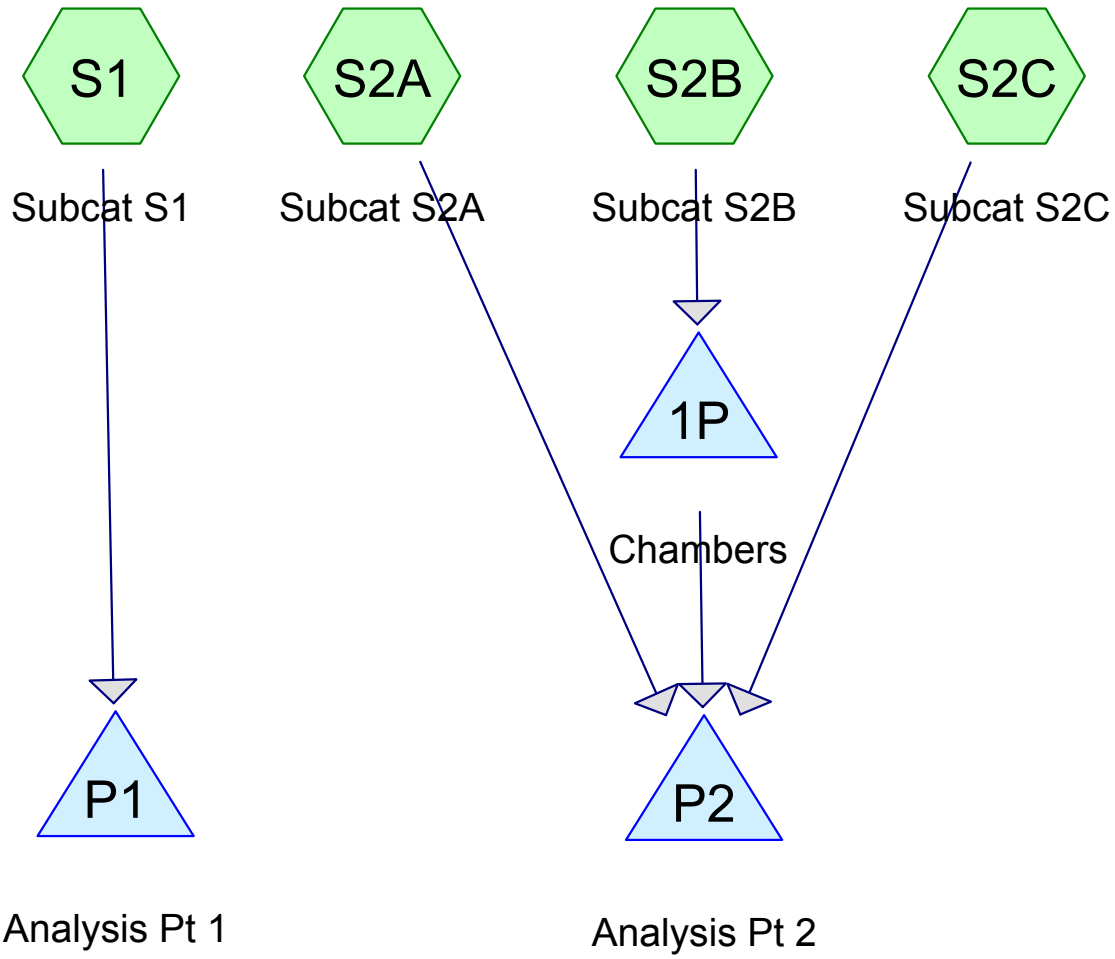
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 172,032 sf, 49.79% Impervious, Inflow Depth = 3.92" for 100 YR event
Inflow = 20.78 cfs @ 12.01 hrs, Volume= 56,158 cf
Primary = 20.78 cfs @ 12.01 hrs, Volume= 56,158 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P2: Analysis Pt 2





Subcat Reach Pond Link

Routing Diagram for HydroCAD-PR
Prepared by Hewlett-Packard Company, Printed 7/12/2018
HydroCAD® 10.00-15 s/n 00455 © 2015 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
147,264	39	Pasture/grassland/range, Good, HSG A (S1, S2A, S2B, S2C)
58,794	98	Paved parking, HSG A (S1, S2A, S2B, S2C)
8,011	30	Woods, Good, HSG A (S1, S2A, S2C)
214,069	**55**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
214,069	HSG A	S1, S2A, S2B, S2C
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
214,069		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
147,264	0	0	0	0	147,264	Pasture/grassland/range, Good
58,794	0	0	0	0	58,794	Paved parking
8,011	0	0	0	0	8,011	Woods, Good
214,069	**0**	**0**	**0**	**0**	**214,069**	**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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 S1: Subcat S1 Runoff Area=0.420 ac 11.78% Impervious Runoff Depth=0.07"
Tc=5.0 min CN=46 Runoff=0.00 cfs 111 cf

Subcatchment S2A: Subcat S2A Runoff Area=151,520 sf 22.93% Impervious Runoff Depth=0.20"
Tc=0.0 min CN=52 Runoff=0.24 cfs 2,530 cf

Subcatchment S2B: Subcat S2B Runoff Area=23,735 sf 89.08% Impervious Runoff Depth=2.46"
Tc=0.0 min CN=92 Runoff=1.75 cfs 4,856 cf

Subcatchment S2C: Subcat S2C Runoff Area=20,530 sf 3.69% Impervious Runoff Depth=0.01"
Tc=0.0 min CN=41 Runoff=0.00 cfs 22 cf

Pond 1P: Chambers Peak Elev=195.72' Storage=2,024 cf Inflow=1.75 cfs 4,856 cf
Discarded=0.08 cfs 4,346 cf Primary=0.16 cfs 510 cf Outflow=0.23 cfs 4,856 cf

Pond P1: Analysis Pt 1 Inflow=0.00 cfs 111 cf
Primary=0.00 cfs 111 cf

Pond P2: Analysis Pt 2 Inflow=0.34 cfs 3,062 cf
Primary=0.34 cfs 3,062 cf

Total Runoff Area = 214,069 sf Runoff Volume = 7,519 cf Average Runoff Depth = 0.42"
72.54% Pervious = 155,275 sf 27.46% Impervious = 58,794 sf

Summary for Subcatchment S1: Subcat S1

[49] Hint: Tc<2dt may require smaller dt

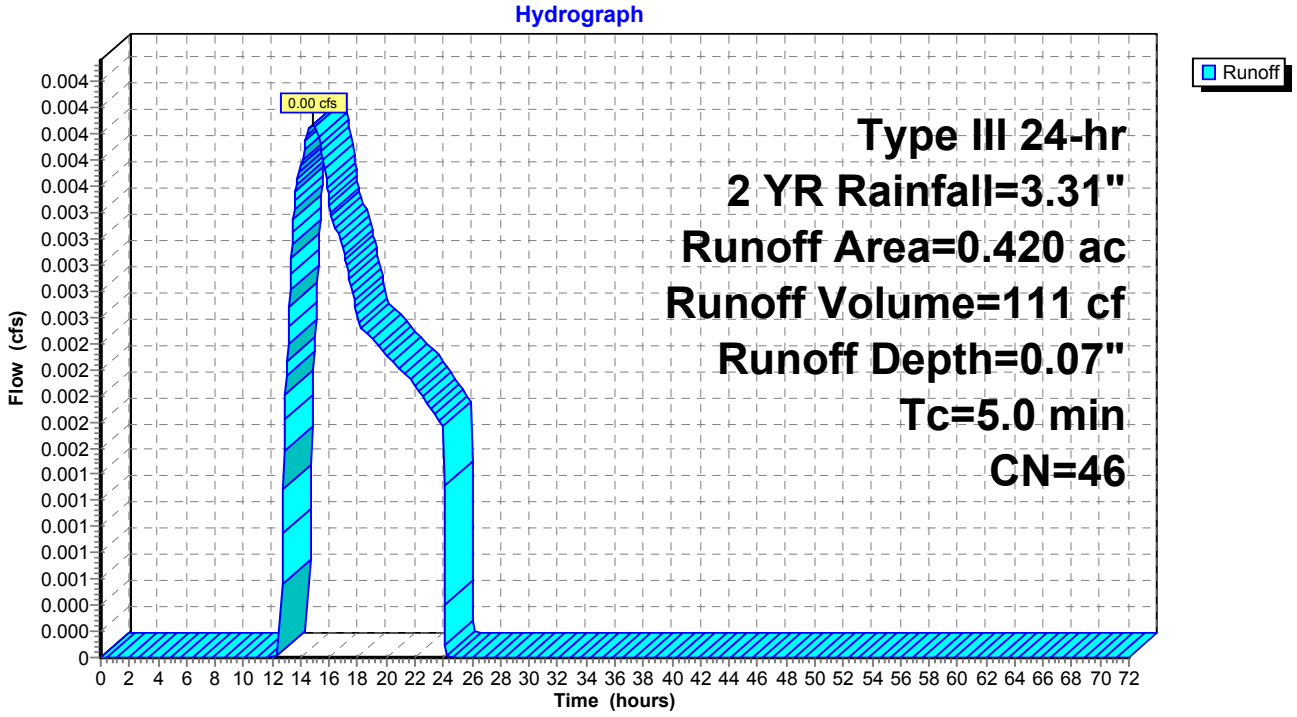
Runoff = 0.00 cfs @ 14.82 hrs, Volume= 111 cf, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (ac)	CN	Description
0.314	39	Pasture/grassland/range, Good, HSG A
0.055	39	Pasture/grassland/range, Good, HSG A
0.001	30	Woods, Good, HSG A
0.049	98	Paved parking, HSG A
0.420	46	Weighted Average
0.370		88.22% Pervious Area
0.049		11.78% Impervious Area

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

Subcatchment S1: Subcat S1



Summary for Subcatchment S2A: Subcat S2A

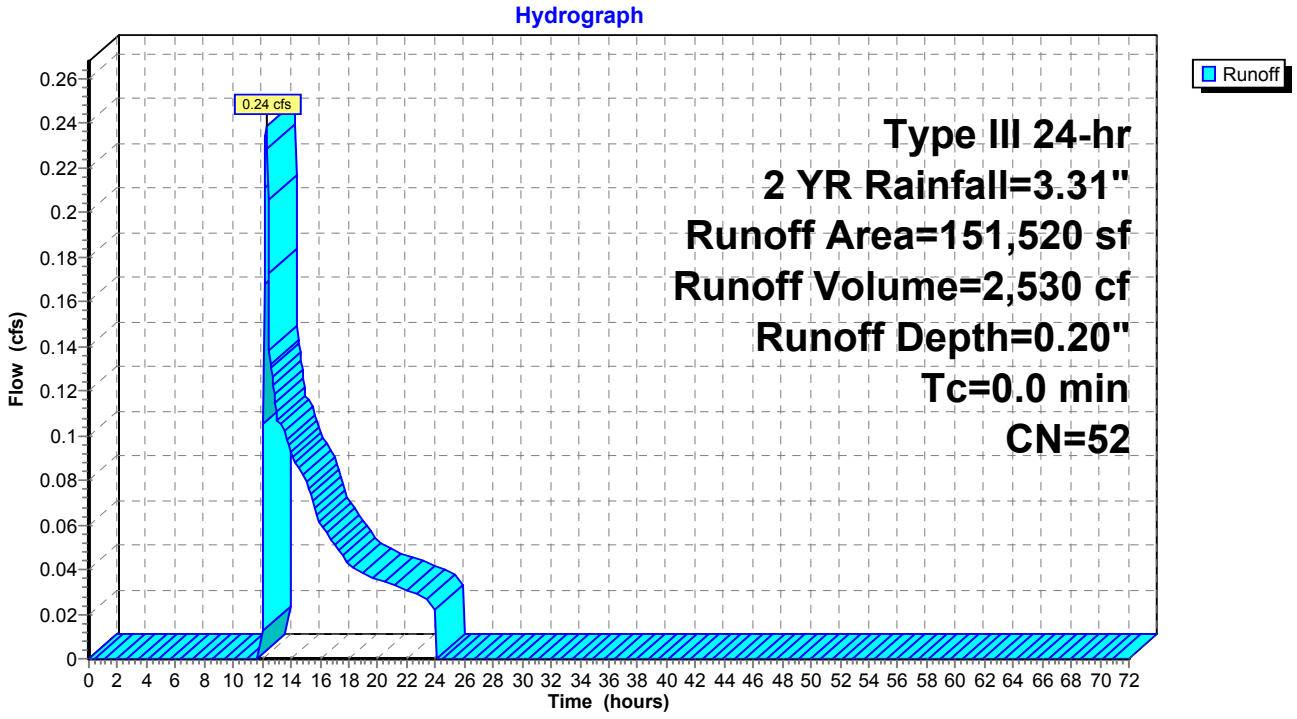
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.24 cfs @ 12.29 hrs, Volume= 2,530 cf, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (sf)	CN	Description
22,077	39	Pasture/grassland/range, Good, HSG A
76,277	39	Pasture/grassland/range, Good, HSG A
10,489	39	Pasture/grassland/range, Good, HSG A
149	30	Woods, Good, HSG A
360	30	Woods, Good, HSG A
23,184	98	Paved parking, HSG A
7,184	30	Woods, Good, HSG A
11,555	98	Paved parking, HSG A
246	39	Pasture/grassland/range, Good, HSG A
151,520	52	Weighted Average
116,782		77.07% Pervious Area
34,738		22.93% Impervious Area

Subcatchment S2A: Subcat S2A



Summary for Subcatchment S2B: Subcat S2B

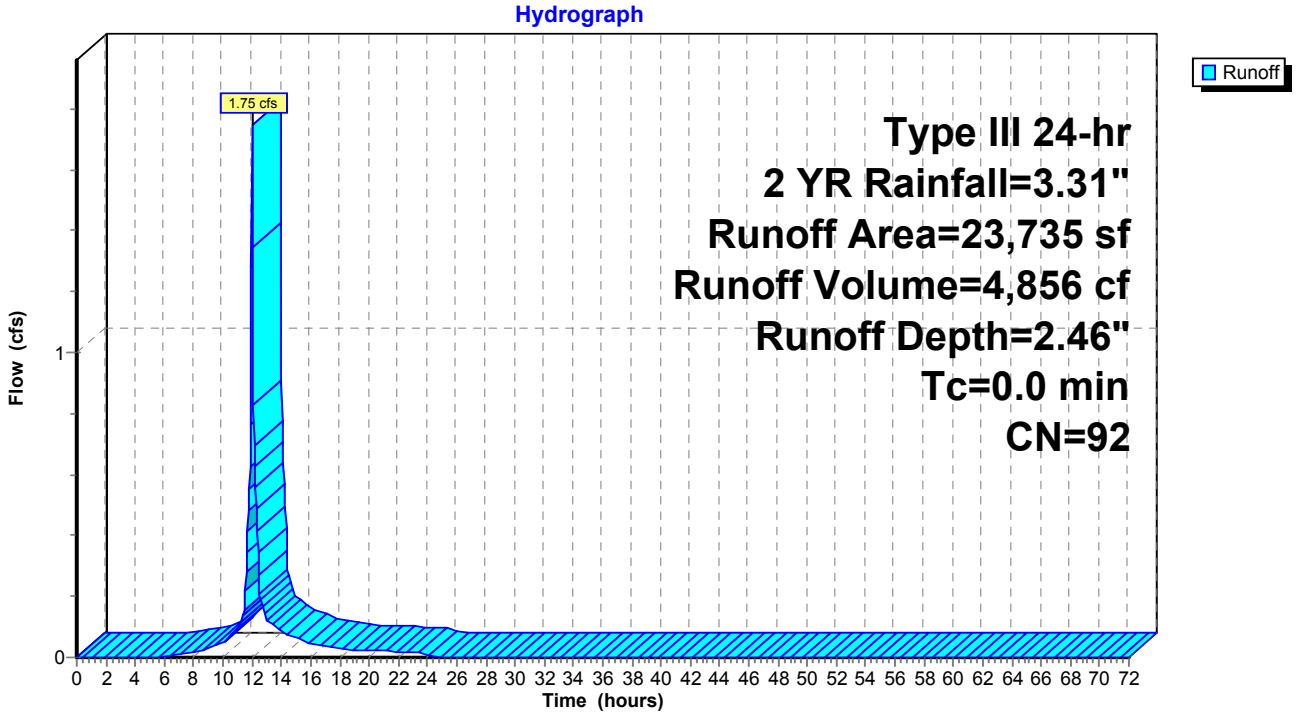
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.75 cfs @ 12.00 hrs, Volume= 4,856 cf, Depth= 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (sf)	CN	Description
21,144	98	Paved parking, HSG A
266	39	Pasture/grassland/range, Good, HSG A
40	39	Pasture/grassland/range, Good, HSG A
266	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
2,018	39	Pasture/grassland/range, Good, HSG A
23,735	92	Weighted Average
2,591		10.92% Pervious Area
21,144		89.08% Impervious Area

Subcatchment S2B: Subcat S2B



Summary for Subcatchment S2C: Subcat S2C

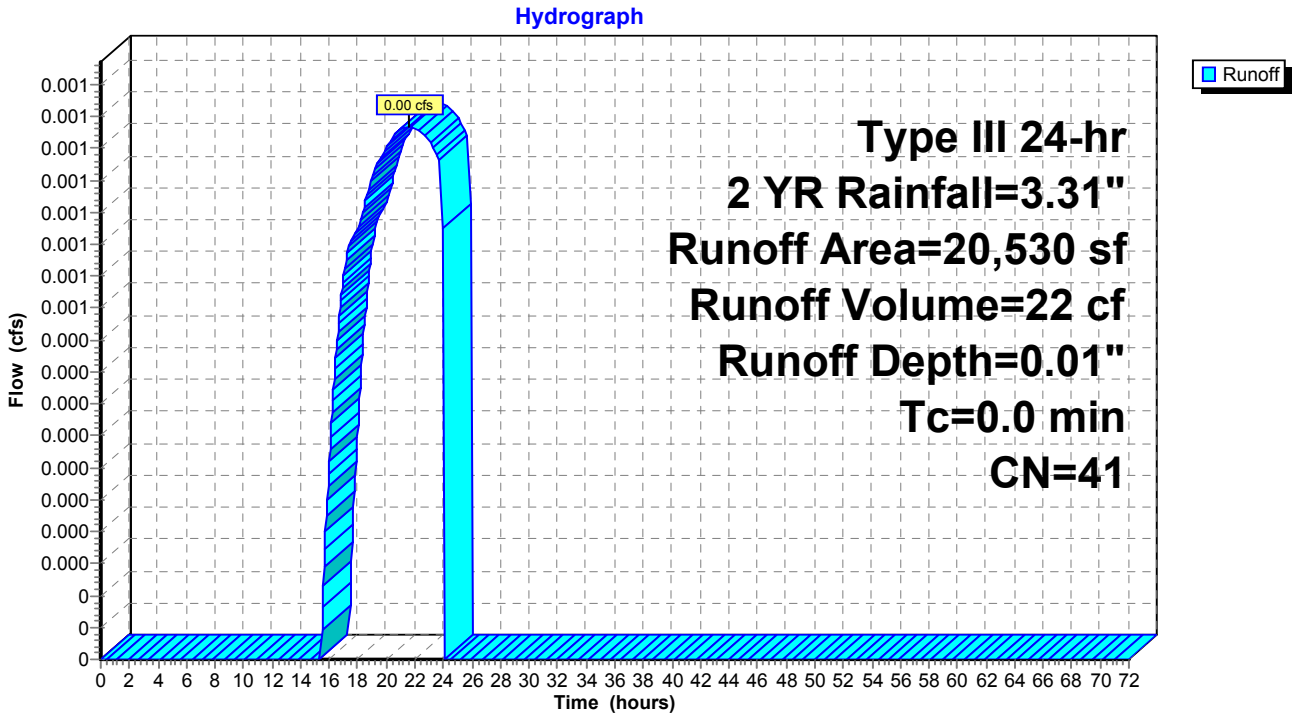
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.00 cfs @ 21.62 hrs, Volume= 22 cf, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (sf)	CN	Description
1,384	39	Pasture/grassland/range, Good, HSG A
18,118	39	Pasture/grassland/range, Good, HSG A
270	30	Woods, Good, HSG A
757	98	Paved parking, HSG A
20,530	41	Weighted Average
19,772		96.31% Pervious Area
757		3.69% Impervious Area

Subcatchment S2C: Subcat S2C



Summary for Pond 1P: Chambers

Inflow Area = 23,735 sf, 89.08% Impervious, Inflow Depth = 2.46" for 2 YR event
Inflow = 1.75 cfs @ 12.00 hrs, Volume= 4,856 cf
Outflow = 0.23 cfs @ 12.49 hrs, Volume= 4,856 cf, Atten= 87%, Lag= 29.2 min
Discarded = 0.08 cfs @ 12.49 hrs, Volume= 4,346 cf
Primary = 0.16 cfs @ 12.49 hrs, Volume= 510 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 195.72' @ 12.49 hrs Surf.Area= 1,333 sf Storage= 2,024 cf

Plug-Flow detention time= 208.8 min calculated for 4,856 cf (100% of inflow)
Center-of-Mass det. time= 208.8 min (999.8 - 791.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	193.50'	1,199 cf	**25.25'W x 52.28'L x 3.50'H Field A** 4,620 cf Overall - 1,622 cf Embedded = 2,998 cf x 40.0% Voids
#2A	194.00'	1,622 cf	**ADS_StormTech SC-740** x 35 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 5 rows
#3	193.50'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		2,897 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	193.50'	**2.410 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	197.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Primary	195.50'	**8.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.08 cfs @ 12.49 hrs HW=195.72' (Free Discharge)
└**1=Exfiltration** (Controls 0.08 cfs)

Primary OutFlow Max=0.15 cfs @ 12.49 hrs HW=195.72' (Free Discharge)
├**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Orifice Controls 0.15 cfs @ 1.58 fps)

Pond 1P: Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 (ADS StormTech® SC-740)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 5 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

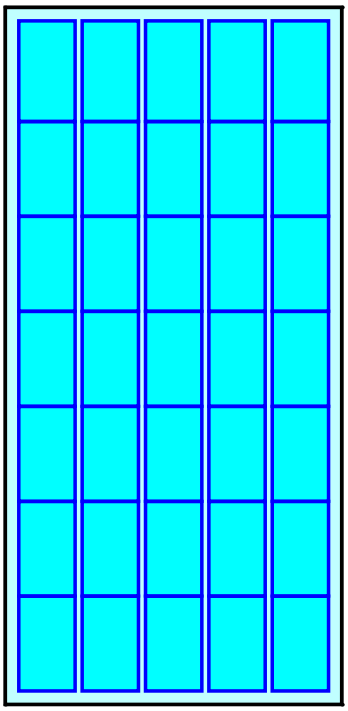
7 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 50.28' Row Length +12.0" End Stone x 2 = 52.28' Base Length
5 Rows x 51.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

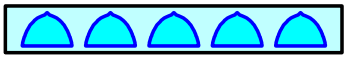
35 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 5 Rows = 1,622.0 cf Chamber Storage

4,620.1 cf Field - 1,622.0 cf Chambers = 2,998.1 cf Stone x 40.0% Voids = 1,199.2 cf Stone Storage

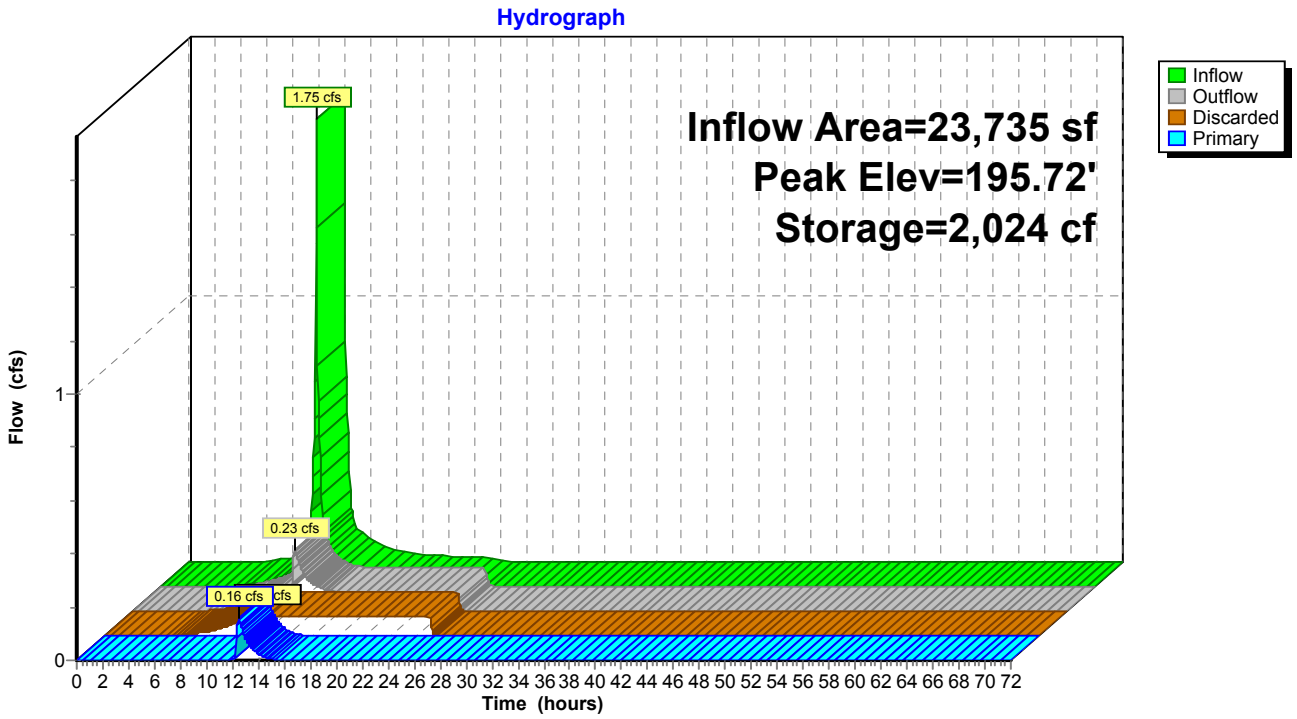
Chamber Storage + Stone Storage = 2,821.3 cf = 0.065 af
Overall Storage Efficiency = 61.1%

35 Chambers
171.1 cy Field
111.0 cy Stone





Pond 1P: Chambers



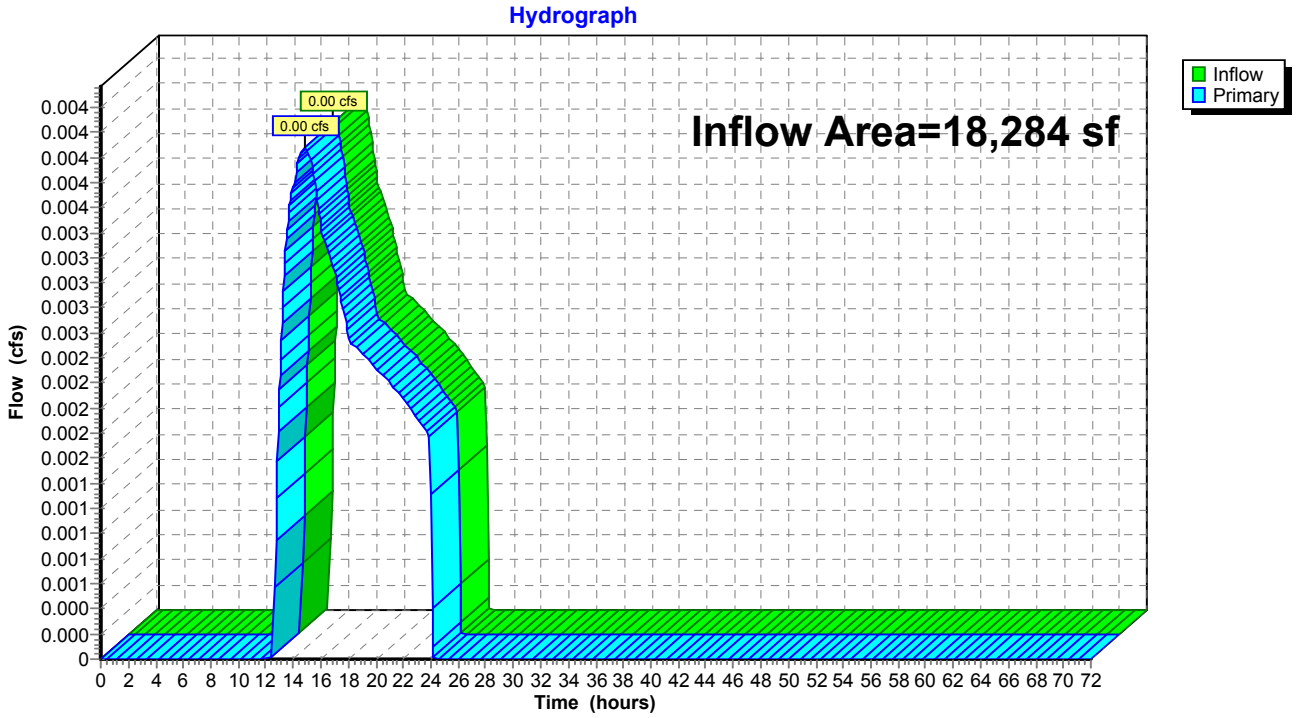
Summary for Pond P1: Analysis Pt 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 18,284 sf, 11.78% Impervious, Inflow Depth = 0.07" for 2 YR event
Inflow = 0.00 cfs @ 14.82 hrs, Volume= 111 cf
Primary = 0.00 cfs @ 14.82 hrs, Volume= 111 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P1: Analysis Pt 1



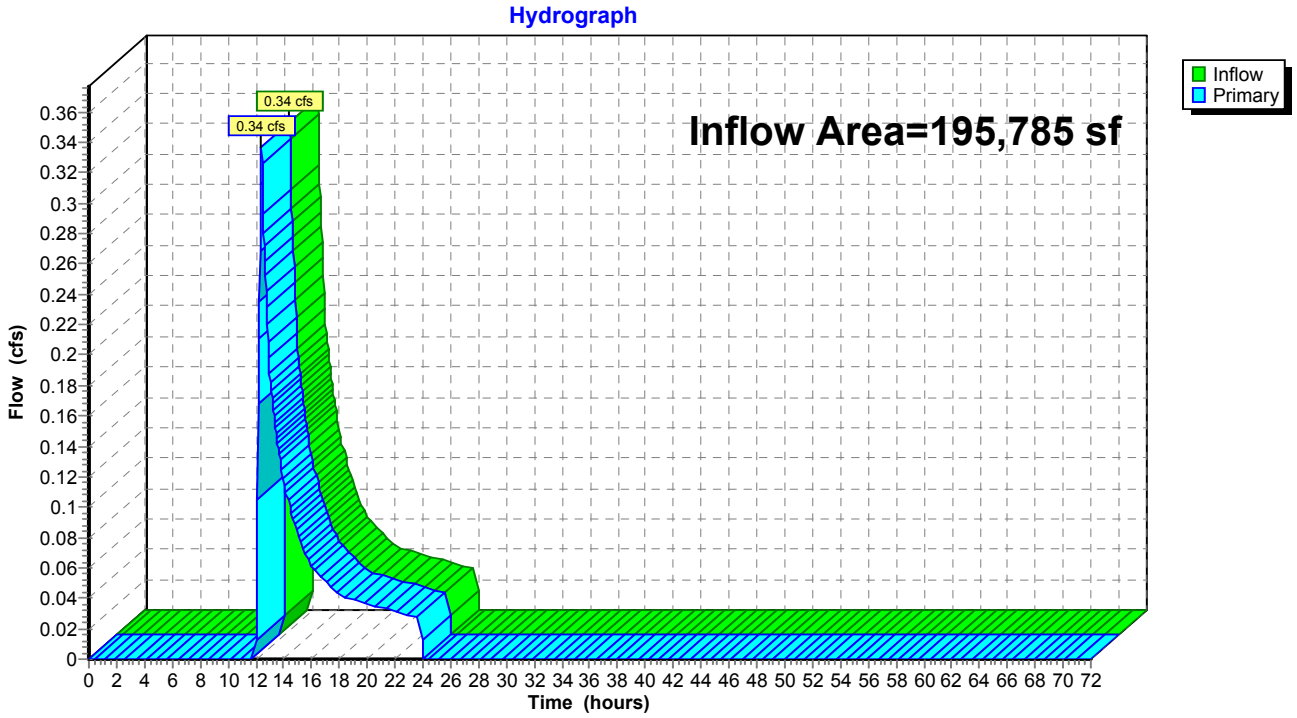
Summary for Pond P2: Analysis Pt 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 195,785 sf, 28.93% Impervious, Inflow Depth = 0.19" for 2 YR event
Inflow = 0.34 cfs @ 12.41 hrs, Volume= 3,062 cf
Primary = 0.34 cfs @ 12.41 hrs, Volume= 3,062 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P2: Analysis Pt 2



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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 S1: Subcat S1 Runoff Area=0.420 ac 11.78% Impervious Runoff Depth=0.55"
Tc=5.0 min CN=46 Runoff=0.13 cfs 844 cf

Subcatchment S2A: Subcat S2A Runoff Area=151,520 sf 22.93% Impervious Runoff Depth=0.89"
Tc=0.0 min CN=52 Runoff=3.08 cfs 11,228 cf

Subcatchment S2B: Subcat S2B Runoff Area=23,735 sf 89.08% Impervious Runoff Depth=4.27"
Tc=0.0 min CN=92 Runoff=2.96 cfs 8,456 cf

Subcatchment S2C: Subcat S2C Runoff Area=20,530 sf 3.69% Impervious Runoff Depth=0.32"
Tc=0.0 min CN=41 Runoff=0.05 cfs 548 cf

Pond 1P: Chambers Peak Elev=196.52' Storage=2,605 cf Inflow=2.96 cfs 8,456 cf
Discarded=0.08 cfs 5,320 cf Primary=1.39 cfs 3,135 cf Outflow=1.47 cfs 8,456 cf

Pond P1: Analysis Pt 1 Inflow=0.13 cfs 844 cf
Primary=0.13 cfs 844 cf

Pond P2: Analysis Pt 2 Inflow=4.09 cfs 14,910 cf
Primary=4.09 cfs 14,910 cf

Total Runoff Area = 214,069 sf Runoff Volume = 21,075 cf Average Runoff Depth = 1.18"
72.54% Pervious = 155,275 sf 27.46% Impervious = 58,794 sf

Summary for Subcatchment S1: Subcat S1

[49] Hint: Tc<2dt may require smaller dt

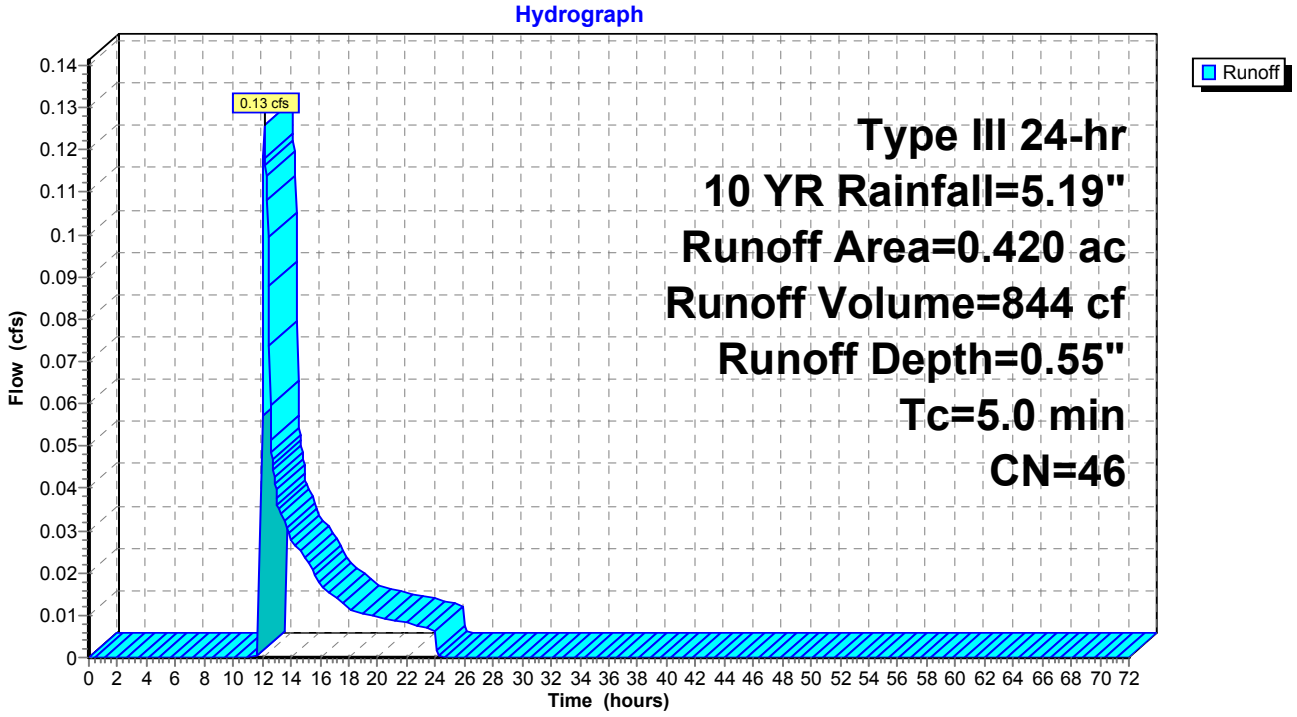
Runoff = 0.13 cfs @ 12.15 hrs, Volume= 844 cf, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.19"

Area (ac)	CN	Description
0.314	39	Pasture/grassland/range, Good, HSG A
0.055	39	Pasture/grassland/range, Good, HSG A
0.001	30	Woods, Good, HSG A
0.049	98	Paved parking, HSG A
0.420	46	Weighted Average
0.370		88.22% Pervious Area
0.049		11.78% Impervious Area

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

Subcatchment S1: Subcat S1



Summary for Subcatchment S2A: Subcat S2A

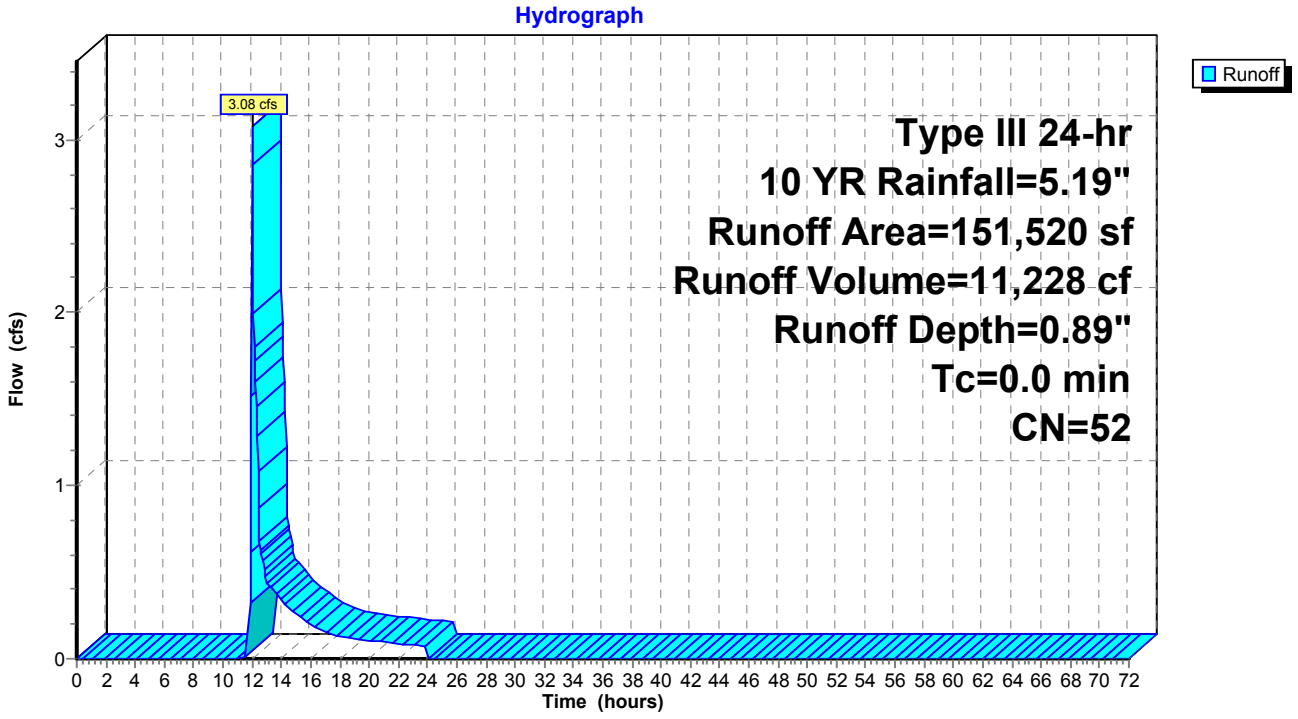
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 3.08 cfs @ 12.02 hrs, Volume= 11,228 cf, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.19"

Area (sf)	CN	Description
22,077	39	Pasture/grassland/range, Good, HSG A
76,277	39	Pasture/grassland/range, Good, HSG A
10,489	39	Pasture/grassland/range, Good, HSG A
149	30	Woods, Good, HSG A
360	30	Woods, Good, HSG A
23,184	98	Paved parking, HSG A
7,184	30	Woods, Good, HSG A
11,555	98	Paved parking, HSG A
246	39	Pasture/grassland/range, Good, HSG A
151,520	52	Weighted Average
116,782		77.07% Pervious Area
34,738		22.93% Impervious Area

Subcatchment S2A: Subcat S2A



Summary for Subcatchment S2B: Subcat S2B

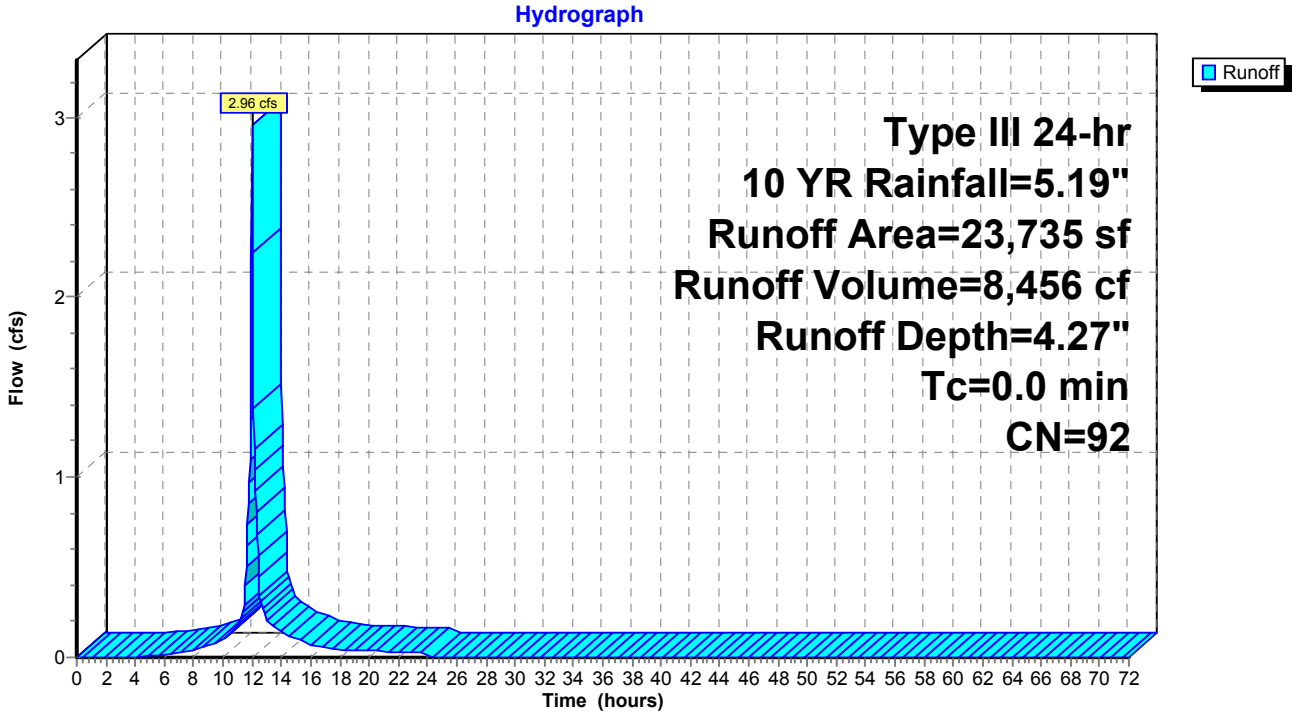
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.96 cfs @ 12.00 hrs, Volume= 8,456 cf, Depth= 4.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.19"

Area (sf)	CN	Description
21,144	98	Paved parking, HSG A
266	39	Pasture/grassland/range, Good, HSG A
40	39	Pasture/grassland/range, Good, HSG A
266	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
2,018	39	Pasture/grassland/range, Good, HSG A
23,735	92	Weighted Average
2,591		10.92% Pervious Area
21,144		89.08% Impervious Area

Subcatchment S2B: Subcat S2B



Summary for Subcatchment S2C: Subcat S2C

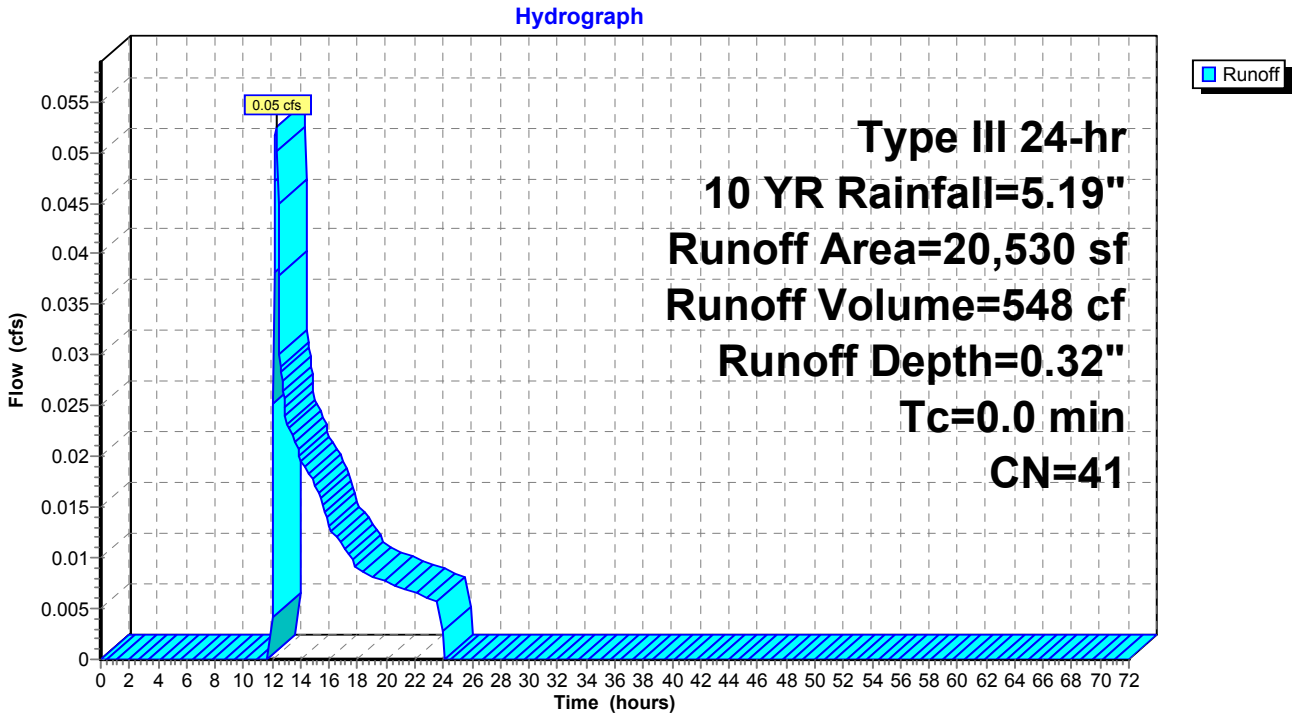
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.05 cfs @ 12.29 hrs, Volume= 548 cf, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.19"

Area (sf)	CN	Description
1,384	39	Pasture/grassland/range, Good, HSG A
18,118	39	Pasture/grassland/range, Good, HSG A
270	30	Woods, Good, HSG A
757	98	Paved parking, HSG A
20,530	41	Weighted Average
19,772		96.31% Pervious Area
757		3.69% Impervious Area

Subcatchment S2C: Subcat S2C



Summary for Pond 1P: Chambers

Inflow Area = 23,735 sf, 89.08% Impervious, Inflow Depth = 4.27" for 10 YR event
Inflow = 2.96 cfs @ 12.00 hrs, Volume= 8,456 cf
Outflow = 1.47 cfs @ 12.11 hrs, Volume= 8,456 cf, Atten= 50%, Lag= 6.6 min
Discarded = 0.08 cfs @ 12.11 hrs, Volume= 5,320 cf
Primary = 1.39 cfs @ 12.11 hrs, Volume= 3,135 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 196.52' @ 12.11 hrs Surf.Area= 1,333 sf Storage= 2,605 cf

Plug-Flow detention time= 156.6 min calculated for 8,456 cf (100% of inflow)
Center-of-Mass det. time= 156.6 min (932.6 - 776.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	193.50'	1,199 cf	**25.25'W x 52.28'L x 3.50'H Field A** 4,620 cf Overall - 1,622 cf Embedded = 2,998 cf x 40.0% Voids
#2A	194.00'	1,622 cf	**ADS_StormTech SC-740** x 35 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 5 rows
#3	193.50'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		2,897 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	193.50'	**2.410 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	197.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Primary	195.50'	**8.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.08 cfs @ 12.11 hrs HW=196.50' (Free Discharge)
└**1=Exfiltration** (Controls 0.08 cfs)

Primary OutFlow Max=1.37 cfs @ 12.11 hrs HW=196.50' (Free Discharge)
├**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Orifice Controls 1.37 cfs @ 3.94 fps)

Pond 1P: Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 (ADS StormTech® SC-740)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 5 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

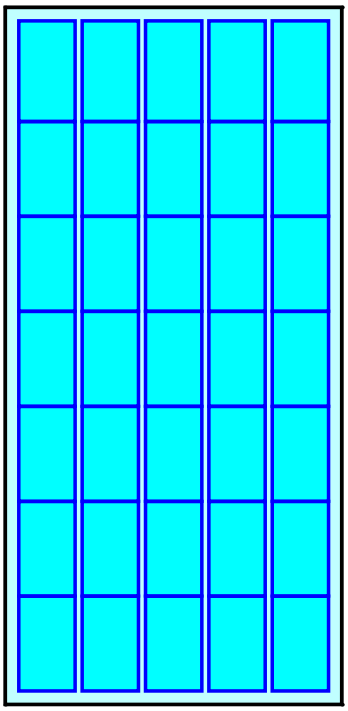
7 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 50.28' Row Length +12.0" End Stone x 2 = 52.28' Base Length
5 Rows x 51.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

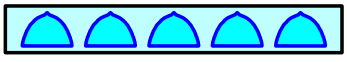
35 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 5 Rows = 1,622.0 cf Chamber Storage

4,620.1 cf Field - 1,622.0 cf Chambers = 2,998.1 cf Stone x 40.0% Voids = 1,199.2 cf Stone Storage

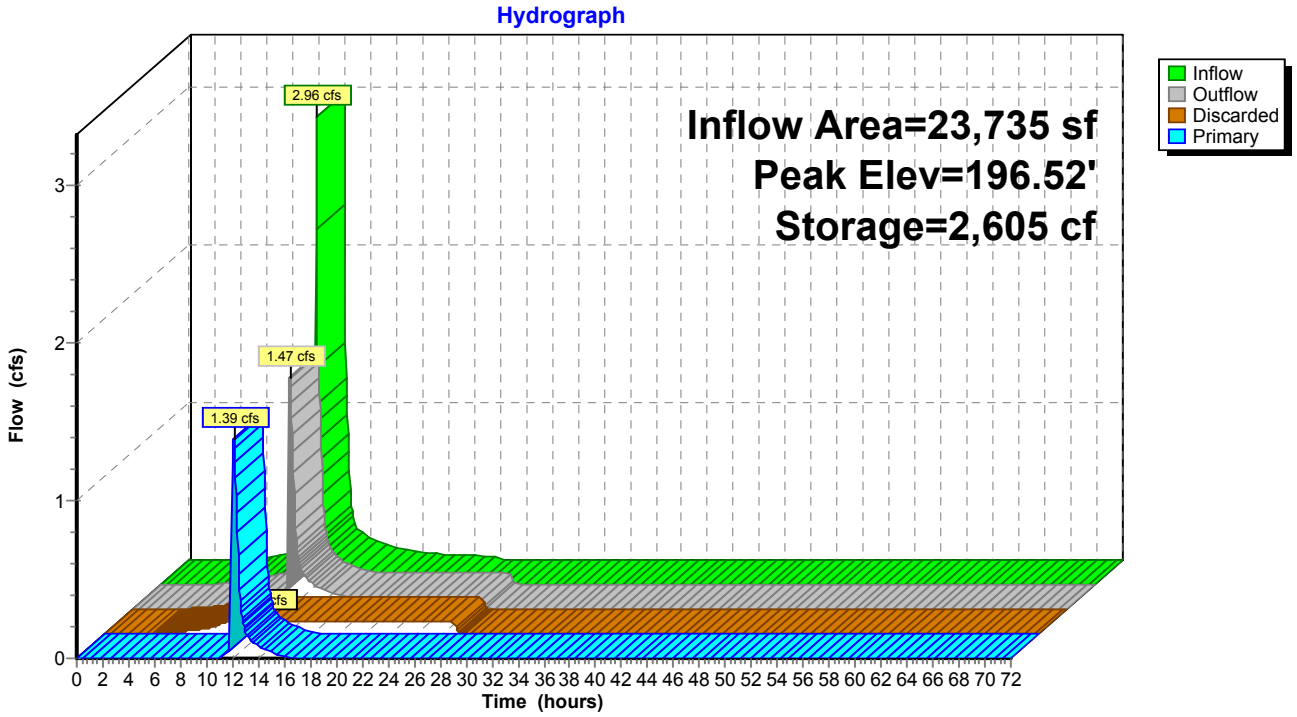
Chamber Storage + Stone Storage = 2,821.3 cf = 0.065 af
Overall Storage Efficiency = 61.1%

35 Chambers
171.1 cy Field
111.0 cy Stone





Pond 1P: Chambers



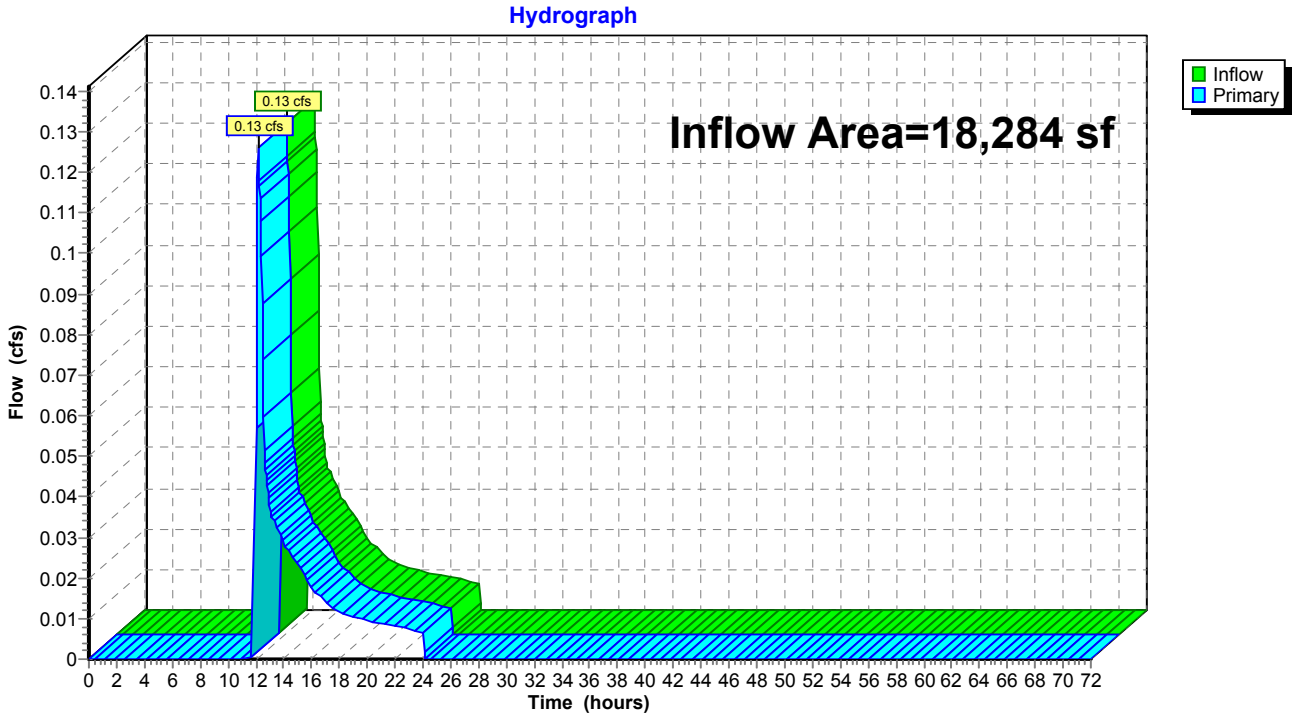
Summary for Pond P1: Analysis Pt 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 18,284 sf, 11.78% Impervious, Inflow Depth = 0.55" for 10 YR event
Inflow = 0.13 cfs @ 12.15 hrs, Volume= 844 cf
Primary = 0.13 cfs @ 12.15 hrs, Volume= 844 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P1: Analysis Pt 1



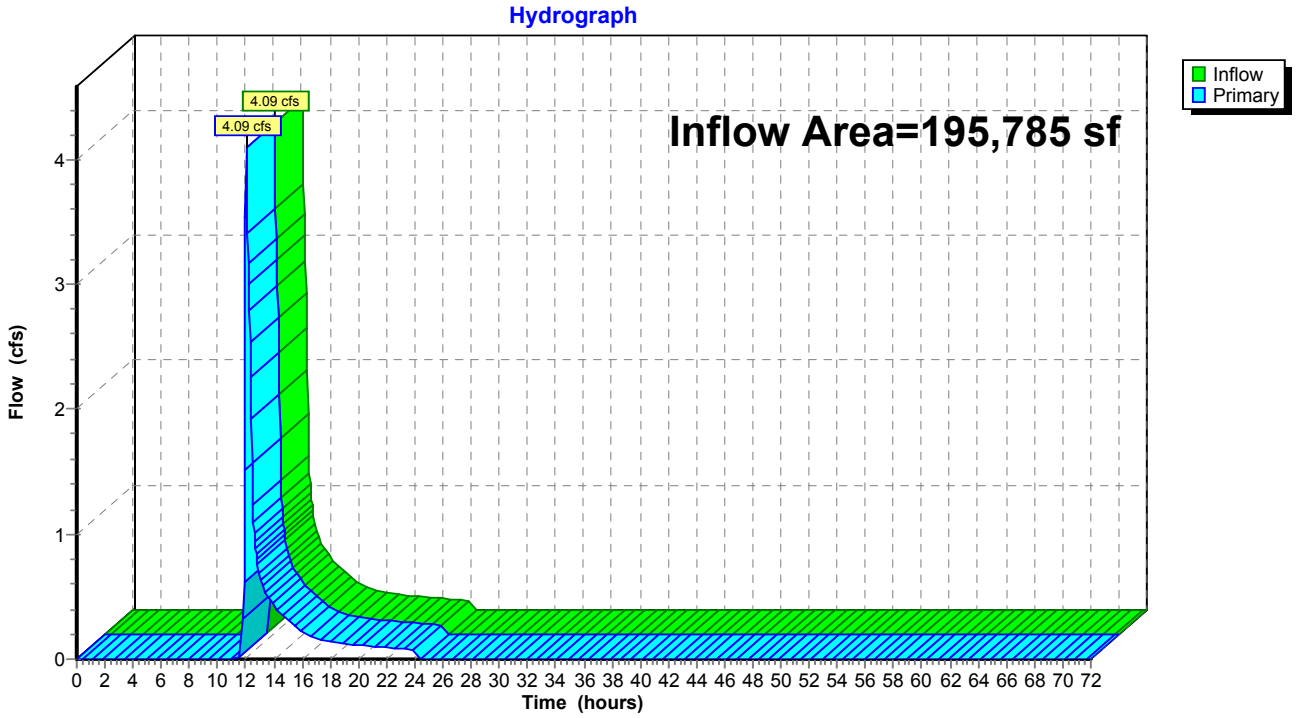
Summary for Pond P2: Analysis Pt 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 195,785 sf, 28.93% Impervious, Inflow Depth = 0.91" for 10 YR event
Inflow = 4.09 cfs @ 12.05 hrs, Volume= 14,910 cf
Primary = 4.09 cfs @ 12.05 hrs, Volume= 14,910 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P2: Analysis Pt 2



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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 S1: Subcat S1 Runoff Area=0.420 ac 11.78% Impervious Runoff Depth=1.02"
Tc=5.0 min CN=46 Runoff=0.37 cfs 1,557 cf

Subcatchment S2A: Subcat S2A Runoff Area=151,520 sf 22.93% Impervious Runoff Depth=1.48"
Tc=0.0 min CN=52 Runoff=6.01 cfs 18,718 cf

Subcatchment S2B: Subcat S2B Runoff Area=23,735 sf 89.08% Impervious Runoff Depth=5.42"
Tc=0.0 min CN=92 Runoff=3.71 cfs 10,728 cf

Subcatchment S2C: Subcat S2C Runoff Area=20,530 sf 3.69% Impervious Runoff Depth=0.68"
Tc=0.0 min CN=41 Runoff=0.20 cfs 1,161 cf

Pond 1P: Chambers Peak Elev=197.23' Storage=2,868 cf Inflow=3.71 cfs 10,728 cf
Discarded=0.08 cfs 5,780 cf Primary=3.37 cfs 4,948 cf Outflow=3.45 cfs 10,728 cf

Pond P1: Analysis Pt 1 Inflow=0.37 cfs 1,557 cf
Primary=0.37 cfs 1,557 cf

Pond P2: Analysis Pt 2 Inflow=8.95 cfs 24,826 cf
Primary=8.95 cfs 24,826 cf

Total Runoff Area = 214,069 sf Runoff Volume = 32,163 cf Average Runoff Depth = 1.80"
72.54% Pervious = 155,275 sf 27.46% Impervious = 58,794 sf

Summary for Subcatchment S1: Subcat S1

[49] Hint: Tc<2dt may require smaller dt

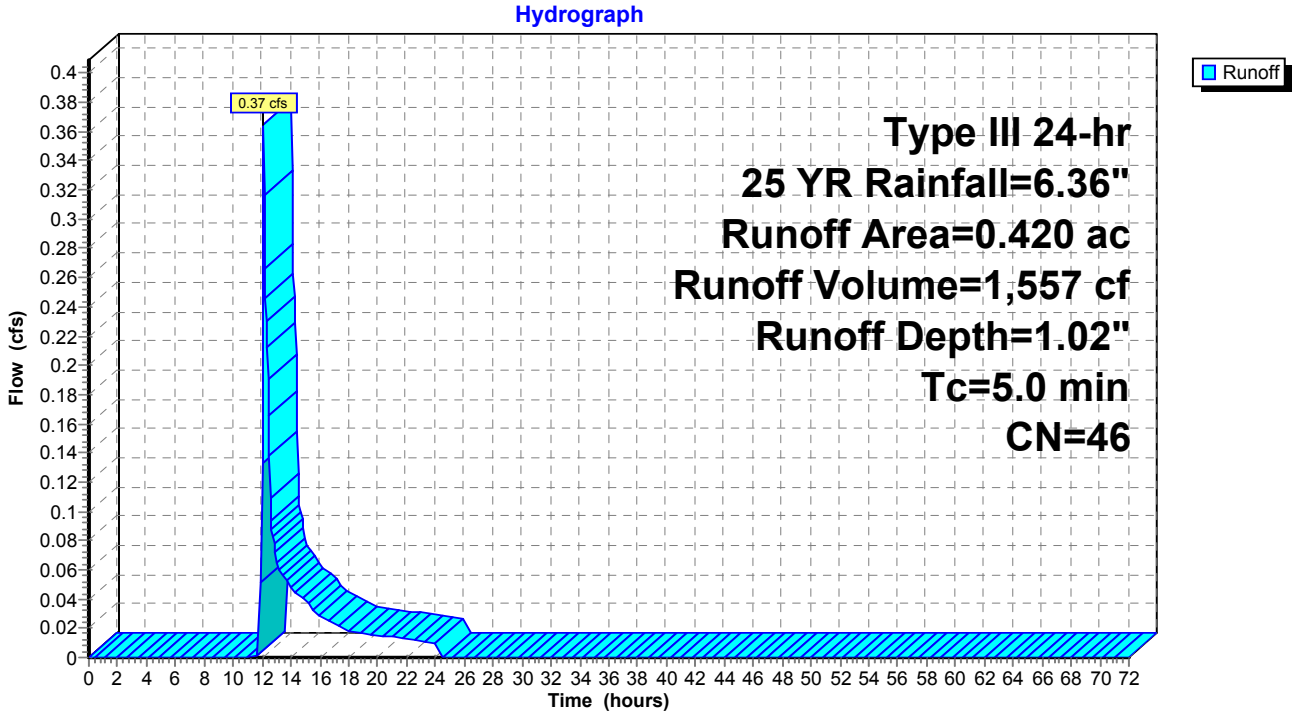
Runoff = 0.37 cfs @ 12.11 hrs, Volume= 1,557 cf, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.36"

Area (ac)	CN	Description
0.314	39	Pasture/grassland/range, Good, HSG A
0.055	39	Pasture/grassland/range, Good, HSG A
0.001	30	Woods, Good, HSG A
0.049	98	Paved parking, HSG A
0.420	46	Weighted Average
0.370		88.22% Pervious Area
0.049		11.78% Impervious Area

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

Subcatchment S1: Subcat S1



Summary for Subcatchment S2A: Subcat S2A

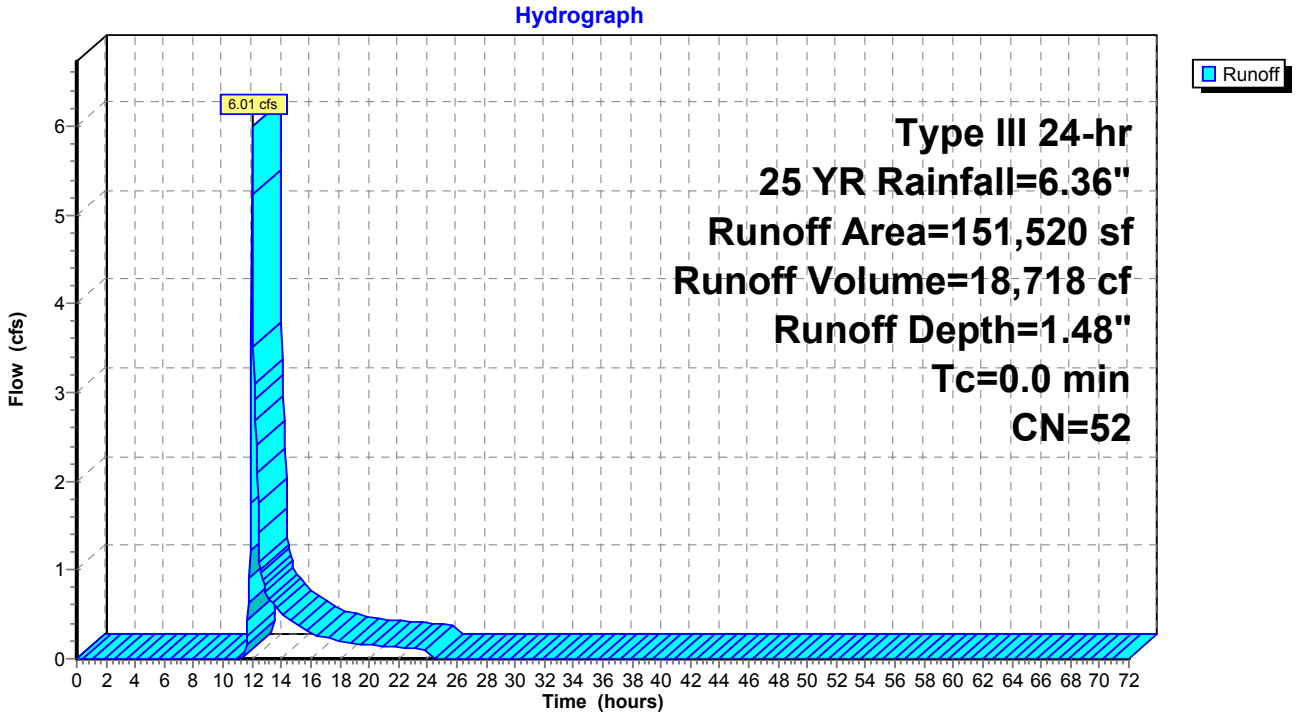
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 6.01 cfs @ 12.01 hrs, Volume= 18,718 cf, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.36"

Area (sf)	CN	Description
22,077	39	Pasture/grassland/range, Good, HSG A
76,277	39	Pasture/grassland/range, Good, HSG A
10,489	39	Pasture/grassland/range, Good, HSG A
149	30	Woods, Good, HSG A
360	30	Woods, Good, HSG A
23,184	98	Paved parking, HSG A
7,184	30	Woods, Good, HSG A
11,555	98	Paved parking, HSG A
246	39	Pasture/grassland/range, Good, HSG A
151,520	52	Weighted Average
116,782		77.07% Pervious Area
34,738		22.93% Impervious Area

Subcatchment S2A: Subcat S2A



Summary for Subcatchment S2B: Subcat S2B

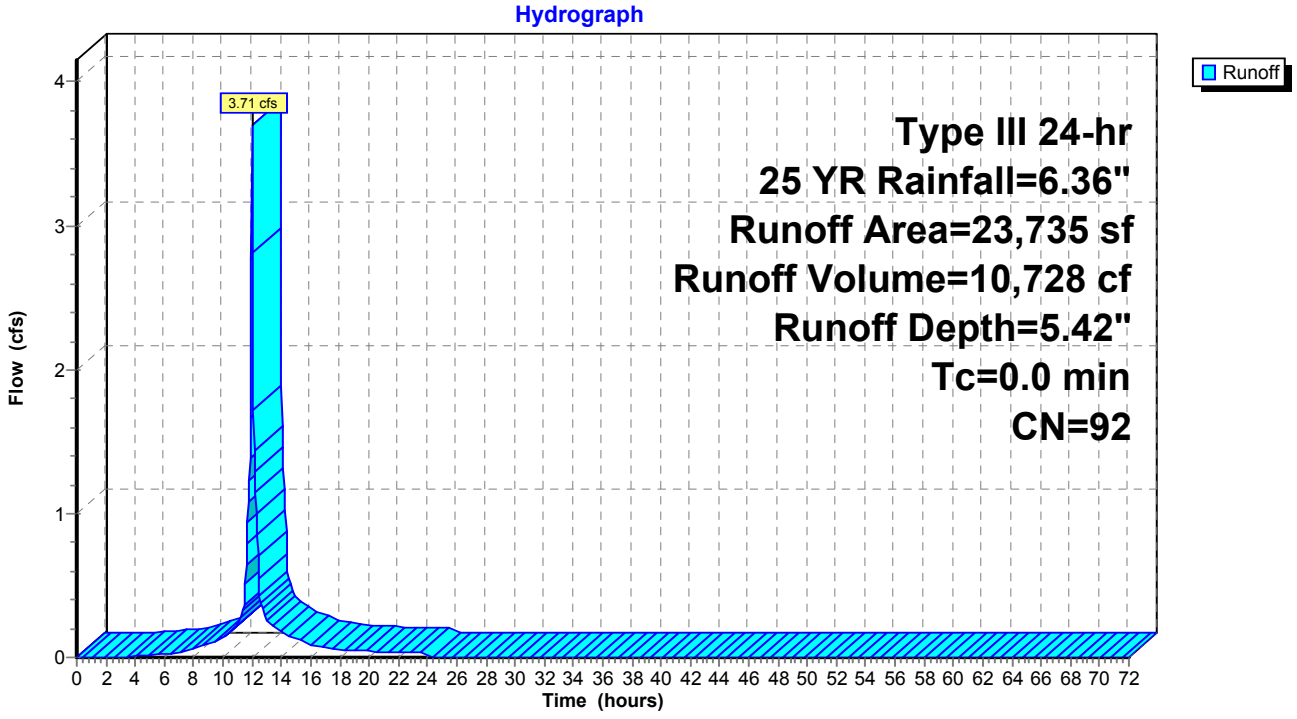
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 3.71 cfs @ 12.00 hrs, Volume= 10,728 cf, Depth= 5.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.36"

Area (sf)	CN	Description
21,144	98	Paved parking, HSG A
266	39	Pasture/grassland/range, Good, HSG A
40	39	Pasture/grassland/range, Good, HSG A
266	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
2,018	39	Pasture/grassland/range, Good, HSG A
23,735	92	Weighted Average
2,591		10.92% Pervious Area
21,144		89.08% Impervious Area

Subcatchment S2B: Subcat S2B



Summary for Subcatchment S2C: Subcat S2C

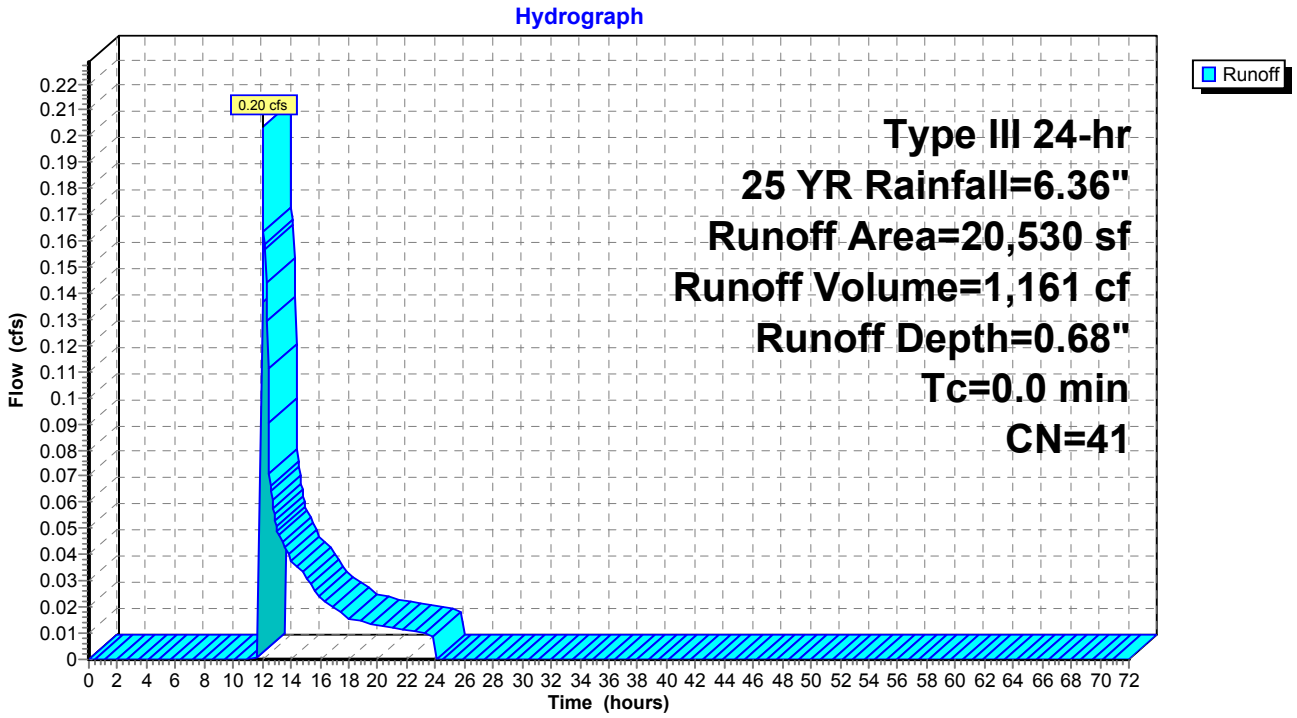
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.20 cfs @ 12.06 hrs, Volume= 1,161 cf, Depth= 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.36"

Area (sf)	CN	Description
1,384	39	Pasture/grassland/range, Good, HSG A
18,118	39	Pasture/grassland/range, Good, HSG A
270	30	Woods, Good, HSG A
757	98	Paved parking, HSG A
20,530	41	Weighted Average
19,772		96.31% Pervious Area
757		3.69% Impervious Area

Subcatchment S2C: Subcat S2C



Summary for Pond 1P: Chambers

Inflow Area = 23,735 sf, 89.08% Impervious, Inflow Depth = 5.42" for 25 YR event
Inflow = 3.71 cfs @ 12.00 hrs, Volume= 10,728 cf
Outflow = 3.45 cfs @ 12.05 hrs, Volume= 10,728 cf, Atten= 7%, Lag= 3.0 min
Discarded = 0.08 cfs @ 12.05 hrs, Volume= 5,780 cf
Primary = 3.37 cfs @ 12.05 hrs, Volume= 4,948 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 197.23' @ 12.05 hrs Surf.Area= 1,333 sf Storage= 2,868 cf

Plug-Flow detention time= 139.3 min calculated for 10,720 cf (100% of inflow)
Center-of-Mass det. time= 139.4 min (909.3 - 769.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	193.50'	1,199 cf	**25.25'W x 52.28'L x 3.50'H Field A** 4,620 cf Overall - 1,622 cf Embedded = 2,998 cf x 40.0% Voids
#2A	194.00'	1,622 cf	**ADS_StormTech SC-740** x 35 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 5 rows
#3	193.50'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		2,897 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	193.50'	**2.410 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	197.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Primary	195.50'	**8.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.08 cfs @ 12.05 hrs HW=197.20' (Free Discharge)
└**1=Exfiltration** (Controls 0.08 cfs)

Primary OutFlow Max=3.32 cfs @ 12.05 hrs HW=197.22' (Free Discharge)
├**2=Sharp-Crested Rectangular Weir** (Weir Controls 1.34 cfs @ 1.54 fps)
└**3=Orifice/Grate** (Orifice Controls 1.98 cfs @ 5.67 fps)

Pond 1P: Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 (ADS StormTech® SC-740)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 5 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

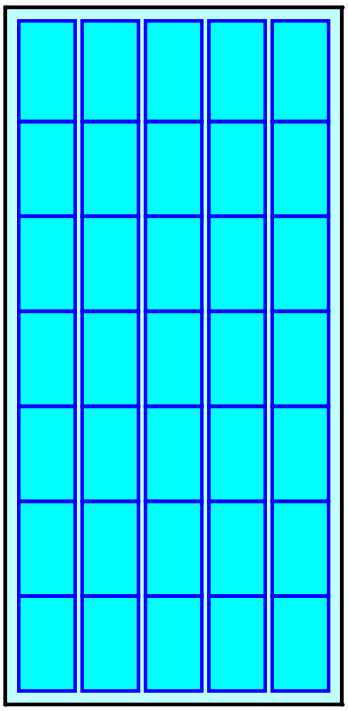
7 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 50.28' Row Length +12.0" End Stone x 2 = 52.28' Base Length
5 Rows x 51.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

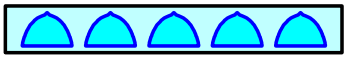
35 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 5 Rows = 1,622.0 cf Chamber Storage

4,620.1 cf Field - 1,622.0 cf Chambers = 2,998.1 cf Stone x 40.0% Voids = 1,199.2 cf Stone Storage

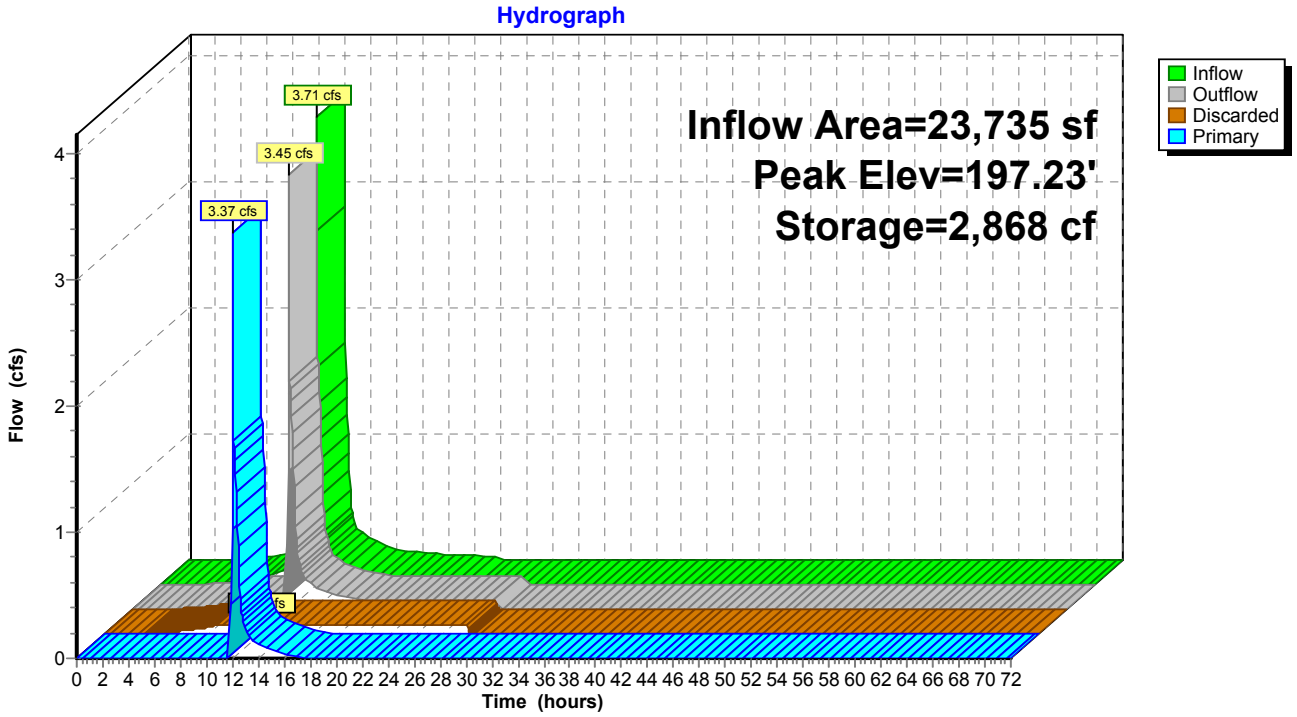
Chamber Storage + Stone Storage = 2,821.3 cf = 0.065 af
Overall Storage Efficiency = 61.1%

35 Chambers
171.1 cy Field
111.0 cy Stone





Pond 1P: Chambers



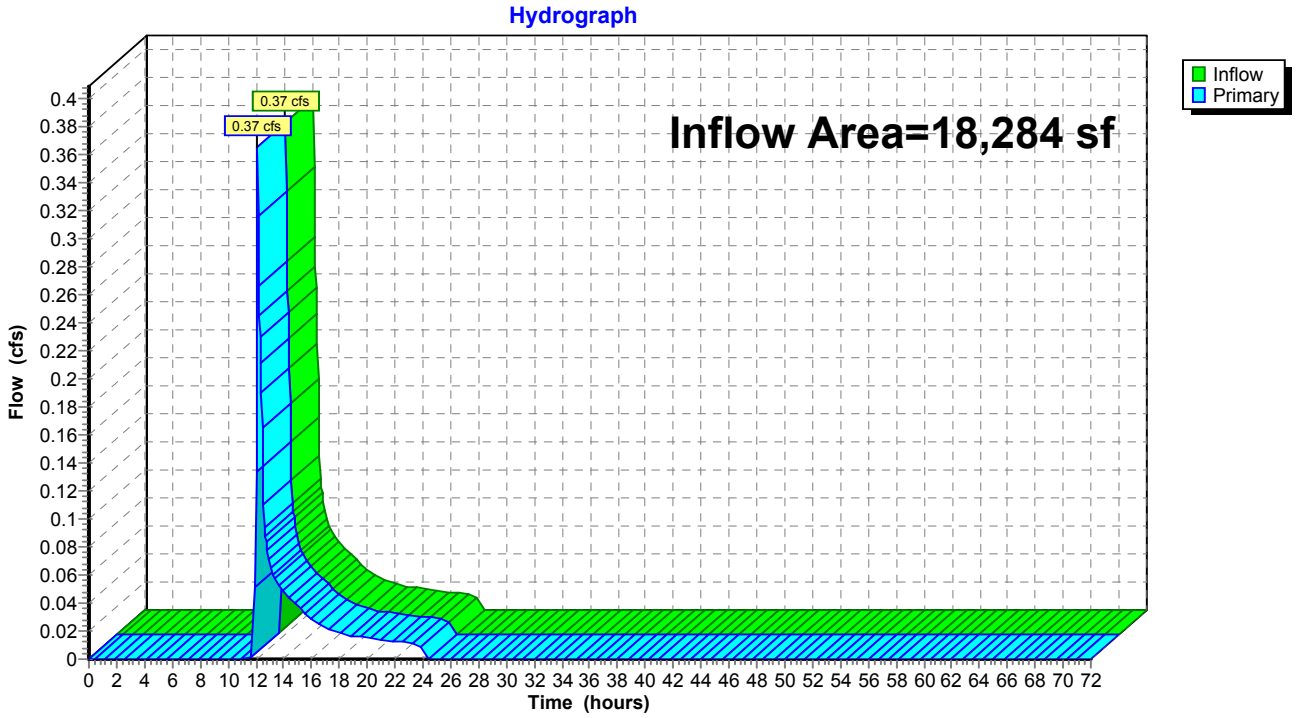
Summary for Pond P1: Analysis Pt 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 18,284 sf, 11.78% Impervious, Inflow Depth = 1.02" for 25 YR event
Inflow = 0.37 cfs @ 12.11 hrs, Volume= 1,557 cf
Primary = 0.37 cfs @ 12.11 hrs, Volume= 1,557 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P1: Analysis Pt 1



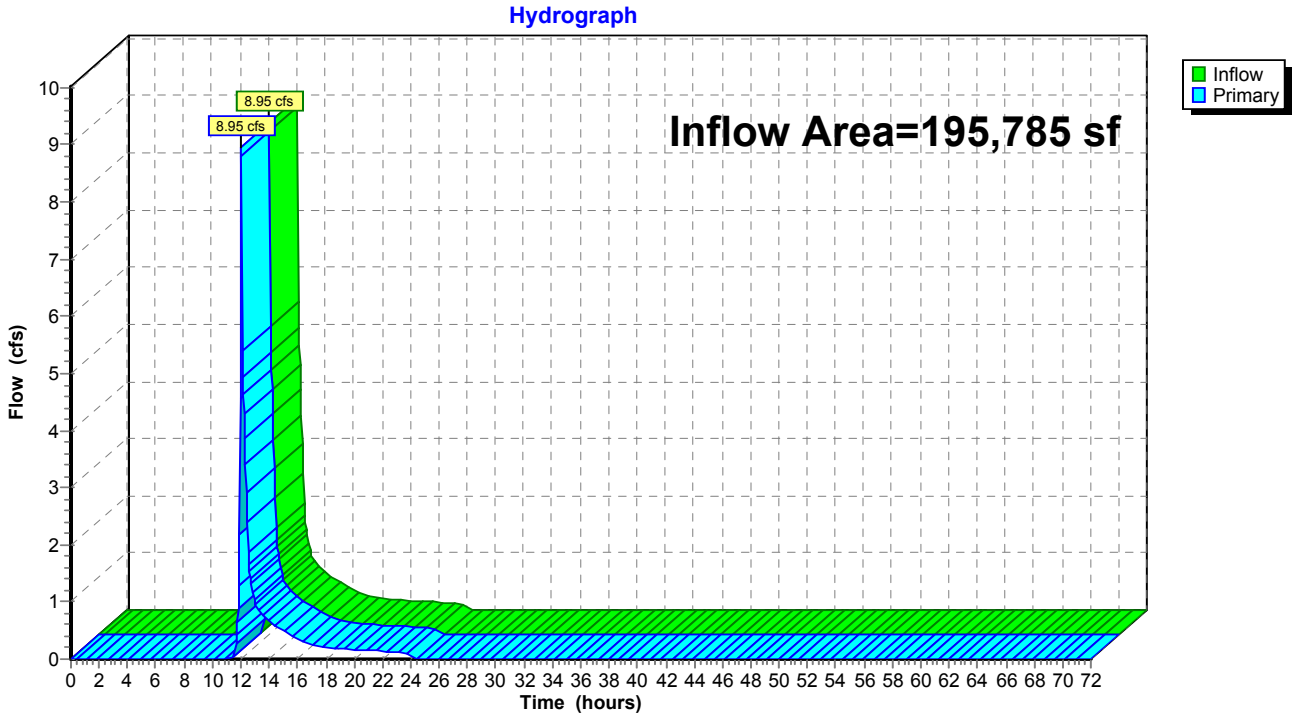
Summary for Pond P2: Analysis Pt 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 195,785 sf, 28.93% Impervious, Inflow Depth = 1.52" for 25 YR event
Inflow = 8.95 cfs @ 12.04 hrs, Volume= 24,826 cf
Primary = 8.95 cfs @ 12.04 hrs, Volume= 24,826 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P2: Analysis Pt 2



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 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 S1: Subcat S1 Runoff Area=0.420 ac 11.78% Impervious Runoff Depth=1.93"
Tc=5.0 min CN=46 Runoff=0.83 cfs 2,941 cf

Subcatchment S2A: Subcat S2A Runoff Area=151,520 sf 22.93% Impervious Runoff Depth=2.57"
Tc=0.0 min CN=52 Runoff=11.37 cfs 32,463 cf

Subcatchment S2B: Subcat S2B Runoff Area=23,735 sf 89.08% Impervious Runoff Depth=7.21"
Tc=0.0 min CN=92 Runoff=4.85 cfs 14,264 cf

Subcatchment S2C: Subcat S2C Runoff Area=20,530 sf 3.69% Impervious Runoff Depth=1.42"
Tc=0.0 min CN=41 Runoff=0.68 cfs 2,434 cf

Pond 1P: Chambers Peak Elev=197.46' Storage=2,871 cf Inflow=4.85 cfs 14,264 cf
Discarded=0.08 cfs 6,368 cf Primary=6.13 cfs 7,897 cf Outflow=6.20 cfs 14,264 cf

Pond P1: Analysis Pt 1 Inflow=0.83 cfs 2,941 cf
Primary=0.83 cfs 2,941 cf

Pond P2: Analysis Pt 2 Inflow=18.11 cfs 42,794 cf
Primary=18.11 cfs 42,794 cf

Total Runoff Area = 214,069 sf Runoff Volume = 52,103 cf Average Runoff Depth = 2.92"
72.54% Pervious = 155,275 sf 27.46% Impervious = 58,794 sf

Summary for Subcatchment S1: Subcat S1

[49] Hint: Tc<2dt may require smaller dt

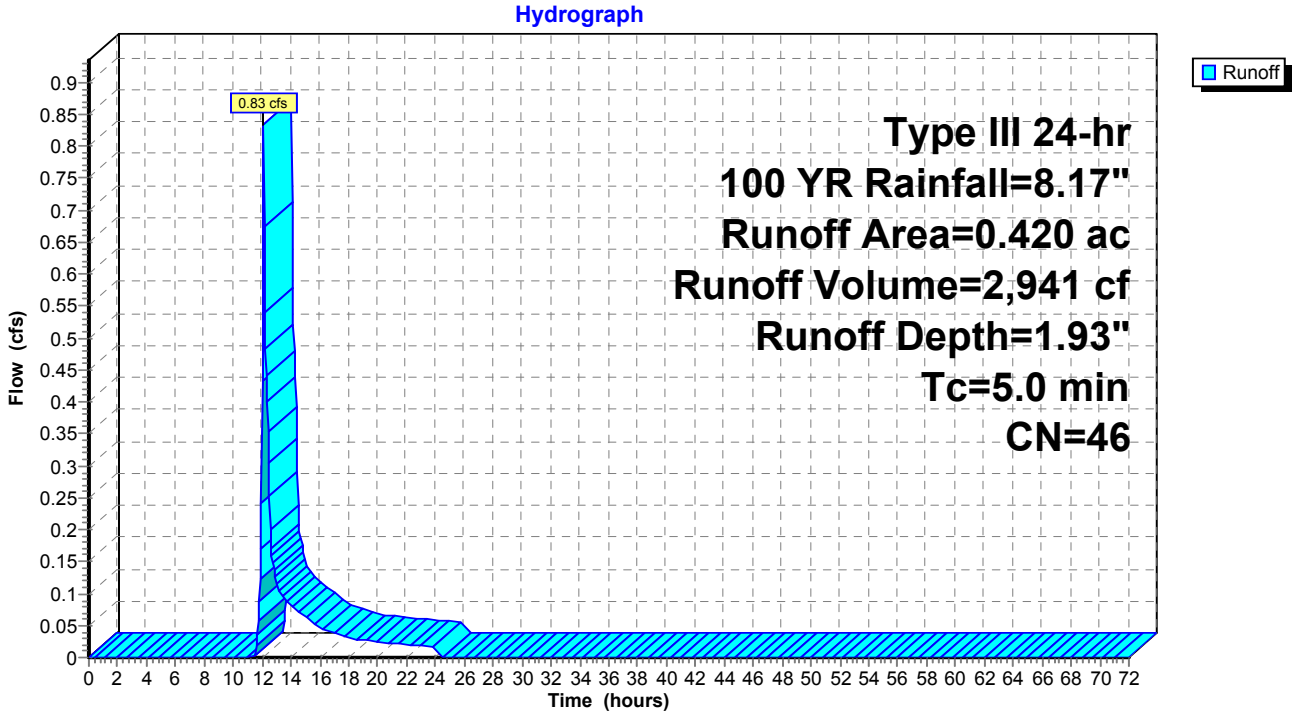
Runoff = 0.83 cfs @ 12.09 hrs, Volume= 2,941 cf, Depth= 1.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.17"

Area (ac)	CN	Description
0.314	39	Pasture/grassland/range, Good, HSG A
0.055	39	Pasture/grassland/range, Good, HSG A
0.001	30	Woods, Good, HSG A
0.049	98	Paved parking, HSG A
0.420	46	Weighted Average
0.370		88.22% Pervious Area
0.049		11.78% Impervious Area

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

Subcatchment S1: Subcat S1



Summary for Subcatchment S2A: Subcat S2A

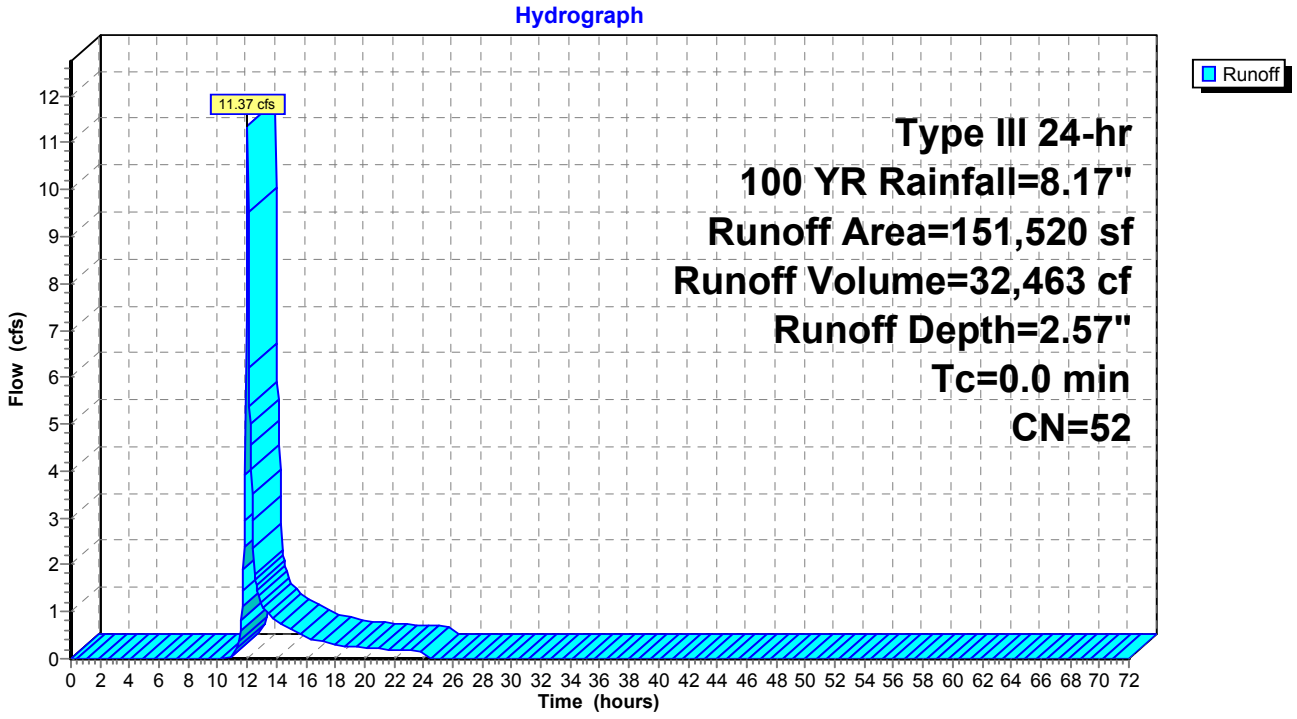
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 11.37 cfs @ 12.01 hrs, Volume= 32,463 cf, Depth= 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.17"

Area (sf)	CN	Description
22,077	39	Pasture/grassland/range, Good, HSG A
76,277	39	Pasture/grassland/range, Good, HSG A
10,489	39	Pasture/grassland/range, Good, HSG A
149	30	Woods, Good, HSG A
360	30	Woods, Good, HSG A
23,184	98	Paved parking, HSG A
7,184	30	Woods, Good, HSG A
11,555	98	Paved parking, HSG A
246	39	Pasture/grassland/range, Good, HSG A
151,520	52	Weighted Average
116,782		77.07% Pervious Area
34,738		22.93% Impervious Area

Subcatchment S2A: Subcat S2A



Summary for Subcatchment S2B: Subcat S2B

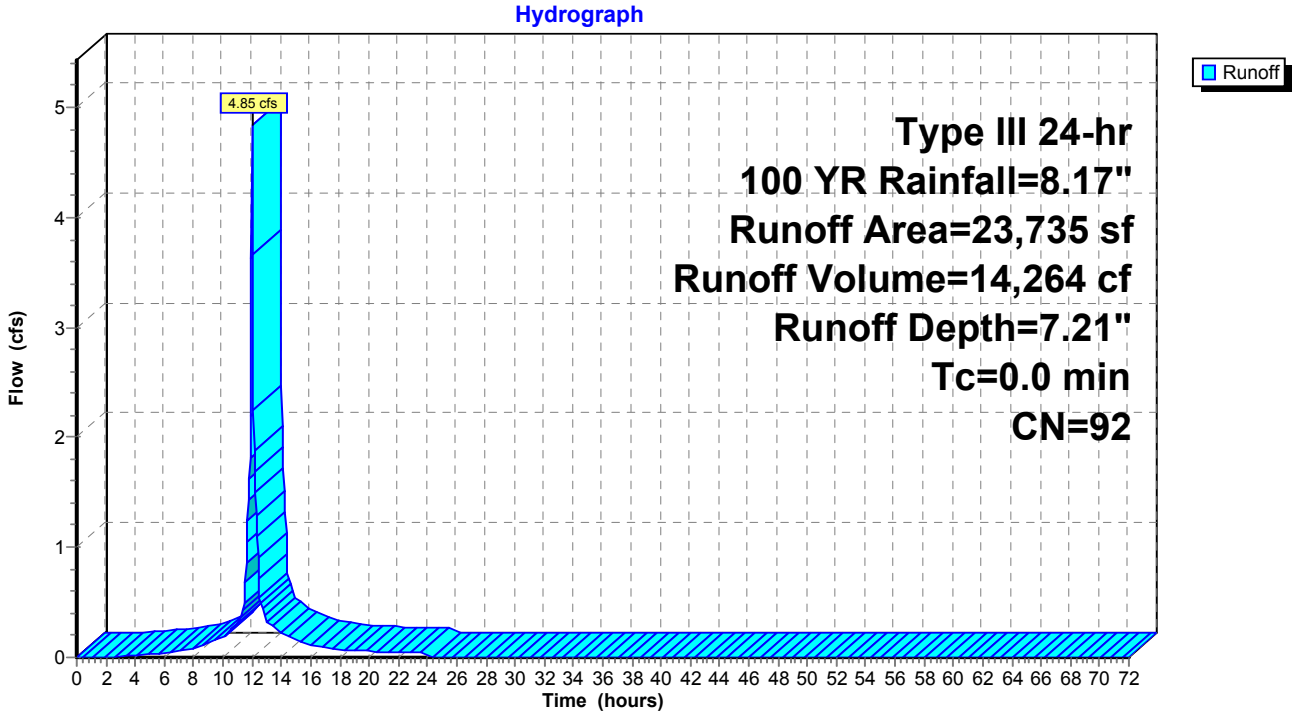
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 4.85 cfs @ 12.00 hrs, Volume= 14,264 cf, Depth= 7.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.17"

Area (sf)	CN	Description
21,144	98	Paved parking, HSG A
266	39	Pasture/grassland/range, Good, HSG A
40	39	Pasture/grassland/range, Good, HSG A
266	39	Pasture/grassland/range, Good, HSG A
0	39	Pasture/grassland/range, Good, HSG A
2,018	39	Pasture/grassland/range, Good, HSG A
23,735	92	Weighted Average
2,591		10.92% Pervious Area
21,144		89.08% Impervious Area

Subcatchment S2B: Subcat S2B



Summary for Subcatchment S2C: Subcat S2C

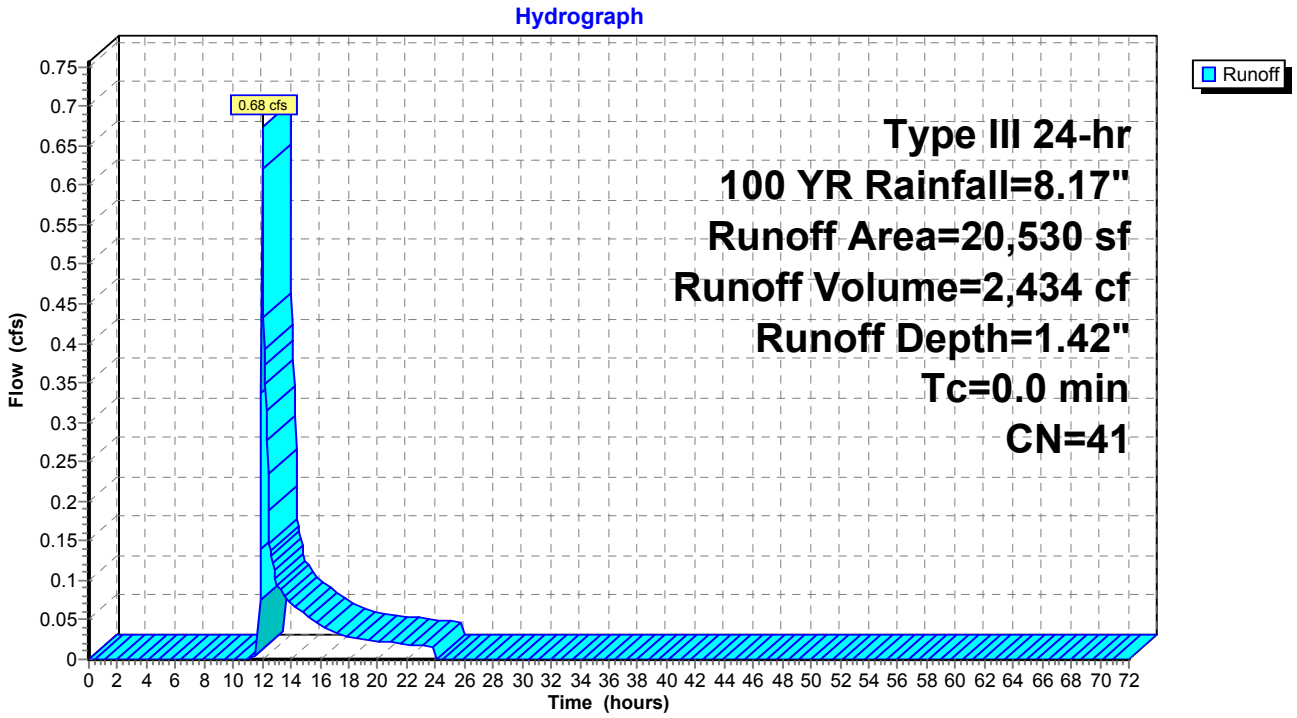
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.68 cfs @ 12.02 hrs, Volume= 2,434 cf, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.17"

Area (sf)	CN	Description
1,384	39	Pasture/grassland/range, Good, HSG A
18,118	39	Pasture/grassland/range, Good, HSG A
270	30	Woods, Good, HSG A
757	98	Paved parking, HSG A
20,530	41	Weighted Average
19,772		96.31% Pervious Area
757		3.69% Impervious Area

Subcatchment S2C: Subcat S2C



Summary for Pond 1P: Chambers

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 23,735 sf, 89.08% Impervious, Inflow Depth = 7.21" for 100 YR event
Inflow = 4.85 cfs @ 12.00 hrs, Volume= 14,264 cf
Outflow = 6.20 cfs @ 12.00 hrs, Volume= 14,264 cf, Atten= 0%, Lag= 0.1 min
Discarded = 0.08 cfs @ 12.00 hrs, Volume= 6,368 cf
Primary = 6.13 cfs @ 12.00 hrs, Volume= 7,897 cf

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 197.46' @ 12.00 hrs Surf.Area= 1,333 sf Storage= 2,871 cf

Plug-Flow detention time= 121.5 min calculated for 14,255 cf (100% of inflow)
Center-of-Mass det. time= 121.6 min (884.6 - 763.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	193.50'	1,199 cf	**25.25'W x 52.28'L x 3.50'H Field A** 4,620 cf Overall - 1,622 cf Embedded = 2,998 cf x 40.0% Voids
#2A	194.00'	1,622 cf	**ADS_StormTech SC-740** x 35 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap Row Length Adjustment= +0.44' x 6.45 sf x 5 rows
#3	193.50'	75 cf	**4.00'D x 6.00'H Vertical Cone/Cylinder**
		2,897 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	193.50'	**2.410 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 0.00'
#2	Primary	197.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#3	Primary	195.50'	**8.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.08 cfs @ 12.00 hrs HW=197.43' (Free Discharge)
└**1=Exfiltration** (Controls 0.08 cfs)

Primary OutFlow Max=5.97 cfs @ 12.00 hrs HW=197.45' (Free Discharge)
├**2=Sharp-Crested Rectangular Weir** (Weir Controls 3.84 cfs @ 2.19 fps)
└**3=Orifice/Grate** (Orifice Controls 2.14 cfs @ 6.12 fps)

Pond 1P: Chambers - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 (ADS StormTech® SC-740)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap
Row Length Adjustment= +0.44' x 6.45 sf x 5 rows

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

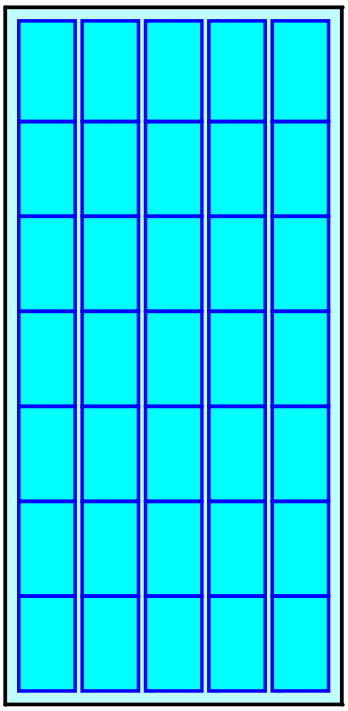
7 Chambers/Row x 7.12' Long +0.44' Row Adjustment = 50.28' Row Length +12.0" End Stone x 2 = 52.28' Base Length
5 Rows x 51.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

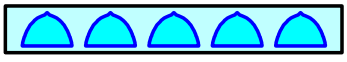
35 Chambers x 45.9 cf +0.44' Row Adjustment x 6.45 sf x 5 Rows = 1,622.0 cf Chamber Storage

4,620.1 cf Field - 1,622.0 cf Chambers = 2,998.1 cf Stone x 40.0% Voids = 1,199.2 cf Stone Storage

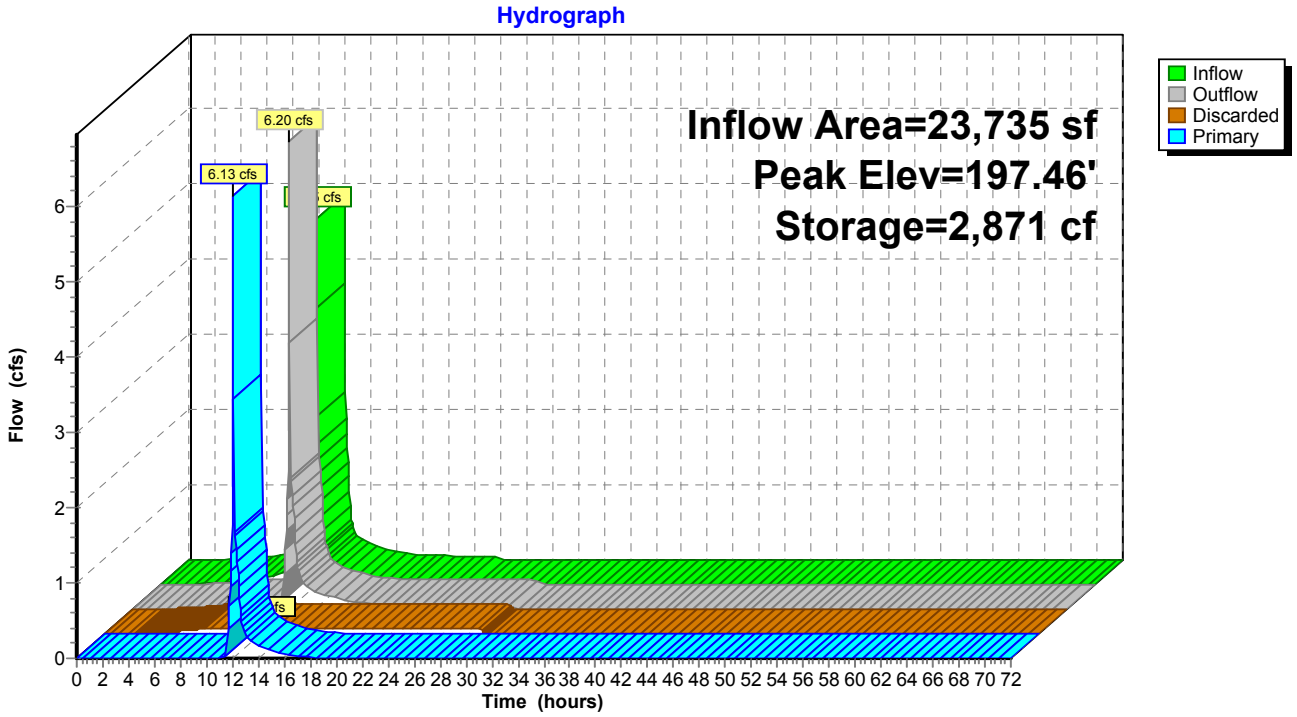
Chamber Storage + Stone Storage = 2,821.3 cf = 0.065 af
Overall Storage Efficiency = 61.1%

35 Chambers
171.1 cy Field
111.0 cy Stone





Pond 1P: Chambers



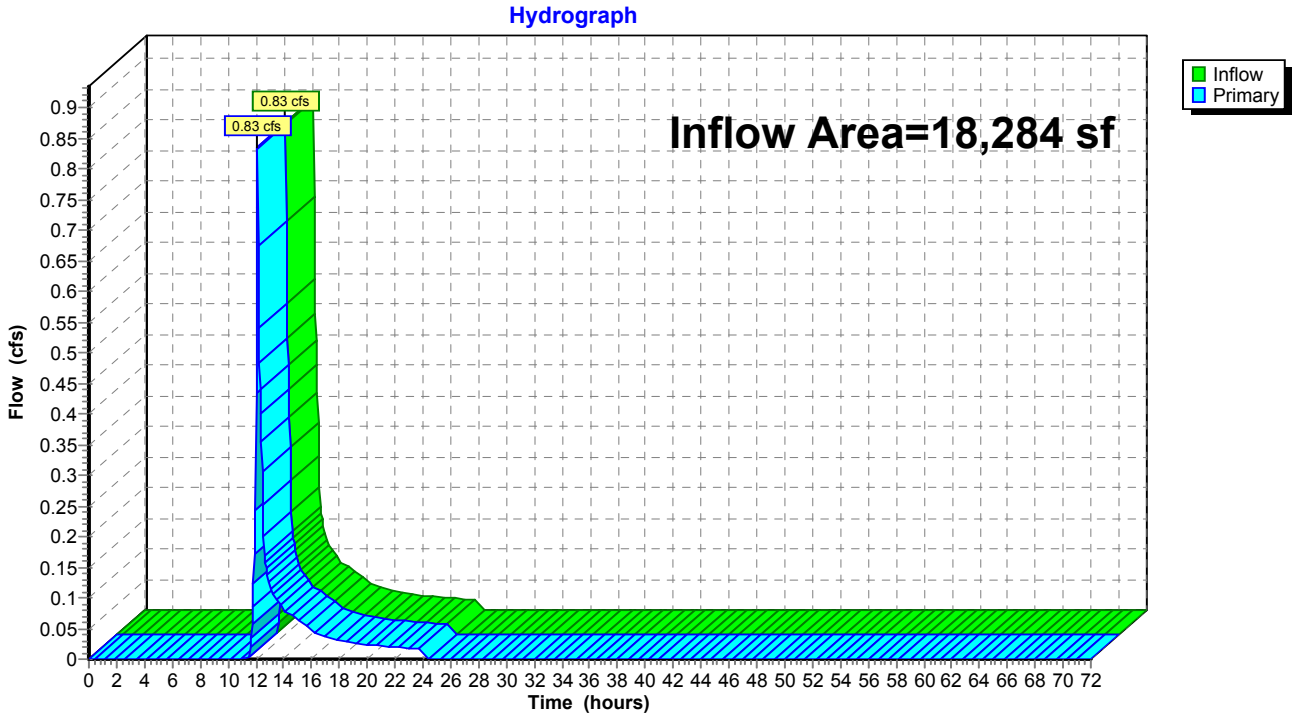
Summary for Pond P1: Analysis Pt 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 18,284 sf, 11.78% Impervious, Inflow Depth = 1.93" for 100 YR event
Inflow = 0.83 cfs @ 12.09 hrs, Volume= 2,941 cf
Primary = 0.83 cfs @ 12.09 hrs, Volume= 2,941 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P1: Analysis Pt 1



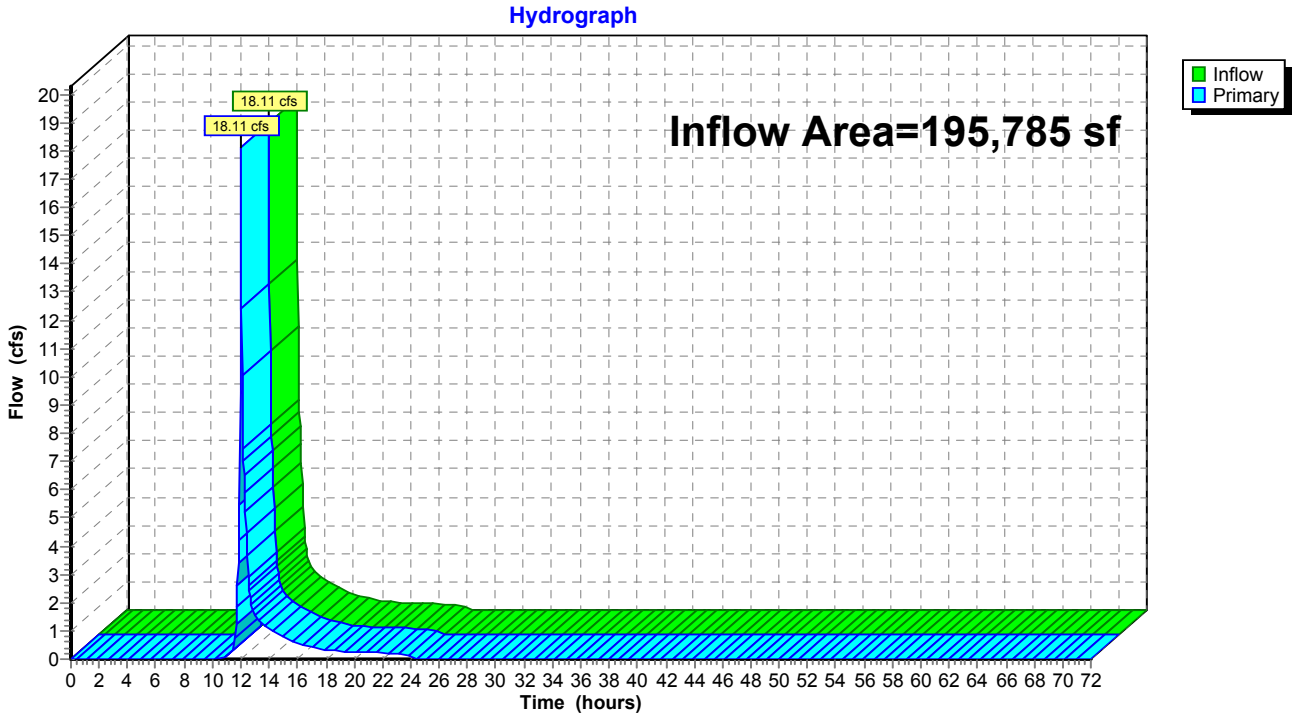
Summary for Pond P2: Analysis Pt 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 195,785 sf, 28.93% Impervious, Inflow Depth = 2.62" for 100 YR event
Inflow = 18.11 cfs @ 12.01 hrs, Volume= 42,794 cf
Primary = 18.11 cfs @ 12.01 hrs, Volume= 42,794 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond P2: Analysis Pt 2



Attachment E - Calculations

Wayland - Loker Field
Recharge Calculation

Required Recharge

Area Summary	
	Area (SF)*
Existing Impervious	0
Proposed Impervious	21,144
Required Recharge Area *(Proposed - Existing)*	21,144

* Areas calculated in HydroCAD

Note: Site consists of HSG A soils.

Hydrologic Soil Group Summary		
Group	Target Depth Factor (in)	Area (SF)
A	0.6	21,144
B	0.35	0
C	0.25	0
D	0.1	0

Required Recharge (*Rv*) Calculation:

Rv = Target Depth Factor x Δ Impervious Area
Rv = 0.6 x (1/12) x 21,144
Rv = 1,057 CF

Proposed Recharge Summary

Location	Volume (CF)*	Description
Underground Chambers	1,827	Chamber Field A
Total	1,827	

Rv = 1,057 CF
Provided recharge = 1,827 CF

Recharge Requirement is met.

*Note: Volume numbers listed above reflect static volume available in recharge systems. Actual volume of recharged water will be much higher due to dynamic action reflected in the HydroCAD analysis.

Wayland-Loker Field
Water Quality Volume Calculation
Jul-18

Required Water Quality Storage
Proposed Paved Area sf x 1" x 1'/12"= Required WQ Storage CF

Location	Proposed Impervious Area (sqft)	Required WQ Storage (cf)	Provided WQ Storage (cf)	Description
Facility Site	21,144	1,762	1,827	Chamber Field A (Volume below lowest outlet)

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Loker Field Parking Lot

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	**0.25**	**1.00**	**0.25**	**0.75**
Subsurface Infiltration Structure	**0.80**	**0.75**	**0.60**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**

Total TSS Removal = **85%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: **Loker Field**
Prepared By: **JIP**
Date: **7/11/2018**

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Attachment F - Long Term Pollution Prevention Plan

Long Term Pollution Prevention Plan
Loker Field Improvemetns
Wayland, MA

To meet the requirements of Standard 4 of the Massachusetts Stormwater Handbook, this Long Term Pollution Prevention Plan is provided to identify the proper procedures of practices for source control and pollution prevention.

Storage and Handling of Oil and other Hazardous Materials

There will be no oil or other hazardous materials stored onsite.

Salt Storage

There will be no salt storage onsite.

Vehicle Storage and Washing

Vehicles will only park on a temporary basis during use of the field. Vehicles will not be stored or washed onsite.

Operation and Maintenance of Stormwater Control Structures

Included in Attachment H of this appendix is the Operation and Maintenance plan for this site, which includes street sweeping of the paved areas and periodic removal of sediment from catch basins and other stormwater structures. The Town will be responsible for implementing the plan.

Landscaping

The landscaped areas will be maintained by the Town. Fertilizers will not be stored onsite.

De-icing & Snow Disposal

The Town intends to utilize salt and sand to treat the paved surfaces of the driveways and main circulation areas during snow and ice events.

Attachment G - Construction Period Pollution and Erosion and Sedimentation Control Plan

Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan

SECTION 1: Introduction

The project applicant, the Town of Wayland, is proposing the installation of a multi-purpose athletic field within the Loker Conservation and Recreation Area. The project includes field installation, field lighting, parking, trail improvements, and the addition of a stormwater management system. There would also be improvements to the existing emergency access road and parking area. The goal of this project is to utilize the Loker Conservation and Recreation Area to provide the Town of Wayland with a multi-purpose athletic field. Currently there is existing open field space on the property. By expanding this open space there will be room for the new athletic field. There is also an existing parking lot that will also be expanded on to allow for additional parking. In addition to the field and parking lot, new lighting will be added to allow for field use after daylight hours. The existing emergency access road will also be improved upon to allow for easier use, and miscellaneous paved areas in various locations of the site will be removed and converted to grassed space.

As part of this project, this "Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan" has been created to insure that no further disturbance to the wetland resource is created during the construction of these repairs.

SECTION 2: Construction Period Pollution Prevention Measures

Best Management Practices (BMPs) will be utilized as Construction Period Pollution Prevention Measures to reduce potential pollutants and prevent any off-site discharge. The objectives of the BMPs for construction activity are to minimize the disturbed areas, stabilize any disturbed areas, control the site perimeter and retain sediment. Both erosion and sedimentation controls and non-stormwater best management measures will be used to minimize site disturbance and ensure compliance with the performance standards of the WPA and Stormwater Standards. Measures will be taken to minimize the area disturbed by construction activities to reduce the potential for soil erosion and stormwater pollution problems. In addition, good housekeeping measures will be followed for the day-to-day operation of the construction site under the control of the contractor to minimize the impact of construction. This section describes the control practices that will be in place during construction activities. All recommended control practices will comply with the standards set in the MA DEP Stormwater Policy Handbook.

2.1 Minimize Disturbed Area and Protect Natural Features and Soil

In order to minimize disturbed areas all work will be completed within well-defined work limits. These work limits are shown on the construction plans. The Contractor shall not disturb native vegetation in the undisturbed wetland area without prior approval from the Engineer. The Contractor will be responsible to make sure that all workers know the

proper work limits and do not extend their work into the undisturbed areas. The protective measures are described in more detail in the following sections.

2.2 Control Stormwater Flowing onto and through the project

All construction areas adjacent to wetlands will be lined with compost filter tubes and silt fence. The tubes and silt fence will be inspected daily and accumulated silt will be removed as appropriate. In addition, any storage of material will require a second level of protection by surrounding the areas with another row of compost filter tubes. A stabilized truck entrance/exit is proposed so that equipment visiting the site can remove any accumulated dirt and mud from vehicles to prevent tracking the mud onto public roads.

2.3 Stabilize Soils

The Contractor shall limit the area of land which is exposed and free from vegetation during construction. In areas where the period of exposure will be greater than two (2) months, mulching, the use of erosion control mats, or other protective measures shall be provided as specified.

The Contractor shall take account of the conditions of the soil where erosion control seeding will take place to insure that materials used for re-vegetation are adaptive to the sediment control.

2.4 Proper storage and cover of any stockpiles

The location of the Contractor's storage areas for equipment and/or materials shall be upon cleared portions of the job site or areas to be cleared as a part of this project, and shall require written approval of the Engineer.

No excavated materials or materials used in backfill operations shall be stored within a minimum distance of fifty (50) feet of any watercourse or any wetlands. Adequate measures for erosion and sediment control such as the placement of compost filter tubes around the downstream perimeter of stockpiles shall be employed to protect any downstream areas from siltation.

There shall be no storage of equipment or materials in areas designated as wetlands.

The Engineer may designate a particular area or areas where the Contractor may store materials used in his operations.

2.5 Perimeter Controls and Sediment Barriers

Erosion control lines as described in Section 5 will be utilized to ensure that no sedimentation occurs outside the perimeter of the work area.

2.6 Storm Drain Inlet Protection

Storm Drain inlets (catch basins) will be fitted with a protective insert.

2.7 Retain Sediment On-Site

The Contractor will be responsible to monitor all erosion control measures. Whenever necessary the Contractor will clear all sediment from the compost filter tubes and silt fence that have been silted up during construction. Daily monitoring should be conducted using the attached Monitoring Form.

The following good housekeeping practices will be followed on-site during the construction project.

2.8 Material Handling and Waste Management

All materials stored on-site will be stored in a neat, orderly manner in appropriate containers. All materials will be kept in their original containers with the original manufacturer's label. Substances will not be mixed with one another unless recommended by the manufacturer.

All waste materials will be collected and stored in a securely lidded metal container from a licensed management company. The waste and any construction debris from the site will be hauled off-site daily and disposed of properly. The contractor will be responsible for all waste removal. Manufacturer's recommendations for proper use and disposal will be followed for all materials. Sanitary waste will be collected from the portable units a minimum of once a week, by a licensed sanitary waste management contractor.

2.9 Designated Washout Areas

The Contractor shall use washout facilities at their own facilities, unless otherwise directed by the Engineer.

2.10 Proper Equipment/Vehicle Fueling and Maintenance Practices

On-site vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the risk of leakage. To ensure that leaks on stored equipment do not contaminate the site, oil-absorbing mats will be placed under all equipment during storage. Regular fueling and service of the equipment may be performed using approved methods and with care taken to minimize chance of spills. Repair of equipment or machinery within the 100' water resources area shall not be allowed without the prior approval of the Engineer. Any petroleum products will be stored in tightly sealed containers that are clearly labeled.

2.11 Equipment/Vehicle Washing

The Contractor will be responsible to ensure that no equipment is washed on-site.

SECTION 3: Spill Prevention and Control Plan

The Contractor will be responsible for preventing spills in accordance with the project specifications and applicable federal, state and local regulations. The Contractor will identify a properly trained site employee, involved with the day-to-day site operations to be the spill prevention and cleanup coordinator. The name(s) of the responsible spill personnel will be posted on-site. Each employee will be instructed that all spills are to be reported to the spill prevention and cleanup coordinator.

3.1 Spill Control Equipment

Spill control/containment equipment will be kept in the Work Area. Materials and equipment necessary for spill cleanup will be kept either in the Work Area or in an otherwise accessible on-site location. Equipment and materials will include, but not be limited to, absorbent booms/mats, brooms, dust pans, mops, rags, gloves, goggles, sand, plastic and metal containers specifically for this purpose. It is the responsibility of the Contractor to ensure the inventory will be readily accessible and maintained.

3.2 Notification

All workers will be directed to inform the on-site supervisor of a spill event. The supervisor will assess the incident and initiate proper containment and response procedures immediately upon notification. Workers should avoid direct contact with spilled materials during the containment procedures. Primary notification of a spill should be made to the local Fire Department and Police Departments. Secondary Notification will be to the certified cleanup contractor if deemed necessary by Fire and/or Police personnel. The third level of notification is to the DEP. The specific cleanup contractor to be used will be identified by the Contractor prior to commencement of construction activities.

3.3 Spill Containment and Clean-Up Measures

Spills will be contained with granular sorbent material, sand, sorbent pads, booms or all of the above to prevent spreading. Certified cleanup contractors should complete spill cleanup. The material manufacturer's recommended methods for spill cleanup will be clearly posted and on-site personnel will be made aware of the procedures and the location of the information and cleanup supplies.

3.4 Hazardous Materials Spill Report

The Contractor will report and record any spill. The spill report will present a description of the release, including the quantity and type of material, date of the spill, circumstances leading to the release, location of spill, response actions and personnel, documentation of notifications and corrective measures implemented to prevent reoccurrence.

This document does not relieve the Contractor of the Federal reporting requirements of 40 CFR Part 110, 40 CFR Part 117, 40 CFR Part 302 and the State requirements specified under the Massachusetts Contingency Plan (M.C.P) relating to spills or other releases of oils or hazardous substances. Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117 or 40 CFR Part 302, occurs during a twenty-four (24) hour period, the Contractor is required to comply with the response requirements of the above mentioned regulations. Spills of oil or hazardous material in excess of the reportable quantity will be reported to the National Response Center (NRC).

SECTION 4: Contact Information/Responsible Parties

Owner/Operator:
Town of Wayland
41 Cochituate Road
Wayland, MA 01778

Engineer:
James Pearson, P.E.
Weston & Sampson, Inc.
5 Centennial Drive
Peabody, MA 01960
978-532-1900

Site Inspector:
TBD

Contractor:
TBD

SECTION 5: Erosion and Sedimentation Control

Erosion and Sedimentation Controls are shown on the project plans. In addition a technical specification (***Section 01570 Environmental Protection***) has been included as part of Appendix D, which details all Erosion and Sedimentation controls.

SECTION 6: Site Development Plans

A full set of site development plans are included with this submittal.

SECTION 7: Operation and Maintenance of Erosion Control

The erosion control measures will be installed as detailed in the technical specification ***01570 Environmental Protection***. If there is a failure to the controls the Contractor, under the supervision of the Engineer, will be required to stop work until the failure is repaired.

Periodically throughout the work, whenever the Engineer deems it necessary, the sediment that has been deposited against the controls will be removed to ensure that the controls are working properly.

SECTION 8: Inspection Schedule

During construction the erosion and sedimentation controls will be inspected daily. Once the Contractor is selected, an on site inspector will be selected to work closely with the Engineer to insure that all erosion and sedimentation controls are in place and working properly. An Inspection Form is included.

Inspection Form

Inspected By: _____ Date: _____Time:_____

YES	NO	DOES NOT APPLY	ITEM
			Do any erosion/siltation control measures require repair or clean out to maintain adequate function?
			Is there any evidence that sediment is leaving the site and entering the wetlands?
			Are any temporary soil stockpiles or construction materials located in non-approved areas?
			Are on-site construction traffic routes, parking, and storage of equipment and supplies located in areas not specifically designed for them?

Specific location, current weather conditions, and action to be taken:

_____

_____

_____

_____

_____

Other Comments:

_____

_____

Pending the actions noted above I certify that the site is in compliance with the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan.

Signature: _____ Date: _____

Attachment H - Operations and Maintenance Plan

Attachment H –
Long-Term Operation and Maintenance Plan

1.0 Introduction

The following document has been written to comply with the stormwater guidelines set forth by the Massachusetts Department of Environmental Protection (MassDEP). The intent of these guidelines is to encourage Low Impact Development techniques to improve the quality of the stormwater runoff. These techniques, also known as Best Management Practices (BMPs) collect, store, and treat the runoff before discharging to adjacent environmental resources.

2.0 Purpose

This Operation and Maintenance Plan (O&M Plan) is intended to provide a mechanism for the consistent inspection and maintenance of each BMP installed on the project site. Included in this O&M Plan is a description of each BMP type and an inspection form for each BMP. The Town of Wayland is the owner and operator of the system and is responsible for its upkeep and maintenance.

This work will be funded on an annual basis through the town's operating budget. The estimated budget to maintain these BMPs utilizing the Municipal Services Department workforce and equipment is approximately $2,000 per year. This budget assumes that Town equipment will be utilized and no additional equipment rental is required.

In the event the Town sells the property, it is the Town's responsibility to transfer this plan as well as the past three years of operation and maintenance records to the new property owner.

3.0 BMP Description and Locations

3.1 Street Sweeping

Street sweeping consists of using a street sweeping machine to clean impervious areas of accumulated sediment, debris, and trash at parking areas.

3.2 Deep Sump Catch Basins

Deep sump catch basins will be located throughout the site and used as pre-treatment before entering the stormwater detention/infiltration basin. The deep sump catch basins are designed to remove trash, debris, and coarse sediment from the stormwater runoff.

3.4 Stormwater Infiltration Chambers

There is one underground infiltration chamber field in the facility that will receive stormwater. A stormwater infiltration chamber field will be built beneath the

parking lot area of the site. This structure also significantly mitigates TSS and provides for stormwater detention to mitigate peak discharges from the site.

4.0 Inspection, Maintenance Checklist and Schedule

4.1 Street Sweeping

Street sweeping shall be performed on the proposed parking lot areas at least twice per year, primarily in the spring and fall. Street sweeping shall be performed using an appropriate street sweeping machine.

In the event of contamination by a spill or other means, all street sweeping cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000 and handled as hazardous waste.

In the absence of evidence of contamination, street sweeping cleanings may be taken to a landfill or other facility permitted by MassDEP to accept Solid Waste without any prior approval by MassDEP. Please note that current MassDEP regulations prevent landfills from accepting materials that contain free-draining liquids. Also see attached operations and maintenance standards (reproduced from the Massachusetts Stormwater Handbook) at the end of this section

4.2 Deep Sump Catch Basins

Inspect and/or clean catch basin at least four times per year and at the end of foliage and snow removal seasons. Sediments must be removed whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin. The catch basin and oil-grit separators should be cleaned a minimum of four times per year regardless of the amount of sediment in the basin. Catch basins shall be cleaned with clamshell buckets or vacuum trucks.

In the event of contamination by a spill or other means, all cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000 and handled as hazardous waste.

In the absence of evidence of contamination, catch basin cleanings may be taken to a landfill or other facility permitted by MassDEP to accept Solid Waste without any prior approval by MassDEP. Please note that current MassDEP regulations prevent landfills from accepting materials that contain free-draining liquids. Also see attached operations and maintenance standards (reproduced from the Massachusetts Stormwater Handbook) at the end of this section

4.3 Stormwater Infiltration Chambers

The stormwater infiltration chamber field shall be inspected every six months during the first year, and annually thereafter. All accumulated sediment and debris in the isolation row(s) shall be removed using water jetting and vacuum truck equipment as described in manufacturer literature for the chamber system.

4.4 Inspections and Record Keeping

- An inspection form should be filled out each and every time maintenance work is performed.
- A binder should be kept by the owner that contains all of the completed inspection forms and any other related materials.
- A review of all Operation & Maintenance actions should take place annually to ensure that these Stormwater BMPs are being taken care of in the manner illustrated in this Operation & Maintenance Plan.
- All operation and maintenance log forms for the last three years, at a minimum, shall be kept on site at the owner.
- The inspection and maintenance schedule may be refined in the future based on the findings and results of this operation and maintenance program or policy.

5.0 Public Safety Features

Underground stormwater system measures are protected from access via manhole covers and grates.

6.0 Stormwater Management System Owner/Responsible Party

Town of Wayland
41 Cochituate Road
Wayland, MA 01778

This operation and Maintenance Plan will be recorded with the registry of deeds so that current and future owners are aware of the requirement for proper operation and maintenance of the onsite stormwater system.

Town of Wayland
Loker Recreation Area
Permanent BMP Inspection Checklist

Street Sweeping

Frequency: Monthly, primarily in the spring and fall.

Location: Parking Lots and Driveways

Inspected By: _____ Date: _____

Observations: _____
_____
_____

Actions Taken: _____
_____
_____

Instructions: Sweep parking lot using street sweeping machine. All trash, debris, and sediments should be disposed of in accordance with local, state, and federal regulations.

Deep Sump Catch Basins

Frequency:	Inspect and clean deep sump catch basins in March, June, September and December.
Structure Number:	_____
Inspected By:	_____ Date: _____
Observations:	_____ _____ _____
Actions Taken:	_____ _____ _____
Instructions:	Clean units four times per year or whenever the depth of the deposits is greater than or equal to one half the depth from the bottom of the invert to the lowest pipe in the structure.

Stormwater Detention/Infiltration Chambers

Frequency:	The detention/infiltration chambers should be inspected every six months during the first year and annually thereafter.
Structure No.:	_____
Inspected By:	_____ Date: _____
Observations:	_____ _____ _____
Actions Taken:	_____ _____ _____
Instructions:	Inspect isolation rows. If visible sediment deposition has occurred, insert reverse water jet into isolation row via access manhole and jet sediment backward into manhole. Remove sediment with vacuum truck and dispose of sediment as required.

Attachment I - Illicit Discharge Compliance Statement

Illicit Discharge Compliance Statement

Section I – Purpose/Intent

The purpose of this document is to provide for the health, safety, and general welfare of the citizens of Wayland, Massachusetts through the regulation of non-stormwater discharges into existing outstanding resource areas near the Wayland Public Works Facility to the maximum extent practicable, as required by federal and state law. This document establishes methods for controlling the introduction of pollutants into existing outstanding resource areas to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process.

Section II - Definitions

For the purposes of this statement, the following shall mean:

Best Management Practices (BMPs): Schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

Clean Water Act: The federal Water Pollution Control Act (33 U.S.C § 1251 et seq.), and any subsequent amendments thereto.

Construction Activity: Activities subject to the Massachusetts Erosion and Sedimentation Control Act or NPDES Construction Permits. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.

Hazardous Materials: Any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Illegal Connection: An illegal connection is defined as either of the following:

a. Any pipe, open channel, drain or conveyance, whether on the surface or subsurface, which allows an illicit discharge to enter the outstanding resource area including but not limited to any conveyances which allow any non-stormwater discharge including sewage, process wastewater, and wash water, regardless of whether said drain or connection has been previously allowed, permitted, or approved by an authorized enforcement agency; or
b. Any pipe, open channel, drain or conveyance connected to the Town of Wayland storm water treatment system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.

Illicit Discharge: Any direct or indirect non-stormwater discharge to the Town of Wayland stormwater treatment system, except as exempted in Section II of this ordinance.

Industrial Activity: Activities subject to NPDES Industrial Permits as defined in 40CFR, Section 122.26 (b) (14).

National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge Permit: A permit issued by MassDEP under authority delegated pursuant to 33 USC § 1342 (b) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

Town of Wayland Stormwater Treatment System: Any facility, owned or maintained by the town, designed or used for collecting and/or conveying stormwater, including but not limited to roads with drainage systems, Town of Wayland streets, curbs, gutters, inlets, catch basins, piped storm drains, pumping facilities, infiltration, retention and detention basins, natural and man-made or altered drainage channels, reservoirs, and other drainage structures.

Non-Stormwater Discharge: Any discharge to the storm drain system that is not composed entirely of stormwater.

Person: Any individual, association, organization, partnership, firm, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, city, county or other political subdivision of the State, interstate body, or any other legal entity.

Pollutant: Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; petroleum hydrocarbons; automotive fluids; cooking grease; detergents (biodegradable or otherwise); degreasers; cleaning chemicals; non-hazardous liquid and solid wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; liquid and solid wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; concrete and cement; and noxious or offensive matter of any kind.

Pollution: Contamination or other alteration of any water's physical, chemical, or biological properties by addition of any constituent including but not limited to a change in temperature, taste, color, turbidity, or odor of such waters, or the discharge of any liquid, gaseous, solid, radioactive, or other substance into any such waters as will or is likely to create a nuisance or render such waters harmful, detrimental, or injurious to the public health, safety, welfare, or environment, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other aquatic life.

Premises: Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

Stormwater: Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation, and resulting from such precipitation.

Wastewater: Any water or other liquid discharged from a facility, that has been used, as for washing, flushing, or in a manufacturing process, and so contains waste products.

Section III - Prohibitions

Prohibition of Illicit Discharges:

No person shall throw, drain, or otherwise discharge, cause or allow others under its control to throw, drain, or otherwise discharge into the Town of Wayland stormwater treatment system or watercourses any materials, including but not limited to, any pollutants or waters containing any pollutants, other than stormwater. The commencement, conduct or continuance of any illicit discharge to the storm drain system is prohibited except as described as follows:

1. Water line flushing performed by a government agency, other potable water sources, landscape irrigation or lawn watering, diverted stream flows, rising ground water, ground water infiltration to storm drains, uncontaminated pumped ground water, foundation or footing drains (not including active groundwater dewatering systems), crawl space pumps, air conditioning condensation, springs, natural riparian habitat or wetland flows, and any other water source not containing pollutants;

2. Discharges or flows from fire fighting, and other discharges specified in writing by the Town of Wayland as being necessary to protect public health and safety;

3. Dye testing is an allowable discharge, but requires a verbal notification to the Town of Wayland prior to the time of the test;

4. Any non-stormwater discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for a discharge to the Town of Wayland stormwater treatment system.

Section IV - Industrial or Construction Activity Discharges

Any person subject to an industrial or construction activity NPDES stormwater discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the Town of Wayland Department of Public Works prior to allowing discharges to the Wayland stormwater treatment system.

Section V - Notification of Spills and Accidental Discharges

Notwithstanding other requirements of law, as soon as any person responsible for a facility, activity or operation, or responsible for emergency response for a facility, activity or operation has information of any known or suspected release of pollutants or non-stormwater discharges from that facility, activity, or operation which are resulting or may result in illicit discharges or pollutants discharging into stormwater, the Town of Londmeadow stormwater treatment system, State Waters, or Waters of the U.S., said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release so as to minimize the effects of the discharge. In the event of such a release of hazardous materials, said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the Town of Wayland Department Public Works in person or by phone no later than the next business day, including the nature, quantity and time of occurrence of the discharge. Notifications in person or by phone shall be confirmed by written notice, via certified mail return receipt requested addressed to the Town of Wayland Department of Public Works within three (3) business days of the initial notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

IN WITNESS WHEREOF the parties hereto have executed copies of this Agreement on the _____ day of _____, _____.

_____

Town of Wayland

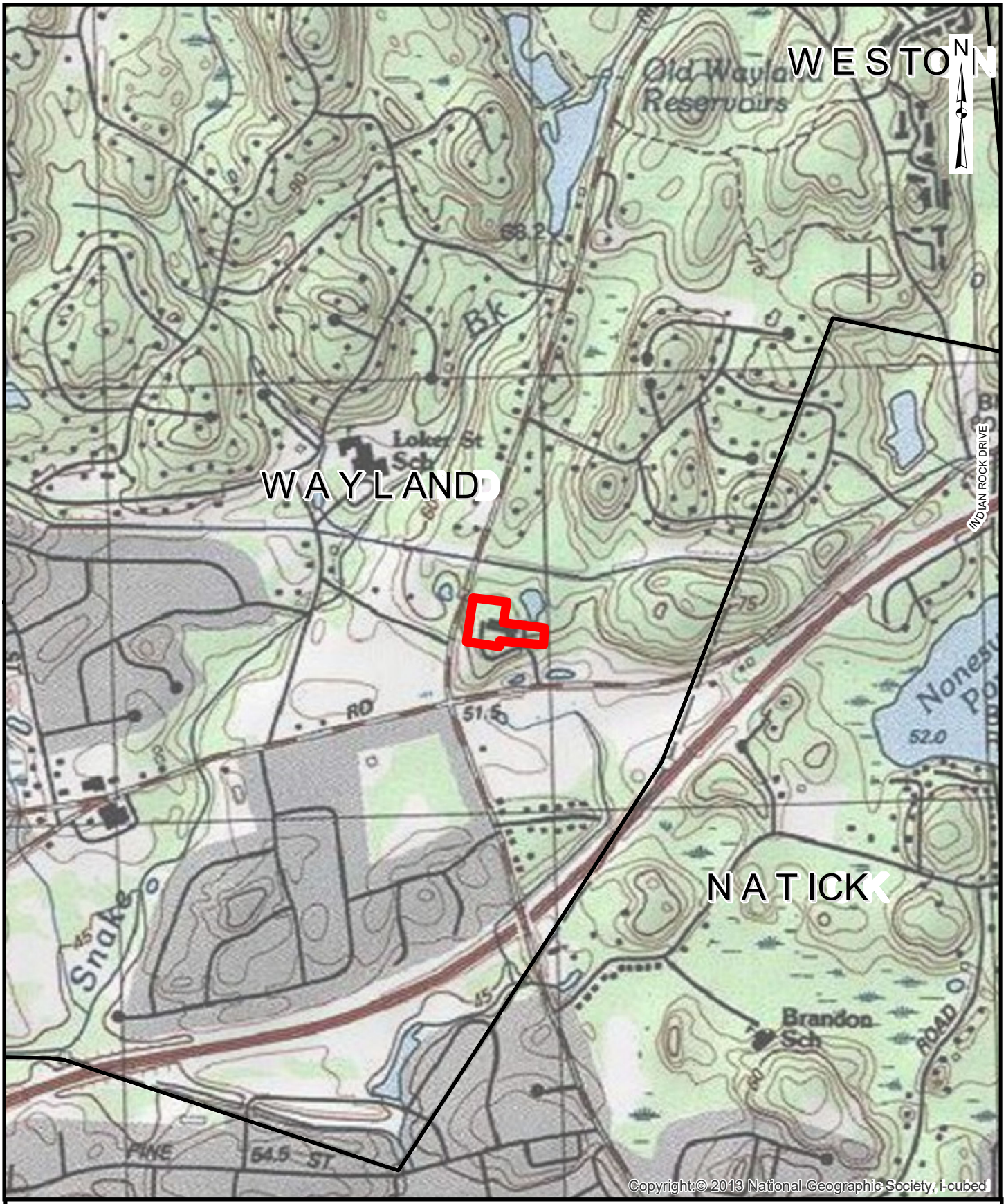


FIGURE 1
Loker Conservation & Recreation Area
Wayland, Massachusetts

Locus Map

Work Area

600 0 600
Scale In Feet

Weston & Sampson

Path: \\wse03.local\WSE\Projects\MA\Wayland MA\Wayland High School Athletic Facilities\GIS\Loker Field\Figure 1 - Locus.mxd User: GasparA Saved: 7/5/2018 1:25:35 PM Opened: 7/5/2018 1:26:15 PM

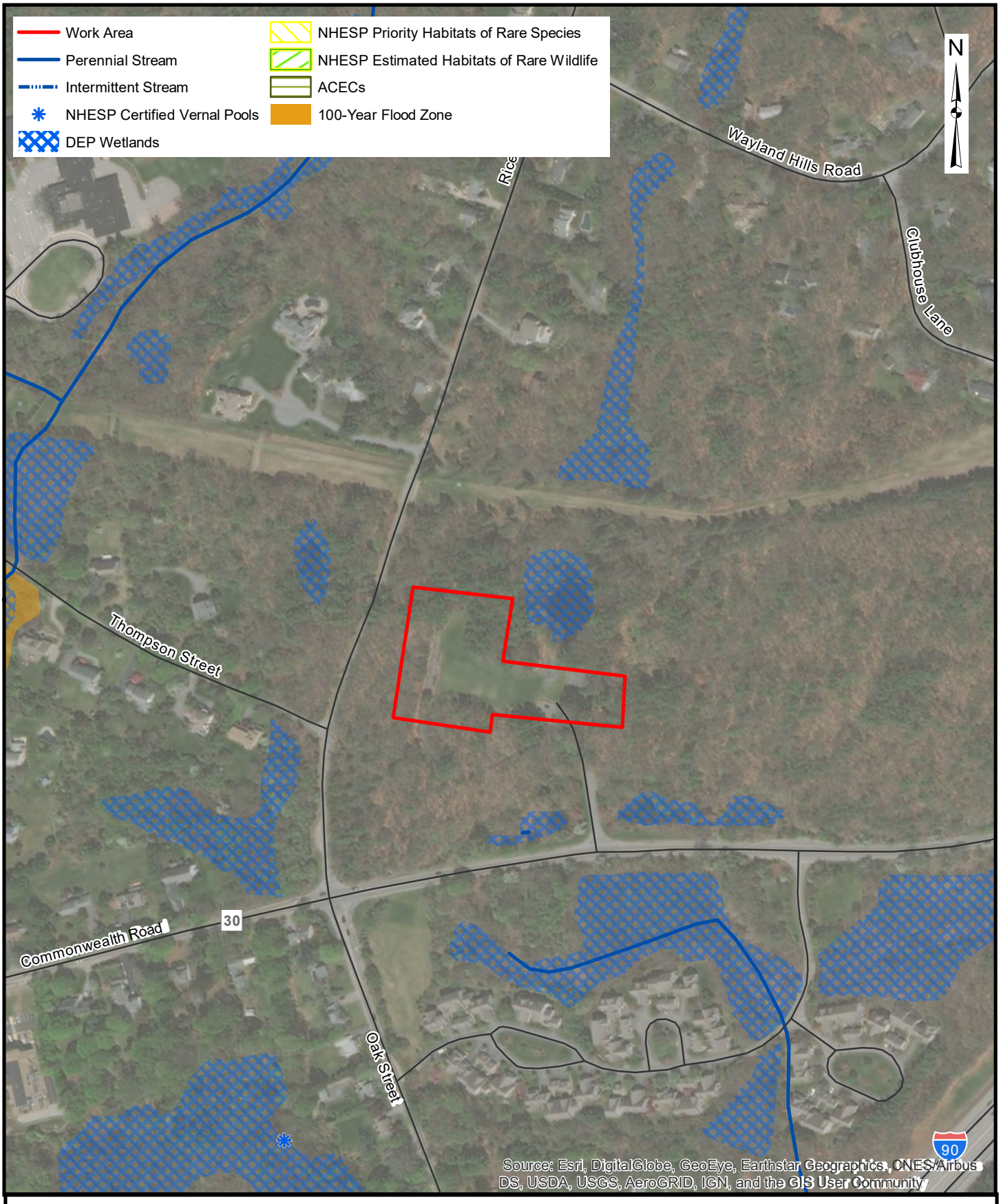


FIGURE 2
Loker Conservation & Recreation Area
Wayland, Massachusetts

ENVIRONMENTAL RECEPTORS

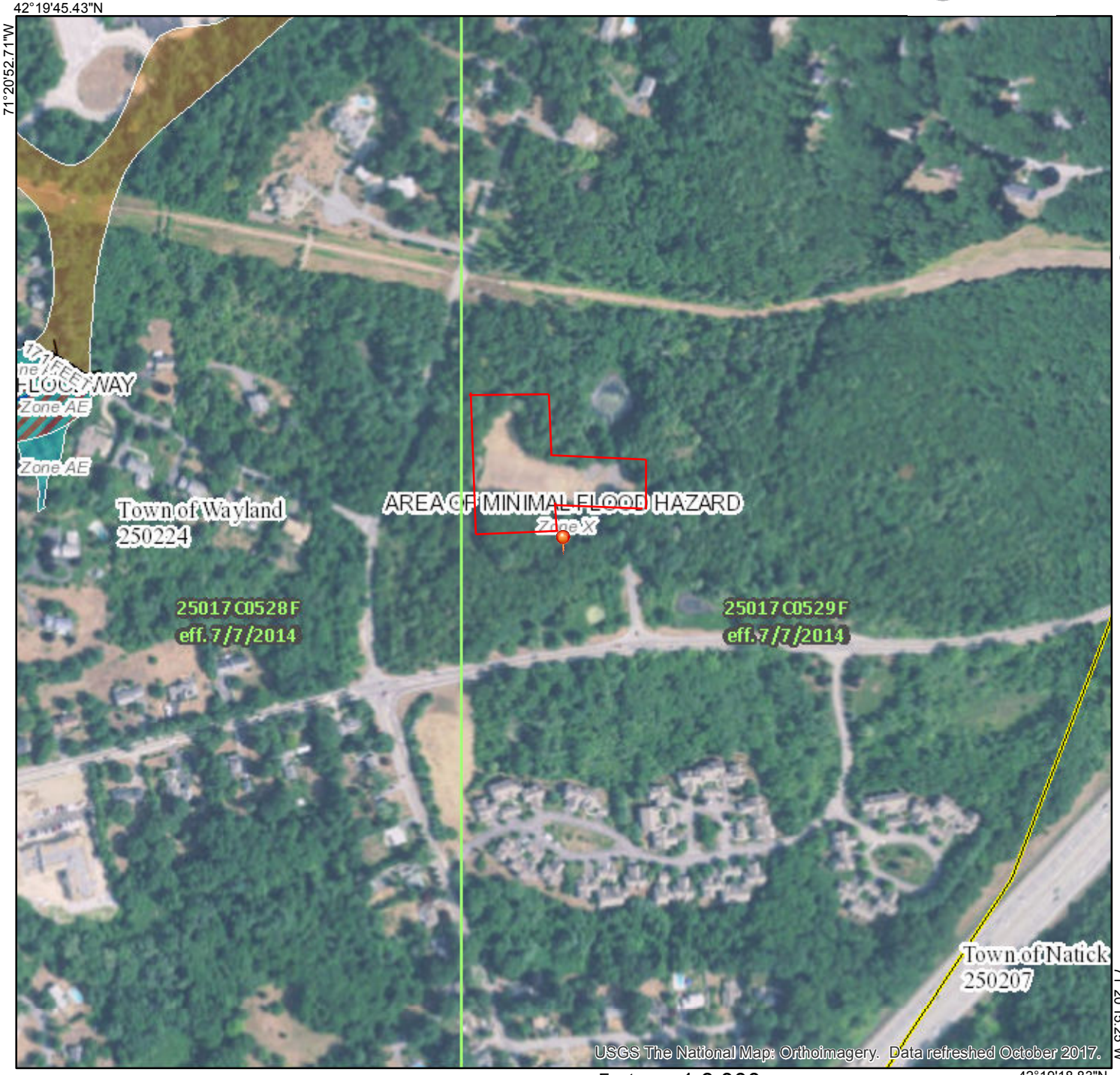
200 0 200
Scale In Feet

Weston & Sampson

Path: \\wse03.local\WSE\Projects\MA\Wayland MA\Wayland High School Athletic Facilities\GIS\Loker Field\Figure 2 - Env Receptor.mxd User: GasparA Saved: 7/5/2018 1:22:03 PM Opened: 7/5/2018 3:07:37 PM

National Flood Hazard Layer FIRMette

FEMA



0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

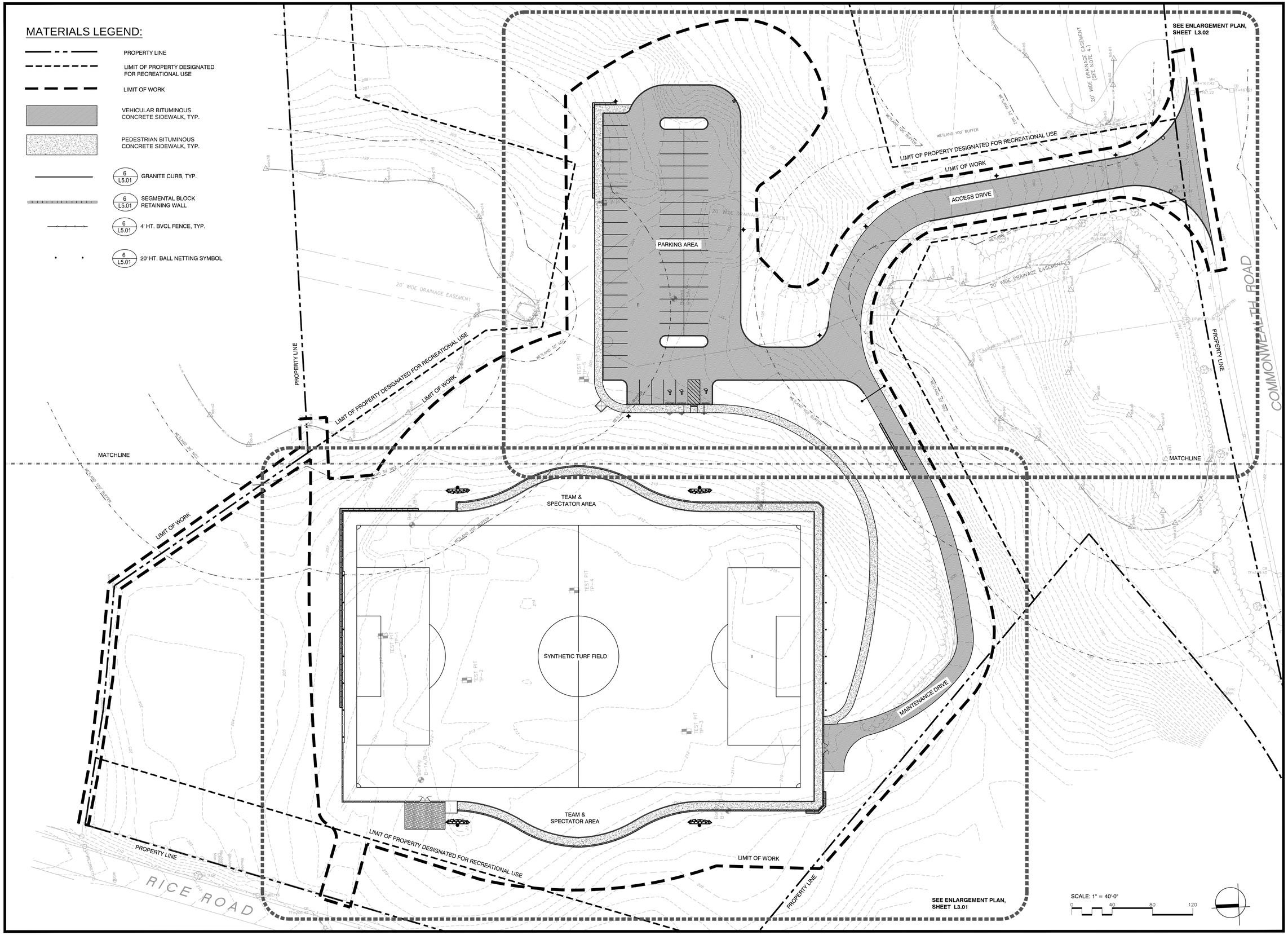
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/6/2018 at 12:41:29 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

MATERIALS LEGEND:

- PROPERTY LINE
- LIMIT OF PROPERTY DESIGNATED FOR RECREATIONAL USE
- LIMIT OF WORK
- VEHICULAR BITUMINOUS CONCRETE SIDEWALK, TYP.
- PEDESTRIAN BITUMINOUS CONCRETE SIDEWALK, TYP.
- 6 / L5.01 — GRANITE CURB, TYP.
- 6 / L5.01 — SEGMENTAL BLOCK RETAINING WALL
- 6 / L5.01 — 4' HT. BVCL FENCE, TYP.
- 6 / L5.01 — 20' HT. BALL NETTING SYMBOL



Project:

IMPROVEMENTS TO LOKER CONSERVATION AND RECREATION AREA

410 COMMONWEALTH RD, WAYLAND, MA 01778

Weston & Sampson

85 Devonshire Street,
3rd Floor, Boston, MA 02109
617.412.4480 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

Seal:

Issued For:

PERMITTING SET
- NOT FOR CONSTRUCTION -

Scale:	AS SHOWN
Date:	JULY 19, 2018
Drawn By:	CCC, DYF
Reviewed By:	BMK
Approved By:	ERB
W&S Project No:	2180076
W&S File No:	

Drawing Title:

OVERALL MATERIALS PLAN

Sheet Number:

L3.00

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SECTION 01562

DUST CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION:

This section of the specification covers the control of dust via calcium chloride and water, complete.

PART 2 - PRODUCTS

2.01 CALCIUM CHLORIDE:

A. Calcium chloride shall conform to the requirements of AASHTO-M 144, Type I or Type II and Specification for Calcium Chloride, ASTM D98. The calcium chloride shall be packaged in moisture proof bags or in airtight drums with the manufacturer, name of product, net weight, and percentage of calcium chloride guaranteed by the manufacturer legibly marked on each container.

B. Calcium chloride failing to meet the requirements of the aforementioned specifications or that which has become caked or sticky in shipment, may be rejected by the Engineer.

2.02 WATER:

A. Water shall not be brackish and shall be free from oil, acid, and injurious alkali or vegetable matter.

PART 3 - EXECUTION

3.01 APPLICATION:

A. Calcium chloride shall be applied when ordered by the Engineer and only in areas which will not be adversely affected by the application. See Section 01570, ENVIRONMENTAL PROTECTION.

B. Calcium chloride shall be uniformly applied at the rate of 1-1/2 pounds per square yard or at any other rate as required by the Engineer. Application shall be by means of a

mechanical spreader, or other approved methods. The number and frequency of applications shall be determined by the Engineer.

C. Water may be sprinkler applied with equipment including a tank with gauge-equipped pressure pump and a nozzle-equipped spray bar.

D. Water shall be dispersed through the nozzle under a minimum pressure of 20 pounds per square inch, gauge pressure.

END OF SECTION

Document1291

SECTION 01570

ENVIRONMENTAL PROTECTION

PART 1 – GENERAL

1.01 DESCRIPTION:

A. The work covered by this section of the specifications consists of furnishing all labor, materials, tools and equipment and performing all work required for the prevention of environmental pollution during and as a result of construction operations under this contract.

B. The requirements set forth in this section of the specifications apply to construction in and adjacent to wetlands, unless otherwise specifically stated.

C. All work under this Contract shall be in accordance with the Conservation Commissions' Orders of Conditions as well as any conditional requirements applied.

D. Prior to commencement of work, the Contractor shall meet with representatives of the Engineer to develop mutual understandings relative to compliance of the environmental protection program.

1.02 SUBMITTALS:

A. The Contractor shall submit for approval six sets of details and literature fully describing environmental protection methods to be employed in carrying out construction activities within 100 feet of wetlands or across areas designated as wetlands.

PART 2 - PRODUCTS

2.01 STRAW BALES:

A. Straw bales shall consist of certified seed free stems of agricultural grain and cereal crops and shall be free of grasses and legumes. Standard bales shall be 14-inches high, 18- inches wide and 36- to 40-inches long tied with polypropylene twine and weigh within 5 percent of 7 lbs. per cubic ft.

2.02 CATCH BASIN PROTECTION:

A. To trap sediment and to prevent sediment from clogging drainage systems, catch basin protection in the form of a siltation sack (Siltsack as manufactured by ACF Environmental, Inc. or approved equal) shall be provided as approved by the Engineer.

2.03 COMPOST FILTER TUBES:

A. Silt socks shall be a tubular filter sock of mesh fabric. The fabric will have openings of between 1/8" to ¼" diameter. The mesh material will either photo degrade within one

year or be made of nylon with a life expectancy of 24 months. The sock shall be filled with a mix of composted leaf mulch, bark mulch and wood chips that have been composted for at least one year. The sock will have a minimum diameter of 12-inches.

PART 3- EXECUTION

3.01 NOTIFICATION AND STOPPAGE OF WORK:

A. The Engineer will notify the Contractor in writing of any non-compliance with the provisions of the Order of Conditions. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails to act promptly, the Owner may order stoppage of all or part of the work through the Engineer until satisfactory corrective action has been taken. No claim for an extension of time or for excess costs or damage incurred by the Contractor as a result of time lost due to any stop work orders shall be made unless it was later determined that the Contractor was in compliance.

3.02 AREA OF CONSTRUCTION ACTIVITY:

A. Insofar as possible, the Contractor shall confine his construction activities to those areas defined by the plans and specifications. All land resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction at least equal to that which existed prior to work under this contract.

3.03 PROTECTION OF WATER RESOURCES:

A. The Contractor shall not pollute streams, lakes or reservoirs with fuels, oils, bitumens, calcium chloride, acids or other harmful materials. It is the Contractor's responsibility to comply with all applicable Federal, State, County and Municipal laws regarding pollution of rivers and streams.

B. Special measures should be taken to insure against spillage of any pollutants into public waters.

3.04 CONSTRUCTION IN AREAS DESIGNATED AS WETLANDS ON THE DRAWINGS:

A. Insofar as possible, the Contractor shall make every effort to minimize disturbance within areas designated as wetlands or within 100-feet of wetland resource areas.

B. The Contractor shall perform his work in such a way that these areas are left in the condition existing prior to construction.

3.05 PROTECTING AND MINIMIZING EXPOSED AREAS:

A. The Contractor shall limit the area of land which is exposed and free from vegetation during construction. In areas where the period of exposure will be greater than two (2) months, temporary vegetation, mulching or other protective measures shall be provided

as specified.

B. The Contractor shall take account of the conditions of the soil where temporary cover crop will be used to insure that materials used for temporary vegetation are adaptive to the sediment control. Materials to be used for temporary vegetation shall be approved by the Engineer.

3.06 LOCATION OF STORAGE AREAS:

A. The location of the Contractor's storage areas for equipment and/or materials shall be upon cleared portions of the job site or areas to be cleared as a part of this project, and shall require written approval of the Engineer. Plans showing storage facilities for equipment and materials shall be submitted for approval of the Engineer.

B. No excavated materials or materials used in backfill operations shall be deposited within a minimum distance of one hundred (100) feet of any watercourse or any drainage facility. Adequate measures for erosion and sediment control such as the placement of straw wattles around the downstream perimeter of stockpiles shall be employed to protect any downstream areas from siltation.

C. There shall be no storage of equipment or materials in areas designated as wetlands.

D. The Engineer may designate a particular area or areas where the Contractor may store materials used in his operations.

3.07 PROTECTION OF LANDSCAPE:

A. The Contractor shall not deface, injure, or destroy trees or shrubs nor remove or cut them without written authority from the Owner. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorages unless specifically authorized by the Engineer. Excavating machinery and cranes shall be of suitable type and be operated with care to prevent injury to trees which are not to be removed, particularly overhanging branches and limbs. The Contractor shall, in any event, be responsible for any damage resulting from such use.

B. Branches, limbs, and roots shall not be cut except by permission of the Engineer. All cutting shall be smoothly and neatly done without splitting or crushing. When there is unavoidable injury to branches, limbs and trunks of trees, the injured portions shall be neatly trimmed and covered with an application of grafting wax or tree healing paint as directed.

C. Where, in the opinion of the Engineer, trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or by his blasting or other operations, the Engineer may require the Contractor to adequately protect such trees by placing boards, planks, poles or fencing around them. Any trees or landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the expense of the Contractor. The Engineer will decide what method of restoration shall be used, and whether damaged trees shall be treated and healed or removed and disposed of.

D. Cultivated hedges, shrubs, and plants which could be injured by the Contractor's operations shall be protected by suitable means or shall be dug up, balled and temporarily replanted and maintained. After construction operations have been substantially completed, they shall be replanted in their original positions and cared for until growth is re-established. If cultivated hedges, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced by items of a kind and quality at least equal to that existing at the start of the work.

3.08 CLEARING AND GRUBBING:

A. The Contractor shall clear and grub only on the Owner's land or the Owner's easements, and only the area required for construction operations, as approved by the Engineer.

3.09 DISCHARGE OF DEWATERING OPERATIONS:

A. Any water that is pumped and discharged from the trench and/or excavation as part of the Contractor's water handling shall be filtered by an approved method prior to its discharge into a receiving water or drainage system.

B. Under no circumstances shall the Contractor discharge water to the areas designated as wetlands. When constructing in a wetlands area, the Contractor shall discharge water from dewatering operations directly to the nearest drainage system, stream, or waterway after filtering by an approved method.

C. The pumped water shall be filtered through filter fabric and baled straw, a vegetative filter strip or a vegetated channel to trap sediment occurring as a result of the construction operations. The vegetated channel shall be constructed such that the discharge flow rate shall not exceed a velocity of more than 1 foot per second. Accumulated sediment shall be cleared from the channel periodically.

3.10 DUST CONTROL:

A. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of streets as necessary, to minimize creation and dispersion of dust. If the Engineer decides it is necessary to use calcium chloride for more effective dust control, the Contractor shall furnish and spread the material, as directed.

B. Calcium Chloride shall not be used for dust control within a drainage basin or in the vicinity of any source of potable water.

3.11 BALED STRAW:

A. To trap sediment during any dewatering process, baled straw shall be used where shown on the drawings. Care shall be taken to keep the bales from breaking apart. All deposited sediment shall be removed periodically. Straw bales shall not be placed within a waterway during construction.

3.12 CATCH BASIN PROTECTION:

A. Catch basin protection shall be used for every catch basin, shown on the plans or as required by the Engineer, to trap sediment and prevent it from clogging drainage systems and entering wetlands. Siltation sacks shall be securely installed under the catch basin grate. Care shall be taken to keep the siltation sacks from breaking apart or clogging. All deposited sediment shall be removed periodically and at times prior to predicted precipitation to allow free drainage flow. Prior to working in areas where catch basins are to be protected, each catch basin sump shall be cleaned of all debris and protected. The contractor shall properly dispose of all debris at no additional cost to the Owner.

3.13 COMPOST FILTER TUBES:

A. The silt socks will be staked in the ground using wooden stakes driven at 4-foot intervals. The wooden stakes will be placed at a minimum depth of 24-inches into the ground.

END OF SECTION

SECTION 01740

CLEANING UP

PART 1 - GENERAL

1.01 DESCRIPTION:

The Contractor must employ at all times during the progress of its work adequate cleanup measures and safety precautions to prevent injuries to persons or damage to property. The Contractor shall immediately, upon request by the Engineer provide adequate material, equipment and labor to cleanup and make safe any and all areas deemed necessary by the Engineer.

PART 2 - PRODUCTS

Not applicable

PART 3 - EXECUTION

3.01 DAILY CLEANUP:

A. The Contractor shall clean up, at least daily, all refuse, rubbish, scrap and surplus material, debris and unneeded construction equipment resulting from the construction operations and sweep the area. The site of the work and the adjacent areas affected thereby shall at all times present a neat, orderly and workmanlike appearance.

B. Upon written notification by the Engineer, the Contractor shall within 24 hours clean up those areas, which in the Engineer's opinion are in violation of this section and the above referenced sections of the specifications.

C. If in the opinion of the Engineer, the referenced areas are not satisfactorily cleaned up, all other work on the project shall stop until the cleanup is satisfactory.

3.02 MATERIAL OR DEBRIS IN DRAINAGE FACILITIES:

A. Where material or debris has washed or flowed into or has been placed in existing watercourses, ditches, gutters, drains, pipes, structures, such material or debris shall be entirely removed and satisfactorily disposed of during progress of the work, and

the ditches, channels, drains, pipes, structures, and work shall, upon completion of the work, be left in a clean and neat condition.

3.03 REMOVAL OF TEMPORARY BUILDINGS, STRUCTURES AND EQUIPMENT:

A. On or before completion of the work, the Contractor shall, unless otherwise specifically required or permitted in writing, tear down and remove all temporary buildings and structures it built; shall remove all temporary works, tools and machinery or other construction equipment it furnished; shall remove all rubbish from any grounds which it has occupied; shall remove silt fences and hay bales used for trapping sediment; and shall leave the roads and all parts of the property and adjacent property affected by its operations in a neat and satisfactory condition.

3.04 RESTORATION OF DAMAGED PROPERTY:

A. The Contractor shall restore or replace, when and as required, any property damaged by its work, equipment or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk and landscaping work. Materials, equipment, and methods for such restoration shall be as approved by the Engineer.

3.05 FINAL CLEANUP:

A. Before acceptance by the Owner, the Contractor shall perform a final cleanup to bring the construction site to its original or specified condition. This cleanup shall include removing all trash and debris off of the premises. Before acceptance, the Engineer shall approve the condition of the site.

END OF SECTION

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SECTION 02677

WETLANDS PROTECTION AND REPLICATION

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section consists of providing all plants, labor, equipment, materials, tools, and required professional services in connection with the protection, replication, and provision of specific mitigation measures to minimize and compensate for impacts to existing wetland areas.

1.02 RELATED WORK:

A. Section 01570, ENVIRONMENTAL PROTECTION

B. Section 02930, TREES, PLANTS, AND GROUND COVERS

1.03 QUALITY ASSURANCE:

A. This Contract requires construction adjacent to environmentally sensitive resource areas including flood plains and wetlands. The Wetlands Protection Act ("Act") G.L. Chapter 131 Sec. 40 governs work in these areas and the Contractor shall be required to comply with this and all other applicable Federal, State and local statutes, regulations, and ordinances, and with the Order of Conditions issued by the Conservation Commission.

B. The Contract Drawings show the extent of the Bordering Vegetated Wetlands (BVW) and Buffer Zone (BZ). Work within the BVW or BZ shall also comply with the requirements of this section.

PART 2 - PRODUCTS

2.01 BACKFILL:

Loam and Organic Mixture - This section describes the specification for preparing a loam and organic mixture to be used as suitable backfill within the wetlands restoration and enhancement areas.

1. Loam shall be a natural, fertile, friable soil, typical of productive soils in the vicinity. Loam shall be free of admixture of subsoil and foreign matter or objects (gravel, roots, debris) larger than 2-inches in diameter.

2. Loam shall be uncontaminated and free of toxic substances or any materials harmful to plant growth, regeneration or reproduction. The pH of the loam shall range between 6.0 and 8.0.

3. Peat (if used) shall be supplied from an authorized peat supplier or nursery. Peat shall have an organic content ranging from 75 to 100%. Peat shall be uncontaminated and free of toxic substances or any materials harmful to plant growth, regeneration or reproduction.

4. The loam and organic mixture shall be mixed onsite to achieve a 5% organic content. This will be determined through laboratory analysis or organic content by the loss of weight by ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230 degrees F. The final pH of the loam-peat mixture shall range from 5.8 to 8.0.

2.02 FERTILIZER:

Fertilizer shall be 10-6-8 controlled release, commercial grade granular free flowing, and uniform in composition and shall conform to applicable state and federal regulations. Fertilizer shall be delivered in manufacturer's standard container printed within manufacturer's name, material, weight, and guaranteed analysis.

2.03 MOISTURE ENHANCER:

A suitable moisture enhancer containing at least 99% Copolymer Acrylamide Acrylate shall be obtained and used for each planted shrub and sapling. This moisture enhancer shall be SuperSorb-C, TerraSorb or approved equal.

2.04 MULCH:

A. Hay Mulch - Hay mulch shall consist of mowed and properly cured grass, clover and other acceptable plants. Hay mulch shall be free of weeds, twigs, debris or other deleterious material.

B. Straw Mulch - Straw mulch shall consist of stalks or stems of grain after threshing.

C. Wood Fiber Mulch - Wood fiber mulch shall consist of wood fiber produced from clean, whole, uncooked wood, formed into resilient bundles having a high degree of internal friction and shall be dry when delivered to the project.

2.05 PROPAGULES:

A. The wetlands restoration and enhancement areas shall be vegetated with indigenous wetlands shrubs, saplings, and emergent species. Individual species to be planted are indicated on the final design plans.

B. Propagules shall be nursery or plantation stock and shall be supplied from a bonded source. Nursery stock shall conform to the requirements and recommendations of American National Standards Institute (ANSI) Z60.1.

C. Plants, propagules or cultivars other than those listed in this section will not be accepted unless specifically approved by the wetlands restoration specialist and accepted by the U.S. Environmental Protection Agency.

D. Propagules shall be dug and prepared for shipment in a manner that will not cause significant damage to branches, roots, shape and future growth and development after planting.

E. Balled and burlapped plants shall have ball sizes and ratios conforming to ANSI Z60.1. Plants shall be balled with firm, natural balls of soil. Balled and burlapped plants shall be wrapped firmly with burlap, strong cloth, or plastic and tied.

F. Planting stock shall be well-branched and well-formed, sound, vigorous, healthy, and free from disease, sun-scald, windburn, abrasion and harmful insect eggs and shall have healthy normal and unbroken root systems.

G. Plants shall have been grown under climactic conditions similar to those in the vicinity of the site. Plants budding into leaf or having soft growth shall be sprayed with an antidesiccant at the nursery prior to delivery.

H. Sapling minimum and maximum heights are as follows: a minimum of 3 feet and a maximum of 5 feet.

I. Shrub minimum and maximum heights are as follows: a minimum of 18-inches and a maximum of 36-inches.

J. Emergent propagules shall be rootstock.

2.06 HYDROSEED:

A. Hydroseed shall be supplied by an authorized hydroseed contractor. The Hydroseed mixture shall include annual grasses and seed stock from *Juncus spp*. and *Carex spp*. The wetlands restoration specialist shall approve the final hydroseed mixture.

2.07 WATER:

Water shall not contain elements toxic to plant life.

PART 3 - EXECUTION

3.01 GENERAL:

A. Every effort shall be made to use existing wetland species. At the discretion of the Engineer, the Contractor may, at his option, dig up, store and maintain existing wetland species trees, shrubs and plants from the excavation area for use in the replication area. Trees shall be a minimum of 1-inch caliper and shrubs shall be a minimum of 24-inches in spread or height. All plants shall be vigorous and well formed specimens.

B. All plant materials dug for this purpose shall be dug by hand, hydraulic tree spade specifically designed for this purpose or other suitable equipment of sufficient size to remove an adequate rootball.

C. American Association of Nurserymen, Inc., American Standard for Nursery Stock (latest edition) for each species. For hand dug plants, a suitable burlap or other wrap or container shall be provided to keep the rootball intact.

D. All plants dug for reuse shall be immediately moved to a protected storage area approved by the Engineer. Plants shall be set plumb on grade or in prepared holes and guyed as necessary. The area or holes shall be backfilled with suitable topsoil to cover rootballs entirely and mulched to prevent erosion. All stored vegetation shall be maintained in a damp condition by regular watering. Contractor shall utilize all cultural measures necessary for survival of collected plants.

E. When work has been completed, stockpiled plants shall be replanted in prepared pits in locations in the replication area designated on the Contract Drawings. Planting, backfilling, fertilizing, staking, mulching, watering and all other cultural methods, including season for planting, maintenance and warranties shall be as per Section 02930.

F. Costs for digging, moving, storage, maintenance and transplanting shall be considered part of the wetland replication item.

G. In order to protect the wetlands from siltation caused by excavation in the replication area and by roadway construction, a silt fence and a continuous line of staked hay bales shall be placed as detailed in the Contract Drawings. Hay bales and silt fence are specified in Section 01570.

H. The organic, top layer of wetlands soils (generally, the top 12-inches) contains the rootstock and seeds for many wetland plant species. As excavation in the wetlands areas commences, the Contractor shall separate the top 12-inch layer of wetland soils (topsoil) within the delineated wetland areas (flagged wetlands) from other soil types and stockpile the wetland soils within an upland area adjacent to the replication area. At no time will stockpiling of excavated soils within wetland areas

be allowed. The wetland soil shall be carefully maintained in a wet condition by adequate watering and shall be protected by installing a siltation fence around the entire stockpiled area. Stockpiles shall be completely covered with a filter fabric and whenever possible, located in the shade.

I. Suitable soil which is excavated, not including the top layer referred to in the paragraph above, shall be carefully removed for use as subgrade material beneath wetland topsoil and if it is not immediately used, shall be stored in a designated stockpile area, to be reused. All soils to be reused shall be carefully stockpiled and protected with appropriate drainage and erosion control.

J. Once the replication area has been excavated, backfilling of the excavation with wetland soil can occur. Prior to the spreading of the wetland soil, the subsoil within the replication area shall be inspected and approved by the Engineer. The elevation and slope of the backfilled subgrade are critical elements in assuring proper replacement of wetlands soils and the function of the wetland. When backfilled with the soil discussed in the paragraph above, elevation and slopes of backfilled areas shall be consistent with the Contract Drawings minus 1-foot to allow for replacement of wetlands (BVW) soils.

3.02 WETLANDS (BVW) SOILS:

A. Wetlands topsoil shall be deposited to a minimum depth of twelve (12) inches. Wetlands topsoil shall be deposited so as to minimize travel and subsequent compression of the underlying material and the replaced wetland topsoil. In the event that the Contractor fails to remove and stockpile sufficient wetlands topsoil to cover the replication area, or in the event sufficient wetlands topsoil is not present, the Contractor shall provide, at no additional cost to the Owner, replacement wetlands topsoil. Replacement wetlands topsoil, if required, shall be provided by a licensed nursery and shall be similar in composition, texture, fertility, and as described in Section 2.01 BACKFILL. The final grading of the replacement wetlands topsoil shall be completed so as to result in no discontinuities in elevation upon removal of any siltation barrier or erosion control materials.

B. Upon completion of final grading, the surface of the new wetlands topsoil shall be shallowly harrowed (depth 3-inches), prior to planting.

C. Upon completion of grading, a final condition survey of the wetlands restoration and enhancement areas shall be performed by a licensed surveyor. Elevations shall be checked in numerous random locations, and shall be within 0.1 feet of the final planned surface elevation. Areas that do not meet the 0.1 foot criteria shall be regraded.

3.03 PLANTING SCHEDULE:

A. Spring planting of saplings and shrubs shall occur between 30 April and 15 June. Fall planting shall occur as dormant planting between 15 September and 30 October for saplings, and 15 September and 15 November for shrubs. If special conditions warrant a variance from the above planting schedules or conditions, and if in concurrence with the wetlands restoration specialist, the above dates can be modified only if recommended by the nursery and if all warranties still apply.

B. Planting and hydroseeding shall not occur when the ground is frozen, snow covered or in an unsuitable condition for planting.

C. All saplings, shrubs and emergent propagules shall be planted in the wetlands restoration and enhancement areas in accordance with a planting plan and schedule as indicated on the Final Plans. All saplings and shrub mixtures (within the wetlands restoration and enhancement areas) shall be planted randomly as indicated on the Final Plans. Sapling and shrub mixtures shall be planted randomly under the direction of the wetlands restoration specialist, with all planting locations no closer than 10 feet on center. Saplings and shrubs shall not be planted within ponds or standing water areas. No machinery or vehicles shall be allowed within the existing adjacent wetlands. Soil disturbances shall be kept to the minimum necessary to accommodate planting. Any extra soil (from pits) shall be removed from the wetland.

D. All balled and burlapped and container grown plants shall be handled and moved only by the root ball or container.

E. Pits for planting shall be dug to produce vertical sides and flat bottoms. The depth of pits shall be 6-inches deeper than the root ball. The diameter of the pits shall allow a minimum distance between the ball and the sides of the hole of 6-inches for shrubs and 10-inches for saplings. The bottom 4-inches of the pit shall be loosened with a shovel prior to planting.

F. Saplings and shrubs shall be set plumb and manually held in position until sufficient soil has been firmly placed around roots or ball. Saplings and shrubs shall be set at the same depth at which they were grown in the nursery or container.

G. Balled and burlapped stock shall be backfilled with soil to approximately half the depth of the ball and watered. Burlap and tying materials shall be carefully removed or folded back at the recommendation of the nursery. Plastic wrap shall be completely removed before placement of backfill. The remainder of backfill shall be tamped and watered.

H. Emergent plantings shall be planted by hand in random locations under the direction of the wetlands restoration specialist in locations designated by the Final Plans. Plantings shall be planted no closer than 2 feet on center.

I. Guying and staking of saplings shall only be required on taller individuals (5 feet), if recommended by the nursery.

3.04 HYDROSEEDING:

Hydroseeding shall accomplish seeding, fertilizing and mulching. Hydroseeded areas shall be seeded at a rate of 400 pounds per acre. Hydroseed application shall be conducted between 15 April and 15 June or 15 September to 30 October, or as recommended by the hydroseed contractor.

3.05 FERTILIZER APPLICATION:

Saplings and trees shall be fertilized at a rate of 0.25 pound of fertilizer per plant, or as recommended by the nursery. Fertilizer shall be worked 2- to 3-inches into the soil.

3.06 MOISTURE ENHANCER:

The moisture enhancer specified in Section 2.03 of this specification shall be applied to each planted shrub and sapling at a rate of 8 ounces per propagule and shall be broadcast around the root ball 3- to 4-inches below the surface.

3.07 MULCH:

Saplings and shrubs shall be mulched to a depth of 2-inches around the base of the pit, at the discretion of the wetlands restoration specialist.

3.08 WATERING:

All saplings and shrubs shall be watered by flooding the backfilled hole within the same working day of planting. Additional soil shall be added around each plant as required to compensate for settling.

3.09 PROTECTION:

Upon completion of construction activities within the wetlands restoration and enhancement areas, barricades or snow fencing shall be erected along upland areas adjacent to the wetland to prevent unauthorized access.

3.10 REPLANTING OF WETLANDS VEGETATION IN THE REPLICATION AREA:

A. In all wetlands, replication of the disturbed areas shall require replanting with indigenous wetland species. The Contractor shall have the option of digging, storing, and replanting existing trees, shrubs and groundcover and respreading

stockpiled wetlands soil from the reservoir excavation area or, alternatively, providing and planting new wetland species at no additional cost to the Owner. The intent of this Section is to insure that at least 75 percent of the surface area of all disturbed wetlands is reestablished with indigenous wetland plant species within two growing seasons of their planting in accordance with the Massachusetts DEP Wetlands Protection Act Regulations. The growing season for wetlands revegetation areas shall be April 15 to October 15. Attention is called to the fact that wetlands to be replicated within the project site have been identified as shrub-scrub or shrub-sapling swamps. The wetland planting zones are schematically shown on the plans. Purple Loosestrife and Phragmites species shall not be planted in any wetland. If after 180 growing season days it is evident in the opinion of the Engineer that it is unlikely that the 75 percent reestablishment requirement will be achieved, the Contractor shall supplement the plantings as necessary to achieve the required coverage at no additional cost to the Owner. If at the end of two growing seasons, 75 percent reestablishment has not been achieved, the Contractor shall provide and plant additional new plant material to achieve 75 percent reestablishment at no additional cost to the Owner.

B. Wetland species are divided into planting groups (designated below) according to their moisture requirements during the growing season. Plantings are done at specified elevations based on the assumed mean water table. (These elevations to be adjusted by the Engineer based on the mean water table as determined during one growing season April 15 to October 15).

C. Wetland plantings shall be performed as designated on the Contract plans.

D. On average, for each 100 square feet of replication area, provide and plant a total of 2 shrubs, and for each 625 square feet of replication area to be revegetated, provide and plant one tree. Shrubs and trees will be spaced according to the Contract Plans.

E. New trees and shrubs shall be balled and burlapped or container grown Nursery Stock.

F. New trees shall be 1- to 1-1/2-inch caliper minimum. All plants selected for replanting shall be of the size specified on the Contract Drawings.

G. New shrubs shall be 24-inches in spread, minimum.

H. For each 100 square feet of replication area to be revegetated with replacement soil, provide and plant a total of 45 plants. New plants shall be a minimum size of 1-3/4-inch peat potted nursery stock, dormant rhizome, dormant tuber, dormant bulb, or bare root plant, as appropriate for the species and planting season. Plants shall be spaced according to Contract Plans.

I. All planting shall be supervised by a licensed nurseryman, qualified to do this work. At least four weeks prior to any wetland planting, the Contractor shall submit details of proposed planting methods, plant layout, and personnel qualifications for approval by the Engineer.

J. Wetland planting materials, operations, maintenance, inspection, and preliminary acceptance shall be as specified in Section 02930. Warranty and final inspection of all wetland plantings shall be a minimum of one year from the date of preliminary acceptance.

K. Maintenance shall be provided until final acceptance. Final acceptance shall be obtained as stipulated in the attached Order of Conditions.

3.11 EROSION CONTROL SEEDING FOR WETLANDS:

A. After wetland soil is respread, no further preparation for seeding is required or allowed. No fertilizer, limestone, superphosphate or other amendment shall be added to wetland soils. Seed mixture and application rates for this work shall follow the contract plans.

B. A wetland seed mixture containing a wide variety of seeds native to New England and which do not include any invasive plant species prohibited in the latest edition of the "Performance Guidelines and Supplemental Information on the Checklist for Review of Mitigation Plan", published by the U.S. Army Corps of Engineers New England Division. Application rates shall be one pound per 5000 square feet when used in an understory seeding and two pounds per 5000 square feet when used in a wet meadow seeding.

C. Where required by the Engineer, for reasons of excessive soil moisture, the wetland seed mixture shall be modified by the addition of an approved portion by weight of Winter Rye seed to provide soil stabilization cover in the fall.

3.12 WORK IN THE BUFFER ZONE (BZ):

A. When any work occurs in the Buffer Zone (BZ) within 100 feet of bordering vegetated wetlands (BVW), certain measures, as indicated on the Contract Drawings, shall be taken to protect the integrity of the wetlands.

B. A siltation barrier consisting of a continuous row of staked hay bales and a silt fence shall be placed between the BVW and the work area to prevent soil materials from entering the BVW from the BZ as shown on the Contract Drawings. This siltation barrier shall be inspected and maintained on a daily basis. Hay bales and silt fence are specified in Section 01570.

C. In general, storage of equipment or materials in BVW or BZ areas shall not be permitted. Storage of oil products or the repairing of vehicles and/or maintenance operations shall not be permitted in the BVW or BZ areas. Should the Engineer deem that the Contractor's activities are unnecessarily detrimental to the wetlands, the Engineer reserves the right to order the Contractor to immediately cease all activities on-site until the situation is resolved to the satisfaction of the Engineer.

END OF SECTION

Document1262

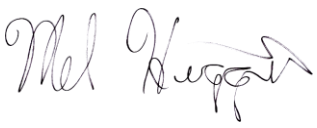
AFFIDAVIT OF SERVICE

Under the Massachusetts Wetlands Protection Act

I, Mel Higgins, hereby certify under the Pains and Penalties of Perjury that on July 18, 2018 I gave notification to abutters in compliance with the second paragraph of Massachusetts General Laws, Chapter 131, Section 40, and the DEP Guide to Abutter Notification dated, April 8, 1994, in connection with the following matter:

> A Notice of Intent has been filed under the Massachusetts Wetlands Protection Act by the Town of Wayland with the Wayland Conservation Commission on July 18, 2018 for property located at Loker Conservation and Recreation Area off of Commonwealth Road in Wayland.

The completed notification and a list of the abutters to whom it was given and their addresses, are attached to this Affidavit of Service.



July 18, 2018
DATE

Name: Mel Higgins
Title: Senior Environmental Scientist
Organization: Weston & Sampson Engineers, Inc

Town of Wayland
Assessing Department
41 COCHITUATE ROAD
WAYLAND MASSACHUSETTS 01778
www.wayland.ma.us TEL. 508-358-3788

RECEIVED
2018 JUL -6 AM 10: 14
WAYLAND

OFFICE STAFF
Ellen M. Brideau, MAA, Director of Assessing
Denise Ellis, MAA, Assistant Assessor
Jessica Marchant, MAA, Administrative Assessor
Savitri Ramgoolam, Department Assistant

BOARD OF ASSESSORS
Susan M. Rufo, Chair
Jayson Brodie, Vice Chair
Zachariah L. Ventress
David Hill
Cheryl Kane

Certification of Abutters

Date of request 7/6/2018

Please plan your submission accordingly. The Assessors' office has 10 business days to certify an abutters list Per MGL Ch. 66, S.10

Address to be certified 412 Commonwealth Road Parcel ID 49/064B 49/064E 49/064C (Map/Lot)

Owner's Name (PLEASE PRINT) Town of Wayland

Owner's Mailing Address 41 Cochituate Road

Name of Applicant (PLEASE PRINT) Alexandra Gaspar Telephone: 978-532-1900 x 2422

5 Centennial Drive Peabody MA 01960
Mailing Address of Applicant City/Town State Zip

Signature of Applicant AGaspar

Reason for List (check one) ☒ Conservation ☐ Health ☐ Planning ☐ Zoning

**Please check with the Board/Commission for their guidelines regarding the number of feet required for notification. Each Board/Commission has its own regulations for their abutters listing. There's no fee for certification, however the list/s of abutters must be provided by the person or company requesting certification. Please submit by mail, in person or fax to 508 358 0061.

For use by Assessors

This is to certify that at the time of the last assessment for taxation made by the Town of Wayland, the names and addresses are the assessed owners to these parcels.

Certified By: _____ Date: _____

CC: ☐ Conservation ☐ Health ☐ Planning ☐ Zoning

100 foot Abutters List Report

Wayland, MA
July 06, 2018

Subject Property:

Parcel Number:	49-064B	Mailing Address:	TOWN OF WAYLAND
CAMA Number:	49-064B		41 COCHITUATE RD
Property Address:	412 COMMONWEALTH RD		WAYLAND, MA 01778

Abutters:

Parcel Number:	48-093	Mailing Address:	TOOMEY THOMAS J
CAMA Number:	48-093		1 DRIFTWOOD WAY
Property Address:	3 THOMPSON ST		ASHLAND, MA 01721
Parcel Number:	48-098	Mailing Address:	TOWN OF WAYLAND CONSERVATION
CAMA Number:	48-098		41 COCHITUATE ROAD
Property Address:	396 COMMONWEALTH RD		WAYLAND,, MA 01778
Parcel Number:	49-065	Mailing Address:	PAOLINI ANGELO D
CAMA Number:	49-065		266 NEVADA ST
Property Address:	417 COMMONWEALTH RD		NEWTON, MA 02460
Parcel Number:	53-00WB	Mailing Address:	SKOLNICK NANCY F TRUSTEE NANCY
CAMA Number:	53-025A		SKOLNICK TRUST U/D/T
Property Address:	100 WILLOWBROOK DR		100 WILLOWBROOK DR
			WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	FISHMAN MARJORIE
CAMA Number:	53-025B		101 WILLOWBROOK DR
Property Address:	101 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	FERDINAND JENNIFER
CAMA Number:	53-025C		102 WILLOW BROOK DR
Property Address:	102 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	FANGER STEPHANIE
CAMA Number:	53-026A		103 WILLOW BROOK DR
Property Address:	103 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	DIAZ SYLVIA C
CAMA Number:	53-026B		104 WILLOW BROOK DR
Property Address:	104 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	TORRES JUAN C
CAMA Number:	53-026C		PO BOX 7814
Property Address:	105 WILLOWBROOK DR		PONCE, PR 00732
Parcel Number:	53-00WB	Mailing Address:	FILIPE LEONOR M HINCKLEY LOUIS E
CAMA Number:	53-026D		T/E
Property Address:	106 WILLOWBROOK DR		106 WILLOWBROOK DR
			WAYLAND, MA 01778

100 foot Abutters List Report

Wayland, MA
July 06, 2018

Parcel Number:	53-00WB	Mailing Address:	DROURR DONALD A DROURR NANCY S
CAMA Number:	53-027A		107 WILLOWBROOK DR
Property Address:	107 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	CLIFFORD REBECCA J
CAMA Number:	53-027B		108 WILLOWBROOK DR
Property Address:	108 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	GUMATAY ROMAN F II GUMATAY BRENDA J
CAMA Number:	53-027C		109 WILLOW BROOK DR
Property Address:	109 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	WEISMAN LAURENCE & ONEILL MARY F TRUSTEE ONEILL WEISMAN FAMILY TRUST
CAMA Number:	53-027D		110 WILLOW BROOK DR
Property Address:	110 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	PEACOCK MARY KATHRYN
CAMA Number:	53-028A		111 WILLOW BROOK DR
Property Address:	111 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	NEWBERG MARLENE D
CAMA Number:	53-028B		112 WILLOW BROOK DR
Property Address:	112 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	FRANKLIN CAROL
CAMA Number:	53-029A		200 WILLOW BROOK DR
Property Address:	200 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	HATCH THEODORE F JR TRUSTEE THEODORE F HATCH JR TRUST
CAMA Number:	53-029B		201 WILLOWBROOK DR
Property Address:	201 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	PAYNE BURTON S JR PAYNE FELICIA F T/E
CAMA Number:	53-029C		202 WILLOW BROOK DR
Property Address:	202 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	SAX CAROL A CHUBOY & SAX JOHN TRUSTEES CAROL ANN CHUBOY SAX TRUST
CAMA Number:	53-029D		203 WILLOW BROOK DR
Property Address:	203 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	MENACHEM MARSHALL MENACHEM MARJORIE H T/E
CAMA Number:	53-030A		204 WILLOWBROOK DR
Property Address:	204 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	RUGGIERE LISA A
CAMA Number:	53-030B		205 WILLOWBROOK DR
Property Address:	205 WILLOWBROOK DR		WAYLAND, MA 01778

100 foot Abutters List Report

Wayland, MA
July 06, 2018

Parcel Number:	53-00WB	Mailing Address:	SLEEPER MARTIN E
CAMA Number:	53-030C		206 WILLOWBROOK DR
Property Address:	206 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	UVEGES GEORGE UVEGES V RENEE
CAMA Number:	53-030D		207 WILLOWBROOK DR
Property Address:	207 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	MARSHALL DAVID F MARSHALL PATRICIA A
CAMA Number:	53-031A		208 WILLOWBROOK DR
Property Address:	208 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	DEANGELIS STEVEN L MAHONEY KERRY L
CAMA Number:	53-031B		209 WILLOWBROOK DR
Property Address:	209 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	GIBBONS JOSEPH N WYNNE STEVEN M
CAMA Number:	53-031C		210 WILLOWBROOK DR
Property Address:	210 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	KHROMOVA SVETLANA
CAMA Number:	53-031D		211 WILLOWBROOK DR
Property Address:	211 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	SYLVETSKY AMY GOODMAN
CAMA Number:	53-032A		212 WILLOWBROOK DR
Property Address:	212 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	JENKINS-CRITIDES JENNIFER
CAMA Number:	53-032B		213 WILLOWBROOK DR
Property Address:	213 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	COHEN ALAN B COHEN HELAINE H T/E
CAMA Number:	53-032C		214 WILLOWBROOK DR
Property Address:	214 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	COHEN HOWARD A
CAMA Number:	53-033A		300 WILLOWBROOK DR
Property Address:	300 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	FILIPE URANIA M
CAMA Number:	53-033B		301 WILLOWBROOK DR
Property Address:	301 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	TIERNEY JOSEPH W JR LANGLEY CHRISTINE T/E
CAMA Number:	53-034A		302 WILLOWBROOK DR
Property Address:	302 WILLOWBROOK DR		WAYLAND, MA 01778

100 foot Abutters List Report

Wayland, MA
July 06, 2018

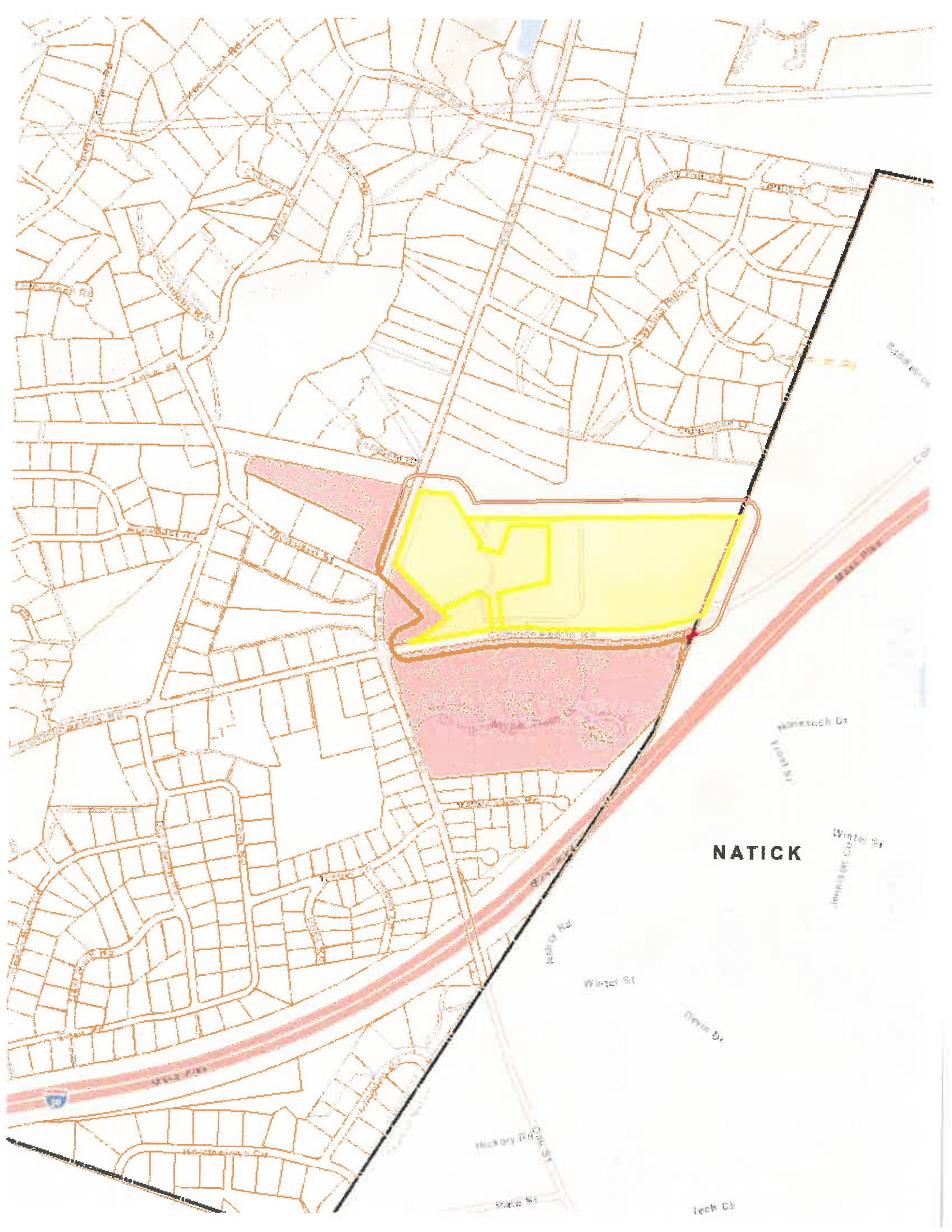
Parcel Number:	53-00WB	Mailing Address:	DEITCHMAN SHEILA R
CAMA Number:	53-034B		303 WILLOWBROOK DR
Property Address:	303 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	GLENN DAVID T GLENN KIM M, T/E
CAMA Number:	53-034C		304 WILLOWBROOK DR
Property Address:	304 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	GHATTAS RAMY
CAMA Number:	53-034D		305 WILLOWBROOK DR
Property Address:	305 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	SAVEL BARBARA A
CAMA Number:	53-035A		306 WILLOWBROOK DR
Property Address:	306 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	SALVUCCI PAUL SALVUCCI JUDITH A
CAMA Number:	53-035B		T/E
Property Address:	307 WILLOWBROOK DR		307 WILLOWBROOK DR
			WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	HSIE CHANG-ER
CAMA Number:	53-035C		308 WILLOWBROOK DR
Property Address:	308 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	LURIE ROBERT S & ANNA S LURIE
CAMA Number:	53-035D		LIVING TRUST
Property Address:	309 WILLOWBROOK DR		309 WILLOWBROOK DR
			WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	SWARTZ JODI L CENTURY BANK &
CAMA Number:	53-036A		TRUST CO/COMSUMER LENDING
Property Address:	310 WILLOWBROOK DR		400 MYSTIC AVE
			MEDFORD, MA 02155
Parcel Number:	53-00WB	Mailing Address:	AGNES EILEEN D
CAMA Number:	53-036B		311 WILLOWBROOK DR
Property Address:	311 WILLOWBROOK DR		WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	REILLY NORBERTA J & THOMAS J
CAMA Number:	53-036C		TRUSTEES NORBETTA J. REILLY 1998
Property Address:	312 WILLOWBROOK DR		REVOCABLE TRUST
			312 WILLOWBROOK DR
			WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	ROSSMAN NANCY ROSSMAN RICHARD
CAMA Number:	53-036D		T/E
Property Address:	313 WILLOWBROOK DR		313 WILLOWBROOK DR
			WAYLAND, MA 01778
Parcel Number:	53-00WB	Mailing Address:	LILIENTHAL JANET L
CAMA Number:	53-037A		314 WILLOWBROOK DR
Property Address:	314 WILLOWBROOK DR		WAYLAND, MA 01778

100 foot Abutters List Report

Wayland, MA
July 06, 2018

Parcel Number: 53-00WB
CAMA Number: 53-037B
Property Address: 315 WILLOWBROOK DR

Mailing Address: HINDERHOFER KATHRYN M & JOSEPH J
TRUSTEE KATHRYN M HINDERHOFER
REVOCABLE TRUST
315 WILLOWBROOK DR
WAYLAND, MA 01778


NATICK

Notification to Abutters Under the Massachusetts Wetlands Protection Act

In accordance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, you are hereby notified of the following:

A. The name of the applicant is: Ben Keefe - Town of Wayland
41 Cochituate Road
Wayland, MA 01778

B. The name of the owner is: same as above

C. The applicant has filed a Notice of Intent with the Wayland Conservation Commission seeking permission to alter an Area Subject to Protection under the Wetlands Protection Act (General Laws Chapter 131, Section 40). The Work includes the installation of a multi-purpose athletic field at Loker Conservation and Recreation Area.

D. The address of the lot(s) where the activity is proposed: 412 Commonwealth Road

E. Copies of the Notice of Intent may be examined at 41 Cochituate Road between the hours of 8:00 AM and 5:00 PM on Monday – Friday. For more information call the Shrewsbury Conservation Commission at (508) 358-3669

F. Information regarding the project, date, time and place of the public hearing may be obtained from Weston & Sampson Engineers, by contacting Mel Higgins at 978-532-1900 ext. 2332 between the hours of 8:00 – 5:00 on the following days of the week: Monday – Friday or the Wayland Conservation Commission at (508) 358-3669 between the hours of 8:00 AM and 5:00 PM on Monday – Friday.

NOTE: Notice of the public hearing, including its date, time, and place, will be published at least five (5) days prior to the hearing date in the local paper.

NOTE: Notice of the meeting of the Conservation Commission, including its date, time and place will be posted in the Town Hall not less than forty-eight (48) hours in advance of the meeting.

NOTE: You also may contact your local Conservation Commission or the Department of Environmental Protection Regional Office for more information about this application or the Wetlands Protection Act.

TOOMEY THOMAS J
1 DRIFTWOOD WAY
ASHLAND MA 01721

TOWN OF WAYLAND CONSERVATION
41 COCHITUATE ROAD
WAYLAND MA 01778

PAOLINI ANGELO D
266 NEVADA STREET
NEWTON MA 02460

SKOLNICK NANCY
100 WILLOWBROOK DRIVE
WAYLAND MA 01778

FISHMAN MARJORIE
101 WILLOWBROOK DRIVE
WAYLAND MA 01778

FERDINAND JENNIFER
102 WILLOWBROOK DRIVE
WAYLAND MA 01778

FANGER STEPHANIE
103 WILLOWBROOK DRIVE
WAYLAND MA 01778

DIAZ SYLVIA C
104 WILLOWBROOK DRIVE
WAYLAND MA 01778

TORRES JUAN C
PO BOX 7814
PONCE, PR 00732

FILIPE LEONAR M HINCKLEY LOUISE E
106 WILLOWBROOK DRIVE
WAYLAND MA 01778

DROURR DONALD A
107 WILLOWBROOK DRIVE
WAYLAND MA 01778

CLIFFORD REBECCA J
108 WILLOWBROOK DRIVE
WAYLAND MA 01778

GUMATAY ROMAN F
109 WILLOWBROOK DRIVE
WAYLAND MA 01778

WEISMAN LAURENCE & ONEIL MARY F
110 WILLOWBROOK DRIVE
WAYLAND MA 01778

PEACOCK MARY KATHRYN
111 WILLBROOK DRIVE
WAYLAND MA 01778

NEWBERG MARLENE D
112 WILLOWBROOK DRIVE
WAYLAND MA 01778

FRANKLIN CAROL
200 WILLOWBROOK DRIVE
WAYLAND MA 01778

HATCH THEODORE F
201 WILLOWBROOK DRIVE
WAYLAND MA 01778

PAYNE BURTON S JR
202 WILLOWBROOK DRIVE
WAYLAND MA 01778

SAX CAROL A
203 WILLOWBROOK DRIVE
WAYLAND MA 01778

MENACHEM MARSHALL
204 WILLOWBROOK DRIVE
WAYLAND MA 01778

RUGGIERE LISA A
205 WILLOWBROOK DRIVE
WAYLAND MA 01778

SLEEPER MARTIN E
206 WILLOWBROOK DRIVE
WAYLAND MA 01778

UVEGES GEORGE
207 WILLOWBROOK DRIVE
WAYLAND MA 01778

MARSHALL DAVID F
208 WILLOWBROOK DRIVE
WAYLAND MA 01778

DEANGELIS STEVEN L
209 WILLOWBROOK DRIVE
WAYLAND MA 01778

GIBBONS JOSEPH M WYNNE STEVEN
210 WILLOWBROOK DRIVE
WAYLAND MA 01778

KHROMOVA SVETLANA
211 WILLOWBROOK DRIVE
WAYLAND MA 01778

SYLVETSKY AMY GOODMAN
212 WILLOWBROOK DRIVE
WAYLAND MA 01778

JENKINS-ORITIDES JENNIFER
213 WILLOWBROOK DRIVE
WAYLAND MA 01778

COHEN ALAN B
214 WILLOWBROOK DRIVE
WAYLAND MA 01778

COHEN HOWARD A
300 WILLOWBROOK DRIVE
WAYLAND MA 01778

FILIPE URANIA M
301 WILLOWBROOK DRIVE
WAYLAND MA 01778

TIERNEY JOSEPH W JR
302 WILLOWBROOK DRIVE
WAYLAND MA 01778

DEITCHMAN SHEILA R
303 WILLOWBROOK DRIVE
WAYLAND MA 01778

GHATTAS RAMY
305 WILLOWBROOK DRIVE
WAYLAND MA 01778

SAVEL BARBARA A
306 WILLOWBROOK DRIVE
WAYLAND MA 01778

SALVUCCI PAUL
307 WILLOWBROOK DRIVE
WAYLAND MA 01778

HSIE CHANG-ER
308 WILLOWBROOK DRIVE
WAYLAND MA 01778

LURIE ROBERT S
309 WILLOWBROOK DRIVE
WAYLAND MA 01778

SWARTZ JODIE L
400 MYSTIC AVENUE
MEDFORD MA 02155

AGNES EILEEN D
311 WILLOWBROOK DRIVE
WAYLAND MA 01778

REILLY NORBERTA J & THOMAS J
312 WILLOWBROOK DRIVE
WAYLAND MA 01778

ROSSMAN NANCY
313 WILLOWBROOK DRIVE
WAYLAND MA 01778

LILIENTHAL JANET L
314 WILLOWBROOK DRIVE
WAYLAND MA 01778

HINDERHOFER KATHRYN M
315 WILLOWBROOK DRIVE
WAYLAND MA 01778

1 Winners Circle, Suite 130, Albany, NY 12205
Tel: 518.463.4400

MEMORANDUM

TO: Brandon Kunkle, RLA - Project Manager

FROM: Daniel Biggs, RLA, ISA

DATE: July 17, 2018

SUBJECT: Town of Wayland - Loker Conservation and Recreation Area Tree Assessment

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Per your request, June 19th-22nd, Weston & Sampson staff completed an assessment of the existing forested areas at the Loker Conservation and Recreation Area, per Town of Wayland Chapter 193 Stormwater Management and Land Disturbance by-laws and Town of Wayland Conservation Commission Chapter 194 (D-768) Wetlands and Water Resources by-law. The Loker Conservation and Recreation Area is currently utilized as a passive recreation area with patrons utilizing existing trails which are partly in the recreation area and primarily throughout the greater conservation area lands. The project area currently consists of a mowed grass area on the western portion of the site, areas with remnants of pavement from the site's previous use as a Dow Chemical research facility and is bordered by volunteer species and established woodlands. Three ponds with associated wetlands exist on the northern and southern ends of the site.

Three wooded areas adjacent to wetlands were assessed between the 30' and 100' wetland buffer boundaries. Trees between the edge of wetland and 30' wetland buffer were not assessed because there will be no disturbance within this buffer. Upland area trees within the area of proposed disturbance were also included in this assessment.

The tree inventory and assessment identified species, size (DBH), condition, and rating per the *Guide for Plant Appraisal (9th edition, 2000)* authored by the *Council of Tree & Landscape Appraisers*, and *Tree Species Rating Guide for New England* authored by the *New England Chapter of the International Society of Arboriculture (2nd edition)*. Forest stand limits within the proposed areas of disturbance were approximate, measured with a handheld GPS with an accuracy range of 2'-5' under heavy leaf cover. The inventory was conducted during the summer; therefore, the identification of Oak species should be considered approximate—common identifiers (buds/acorns) were not present. Trees greater than 4" diameter breast height (DBH) were assessed, and trees smaller than 4" DBH were noted but not included as part of this study. An herbaceous species inventory was not conducted.

Existing Forest Composition:

The forest areas within the inventory limits consist of a Laurentian Mixed Forest type, a transitional mixed forest between the continent's two biggest forest types: coniferous boreal forest and the eastern deciduous forest. Much of the forest appears to be in a steady state of succession, and the canopy has gradually transitioned from a conifer-dominated landscape to that of a mixed broadleaf-conifer type. The overstory species mosaic is composed of a mix of deciduous and coniferous trees. Evergreen species predominately consist of Eastern White Pine, Red Pine, and Eastern Red Cedar, which are common pioneer species found after disturbance. These conifers are mixed with broadleaf trees in varying abundance on the site—primarily composed of Oaks (Red, Black), Red Maple, Cherry (less frequent), Hickory, and Beech. The dominant canopy species ranged in size from 4" to 33.9". The understory primarily consisted of Serviceberry, Cherry, Glossy Buckthorn, and Alder. Moderate invasive and shrubby species exist within the study area and are primarily located on the fringe/ edges of the forest where disturbance has occurred. The exception to this rule is the Glossy Buckthorn, which can be found distributed throughout the forest area. A uniform groundcover of herbaceous material was present at the time of the assessment. A complete inventory of trees within the study area can be found in the following documents: Attachment A – Wetland Buffer Areas and Attachment B – Upland Areas.

Town of Wayland - Loker Conservation and Recreation Area

Attachment A: Tree Inventory/ Assessment - Wetland Buffer Areas

GENUS	SPECIES	DIAMETER BREAST HEIGHT (DBH) - INCHES	CONDITION	RATING	Replacement Count Per Guidelines
Quercus	velutina	4	good	90-100	1
Quercus	alba	4	good	90-100	1
Acer	rubrum	4.1	good	70-80	1
Quercus	rubra	4.7	good	50-60	1
Acer	rubrum	5.1	good	50-60	1
Fagus	grandifolia	5.6	good	90-100	1
Carya	ovata	6.2	good	70-80	2
Quercus	rubra	6.2	good	90-100	2
Quercus	rubra	6.5	good	90-100	2
Quercus	rubra	6.8	good	90-100	2
Pinus	resinosa	7.8	good	50-60	2
Pinus	resinosa	8.4	good	50-60	2
Pinus	resinosa	8.5	good	50-60	2
Pinus	strobus	9.9	good	80-90	2
Quercus	rubra	10.5	good	90-100	2
Pinus	resinosa	10.7	good	50-60	2
Quercus	rubra	11.7	good	90-100	2
Pinus	strobus	12.1	good	80-90	3
Quercus	rubra	12.3	good	90-100	3
Pinus	strobus	12.6	good	80-90	3
Pinus	resinosa	12.7	good	50-60	3
Pinus	strobus	12.7	good	80-90	3
Quercus	rubra	13.5	good	90-100	3
Pinus	resinosa	16	good	50-60	3
Pinus	resinosa	16	good	80-90	3
Quercus	rubra	16.7	good	90-100	3
Quercus	alba	16.8	good	90-100	3
Pinus	strobus	18.5	good	80-90	5
Pinus	strobus	18.6	good	80-90	5
Pinus	strobus	18.8	good	80-90	5
Pinus	strobus	20.1	good	80-90	5
Pinus	strobus	21	good	80-90	5
Pinus	strobus	24.8	good	80-90	5
Quercus	velutina	25.7	good	90-100	7
Pinus	strobus	30.6	good	80-90	7
Pinus	strobus	33.2	good	80-90	7
Malus	spp.	4.5,3,2	good	60-70	1
Quercus	velutina	4.2	fair	90-100	1
Acer	rubrum	4.5	fair	70-80	1
Quercus	rubra	6.4	fair	90-100	2
Pinus	resinosa	10.9	fair	50-60	2
Pinus	resinosa	11.7	fair	50-60	2
Pinus	strobus	11.9	fair	80-90	2
Pinus	resinosa	13.7	fair	50-60	3
Pinus	resinosa	13.8	fair	50-60	3
Juniperus	virginiana	13.8	fair	60-70	3

Town of Wayland - Loker Conservation and Recreation Area

Attachment A: Tree Inventory/ Assessment - Wetland Buffer Areas

GENUS	SPECIES	DIAMETER BREAST HEIGHT (DBH) - INCHES	CONDITION	RATING	Replacement Count Per Guidelines
Acer	rubrum	14.5	fair	70-80	3
Quercus	rubra	15.1	fair	90-100	3
Pinus	resinosa	15.1	fair	50-60	3
Pinus	resinosa	16	fair	50-60	3
Pinus	resinosa	16.1	fair	50-60	3
Pinus	resinosa	16.3	fair	50-60	3
Quercus	rubra	17.9	fair	90-100	3
Pinus	strobus	21.1	fair	80-90	5
Pinus	resinosa	6.7	poor	50-60	2
Pinus	resinosa	9.7	poor	50-60	2

Total Number of Trees Removed: 56

Total Number of Replacement Trees Per Guidelines: 159

Town of Wayland - Loker Conservation and Recreation Area

Attachment B: Tree Inventory/ Assessment - Wetland Upland Areas

GENUS	SPECIES	DIAMETER BREAST HEIGHT (DBH)-INCHES	CONDITION	RATING	Replacement Count Per Guidelines
Quercus	alba	4	good	90-100	1
Quercus	velutina	4	good	90-100	1
Pinus	strobus	4.2	good	80-90	1
Quercus	rubra	4.2	good	90-100	1
Acer	rubrum	4.2	good	70-80	1
Quercus	rubra	4.4	good	90-100	1
Pinus	strobus	4.4	good	80-90	1
Quercus	rubra	4.5	good	90-100	1
Quercus	rubra	4.5	good	90-100	1
Acer	platanoides	4.5	good	60-70	1
Quercus	alba	4.6	good	90-100	1
Quercus	alba	4.6	good	90-100	1
Quercus	alba	4.7	good	90-100	1
Quercus	velutina	4.8	good	90-100	1
Quercus	alba	4.8	good	90-100	1
Quercus	rubra	4.9	good	90-100	1
Quercus	alba	4.9	good	90-100	1
Pinus	strobus	4.9	good	80-90	1
Quercus	rubra	5	good	90-100	1
Carya	ovata	5	good	80-90	1
Quercus	rubra	5.1	good	90-100	1
Populus	grandifolia	5.1	good	20-30	1
Quercus	velutina	5.2	good	90-100	1
Pinus	strobus	5.2	good	80-90	1
Acer	rubrum	5.2	good	70-80	1
Quercus	rubra	5.3	good	90-100	1
Quercus	alba	5.3	good	90-100	1
Pinus	strobus	5.3	good	80-90	1
Pinus	strobus	5.4	good	80-90	1
Ulmus	americana	5.4	good	20-30	1
Fraxinus	pensylvanica	5.4	good	70-80	1
Quercus	velutina	5.4	good	90-100	1
Quercus	rubra	5.5	good	90-100	1
Quercus	rubra	5.5	good	90-100	1
Pinus	strobus	5.6	good	80-90	1
Pinus	strobus	5.7	good	80-90	1
Ulmus	americana	5.8	good	20-30	1
Pinus	strobus	5.8	good	80-90	1
Quercus	rubra	6.1	good	90-100	2
Quercus	rubra	6.1	good	90-100	2
Quercus	alba	6.1	good	90-100	2
Quercus	alba	6.2	good	90-100	2
Quercus	rubra	6.3	good	90-100	2
Ulmus	americana	6.4	good	70-80	2
Pinus	strobus	6.4	good	80-90	2
Quercus	velutina	6.4	good	90-100	2

Town of Wayland - Loker Conservation and Recreation Area

Attachment B: Tree Inventory/ Assessment - Wetland Upland Areas

GENUS	SPECIES	DIAMETER BREAST HEIGHT (DBH)-INCHES	CONDITION	RATING	Replacement Count Per Guidelines
Quercus	alba	6.5	good	90-100	2
Quercus	rubra	6.6	good	90-100	2
Quercus	rubra	6.8	good	90-100	2
Pinus	rubra	7.1	good	90-100	2
Quercus	rubra	7.1	good	90-100	2
Quercus	rubra	7.2	good	90-100	2
Pinus	strobus	7.3	good	80-90	2
Quercus	rubra	7.4	good	90-100	2
Carya	ovata	7.5	good	80-90	2
Querucs	rubra	7.5	good	90-100	2
Pinus	strobus	7.5	good	80-90	2
Quercus	alba	7.5	good	90-100	2
Quercus	velutina	7.5	good	90-100	2
Quercus	rubra	7.6	good	90-100	2
Quercus	velutina	7.7	good	90-100	2
Quercus	alba	7.7	good	90-100	2
Quercus	alba	7.7	good	90-100	2
Quercus	velutina	7.8	good	90-100	2
Quercus	rubra	7.9	good	90-100	2
Acer	rubrum	7.9	good	70-80	2
Quercus	rubra	8	good	90-100	2
Quercus	rubra	8.1	good	90-100	2
Quercus	alba	8.2	good	90-100	2
Quercus	rubra	8.4	good	90-100	2
Quercus	rubra	8.4	good	90-100	2
Quercus	rubra	8.5	good	90-100	2
Quercus	rubra	8.5	good	90-100	2
Carya	ovata	8.9	good	80-90	2
Quercus	alba	9	good	90-100	2
Quercus	rubra	9.1	good	90-100	2
Quercus	alba	9.3	good	90-100	2
Pinus	resinosa	9.3	good	50-60	2
Carya	ovata	9.6	good	80-90	2
Quercus	rubra	9.7	good	90-100	2
Quercus	rubra	9.8	good	90-100	2
Quercus	velutina	9.9	good	90-100	2
Pinus	strobus	10.1	good	80-90	2
Quercus	rubra	10.1	good	90-100	2
Quercus	rubra	10.3	good	90-100	2
Quercus	rubra	10.3	good	90-100	2
Quercus	rubra	10.3	good	90-100	2
Quercus	rubra	10.4	good	90-100	2
Quercus	rubra	10.5	good	90-100	2
Pinus	resinosa	10.5	good	50-60	2
Quercus	rubra	10.6	good	90-100	2
Carya	cordiformis	10.8	good	70-80	2

Town of Wayland - Loker Conservation and Recreation Area

Attachment B: Tree Inventory/ Assessment - Wetland Upland Areas

GENUS	SPECIES	DIAMETER BREAST HEIGHT (DBH)-INCHES	CONDITION	RATING	Replacement Count Per Guidelines
Quercus	velutina	10.9	good	90-100	2
Pinus	strobus	11.1	good	80-90	2
Quercus	rubra	11.1	good	90-100	2
Acer	rubrum	11.1	good	70-80	2
Quercus	rubra	11.2	good	90-100	2
Quercus	rubra	11.3	good	90-100	2
Acer	rubrum	11.4	good	70-80	2
Pinus	resinosa	11.8	good	50-60	2
Quercus	rubra	12.1	good	90-100	2
Quercus	rubra	12.2	good	90-100	2
Quercus	velutina	12.6	good	90-100	2
Quercus	rubra	12.9	good	90-100	2
Quercus	rubra	12.9	good	90-100	2
Acer	platanoides	13	good	60-70	2
Quercus	rubra	13	good	90-100	2
Pinus	resinosa	13.1	good	50-60	2
Pinus	strobus	13.4	good	80-90	2
Quercus	velutina	13.5	good	90-100	2
Pinus	strobus	13.6	good	80-90	2
Quercus	velutina	13.6	good	90-100	2
Pinus	strobus	13.9	good	80-90	2
Quercus	rubra	14	good	90-100	2
Quercus	velutina	14.1	good	90-100	2
Pinus	resinosa	14.1	good	50-60	2
Juniperus	virginiana	14.2	good	60-70	2
Quercus	velutina	14.2	good	90-100	2
Pinus	strobus	14.5	good	80-90	2
Pinus	strobus	15.3	good	80-90	2
Quercus	rubra	15.4	good	90-100	2
Quercus	rubra	15.5	good	90-100	2
Acer	rubrum	15.6	good	70-80	2
Pinus	resinosa	16.2	good	50-60	2
Pinus	strobus	16.3	good	80-90	2
Quercus	rubra	16.3	good	90-100	2
Pinus	strobus	16.3	good	80-90	2
Quercus	rubra	16.6	good	90-100	2
Pinus	strobus	16.7	good	80-90	2
Quercus	rubra	17.3	good	90-100	2
Quercus	rubra	17.3	good	90-100	2
Pinus	strobus	17.7	good	80-90	2
Quercus	rubra	17.7	good	90-100	2
Pinus	resinosa	17.7	good	50-60	2
Populus	deltoides	18.1	good	30-40	2
Pinus	strobus	18.1	good	80-90	2
Pinus	strobus	19.1	good	80-90	2
Quercus	rubra	19.3	good	90-100	2

Town of Wayland - Loker Conservation and Recreation Area

Attachment B: Tree Inventory/ Assessment - Wetland Upland Areas

GENUS	SPECIES	DIAMETER BREAST HEIGHT (DBH)-INCHES	CONDITION	RATING	Replacement Count Per Guidelines
Pinus	strobus	19.4	good	80-90	2
Pinus	strobus	19.4	good	80-90	2
Tsuga	canadensis	20.1	good	60-70	2
Pinus	strobus	20.1	good	80-90	2
Pinus	strobus	20.1	good	80-90	2
Quercus	rubra	20.5	good	90-100	2
Pinus	strobus	20.5	good	80-90	2
Pinus	strobus	20.9	good	80-90	2
Quercus	velutina	21.1	good	90-100	2
Pinus	strobus	22	good	80-90	2
Quercus	rubra	22	good	90-100	2
Quercus	velutina	22.8	good	90-100	2
Quercus	rubra	24.2	good	90-101	2
Pinus	strobus	24.5	good	80-90	2
Pinus	strobus	25.9	good	80-90	2
Pinus	strobus	26.6	good	80-90	2
Pinus	strobus	27.5	good	80-90	2
Pinus	strobus	31	good	80-90	2
Pinus	strobus	33.9	good	80-90	2
Pinus	strobus	51	good	80-90	2
Quercus	alba	10.8,11.8	good	90-100	2
Quercus	rubra	11.1,8.1	good	90-100	2
Acer	rubrum	11.1/7/5.2	good	70-80	2
Tsuga	canadensis	11.6,11.2	good	60-70	2
Quercus	rubra	12.1,16.3	good	90-100	2
Quercus	velutina	12/9.5	good	90-100	2
Quercus	rubra	13.4,17.8	good	90-100	2
Populus	grandifolia	4.5/3.7	good	20-30	2
Quercus	rubra	5,7	good	90-100	2
Malus	spp.	5.1,2.6	good	60-70	2
Acer	platanoides	7.3,8	good	60-70	2
Acer	rubrum	7.6,9.5	good	70-80	2
Quercus	rubra	4	fair	90-100	2
Quercus	rubra	4.1	fair	90-100	2
Acer	rubrum	4.2	fair	70-80	2
Malus	spp.	4.2	fair	60-70	2
Pinus	strobus	4.2	fair	80-90	2
Quercus	rubra	4.3	fair	90-100	2
Quercus	rubra	4.3	fair	90-100	2
Quercus	rubra	4.3	fair	90-100	2
Frangulus	alnus	4.3	fair	not listed	2
Quercus	rubra	4.3	fair	90-100	2
Quercus	rubra	4.4	fair	90-100	2
Quercus	rubra	4.5	fair	90-100	2
Quercus	rubra	4.7	fair	90-100	2
Quercus	rubra	4.7	fair	90-100	2

Town of Wayland - Loker Conservation and Recreation Area

Attachment B: Tree Inventory/ Assessment - Wetland Upland Areas

GENUS	SPECIES	DIAMETER BREAST HEIGHT (DBH)-INCHES	CONDITION	RATING	Replacement Count Per Guidelines
Quercus	alba	4.7	fair	90-100	2
Rhamnus	cathartica	4.9	fair	not listed	2
Quercus	rubra	5.1	fair	90-100	2
Quercus	velutina	5.2	fair	90-100	2
Juniperus	virginiana	5.2	fair	60-70	2
Quercus	rubra	5.3	fair	90-100	2
Quercus	rubra	5.6	fair	90-100	2
Quercus	rubra	5.9	fair	90-100	2
Quercus	rubra	6	fair	90-100	2
Juniperus	virginiana	6.1	fair	60-70	2
Quercus	rubra	6.2	fair	90-100	2
Quercus	rubra	6.4	fair	90-100	2
Fraxinus	pensylvanica	6.4	fair	70-80	2
Quercus	rubra	6.4	fair	90-100	2
Juniperus	virginiana	6.4	fair	60-70	2
Pinus	strobus	6.5	fair	80-90	2
Pinus	strobus	7	fair	80-90	2
Quercus	rubra	7.1	fair	90-100	2
Quercus	rubra	7.1	fair	90-100	2
Pinus	resinosa	7.3	fair	50-60	2
Quercus	rubra	7.3	fair	90-100	2
Quercus	rubra	7.5	fair	90-100	2
Quercus	rubra	7.5	fair	90-100	2
Quercus	rubra	7.9	fair	90-100	2
Pinus	resinosa	8	fair	50-60	2
Quercus	rubra	8.2	fair	90-100	2
Pinus	resinosa	8.2	fair	50-60	2
Quercus	alba	8.5	fair	90-100	2
Quercus	rubra	8.6	fair	90-100	2
Juniperus	virginiana	8.6	fair	60-70	2
Juniperus	virginiana	8.7	fair	60-70	2
Quercus	rubra	8.7	fair	90-100	2
Acer	rubrum	8.7	fair	70-80	2
Quercus	rubra	8.8	fair	90-100	2
Quercus	rubra	9.1	fair	90-100	2
Pinus	resinosa	9.2	fair	50-60	2
Quercus	rubra	9.3	fair	90-100	2
Quercus	rubra	9.4	fair	90-100	2
Quercus	rubra	9.5	fair	90-100	2
Juniperus	virginiana	9.6	fair	60-70	2
Pinus	resinosa	9.7	fair	50-60	2
Juniperus	virginiana	9.8	fair	60-70	2
Pinus	resinosa	9.9	fair	50-60	2
Pinus	resinosa	10	fair	50-60	2
Quercus	alba	10.3	fair	90-100	2
Pinus	strobus	10.3	fair	80-90	2

Town of Wayland - Loker Conservation and Recreation Area

Attachment B: Tree Inventory/ Assessment - Wetland Upland Areas

GENUS	SPECIES	DIAMETER BREAST HEIGHT (DBH)-INCHES	CONDITION	RATING	Replacement Count Per Guidelines
Pinus	resinosa	10.5	fair	50-60	2
Quercus	rubra	10.7	fair	90-100	2
Juniperus	virginiana	10.8	fair	60-70	2
Pinus	resinosa	11	fair	50-60	2
Pinus	resinosa	11.1	fair	50-60	2
Pinus	resinosa	11.2	fair	50-60	2
Quercus	rubra	11.4	fair	90-100	2
Pinus	resinosa	11.7	fair	50-60	2
Pinus	resinosa	11.7	fair	50-60	2
Quercus	rubra	12	fair	90-100	3
Pinus	resinosa	12.1	fair	50-60	3
Pinus	resinosa	12.2	fair	50-60	3
Quercus	velutina	12.3	fair	90-100	3
Pinus	resinosa	12.7	fair	50-60	3
Pinus	resinosa	13	fair	50-60	3
Pinus	resinosa	13.1	fair	50-60	3
Pinus	resinosa	13.1	fair	50-60	3
Quercus	rubra	13.2	fair	90-100	3
Pinus	resinosa	13.2	fair	50-60	3
Quercus	rubra	13.3	fair	90-100	3
Pinus	resinosa	14.2	fair	50-60	3
Quercus	rubra	14.7	fair	90-100	3
Quercus	alba	14.9	fair	90-100	3
Quercus	velutina	14.9	fair	90-100	3
Pinus	resinosa	15	fair	50-60	3
Pinus	resinosa	15.3	fair	50-60	3
Quercus	rubra	15.3	fair	90-100	3
Pinus	resinosa	16.2	fair	50-60	3
Pinus	resinosa	16.3	fair	50-60	3
Pinus	resinosa	16.3	fair	50-60	3
Pinus	resinosa	16.8	fair	50-60	3
Pinus	resinosa	16.9	fair	50-60	3
Pinus	resinosa	17.2	fair	50-60	3
Pinus	resinosa	17.4	fair	50-60	3
Ulmus	spp.	17.5	fair	20-30	3
Quercus	rubra	17.9	fair	90-100	3
Quercus	rubra	17.9	fair	90-100	3
Quercus	velutina	18.3	fair	90-100	5
Quercus	rubra	18.5	fair	90-100	5
Pinus	resinosa	20.4	fair	50-60	5
Pinus	resinosa	21.5	fair	50-60	5
Juniperus	virginiana	23.5	fair	60-70	5
Pinus	strobus	28.4	fair	80-90	7
Quercus	rubra	28.4	fair	90-100	7
Quercus	rubra	10.1,4	fair	90-100	2
Juniperus	virginiana	11.1,9.2	fair	60-70	2

Town of Wayland - Loker Conservation and Recreation Area

Attachment B: Tree Inventory/ Assessment - Wetland Upland Areas

GENUS	SPECIES	DIAMETER BREAST HEIGHT (DBH)-INCHES	CONDITION	RATING	Replacement Count Per Guidelines
Pinus	resinosa	11.6,11.7	fair	50-60	2
Quercus	rubra	14.9,15.6	fair	90-100	3
Quer	alba	3.9/4.1	fair	90-100	1
Quercus	rubra	4,3.3,3,3.4	fair	90-100	1
Quercus	rubra	4.4,3.5	fair	90-100	1
Quercus	velutina	4.9,3.3	fair	90-100	1
Juniperus	virginiana	4.9,5.3,6.2,5.9	fair	60-70	2
Juniperus	virginiana	5.8,4,3.3,2.6	fair	60-70	1
Acer	rubra	6,3	fair	90-100	2
Malus	spp.	6.4,5.6,6.7	fair	60-70	2
Juniperus	virginiana	7.5,8.3,7.5	fair	60-70	2
Juniperus	virginiana	9.6,7,13.1	fair	60-70	2
Quercus	rubra	9.8, 5.4	fair	90-100	2
Quercus	rubra	4	poor	90-100	1
Quercus	alba	4	poor	90-100	1
Quercus	rubra	4.2	poor	90-100	1
Quercus	spp.	4.2	poor	90-100	1
Quercus	rubra	4.3	poor	90-100	1
Juniperus	virginiana	5	poor	60-70	1
Quercus	alba	5.1	poor	90-100	1
Malus	spp.	5.1	poor	60-70	1
Juniperus	virginiana	5.5	poor	60-70	1
Quercus	alba	5.7	poor	90-100	1
Pinus	resinosa	6.1	poor	50-60	2
Ulmus	spp.	7.1	poor	20-30	2
Pinus	resinosa	7.3	poor	50-60	2
Juniperus	virginiana	7.4	poor	60-70	2
Pinus	resinosa	8.2	poor	50-60	2
Quercus	rubra	8.5	poor	90-100	2
Prunus	serotina	8.5	poor	40-50	2
Quercus	alba	9	poor	90-100	2
Pinus	resinosa	9.3	poor	50-60	2
Pinus	resinosa	9.4	poor	50-60	2
Juniperus	virginiana	9.6	poor	60-70	2
Pinus	resinosa	9.7	poor	50-60	2
Pinus	strobus	9.8	poor	80-90	2
Pinus	resinosa	10.3	poor	50-60	2
Pinus	resinosa	10.5	poor	50-60	2
Pinus	resinosa	10.5	poor	50-60	2
Pinus	resinosa	10.9	poor	50-60	2
Pinus	resinosa	11.2	poor	50-60	2
Pinus	resinosa	11.2	poor	50-60	2
Pinus	resinosa	11.4	poor	50-60	2
Juniperus	virginiana	12.8	poor	60-70	3
Pinus	resinosa	13.2	poor	50-60	3
Carya	cordiformis	13.4	poor	70-80	3

Town of Wayland - Loker Conservation and Recreation Area

Attachment B: Tree Inventory/ Assessment - Wetland Upland Areas

GENUS	SPECIES	DIAMETER BREAST HEIGHT (DBH)-INCHES	CONDITION	RATING	Replacement Count Per Guidelines
Pinus	resinosa	14	poor	50-60	3
Pinus	resinosa	14.1	poor	50-60	3
Pinus	resinosa	14.2	poor	50-60	3
Pinus	resinosa	15.2	poor	50-60	3
Pinus	resinosa	15.3	poor	50-60	3
Pinus	resinosa	15.5	poor	50-60	3
Pinus	resinosa	18.6	poor	50-60	5
Pinus	resinosa	19.5	poor	50-60	5
Malus	spp.	4.1,3.5,3	poor	60-70	1
Juniperus	virginiana	4.4,5.1	poor	60-70	1
Juniperus	virginiana	5.2,4.1	poor	60-70	1
Prunus	spp.	6.5,3.9,5.5,4.3	poor	40-50	2
Juniperus	virginiana	9.5,5,4.8	poor	60-70	2

Total Number of Trees Removed: 335

Total Number of Replacement Trees Per Guidelines: 683

Weston & Sampson

5 Centennial Drive, Peabody, MA 01960 (HQ)
Tel: 978.532.1900

MEMORANDUM

TO: Cassidy Chroust

FROM: Mel Higgins, PWS

DATE: April 23, 2018

SUBJECT: Wetland Delineation
Loker Conservation and Recreation Area
Wayland, Massachusetts

On April 13, 2018, the presence of wetland resources was investigated on at the Loker Conservation and Recreation Area, located at 410 Commonwealth Road in Waymouth, MA.

Wetland resource areas including top of bank of three small ponds and top of bank of two intermittent streams were identified and flagged in the field using pink flagging by a Weston & Sampson employee who is trained in the wetland delineation process using the Massachusetts Department of Environmental Protection (MassDEP) manual "*Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act*" and the US Army Corps of Engineers' *Wetland Delineation Manual*. The location and flag numbering system can be seen on the attached field map.

Site Hydrology

The upgradient-most surface water body is a small pond to the north of the parking spaces, noted as "Pond 3", below. This pond is dammed at its southern extent, near the parking spaces. Water flows over the small stop blocks and through a culvert which runs beneath the parking spaces/access road. Upon exiting the culvert, the water flows in a southerly direction through an intermittent stream and into a small pond named "Pond 1", below. Water from Pond 1 exits to the east, through a culvert below the access road, and outfalls into "Pond 2", mentioned below. There did not appear to be an exit for the surface water at Pond 2.

A further description of these wetland resource areas is presented, below.

Pond 1 (Top of Bank)

The first of three small ponds delineated at the site is located west of the site access road, just north of Commonwealth Road. Flags left in the field indicating top of bank were TOB-A1 through TOB-A15. The top of bank was identified as the first natural break in slope, and often had a near vertical slope. Bordering vegetated wetlands (BVW) were not noted upgradient of the top of bank.

Pond 2 (Top of Bank)

The second of three small ponds delineated at the site is located east of the site access road, just north of Commonwealth Road. Flags left in the field indicating top of bank were TOB-B1 through TOB-B21. The top of bank was identified as the first natural break in slope, and often had a near vertical slope. Bordering vegetated wetlands (BVW) were not noted upgradient of the top of bank.

Pond 3 (Top of Bank)

The third of three small ponds delineated at the site is located north of the parking spaces at the site. Flags left in the field indicating top of bank were TOC-C1 through TOB-C18. The top of bank was identified as the first natural break in slope, and often had a near vertical slope. Bordering vegetated wetlands (BVW) were not noted upgradient of the top of bank.

Intermittent Stream Banks

Two intermittent streams were identified downgradient from Pond 3 which can convey water from Pond 3 to Pond 1. The first intermittent stream originated from the northern access road culvert and flows in a southerly direction until it joins with the Pond 1 bank. At the time of the site visit, water was flowing in this intermittent stream. The eastern edge of the intermittent stream bank was flagged in the field with flags ISB-A1 through ISB-A6. The top of bank was identified as the first natural break in slope, and often had a near vertical slope.

The second intermittent stream also originated from the northern culvert, and flows in a westerly direction, eventually changing course and heading in a southerly direction until it intersects with the northern bank of Pond 1. At the time of this field effort, there was no surface water flowing in this intermittent stream. The northern, and then western, bank of this second intermittent stream was flagged, leaving flags ISB-A1 through ISB-A15 in the field. The top of bank was identified as the first natural break in slope, and often had a near vertical slope.

Attached please find a field map showing the wetland limits flagged in the field with associated wetland flag numbers.

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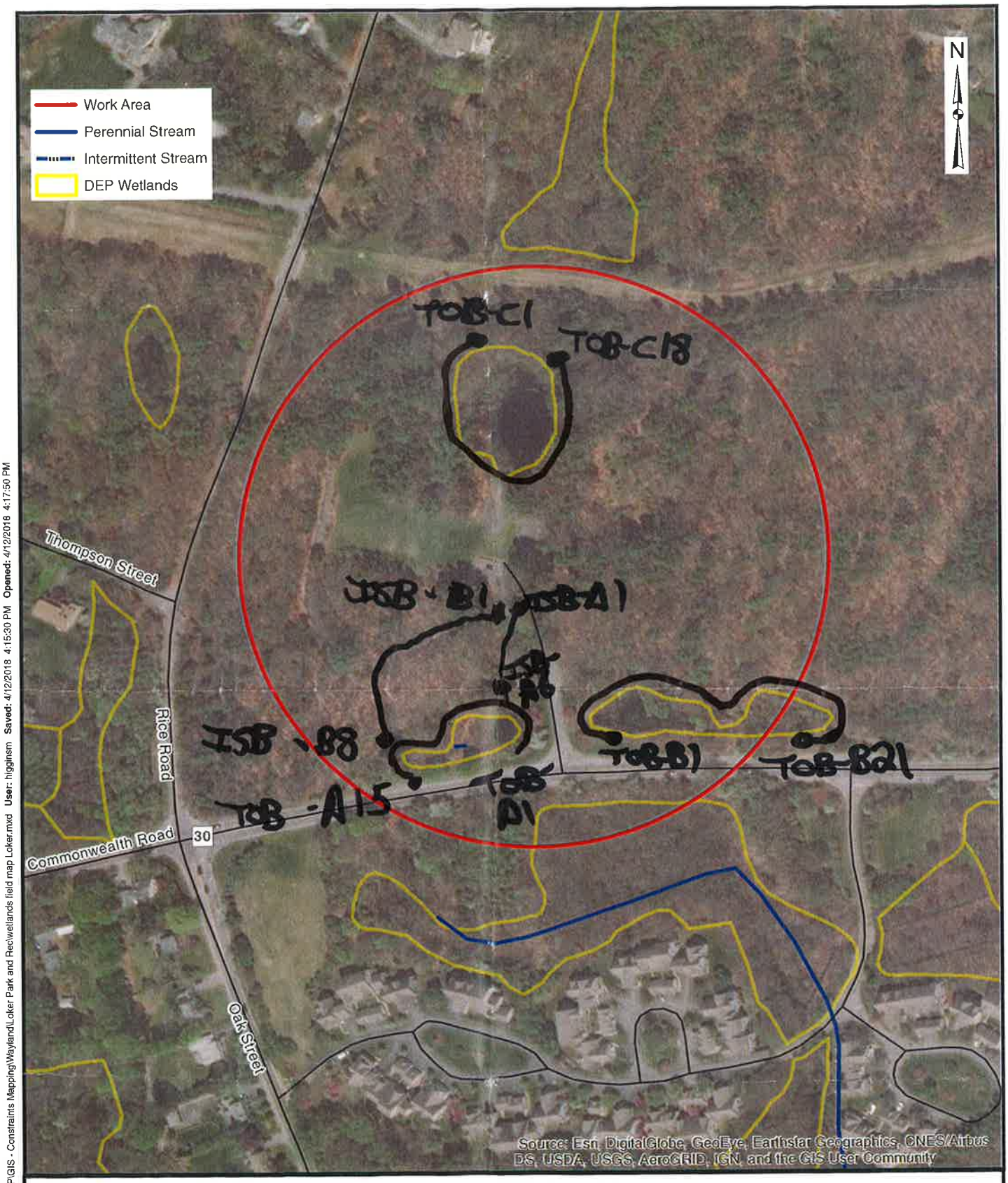

FIGURE 1
Loker Conservation and Recreation Area
Wayland, Massachusetts

WETLANDS FIELD MAP

200 0 200
Scale In Feet

Weston & Sampson

Path: \\wse03.local\WSE\Depts\Water\ERMAP\GIS - Constraints Mapping\Wayland\Loker Park and Rec\wetlands field map Loker.mxd **User:** higginsm **Saved:** 4/12/2018 4:15:30 PM **Opened:** 4/12/2018 4:17:50 PM