Stormwater Management Report

NOVO Riverside Commons

292-294 Baker Avenue
Concord, Massachusetts

Prepared for:
NOVO Riverside Commons, LLC

Prepared by:

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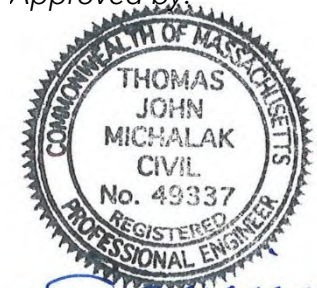

Thomas J. Michalak, PE

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1.0 INTRODUCTION

1.1 Executive Summary

The project site is located at the existing 300-310 Baker Avenue site in Concord. The Applicant is proposing two residential apartment buildings be constructed along the southern portion of the 300-310 Baker Avenue property on a new 10.2 acre parcel. The overall site currently consists of a general office building and associated parking areas. Stormwater runoff ultimately flows to the Assabet River which abuts the property to the south and west. Portions of the existing development fall within the 100-Year Floodplain of the Assabet River.

The project has been designed in accordance with:

- The 2008 Massachusetts Department of Environmental Protection (DEP) Stormwater Management Handbook,
- The Massachusetts Wetland Protection Act (310 CMR 10.00), and
- The Concord Wetlands Bylaw (where practicable)

The pre- and post-development hydrologic conditions were modeled using HydroCAD™ version 8.00 to demonstrate that post-development stormwater runoff rates will be less than or equal to the pre-development rates. Watershed maps with soil types as well as detailed analysis of the model results are also included. The following tables summarize the peak runoff rates and volumes for the pre and post-development conditions to the respective design points. Design points DP-1, 2 & 3 are interim design points, interior to the site; design points DP-4, 5, & 6 are ultimate design points, where runoff discharges from the development area. Peak rates of runoff are attenuated at the respective ultimate design points.

Table 1: Pre- & Post-development Peak Runoff Rate Comparison, units are in cubic feet per second (cfs).

Storm Event	2-Year		10-Year		25-Year		100-Year	
	Pre	Post	*Pre*	Post	*Pre*	Post	*Pre*	Post
DP-1	*3.94 cfs*	4.16 cfs	*10.54 cfs*	9.29 cfs	*16.62 cfs*	13.85 cfs	*30.02 cfs*	26.50 cfs
DP-2	*0.09 cfs*	0.00 cfs	*0.21 cfs*	0.00 cfs	*0.22 cfs*	0.00 cfs	*0.34 cfs*	0.01 cfs
DP-3	*0.64 cfs*	0.62 cfs	*1.58 cfs*	1.50 cfs	*2.41 cfs*	2.46 cfs	*4.23 cfs*	4.49 cfs
DP-4	*0.32 cfs*	0.14 cfs	*0.77 cfs*	0.23 cfs	*1.17 cfs*	0.30 cfs	*2.02 cfs*	0.43 cfs
DP-5	*0.64 cfs*	0.62 cfs	*1.59 cfs*	1.50 cfs	*2.45 cfs*	2.46 cfs	*4.47 cfs*	4.46 cfs
DP-6	*0.96 cfs*	0.67 cfs	*2.36 cfs*	1.60 cfs	*3.62 cfs*	2.69 cfs	*6.49 cfs*	4.83 cfs

Table 2: Pre- & Post-development Runoff Volume Comparison, units are in acre-feet.

Storm Event	2-Year		10-Year		25-Year		100-Year	
	Pre	Post	*Pre*	Post	*Pre*	Post	*Pre*	Post
DP-1	*0.442 af*	0.401 af	*1.050 af*	0.886 af	*1.606 af*	1.372 af	*2.864 af*	2.499 af
DP-2	*0.143 af*	0.00 af	*0.386 af*	0.000 af	*0.409 af*	0.000 af	*0.470 af*	0.001 af
DP-3	*0.051 af*	0.338 af	*0.116 af*	0.756 af	*0.175 af*	0.943 af	*0.307 af*	1.320 af
DP-4	*0.025 af*	0.011 af	*0.057 af*	0.018 af	*0.085 af*	0.023 af	*0.147 af*	0.035 af
DP-5	*0.194 af*	0.338 af	*0.502 af*	0.756 af	*0.585 af*	0.944 af	*0.777 af*	1.321 af
DP-6	*0.219 af*	0.349 af	*0.559 af*	0.774 af	*0.669 af*	0.967 af	*0.924 af*	1.356 af

2.0 PRE-DEVELOPMENT CONDITIONS

2.1 Site Conditions

The proposed 10.2-acre parcel is partially developed with parking areas and site driveways serving for the 300-310 Baker Avenue office building. The western portion of the parcel consists of bordering vegetated wetlands (BVW) associated with the Assabet River. A pond and associated BVW are located within the central portion of the site. Stormwater from the existing paved parking areas is collected in catch basins and discharged to onsite wetland pond with minimal treatment of stormwater.

2.2 Total Maximum Daily Loads (TMDL)

A TMDL is the greatest amount of a pollutant that a waterbody can accept and still meet water quality standards for protecting public health and maintaining the designated beneficial uses of those waters for drinking, swimming, recreation, and fishing. A TMDL is implemented by specifying how much of that pollutant can come from point, nonpoint, and natural sources.

MassDEP has issued a Phosphorus Total Maximum Daily Load (TMDL) for the Assabet River as part of the Concord (SuAsCo) basin.

2.3 Soil Description

The Natural Resources Conservation Service (NRCS) lists the on-site soils as:

Rippowam Fine Sandy Loam

A poorly drained soil consisting of 80% Rippowam, 10% Saco, 5% Pootatuck, and 5% Limerick component materials. Generally, this soil is located on alluvial flats on alluvial plains, with layers of fine sandy loam, sandy loam, and stratified sand to fine sand to 65 inches below the surface. Parent material consists of loamy alluvium over sandy and gravelly alluvium derived from granite and gneiss. NRCS classifies this type of soil as dual-hydrologic class HSG A/D (upland/wetland, for the purposes of this analysis).

Hinckley Loamy Sand

An excessively drained soil consisting of 80% Hinckley, 8% Merrimac, 5% Windsor and 2% Sudbury. Generally, this soil is located on kames on valleys, and has layers of loamy sand and gravelly loamy sand to 19 inches below the surface. Very gravelly sand parent material consists of sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist. NRCS classifies this type of soil as hydrologic class HSG A.

Merrimac-Urban Land Complex
A somewhat excessively drained soil consisting of 45% Merrimac, 40% Urban Land, 5% Windsor, 5% Sudbury, and 5% Hinckley. Generally, this soil is located on outwash terraces on outwash plains, and has layers of fine sandy loam, stratified gravel to gravelly sandy loam to 26 inches below the surface. Stratified gravel to very gravelly sand parent material consists of loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss. NRCS classifies this type of soil as hydrologic class HSG A.

Urban Land & Udorthents
NRCS does not provide a hydrologic soil classification for these soils. Given the adjacent soils, these soils were conservatively assumed to be hydrologic soil class HSG A.

2.4 Hydrologic Analysis

Sub-catchment areas were delineated based on existing runoff patterns and topographic information. This information is shown on the *Pre-Development Conditions Hydrologic Areas Map* included in Attachment 2. Summaries of each area with respect to Curve Number and Time of Concentration calculations can be found in the model results also in Attachment 2.

3.0 POST-DEVELOPMENT CONDITIONS

3.1 Design Strategy

During the design phase of the site layout, consideration was given to conserving environmentally sensitive features and minimizing impact on the existing hydrology. To achieve this, extensive grading was avoided and the site was designed to match the existing terrain where feasible. Minimizing earthwork helps to maintain the existing drainage patterns to the maximum extent practicable under post-development conditions. On-site resource areas, such as the Bordering Vegetated Wetlands were excluded from the development envelope and will not be altered by the proposed project.

A stormwater management system has been designed to mitigate increased rates of runoff and to provide treatment for stormwater runoff associated with the proposed impervious surfaces on site. Stormwater BMPs were designed to treat a minimum of the first 1.0 inch of runoff generated by the majority of on-site impervious areas (the exceptions being portions of the proposed public access trail and adjacent fire lane). Proprietary structural treatment devices were designed to treat the runoff rate associated with the water quality volume for trafficked areas in accordance with the requirements of the DEP Stormwater Handbook. A majority of the proposed parking and associated driveways are routed through proprietary treatment devices prior to infiltrative BMPs.

The net increase in impervious area for the project is approximate to the combined rooftop area of the proposed residential buildings. Roof runoff is generally considered clean and does not require additional treatment for water quality. The total exposed paved area subject to traffic will be less than that of the pre-development condition and a majority of this impervious will be treated to a higher standard than the existing paved areas.

The reduced paved surfaces and proposed infiltrative stormwater systems will provide a net reduction in total phosphorus (as related to the final TMDL associated with the Assabet River), as well.

Water quality sizing calculations are included in Attachment 6 of this report.

To mitigate increased stormwater runoff volumes associated with the proposed increase in impervious area, proposed stormwater BMPs include an infiltrative component. The infiltration system will overflow to proposed outfalls directed toward the existing wetlands, consistent with the existing hydrology of the site.

Additional subsurface storage volumes are proposed to compensate for proposed fill within the floodplain and to account for the increased runoff volume generated onsite for the 100-year storm event.

3.2 Hydrologic Analysis

The established design points used in the pre-development conditions analysis were used in the post-development analysis for direct comparison. The tributary areas and flow paths were modified to reflect post-development conditions. See Attachment 3 for the *Post- Development Conditions Hydrologic Areas Map*. Summaries of each area with respect to Curve Number and Time of Concentration calculations can be found in the model results in Attachment 3.

3.3 Stormwater Management Controls Sizing

Subusurface Infiltration Chambers

The proposed stormwater infiltration/detention systems consist of StormTrap precast concrete vault-chambers. The systems have been designed with outlet controls (including emergency overflow weirs) within downgradient manholes to mitigate peak rates of runoff.

The infiltration system was sized using the Static Method, as described in Chapter 3 of the Massachusetts Stormwater Handbook, using a Rawl's exfiltration rate of 0.27 inches per hour. The system has been designed to meet the required recharge volume (associated with the net increase in impervious area) and will fully dewater within 72 hours.

Separate subsurface floodplain compensation volumes consisting of StormTrap vault-chamber systems are also proposed (though have not been modeled for mitigation of peak rates of runoff).

Water Quality Structures

Six (6) water quality structures are proposed as part of the residential development. The water quality structures will treat the majority of pavement on the proposed residential lot except for a small portion of the ponding lot on the north side of the parcel which will drain to a sediment forebay.

3.4 Hydraulic Calculations

The proposed storm drain system was analyzed based on the 25-year and 100-year rational storm events using the Rational Formula. A watershed map depicting the catchment area for each respective inlet and detailed hydraulic analysis are provided in Attachment 5.

3.5 Compliance with DEP Stormwater Management Standards

The proposed stormwater management system was designed in compliance with the ten (10) DEP Stormwater Management Standards. The following summary provides key information related to the proposed stormwater management system, its design elements, and mitigation measures for potential impacts.

STANDARD 1: **No new stormwater conveyance (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.**

There will be no direct discharge of untreated stormwater to nearby wetlands or waters of the Commonwealth. Runoff from all impervious areas of the site will be conveyed to stormwater management controls for infiltration, water quality treatment, and runoff rate attenuation prior to discharge to adjacent wetlands.

STANDARD 2: **Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.**

The stormwater management design will control post-development peak discharge rates for the 2, 10, 25, and 100-year, 24-hour storms so as to maintain pre-development peak discharge rates at the ultimate design points. Refer to Section 1.0 Introduction for a summary of the peak runoff rates.

STANDARD 3: **Loss of annual recharge to groundwater shall be eliminated or minimized through the use of environmentally sensitive site design, low impact development techniques, stormwater management practices and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil types. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.**

The stormwater management system includes a stormwater infiltration system that will effectively recharge groundwater on-site. Infiltration BMPs were sized using the static method based on the required recharge volume for the net increase in impervious area associated with the post-development site. As a result, annual recharge from the post-development site will approximate the annual recharge from the site under pre-development conditions. See Attachment 5 for stormwater BMP design worksheets and Groundwater Recharge Calculation.

STANDARD 4: **Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).**

The proposed development will meet the Standard 4 requirement to the maximum extent practicable using several on-site treatment trains that achieve 80% TSS removal (minimum) for a majority of the site, which is a significant improvement over the existing impervious areas. While portions of the public access trail and adjacent fire lane are not routed to a treatment BMP, a majority of the parking area and associated driveways are routed to water quality units before subsurface infiltration systems. The net increase in impervious area associated with the project is approximate to combined roof area of the proposed residential buildings, which does not require treatment for TSS.

Structural BMPs designed for water quality treatment include proprietary water quality treatment units and the reconstruction of a sediment forebay.

Proposed stormwater management BMPs will be operated and maintained to ensure continued water quality treatment of runoff. The Site Owner's Manual will comply with the Long-Term Pollution Prevention Plan (Standard 4) and the Long-Term Operation and Maintenance Plan (Standard 9) requirements of the 2008 Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards. The Manual will outline source control and pollution prevention measures and maintenance requirements of stormwater best management practices (BMPs) associated with the proposed development.

STANDARD 5: **For land uses with higher potential pollutant loads (LUHPPLs), source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.**

The proposed project is not associated with stormwater discharges from land uses with higher potential pollutant loads.

STANDARD 6: **Stormwater discharges to critical areas must utilize certain stormwater management BMPs approved for critical areas. Critical areas are Outstanding Resource Waters, shellfish beds, swimming beaches, coldwater fisheries and recharge areas for public water supplies.**

There are no stormwater discharges to critical areas associated with this project.

STANDARD 7: **Redevelopment of previously developed sites must meet the Stormwater Management Standards to the maximum extent practicable. However, if it is not practicable to meet all the Standards, new (retrofitted or expanded) stormwater management systems must be designed to improve existing conditions.**

The proposed project is a mixture of new development and redevelopment. As such, certain portions of the site meet select Standards only to the maximum extent practicable.

STANDARD 8: **A plan to control construction-related impacts during erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.**

A Stormwater Pollution Prevention Plan (SWPPP) will be developed prior to construction to comply with Section 3 of the NPDES Construction General Permit for Stormwater Discharges; therefore the requirements of Standard 8 are fulfilled.

STANDARD 9: **A Long-Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.**

The Site Owner's Manual complies with the Long-Term Pollution Prevention Plan (Standard 4) and the Long-Term Operation and Maintenance Plan (Standard 9) requirements of the 2008 Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards. The Manual outlines source control and pollution prevention measures and maintenance requirements of the stormwater best management practices (BMPs) associated with the proposed development.

STANDARD 10: **All illicit discharges to the stormwater management system are prohibited.**

There will be no illicit discharges to the proposed stormwater management system associated with the proposed project. An Illicit Discharge Compliance Statement is provided on the following page.

3.6 Illicit Discharge Compliance Statement

An illicit discharge is any discharge to a stormwater management system that is not comprised entirely of stormwater, discharges from fire-fighting activities, and certain non-designated non-stormwater discharges.

To the best of my knowledge, no detectable illicit discharge exists on site. The site plans included with this report detail the storm sewers that convey stormwater on the site and demonstrate that these systems do not include the entry of an illicit discharge. A Site Owner's Manual is also included, which contains the Long Term Pollution Plan that outlines measures to prevent future illicit discharges. As the Site Owner, I will ultimately be responsible for implementing the Long Term Pollution Prevention Plan.

Signature: _____

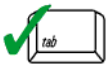
Owner's Name

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.

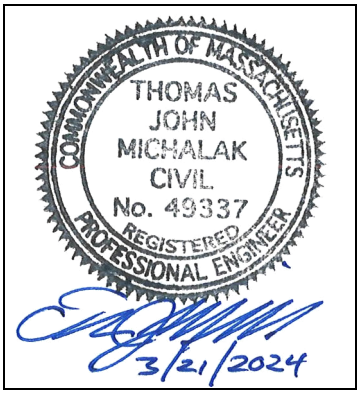
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



Thomas J. Michalak, March 21, 2024

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;

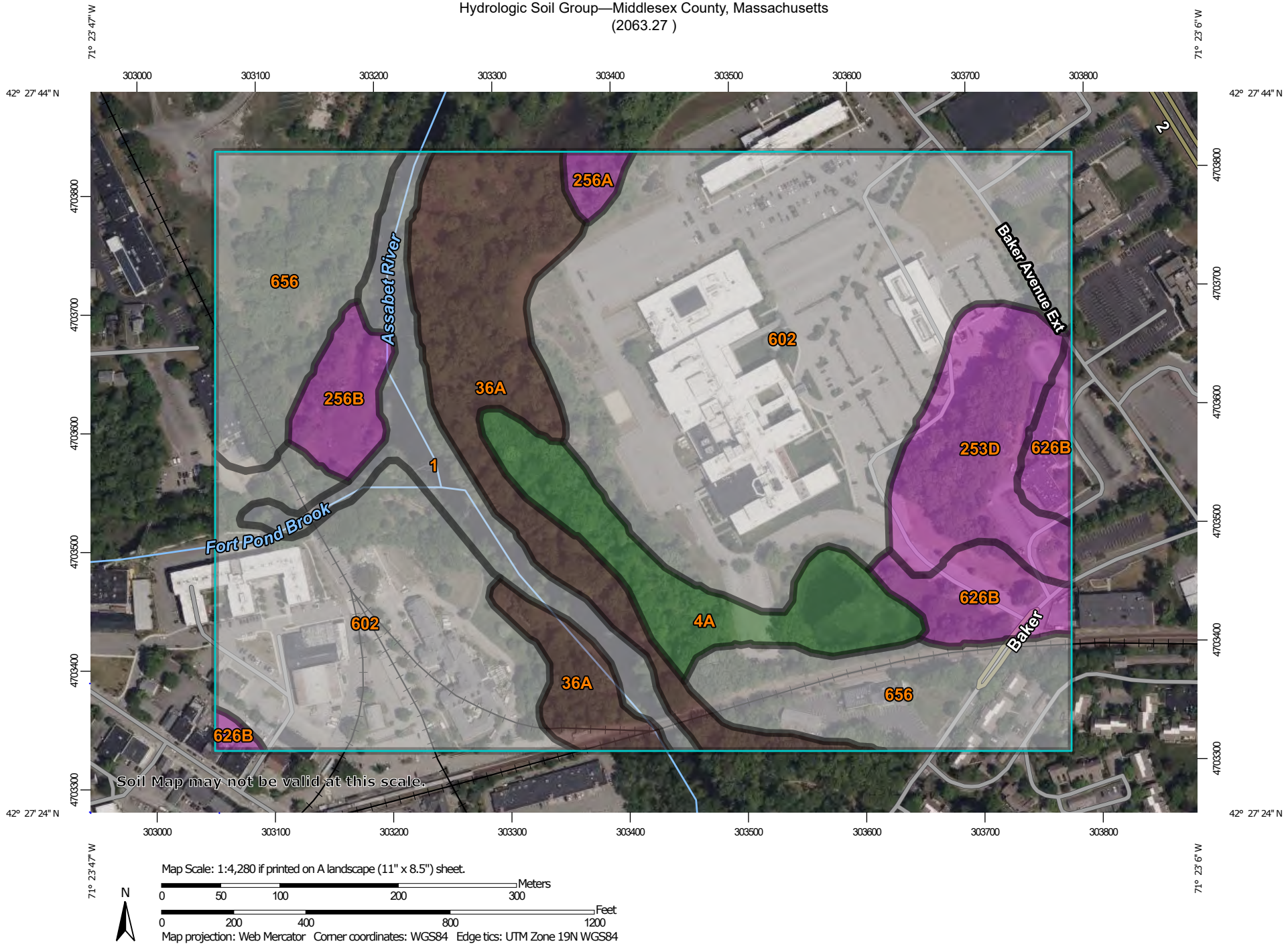
☒ An Illicit Discharge Compliance Statement is attached;

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

Attachment 1
Soil Data

BEALS AND THOMAS

Hydrologic Soil Group—Middlesex County, Massachusetts
(2063.27)



Map Scale: 1:4,280 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

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 22, Sep 9, 2022

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

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
1	Water		5.2	5.8%
4A	Rippowam fine sandy loam, 0 to 3 percent slopes, frequently flooded	A/D	5.3	5.9%
36A	Saco mucky silt loam, frequently ponded, 0 to 1 percent slopes, frequently flooded	B/D	11.4	12.5%
253D	Hinckley loamy sand, 15 to 25 percent slopes	A	5.9	6.4%
256A	Deerfield loamy fine sand, 0 to 3 percent slopes	A	0.6	0.7%
256B	Deerfield loamy fine sand, 3 to 8 percent slopes	A	2.0	2.2%
602	Urban land		43.1	47.5%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	3.7	4.1%
656	Udorthents-Urban land complex		13.5	14.9%
Totals for Area of Interest			**90.7**	**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

Map Unit Description (Brief, Generated)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, provide information on the composition of map units and properties of their components.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description (Brief, Generated)

Middlesex County, Massachusetts

Map Unit: 1—Water

Component: Water (100%)

Generated brief soil descriptions are created for major soil components. The Water is a miscellaneous area.

Map Unit: 4A—Rippowam fine sandy loam, 0 to 3 percent slopes, frequently flooded

Component: Rippowam (80%)

The Rippowam component makes up 80 percent of the map unit. Slopes are 0 to 3 percent. This component is on alluvial flats on alluvial plains. The parent material consists of loamy alluvium over sandy and gravelly alluvium derived from granite and gneiss. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is frequently flooded. It is not ponded. A seasonal zone of water saturation is at 9 inches during January, February, March, April, May, June, September, October, November, December. Organic matter content in the surface horizon is about 6 percent. This component is in the F144AY014CT Wet Sandy Low Floodplain ecological site. Nonirrigated land capability classification is 4w. This soil meets hydric criteria.

Component: Saco (10%)

Generated brief soil descriptions are created for major soil components. The Saco soil is a minor component.

Component: Pootatuck (5%)

Generated brief soil descriptions are created for major soil components. The Pootatuck soil is a minor component.

Component: Limerick (5%)

Generated brief soil descriptions are created for major soil components. The Limerick soil is a minor component.

Map Unit: 36A—Saco mucky silt loam, frequently ponded, 0 to 1 percent slopes, frequently flooded

Component: Saco (80%)

The Saco component makes up 80 percent of the map unit. Slopes are 0 to 1 percent. This component is on alluvial flats on alluvial plains, terraces on alluvial plains. The parent material consists of silty alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is low. This soil is frequently flooded. It is frequently ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, October, November, December. Organic matter content in the surface horizon is about 15 percent. This component is in the F144AY016MA Very Wet Low Floodplain ecological site. Nonirrigated land capability classification is 6w. This soil meets hydric criteria.

Component: Freetown (8%)

Generated brief soil descriptions are created for major soil components. The Freetown soil is a minor component.

Component: Swansea (8%)

Generated brief soil descriptions are created for major soil components. The Swansea soil is a minor component.

Component: Limerick (4%)

Generated brief soil descriptions are created for major soil components. The Limerick soil is a minor component.

Map Unit: 253D—Hinckley loamy sand, 15 to 25 percent slopes

Component: Hinckley (85%)

The Hinckley component makes up 85 percent of the map unit. Slopes are 15 to 25 percent. This component is on kames on valleys. The parent material consists of sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 95 percent. Below this thin organic horizon the organic matter content is about 6 percent. This component is in the F144AY022MA Dry Outwash ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria.

Component: Merrimac (8%)

Generated brief soil descriptions are created for major soil components. The Merrimac soil is a minor component.

Component: Windsor (5%)

Generated brief soil descriptions are created for major soil components. The Windsor soil is a minor component.

Component: Sudbury (2%)

Generated brief soil descriptions are created for major soil components. The Sudbury soil is a minor component.

Map Unit: 256A—Deerfield loamy fine sand, 0 to 3 percent slopes

Component: Deerfield (85%)

The Deerfield component makes up 85 percent of the map unit. Slopes are 0 to 3 percent. This component is on outwash plains on lowlands. The parent material consists of sandy outwash derived from granite, gneiss, and/or quartzite. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 25 inches during January, February, March, April, May, June, November, December. Organic matter content in the surface horizon is about 3 percent. This component is in the F144AY027MA Moist Sandy Outwash ecological site. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Component: Windsor (7%)

Generated brief soil descriptions are created for major soil components. The Windsor soil is a minor component.

Component: Wareham (5%)

Generated brief soil descriptions are created for major soil components. The Wareham soil is a minor component.

Component: Sudbury (2%)

Generated brief soil descriptions are created for major soil components. The Sudbury soil is a minor component.

Component: Ninigret (1%)

Generated brief soil descriptions are created for major soil components. The Ninigret soil is a minor component.

Map Unit: 256B—Deerfield loamy fine sand, 3 to 8 percent slopes

Component: Deerfield (85%)

The Deerfield component makes up 85 percent of the map unit. Slopes are 3 to 8 percent. This component is on outwash plains on lowlands. The parent material consists of sandy outwash derived from granite, gneiss, and/or quartzite. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 25 inches during January, February, March, April, May, June, November, December. Organic matter content in the surface horizon is about 3 percent. This component is in the F144AY027MA Moist Sandy Outwash ecological site. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

Component: Windsor (7%)

Generated brief soil descriptions are created for major soil components. The Windsor soil is a minor component.

Component: Wareham (5%)

Generated brief soil descriptions are created for major soil components. The Wareham soil is a minor component.

Component: Sudbury (2%)

Generated brief soil descriptions are created for major soil components. The Sudbury soil is a minor component.

Component: Ninigret (1%)

Generated brief soil descriptions are created for major soil components. The Ninigret soil is a minor component.

Map Unit: 602—Urban land

Component: Urban land (85%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Component: Udorthents, loamy (5%)

Generated brief soil descriptions are created for major soil components. The Udorthents, loamy soil is a minor component.

Component: Rock outcrop (5%)

Generated brief soil descriptions are created for major soil components. The Rock outcrop soil is a minor component.

Component: Udorthents, wet substratum (5%)

Generated brief soil descriptions are created for major soil components. The Udorthents, wet substratum soil is a minor component.

Map Unit: 626B—Merrimac-Urban land complex, 0 to 8 percent slopes

Component: Merrimac (45%)

The Merrimac component makes up 45 percent of the map unit. Slopes are 0 to 8 percent. This component is on outwash terraces on outwash plains. The parent material consists of loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. This component is in the F144AY022MA Dry Outwash ecological site. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Component: Urban land (40%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Component: Windsor (5%)

Generated brief soil descriptions are created for major soil components. The Windsor soil is a minor component.

Component: Sudbury (5%)

Generated brief soil descriptions are created for major soil components. The Sudbury soil is a minor component.

Component: Hinckley (5%)

Generated brief soil descriptions are created for major soil components. The Hinckley soil is a minor component.

Map Unit: 656—Udorthents-Urban land complex

Component: Udorthents (45%)

The Udorthents component makes up 45 percent of the map unit. Slopes are 0 to 15 percent. This component is on fills, leveled land, railroad beds, sanitary landfills. The parent material consists of loamy alluvium and/or sandy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy marine deposits and/or loamy basal till and/or loamy lodgment till. Depth to a root restrictive layer is greater than 60 inches. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. This soil does not meet hydric criteria.

Component: Urban land (35%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

Component: Canton (10%)

Generated brief soil descriptions are created for major soil components. The Canton soil is a minor component.

Component: Merrimac (5%)

Generated brief soil descriptions are created for major soil components. The Merrimac soil is a minor component.

Component: Paxton (5%)

Generated brief soil descriptions are created for major soil components. The Paxton soil is a minor component.

Data Source Information

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 22, Sep 9, 2022

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named, soils that are similar to the named components, and some minor components that differ in use and management from the major soils.

Most of the soils similar to the major components have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Some minor components, however, have properties and behavior characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Middlesex County, Massachusetts

1—Water

Map Unit Setting

National map unit symbol: 996p
Frost-free period: 110 to 200 days

Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear

4A—Rippowam fine sandy loam, 0 to 3 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2zvd6
Elevation: 50 to 1,180 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Rippowam and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rippowam

Setting

Landform: Alluvial flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Loamy alluvium over sandy and gravelly alluvium derived from granite and gneiss

Typical profile

H1 - 0 to 7 inches: fine sandy loam
H2 - 7 to 18 inches: fine sandy loam
H3 - 18 to 40 inches: sandy loam
H4 - 40 to 65 inches: stratified sand to fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F144AY014CT - Wet Sandy Low Floodplain
Hydric soil rating: Yes

Minor Components

Saco

Percent of map unit: 10 percent
Landform: Terraces, alluvial flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Pootatuck

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Limerick

Percent of map unit: 5 percent
Landform: Terraces, alluvial flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

36A—Saco mucky silt loam, frequently ponded, 0 to 1 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2zvfl
Elevation: 30 to 500 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Saco and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saco

Setting

Landform: Terraces, alluvial flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Silty alluvium

Typical profile

H1 - 0 to 13 inches: mucky silt loam
H2 - 13 to 30 inches: silt loam
H3 - 30 to 45 inches: silt loam
H4 - 45 to 65 inches: loamy sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 to 2 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B/D
Ecological site: F144AY016MA - Very Wet Low Floodplain
Hydric soil rating: Yes

Minor Components

Freetown

Percent of map unit: 8 percent
Landform: Bogs, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Swansea

Percent of map unit: 8 percent
Landform: Depressions, bogs
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Limerick

Percent of map unit: 4 percent
Landform: Terraces, alluvial flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

253D—Hinckley loamy sand, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2svmc
Elevation: 0 to 1,460 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Hinckley and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Kames, kame terraces, outwash deltas, outwash terraces, moraines, eskers, outwash plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand

BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 8 percent
Landform: Eskers, outwash terraces, kames, outwash plains, moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Kames, kame terraces, moraines, eskers, outwash deltas, outwash terraces, outwash plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Sudbury

Percent of map unit: 2 percent
Landform: Eskers, kame terraces, outwash deltas, moraines, outwash plains, outwash terraces
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Convex, concave, linear

Across-slope shape: Convex, concave, linear
Hydric soil rating: No

256A—Deerfield loamy fine sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2xfg8
Elevation: 0 to 1,100 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Deerfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Deerfield

Setting

Landform: Outwash terraces, outwash deltas, outwash plains, kame terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy outwash derived from granite, gneiss, and/or quartzite

Typical profile

Ap - 0 to 9 inches: loamy fine sand
Bw - 9 to 25 inches: loamy fine sand
BC - 25 to 33 inches: fine sand
Cg - 33 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: About 15 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Sodium adsorption ratio, maximum: 11.0
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Ecological site: F144AY027MA - Moist Sandy Outwash
Hydric soil rating: No

Minor Components

Windsor
Percent of map unit: 7 percent
Landform: Outwash terraces, kame terraces, outwash deltas, outwash plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Wareham
Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Sudbury
Percent of map unit: 2 percent
Landform: Outwash plains, kame terraces, outwash deltas, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Ninigret
Percent of map unit: 1 percent
Landform: Kame terraces, outwash plains, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, concave
Hydric soil rating: No

602—Urban land

Map Unit Setting
National map unit symbol: 9950
Elevation: 0 to 3,000 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition
Urban land: 85 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Excavated and filled land

Minor Components

Udorthents, loamy

Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 5 percent
Landform: Ledges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave

Udorthents, wet substratum

Percent of map unit: 5 percent
Hydric soil rating: No

626B—Merrimac-Urban land complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyr9
Elevation: 0 to 820 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Merrimac and similar soils: 45 percent
Urban land: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames

Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Crest, side slope, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8

Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Windsor
Percent of map unit: 5 percent
Landform: Outwash terraces, dunes, outwash plains, deltas
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Sudbury
Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hinckley
Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, crest, side slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

656—Udorthents-Urban land complex

Map Unit Setting
National map unit symbol: 995k
Elevation: 0 to 3,000 feet
Mean annual precipitation: 32 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 110 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition
Udorthents and similar soils: 45 percent
Urban land: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Parent material: Loamy alluvium and/or sandy glaciofluvial deposits and/or loamy glaciolacustrine deposits and/or loamy marine deposits and/or loamy basal till and/or loamy lodgment till

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Excavated and filled land

Minor Components

Canton

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Backslope, toeslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent
Landform: Terraces, plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Paxton

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Head slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex

Hydric soil rating: No

Data Source Information

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 22, Sep 9, 2022

Attachment 2
Pre-Development Hydrologic Analysis

BEALS AND THOMAS

2063.27 Pre-Development Hydrology Calculation Summary

Objective

To determine the pre-development peak rates of runoff and total runoff volumes to the respective design points associated with the 2, 10, 25 & 100-year storm events.

Conclusion

Storm Event	2-Year Runoff		10-Year Runoff		25-Year Runoff		100-Year Runoff	
Design Point	Peak Rate	Total Volume	Peak Rate	Total Volume	Peak Rate	Total Volume	Peak Rate	Total Volume
DP-1	3.94 cfs	0.442 af	10.54 cfs	1.050 af	16.62 cfs	1.606 af	30.02 cfs	2.864 af
DP-2	0.09 cfs	0.143 af	0.21 cfs	0.386 af	0.22 cfs	0.409 af	0.34 cfs	0.470 af
DP-3	0.64 cfs	0.051 af	1.58 cfs	0.116 af	2.41 cfs	0.175 af	4.23 cfs	0.307 af
DP-4	0.32 cfs	0.025 af	0.77 cfs	0.057 af	1.17 cfs	0.085 af	2.02 cfs	0.147 af
DP-5	0.64 cfs	0.194 af	1.59 cfs	0.502 af	2.45 cfs	0.585 af	4.47 cfs	0.777 af
DP-6	0.96 cfs	0.219 af	2.36 cfs	0.559 af	3.62 cfs	0.669 af	6.49 cfs	0.924 af

Calculation Methods

1. Runoff curve numbers (CN) and times-of-concentration (Tc) are based on TR-55 methodology.
2. Peak rates of runoff and total runoff volumes were computed with HydroCAD (version 10.20-3c).
3. Subcatchment areas were imported into HydroCAD from AutoCAD Civil 3D.

Assumptions

1. A minimum Tc of 6.0 minutes was used, where applicable.
2. Storm events are Type III 24-hr rainfall distribution for Concord, Massachusetts.
3. Surface cover types and watershed boundaries were estimated based on B+T topographic base information.
4. For areas with dual Hydrologic Soil Group (HSG) classifications, wetlands were considered HSG D.
5. Soils mapped as "Udorthents" and/or "Urban Land" were considered HSG A soils, given the HSG of adjacent mapped soils.
6. Design Points are as follows:
    - Interim Design Points
        - DP-1 – To Existing Pond
        - DP-2 – West to Conservation Restriction
        - DP-3 – Northwest to rear of #300 Baker Avenue
    - Primary Design Points
        - DP-4 – To Existing Stormwater Infrastructure East of #300 Baker Avenue
        - DP-5 –To Bordering Vegetative Wetlands to the West
        - DP-6 – To Assabet River (Confluence of DP-4 & DP-5)

Sources of Data/ Equations

1. Existing Conditions Watershed Map (dated 3/21/2024) prepared by Beals and Thomas, Inc. (206327P123C-001).
2. Topographic AutoCAD base file 206326B017E generated by Beals and Thomas, Inc.
3. Pre-development HydroCAD file 206327HC002C generated by Beals and Thomas, Inc.
4. Existing pond model from HydroCAD file 206317HC001B (Pond P-7: Pond 7) included in the Proposed Hotel Development Stormwater Management Report (206317RP001B) prepared by Beals and Thomas, Inc. dated 9/5/2014.
5. TR-55 Urban Hydrology for Small Watersheds, SCS, 1986.
6. Storm event rainfall sourced from HydroCAD 10.20-3c.
7. Hydrologic Soil Groups per MassMapper GIS data layers and USDA NRCS Web Soil Survey (both downloaded August 5, 2023).
8. Massachusetts Department of Environmental Protection Stormwater Handbook dated February 2008.

List of Attachments

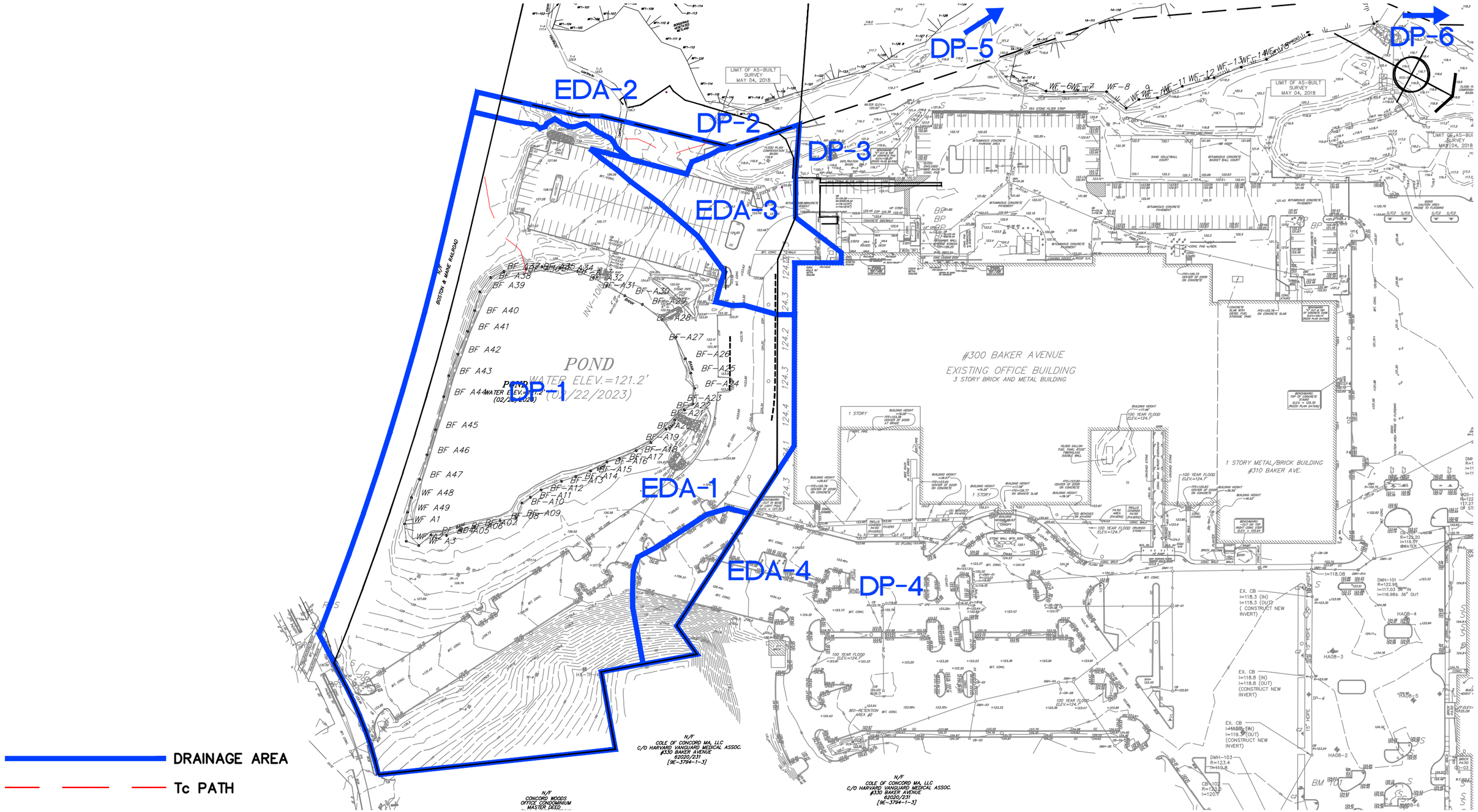
1. NOVO Riverside Commons Existing Conditions Watershed Map (Figure 1)
2. Pre-Development Hydrologic Calculations.

REV	CALC. BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
0						

206327CS002C

NOVO Riverside Commons

Concord, Massachusetts



METERS
0 10 25 50 100

0 60 120 240 360
FEET

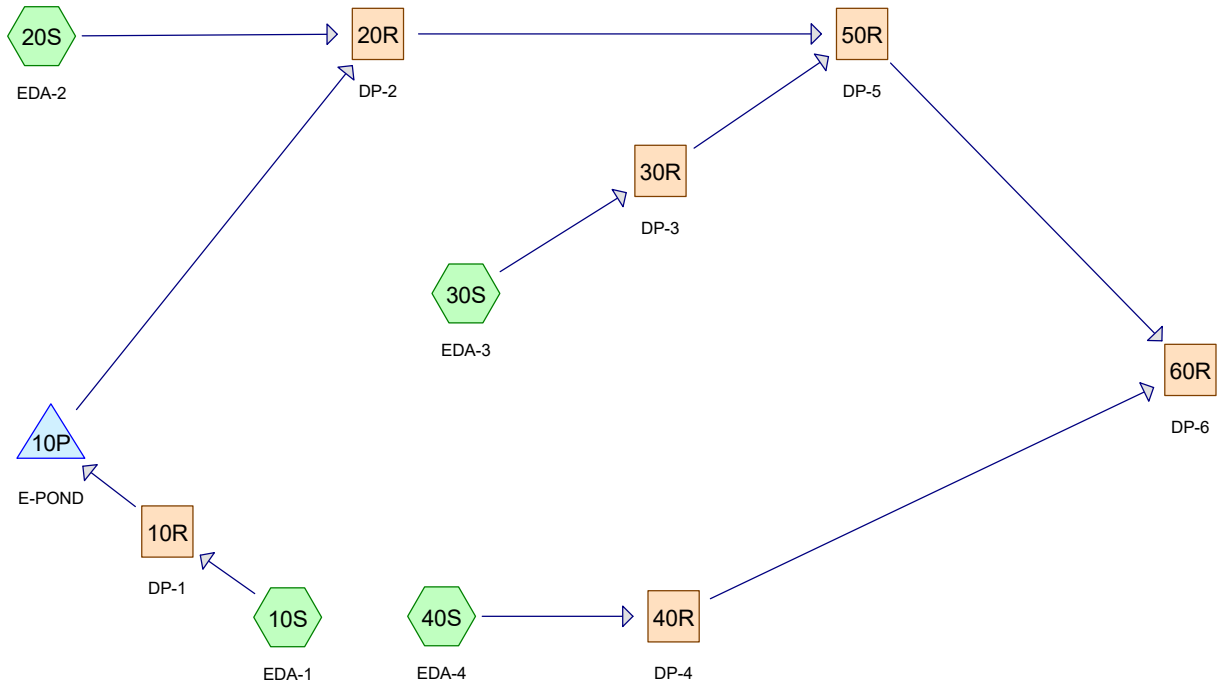
BEALS AND THOMAS

B+T Drawing No. 206327P123C-001 Date: 3/21/2024 Scale: 1" = 120'

Existing Conditions

Watershed Map

Figure 1



PRE-DEVELOPMENT

Subcat Reach Pond Link

Routing Diagram for 206327HC002C
Prepared by Beals & Thomas Inc, Printed 3/20/2024

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.09	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.65	2
3	25-Year	Type III 24-hr		Default	24.00	1	5.87	2
4	100-Year	Type III 24-hr		Default	24.00	1	8.36	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.669	39	>75% Grass cover, Good, HSG A (10S, 20S, 30S, 40S)
0.567	96	Gravel surface, HSG A (10S, 20S)
2.177	98	Paved parking, HSG A (10S, 30S, 40S)
1.724	98	Water Surface, HSG D (10S)
1.432	30	Woods, Good, HSG A (10S, 20S, 30S, 40S)
0.132	77	Woods, Good, HSG D (10S)
8.700	**68**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
6.844	HSG A	10S, 20S, 30S, 40S
0.000	HSG B	
0.000	HSG C	
1.856	HSG D	10S
0.000	Other	
8.700		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
2.669	0.000	0.000	0.000	0.000	2.669	>75% Grass cover, Good	10S, 20S, 30S, 40S
0.567	0.000	0.000	0.000	0.000	0.567	Gravel surface	10S, 20S
2.177	0.000	0.000	0.000	0.000	2.177	Paved parking	10S, 30S, 40S
0.000	0.000	0.000	1.724	0.000	1.724	Water Surface	10S
1.432	0.000	0.000	0.132	0.000	1.564	Woods, Good	10S, 20S, 30S, 40S
6.844	**0.000**	**0.000**	**1.856**	**0.000**	**8.700**	**TOTAL AREA**	

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 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 10S: EDA-1 Runoff Area=7.381 ac 44.61% Impervious Runoff Depth=0.72"
Flow Length=141' Tc=15.5 min CN=69 Runoff=3.94 cfs 0.442 af

Subcatchment 20S: EDA-2 Runoff Area=0.214 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=117' Tc=10.5 min CN=37 Runoff=0.00 cfs 0.000 af

Subcatchment 30S: EDA-3 Runoff Area=0.753 ac 54.42% Impervious Runoff Depth=0.81"
Tc=6.0 min CN=71 Runoff=0.64 cfs 0.051 af

Subcatchment 40S: EDA-4 Runoff Area=0.352 ac 56.27% Impervious Runoff Depth=0.86"
Tc=6.0 min CN=72 Runoff=0.32 cfs 0.025 af

Reach 10R: DP-1 Inflow=3.94 cfs 0.442 af
Outflow=3.94 cfs 0.442 af

Reach 20R: DP-2 Inflow=0.09 cfs 0.143 af
Outflow=0.09 cfs 0.143 af

Reach 30R: DP-3 Inflow=0.64 cfs 0.051 af
Outflow=0.64 cfs 0.051 af

Reach 40R: DP-4 Inflow=0.32 cfs 0.025 af
Outflow=0.32 cfs 0.025 af

Reach 50R: DP-5 Inflow=0.64 cfs 0.194 af
Outflow=0.64 cfs 0.194 af

Reach 60R: DP-6 Inflow=0.96 cfs 0.219 af
Outflow=0.96 cfs 0.219 af

Pond 10P: E-POND Peak Elev=121.61' Storage=0.372 af Inflow=3.94 cfs 0.442 af
4.0" Round Culvert n=0.012 L=275.0' S=0.0090 '/' Outflow=0.09 cfs 0.143 af

Total Runoff Area = 8.700 ac Runoff Volume = 0.518 af Average Runoff Depth = 0.71"
55.16% Pervious = 4.799 ac 44.84% Impervious = 3.901 ac

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 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 10S: EDA-1 Runoff Area=7.381 ac 44.61% Impervious Runoff Depth=1.71"
Flow Length=141' Tc=15.5 min CN=69 Runoff=10.54 cfs 1.050 af

Subcatchment 20S: EDA-2 Runoff Area=0.214 ac 0.00% Impervious Runoff Depth=0.08"
Flow Length=117' Tc=10.5 min CN=37 Runoff=0.00 cfs 0.002 af

Subcatchment 30S: EDA-3 Runoff Area=0.753 ac 54.42% Impervious Runoff Depth=1.86"
Tc=6.0 min CN=71 Runoff=1.58 cfs 0.116 af

Subcatchment 40S: EDA-4 Runoff Area=0.352 ac 56.27% Impervious Runoff Depth=1.93"
Tc=6.0 min CN=72 Runoff=0.77 cfs 0.057 af

Reach 10R: DP-1 Inflow=10.54 cfs 1.050 af
Outflow=10.54 cfs 1.050 af

Reach 20R: DP-2 Inflow=0.21 cfs 0.386 af
Outflow=0.21 cfs 0.386 af

Reach 30R: DP-3 Inflow=1.58 cfs 0.116 af
Outflow=1.58 cfs 0.116 af

Reach 40R: DP-4 Inflow=0.77 cfs 0.057 af
Outflow=0.77 cfs 0.057 af

Reach 50R: DP-5 Inflow=1.59 cfs 0.502 af
Outflow=1.59 cfs 0.502 af

Reach 60R: DP-6 Inflow=2.36 cfs 0.559 af
Outflow=2.36 cfs 0.559 af

Pond 10P: E-POND Peak Elev=121.89' Storage=0.860 af Inflow=10.54 cfs 1.050 af
4.0" Round Culvert n=0.012 L=275.0' S=0.0090 '/' Outflow=0.21 cfs 0.384 af

Total Runoff Area = 8.700 ac Runoff Volume = 1.225 af Average Runoff Depth = 1.69"
55.16% Pervious = 4.799 ac 44.84% Impervious = 3.901 ac

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 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 10S: EDA-1 Runoff Area=7.381 ac 44.61% Impervious Runoff Depth=2.61"
Flow Length=141' Tc=15.5 min CN=69 Runoff=16.62 cfs 1.606 af

Subcatchment 20S: EDA-2 Runoff Area=0.214 ac 0.00% Impervious Runoff Depth=0.31"
Flow Length=117' Tc=10.5 min CN=37 Runoff=0.02 cfs 0.006 af

Subcatchment 30S: EDA-3 Runoff Area=0.753 ac 54.42% Impervious Runoff Depth=2.79"
Tc=6.0 min CN=71 Runoff=2.41 cfs 0.175 af

Subcatchment 40S: EDA-4 Runoff Area=0.352 ac 56.27% Impervious Runoff Depth=2.89"
Tc=6.0 min CN=72 Runoff=1.17 cfs 0.085 af

Reach 10R: DP-1 Inflow=16.62 cfs 1.606 af
Outflow=16.62 cfs 1.606 af

Reach 20R: DP-2 Inflow=0.22 cfs 0.409 af
Outflow=0.22 cfs 0.409 af

Reach 30R: DP-3 Inflow=2.41 cfs 0.175 af
Outflow=2.41 cfs 0.175 af

Reach 40R: DP-4 Inflow=1.17 cfs 0.085 af
Outflow=1.17 cfs 0.085 af

Reach 50R: DP-5 Inflow=2.45 cfs 0.585 af
Outflow=2.45 cfs 0.585 af

Reach 60R: DP-6 Inflow=3.62 cfs 0.669 af
Outflow=3.62 cfs 0.669 af

Pond 10P: E-POND Peak Elev=122.19' Storage=1.402 af Inflow=16.62 cfs 1.606 af
4.0" Round Culvert n=0.012 L=275.0' S=0.0090 '/' Outflow=0.21 cfs 0.404 af

Total Runoff Area = 8.700 ac Runoff Volume = 1.872 af Average Runoff Depth = 2.58"
55.16% Pervious = 4.799 ac 44.84% Impervious = 3.901 ac

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 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 10S: EDA-1 Runoff Area=7.381 ac 44.61% Impervious Runoff Depth=4.66"
Flow Length=141' Tc=15.5 min CN=69 Runoff=30.02 cfs 2.864 af

Subcatchment 20S: EDA-2 Runoff Area=0.214 ac 0.00% Impervious Runoff Depth=1.12"
Flow Length=117' Tc=10.5 min CN=37 Runoff=0.14 cfs 0.020 af

Subcatchment 30S: EDA-3 Runoff Area=0.753 ac 54.42% Impervious Runoff Depth=4.89"
Tc=6.0 min CN=71 Runoff=4.23 cfs 0.307 af

Subcatchment 40S: EDA-4 Runoff Area=0.352 ac 56.27% Impervious Runoff Depth=5.01"
Tc=6.0 min CN=72 Runoff=2.02 cfs 0.147 af

Reach 10R: DP-1 Inflow=30.02 cfs 2.864 af
Outflow=30.02 cfs 2.864 af

Reach 20R: DP-2 Inflow=0.34 cfs 0.470 af
Outflow=0.34 cfs 0.470 af

Reach 30R: DP-3 Inflow=4.23 cfs 0.307 af
Outflow=4.23 cfs 0.307 af

Reach 40R: DP-4 Inflow=2.02 cfs 0.147 af
Outflow=2.02 cfs 0.147 af

Reach 50R: DP-5 Inflow=4.47 cfs 0.777 af
Outflow=4.47 cfs 0.777 af

Reach 60R: DP-6 Inflow=6.49 cfs 0.924 af
Outflow=6.49 cfs 0.924 af

Pond 10P: E-POND Peak Elev=122.83' Storage=2.634 af Inflow=30.02 cfs 2.864 af
4.0" Round Culvert n=0.012 L=275.0' S=0.0090 '/' Outflow=0.23 cfs 0.450 af

Total Runoff Area = 8.700 ac Runoff Volume = 3.338 af Average Runoff Depth = 4.60"
55.16% Pervious = 4.799 ac 44.84% Impervious = 3.901 ac

Summary for Subcatchment 10S: EDA-1

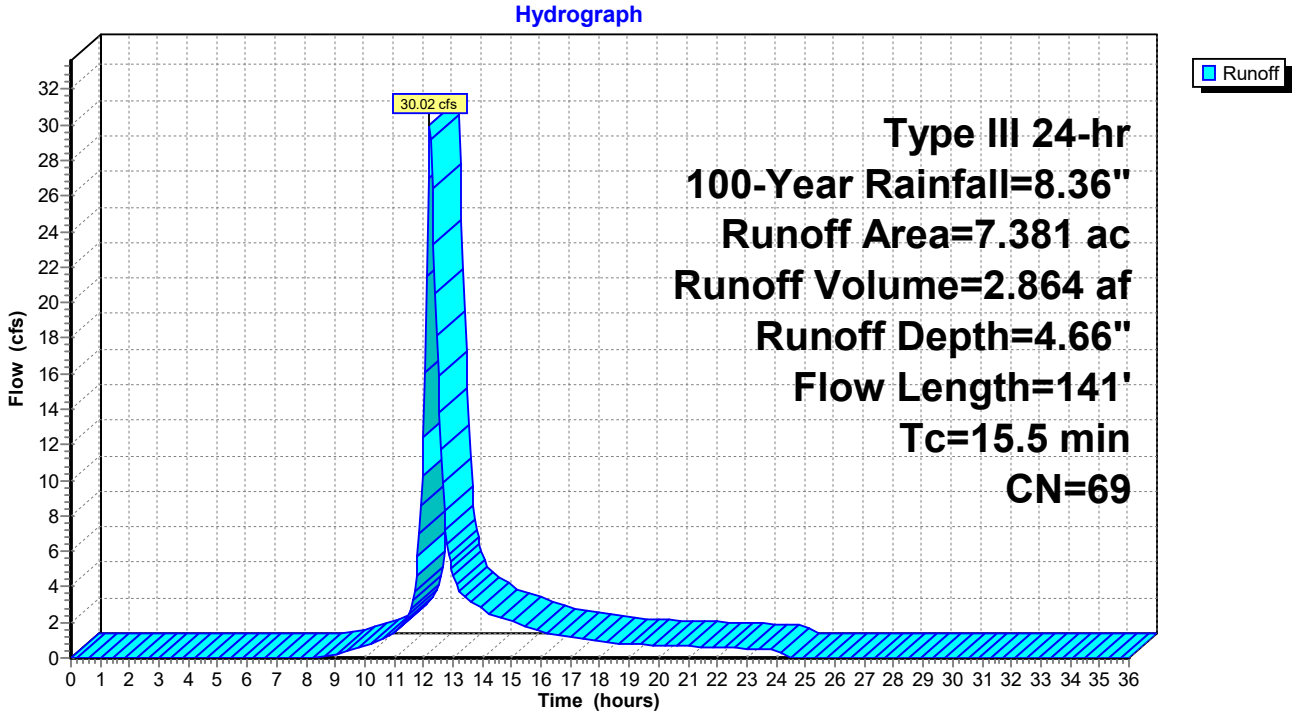
Runoff = 30.02 cfs @ 12.22 hrs, Volume= 2.864 af, Depth= 4.66"
Routed to Reach 10R : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.36"

Area (ac)	CN	Description
2.167	39	>75% Grass cover, Good, HSG A
0.548	96	Gravel surface, HSG A
1.569	98	Paved parking, HSG A
1.724	98	Water Surface, HSG D
1.242	30	Woods, Good, HSG A
0.132	77	Woods, Good, HSG D
7.381	69	Weighted Average
4.088		55.39% Pervious Area
3.293		44.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	50	0.0140	0.06		**Sheet Flow, SF** Woods: Light underbrush n= 0.400 P2= 3.09"
0.9	67	0.0569	1.19		**Shallow Concentrated Flow, SCF-1** Woodland Kv= 5.0 fps
0.1	24	0.2962	2.72		**Shallow Concentrated Flow, SCF-2** Woodland Kv= 5.0 fps
15.5	141	Total			

Subcatchment 10S: EDA-1



Summary for Subcatchment 20S: EDA-2

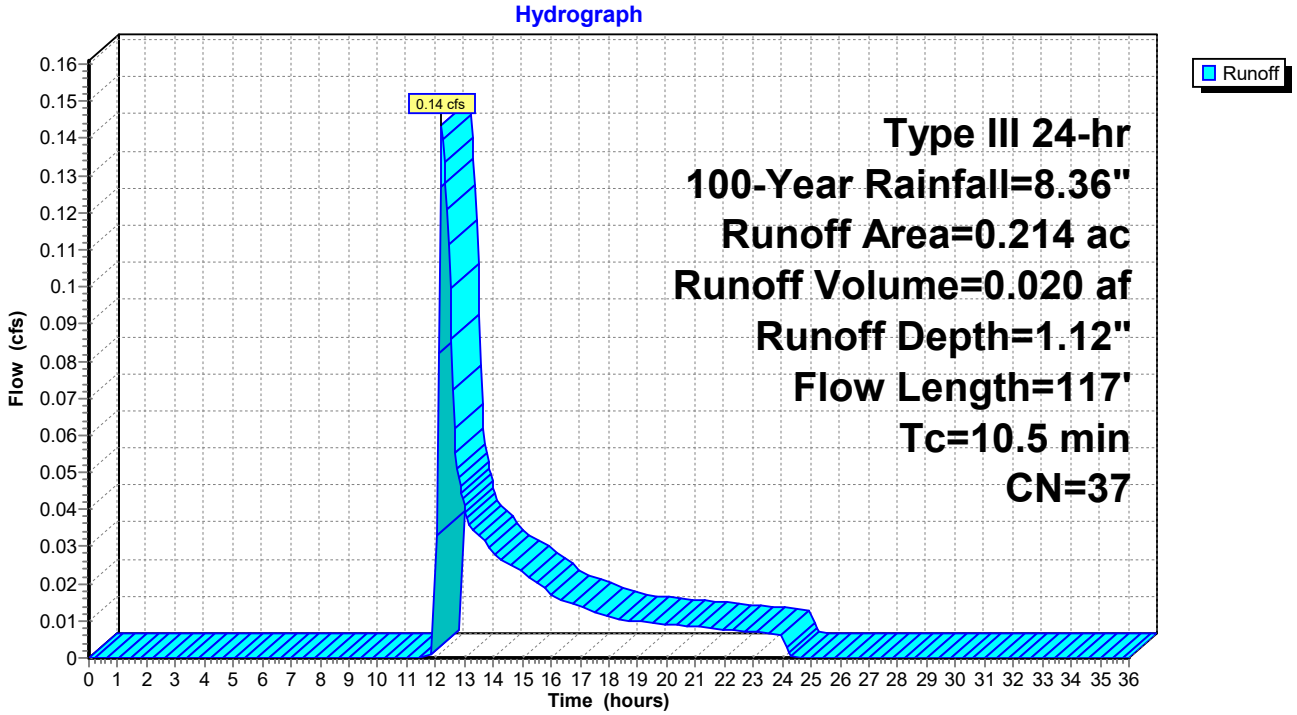
Runoff = 0.14 cfs @ 12.22 hrs, Volume= 0.020 af, Depth= 1.12"
Routed to Reach 20R : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.36"

Area (ac)	CN	Description
0.026	39	>75% Grass cover, Good, HSG A
0.019	96	Gravel surface, HSG A
0.169	30	Woods, Good, HSG A
0.214	37	Weighted Average
0.214		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	50	0.0400	0.09		**Sheet Flow, SHT** Woods: Light underbrush n= 0.400 P2= 3.09"
1.0	67	0.0505	1.12		**Shallow Concentrated Flow, SCF-1** Woodland Kv= 5.0 fps
10.5	117	Total			

Subcatchment 20S: EDA-2



Summary for Subcatchment 30S: EDA-3

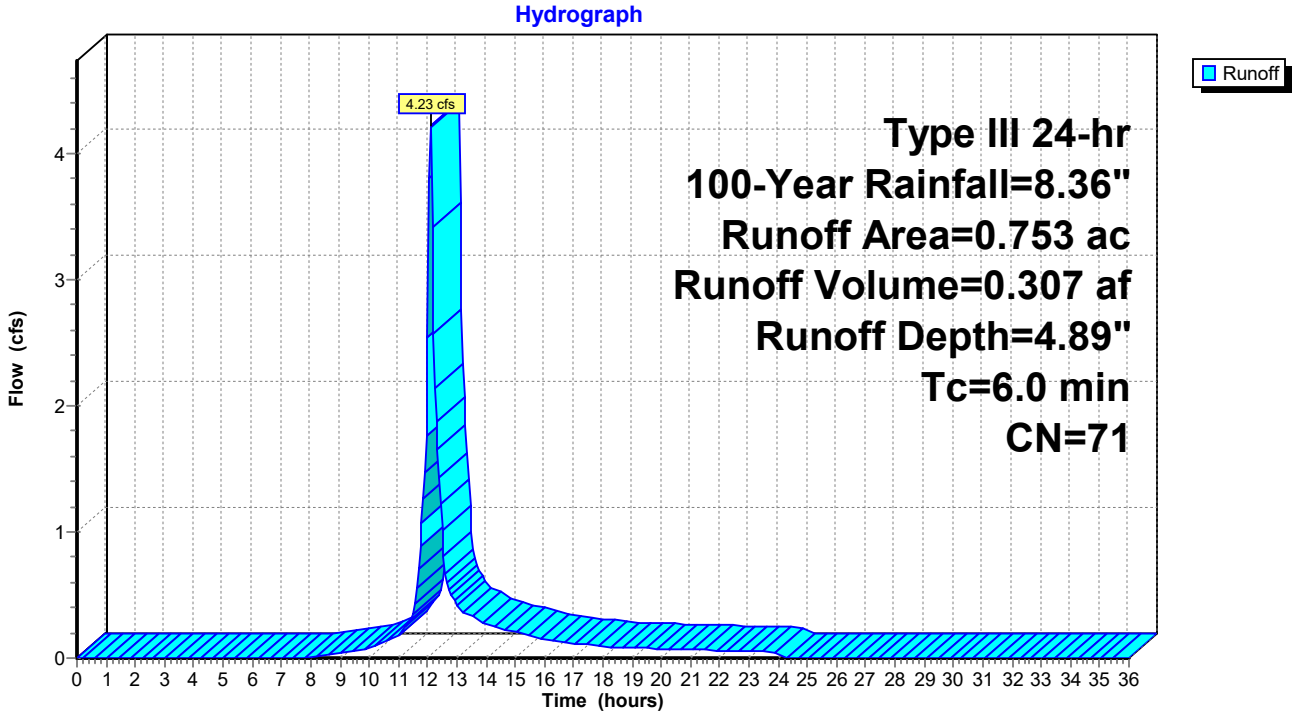
Runoff = 4.23 cfs @ 12.09 hrs, Volume= 0.307 af, Depth= 4.89"
Routed to Reach 30R : DP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.36"

Area (ac)	CN	Description
0.323	39	>75% Grass cover, Good, HSG A
0.410	98	Paved parking, HSG A
0.020	30	Woods, Good, HSG A
0.753	71	Weighted Average
0.343		45.58% Pervious Area
0.410		54.42% Impervious Area

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

Subcatchment 30S: EDA-3



Summary for Subcatchment 40S: EDA-4

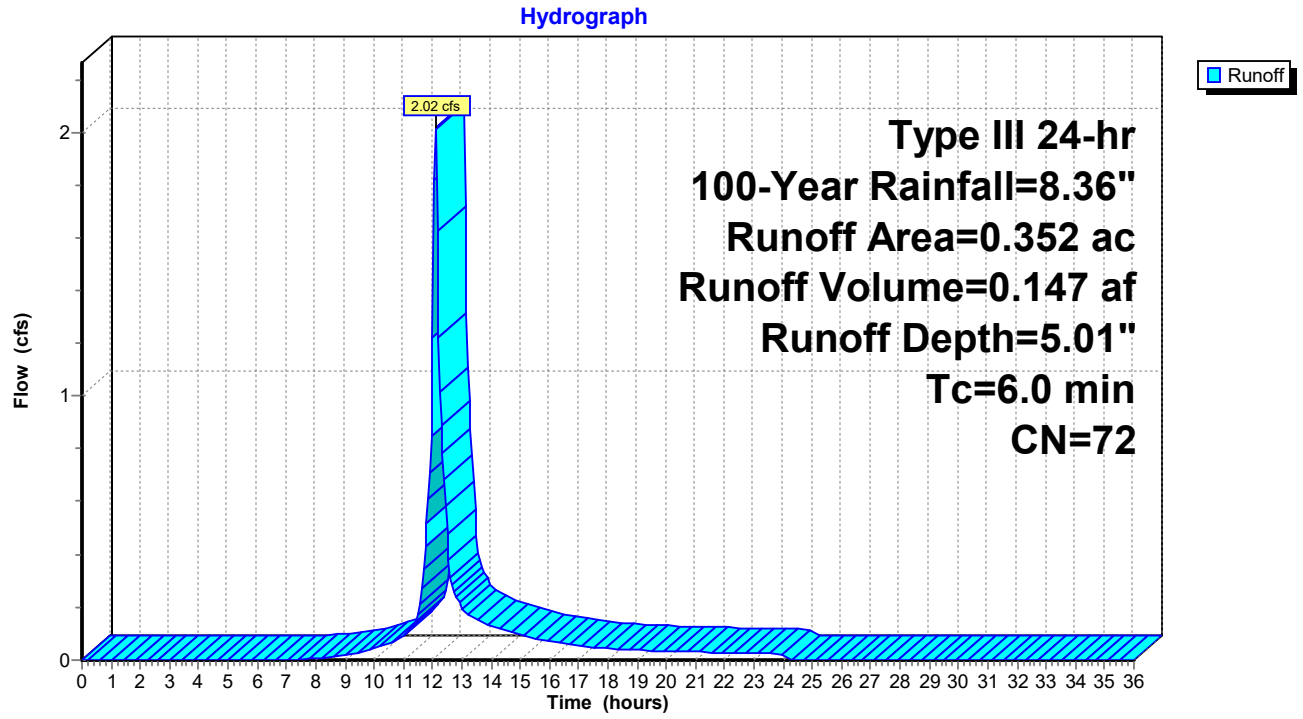
Runoff = 2.02 cfs @ 12.09 hrs, Volume= 0.147 af, Depth= 5.01"
Routed to Reach 40R : DP-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.36"

Area (ac)	CN	Description
0.153	39	>75% Grass cover, Good, HSG A
0.198	98	Paved parking, HSG A
0.001	30	Woods, Good, HSG A
0.352	72	Weighted Average
0.154		43.73% Pervious Area
0.198		56.27% Impervious Area

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

Subcatchment 40S: EDA-4



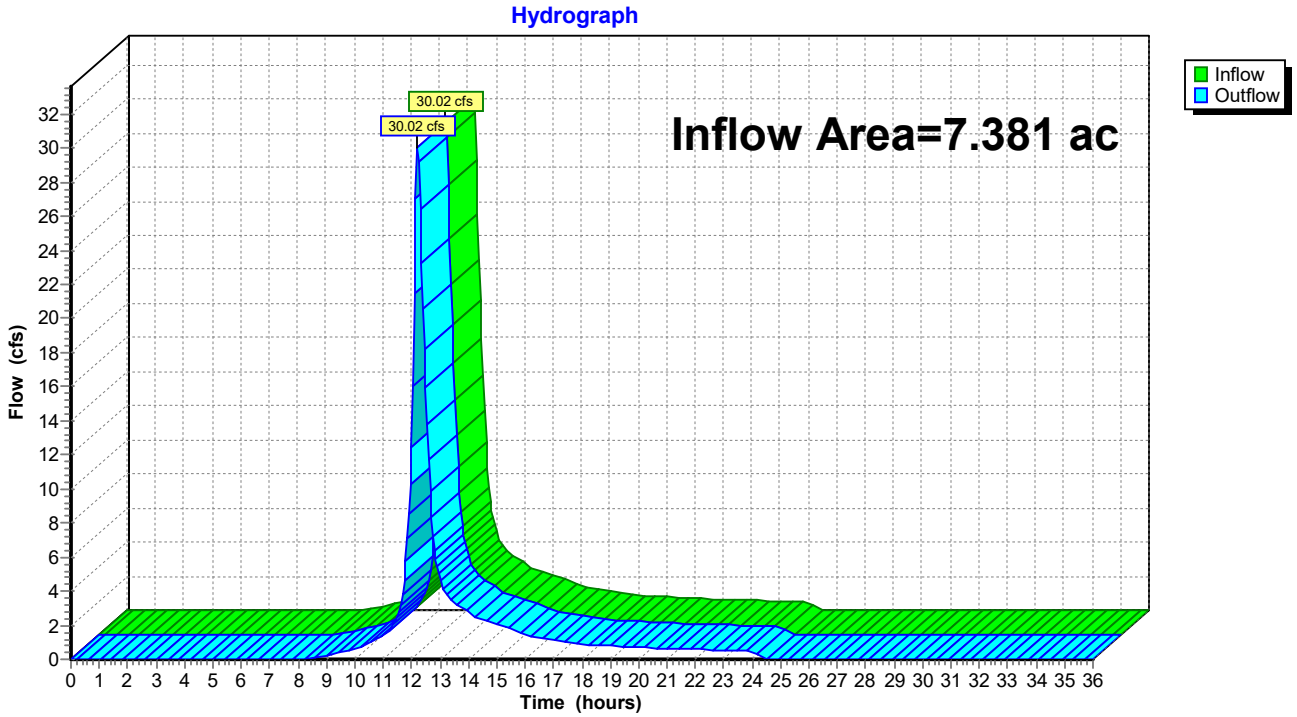
Summary for Reach 10R: DP-1

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

Inflow Area = 7.381 ac, 44.61% Impervious, Inflow Depth = 4.66" for 100-Year event
Inflow = 30.02 cfs @ 12.22 hrs, Volume= 2.864 af
Outflow = 30.02 cfs @ 12.22 hrs, Volume= 2.864 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 10P : E-POND

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Reach 10R: DP-1



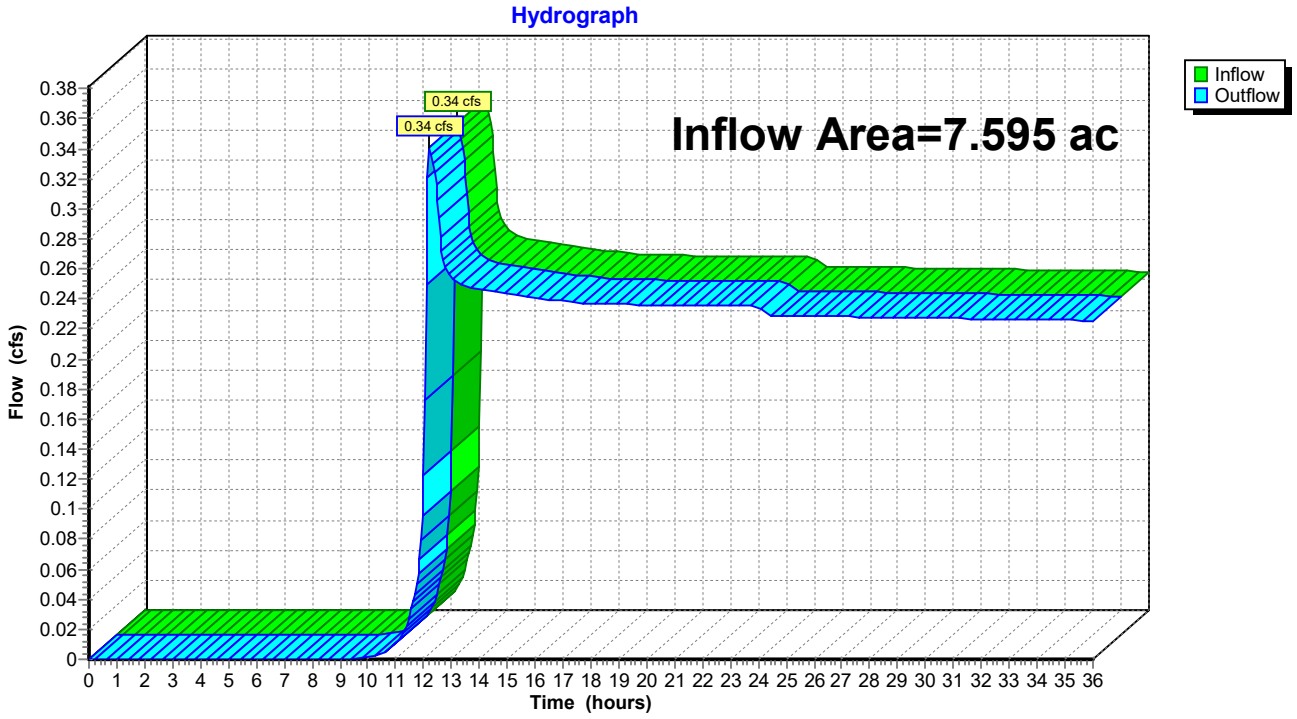
Summary for Reach 20R: DP-2

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

Inflow Area = 7.595 ac, 43.36% Impervious, Inflow Depth > 0.74" for 100-Year event
Inflow = 0.34 cfs @ 12.22 hrs, Volume= 0.470 af
Outflow = 0.34 cfs @ 12.22 hrs, Volume= 0.470 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 50R : DP-5

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Reach 20R: DP-2



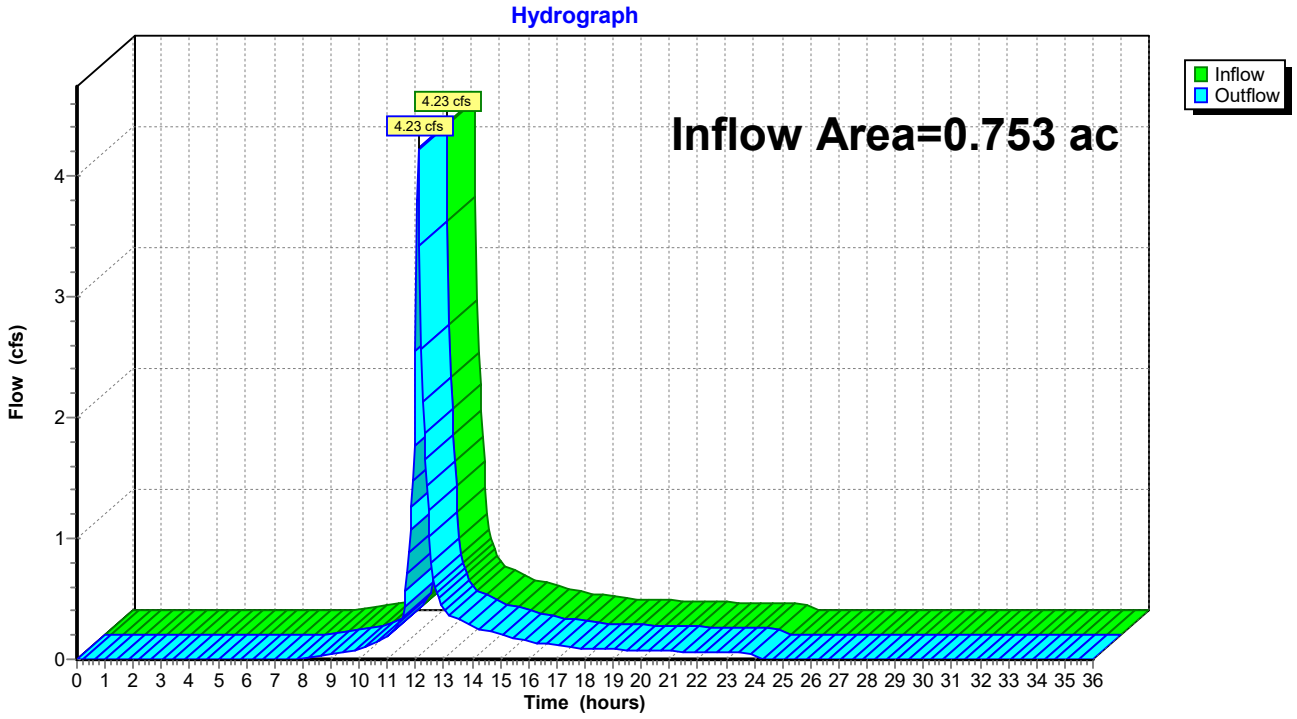
Summary for Reach 30R: DP-3

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

Inflow Area = 0.753 ac, 54.42% Impervious, Inflow Depth = 4.89" for 100-Year event
Inflow = 4.23 cfs @ 12.09 hrs, Volume= 0.307 af
Outflow = 4.23 cfs @ 12.09 hrs, Volume= 0.307 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 50R : DP-5

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Reach 30R: DP-3



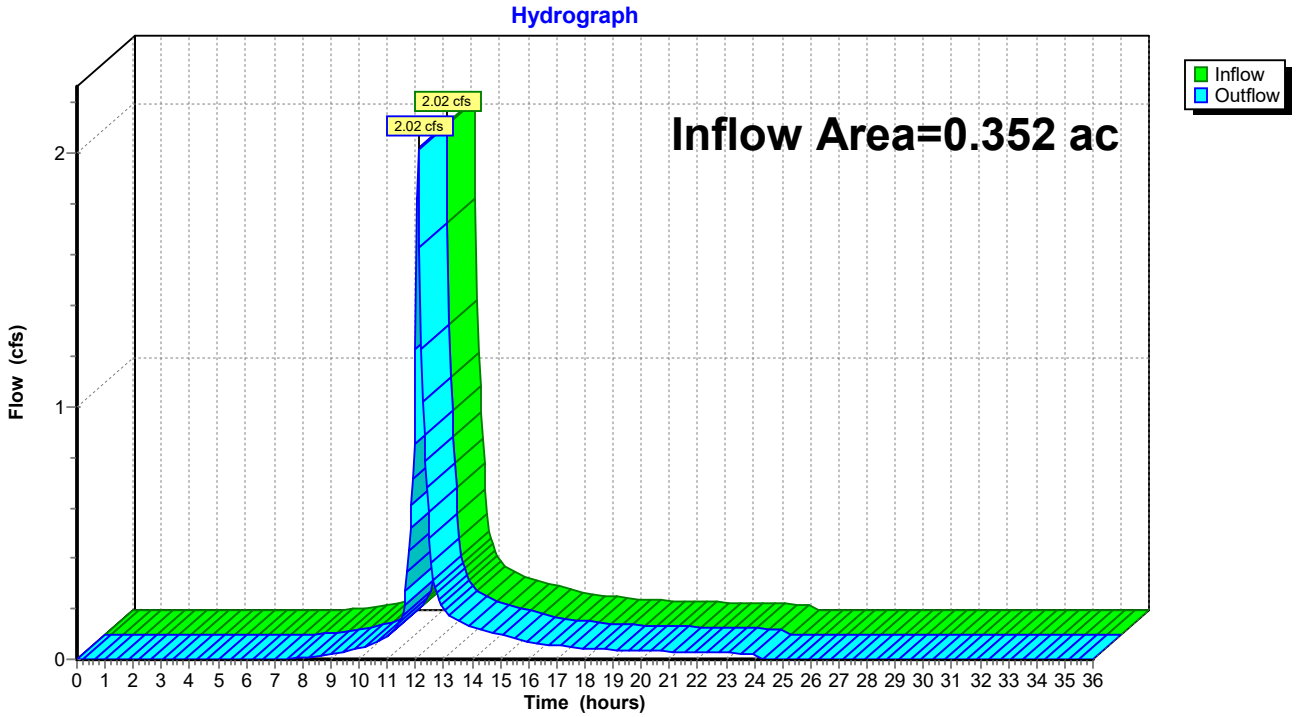
Summary for Reach 40R: DP-4

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

Inflow Area = 0.352 ac, 56.27% Impervious, Inflow Depth = 5.01" for 100-Year event
Inflow = 2.02 cfs @ 12.09 hrs, Volume= 0.147 af
Outflow = 2.02 cfs @ 12.09 hrs, Volume= 0.147 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 60R : DP-6

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Reach 40R: DP-4



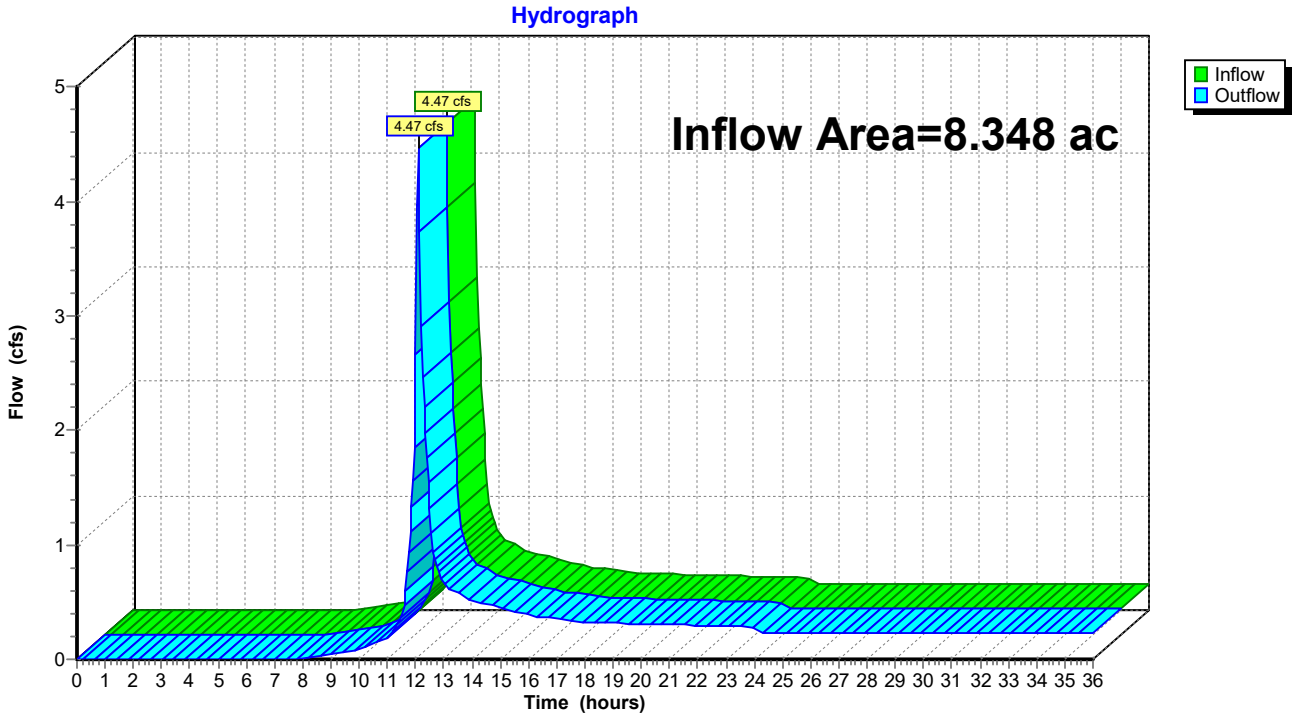
Summary for Reach 50R: DP-5

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

Inflow Area = 8.348 ac, 44.35% Impervious, Inflow Depth > 1.12" for 100-Year event
Inflow = 4.47 cfs @ 12.10 hrs, Volume= 0.777 af
Outflow = 4.47 cfs @ 12.10 hrs, Volume= 0.777 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 60R : DP-6

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Reach 50R: DP-5



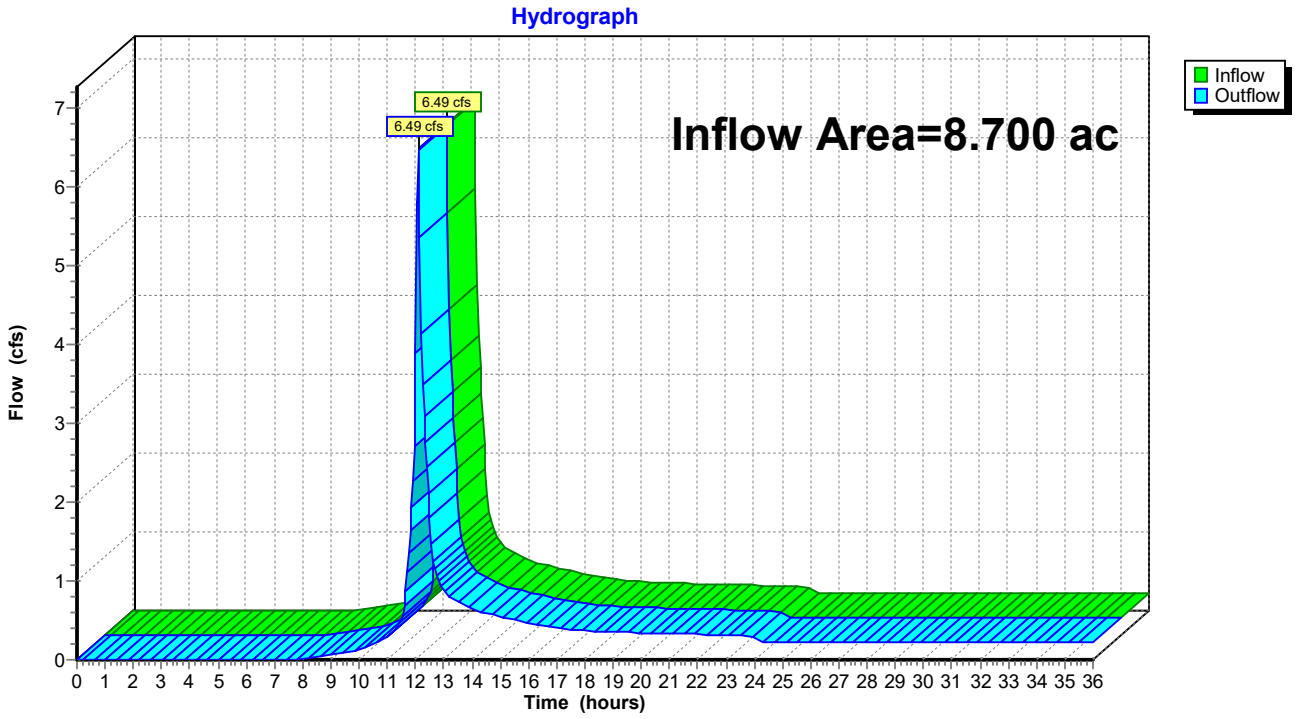
Summary for Reach 60R: DP-6

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

Inflow Area = 8.700 ac, 44.84% Impervious, Inflow Depth > 1.27" for 100-Year event
Inflow = 6.49 cfs @ 12.09 hrs, Volume= 0.924 af
Outflow = 6.49 cfs @ 12.09 hrs, Volume= 0.924 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Reach 60R: DP-6



Summary for Pond 10P: E-POND

Inflow Area = 7.381 ac, 44.61% Impervious, Inflow Depth = 4.66" for 100-Year event
Inflow = 30.02 cfs @ 12.22 hrs, Volume= 2.864 af
Outflow = 0.23 cfs @ 24.22 hrs, Volume= 0.450 af, Atten= 99%, Lag= 720.3 min
Primary = 0.23 cfs @ 24.22 hrs, Volume= 0.450 af
Routed to Reach 20R : DP-2

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 122.83' @ 24.22 hrs Surf.Area= 2.007 ac Storage= 2.634 af

Plug-Flow detention time= 763.2 min calculated for 0.450 af (16% of inflow)
Center-of-Mass det. time= 607.6 min (1,441.3 - 833.8)

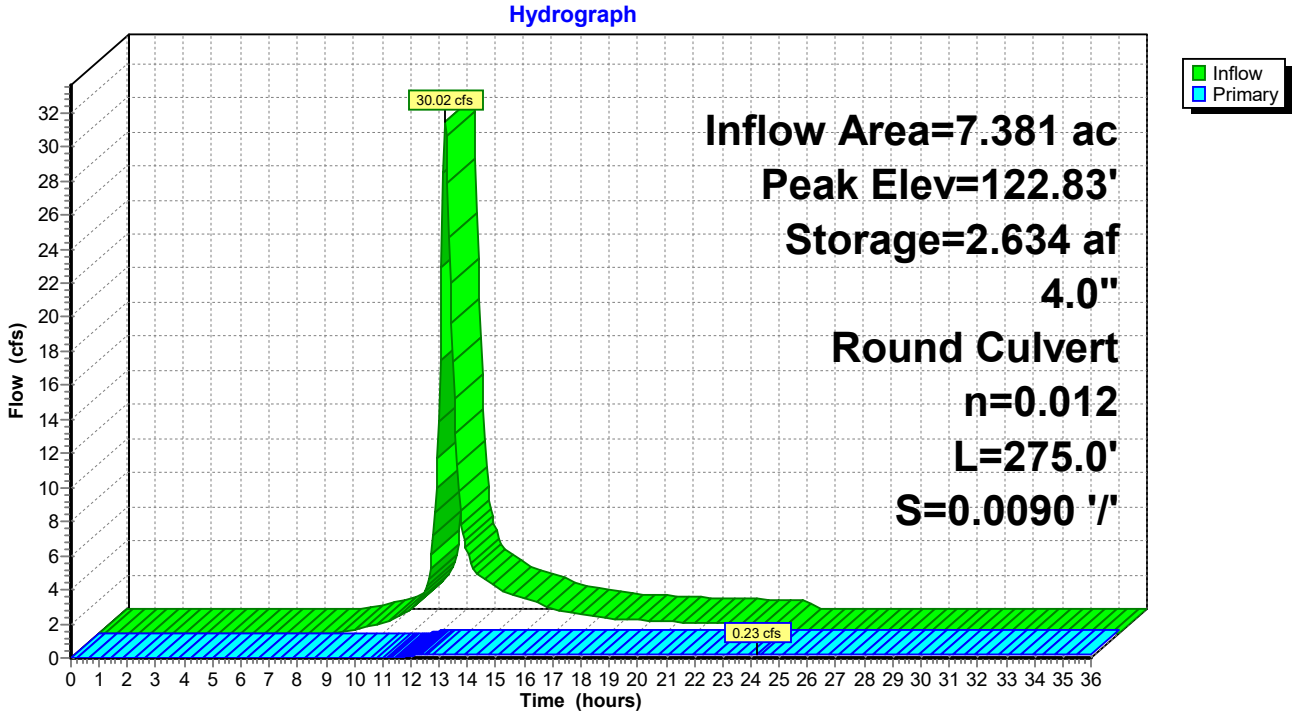
Volume	Invert	Avail.Storage	Storage Description
#1	121.40'	2.981 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
121.40	1.720	0.000	0.000
122.00	1.800	1.056	1.056
123.00	2.050	1.925	2.981

Device	Routing	Invert	Outlet Devices
#1	Primary	121.40'	**4.0" Round Culvert** L= 275.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 121.40' / 118.93' S= 0.0090 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf

Primary OutFlow Max=0.23 cfs @ 24.22 hrs HW=122.83' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.23 cfs @ 2.63 fps)

Pond 10P: E-POND



Stage-Area-Storage for Pond 10P: E-POND

Elevation (feet)	Surface (acres)	Storage (acre-feet)
121.40	1.720	0.000
121.42	1.723	0.034
121.44	1.725	0.069
121.46	1.728	0.103
121.48	1.731	0.138
121.50	1.733	0.173
121.52	1.736	0.207
121.54	1.739	0.242
121.56	1.741	0.277
121.58	1.744	0.312
121.60	1.747	0.347
121.62	1.749	0.382
121.64	1.752	0.417
121.66	1.755	0.452
121.68	1.757	0.487
121.70	1.760	0.522
121.72	1.763	0.557
121.74	1.765	0.593
121.76	1.768	0.628
121.78	1.771	0.663
121.80	1.773	0.699
121.82	1.776	0.734
121.84	1.779	0.770
121.86	1.781	0.805
121.88	1.784	0.841
121.90	1.787	0.877
121.92	1.789	0.912
121.94	1.792	0.948
121.96	1.795	0.984
121.98	1.797	1.020
122.00	1.800	1.056
122.02	1.805	1.092
122.04	1.810	1.128
122.06	1.815	1.164
122.08	1.820	1.201
122.10	1.825	1.237
122.12	1.830	1.274
122.14	1.835	1.310
122.16	1.840	1.347
122.18	1.845	1.384
122.20	1.850	1.421
122.22	1.855	1.458
122.24	1.860	1.495
122.26	1.865	1.532
122.28	1.870	1.570
122.30	1.875	1.607
122.32	1.880	1.645
122.34	1.885	1.682
122.36	1.890	1.720
122.38	1.895	1.758
122.40	1.900	1.796
122.42	1.905	1.834
122.44	1.910	1.872
122.46	1.915	1.910
122.48	1.920	1.949
122.50	1.925	1.987
122.52	1.930	2.026
122.54	1.935	2.064
122.56	1.940	2.103
122.58	1.945	2.142
122.60	1.950	2.181
122.62	1.955	2.220
122.64	1.960	2.259
122.66	1.965	2.298
122.68	1.970	2.338
122.70	1.975	2.377
122.72	1.980	2.417
122.74	1.985	2.456
122.76	1.990	2.496
122.78	1.995	2.536
122.80	2.000	2.576
122.82	2.005	2.616
122.84	2.010	2.656
122.86	2.015	2.696
122.88	2.020	2.737
122.90	2.025	2.777
122.92	2.030	2.818
122.94	2.035	2.858
122.96	2.040	2.899
122.98	2.045	2.940
123.00	**2.050**	**2.981**

Attachment 3
Post-Development Hydrologic Analysis

BEALS AND THOMAS

2063.27 Post-Development Hydrology Calculation Summary

Objective

To determine the post-development peak rates of runoff and total runoff volumes to the respective design points associated with the 2, 10, 25 & 100-year storm events.

Conclusion

Storm Event	2-Year Runoff		10-Year Runoff		25-Year Runoff		100-Year Runoff	
Design Point	Peak Rate	Total Volume	Peak Rate	Total Volume	Peak Rate	Total Volume	Peak Rate	Total Volume
DP-1	4.16 cfs	0.401 af	9.29 cfs	0.886 af	13.85 cfs	1.372 af	26.50 cfs	2.499 af
DP-2	0.00 cfs	0.000 af	0.00 cfs	0.000 af	0.00 cfs	0.000 af	0.01 cfs	0.001 af
DP-3	0.62 cfs	0.338 af	1.50 cfs	0.756 af	2.46 cfs	0.943 af	4.49 cfs	1.320 af
DP-4	0.14 cfs	0.011 af	0.23 cfs	0.018 af	0.30 cfs	0.023 af	0.43 cfs	0.035 af
DP-5	0.62 cfs	0.338 af	1.50 cfs	0.756 af	2.46 cfs	0.944 af	4.46 cfs	1.321 af
DP-6	0.67 cfs	0.349 af	1.60 cfs	0.774 af	2.69 cfs	0.967 af	4.83 cfs	1.356 af

Calculation Methods

1. Runoff curve numbers (CN) and times-of-concentration (Tc) are based on TR-55 methodology.
2. Peak rates of runoff and total runoff volumes were computed with HydroCAD (version 10.20-3c).
3. Subcatchment areas were imported into HydroCAD from AutoCAD Civil 3D.

Assumptions

1. A minimum time-of-concentration (Tc) of 6.0 minutes was used, where applicable.
2. Storm events are NRCC 24-hr D rainfall distribution for Concord, Massachusetts.
3. Surface cover types and watershed boundaries were estimated based on B+T topographic base information.
4. For areas with dual Hydrologic Soil Group (HSG) classifications, wetlands were considered HSG D.
5. Soils mapped as "Udorthents" and/or "Urban Land" were considered HSG A soils, given the HSG of adjacent mapped soils.
6. Design Points are as follows:
    - Interim Design Points
        - DP-1 – To Existing Pond
        - DP-2 – West to Conservation Restriction
        - DP-3 – Northwest to rear of #300 Baker Avenue
    - Primary Design Points
        - DP-4 – To Existing Stormwater Infrastructure East of #300 Baker Avenue
        - DP-5 –To Bordering Vegetative Wetlands to the West
        - DP-6 – To Assabet River (Confluence of DP-4 & DP-5)
7. Proposed interior landscape islands considered impervious.

8. Several assumptions were made relative to the proposed subsurface stormwater management best management practice designs, as follows:
    - Consistent with the HSG A mapping, Subsurface Stormwater Management System #1 was modelled with an exfiltration rate of 2.41 inches per hour.
    - System #1 is assumed to be "dry" at the beginning of a storm event.
    - Subsurface Stormwater Management Systems #2 & #3 are not designed to retain/infiltrate stormwater.
9. Tailwater effects have not been analyzed at this time.
10. Proposed floodplain compensatory storage chambers were not modelled for peak-rate attenuation.

Sources of Data/ Equations

1. Proposed Conditions Watershed Map (dated 12/15/2023) prepared by Beals and Thomas, Inc. (206323P123C-002).
2. Topographic AutoCAD base file 206326B017E generated by Beals and Thomas, Inc.
3. Post-development HydroCAD file 206327HC003C generated by Beals and Thomas, Inc.
4. Existing pond model from HydroCAD file 206317HC001A (Pond P-7: Pond 7) included in the Proposed Hotel Development Stormwater Management Report (206317RP001B) prepared by Beals and Thomas, Inc. dated 9/5/2014.
5. TR-55 Urban Hydrology for Small Watersheds, SCS, 1986.
6. Storm event rainfall from HydroCAD 10.20-3c.
7. Hydrologic Soil Groups per MassMapper GIS data layers and USDA NRCS Web Soil Survey (both downloaded August 5, 2023).
8. Massachusetts Department of Environmental Protection Stormwater Handbook dated February 2008.

List of Attachments

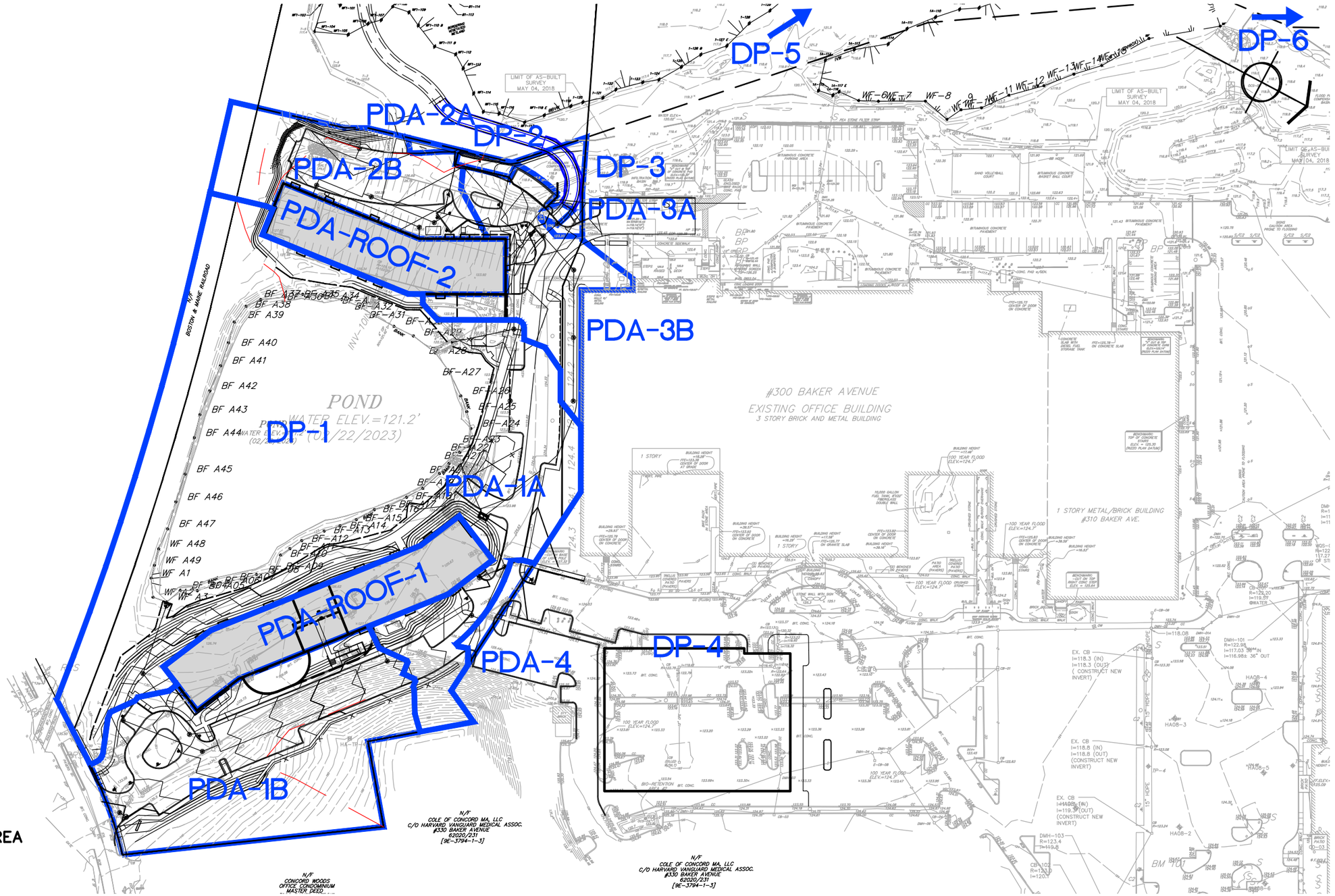
1. NOVO Riverside Commons Proposed Conditions Watershed Map (Figure 2)
2. Post-Development Hydrologic Calculations.

REV	CALC. BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
0						

206327CS003C

NOVO Riverside Commons

Concord, Massachusetts



DRAINAGE AREA

Tc PATH

METERS
0 10 25 50 100

0 60 120 240 360
FEET

BEALS AND THOMAS

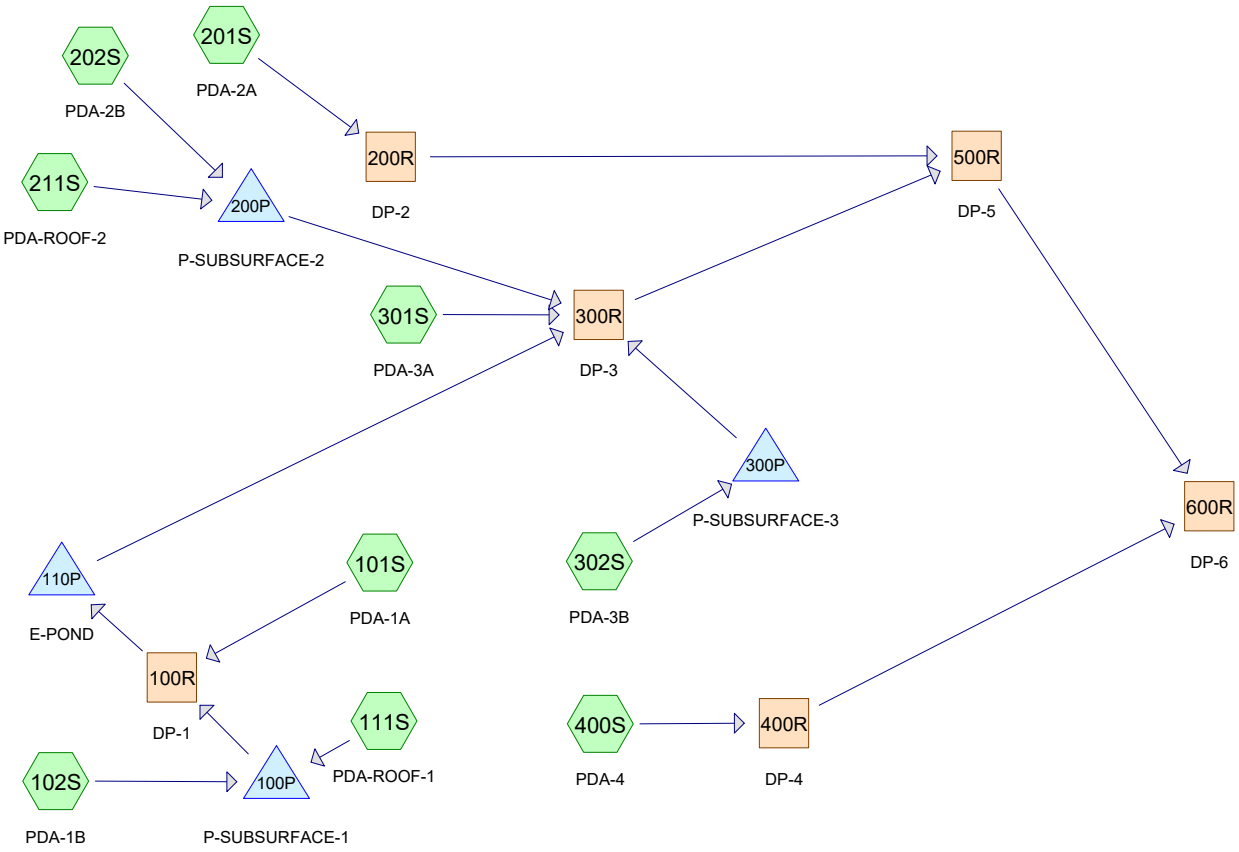
B+T Drawing No. 206327P123C-002 Date: 3/21/2024 Scale: 1" = 120'

Proposed Conditions

Watershed Map

Figure

2



POST-DEVELOPMENT

Subcat Reach Pond Link

Routing Diagram for 206327HC003C
Prepared by Beals & Thomas Inc, Printed 3/21/2024

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.09	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.65	2
3	25-Year	Type III 24-hr		Default	24.00	1	5.87	2
4	100-Year	Type III 24-hr		Default	24.00	1	8.36	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.906	39	>75% Grass cover, Good, HSG A (101S, 102S, 201S, 202S, 301S, 302S, 400S)
0.567	96	Gravel surface, HSG A (101S, 202S)
2.127	98	Paved parking, HSG A (101S, 102S, 202S, 301S, 302S, 400S)
1.177	98	Roofs, HSG A (101S, 102S, 111S, 211S, 302S)
1.724	98	Water Surface, HSG D (101S)
1.083	30	Woods, Good, HSG A (101S, 102S, 201S, 202S, 301S, 302S)
0.132	77	Woods, Good, HSG D (101S)
8.717	**76**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
6.861	HSG A	101S, 102S, 111S, 201S, 202S, 211S, 301S, 302S, 400S
0.000	HSG B	
0.000	HSG C	
1.856	HSG D	101S
0.000	Other	
8.717		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
1.906	0.000	0.000	0.000	0.000	1.906	>75% Grass cover, Good	101S, 102S, 201S, 202S, 301S, 302S, 400S
0.567	0.000	0.000	0.000	0.000	0.567	Gravel surface	101S, 202S
2.127	0.000	0.000	0.000	0.000	2.127	Paved parking	101S, 102S, 202S, 301S, 302S, 400S
1.177	0.000	0.000	0.000	0.000	1.177	Roofs	101S, 102S, 111S, 211S, 302S
0.000	0.000	0.000	1.724	0.000	1.724	Water Surface	101S
1.083	0.000	0.000	0.132	0.000	1.215	Woods, Good	101S, 102S, 201S, 202S, 301S, 302S
6.861	**0.000**	**0.000**	**1.856**	**0.000**	**8.717**	**TOTAL AREA**	

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 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 101S: PDA-1A Runoff Area=4.720 ac 51.91% Impervious Runoff Depth=1.02"
Flow Length=136' Tc=13.6 min CN=75 Runoff=4.16 cfs 0.401 af

Subcatchment 102S: PDA-1B Runoff Area=1.523 ac 50.84% Impervious Runoff Depth=0.67"
Flow Length=303' Tc=8.3 min CN=68 Runoff=0.91 cfs 0.086 af

Subcatchment 111S: PDA-ROOF-1 Runoff Area=0.585 ac 100.00% Impervious Runoff Depth=2.86"
Tc=6.0 min CN=98 Runoff=1.71 cfs 0.139 af

Subcatchment 201S: PDA-2A Runoff Area=0.014 ac 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=35 Runoff=0.00 cfs 0.000 af

Subcatchment 202S: PDA-2B Runoff Area=0.677 ac 47.05% Impervious Runoff Depth=0.86"
Flow Length=205' Tc=14.1 min CN=72 Runoff=0.48 cfs 0.049 af

Subcatchment 211S: PDA-ROOF-2 Runoff Area=0.427 ac 100.00% Impervious Runoff Depth=2.86"
Tc=6.0 min CN=98 Runoff=1.25 cfs 0.102 af

Subcatchment 301S: PDA-3A Runoff Area=0.134 ac 13.73% Impervious Runoff Depth=0.03"
Tc=6.0 min CN=45 Runoff=0.00 cfs 0.000 af

Subcatchment 302S: PDA-3B Runoff Area=0.581 ac 69.41% Impervious Runoff Depth=1.32"
Tc=6.0 min CN=80 Runoff=0.87 cfs 0.064 af

Subcatchment 400S: PDA-4 Runoff Area=0.056 ac 91.51% Impervious Runoff Depth=2.34"
Tc=6.0 min CN=93 Runoff=0.14 cfs 0.011 af

Reach 100R: DP-1 Inflow=4.16 cfs 0.401 af
Outflow=4.16 cfs 0.401 af

Reach 200R: DP-2 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 300R: DP-3 Inflow=0.62 cfs 0.338 af
Outflow=0.62 cfs 0.338 af

Reach 400R: DP-4 Inflow=0.14 cfs 0.011 af
Outflow=0.14 cfs 0.011 af

Reach 500R: DP-5 Inflow=0.62 cfs 0.338 af
Outflow=0.62 cfs 0.338 af

Reach 600R: DP-6 Inflow=0.67 cfs 0.349 af
Outflow=0.67 cfs 0.349 af

Pond 100P: P-SUBSURFACE-1 Peak Elev=124.60' Storage=2,931 cf Inflow=2.54 cfs 0.225 af
Discarded=0.38 cfs 0.225 af Primary=0.00 cfs 0.000 af Outflow=0.38 cfs 0.225 af

Pond 110P: E-POND Peak Elev=121.60' Storage=0.339 af Inflow=4.16 cfs 0.401 af
4.0" Round Culvert n=0.012 L=275.0' S=0.0090 '/' Outflow=0.08 cfs 0.125 af

Pond 200P: P-SUBSURFACE-2 Peak Elev=121.24' Storage=2,919 cf Inflow=1.55 cfs 0.150 af
Outflow=0.21 cfs 0.149 af

Pond 300P: P-SUBSURFACE-3 Peak Elev=120.66' Storage=525 cf Inflow=0.87 cfs 0.064 af
Outflow=0.41 cfs 0.064 af

Total Runoff Area = 8.717 ac Runoff Volume = 0.852 af Average Runoff Depth = 1.17"
42.32% Pervious = 3.689 ac 57.68% Impervious = 5.028 ac

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 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 101S: PDA-1A Runoff Area=4.720 ac 51.91% Impervious Runoff Depth=2.17"
Flow Length=136' Tc=13.6 min CN=75 Runoff=9.28 cfs 0.853 af

Subcatchment 102S: PDA-1B Runoff Area=1.523 ac 50.84% Impervious Runoff Depth=1.63"
Flow Length=303' Tc=8.3 min CN=68 Runoff=2.53 cfs 0.208 af

Subcatchment 111S: PDA-ROOF-1 Runoff Area=0.585 ac 100.00% Impervious Runoff Depth=4.41"
Tc=6.0 min CN=98 Runoff=2.60 cfs 0.215 af

Subcatchment 201S: PDA-2A Runoff Area=0.014 ac 0.00% Impervious Runoff Depth=0.04"
Tc=6.0 min CN=35 Runoff=0.00 cfs 0.000 af

Subcatchment 202S: PDA-2B Runoff Area=0.677 ac 47.05% Impervious Runoff Depth=1.93"
Flow Length=205' Tc=14.1 min CN=72 Runoff=1.16 cfs 0.109 af

Subcatchment 211S: PDA-ROOF-2 Runoff Area=0.427 ac 100.00% Impervious Runoff Depth=4.41"
Tc=6.0 min CN=98 Runoff=1.89 cfs 0.157 af

Subcatchment 301S: PDA-3A Runoff Area=0.134 ac 13.73% Impervious Runoff Depth=0.34"
Tc=6.0 min CN=45 Runoff=0.02 cfs 0.004 af

Subcatchment 302S: PDA-3B Runoff Area=0.581 ac 69.41% Impervious Runoff Depth=2.59"
Tc=6.0 min CN=80 Runoff=1.73 cfs 0.125 af

Subcatchment 400S: PDA-4 Runoff Area=0.056 ac 91.51% Impervious Runoff Depth=3.85"
Tc=6.0 min CN=93 Runoff=0.23 cfs 0.018 af

Reach 100R: DP-1 Inflow=9.29 cfs 0.886 af
Outflow=9.29 cfs 0.886 af

Reach 200R: DP-2 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 300R: DP-3 Inflow=1.50 cfs 0.756 af
Outflow=1.50 cfs 0.756 af

Reach 400R: DP-4 Inflow=0.23 cfs 0.018 af
Outflow=0.23 cfs 0.018 af

Reach 500R: DP-5 Inflow=1.50 cfs 0.756 af
Outflow=1.50 cfs 0.756 af

Reach 600R: DP-6 Inflow=1.60 cfs 0.774 af
Outflow=1.60 cfs 0.774 af

Pond 100P: P-SUBSURFACE-1 Peak Elev=125.38' Storage=6,743 cf Inflow=5.04 cfs 0.423 af
Discarded=0.47 cfs 0.390 af Primary=0.17 cfs 0.033 af Outflow=0.64 cfs 0.423 af

Pond 110P: E-POND Peak Elev=121.80' Storage=0.704 af Inflow=9.29 cfs 0.886 af
4.0" Round Culvert n=0.012 L=275.0' S=0.0090 '/' Outflow=0.20 cfs 0.362 af

Pond 200P: P-SUBSURFACE-2 Peak Elev=121.92' Storage=5,027 cf Inflow=2.73 cfs 0.266 af
Outflow=0.54 cfs 0.264 af

Pond 300P: P-SUBSURFACE-3 Peak Elev=121.34' Storage=899 cf Inflow=1.73 cfs 0.125 af
Outflow=1.15 cfs 0.125 af

Total Runoff Area = 8.717 ac Runoff Volume = 1.689 af Average Runoff Depth = 2.33"
42.32% Pervious = 3.689 ac 57.68% Impervious = 5.028 ac

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 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 101S: PDA-1A Runoff Area=4.720 ac 51.91% Impervious Runoff Depth=3.17"
Flow Length=136' Tc=13.6 min CN=75 Runoff=13.67 cfs 1.247 af

Subcatchment 102S: PDA-1B Runoff Area=1.523 ac 50.84% Impervious Runoff Depth=2.52"
Flow Length=303' Tc=8.3 min CN=68 Runoff=4.04 cfs 0.320 af

Subcatchment 111S: PDA-ROOF-1 Runoff Area=0.585 ac 100.00% Impervious Runoff Depth=5.63"
Tc=6.0 min CN=98 Runoff=3.29 cfs 0.275 af

Subcatchment 201S: PDA-2A Runoff Area=0.014 ac 0.00% Impervious Runoff Depth=0.22"
Tc=6.0 min CN=35 Runoff=0.00 cfs 0.000 af

Subcatchment 202S: PDA-2B Runoff Area=0.677 ac 47.05% Impervious Runoff Depth=2.89"
Flow Length=205' Tc=14.1 min CN=72 Runoff=1.76 cfs 0.163 af

Subcatchment 211S: PDA-ROOF-2 Runoff Area=0.427 ac 100.00% Impervious Runoff Depth=5.63"
Tc=6.0 min CN=98 Runoff=2.40 cfs 0.200 af

Subcatchment 301S: PDA-3A Runoff Area=0.134 ac 13.73% Impervious Runoff Depth=0.75"
Tc=6.0 min CN=45 Runoff=0.07 cfs 0.008 af

Subcatchment 302S: PDA-3B Runoff Area=0.581 ac 69.41% Impervious Runoff Depth=3.66"
Tc=6.0 min CN=80 Runoff=2.44 cfs 0.178 af

Subcatchment 400S: PDA-4 Runoff Area=0.056 ac 91.51% Impervious Runoff Depth=5.05"
Tc=6.0 min CN=93 Runoff=0.30 cfs 0.023 af

Reach 100R: DP-1 Inflow=13.85 cfs 1.372 af
Outflow=13.85 cfs 1.372 af

Reach 200R: DP-2 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 300R: DP-3 Inflow=2.46 cfs 0.943 af
Outflow=2.46 cfs 0.943 af

Reach 400R: DP-4 Inflow=0.30 cfs 0.023 af
Outflow=0.30 cfs 0.023 af

Reach 500R: DP-5 Inflow=2.46 cfs 0.944 af
Outflow=2.46 cfs 0.944 af

Reach 600R: DP-6 Inflow=2.69 cfs 0.967 af
Outflow=2.69 cfs 0.967 af

Pond 100P: P-SUBSURFACE-1 Peak Elev=125.92' Storage=9,424 cf Inflow=7.20 cfs 0.595 af
Discarded=0.54 cfs 0.471 af Primary=0.83 cfs 0.124 af Outflow=1.37 cfs 0.595 af

Pond 110P: E-POND Peak Elev=122.06' Storage=1.172 af Inflow=13.85 cfs 1.372 af
4.0" Round Culvert n=0.012 L=275.0' S=0.0090 '/' Outflow=0.21 cfs 0.396 af

Pond 200P: P-SUBSURFACE-2 Peak Elev=122.45' Storage=6,654 cf Inflow=3.71 cfs 0.363 af
Outflow=0.96 cfs 0.361 af

Pond 300P: P-SUBSURFACE-3 Peak Elev=121.81' Storage=1,153 cf Inflow=2.44 cfs 0.178 af
Outflow=1.84 cfs 0.178 af

Total Runoff Area = 8.717 ac Runoff Volume = 2.415 af Average Runoff Depth = 3.32"
42.32% Pervious = 3.689 ac 57.68% Impervious = 5.028 ac

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 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 101S: PDA-1A Runoff Area=4.720 ac 51.91% Impervious Runoff Depth=5.37"
Flow Length=136' Tc=13.6 min CN=75 Runoff=23.04 cfs 2.111 af

Subcatchment 102S: PDA-1B Runoff Area=1.523 ac 50.84% Impervious Runoff Depth=4.54"
Flow Length=303' Tc=8.3 min CN=68 Runoff=7.39 cfs 0.576 af

Subcatchment 111S: PDA-ROOF-1 Runoff Area=0.585 ac 100.00% Impervious Runoff Depth=8.12"
Tc=6.0 min CN=98 Runoff=4.69 cfs 0.396 af

Subcatchment 201S: PDA-2A Runoff Area=0.014 ac 0.00% Impervious Runoff Depth=0.93"
Tc=6.0 min CN=35 Runoff=0.01 cfs 0.001 af

Subcatchment 202S: PDA-2B Runoff Area=0.677 ac 47.05% Impervious Runoff Depth=5.01"
Flow Length=205' Tc=14.1 min CN=72 Runoff=3.06 cfs 0.283 af

Subcatchment 211S: PDA-ROOF-2 Runoff Area=0.427 ac 100.00% Impervious Runoff Depth=8.12"
Tc=6.0 min CN=98 Runoff=3.42 cfs 0.289 af

Subcatchment 301S: PDA-3A Runoff Area=0.134 ac 13.73% Impervious Runoff Depth=1.93"
Tc=6.0 min CN=45 Runoff=0.26 cfs 0.021 af

Subcatchment 302S: PDA-3B Runoff Area=0.581 ac 69.41% Impervious Runoff Depth=5.96"
Tc=6.0 min CN=80 Runoff=3.90 cfs 0.289 af

Subcatchment 400S: PDA-4 Runoff Area=0.056 ac 91.51% Impervious Runoff Depth=7.52"
Tc=6.0 min CN=93 Runoff=0.43 cfs 0.035 af

Reach 100R: DP-1 Inflow=26.50 cfs 2.499 af
Outflow=26.50 cfs 2.499 af

Reach 200R: DP-2 Inflow=0.01 cfs 0.001 af
Outflow=0.01 cfs 0.001 af

Reach 300R: DP-3 Inflow=4.46 cfs 1.320 af
Outflow=4.46 cfs 1.320 af

Reach 400R: DP-4 Inflow=0.43 cfs 0.035 af
Outflow=0.43 cfs 0.035 af

Reach 500R: DP-5 Inflow=4.46 cfs 1.321 af
Outflow=4.46 cfs 1.321 af

Reach 600R: DP-6 Inflow=4.83 cfs 1.356 af
Outflow=4.83 cfs 1.356 af

Pond 100P: P-SUBSURFACE-1 Peak Elev=126.67' Storage=13,073 cf Inflow=11.91 cfs 0.972 af
Discarded=0.63 cfs 0.585 af Primary=4.66 cfs 0.387 af Outflow=5.28 cfs 0.972 af

Pond 110P: E-POND Peak Elev=122.65' Storage=2.274 af Inflow=26.50 cfs 2.499 af
4.0" Round Culvert n=0.012 L=275.0' S=0.0090 '/' Outflow=0.22 cfs 0.440 af

Pond 200P: P-SUBSURFACE-2 Peak Elev=123.55' Storage=10,063 cf Inflow=5.80 cfs 0.572 af
Outflow=1.68 cfs 0.569 af

Pond 300P: P-SUBSURFACE-3 Peak Elev=122.84' Storage=1,641 cf Inflow=3.90 cfs 0.289 af
Outflow=2.92 cfs 0.289 af

Total Runoff Area = 8.717 ac Runoff Volume = 4.002 af Average Runoff Depth = 5.51"
42.32% Pervious = 3.689 ac 57.68% Impervious = 5.028 ac

Summary for Subcatchment 101S: PDA-1A

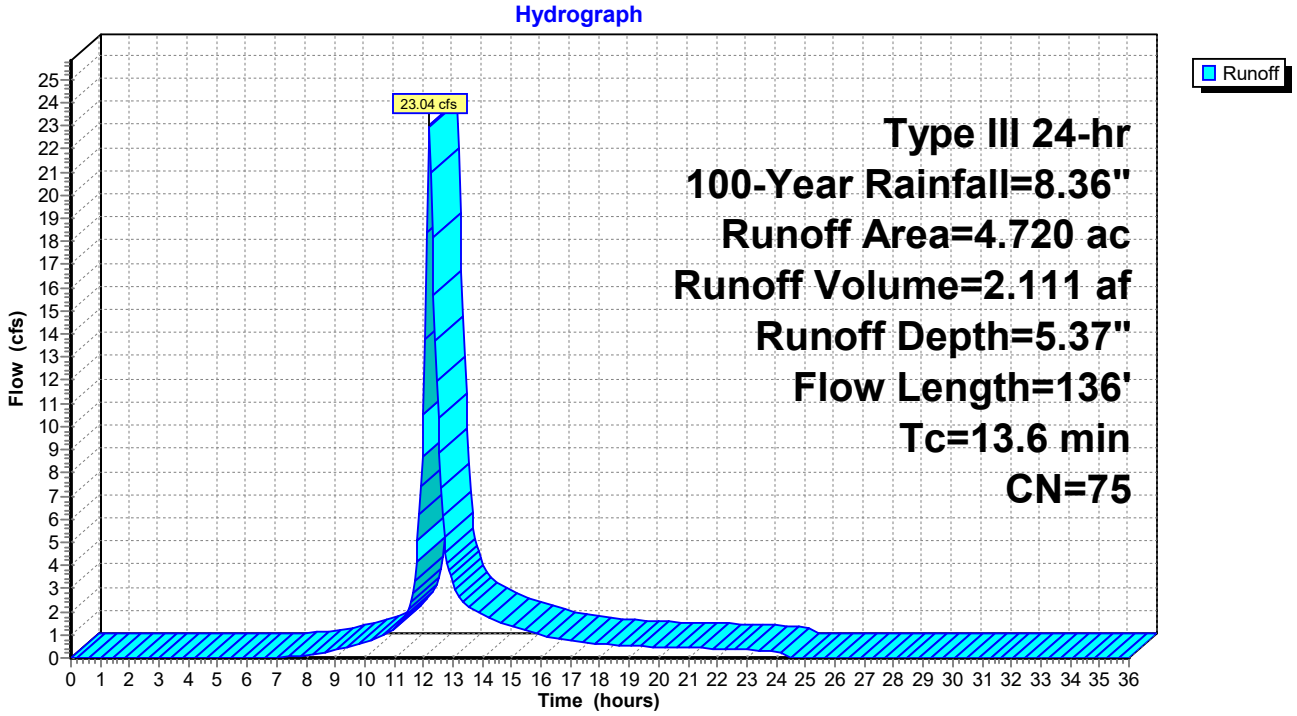
Runoff = 23.04 cfs @ 12.19 hrs, Volume= 2.111 af, Depth= 5.37"
Routed to Reach 100R : DP-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.36"

Area (ac)	CN	Description
0.919	39	>75% Grass cover, Good, HSG A
0.487	96	Gravel surface, HSG A
0.726	98	Paved parking, HSG A
0.000	98	Roofs, HSG A
1.724	98	Water Surface, HSG D
0.732	30	Woods, Good, HSG A
0.132	77	Woods, Good, HSG D
4.720	75	Weighted Average
2.269		48.09% Pervious Area
2.450		51.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	50	0.0200	0.07		**Sheet Flow, SHT** Woods: Light underbrush n= 0.400 P2= 3.09"
0.9	62	0.0569	1.19		**Shallow Concentrated Flow, SCF-1** Woodland Kv= 5.0 fps
0.1	24	0.2962	2.72		**Shallow Concentrated Flow, SCF-2** Woodland Kv= 5.0 fps
13.6	136	Total			

Subcatchment 101S: PDA-1A



Summary for Subcatchment 102S: PDA-1B

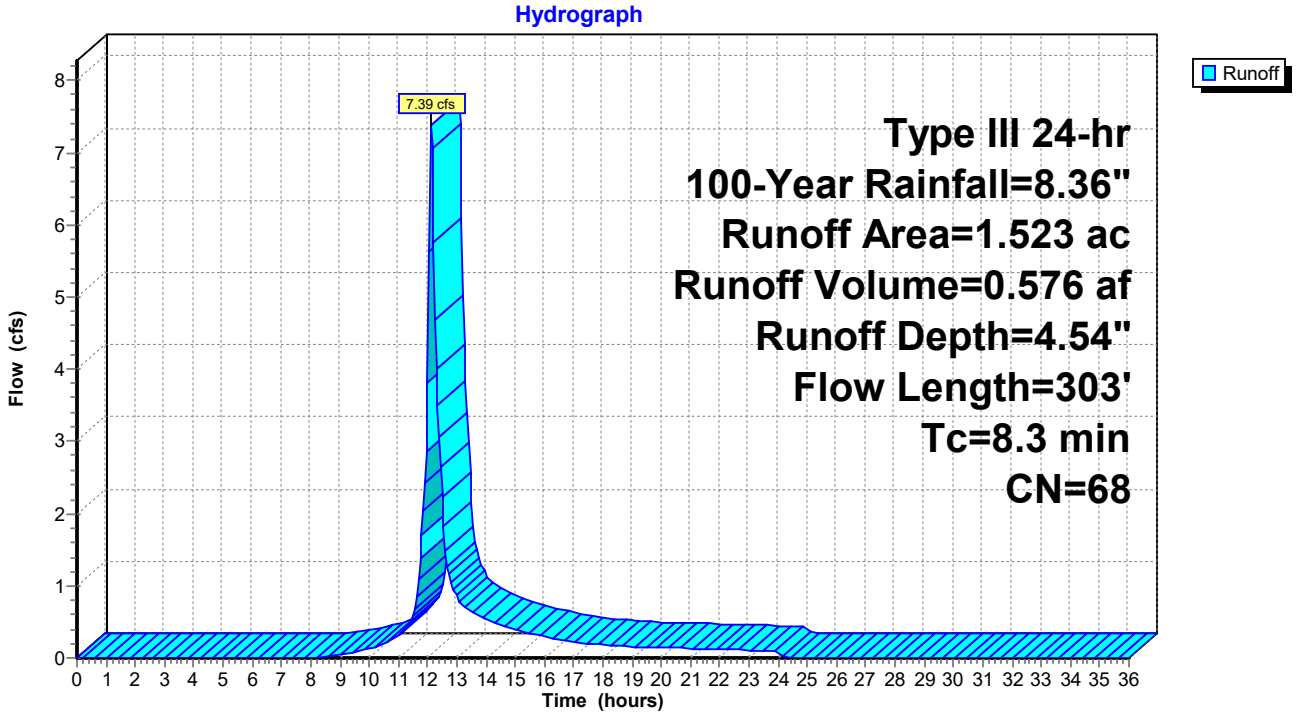
Runoff = 7.39 cfs @ 12.12 hrs, Volume= 0.576 af, Depth= 4.54"
Routed to Pond 100P : P-SUBSURFACE-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.36"

Area (ac)	CN	Description
0.513	39	>75% Grass cover, Good, HSG A
0.673	98	Paved parking, HSG A
0.102	98	Roofs, HSG A
0.236	30	Woods, Good, HSG A
1.523	68	Weighted Average
0.749		49.16% Pervious Area
0.774		50.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.1000	0.13		**Sheet Flow, SHT** Woods: Light underbrush n= 0.400 P2= 3.09"
0.6	67	0.1348	1.84		**Shallow Concentrated Flow, SCF-1** Woodland Kv= 5.0 fps
0.2	36	0.1348	2.57		**Shallow Concentrated Flow, SCF-2** Short Grass Pasture Kv= 7.0 fps
0.9	150	0.0200	2.87		**Shallow Concentrated Flow, SCF-3** Paved Kv= 20.3 fps
8.3	303	Total			

Subcatchment 102S: PDA-1B



Summary for Subcatchment 111S: PDA-ROOF-1

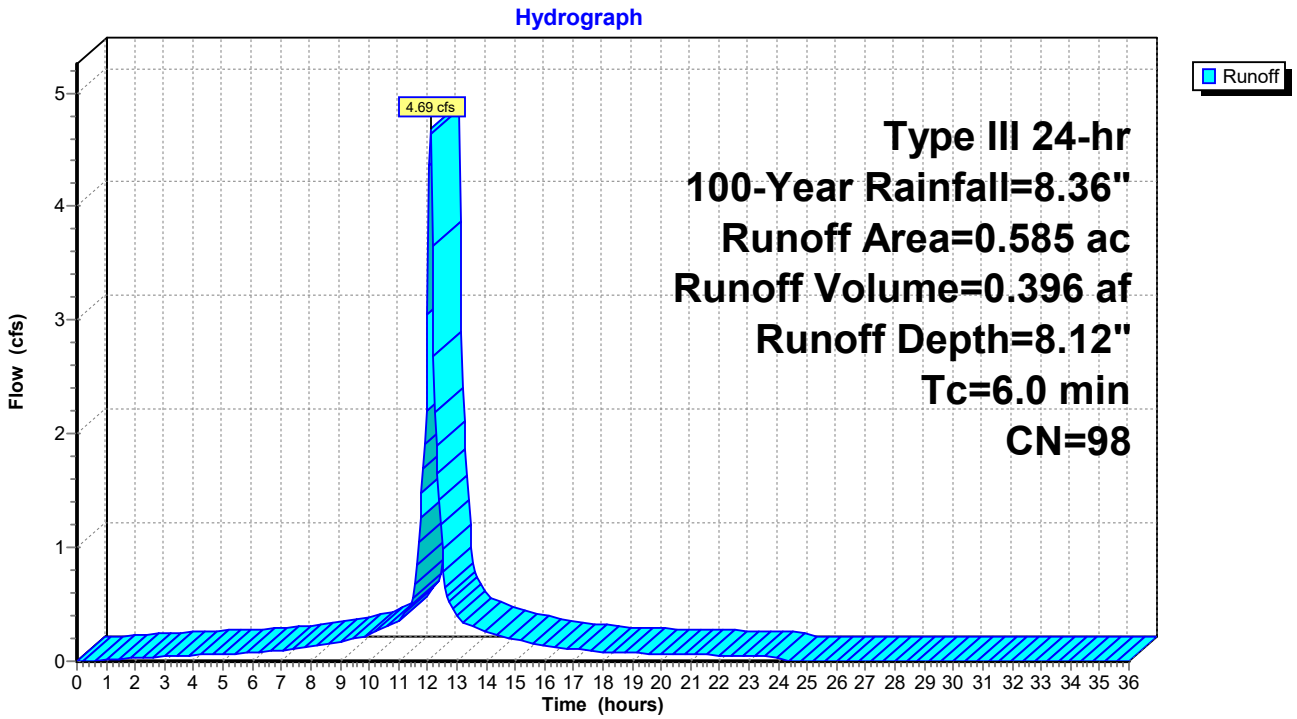
Runoff = 4.69 cfs @ 12.09 hrs, Volume= 0.396 af, Depth= 8.12"
Routed to Pond 100P : P-SUBSURFACE-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.36"

Area (ac)	CN	Description
0.585	98	Roofs, HSG A
0.585		100.00% Impervious Area

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

Subcatchment 111S: PDA-ROOF-1



Summary for Subcatchment 201S: PDA-2A

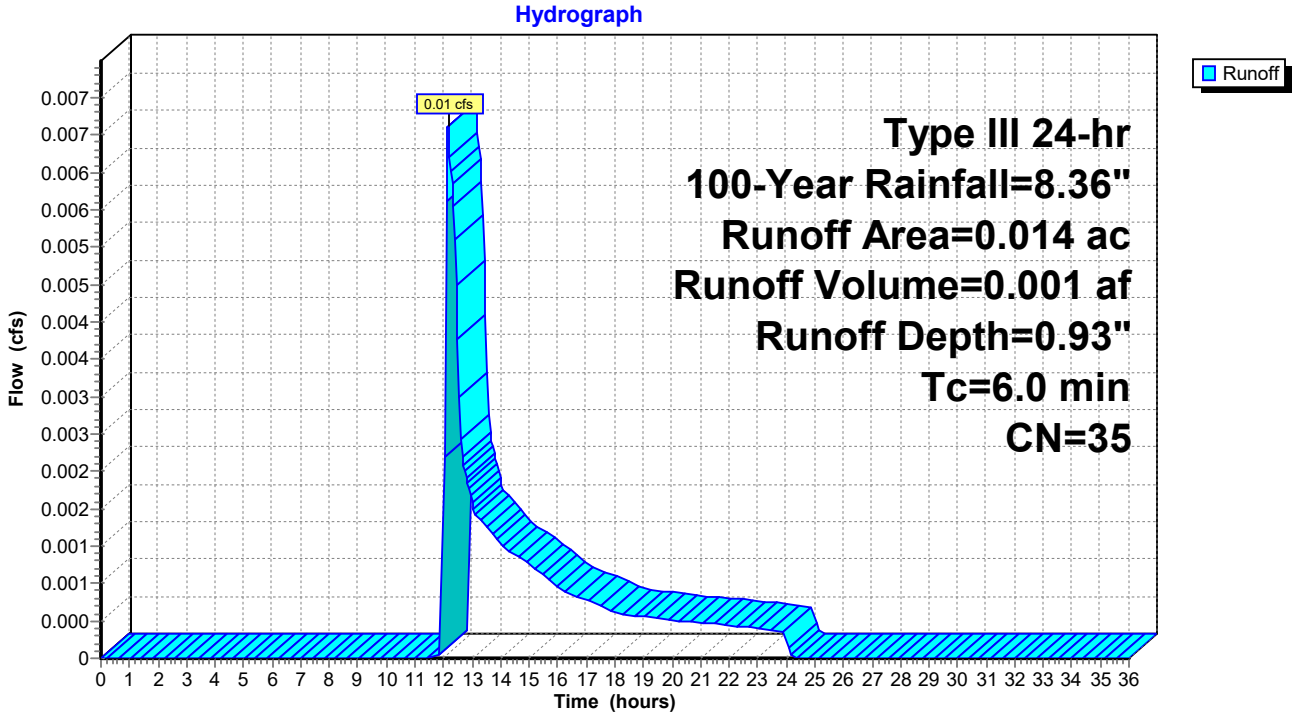
Runoff = 0.01 cfs @ 12.16 hrs, Volume= 0.001 af, Depth= 0.93"
Routed to Reach 200R : DP-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.36"

Area (ac)	CN	Description
0.007	39	>75% Grass cover, Good, HSG A
0.006	30	Woods, Good, HSG A
0.014	35	Weighted Average
0.014		100.00% Pervious Area

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

Subcatchment 201S: PDA-2A



Summary for Subcatchment 202S: PDA-2B

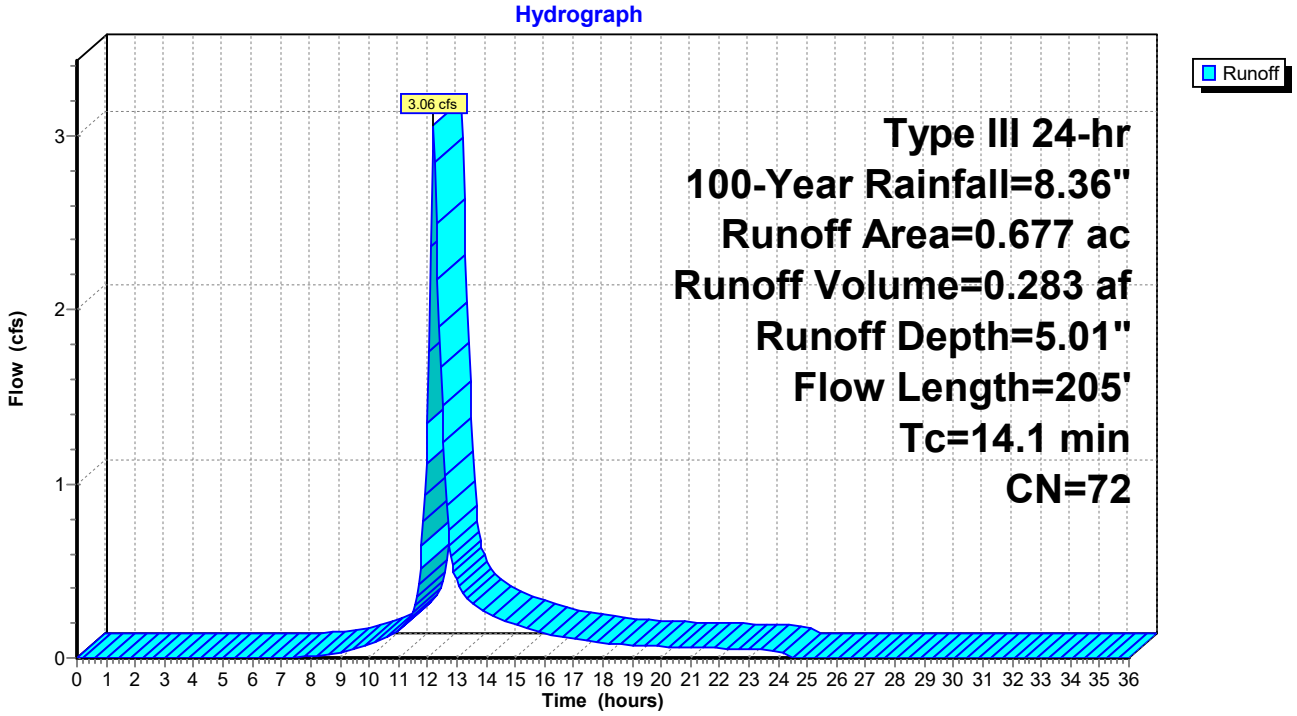
Runoff = 3.06 cfs @ 12.20 hrs, Volume= 0.283 af, Depth= 5.01"
Routed to Pond 200P : P-SUBSURFACE-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.36"

Area (ac)	CN	Description
0.194	39	>75% Grass cover, Good, HSG A
0.080	96	Gravel surface, HSG A
0.319	98	Paved parking, HSG A
0.084	30	Woods, Good, HSG A
0.677	72	Weighted Average
0.359		52.95% Pervious Area
0.319		47.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	50	0.0200	0.07		**Sheet Flow, SHT** Woods: Light underbrush n= 0.400 P2= 3.09"
0.1	21	0.1864	3.02		**Shallow Concentrated Flow, SCF-1** Short Grass Pasture Kv= 7.0 fps
0.5	27	0.0200	0.99		**Shallow Concentrated Flow, SCF-2** Short Grass Pasture Kv= 7.0 fps
0.9	107	0.0100	2.03		**Shallow Concentrated Flow, SCF-3** Paved Kv= 20.3 fps
14.1	205	Total			

Subcatchment 202S: PDA-2B



Summary for Subcatchment 211S: PDA-ROOF-2

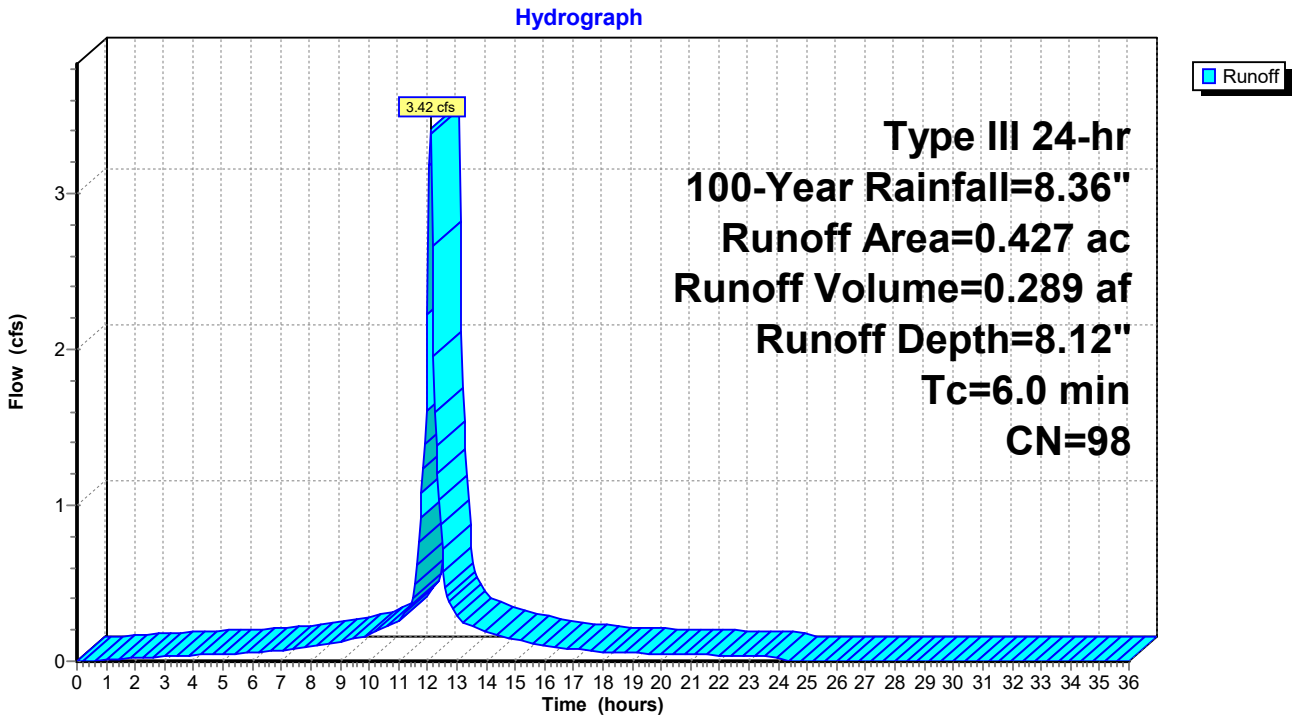
Runoff = 3.42 cfs @ 12.09 hrs, Volume= 0.289 af, Depth= 8.12"
Routed to Pond 200P : P-SUBSURFACE-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.36"

Area (ac)	CN	Description
0.427	98	Roofs, HSG A
0.427		100.00% Impervious Area

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

Subcatchment 211S: PDA-ROOF-2



Summary for Subcatchment 301S: PDA-3A

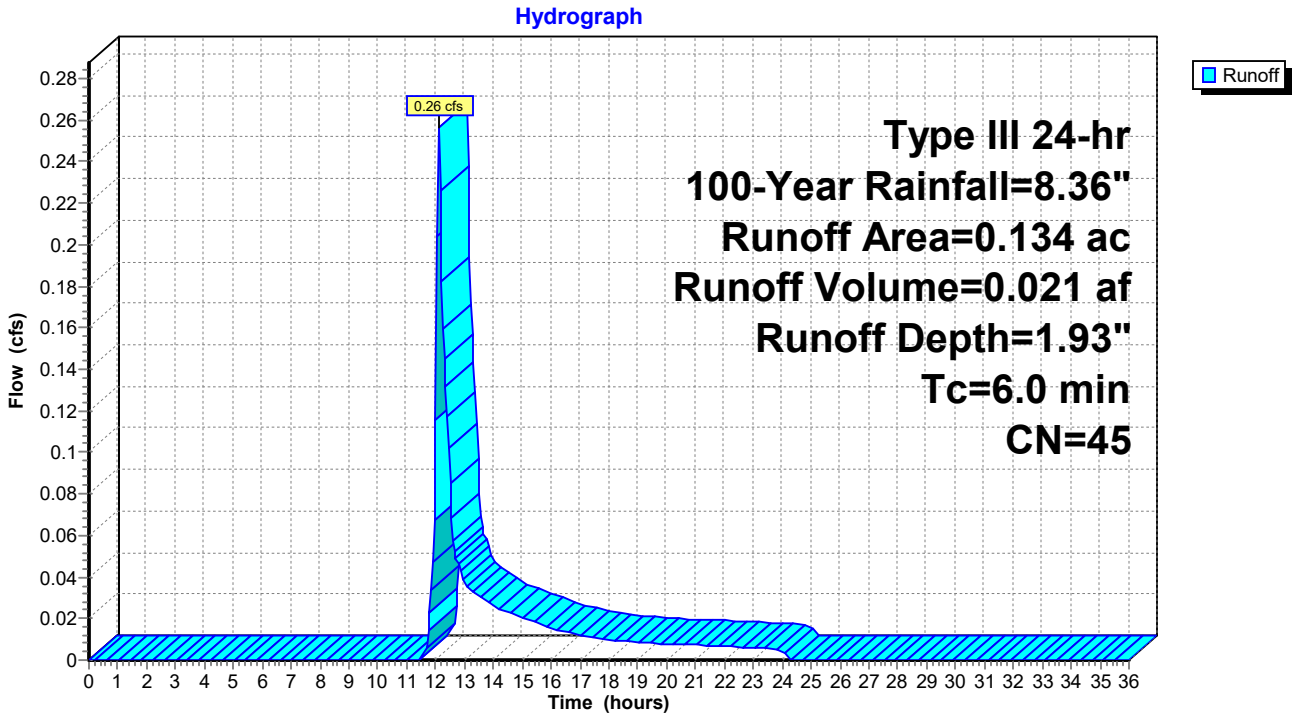
Runoff = 0.26 cfs @ 12.11 hrs, Volume= 0.021 af, Depth= 1.93"
Routed to Reach 300R : DP-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.36"

Area (ac)	CN	Description
0.090	39	>75% Grass cover, Good, HSG A
0.018	98	Paved parking, HSG A
0.025	30	Woods, Good, HSG A
0.134	45	Weighted Average
0.115		86.27% Pervious Area
0.018		13.73% Impervious Area

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

Subcatchment 301S: PDA-3A



Summary for Subcatchment 302S: PDA-3B

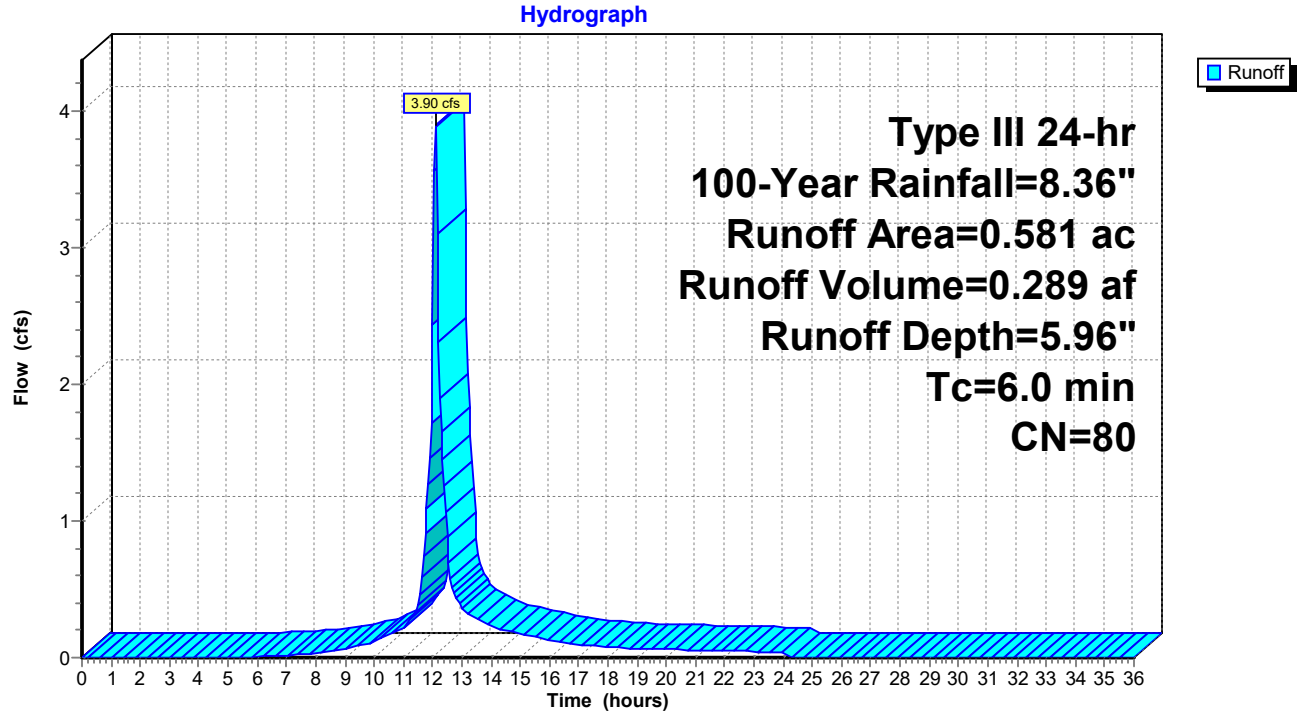
Runoff = 3.90 cfs @ 12.09 hrs, Volume= 0.289 af, Depth= 5.96"
Routed to Pond 300P : P-SUBSURFACE-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.36"

Area (ac)	CN	Description
0.178	39	>75% Grass cover, Good, HSG A
0.341	98	Paved parking, HSG A
0.063	98	Roofs, HSG A
0.000	30	Woods, Good, HSG A
0.581	80	Weighted Average
0.178		30.59% Pervious Area
0.404		69.41% Impervious Area

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

Subcatchment 302S: PDA-3B



Summary for Subcatchment 400S: PDA-4

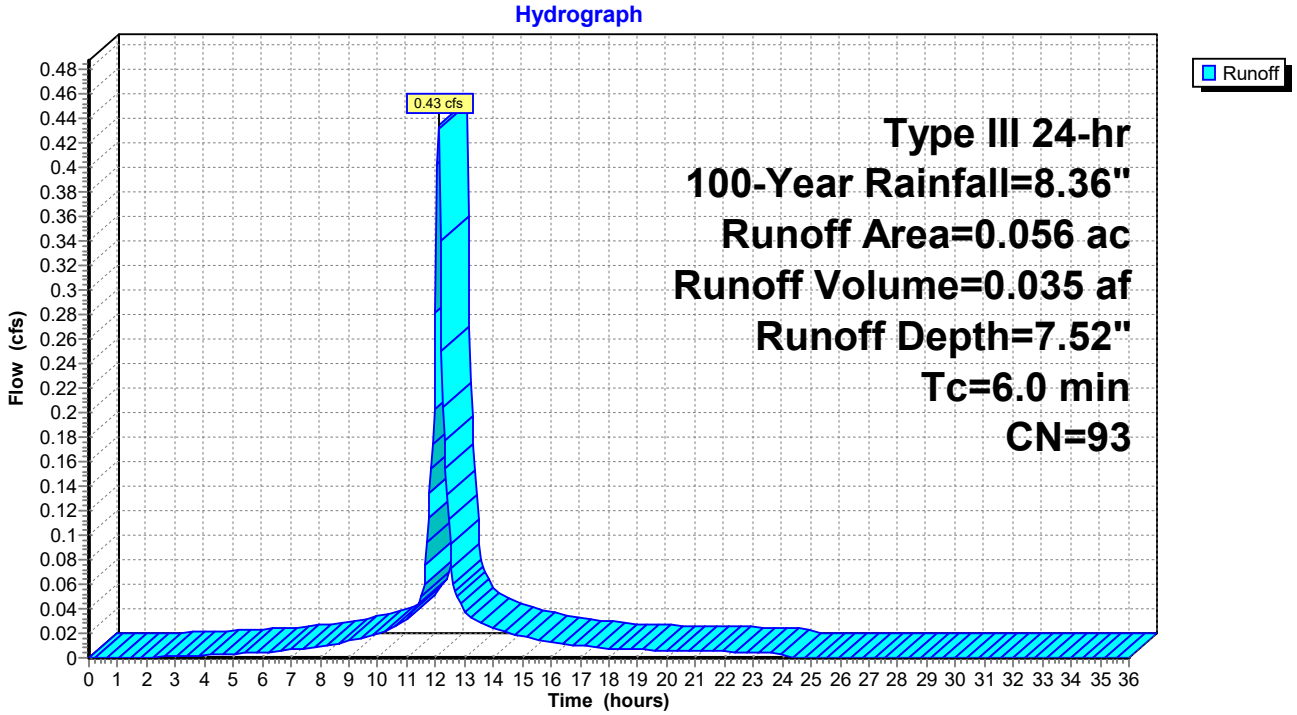
Runoff = 0.43 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 7.52"
Routed to Reach 400R : DP-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.36"

Area (ac)	CN	Description
0.005	39	>75% Grass cover, Good, HSG A
0.051	98	Paved parking, HSG A
0.056	93	Weighted Average
0.005		8.49% Pervious Area
0.051		91.51% Impervious Area

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

Subcatchment 400S: PDA-4



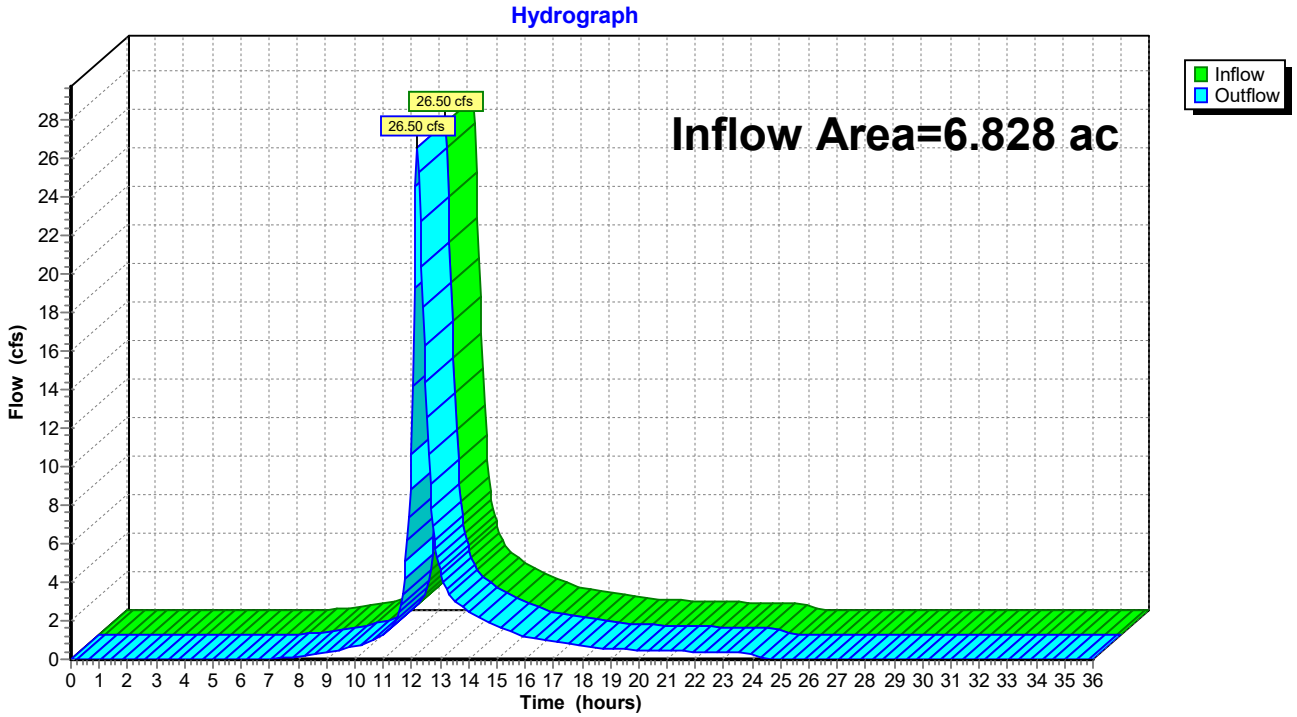
Summary for Reach 100R: DP-1

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

Inflow Area = 6.828 ac, 55.80% Impervious, Inflow Depth = 4.39" for 100-Year event
Inflow = 26.50 cfs @ 12.21 hrs, Volume= 2.499 af
Outflow = 26.50 cfs @ 12.21 hrs, Volume= 2.499 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 110P : E-POND

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Reach 100R: DP-1



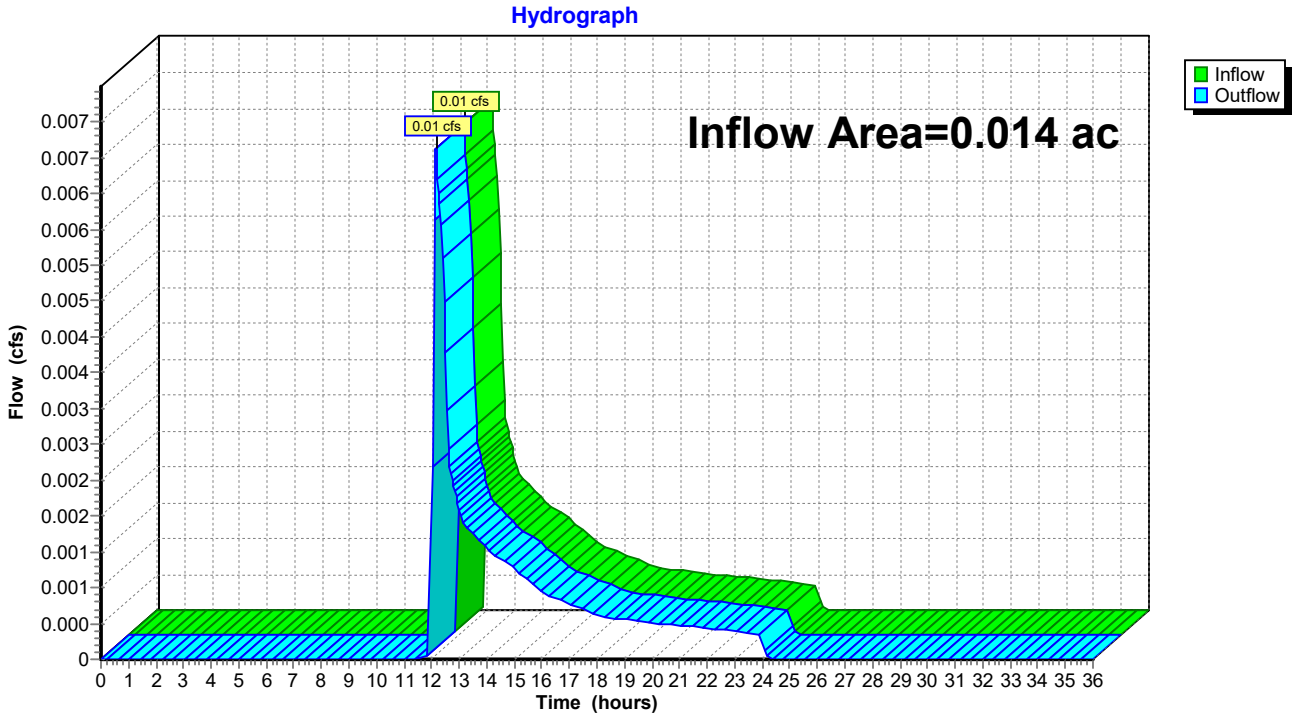
Summary for Reach 200R: DP-2

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

Inflow Area = 0.014 ac, 0.00% Impervious, Inflow Depth = 0.93" for 100-Year event
Inflow = 0.01 cfs @ 12.16 hrs, Volume= 0.001 af
Outflow = 0.01 cfs @ 12.16 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 500R : DP-5

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Reach 200R: DP-2



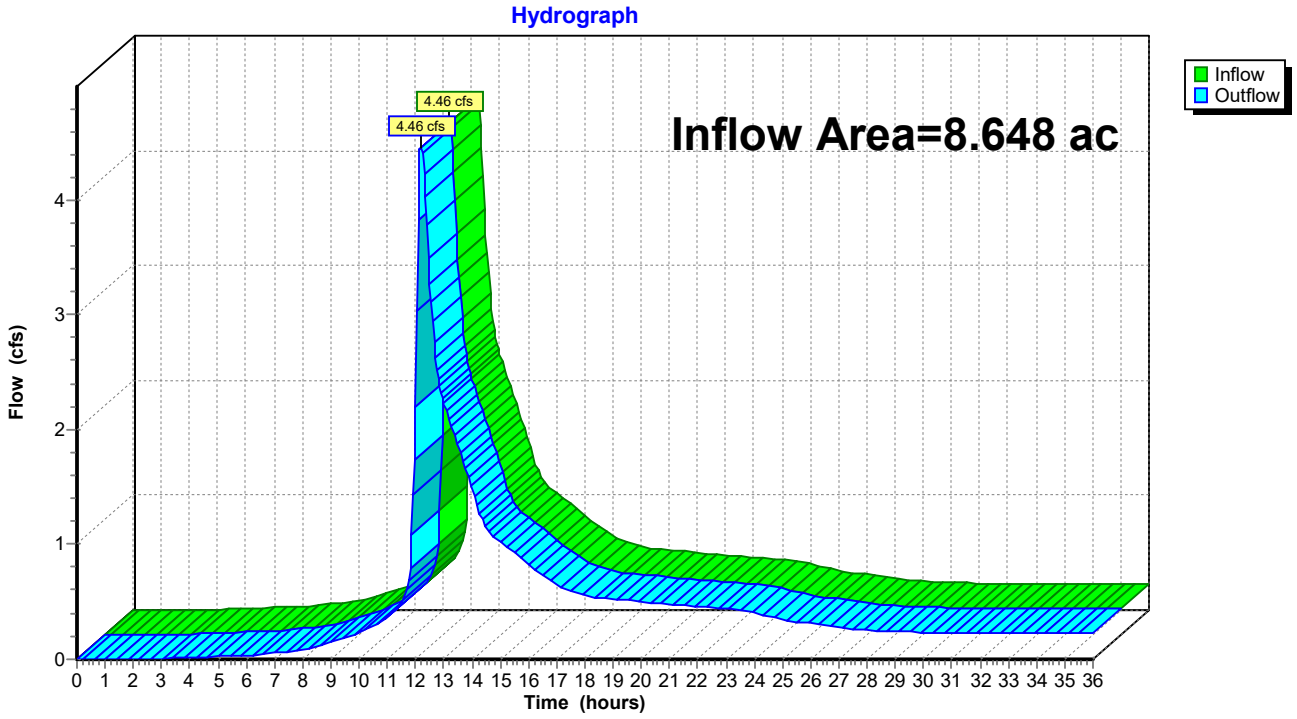
Summary for Reach 300R: DP-3

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

Inflow Area = 8.648 ac, 57.56% Impervious, Inflow Depth > 1.83" for 100-Year event
Inflow = 4.46 cfs @ 12.18 hrs, Volume= 1.320 af
Outflow = 4.46 cfs @ 12.18 hrs, Volume= 1.320 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 500R : DP-5

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Reach 300R: DP-3



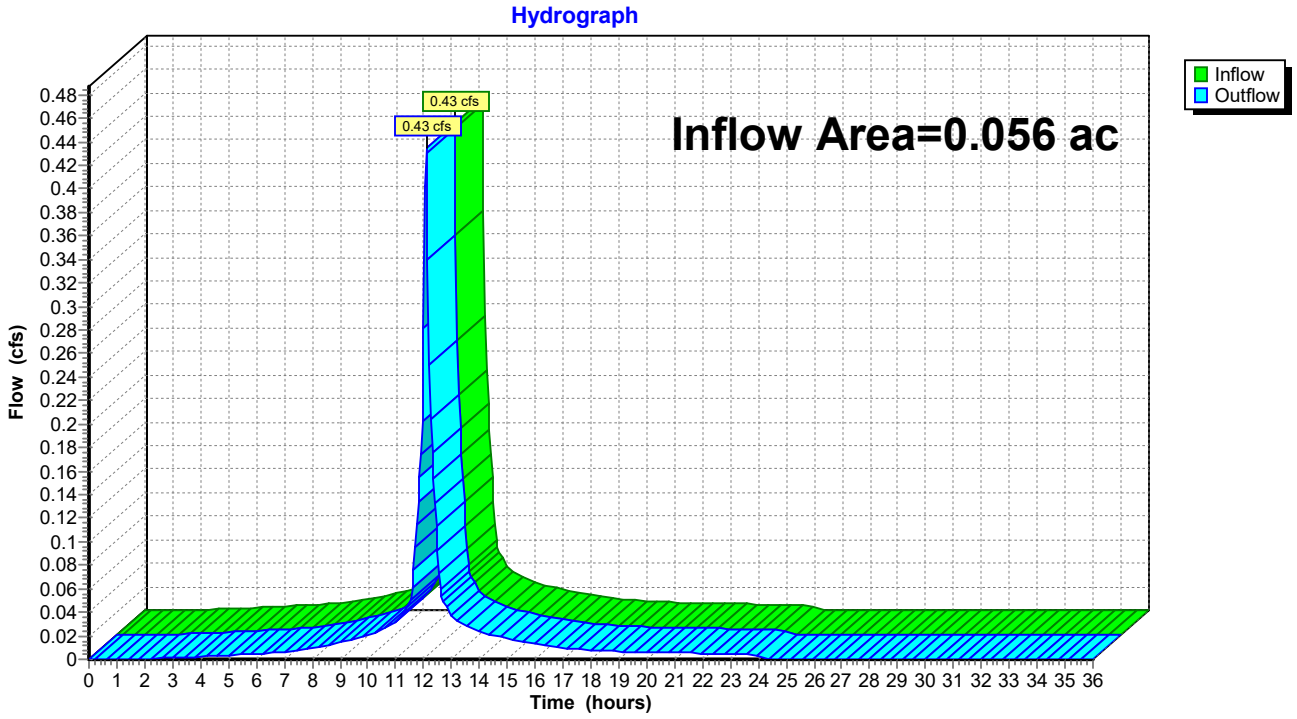
Summary for Reach 400R: DP-4

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

Inflow Area = 0.056 ac, 91.51% Impervious, Inflow Depth = 7.52" for 100-Year event
Inflow = 0.43 cfs @ 12.09 hrs, Volume= 0.035 af
Outflow = 0.43 cfs @ 12.09 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 600R : DP-6

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Reach 400R: DP-4



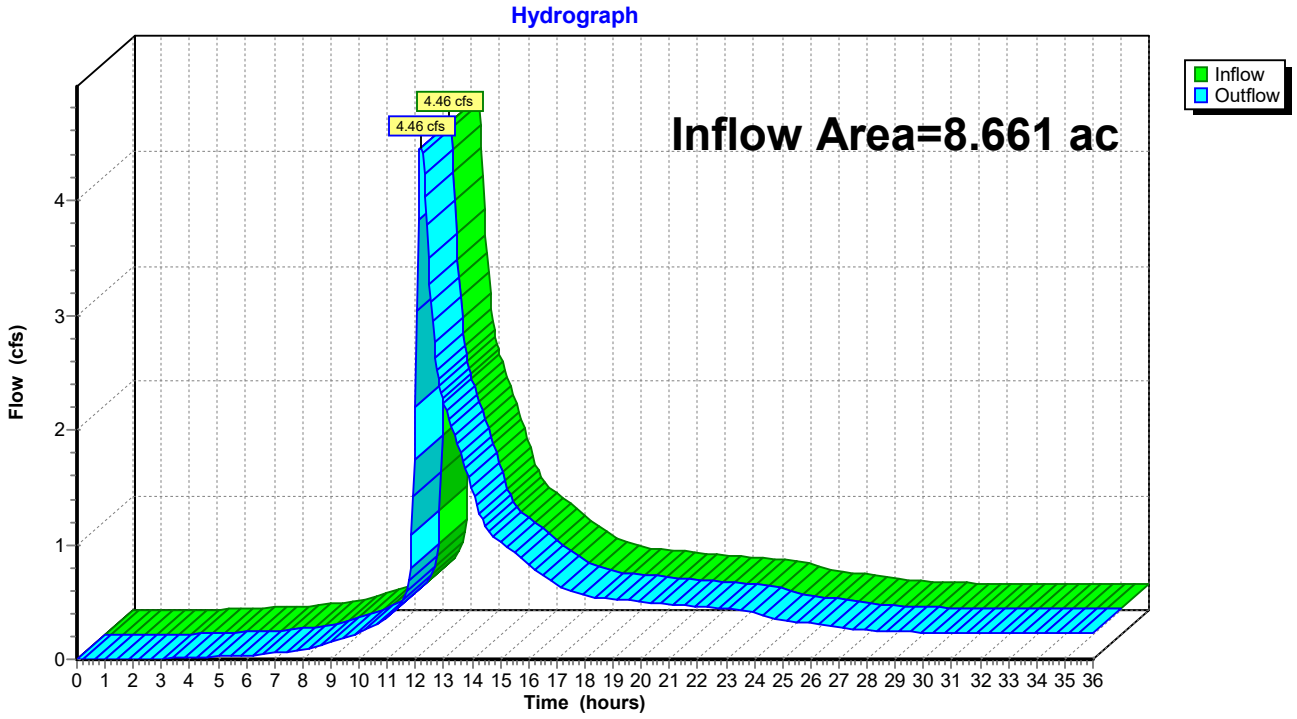
Summary for Reach 500R: DP-5

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

Inflow Area = 8.661 ac, 57.47% Impervious, Inflow Depth > 1.83" for 100-Year event
Inflow = 4.46 cfs @ 12.18 hrs, Volume= 1.321 af
Outflow = 4.46 cfs @ 12.18 hrs, Volume= 1.321 af, Atten= 0%, Lag= 0.0 min
Routed to Reach 600R : DP-6

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Reach 500R: DP-5



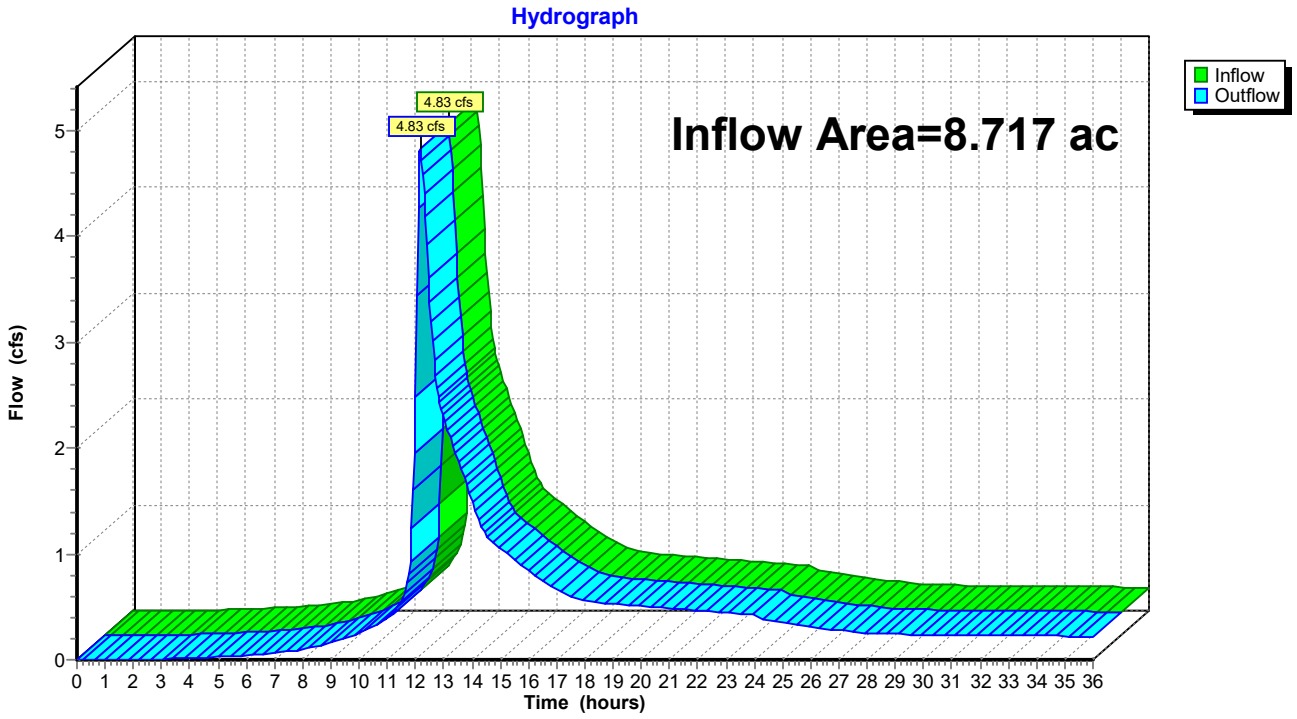
Summary for Reach 600R: DP-6

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

Inflow Area = 8.717 ac, 57.68% Impervious, Inflow Depth > 1.87" for 100-Year event
Inflow = 4.83 cfs @ 12.17 hrs, Volume= 1.356 af
Outflow = 4.83 cfs @ 12.17 hrs, Volume= 1.356 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Reach 600R: DP-6



Summary for Pond 100P: P-SUBSURFACE-1

Inflow Area = 2.109 ac, 64.48% Impervious, Inflow Depth = 5.53" for 100-Year event
Inflow = 11.91 cfs @ 12.11 hrs, Volume= 0.972 af
Outflow = 5.28 cfs @ 12.34 hrs, Volume= 0.972 af, Atten= 56%, Lag= 14.3 min
Discarded = 0.63 cfs @ 12.34 hrs, Volume= 0.585 af
Primary = 4.66 cfs @ 12.34 hrs, Volume= 0.387 af
Routed to Reach 100R : DP-1

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 126.67' @ 12.34 hrs Surf.Area= 5,529 sf Storage= 13,073 cf

Plug-Flow detention time= 98.4 min calculated for 0.971 af (100% of inflow)
Center-of-Mass det. time= 98.3 min (891.4 - 793.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	124.00'	0 cf	**30.27'W x 182.67'L x 3.50'H Field A** 19,353 cf Overall - 19,353 cf Embedded = 0 cf x 40.0% Voids
#2A	124.00'	14,694 cf	**StormTrap ST2 SingleTrap 3-0** x 22 Inside #1 Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf 22 Chambers in 2 Rows 16.96' x 169.35' Core + 6.66' Border = 30.27' x 182.67' System
		14,694 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	124.85'	**15.0" Round Culvert** L= 170.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 124.85' / 124.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	124.85'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	125.30'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	125.90'	**1.6' long x 2.10' rise Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.9' Crest Height
#5	Discarded	124.00'	**2.410 in/hr Exfiltration over Horizontal area** Conductivity to Groundwater Elevation = 121.42'

Discarded OutFlow Max=0.63 cfs @ 12.34 hrs HW=126.67' (Free Discharge)
└**5=Exfiltration** (Controls 0.63 cfs)

Primary OutFlow Max=4.65 cfs @ 12.34 hrs HW=126.67' (Free Discharge)
└**1=Culvert** (Passes 4.65 cfs of 5.02 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.31 cfs @ 6.26 fps)
  ├**3=Orifice/Grate** (Orifice Controls 1.00 cfs @ 5.09 fps)
  └**4=Sharp-Crested Rectangular Weir** (Weir Controls 3.34 cfs @ 3.01 fps)

Pond 100P: P-SUBSURFACE-1 - Chamber Wizard Field A

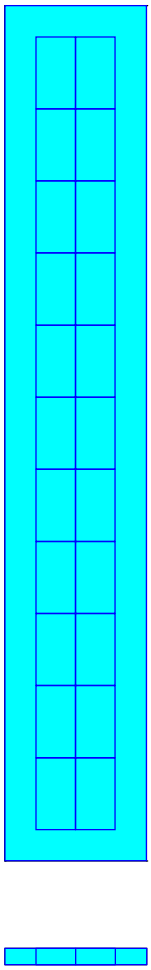
Chamber Model = StormTrap ST2 SingleTrap 3-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf
Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf

11 Chambers/Row x 15.40' Long = 169.35' Row Length +79.9" Border x 2 = 182.67' Base Length
2 Rows x 101.7" Wide + 79.9" Side Border x 2 = 30.27' Base Width
42.0" Chamber Height = 3.50' Field Height

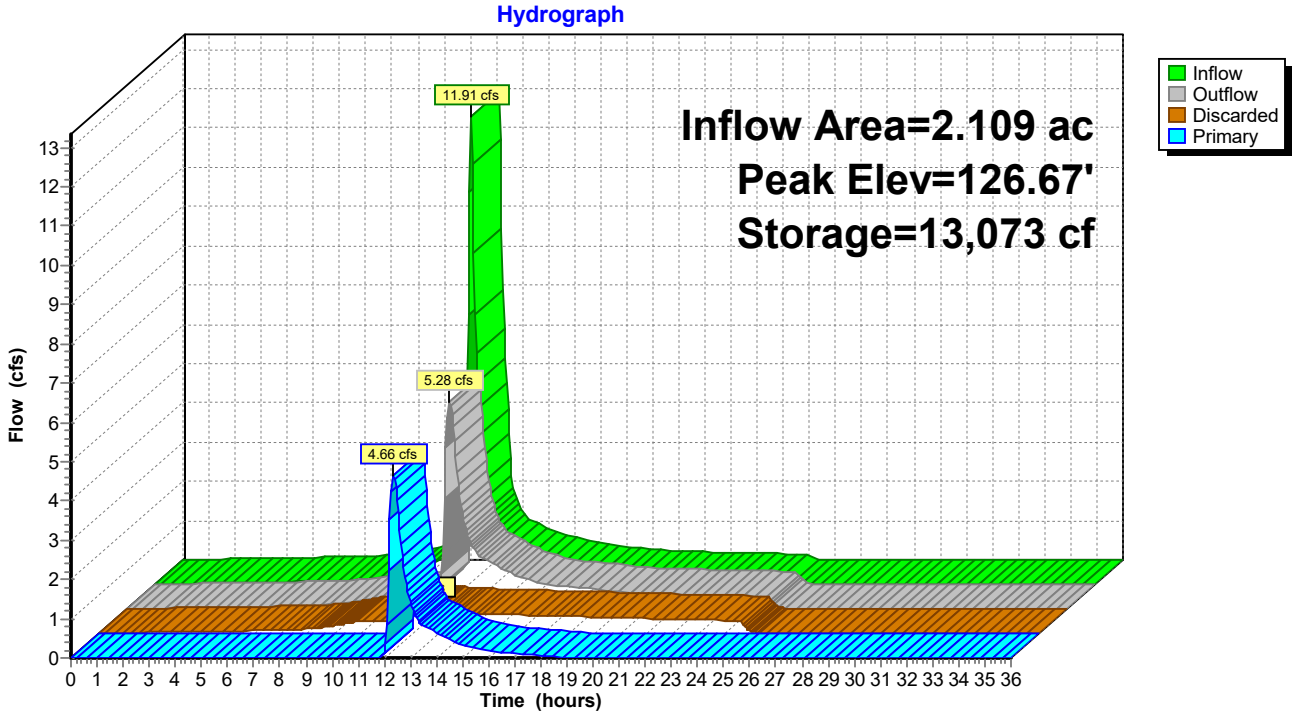
22 Chambers x 354.0 cf + 6,906.5 cf Border = 14,694.3 cf Chamber Storage
22 Chambers x 456.9 cf + 9,301.3 cf Border = 19,353.2 cf Displacement

Chamber Storage = 14,694.3 cf = 0.337 af
Overall Storage Efficiency = 75.9%
Overall System Size = 182.67' x 30.27' x 3.50'

22 Chambers (plus border)
716.8 cy Field



Pond 100P: P-SUBSURFACE-1



Stage-Area-Storage for Pond 100P: P-SUBSURFACE-1

Elevation (feet)	Horizontal (sq-ft)	Storage (cubic-feet)
124.00	**5,529**	0
124.05	5,529	245
124.10	5,529	490
124.15	5,529	735
124.20	5,529	980
124.25	5,529	1,225
124.30	5,529	1,469
124.35	5,529	1,714
124.40	5,529	1,959
124.45	5,529	2,204
124.50	5,529	2,449
124.55	5,529	2,694
124.60	5,529	2,939
124.65	5,529	3,184
124.70	5,529	3,429
124.75	5,529	3,674
124.80	5,529	3,918
124.85	5,529	4,163
124.90	5,529	4,408
124.95	5,529	4,653
125.00	5,529	4,898
125.05	5,529	5,143
125.10	5,529	5,388
125.15	5,529	5,633
125.20	5,529	5,878
125.25	5,529	6,123
125.30	5,529	6,368
125.35	5,529	6,612
125.40	5,529	6,857
125.45	5,529	7,102
125.50	5,529	7,347
125.55	5,529	7,592
125.60	5,529	7,837
125.65	5,529	8,082
125.70	5,529	8,327
125.75	5,529	8,572
125.80	5,529	8,817
125.85	5,529	9,061
125.90	5,529	9,306
125.95	5,529	9,551
126.00	5,529	9,796
126.05	5,529	10,041
126.10	5,529	10,286
126.15	5,529	10,531
126.20	5,529	10,776
126.25	5,529	11,021
126.30	5,529	11,266
126.35	5,529	11,511
126.40	5,529	11,755
126.45	5,529	12,000
126.50	5,529	12,245
126.55	5,529	12,490
126.60	5,529	12,735
126.65	5,529	12,980
126.70	5,529	13,225
126.75	5,529	13,470
126.80	5,529	13,715
126.85	5,529	13,960
126.90	5,529	14,205
126.95	5,529	14,449
127.00	5,529	14,694
127.05	5,529	14,694
127.10	5,529	14,694
127.15	5,529	14,694
127.20	5,529	14,694
127.25	5,529	**14,694**
127.30	5,529	**14,694**
127.35	5,529	14,694
127.40	5,529	14,694
127.45	5,529	14,694
127.50	5,529	14,694
127.55	5,529	14,694
127.60	5,529	14,694
127.65	5,529	14,694
127.70	5,529	14,694
127.75	5,529	14,694
127.80	5,529	14,694
127.85	5,529	14,694
127.90	5,529	14,694
127.95	5,529	14,694
128.00	5,529	14,694

Summary for Pond 110P: E-POND

Inflow Area = 6.828 ac, 55.80% Impervious, Inflow Depth = 4.39" for 100-Year event
Inflow = 26.50 cfs @ 12.21 hrs, Volume= 2.499 af
Outflow = 0.22 cfs @ 24.15 hrs, Volume= 0.440 af, Atten= 99%, Lag= 716.4 min
Primary = 0.22 cfs @ 24.15 hrs, Volume= 0.440 af
Routed to Reach 300R : DP-3

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 122.65' @ 24.15 hrs Surf.Area= 1.962 ac Storage= 2.274 af

Plug-Flow detention time= 770.6 min calculated for 0.440 af (18% of inflow)
Center-of-Mass det. time= 622.8 min (1,438.6 - 815.8)

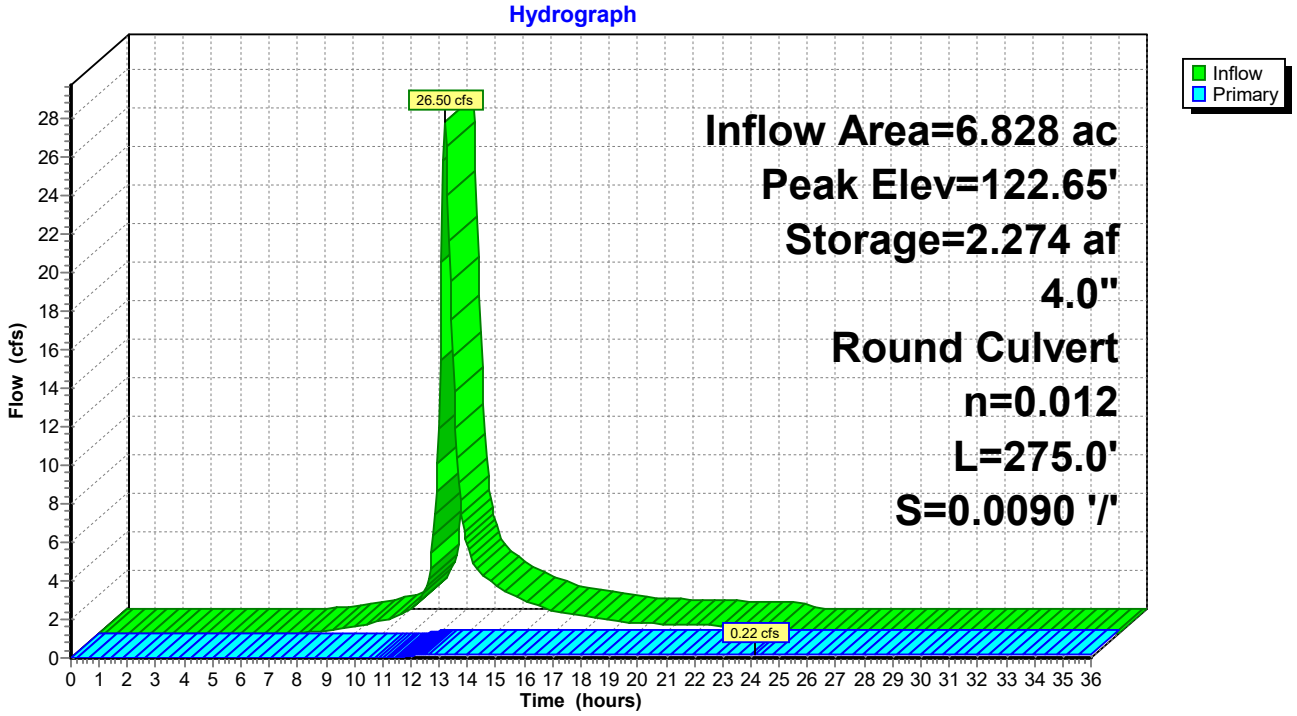
Volume	Invert	Avail.Storage	Storage Description
#1	121.40'	2.981 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
121.40	1.720	0.000	0.000
122.00	1.800	1.056	1.056
123.00	2.050	1.925	2.981

Device	Routing	Invert	Outlet Devices
#1	Primary	121.40'	**4.0" Round Culvert** L= 275.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 121.40' / 118.93' S= 0.0090 '/' Cc= 0.900 n= 0.012, Flow Area= 0.09 sf

Primary OutFlow Max=0.22 cfs @ 24.15 hrs HW=122.65' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.22 cfs @ 2.56 fps)

Pond 110P: E-POND



Stage-Area-Storage for Pond 110P: E-POND

Elevation (feet)	Surface (acres)	Storage (acre-feet)
121.40	1.720	0.000
121.42	1.723	0.034
121.44	1.725	0.069
121.46	1.728	0.103
121.48	1.731	0.138
121.50	1.733	0.173
121.52	1.736	0.207
121.54	1.739	0.242
121.56	1.741	0.277
121.58	1.744	0.312
121.60	1.747	0.347
121.62	1.749	0.382
121.64	1.752	0.417
121.66	1.755	0.452
121.68	1.757	0.487
121.70	1.760	0.522
121.72	1.763	0.557
121.74	1.765	0.593
121.76	1.768	0.628
121.78	1.771	0.663
121.80	1.773	0.699
121.82	1.776	0.734
121.84	1.779	0.770
121.86	1.781	0.805
121.88	1.784	0.841
121.90	1.787	0.877
121.92	1.789	0.912
121.94	1.792	0.948
121.96	1.795	0.984
121.98	1.797	1.020
122.00	1.800	1.056
122.02	1.805	1.092
122.04	1.810	1.128
122.06	1.815	1.164
122.08	1.820	1.201
122.10	1.825	1.237
122.12	1.830	1.274
122.14	1.835	1.310
122.16	1.840	1.347
122.18	1.845	1.384
122.20	1.850	1.421
122.22	1.855	1.458
122.24	1.860	1.495
122.26	1.865	1.532
122.28	1.870	1.570
122.30	1.875	1.607
122.32	1.880	1.645
122.34	1.885	1.682
122.36	1.890	1.720
122.38	1.895	1.758
122.40	1.900	1.796
122.42	1.905	1.834
122.44	1.910	1.872
122.46	1.915	1.910
122.48	1.920	1.949
122.50	1.925	1.987
122.52	1.930	2.026
122.54	1.935	2.064
122.56	1.940	2.103
122.58	1.945	2.142
122.60	1.950	2.181
122.62	1.955	2.220
122.64	1.960	2.259
122.66	1.965	2.298
122.68	1.970	2.338
122.70	1.975	2.377
122.72	1.980	2.417
122.74	1.985	2.456
122.76	1.990	2.496
122.78	1.995	2.536
122.80	2.000	2.576
122.82	2.005	2.616
122.84	2.010	2.656
122.86	2.015	2.696
122.88	2.020	2.737
122.90	2.025	2.777
122.92	2.030	2.818
122.94	2.035	2.858
122.96	2.040	2.899
122.98	2.045	2.940
123.00	**2.050**	**2.981**

Summary for Pond 200P: P-SUBSURFACE-2

Inflow Area = 1.104 ac, 67.52% Impervious, Inflow Depth = 6.21" for 100-Year event
Inflow = 5.80 cfs @ 12.12 hrs, Volume= 0.572 af
Outflow = 1.68 cfs @ 12.57 hrs, Volume= 0.569 af, Atten= 71%, Lag= 27.4 min
Primary = 1.68 cfs @ 12.57 hrs, Volume= 0.569 af
Routed to Reach 300R : DP-3

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 123.55' @ 12.57 hrs Surf.Area= 3,499 sf Storage= 10,063 cf

Plug-Flow detention time= 150.0 min calculated for 0.568 af (99% of inflow)
Center-of-Mass det. time= 147.8 min (930.8 - 783.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	120.30'	0 cf	**38.75'W x 90.29'L x 4.00'H Field A** 13,995 cf Overall - 13,995 cf Embedded = 0 cf x 40.0% Voids
#2A	120.30'	10,848 cf	**StormTrap ST2 SingleTrap 3-6** x 15 Inside #1 Inside= 101.7"W x 42.0"H => 26.77 sf x 15.40'L = 412.1 cf Outside= 101.7"W x 48.0"H => 33.92 sf x 15.40'L = 522.2 cf 15 Chambers in 3 Rows 25.44' x 76.98' Core + 6.66' Border = 38.75' x 90.29' System
		10,848 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	120.30'	**12.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 120.30' / 120.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	120.30'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	121.40'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	122.10'	**4.8" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.68 cfs @ 12.57 hrs HW=123.54' (Free Discharge)
└**1=Culvert** (Passes 1.68 cfs of 6.26 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.42 cfs @ 8.50 fps)
  ├**3=Orifice/Grate** (Orifice Controls 0.59 cfs @ 6.77 fps)
  └**4=Orifice/Grate** (Orifice Controls 0.67 cfs @ 5.37 fps)

Pond 200P: P-SUBSURFACE-2 - Chamber Wizard Field A

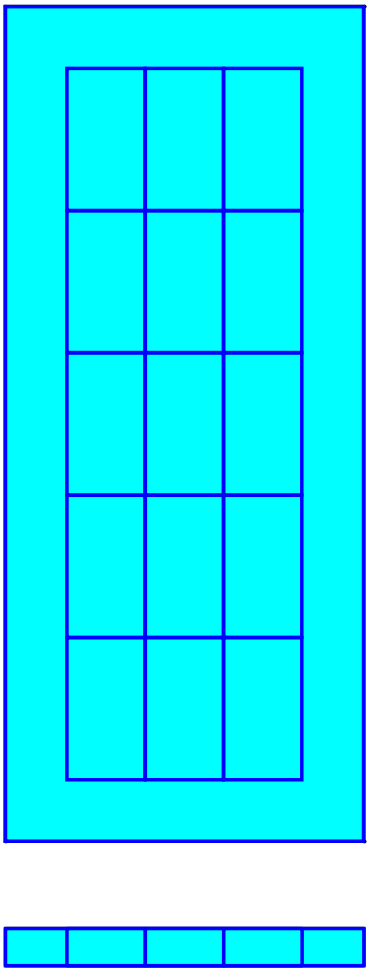
Chamber Model = StormTrap ST2 SingleTrap 3-6 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 42.0"H => 26.77 sf x 15.40'L = 412.1 cf
Outside= 101.7"W x 48.0"H => 33.92 sf x 15.40'L = 522.2 cf

5 Chambers/Row x 15.40' Long = 76.98' Row Length +79.9" Border x 2 = 90.29' Base Length
3 Rows x 101.7" Wide + 79.9" Side Border x 2 = 38.75' Base Width
48.0" Chamber Height = 4.00' Field Height

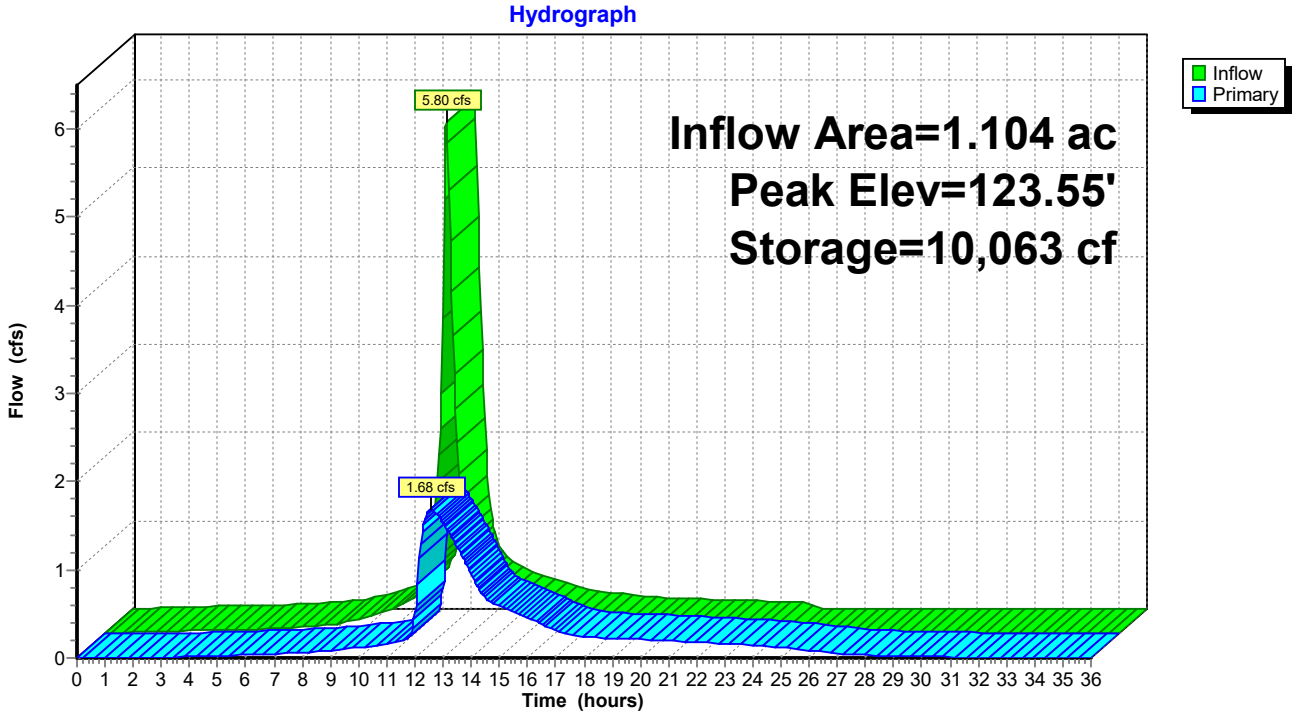
15 Chambers x 412.1 cf + 4,665.9 cf Border = 10,847.9 cf Chamber Storage
15 Chambers x 522.2 cf + 6,162.6 cf Border = 13,995.2 cf Displacement

Chamber Storage = 10,847.9 cf = 0.249 af
Overall Storage Efficiency = 77.5%
Overall System Size = 90.29' x 38.75' x 4.00'

15 Chambers (plus border)
518.3 cy Field



Pond 200P: P-SUBSURFACE-2



Stage-Area-Storage for Pond 200P: P-SUBSURFACE-2

Elevation (feet)	Storage (cubic-feet)
120.30	0
120.35	155
120.40	310
120.45	465
120.50	620
120.55	775
120.60	930
120.65	1,085
120.70	1,240
120.75	1,395
120.80	1,550
120.85	1,705
120.90	1,860
120.95	2,015
121.00	2,170
121.05	2,325
121.10	2,480
121.15	2,634
121.20	2,789
121.25	2,944
121.30	3,099
121.35	3,254
121.40	3,409
121.45	3,564
121.50	3,719
121.55	3,874
121.60	4,029
121.65	4,184
121.70	4,339
121.75	4,494
121.80	4,649
121.85	4,804
121.90	4,959
121.95	5,114
122.00	5,269
122.05	5,424
122.10	5,579
122.15	5,734
122.20	5,889
122.25	6,044
122.30	6,199
122.35	6,354
122.40	6,509
122.45	6,664
122.50	6,819
122.55	6,974
122.60	7,129
122.65	7,284
122.70	7,439
122.75	7,594
122.80	7,748
122.85	7,903
122.90	8,058
122.95	8,213
123.00	8,368
123.05	8,523
123.10	8,678
123.15	8,833
123.20	8,988
123.25	9,143
123.30	9,298
123.35	9,453
123.40	9,608
123.45	9,763
123.50	9,918
123.55	10,073
123.60	10,228
123.65	10,383
123.70	10,538
123.75	10,693
123.80	10,848
123.85	10,848
123.90	10,848
123.95	**10,848**
124.00	**10,848**
124.05	10,848
124.10	10,848
124.15	10,848
124.20	10,848
124.25	10,848
124.30	10,848

Summary for Pond 300P: P-SUBSURFACE-3

Inflow Area = 0.581 ac, 69.41% Impervious, Inflow Depth = 5.96" for 100-Year event
Inflow = 3.90 cfs @ 12.09 hrs, Volume= 0.289 af
Outflow = 2.92 cfs @ 12.16 hrs, Volume= 0.289 af, Atten= 25%, Lag= 4.2 min
Primary = 2.92 cfs @ 12.16 hrs, Volume= 0.289 af
Routed to Reach 300R : DP-3

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 122.84' @ 12.16 hrs Surf.Area= 626 sf Storage= 1,641 cf

Plug-Flow detention time= 16.4 min calculated for 0.289 af (100% of inflow)
Center-of-Mass det. time= 16.6 min (817.8 - 801.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	119.70'	0 cf	**21.79'W x 28.71'L x 3.50'H Field A** 2,190 cf Overall - 2,190 cf Embedded = 0 cf x 40.0% Voids
#2A	119.70'	1,641 cf	**StormTrap ST2 SingleTrap 3-0** Inside #1 Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf 8.48' x 15.40' Core + 6.66' Border = 21.79' x 28.71' System
		1,641 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	119.70'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 119.70' / 119.30' S= 0.0400 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	119.70'	**4.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	120.70'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	121.40'	**5.3" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.88 cfs @ 12.16 hrs HW=122.80' (Free Discharge)
└**1=Culvert** (Passes 2.88 cfs of 6.10 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.79 cfs @ 8.23 fps)
  ├**3=Orifice/Grate** (Orifice Controls 1.29 cfs @ 6.55 fps)
  └**4=Orifice/Grate** (Orifice Controls 0.80 cfs @ 5.23 fps)

Pond 300P: P-SUBSURFACE-3 - Chamber Wizard Field A

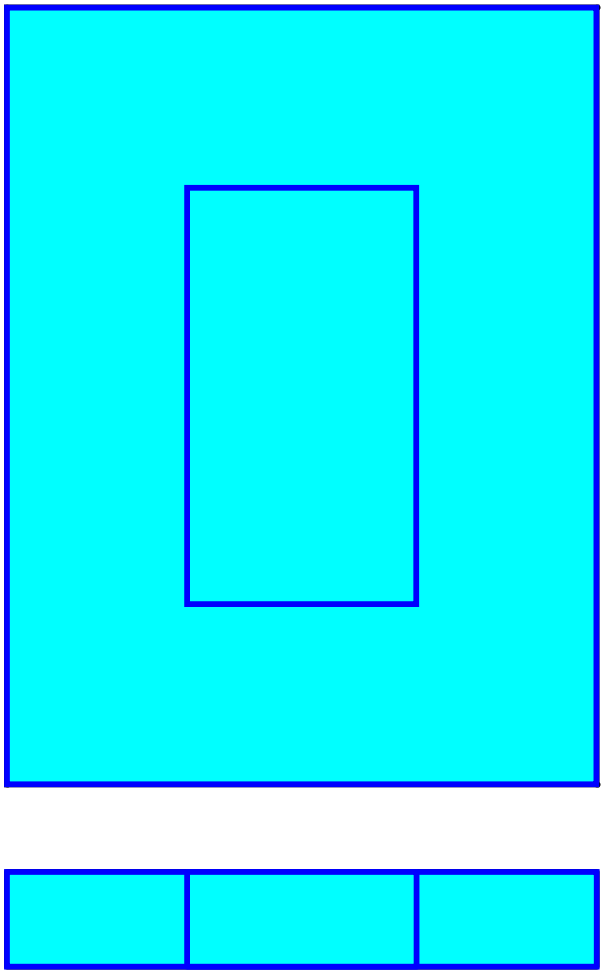
Chamber Model = StormTrap ST2 SingleTrap 3-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf
Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf

1 Chambers/Row x 15.40' Long = 15.40' Row Length +79.9" Border x 2 = 28.71' Base Length
1 Rows x 101.7" Wide + 79.9" Side Border x 2 = 21.79' Base Width
42.0" Chamber Height = 3.50' Field Height

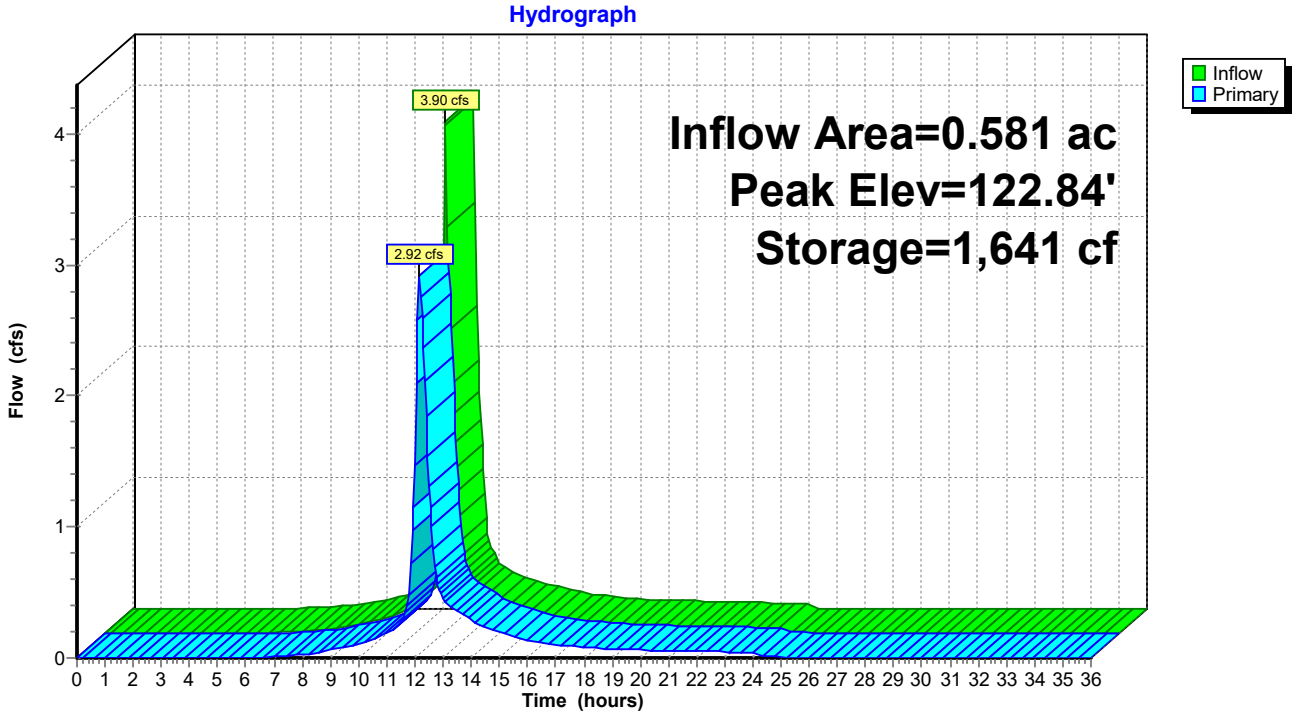
1 Chambers x 354.0 cf + 1,286.6 cf Border = 1,640.6 cf Chamber Storage
1 Chambers x 456.9 cf + 1,732.7 cf Border = 2,189.6 cf Displacement

Chamber Storage = 1,640.6 cf = 0.038 af
Overall Storage Efficiency = 74.9%
Overall System Size = 28.71' x 21.79' x 3.50'

1 Chambers (plus border)
81.1 cy Field



Pond 300P: P-SUBSURFACE-3



Stage-Area-Storage for Pond 300P: P-SUBSURFACE-3

Elevation (feet)	Storage (cubic-feet)
119.70	0
119.75	27
119.80	55
119.85	82
119.90	109
119.95	137
120.00	164
120.05	191
120.10	219
120.15	246
120.20	273
120.25	301
120.30	328
120.35	355
120.40	383
120.45	410
120.50	437
120.55	465
120.60	492
120.65	520
120.70	547
120.75	574
120.80	602
120.85	629
120.90	656
120.95	684
121.00	711
121.05	738
121.10	766
121.15	793
121.20	820
121.25	848
121.30	875
121.35	902
121.40	930
121.45	957
121.50	984
121.55	1,012
121.60	1,039
121.65	1,066
121.70	1,094
121.75	1,121
121.80	1,148
121.85	1,176
121.90	1,203
121.95	1,230
122.00	1,258
122.05	1,285
122.10	1,312
122.15	1,340
122.20	1,367
122.25	1,394
122.30	1,422
122.35	1,449
122.40	1,477
122.45	1,504
122.50	1,531
122.55	1,559
122.60	1,586
122.65	1,613
122.70	1,641
122.75	1,641
122.80	1,641
122.85	1,641
122.90	1,641
122.95	1,641
123.00	**1,641**
123.05	1,641
123.10	1,641
123.15	1,641
123.20	1,641

Attachment 4
Floodplain & Proposed Compensatory Storage Analysis

BEALS AND THOMAS

2063.27 Floodplain & Proposed Compensatory Storage

Objective

To determine the 100-year floodplain volume lost given the proposed grading design and design adequate compensatory flood storage volumes. Also, to demonstrate proposed stormwater systems will have adequate volume to mitigate for the increase in total runoff volumes generated during the 100-year storm event.

Conclusion

The proposed grading results in a net loss of approximately 69± cubic yards of flood storage between elevation 119.0 and 124.7. A compensatory storage volume consisting of various StormTrap ST2 Single-Trap subsurface chamber fields provides approximately 1,106± cubic yards of total compensatory storage.

Regarding stormwater, the increase in total site runoff during the 100-year storm event will be mitigated by the available surplus within the dedicated floodplain compensatory storage:

1.293 af – 0.892 af =	0.401 af	Increase in total site runoff volume during 100-year storm
800 cy =	0.496 af	Available surplus within dedicated compensatory storage

0.496 af - 0.401 af = 0.0.095 af = 4,138± cf = 153± cy surplus flood & stormwater storage

Calculation Methods

1. Analysis of flood volumes between existing/proposed surfaces and incremental flood elevations performed with Trimble Paydirt SiteWork (version 5.23) earthworks software.
2. Subsurface chamber compensatory storage volumes modeled with HydroCAD (version 10.20-2g) hydrology software.
3. Existing and proposed surface information exported from AutoCAD Civil 3D.
4. Hydrologic calculations from HydroCAD.

Assumptions

1. Stormwater tailwater effects were not analyzed.
2. Proposed compensatory storage is free draining.
3. Proposed compensatory storage volumes will not be influenced by groundwater.
4. Proposed stone void volumes were not included in the analyses.
5. Infiltration at the subsurface floodplain compensation system and Subsurface Stormwater Systems #2 & #3 was conservatively not modelled.
6. Structural components for proposed 6-space parking deck were not included in the calculation (fully-open flood compensation area, below).
7. The 224± ft connection to the shared access trail is assumed to be a deck spanning above the 100-year flood elevation. Supports have not been modeled.

Sources of Data/ Equations

1. Existing topography from B+T base file 206326B017D.

2. Proposed surface from B+T design file 206327D032D.
3. Paydirt file no. 206327PD001C.
4. Pre and Post-Development Calculation Summaries (206327CS002B & 206327CS003B) for additional information regarding overall site hydrology.

List of Attachments

1. Floodplain Storage Volume Tabulation
2. Paydirt Earthwork Volume Maps and Reports
3. Compensatory Floodplain Storage System Models

REV	CALC. BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
0	TJM		DMF		TJM	
1	TJM	12/15/23	DMF	/23	TJM	/23

206327CS001C

Attachment 1

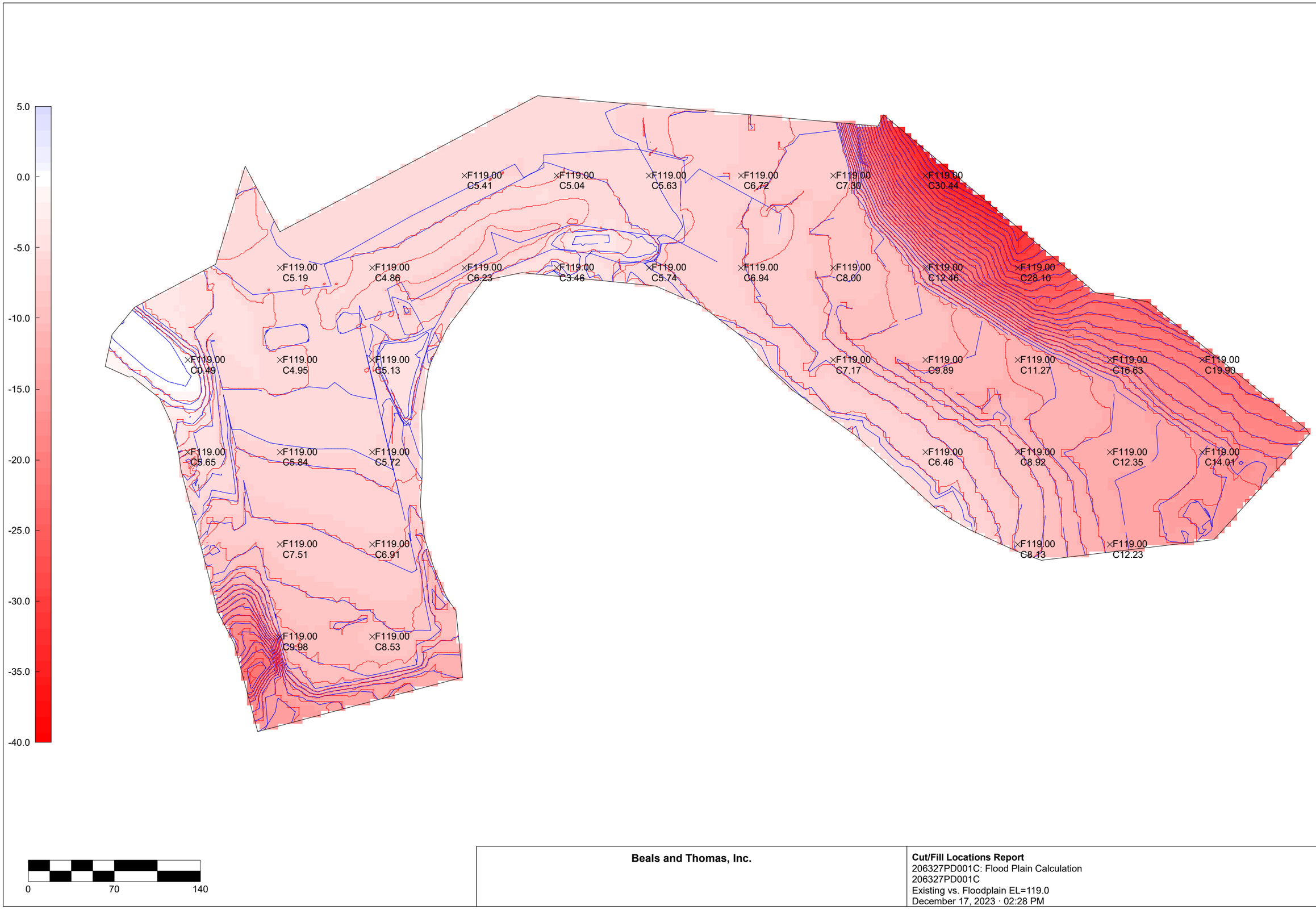
Floodplain Storage Volume Tabulation

Elevation	Floodplain Storage Volumes (Cubic Yards)									
	From Existing		From Proposed		Delta		Proposed Compensation		Proposed Surplus	
	Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative	Incremental	Cumulative
119.0	0	0	0	0	0	0	0	0	0	0
120.0	84	84	42	42	-42	-42	68	68	26	26
121.0	134	218	109	151	-25	-67	170	238	145	171
122.0	161	379	161	312	0	-67	169	407	169	340
123.0	237	616	196	508	-41	-108	222	629	181	521
124.0	538	1,154	455	963	-83	-191	338	967	255	776
124.7	1,252	2,406	1,064	2,027	-188	-379	212	1,179	24	800

Attachment 2

Paydirt Earthwork Volume Maps and Reports

(Comparing Existing and Proposed Topography to the Respective Floodplain Elevations)



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Cut/Fill Locations Report
206327PD001C: Flood Plain Calculation
206327PD001C
Existing vs. Floodplain EL=119.0
December 17, 2023 · 02:28 PM

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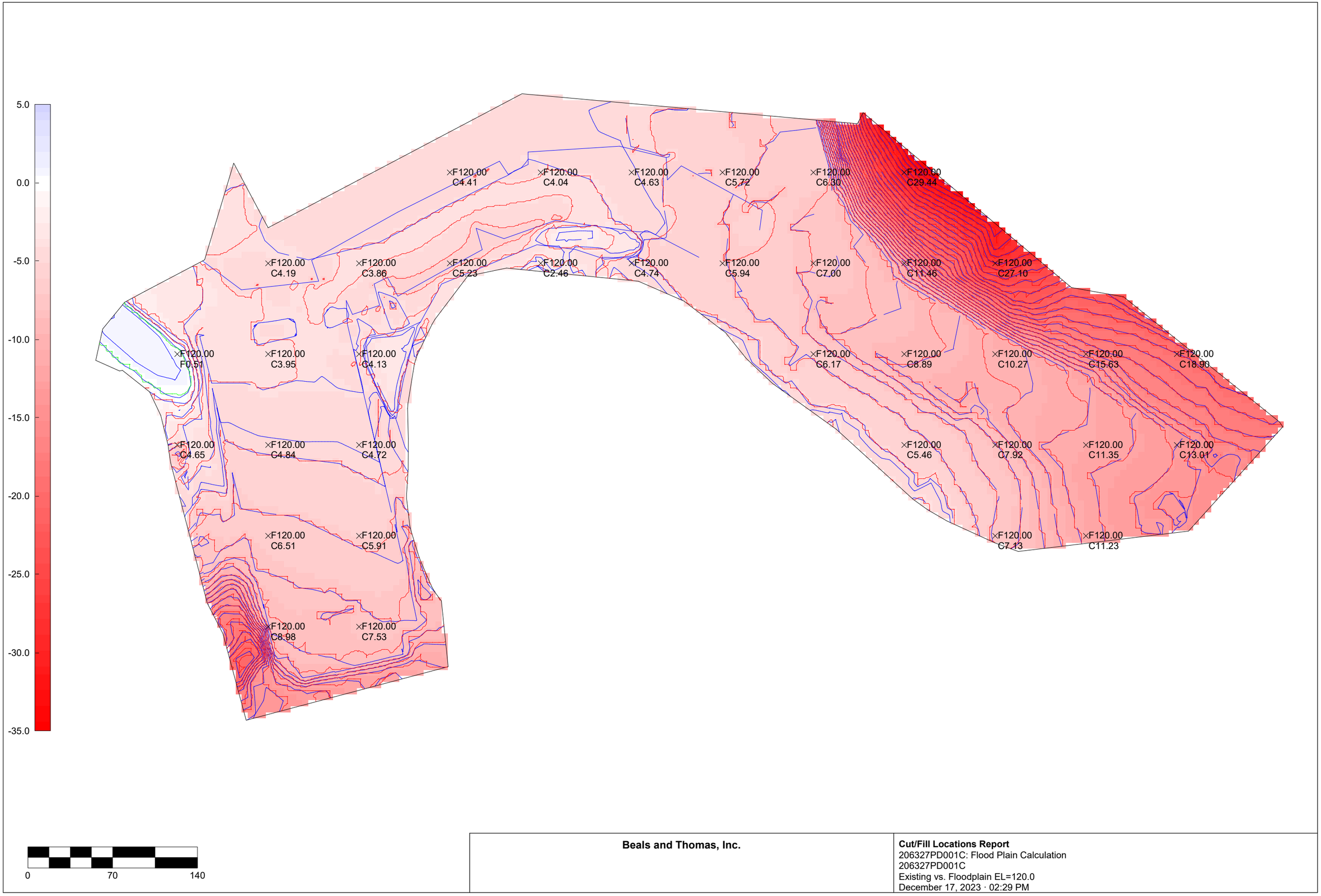
Area of Interest Cut/Fill Zone	Area (sq ft)	Average Depth (ft)	Maximum Depth (ft)	Bank Volume (cu yd)	Shrink Swell (%)	Adjusted Volume (cu yd)	Center of Mass X	 Y
LOW								
Cut Zone 1	215963.42	9.16	35.00	73302.70	0.00	73302.70	5759.66	6392.88
LOW: Total Cut	**215963.42**	**9.16**	**35.00**	**73302.70**	**0.00**	**73302.70**	0.00	0.00
Misc. Fills (10)	133.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOW: Total Fill	**133.50**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	0.00	0.00
LOW: Import/Export			**Export**	**73302.70**	**Export**	**73302.70**		
206327PD001C								
LOW: Total Cut	215963.42	9.16	35.00	73302.70	0.00	73302.70	0.00	0.00
206327PD001C: Total Cut	**215963.42**	**9.16**	**35.00**	**73302.70**	**0.00**	**73302.70**	0.00	0.00
LOW: Total Fill	133.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
206327PD001C: Total Fill	**133.50**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	0.00	0.00
206327PD001C: Import/Export			**Export**	**73302.70**	**Export**	**73302.70**		



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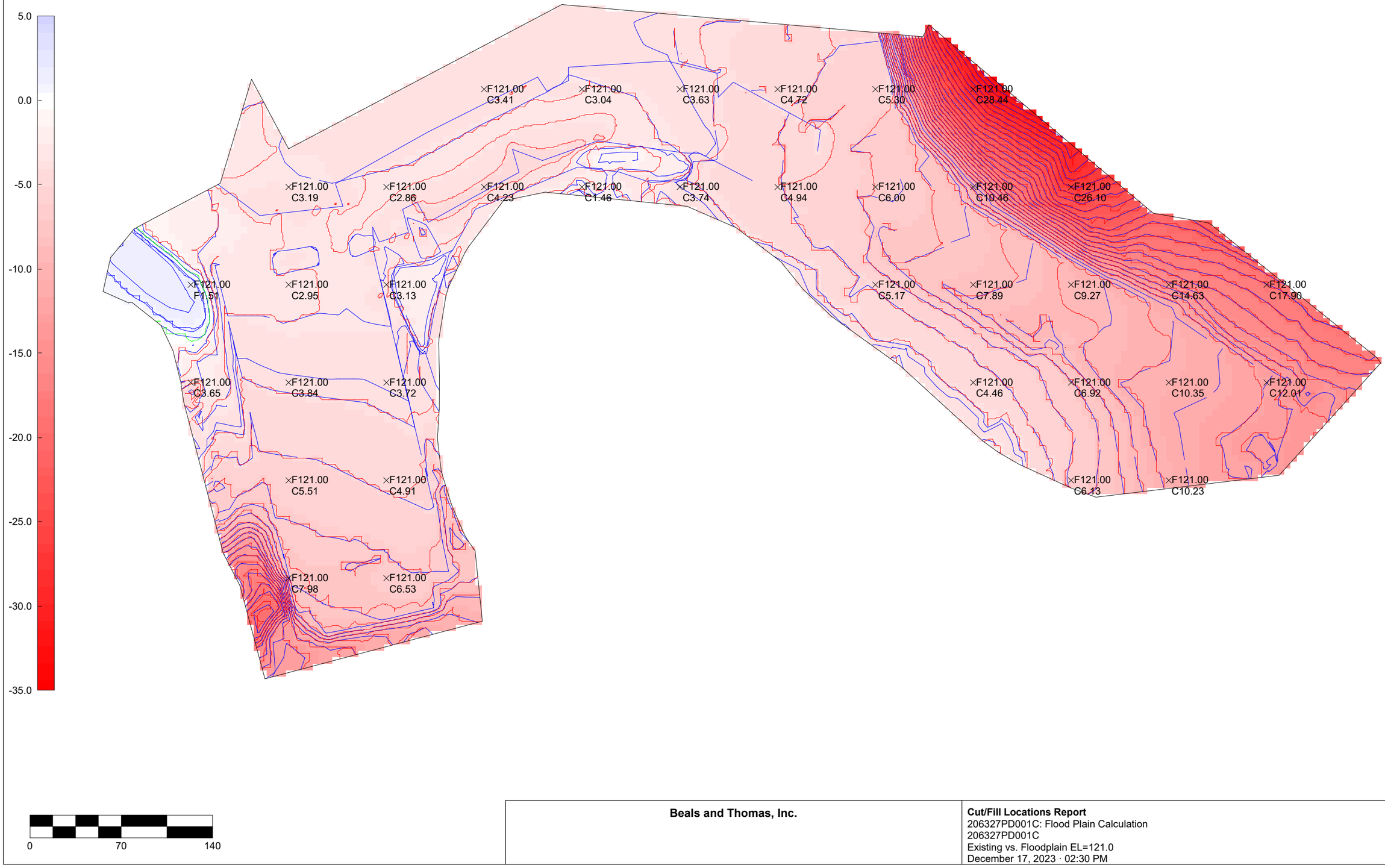
Cut/Fill Locations Report
206327PD001C: Flood Plain Calculation
206327PD001C
Existing vs. Floodplain EL=120.0
December 17, 2023 · 02:29 PM

Area of Interest Cut/Fill Zone	Area (sq ft)	Average Depth (ft)	Maximum Depth (ft)	Bank Volume (cu yd)	Shrink Swell (%)	Adjusted Volume (cu yd)	Center of Mass X	 Y
LOW								
Cut Zone 1	213217.57	8.28	34.00	65382.29	0.00	65382.29	5771.35	6392.21
LOW: Total Cut	**213217.57**	**8.28**	**34.00**	**65382.29**	**0.00**	**65382.29**	0.00	0.00
Fill Zone 1	2907.43	0.78	1.00	84.19	0.00	84.19	5248.23	6403.98
LOW: Total Fill	**2907.43**	**0.78**	**1.00**	**84.19**	**0.00**	**84.19**	0.00	0.00
LOW: Import/Export			**Export**	**65298.11**	**Export**	**65298.11**		
206327PD001C								
LOW: Total Cut	213217.57	8.28	34.00	65382.29	0.00	65382.29	0.00	0.00
206327PD001C: Total Cut	**213217.57**	**8.28**	**34.00**	**65382.29**	**0.00**	**65382.29**	0.00	0.00
LOW: Total Fill	2907.43	0.78	1.00	84.19	0.00	84.19	0.00	0.00
206327PD001C: Total Fill	**2907.43**	**0.78**	**1.00**	**84.19**	**0.00**	**84.19**	0.00	0.00
206327PD001C: Import/Export			**Export**	**65298.11**	**Export**	**65298.11**		



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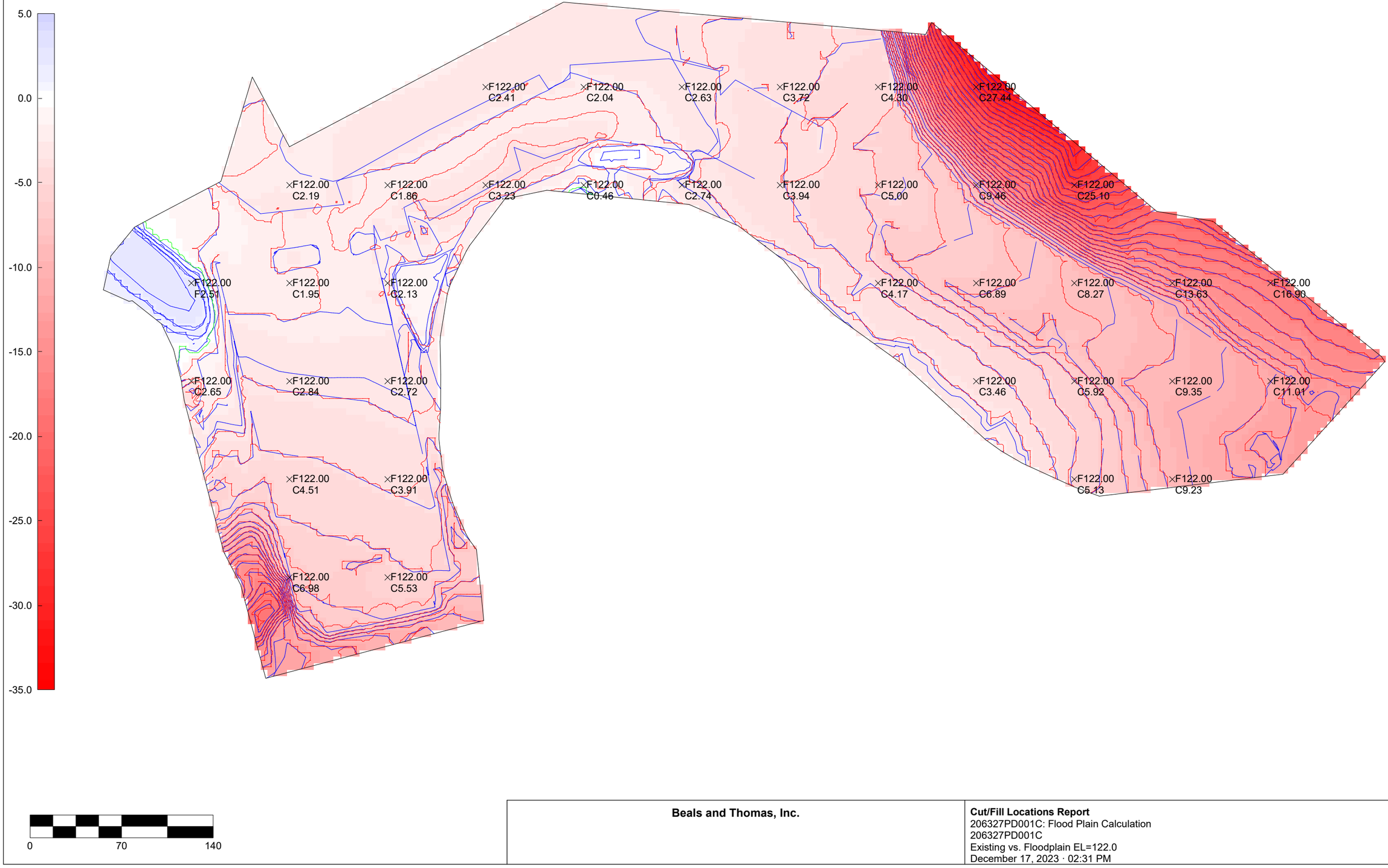
Cut/Fill Locations Report
206327PD001C: Flood Plain Calculation
206327PD001C
Existing vs. Floodplain EL=121.0
December 17, 2023 · 02:30 PM

Beals and Thomas, Inc.

Area of Interest Cut/Fill Zone	Area (sq ft)	Average Depth (ft)	Maximum Depth (ft)	Bank Volume (cu yd)	Shrink Swell (%)	Adjusted Volume (cu yd)	Center of Mass X	 Y
LOW								
Cut Zone 1	212145.91	7.32	33.00	57510.86	0.00	57510.86	5785.81	6391.36
Misc. Cuts (2)	49.43	0.07	0.07	0.13	0.00	0.13	0.00	0.00
LOW: Total Cut	**212195.34**	**7.32**	**33.00**	**57510.99**	**0.00**	**57510.99**	0.00	0.00
Fill Zone 1	3938.68	1.49	2.00	217.40	0.00	217.40	5248.65	6401.14
Misc. Fills (1)	37.50	0.50	0.50	0.69	0.00	0.69	0.00	0.00
LOW: Total Fill	**3976.19**	**1.48**	**2.00**	**218.10**	**0.00**	**218.10**	0.00	0.00
LOW: Import/Export			**Export**	**57292.90**	**Export**	**57292.90**		
206327PD001C								
LOW: Total Cut	212195.34	7.32	33.00	57510.99	0.00	57510.99	0.00	0.00
206327PD001C: Total Cut	**212195.34**	**7.32**	**33.00**	**57510.99**	**0.00**	**57510.99**	0.00	0.00
LOW: Total Fill	3976.19	1.48	2.00	218.10	0.00	218.10	0.00	0.00
206327PD001C: Total Fill	**3976.19**	**1.48**	**2.00**	**218.10**	**0.00**	**218.10**	0.00	0.00
206327PD001C: Import/Export			**Export**	**57292.90**	**Export**	**57292.90**		

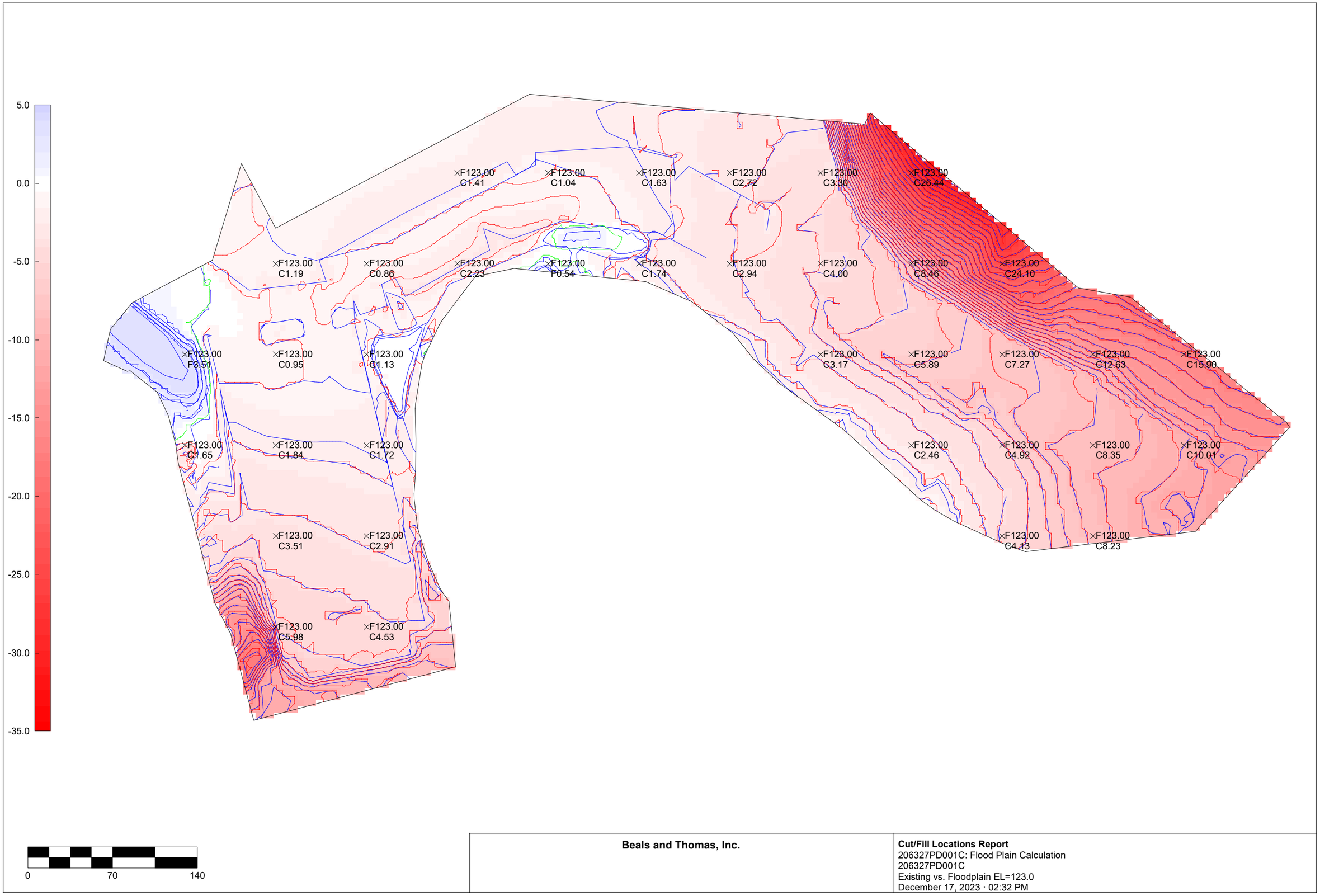


Beals and Thomas, Inc.

Cut/Fill Locations Report
206327PD001C: Flood Plain Calculation
206327PD001C
Existing vs. Floodplain EL=122.0
December 17, 2023 · 02:31 PM

Beals and Thomas, Inc.

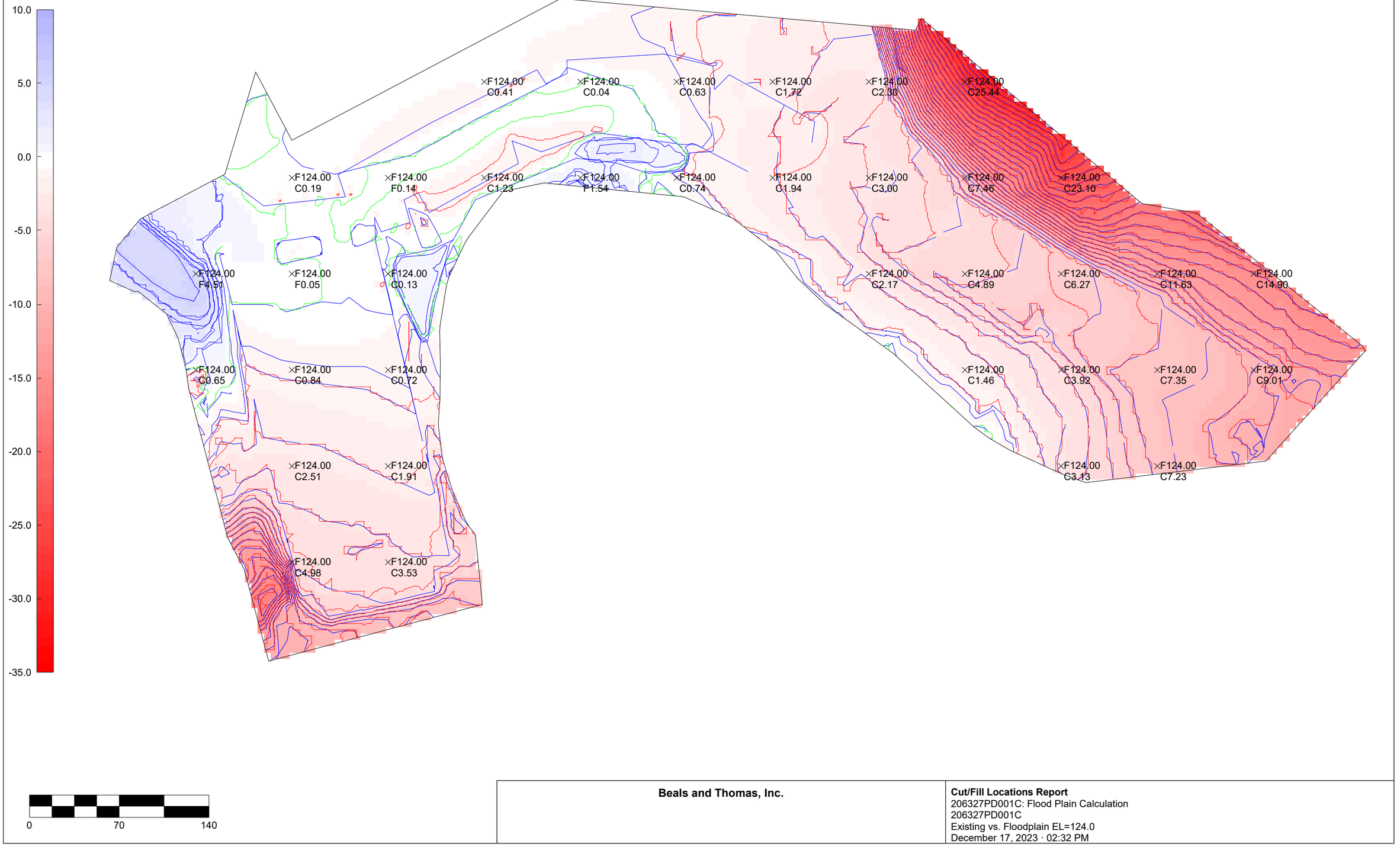
Area of Interest Cut/Fill Zone	Area (sq ft)	Average Depth (ft)	Maximum Depth (ft)	Bank Volume (cu yd)	Shrink Swell (%)	Adjusted Volume (cu yd)	Center of Mass X	 Y
LOW								
Cut Zone 1	211311.98	6.35	32.00	49667.34	0.00	49667.34	5804.55	6390.23
LOW: Total Cut	**211311.98**	**6.35**	**32.00**	**49667.34**	**0.00**	**49667.34**	0.00	0.00
Fill Zone 1	4699.94	2.17	3.00	377.95	0.00	377.95	5250.00	6399.30
Misc. Fills (6)	173.04	0.20	0.39	1.30	0.00	1.30	0.00	0.00
LOW: Total Fill	**4872.98**	**2.10**	**3.00**	**379.25**	**0.00**	**379.25**	0.00	0.00
LOW: Import/Export			**Export**	**49288.10**	**Export**	**49288.10**		
206327PD001C								
LOW: Total Cut	211311.98	6.35	32.00	49667.34	0.00	49667.34	0.00	0.00
206327PD001C: Total Cut	**211311.98**	**6.35**	**32.00**	**49667.34**	**0.00**	**49667.34**	0.00	0.00
LOW: Total Fill	4872.98	2.10	3.00	379.25	0.00	379.25	0.00	0.00
206327PD001C: Total Fill	**4872.98**	**2.10**	**3.00**	**379.25**	**0.00**	**379.25**	0.00	0.00
206327PD001C: Import/Export			**Export**	**49288.10**	**Export**	**49288.10**		



Beals and Thomas, Inc.	**Cut/Fill Locations Report** 206327PD001C: Flood Plain Calculation 206327PD001C Existing vs. Floodplain EL=123.0 December 17, 2023 · 02:32 PM

Beals and Thomas, Inc.

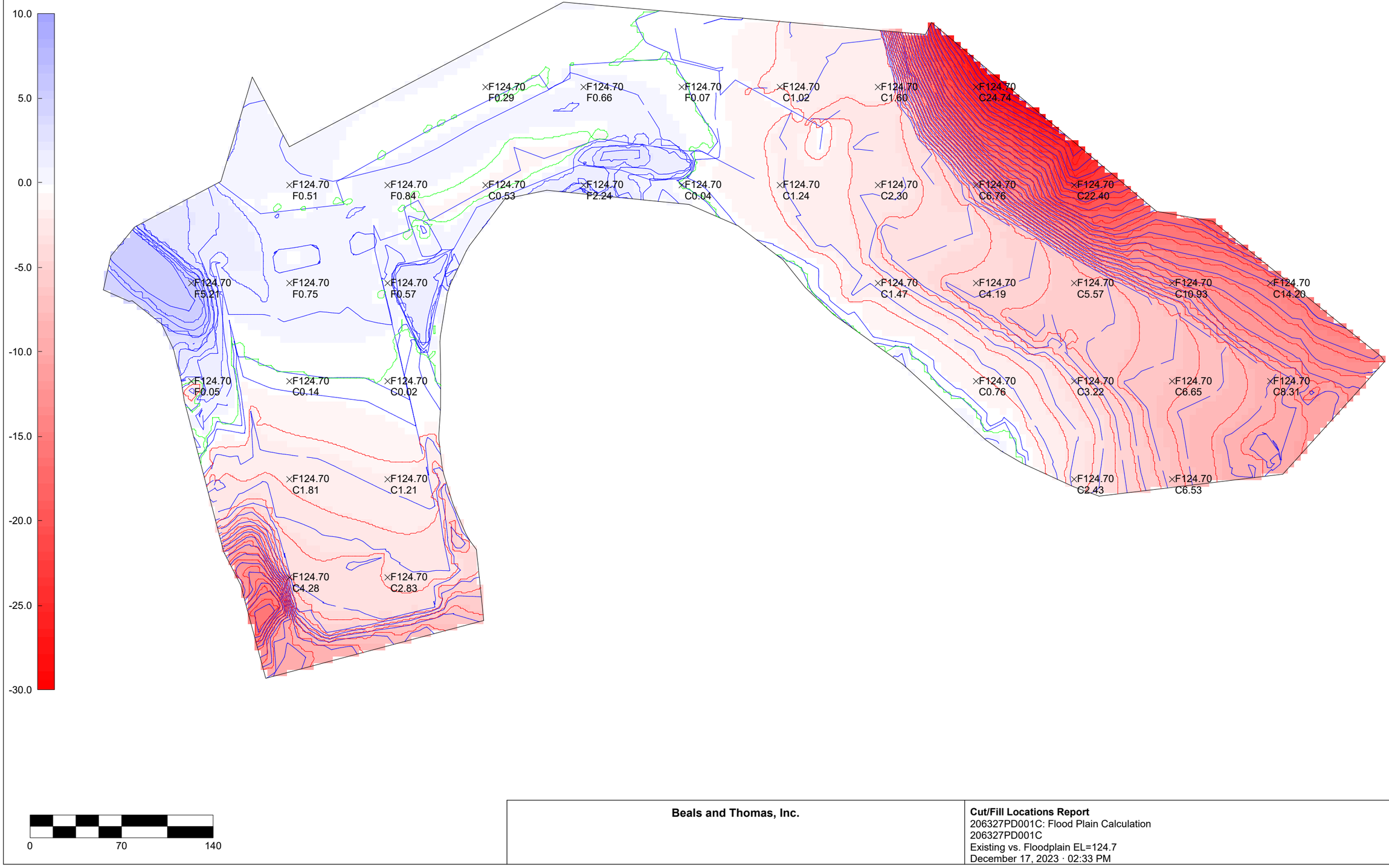
Area of Interest Cut/Fill Zone	Area (sq ft)	Average Depth (ft)	Maximum Depth (ft)	Bank Volume (cu yd)	Shrink Swell (%)	Adjusted Volume (cu yd)	Center of Mass X	 Y
LOW								
Cut Zone 1	207648.38	5.45	31.00	41900.37	0.00	41900.37	5829.50	6388.77
Misc. Cuts (1)	6.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOW: Total Cut	**207655.26**	**5.45**	**31.00**	**41900.37**	**0.00**	**41900.37**	0.00	0.00
Fill Zone 1	7041.63	2.26	4.00	590.41	0.00	590.41	5252.12	6399.29
Misc. Fills (10)	1455.37	0.48	1.36	25.75	0.00	25.75	0.00	0.00
LOW: Total Fill	**8497.00**	**1.96**	**4.00**	**616.16**	**0.00**	**616.16**	0.00	0.00
LOW: Import/Export			**Export**	**41284.20**	**Export**	**41284.20**		
206327PD001C								
LOW: Total Cut	207655.26	5.45	31.00	41900.37	0.00	41900.37	0.00	0.00
206327PD001C: Total Cut	**207655.26**	**5.45**	**31.00**	**41900.37**	**0.00**	**41900.37**	0.00	0.00
LOW: Total Fill	8497.00	1.96	4.00	616.16	0.00	616.16	0.00	0.00
206327PD001C: Total Fill	**8497.00**	**1.96**	**4.00**	**616.16**	**0.00**	**616.16**	0.00	0.00
206327PD001C: Import/Export			**Export**	**41284.20**	**Export**	**41284.20**		



Beals and Thomas, Inc.	**Cut/Fill Locations Report** 206327PD001C: Flood Plain Calculation 206327PD001C Existing vs. Floodplain EL=124.0 December 17, 2023 · 02:32 PM

Beals and Thomas, Inc.

Area of Interest Cut/Fill Zone	Area (sq ft)	Average Depth (ft)	Maximum Depth (ft)	Bank Volume (cu yd)	Shrink Swell (%)	Adjusted Volume (cu yd)	Center of Mass X	 Y
LOW								
Cut Zone 1	187787.14	4.95	30.00	34414.32	0.00	34414.32	5862.24	6387.11
Misc. Cuts (11)	958.67	0.53	2.00	18.88	0.00	18.88	0.00	0.00
LOW: Total Cut	**188745.81**	**4.93**	**30.00**	**34433.20**	**0.00**	**34433.20**	0.00	0.00
Fill Zone 1	13743.72	1.85	5.00	939.43	0.00	939.43	5259.20	6401.13
Fill Zone 2	12074.85	0.47	2.36	208.03	0.00	208.03	5552.03	6465.74
Fill Zone 3	1270.97	0.12	0.32	5.59	0.00	5.59	5314.46	6507.65
Misc. Fills (25)	499.11	0.05	0.31	0.91	0.00	0.91	0.00	0.00
LOW: Total Fill	**27588.65**	**1.13**	**5.00**	**1153.95**	**0.00**	**1153.95**	0.00	0.00
LOW: Import/Export			**Export**	**33279.25**	**Export**	**33279.25**		
206327PD001C								
LOW: Total Cut	188745.81	4.93	30.00	34433.20	0.00	34433.20	0.00	0.00
206327PD001C: Total Cut	**188745.81**	**4.93**	**30.00**	**34433.20**	**0.00**	**34433.20**	0.00	0.00
LOW: Total Fill	27588.65	1.13	5.00	1153.95	0.00	1153.95	0.00	0.00
206327PD001C: Total Fill	**27588.65**	**1.13**	**5.00**	**1153.95**	**0.00**	**1153.95**	0.00	0.00
206327PD001C: Import/Export			**Export**	**33279.25**	**Export**	**33279.25**		

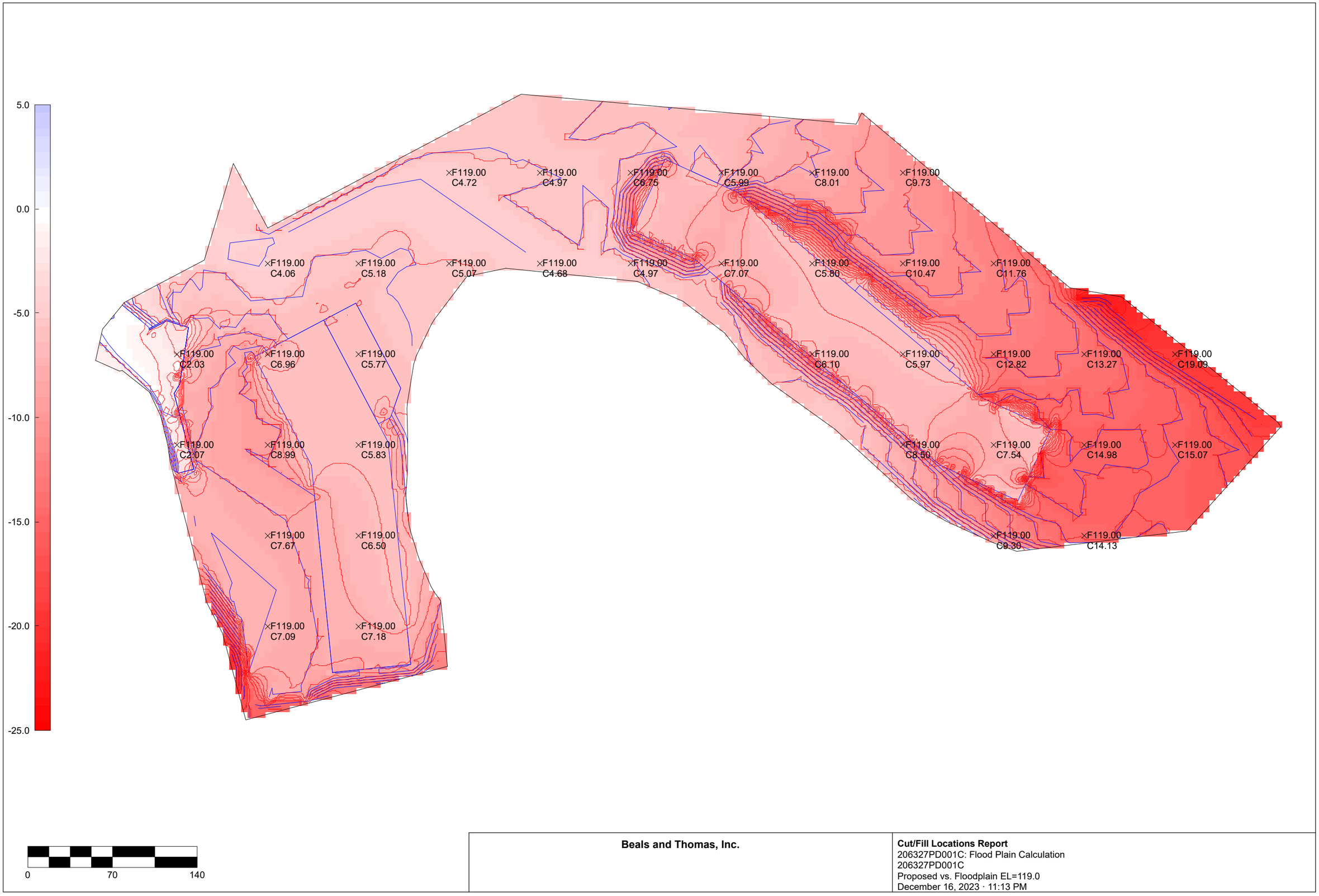


Beals and Thomas, Inc.

Cut/Fill Locations Report
206327PD001C: Flood Plain Calculation
206327PD001C
Existing vs. Floodplain EL=124.7
December 17, 2023 · 02:33 PM

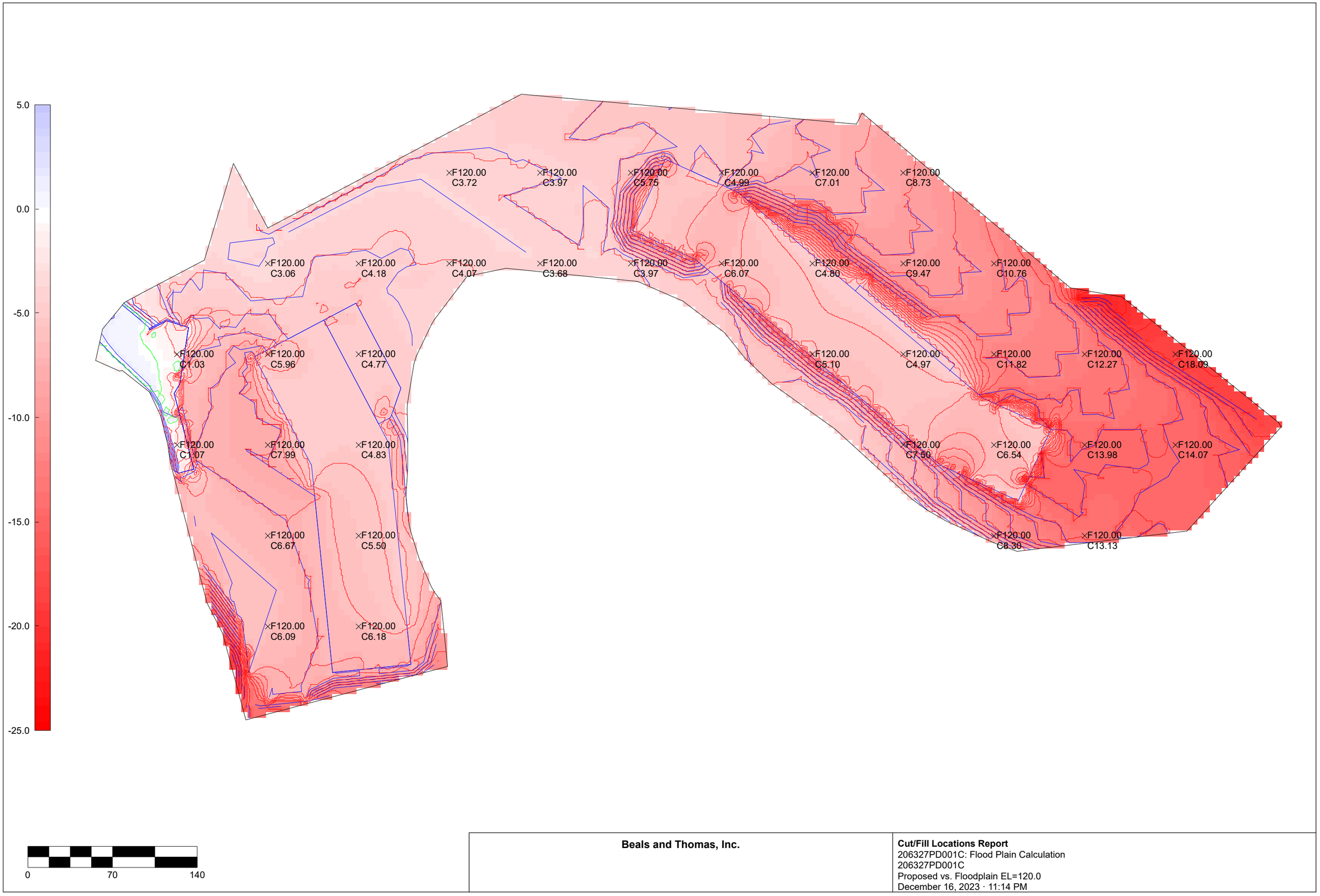
Beals and Thomas, Inc.

Area of Interest Cut/Fill Zone	Area (sq ft)	Average Depth (ft)	Maximum Depth (ft)	Bank Volume (cu yd)	Shrink Swell (%)	Adjusted Volume (cu yd)	Center of Mass X	 Y
LOW								
Cut Zone 1	107006.81	6.46	29.30	25609.25	0.00	25609.25	5969.13	6423.77
Cut Zone 2	38378.89	3.11	15.30	4422.24	0.00	4422.24	5377.76	6177.10
Cut Zone 3	3001.66	0.37	0.64	40.70	0.00	40.70	5511.24	6482.84
Misc. Cuts (24)	998.38	0.30	1.30	11.24	0.00	11.24	0.00	0.00
LOW: Total Cut	**149385.74**	**5.44**	**29.30**	**30083.43**	**0.00**	**30083.43**	0.00	0.00
Fill Zone 1	65220.57	0.99	5.70	2390.70	0.00	2390.70	5364.94	6433.08
Fill Zone 2	1174.15	0.34	0.70	14.69	0.00	14.69	5858.55	6306.55
Misc. Fills (13)	296.08	0.10	0.31	1.08	0.00	1.08	0.00	0.00
LOW: Total Fill	**66690.81**	**0.97**	**5.70**	**2406.47**	**0.00**	**2406.47**	0.00	0.00
LOW: Import/Export			**Export**	**27676.96**	**Export**	**27676.96**		
206327PD001C								
LOW: Total Cut	149385.74	5.44	29.30	30083.43	0.00	30083.43	0.00	0.00
206327PD001C: Total Cut	**149385.74**	**5.44**	**29.30**	**30083.43**	**0.00**	**30083.43**	0.00	0.00
LOW: Total Fill	66690.81	0.97	5.70	2406.47	0.00	2406.47	0.00	0.00
206327PD001C: Total Fill	**66690.81**	**0.97**	**5.70**	**2406.47**	**0.00**	**2406.47**	0.00	0.00
206327PD001C: Import/Export			**Export**	**27676.96**	**Export**	**27676.96**		



Beals and Thomas, Inc.	**Cut/Fill Locations Report** 206327PD001C: Flood Plain Calculation 206327PD001C Proposed vs. Floodplain EL=119.0 December 16, 2023 · 11:13 PM

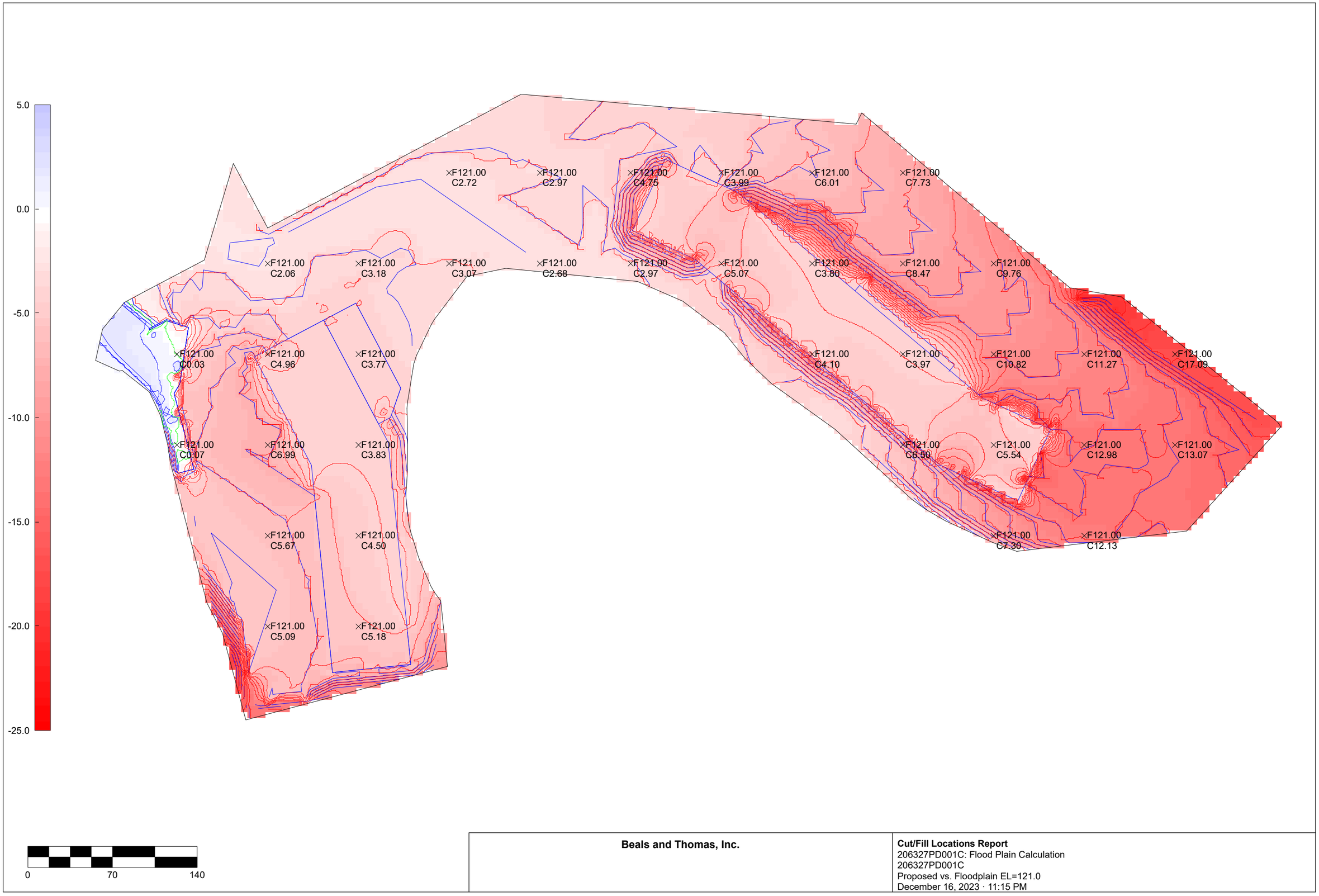
Area of Interest Cut/Fill Zone	Area (sq ft)	Average Depth (ft)	Maximum Depth (ft)	Bank Volume (cu yd)	Shrink Swell (%)	Adjusted Volume (cu yd)	Center of Mass X	 Y
LOW								
Cut Zone 1	216106.24	8.24	22.00	65941.94	0.00	65941.94	5744.03	6384.34
LOW: Total Cut	**216106.24**	**8.24**	**22.00**	**65941.94**	**0.00**	**65941.94**	0.00	0.00
Misc. Fills (4)	3.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOW: Total Fill	**3.15**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	0.00	0.00
LOW: Import/Export			**Export**	**65941.94**	**Export**	**65941.94**		
206327PD001C								
LOW: Total Cut	216106.24	8.24	22.00	65941.94	0.00	65941.94	0.00	0.00
206327PD001C: Total Cut	**216106.24**	**8.24**	**22.00**	**65941.94**	**0.00**	**65941.94**	0.00	0.00
LOW: Total Fill	3.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
206327PD001C: Total Fill	**3.15**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	0.00	0.00
206327PD001C: Import/Export			**Export**	**65941.94**	**Export**	**65941.94**		



Beals and Thomas, Inc.	**Cut/Fill Locations Report** 206327PD001C: Flood Plain Calculation 206327PD001C Proposed vs. Floodplain EL=120.0 December 16, 2023 · 11:14 PM

Beals and Thomas, Inc.

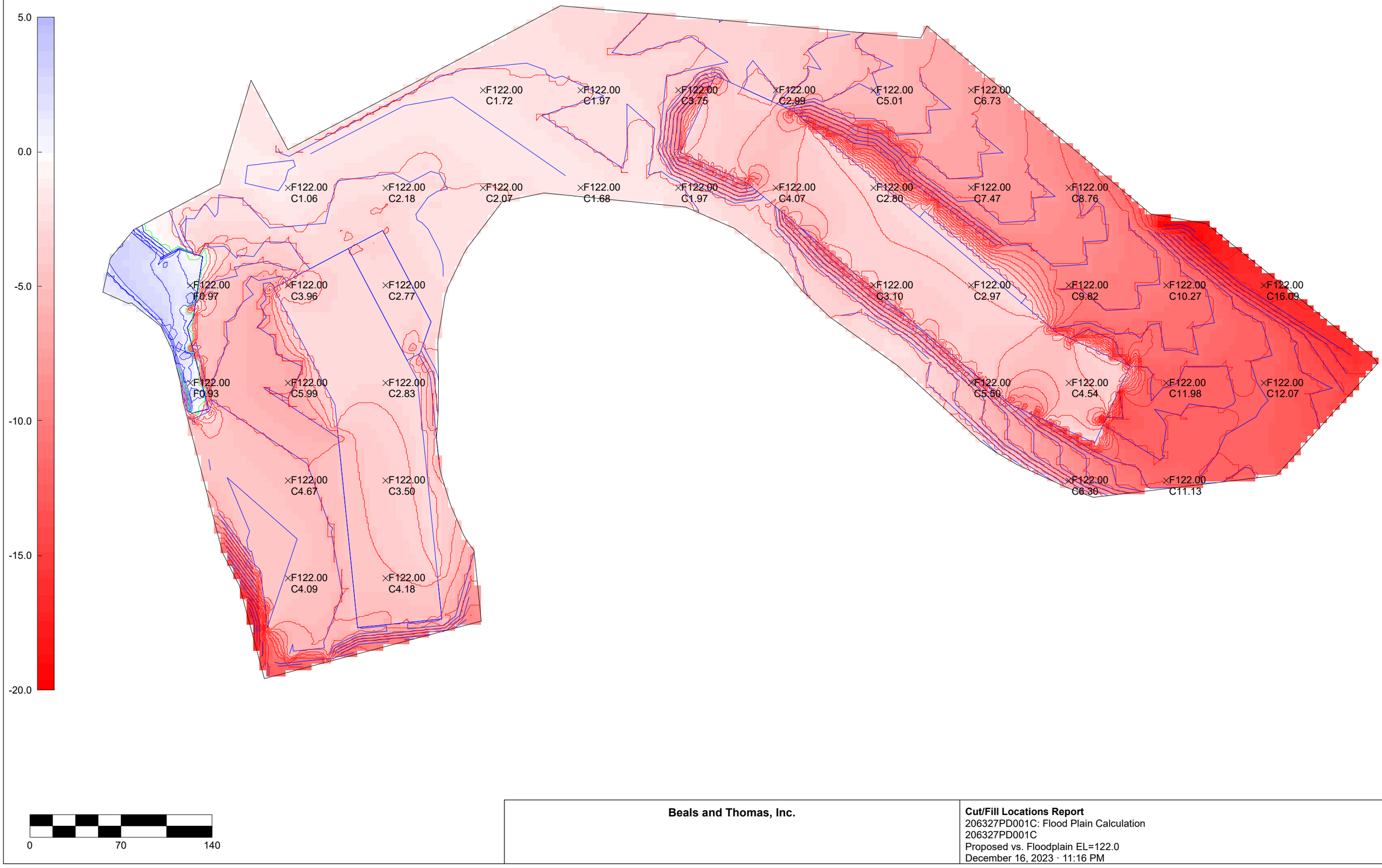
Area of Interest Cut/Fill Zone	Area (sq ft)	Average Depth (ft)	Maximum Depth (ft)	Bank Volume (cu yd)	Shrink Swell (%)	Adjusted Volume (cu yd)	Center of Mass X	 Y
LOW								
Cut Zone 1	213814.28	7.32	21.00	57975.22	0.00	57975.22	5755.47	6382.40
Misc. Cuts (2)	383.53	0.28	0.80	4.00	0.00	4.00	0.00	0.00
LOW: Total Cut	**214197.81**	**7.31**	**21.00**	**57979.22**	**0.00**	**57979.22**	0.00	0.00
Fill Zone 1	1824.83	0.60	1.00	40.51	0.00	40.51	5234.40	6408.38
Misc. Fills (4)	121.96	0.35	1.00	1.58	0.00	1.58	0.00	0.00
LOW: Total Fill	**1946.78**	**0.58**	**1.00**	**42.09**	**0.00**	**42.09**	0.00	0.00
LOW: Import/Export			**Export**	**57937.13**	**Export**	**57937.13**		
206327PD001C								
LOW: Total Cut	214197.81	7.31	21.00	57979.22	0.00	57979.22	0.00	0.00
206327PD001C: Total Cut	**214197.81**	**7.31**	**21.00**	**57979.22**	**0.00**	**57979.22**	0.00	0.00
LOW: Total Fill	1946.78	0.58	1.00	42.09	0.00	42.09	0.00	0.00
206327PD001C: Total Fill	**1946.78**	**0.58**	**1.00**	**42.09**	**0.00**	**42.09**	0.00	0.00
206327PD001C: Import/Export			**Export**	**57937.13**	**Export**	**57937.13**		



	Beals and Thomas, Inc.	**Cut/Fill Locations Report** 206327PD001C: Flood Plain Calculation 206327PD001C Proposed vs. Floodplain EL=121.0 December 16, 2023 · 11:15 PM

Beals and Thomas, Inc.

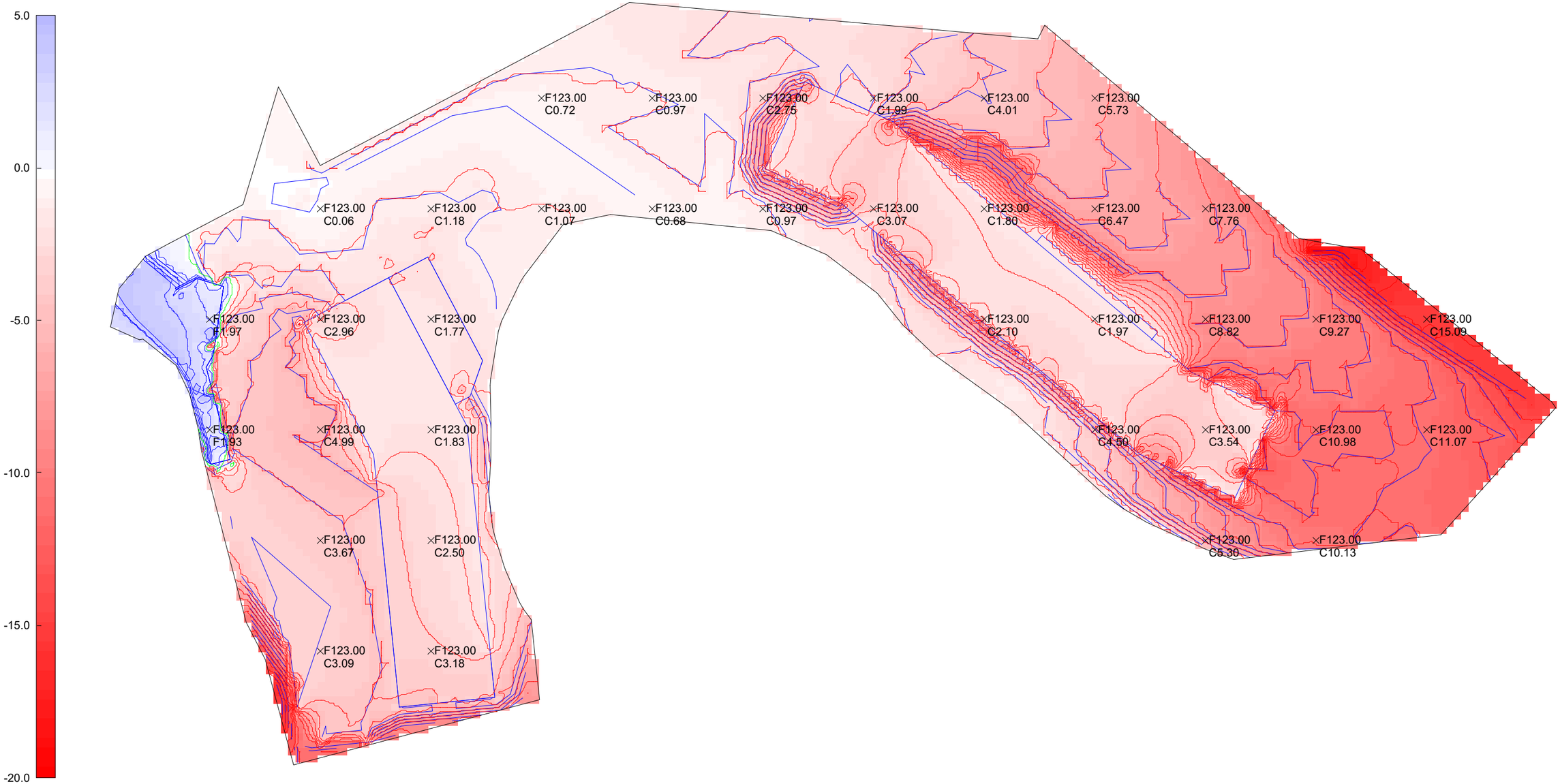
Area of Interest Cut/Fill Zone	Area (sq ft)	Average Depth (ft)	Maximum Depth (ft)	Bank Volume (cu yd)	Shrink Swell (%)	Adjusted Volume (cu yd)	Center of Mass X	 Y
LOW								
Cut Zone 1	212338.43	6.37	20.00	50083.01	0.00	50083.01	5769.77	6379.87
Misc. Cuts (4)	86.77	0.44	0.81	1.43	0.00	1.43	0.00	0.00
LOW: Total Cut	**212425.20**	**6.37**	**20.00**	**50084.43**	**0.00**	**50084.43**	0.00	0.00
Fill Zone 1	3645.03	1.11	2.00	150.48	0.00	150.48	5241.26	6401.00
Misc. Fills (2)	84.59	0.29	0.93	0.90	0.00	0.90	0.00	0.00
LOW: Total Fill	**3729.62**	**1.10**	**2.00**	**151.38**	**0.00**	**151.38**	0.00	0.00
LOW: Import/Export			**Export**	**49933.05**	**Export**	**49933.05**		
206327PD001C								
LOW: Total Cut	212425.20	6.37	20.00	50084.43	0.00	50084.43	0.00	0.00
206327PD001C: Total Cut	**212425.20**	**6.37**	**20.00**	**50084.43**	**0.00**	**50084.43**	0.00	0.00
LOW: Total Fill	3729.62	1.10	2.00	151.38	0.00	151.38	0.00	0.00
206327PD001C: Total Fill	**3729.62**	**1.10**	**2.00**	**151.38**	**0.00**	**151.38**	0.00	0.00
206327PD001C: Import/Export			**Export**	**49933.05**	**Export**	**49933.05**		



Beals and Thomas, Inc.	**Cut/Fill Locations Report** 206327PD001C: Flood Plain Calculation 206327PD001C Proposed vs. Floodplain EL=122.0 December 16, 2023 · 11:16 PM

Beals and Thomas, Inc.

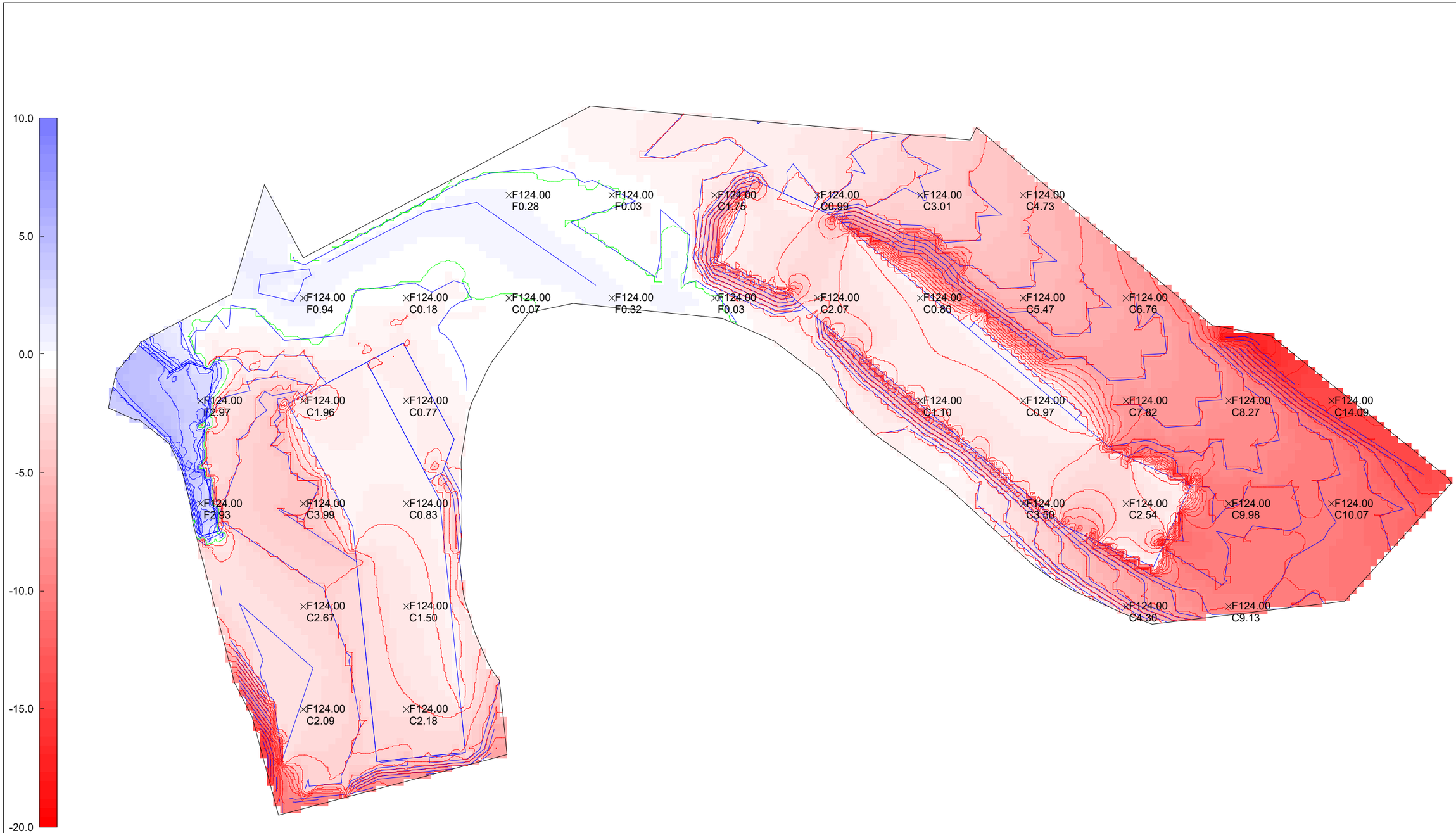
Area of Interest Cut/Fill Zone	Area (sq ft)	Average Depth (ft)	Maximum Depth (ft)	Bank Volume (cu yd)	Shrink Swell (%)	Adjusted Volume (cu yd)	Center of Mass X	 Y
LOW								
Cut Zone 1	211189.29	5.40	19.00	42236.23	0.00	42236.23	5788.87	6376.40
Misc. Cuts (1)	90.24	1.16	2.23	3.88	0.00	3.88	0.00	0.00
LOW: Total Cut	**211279.54**	**5.40**	**19.00**	**42240.11**	**0.00**	**42240.11**	0.00	0.00
Fill Zone 1	4808.66	1.75	3.00	312.22	0.00	312.22	5246.19	6396.31
Misc. Fills (1)	42.71	0.10	0.10	0.16	0.00	0.16	0.00	0.00
LOW: Total Fill	**4851.37**	**1.74**	**3.00**	**312.38**	**0.00**	**312.38**	0.00	0.00
LOW: Import/Export			**Export**	**41927.73**	**Export**	**41927.73**		
206327PD001C								
LOW: Total Cut	211279.54	5.40	19.00	42240.11	0.00	42240.11	0.00	0.00
206327PD001C: Total Cut	**211279.54**	**5.40**	**19.00**	**42240.11**	**0.00**	**42240.11**	0.00	0.00
LOW: Total Fill	4851.37	1.74	3.00	312.38	0.00	312.38	0.00	0.00
206327PD001C: Total Fill	**4851.37**	**1.74**	**3.00**	**312.38**	**0.00**	**312.38**	0.00	0.00
206327PD001C: Import/Export			**Export**	**41927.73**	**Export**	**41927.73**		



Beals and Thomas, Inc.	**Cut/Fill Locations Report** 206327PD001C: Flood Plain Calculation 206327PD001C Proposed vs. Floodplain EL=123.0 December 16, 2023 · 11:17 PM

Beals and Thomas, Inc.

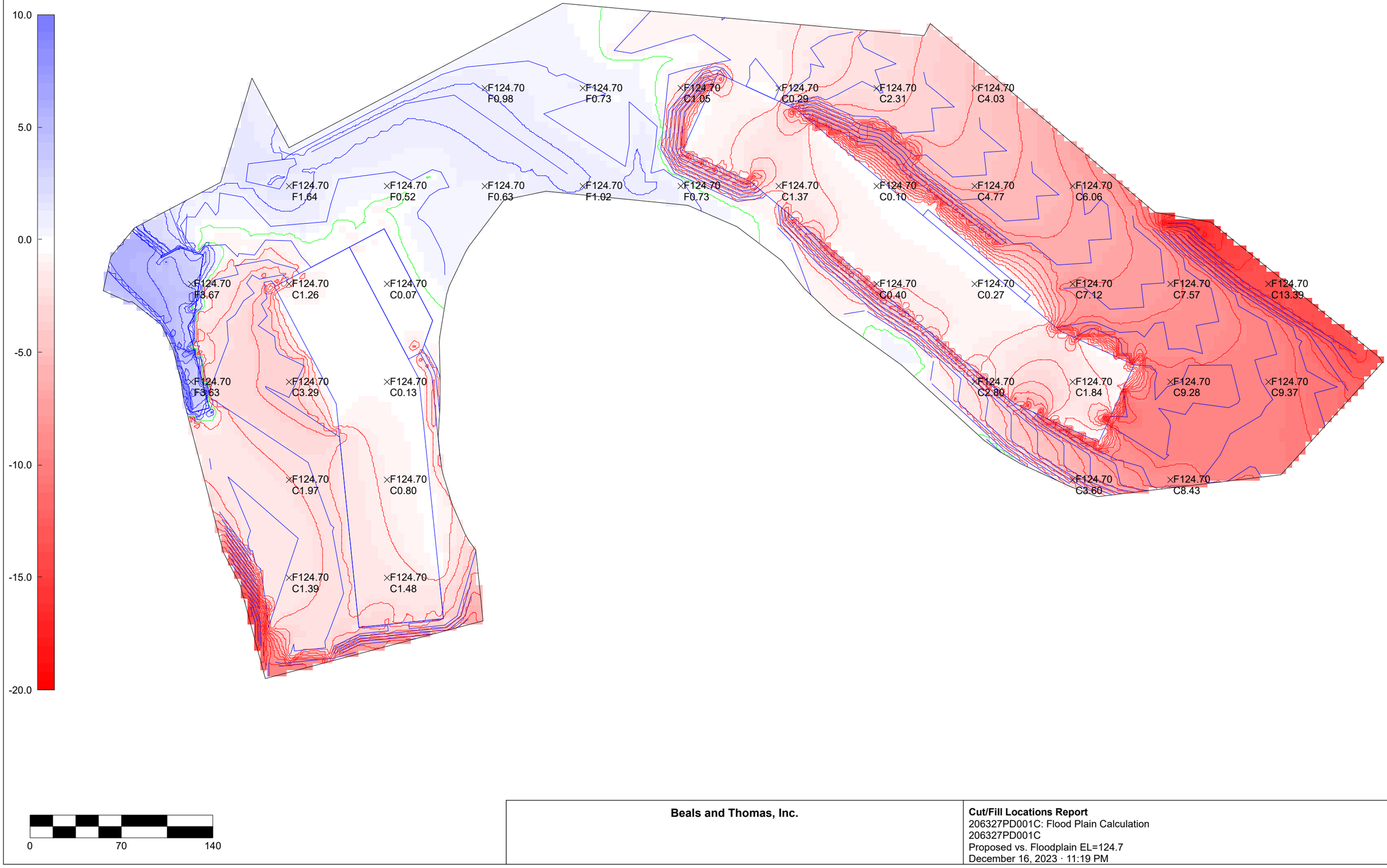
Area of Interest Cut/Fill Zone	Area (sq ft)	Average Depth (ft)	Maximum Depth (ft)	Bank Volume (cu yd)	Shrink Swell (%)	Adjusted Volume (cu yd)	Center of Mass X	 Y
LOW								
Cut Zone 1	210414.00	4.42	18.00	34428.83	0.00	34428.83	5816.05	6371.36
Misc. Cuts (2)	115.57	0.89	2.00	3.79	0.00	3.79	0.00	0.00
LOW: Total Cut	**210529.57**	**4.42**	**18.00**	**34432.63**	**0.00**	**34432.63**	0.00	0.00
Fill Zone 1	5635.26	2.43	4.00	507.15	0.00	507.15	5249.03	6395.15
Misc. Fills (2)	24.58	0.70	0.76	0.64	0.00	0.64	0.00	0.00
LOW: Total Fill	**5659.83**	**2.42**	**4.00**	**507.79**	**0.00**	**507.79**	0.00	0.00
LOW: Import/Export			**Export**	**33924.84**	**Export**	**33924.84**		
206327PD001C								
LOW: Total Cut	210529.57	4.42	18.00	34432.63	0.00	34432.63	0.00	0.00
206327PD001C: Total Cut	**210529.57**	**4.42**	**18.00**	**34432.63**	**0.00**	**34432.63**	0.00	0.00
LOW: Total Fill	5659.83	2.42	4.00	507.79	0.00	507.79	0.00	0.00
206327PD001C: Total Fill	**5659.83**	**2.42**	**4.00**	**507.79**	**0.00**	**507.79**	0.00	0.00
206327PD001C: Import/Export			**Export**	**33924.84**	**Export**	**33924.84**		



Beals and Thomas, Inc.	**Cut/Fill Locations Report** 206327PD001C: Flood Plain Calculation 206327PD001C Proposed vs. Floodplain EL=124.0 December 16, 2023 · 11:18 PM

Beals and Thomas, Inc.

Area of Interest Cut/Fill Zone	Area (sq ft)	Average Depth (ft)	Maximum Depth (ft)	Bank Volume (cu yd)	Shrink Swell (%)	Adjusted Volume (cu yd)	Center of Mass X	 Y
LOW								
Cut Zone 1	120052.89	4.87	17.00	21661.26	0.00	21661.26	5971.66	6393.48
Cut Zone 2	66838.41	2.11	15.00	5219.97	0.00	5219.97	5370.56	6244.93
Misc. Cuts (8)	116.09	0.09	1.26	0.37	0.00	0.37	0.00	0.00
LOW: Total Cut	**187007.39**	**3.88**	**17.00**	**26881.60**	**0.00**	**26881.60**	0.00	0.00
Fill Zone 1	22734.62	0.28	1.00	236.25	0.00	236.25	5435.78	6503.28
Fill Zone 2	6254.67	3.14	5.00	726.47	0.00	726.47	5251.03	6394.84
Misc. Fills (8)	309.33	0.02	0.03	0.22	0.00	0.22	0.00	0.00
LOW: Total Fill	**29298.62**	**0.89**	**5.00**	**962.95**	**0.00**	**962.95**	0.00	0.00
LOW: Import/Export			**Export**	**25918.66**	**Export**	**25918.66**		
206327PD001C								
LOW: Total Cut	187007.39	3.88	17.00	26881.60	0.00	26881.60	0.00	0.00
206327PD001C: Total Cut	**187007.39**	**3.88**	**17.00**	**26881.60**	**0.00**	**26881.60**	0.00	0.00
LOW: Total Fill	29298.62	0.89	5.00	962.95	0.00	962.95	0.00	0.00
206327PD001C: Total Fill	**29298.62**	**0.89**	**5.00**	**962.95**	**0.00**	**962.95**	0.00	0.00
206327PD001C: Import/Export			**Export**	**25918.66**	**Export**	**25918.66**		



Beals and Thomas, Inc.	**Cut/Fill Locations Report** 206327PD001C: Flood Plain Calculation 206327PD001C Proposed vs. Floodplain EL=124.7 December 16, 2023 · 11:19 PM

Beals and Thomas, Inc.

Area of Interest Cut/Fill Zone	Area (sq ft)	Average Depth (ft)	Maximum Depth (ft)	Bank Volume (cu yd)	Shrink Swell (%)	Adjusted Volume (cu yd)	Center of Mass X	 Y
LOW								
Cut Zone 1	109617.75	4.61	16.30	18707.62	0.00	18707.62	5985.59	6388.22
Cut Zone 2	57830.29	1.70	14.30	3634.57	0.00	3634.57	5365.26	6226.58
Misc. Cuts (1)	1.77	0.02	0.04	0.00	0.00	0.00	0.00	0.00
LOW: Total Cut	**167449.81**	**3.60**	**16.30**	**22342.19**	**0.00**	**22342.19**	0.00	0.00
Fill Zone 1	47223.27	1.15	5.70	2018.65	0.00	2018.65	5373.39	6455.77
Misc. Fills (38)	1469.75	0.15	0.70	8.06	0.00	8.06	0.00	0.00
LOW: Total Fill	**48693.03**	**1.12**	**5.70**	**2026.71**	**0.00**	**2026.71**	0.00	0.00
LOW: Import/Export			**Export**	**20315.48**	**Export**	**20315.48**		
206327PD001C								
LOW: Total Cut	167449.81	3.60	16.30	22342.19	0.00	22342.19	0.00	0.00
206327PD001C: Total Cut	**167449.81**	**3.60**	**16.30**	**22342.19**	**0.00**	**22342.19**	0.00	0.00
LOW: Total Fill	48693.03	1.12	5.70	2026.71	0.00	2026.71	0.00	0.00
206327PD001C: Total Fill	**48693.03**	**1.12**	**5.70**	**2026.71**	**0.00**	**2026.71**	0.00	0.00
206327PD001C: Import/Export			**Export**	**20315.48**	**Export**	**20315.48**		

Attachment 3

Compensatory Floodplain Storage System Models
(HydroCAD Calculations)

Summary for Pond 2500P: REV-FP-COMP-ABC

[43] Hint: Has no inflow (Outflow=Zero)

Volume	Invert	Avail.Storage	Storage Description
#1A	119.70'	0 cf	**64.19'W x 59.50'L x 5.50'H Field A** 21,005 cf Overall - 21,005 cf Embedded = 0 cf x 40.0% Voids
#2A	119.70'	16,994 cf	**StormTrap ST2 SingleTrap 5-0** x 18 Inside #1 Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf 18 Chambers in 6 Rows 50.88' x 46.19' Core + 6.66' Border = 64.19' x 59.50' System
#3B	122.70'	0 cf	**72.67'W x 74.90'L x 2.50'H Field B** 13,606 cf Overall - 13,606 cf Embedded = 0 cf x 40.0% Voids
#4B	122.70'	9,542 cf	**StormTrap ST2 SingleTrap 2-0** x 28 Inside #3 Inside= 101.7"W x 24.0"H => 15.05 sf x 15.40'L = 231.7 cf Outside= 101.7"W x 30.0"H => 21.20 sf x 15.40'L = 326.4 cf 28 Chambers in 7 Rows 59.35' x 61.58' Core + 6.66' Border = 72.67' x 74.90' System
#5C	119.30'	0 cf	**30.27'W x 44.10'L x 5.00'H Field C** 6,675 cf Overall - 6,675 cf Embedded = 0 cf x 40.0% Voids
#6C	119.30'	5,286 cf	**StormTrap ST2 SingleTrap 4-6** x 4 Inside #5 Inside= 101.7"W x 54.0"H => 34.42 sf x 15.40'L = 529.9 cf Outside= 101.7"W x 60.0"H => 42.40 sf x 15.40'L = 652.7 cf 4 Chambers in 2 Rows 16.96' x 30.79' Core + 6.66' Border = 30.27' x 44.10' System
		31,823 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard
Storage Group C created with Chamber Wizard

Pond 2500P: REV-FP-COMP-ABC - Chamber Wizard Field A

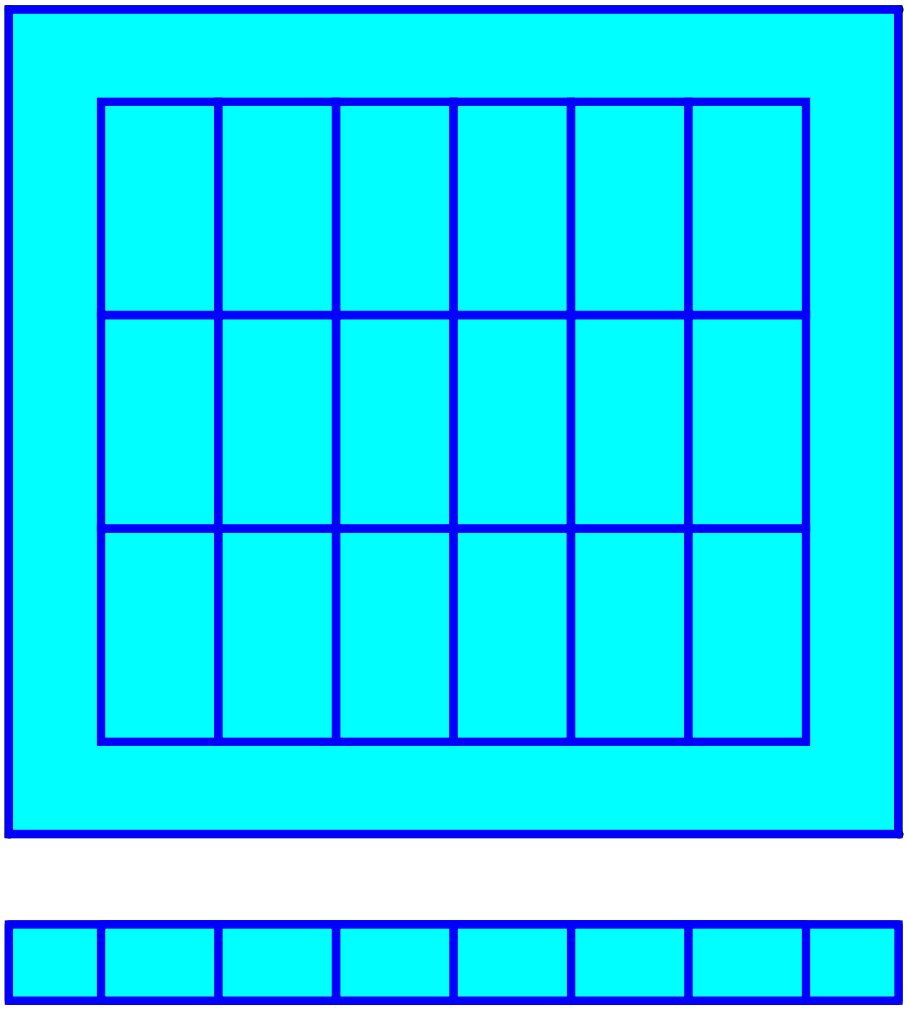
Chamber Model = StormTrap ST2 SingleTrap 5-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

3 Chambers/Row x 15.40' Long = 46.19' Row Length +79.9" Border x 2 = 59.50' Base Length
6 Rows x 101.7" Wide + 79.9" Side Border x 2 = 64.19' Base Width
66.0" Chamber Height = 5.50' Field Height

18 Chambers x 590.2 cf + 6,370.6 cf Border = 16,993.9 cf Chamber Storage
18 Chambers x 718.0 cf + 8,081.5 cf Border = 21,005.4 cf Displacement

Chamber Storage = 16,993.9 cf = 0.390 af
Overall Storage Efficiency = 80.9%
Overall System Size = 59.50' x 64.19' x 5.50'

18 Chambers (plus border)
778.0 cy Field



Pond 2500P: REV-FP-COMP-ABC - Chamber Wizard Field B

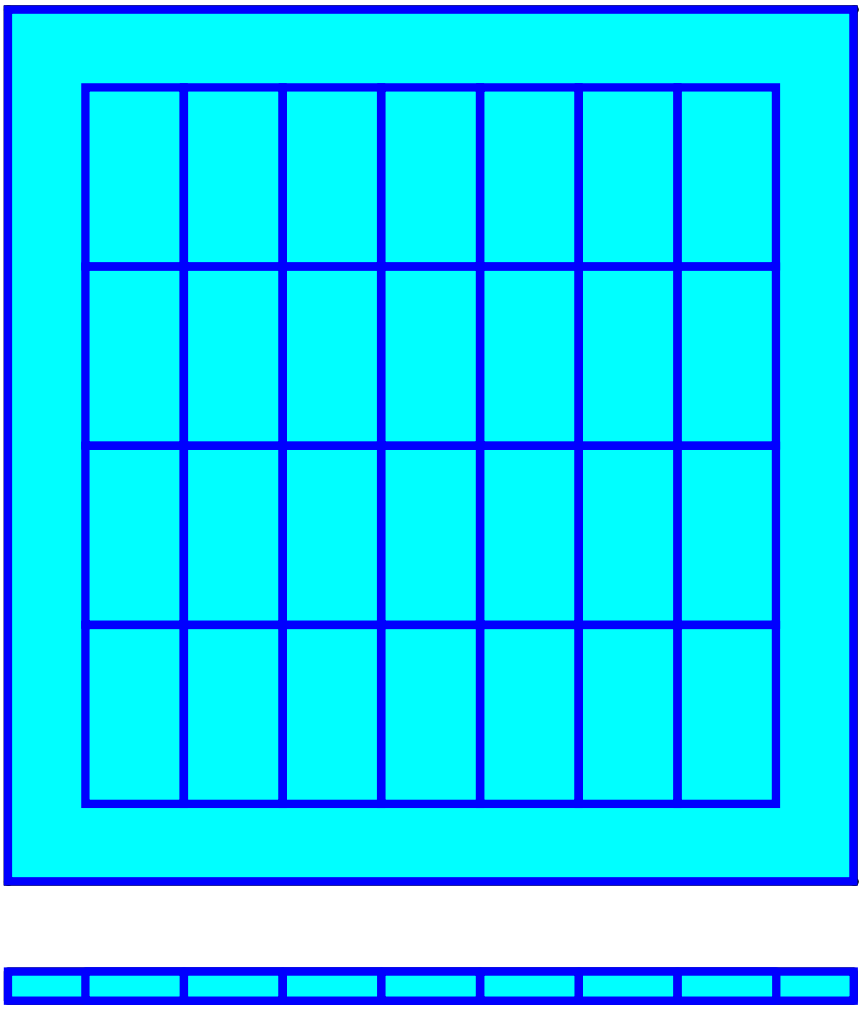
Chamber Model = StormTrap ST2 SingleTrap 2-0 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 24.0"H => 15.05 sf x 15.40'L = 231.7 cf
Outside= 101.7"W x 30.0"H => 21.20 sf x 15.40'L = 326.4 cf

4 Chambers/Row x 15.40' Long = 61.58' Row Length +79.9" Border x 2 = 74.90' Base Length
7 Rows x 101.7" Wide + 79.9" Side Border x 2 = 72.67' Base Width
30.0" Chamber Height = 2.50' Field Height

28 Chambers x 231.7 cf + 3,055.6 cf Border = 9,542.4 cf Chamber Storage
28 Chambers x 326.4 cf + 4,468.0 cf Border = 13,606.1 cf Displacement

Chamber Storage = 9,542.4 cf = 0.219 af
Overall Storage Efficiency = 70.1%
Overall System Size = 74.90' x 72.67' x 2.50'

28 Chambers (plus border)
503.9 cy Field



Pond 2500P: REV-FP-COMP-ABC - Chamber Wizard Field C

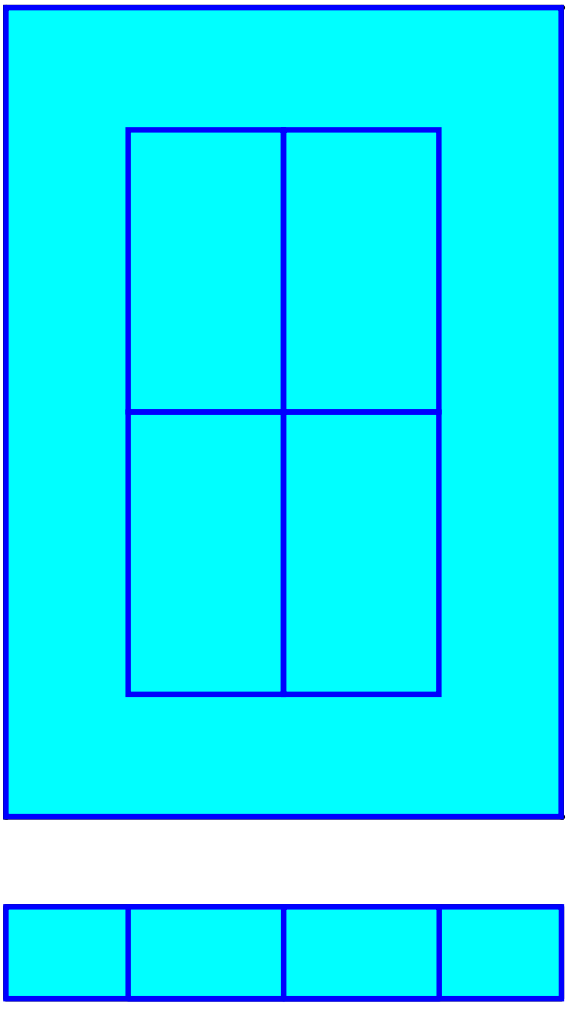
Chamber Model = StormTrap ST2 SingleTrap 4-6 (StormTrap ST2 SingleTrap® Type II+IV)
Inside= 101.7"W x 54.0"H => 34.42 sf x 15.40'L = 529.9 cf
Outside= 101.7"W x 60.0"H => 42.40 sf x 15.40'L = 652.7 cf

2 Chambers/Row x 15.40' Long = 30.79' Row Length +79.9" Border x 2 = 44.10' Base Length
2 Rows x 101.7" Wide + 79.9" Side Border x 2 = 30.27' Base Width
60.0" Chamber Height = 5.00' Field Height

4 Chambers x 529.9 cf + 3,166.6 cf Border = 5,286.4 cf Chamber Storage
4 Chambers x 652.7 cf + 4,064.5 cf Border = 6,675.3 cf Displacement

Chamber Storage = 5,286.4 cf = 0.121 af
Overall Storage Efficiency = 79.2%
Overall System Size = 44.10' x 30.27' x 5.00'

4 Chambers (plus border)
247.2 cy Field



Stage-Area-Storage for Pond 2500P: REV-FP-COMP-ABC

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
119.30	0	119.82	1,019	120.34	3,397
119.31	12	119.83	1,064	120.35	3,443
119.32	23	119.84	1,110	120.36	3,488
119.33	35	119.85	1,156	120.37	3,534
119.34	47	119.86	1,202	120.38	3,580
119.35	59	119.87	1,247	120.39	3,626
119.36	70	119.88	1,293	120.40	3,671
119.37	82	119.89	1,339	120.41	3,717
119.38	94	119.90	1,385	120.42	3,763
119.39	106	119.91	1,430	120.43	3,809
119.40	117	119.92	1,476	120.44	3,854
119.41	129	119.93	1,522	120.45	3,900
119.42	141	119.94	1,568	120.46	3,946
119.43	153	119.95	1,613	120.47	3,992
119.44	164	119.96	1,659	120.48	4,037
119.45	176	119.97	1,705	120.49	4,083
119.46	188	119.98	1,750	120.50	4,129
119.47	200	119.99	1,796	120.51	4,174
119.48	211	120.00	1,842	120.52	4,220
119.49	223	120.01	1,888	120.53	4,266
119.50	235	120.02	1,933	120.54	4,312
119.51	247	120.03	1,979	120.55	4,357
119.52	258	120.04	2,025	120.56	4,403
119.53	270	120.05	2,071	120.57	4,449
119.54	282	120.06	2,116	120.58	4,495
119.55	294	120.07	2,162	120.59	4,540
119.56	305	120.08	2,208	120.60	4,586
119.57	317	120.09	2,254	120.61	4,632
119.58	329	120.10	2,299	120.62	4,678
119.59	341	120.11	2,345	120.63	4,723
119.60	352	120.12	2,391	120.64	4,769
119.61	364	120.13	2,437	120.65	4,815
119.62	376	120.14	2,482	120.66	4,860
119.63	388	120.15	2,528	120.67	4,906
119.64	399	120.16	2,574	120.68	4,952
119.65	411	120.17	2,619	120.69	4,998
119.66	423	120.18	2,665	120.70	5,043
119.67	435	120.19	2,711	120.71	5,089
119.68	446	120.20	2,757	120.72	5,135
119.69	458	120.21	2,802	120.73	5,181
119.70	470	120.22	2,848	120.74	5,226
119.71	516	120.23	2,894	120.75	5,272
119.72	561	120.24	2,940	120.76	5,318
119.73	607	120.25	2,985	120.77	5,364
119.74	653	120.26	3,031	120.78	5,409
119.75	699	120.27	3,077	120.79	5,455
119.76	744	120.28	3,123	120.80	5,501
119.77	790	120.29	3,168	120.81	5,547
119.78	836	120.30	3,214	120.82	5,592
119.79	882	120.31	3,260	120.83	5,638
119.80	927	120.32	3,305	120.84	5,684
119.81	973	120.33	3,351	120.85	5,729

Stage-Area-Storage for Pond 2500P: REV-FP-COMP-ABC (continued)

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
120.86	5,775	121.38	8,153	121.90	10,532
120.87	5,821	121.39	8,199	121.91	10,577
120.88	5,867	121.40	8,245	121.92	10,623
120.89	5,912	121.41	8,291	121.93	10,669
120.90	5,958	121.42	8,336	121.94	10,715
120.91	6,004	121.43	8,382	121.95	10,760
120.92	6,050	121.44	8,428	121.96	10,806
120.93	6,095	121.45	8,474	121.97	10,852
120.94	6,141	121.46	8,519	121.98	10,898
120.95	6,187	121.47	8,565	121.99	10,943
120.96	6,233	121.48	8,611	122.00	10,989
120.97	6,278	121.49	8,657	122.01	11,035
120.98	6,324	121.50	8,702	122.02	11,080
120.99	6,370	121.51	8,748	122.03	11,126
121.00	6,415	121.52	8,794	122.04	11,172
121.01	6,461	121.53	8,839	122.05	11,218
121.02	6,507	121.54	8,885	122.06	11,263
121.03	6,553	121.55	8,931	122.07	11,309
121.04	6,598	121.56	8,977	122.08	11,355
121.05	6,644	121.57	9,022	122.09	11,401
121.06	6,690	121.58	9,068	122.10	11,446
121.07	6,736	121.59	9,114	122.11	11,492
121.08	6,781	121.60	9,160	122.12	11,538
121.09	6,827	121.61	9,205	122.13	11,584
121.10	6,873	121.62	9,251	122.14	11,629
121.11	6,919	121.63	9,297	122.15	11,675
121.12	6,964	121.64	9,343	122.16	11,721
121.13	7,010	121.65	9,388	122.17	11,767
121.14	7,056	121.66	9,434	122.18	11,812
121.15	7,102	121.67	9,480	122.19	11,858
121.16	7,147	121.68	9,525	122.20	11,904
121.17	7,193	121.69	9,571	122.21	11,949
121.18	7,239	121.70	9,617	122.22	11,995
121.19	7,284	121.71	9,663	122.23	12,041
121.20	7,330	121.72	9,708	122.24	12,087
121.21	7,376	121.73	9,754	122.25	12,132
121.22	7,422	121.74	9,800	122.26	12,178
121.23	7,467	121.75	9,846	122.27	12,224
121.24	7,513	121.76	9,891	122.28	12,270
121.25	7,559	121.77	9,937	122.29	12,315
121.26	7,605	121.78	9,983	122.30	12,361
121.27	7,650	121.79	10,029	122.31	12,407
121.28	7,696	121.80	10,074	122.32	12,453
121.29	7,742	121.81	10,120	122.33	12,498
121.30	7,788	121.82	10,166	122.34	12,544
121.31	7,833	121.83	10,212	122.35	12,590
121.32	7,879	121.84	10,257	122.36	12,635
121.33	7,925	121.85	10,303	122.37	12,681
121.34	7,970	121.86	10,349	122.38	12,727
121.35	8,016	121.87	10,394	122.39	12,773
121.36	8,062	121.88	10,440	122.40	12,818
121.37	8,108	121.89	10,486	122.41	12,864

Stage-Area-Storage for Pond 2500P: REV-FP-COMP-ABC (continued)

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
122.42	12,910	122.94	16,433	123.46	21,292
122.43	12,956	122.95	16,527	123.47	21,386
122.44	13,001	122.96	16,620	123.48	21,479
122.45	13,047	122.97	16,714	123.49	21,573
122.46	13,093	122.98	16,807	123.50	21,666
122.47	13,139	122.99	16,900	123.51	21,760
122.48	13,184	123.00	16,994	123.52	21,853
122.49	13,230	123.01	17,087	123.53	21,947
122.50	13,276	123.02	17,181	123.54	22,040
122.51	13,322	123.03	17,274	123.55	22,133
122.52	13,367	123.04	17,368	123.56	22,227
122.53	13,413	123.05	17,461	123.57	22,320
122.54	13,459	123.06	17,555	123.58	22,414
122.55	13,504	123.07	17,648	123.59	22,507
122.56	13,550	123.08	17,741	123.60	22,601
122.57	13,596	123.09	17,835	123.61	22,694
122.58	13,642	123.10	17,928	123.62	22,788
122.59	13,687	123.11	18,022	123.63	22,881
122.60	13,733	123.12	18,115	123.64	22,975
122.61	13,779	123.13	18,209	123.65	23,068
122.62	13,825	123.14	18,302	123.66	23,161
122.63	13,870	123.15	18,396	123.67	23,255
122.64	13,916	123.16	18,489	123.68	23,348
122.65	13,962	123.17	18,582	123.69	23,442
122.66	14,008	123.18	18,676	123.70	23,535
122.67	14,053	123.19	18,769	123.71	23,629
122.68	14,099	123.20	18,863	123.72	23,722
122.69	14,145	123.21	18,956	123.73	23,816
122.70	14,190	123.22	19,050	123.74	23,909
122.71	14,284	123.23	19,143	123.75	24,002
122.72	14,377	123.24	19,237	123.76	24,096
122.73	14,471	123.25	19,330	123.77	24,189
122.74	14,564	123.26	19,424	123.78	24,283
122.75	14,658	123.27	19,517	123.79	24,376
122.76	14,751	123.28	19,610	123.80	24,470
122.77	14,845	123.29	19,704	123.81	24,551
122.78	14,938	123.30	19,797	123.82	24,633
122.79	15,031	123.31	19,891	123.83	24,715
122.80	15,125	123.32	19,984	123.84	24,796
122.81	15,218	123.33	20,078	123.85	24,878
122.82	15,312	123.34	20,171	123.86	24,960
122.83	15,405	123.35	20,265	123.87	25,042
122.84	15,499	123.36	20,358	123.88	25,123
122.85	15,592	123.37	20,451	123.89	25,205
122.86	15,686	123.38	20,545	123.90	25,287
122.87	15,779	123.39	20,638	123.91	25,368
122.88	15,873	123.40	20,732	123.92	25,450
122.89	15,966	123.41	20,825	123.93	25,532
122.90	16,059	123.42	20,919	123.94	25,613
122.91	16,153	123.43	21,012	123.95	25,695
122.92	16,246	123.44	21,106	123.96	25,777
122.93	16,340	123.45	21,199	123.97	25,859

Stage-Area-Storage for Pond 2500P: REV-FP-COMP-ABC (continued)

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
123.98	25,940	124.50	30,189	125.02	31,823
123.99	26,022	124.51	30,270	125.03	31,823
124.00	26,104	124.52	30,352	125.04	31,823
124.01	26,185	124.53	30,434	125.05	31,823
124.02	26,267	124.54	30,515	125.06	31,823
124.03	26,349	124.55	30,597	125.07	31,823
124.04	26,430	124.56	30,679	125.08	31,823
124.05	26,512	124.57	30,761	125.09	31,823
124.06	26,594	124.58	30,842	125.10	31,823
124.07	26,676	124.59	30,924	125.11	31,823
124.08	26,757	124.60	31,006	125.12	31,823
124.09	26,839	124.61	31,087	125.13	31,823
124.10	26,921	124.62	31,169	125.14	31,823
124.11	27,002	124.63	31,251	125.15	31,823
124.12	27,084	124.64	31,332	125.16	31,823
124.13	27,166	124.65	31,414	125.17	31,823
124.14	27,247	124.66	31,496	125.18	31,823
124.15	27,329	124.67	31,578	125.19	31,823
124.16	27,411	124.68	31,659	125.20	31,823
124.17	27,493	124.69	31,741		
124.18	27,574	124.70	**31,823**		
124.19	27,656	124.71	31,823		
124.20	27,738	124.72	31,823		
124.21	27,819	124.73	31,823		
124.22	27,901	124.74	31,823		
124.23	27,983	124.75	31,823		
124.24	28,064	124.76	31,823		
124.25	28,146	124.77	31,823		
124.26	28,228	124.78	31,823		
124.27	28,310	124.79	31,823		
124.28	28,391	124.80	31,823		
124.29	28,473	124.81	31,823		
124.30	28,555	124.82	31,823		
124.31	28,636	124.83	31,823		
124.32	28,718	124.84	31,823		
124.33	28,800	124.85	31,823		
124.34	28,881	124.86	31,823		
124.35	28,963	124.87	31,823		
124.36	29,045	124.88	31,823		
124.37	29,127	124.89	31,823		
124.38	29,208	124.90	31,823		
124.39	29,290	124.91	31,823		
124.40	29,372	124.92	31,823		
124.41	29,453	124.93	31,823		
124.42	29,535	124.94	31,823		
124.43	29,617	124.95	31,823		
124.44	29,698	124.96	31,823		
124.45	29,780	124.97	31,823		
124.46	29,862	124.98	31,823		
124.47	29,944	124.99	31,823		
124.48	30,025	125.00	31,823		
124.49	30,107	125.01	31,823		

Summary for Reach 60R: DP-6

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

Inflow Area = 8.145 ac, 47.70% Impervious, Inflow Depth > 1.31" for 100-Year event
Inflow = 5.89 cfs @ 12.13 hrs, Volume= 0.892 af
Outflow = 5.89 cfs @ 12.13 hrs, Volume= 0.892 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Reach 600R: DP-6

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

Inflow Area = 8.145 ac, 61.66% Impervious, Inflow Depth > 1.91" for 100-Year event
Inflow = 4.36 cfs @ 12.21 hrs, Volume= 1.293 af
Outflow = 4.36 cfs @ 12.21 hrs, Volume= 1.293 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Attachment 5
Hydraulic Analysis

BEALS AND THOMAS

Hydraulic Calculations

Objective

To design a stormwater collection system to capture and convey runoff to the proposed stormwater best management practices (BMPs) and outfalls. To design a stormwater management system to meet the standards of the Massachusetts DEP Stormwater Management Handbook for erosion and scour protection.

Conclusion

The proposed stormwater collection system will adequately capture and convey the peak rates of runoff generated by the 25-year rational storm event. The 100-year rational storm event will surcharge some pipes though will not surcharge to grade at structures outside of the 100-year flood plain. Structures within the flood plain will be inundated regardless of system hydraulics. The proposed stormwater management design has been reviewed for compliance with the stormwater management standards described in the Massachusetts DEP Stormwater Management Handbook.

Calculation Methods

1. Drainage structures and pipes were designed using the Rational Formula and Manning's Formula based on a 25-year rational storm frequency.
2. The stormwater conveyance system was analyzed for surcharge during the 100-year rational storm event.
3. Catchment areas were delineated using Autodesk Civil 3D.
4. The proposed system was modeled and analyzed with StormCAD Version 10.03.04.53 by Bentley Systems. Inc.

Assumptions

1. Runoff coefficient of C=0.9 for impervious areas (i.e. building, pavement) and C=0.3 for pervious areas (i.e. grass, landscape).
2. Manning's n-value of n=0.013 for reinforced concrete pipe (RCP).
3. Manning's n-value of n=0.012 for ductile iron (DI) pipe.
4. Manning's n-value of n=0.010 for PVC pipe.
5. The minimum time of concentration (T_C) is 5 minutes.
6. Target minimum flowing-full velocity of 2 feet per second.
7. Target maximum flowing-full velocity of 10 feet per second.
8. DCB-200 and DMH-200 weren't included in the StormCAD model. These structures are intended to replace the existing infrastructure at the driveway off Baker Avenue in order to maintain the existing drainage patterns and collection of Baker Avenue runoff.
9. FE-203, DMH-207, and the pipe connections associated with these structures weren't included in the StormCAD model. The drainage pipe connections between these structures and the compensatory storage chambers are to be 4" DI pipes. The intention of this is to match the existing 4" CIP connection between the pond and the wetland adjacent to the Assabet River in order maintain the existing hydraulic connection between the two areas.

10. Known flows for the subsurface stormwater management system outlets (OCS-1, OCS-2, OCS-3) were taken from the proposed conditions HydroCAD model. Outflow values for the 100-year storm event were used.
11. A tailwater of EL=124.7 (100-year flood elevation) was applied to the outfalls for the 100-year hydraulic analysis.

Sources of Data/ Equations

1. Proposed Hydraulic Watershed Map, prepared by Beals and Thomas, Inc., dated 3/21/2024.
2. Rational Method (Q=CiA) was used to calculate peak runoff rates.
3. Manning's Formula was used to determine pipe capacities.
4. Boston rainfall intensities (in/hr) for the 25 & 100-year rational storm events were used and obtained from Intensity/Duration/Frequency rainfall curves from S.C.S. Technical Paper No. 40.
5. Massachusetts DEP Stormwater Management Handbook, February 2008.

List of Attachments

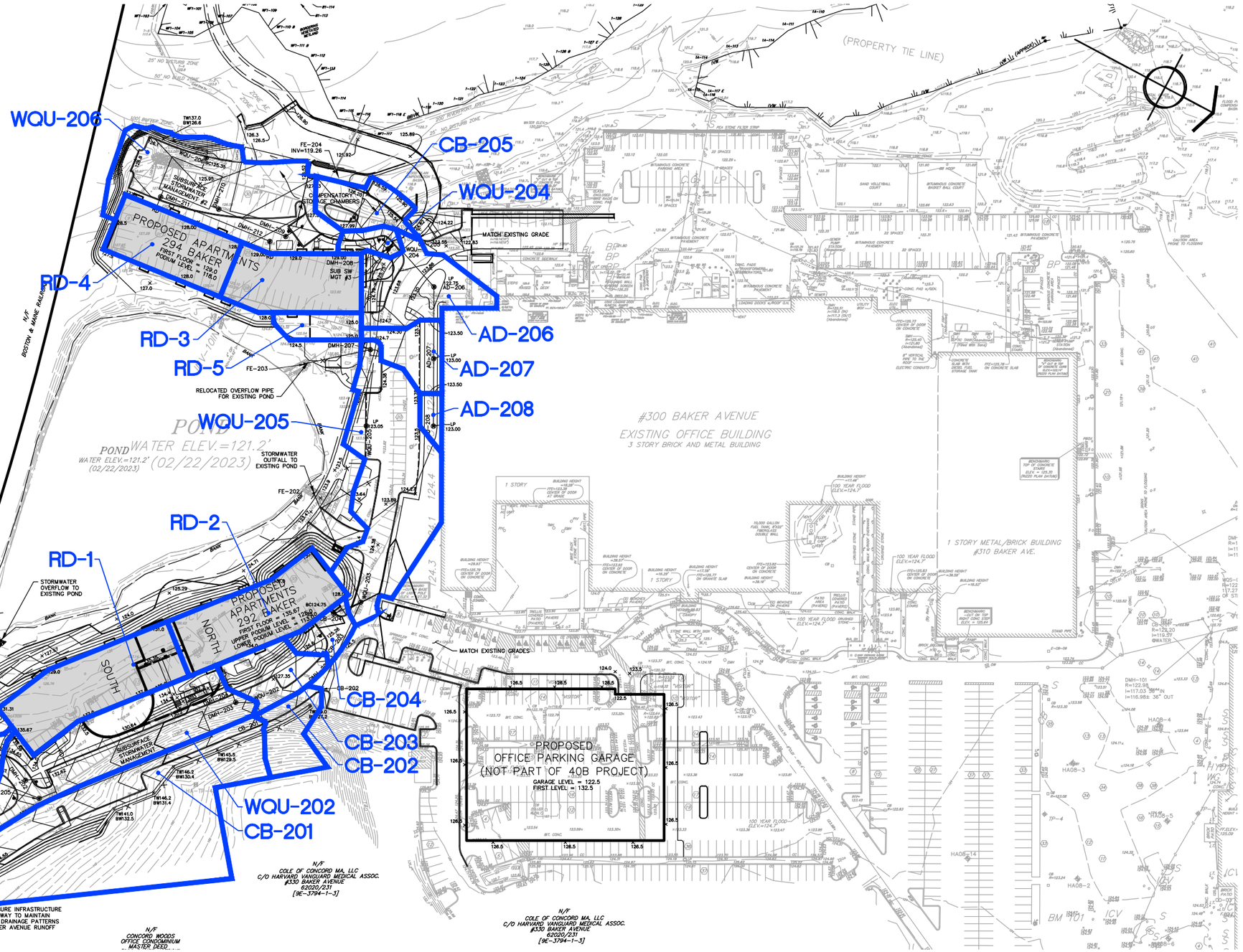
1. Hydraulic Watershed Map (B+T File No. 206327P123C-003)
2. StormCAD Hydraulic Spreadsheet

REV	CALC. BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE

206327CS005B

NOVO Riverside Commons

Concord, Massachusetts



DRAINAGE AREA

Tc PATH

METERS
0 10 25 50 100

0 60 120 240 360
FEET

BEALS AND THOMAS

B+T Drawing No. 206327P123C-003 Date: 3/21/2024 Scale: 1" = 120'

Hydraulic
Watershed Map

Figure
3

25-Year Rational Storm Event - No Tailwater

Conduit FlexTable: B+T Hydraulic Spreadsheet

Start Node	Stop Node	System Flow Time (min)	System CA (acres)	System Intensity (in/h)	Flow (cfs)	Elevation Ground (Start) (ft)	Hydraulic Grade Line (In) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (Out) (ft)	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Diameter (in)	Manning's n	Slope (Calculated) (ft/ft)	Material	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Excess Capacity (Full Flow) (cfs)	Is Surcharged?
CB-201	WQU-202	4.980	0.384	6.004	2.32	127.70	125.68	127.67	125.48	124.95	124.83	12.0	0.013	0.005	Concrete	2.57	3.71	0.25	False
WQU-202	DMH-203	5.083	0.679	5.983	4.10	127.67	125.47	128.75	125.28	124.58	124.46	15.0	0.013	0.005	Concrete	4.70	4.31	0.60	False
RD-2	DMH-204	4.998	0.264	6.000	1.59	134.00	125.52	129.50	125.37	124.95	124.80	12.0	0.013	0.005	<None>	2.60	3.48	1.00	False
DMH-204	DMH-203	5.133	0.264	5.973	1.59	129.50	125.37	128.75	125.24	124.80	124.71	12.0	0.013	0.005	Concrete	2.53	3.40	0.95	False
DMH-203	INLET-1A	5.220	0.943	5.956	5.66	128.75	125.19	124.02	124.94	124.21	124.02	18.0	0.013	0.005	Concrete	7.42	4.62	1.76	False
WQU-201	DMH-205	4.980	0.124	6.004	0.75	133.08	128.47	132.84	127.97	128.10	127.60	12.0	0.013	0.005	Concrete	2.52	2.80	1.77	False
DMH-205	INLET-1B	5.574	0.124	5.885	0.73	132.84	127.97	127.50	127.86	127.60	127.50	12.0	0.013	0.005	Concrete	2.52	2.78	1.78	False
OCS-1	DMH-202	0.000	0.000	6.196	4.04	124.85	125.66	133.24	125.26	124.85	124.35	15.0	0.013	0.018	Concrete	8.71	6.97	4.67	False
DMH-202	DMH-201	0.066	0.000	6.987	4.04	133.24	125.26	132.75	124.82	124.35	123.90	15.0	0.013	0.005	Concrete	4.57	4.21	0.53	False
DMH-201	FE-201	0.421	0.000	6.916	4.04	132.75	124.82	123.50	124.31	123.90	123.50	15.0	0.013	0.005	Concrete	4.55	4.19	0.51	False
CB-202	DMH-206	4.980	0.047	6.004	0.28	126.45	123.31	125.95	123.26	123.09	122.89	12.0	0.013	0.005	Concrete	2.57	2.15	2.29	False
CB-203	DMH-206	4.980	0.073	6.004	0.44	125.85	123.26	125.95	123.26	122.95	122.89	12.0	0.013	0.005	Concrete	2.55	2.44	2.11	False
DMH-206	WQU-203	5.278	0.120	5.944	0.72	125.95	123.26	125.00	123.00	122.89	122.55	12.0	0.013	0.005	Concrete	2.52	2.76	1.80	False
CB-204	WQU-203	4.980	0.043	6.004	0.26	124.75	123.04	125.00	123.00	122.75	122.55	6.0	0.012	0.006	Ductile Iron	0.48	2.49	0.22	False
WQU-203	FE-202	5.688	0.163	5.862	0.96	125.00	123.00	122.00	122.41	122.55	122.00	12.0	0.013	0.004	Concrete	2.32	2.82	1.36	False
WQU-205	INLET-3A	4.980	0.336	6.004	2.03	123.05	121.28	119.80	120.41	120.60	119.80	12.0	0.013	0.005	Concrete	2.51	3.56	0.48	False
OCS-3	DMH-208	0.000	0.000	6.196	2.41	119.70	120.43	125.16	120.39	119.70	119.66	12.0	0.013	0.006	Concrete	2.74	3.94	0.33	False
AD-208	AD-207	4.980	0.011	6.004	0.07	123.00	121.75	123.00	121.03	121.62	120.74	6.0	0.010	0.012	PVC	0.79	2.46	0.73	False
AD-207	AD-206	5.486	0.081	5.903	0.48	123.00	121.03	122.75	120.81	120.74	120.34	12.0	0.010	0.005	PVC	3.29	2.99	2.81	False
AD-206	WQU-204	5.927	0.209	5.815	1.22	122.75	120.81	124.61	120.71	120.34	120.07	12.0	0.010	0.005	PVC	3.29	3.89	2.07	False
CB-205	WQU-204	4.980	0.093	6.004	0.56	124.40	120.71	124.61	120.71	120.18	120.07	12.0	0.013	0.005	Concrete	2.52	2.58	1.96	False
DMH-208	INLET-4	0.029	0.000	6.994	2.41	125.16	120.39	119.62	120.28	119.66	119.62	12.0	0.013	0.005	Concrete	2.52	3.65	0.11	False
RD-3	DMH-212	4.980	0.193	6.004	1.17	129.00	125.13	128.32	125.07	124.66	124.59	12.0	0.013	0.005	<None>	2.57	3.19	1.40	False
DMH-212	DMH-211	5.050	0.193	5.990	1.16	128.32	125.07	126.94	124.64	124.59	123.94	12.0	0.013	0.005	Concrete	2.52	3.14	1.36	False
RD-4	DMH-211	4.980	0.193	6.004	1.17	127.75	124.64	126.94	124.64	124.01	123.94	12.0	0.013	0.006	<None>	2.67	3.28	1.50	False
DMH-211	INLET-2A	5.740	0.385	5.852	2.27	126.94	124.64	123.90	124.54	123.94	123.90	12.0	0.013	0.005	Concrete	2.60	3.73	0.33	False
WQU-206	INLET-2B	4.980	0.348	6.004	2.10	125.35	123.01	122.28	122.90	122.35	122.28	12.0	0.013	0.006	Concrete	2.66	3.76	0.56	False
OCS-2	DMH-210	0.000	0.000	6.196	1.95	120.30	120.96	126.85	120.91	120.30	120.25	12.0	0.013	0.005	Concrete	2.52	3.54	0.57	False
DMH-210	DMH-209	0.047	0.000	6.991	1.95	126.85	120.91	128.35	120.50	120.25	119.85	12.0	0.013	0.005	Concrete	2.52	3.54	0.57	False
DMH-209	INLET-5	0.422	0.000	6.916	1.95	128.35	120.50	119.74	120.34	119.85	119.74	12.0	0.013	0.005	Concrete	2.57	3.60	0.62	False
WQU-204	INLET-3B	6.156	0.332	5.769	1.93	124.61	120.71	120.00	120.59	120.07	120.00	12.0	0.013	0.005	Concrete	2.58	3.60	0.65	False
RD-1	INLET-1C	4.980	0.264	6.004	1.60	135.00	125.74	125.00	125.54	125.17	125.00	12.0	0.013	0.005	<None>	2.59	3.46	0.99	False
RD-5	INLET-3C	4.980	0.057	6.004	0.34	125.00	121.95	121.50	121.74	121.70	121.50	12.0	0.013	0.005	<None>	2.55	2.26	2.21	False

100-Year Rational Storm Event - Tailwater EL=124.7

Conduit FlexTable: B+T Hydraulic Spreadsheet

Start Node	Stop Node	System Flow Time (min)	System CA (acres)	System Intensity (in/h)	Flow (cfs)	Elevation Ground (Start) (ft)	Hydraulic Grade Line (In) (ft)	Elevation Ground (Stop) (ft)	Hydraulic Grade Line (Out) (ft)	Invert (Upstream) (ft)	Invert (Downstream) (ft)	Diameter (in)	Manning's n	Slope (Calculated) (ft/ft)	Material	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Excess Capacity (Full Flow) (cfs)	Is Surcharged?
CB-201	WQU-202	4.980	0.384	7.402	2.87	127.70	125.81	127.67	125.62	124.95	124.83	12.0	0.013	0.005	Concrete	2.57	3.65	-0.29	False
WQU-202	DMH-203	5.085	0.679	7.391	5.06	127.67	125.62	128.75	125.37	124.58	124.46	15.0	0.013	0.005	Concrete	4.70	4.12	-0.37	False
RD-2	DMH-204	4.998	0.264	7.400	1.97	134.00	125.60	129.50	125.46	124.95	124.80	12.0	0.013	0.005	<None>	2.60	3.64	0.63	False
DMH-204	DMH-203	5.127	0.264	7.387	1.96	129.50	125.46	128.75	125.35	124.80	124.71	12.0	0.013	0.005	Concrete	2.53	3.56	0.57	False
DMH-203	INLET-1A	5.210	0.943	7.379	7.01	128.75	125.35	124.02	125.05	124.21	124.02	18.0	0.013	0.005	Concrete	7.42	4.78	0.40	False
WQU-201	DMH-205	4.980	0.124	7.402	0.92	133.08	128.52	132.84	128.02	128.10	127.60	12.0	0.013	0.005	Concrete	2.52	2.96	1.60	False
DMH-205	INLET-1B	5.541	0.124	7.346	0.92	132.84	128.02	127.50	127.90	127.60	127.50	12.0	0.013	0.005	Concrete	2.52	2.95	1.60	False
OCS-1	DMH-202	0.000	0.000	7.498	4.04	124.85	125.66	133.24	125.28	124.85	124.35	15.0	0.013	0.018	Concrete	8.71	6.97	4.67	False
DMH-202	DMH-201	0.066	0.000	7.893	4.04	133.24	125.28	132.75	124.94	124.35	123.90	15.0	0.013	0.005	Concrete	4.57	4.21	0.53	False
DMH-201	FE-201	0.421	0.000	7.858	4.04	132.75	124.94	123.50	124.70	123.90	123.50	15.0	0.013	0.005	Concrete	4.55	4.19	0.51	False
CB-202	DMH-206	4.980	0.047	7.402	0.35	126.45	124.87	125.95	124.87	123.09	122.89	12.0	0.013	0.005	Concrete	2.57	0.44	2.22	True
CB-203	DMH-206	4.980	0.073	7.402	0.55	125.85	124.87	125.95	124.87	122.95	122.89	12.0	0.013	0.005	Concrete	2.55	0.70	2.01	True
DMH-206	WQU-203	6.424	0.120	7.173	0.87	125.95	124.87	125.00	124.83	122.89	122.55	12.0	0.013	0.005	Concrete	2.52	1.10	1.65	True
CB-204	WQU-203	4.980	0.043	7.402	0.32	124.75	124.92	125.00	124.83	122.75	122.55	6.0	0.012	0.006	Ductile Iron	0.48	1.64	0.16	True
WQU-203	FE-202	7.449	0.163	6.820	1.12	125.00	124.83	122.00	124.70	122.55	122.00	12.0	0.013	0.004	Concrete	2.32	1.43	1.20	True
WQU-205	INLET-3A	4.980	0.336	7.402	2.51	123.05	125.50	119.80	124.70	120.60	119.80	12.0	0.013	0.005	Concrete	2.51	3.19	0.01	True
OCS-3	DMH-208	0.000	0.000	7.498	2.41	119.70	124.77	125.16	124.74	119.70	119.66	12.0	0.013	0.006	Concrete	2.74	3.07	0.33	True
AD-208	AD-207	4.980	0.011	7.402	0.08	123.00	122.77	123.00	122.76	121.62	120.74	6.0	0.010	0.012	PVC	0.79	0.42	0.71	True
AD-207	AD-206	7.922	0.081	6.631	0.54	123.00	122.76	122.75	122.75	120.74	120.34	12.0	0.010	0.005	PVC	3.29	0.69	2.75	True
AD-206	WQU-204	9.844	0.209	6.231	1.31	122.75	124.65	124.61	124.61	120.34	120.07	12.0	0.010	0.005	PVC	3.29	1.67	1.98	True
CB-205	WQU-204	4.980	0.093	7.402	0.69	124.40	124.62	124.61	124.61	120.18	120.07	12.0	0.013	0.005	Concrete	2.52	0.88	1.83	True
DMH-208	INLET-4	0.037	0.000	7.896	2.41	125.16	124.74	119.62	124.70	119.66	119.62	12.0	0.013	0.005	Concrete	2.52	3.07	0.11	True
RD-3	DMH-212	4.980	0.193	7.402	1.44	129.00	125.20	128.32	125.13	124.66	124.59	12.0	0.013	0.005	<None>	2.57	3.36	1.13	False
DMH-212	DMH-211	5.047	0.193	7.395	1.44	128.32	125.13	126.94	124.76	124.59	123.94	12.0	0.013	0.005	Concrete	2.52	3.31	1.08	False
RD-4	DMH-211	4.980	0.193	7.402	1.44	127.75	124.77	126.94	124.76	124.01	123.94	12.0	0.013	0.006	<None>	2.67	3.46	1.23	False
DMH-211	INLET-2A	5.701	0.385	7.330	2.85	126.94	124.76	123.90	124.70	123.94	123.90	12.0	0.013	0.005	Concrete	2.60	3.62	-0.24	False
WQU-206	INLET-2B	4.980	0.348	7.402	2.60	125.35	124.77	122.28	124.70	122.35	122.28	12.0	0.013	0.006	Concrete	2.66	3.30	0.07	True
OCS-2	DMH-210	0.000	0.000	7.498	1.95	120.30	125.03	126.85	125.00	120.30	120.25	12.0	0.013	0.005	Concrete	2.52	2.48	0.57	True
DMH-210	DMH-209	0.067	0.000	7.893	1.95	126.85	125.00	128.35	124.76	120.25	119.85	12.0	0.013	0.005	Concrete	2.52	2.48	0.57	True
DMH-209	INLET-5	0.603	0.000	7.840	1.95	128.35	124.76	119.74	124.70	119.85	119.74	12.0	0.013	0.005	Concrete	2.57	2.48	0.62	True
WQU-204	INLET-3B	10.376	0.332	6.132	2.05	124.61	124.74	120.00	124.70	120.07	120.00	12.0	0.013	0.005	Concrete	2.58	2.61	0.53	True
RD-1	INLET-1C	4.980	0.264	7.402	1.97	135.00	125.82	125.00	125.60	125.17	125.00	12.0	0.013	0.005	<None>	2.59	3.62	0.62	False
RD-5	INLET-3C	4.980	0.057	7.402	0.42	125.00	124.71	121.50	124.70	121.70	121.50	12.0	0.013	0.005	<None>	2.55	0.54	2.13	True

Attachment 6
Recharge/Drawdown, Water Quality, TSS & Sizing Calculations

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Standard 3: Groundwater Recharge

Groundwater Recharge Volume Required:

Rv = F x Impervious Area, where:

Rv = Required Recharge Volume [Ac-ft]

F = Target Depth Factor associated with each Hydrologic Soil Group (HSG) [in]

Impervious Area = Total Pavement and Rooftop Area under Post-development Conditions [Ac]

			2.41	**Required Recharge Volume [Ac-ft]**	
HSG "A", use F =	0.6	in	1.127	0.056	Net Increase
HSG "B", use F =	0.35	in	0.000	0.000	
HSG "C", use F =	0.25	in	0.000	0.000	
HSG "D", use F =	0.1	in	0.000	0.000	
Total Required Recharge Volume (Rv) =				**0.056**	**Ac-ft**

Capture Area Adjustment: (Ref: DEP Handbook V.3 Ch.1 P.27-28)

Total Site Impervious Area (Total)=	1.127	Acres
Impervious Area Draining to Infiltrative BMPs (infil) =	0.76	Acres
Percent Imp. Area Draining to Infiltrative BMPs =	67.5%	

Subsurface #1	0.096	Below Lowest Outlet
Total Provided Recharge Volume =	**0.096**	**Ac-ft**

PROVIDED GROUNDWATER RECHARGE VOLUME IS GREATER THAN OR EQUAL TO THE REQUIRED RECHARGE VOLUME, THEREFORE PROPOSED STORMWATER MANAGEMENT DESIGN IS IN COMPLIANCE WITH STANDARD 3.

JOB NO.	2063.27	COMPUTED BY:	TJM	CHECKED BY:	
JOB:	NOVO Riverside Commons	DATE:	03/21/24	DATE:	

Standard 3: Drawdown

$$\text{Drawdown Time} = \frac{\text{Rv}}{\text{(K) (Bottom Area)}}$$

where:

Rv = Storage Volume Below Outlet [Ac-ft]
K= Infiltration Rate [in/hr]
Bottom Area= Bottom Area of Recharge System [Ac]

Subsurface #1

Rv =	0.096	Ac-ft	
K =	2.410	in/hr	Conservative Rawls for HSG C
Bottom Area =	0.127	Acres	
Drawdown Time =	**3.764**	**Hours**	*< 72 Hours, Design is in compliance with the standard.*

Note:

1. The infiltration BMPs have been designed to fully drain within 72 hours, therefore the proposed stormwater management design is in compliance with Standard 3 .

2. Infiltration Rate based on Volume 3, Chapter 1, Table 2.3.3 *Rawls Rates* from the 2008 MA DEP Stormwater Management Handbook.

JOB NO. 2063.27 COMPUTED BY: TJM CHECKED BY:

JOB: NOVO Riverside Commons DATE: 03/21/24 DATE:

BEALS AND THOMAS

Standard 4: Water Quality Volume Summary

$V_{WQ} = (D_{WQ} / 12\ in/ft) \times (A_{IMP} \times 43{,}560\ SF/Ac)$ **where:**

V_{WQ} = Required Water Quality Volume [CF]

D_{WQ} = Water Quality Depth : 1-inch for discharges within a Zone II or Interim Wellhead Protection Area, to or near critical areas, runoff from LUHPPL, or exfiltration to soil with infiltration rate 2.4 in/hr or greater; ½-inch for discharges to other areas.

A_{IMP} = Post-development Impervious Area; may exclude roof top areas [Ac]

2.41

Required Water Quality Volume:

Drainage Area/ Treatment Train	A_{IMP} [Ac]	D_{WQ} [in]	V_{WQ} Required [CF]	
PDA-1A*	0.761	1	2,762	Path and
PDA-1B	0.797	1	2,893	
PDA-2B	0.319	1	1,158	
PDA-3B	0.310	1	1,125	
PDA-4	0.049	1	179	
Total Required Water Quality Volume:			8,118	Cubic Feet

Provided Water Quality Volume:

Total Provided Water Quality Volume:	10,081	Cubic Feet

WATER QUALITY VOLUME PROVIDED IS GREATER THAN OR EQUAL TO THE REQUIRED WATER QUALITY VOLUME, THEREFORE PROPOSED STORMWATER MANAGEMENT DESIGN IS IN COMPLIANCE WITH STANDARD 4.

JOB NO. 2063.27 COMPUTED BY: TJM CHECKED BY:

JOB: NOVO Riverside Commons DATE: 09/19/23 DATE:

BEALS AND THOMAS

Proprietary Water Quality Inlet Sizing

Step 1: Define Minimum Flow Rate per Water Quality Inlet to Treat Desired Water Quality Volume

Water quality inlets are sized based on flow rate; therefore expressing Water Quality Volume as a flow rate based on the percentage of cumulative average volume captured ensures systems are sized to achieve the desired Water Quality treatment level.

$Q = (q_u)(A)(WQV)$ where:

Q = peak flow rate associated with first 1.0-inch of runoff [CFS]

q_u = The Peak Discharge [CFS/mi^2/in] Massachusetts DEP Standard Method to Convert Required Water Quality Volume to a Discharge Rate for Sizing Flow Based Manufactured Proprietary Stormwater Treatment Practices

A = Contributing Drainage Area, Impervious Surface Only [Ac]

WQV = The Water Quality Treatment Depth [In]

WQI No.	A (Ac)	Tc (Min)	WQV (in)	q_u (csm/in)	Q (cfs)
WQI-1	0.25	6.0	1.0	774	0.30
WQI-2	0.50	6.0	1.0	774	0.60
WQI-3	0.30	6.0	1.0	774	0.36
WQI-4	0.30	6.0	1.0	774	0.36
WQI-5	0.33	6.0	1.0	774	0.40
Total	1.68	Acres			

Step 2: Size Water Quality Inlet as recommended by Manufacturer

See attached Sizing Report(s) for recommended model(s).

Step 3: Water Quality Volume Provided by WQI unit(s)

Total Impervious Area Treated by WQI unit(s): 1.68 Acres

73,181 SF

Treated Water Quality Depth : 1.0 inches

(accounted for by Average Water Quality Flow Rate)

Total Water Quality Volume provided by Water Quality Inlets: 6,098 CF

JOB NO. 2063.27 COMPUTED BY: TJM CHECKED BY:

JOB: NOVO Riverside DATE: 03/21/24 DATE:

BEALS AND THOMAS

Riprap Apron Sizing

Median Stone Sizing:

$$D_{50} = 0.2 D_0 \left(\frac{Q}{\sqrt{g} D_0^{2.5}} \right)^{\frac{4}{3}} \left(\frac{D_0}{TW} \right)$$

Where:

D_0 = Maximum Inside Pipe Diameter (ft)

D_{50} = Median Riprap Diameter (ft)

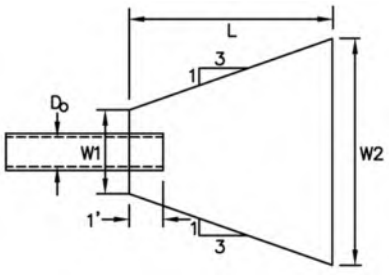
Q = Peak Discharge Rate from Hydraulic Design (cfs)

TW = Tailwater Depth (ft); (Use $0.4D_0$ if TW is unknown, max $1.0D_{o)}$

g = Gravitational Acceleration Constant = 32.2 ft/s^2

Apron Sizing:

D_{50} [In]	Apron Length (L) [ft}	Apron Depth [In]	Apron Width At Beginning	Apron Width At End
5	$4D_0$	$3.5D_{50}$	$3D_0$	$3D_0 + \frac{2}{3}L$
6	$4D_0$	$3.3D_{50}$	$3D_0$	$3D_0 + \frac{2}{3}L$
10	$5D_0$	$2.4D_{50}$	$3D_0$	$3D_0 + \frac{2}{3}L$
14	$6D_0$	$2.2D_{50}$	$3D_0$	$3D_0 + \frac{2}{3}L$
20	$7D_0$	$2.0D_{50}$	$3D_0$	$3D_0 + \frac{2}{3}L$
22	$8D_0$	$2.0D_{50}$	$3D_0$	$3D_0 + \frac{2}{3}L$



FLARED END SECTION	PIPE DIAMETER (D_0) (FEET)	25-YEAR STORM FLOW (Q) (CFS±)	TAILWATER (TW) [ft]	MEDIAN STONE DIAMETER (D_{50}) (INCHES)	APRON LENGTH (L) (FEET)	APRON DEPTH [In]	APRON WIDTH AT BEGINING (W_1) [ft]	APRON WIDTH AT END (W_2) [ft]
FE-201	1.25	4.04	0.5	5	5.00	17.5	3.8	7.1
FE-202	1.00	0.96	0.4	5	4.00	17.5	3.0	5.7

Notes

[1] Calculations performed in accordance with Hydraulic Engineering Circular No. 14, Third Edition; Hydraulic Design of Energy Dissipaters for Culverts and Channels, dated July 2006.

[2] Pipe shall extend 1 foot into riprap.

[3] For maximum pipe size of 60".

JOB NO. 2063.27 COMPUTED BY: TJM CHECKED BY:

JOB: NOVO Riverside Commons 12/18/2023 12/18/23 DATE:

Project: NOVO Riverside Commons
Location: Concord, MA
Prepared For: Beals & Thomas / Tom Michalak

Purpose: To calculate the water quality flow rate (WQF) over a given site area. In this situation the WQF is derived from the first 1" of runoff from the contributing impervious surface.

Reference: Massachusetts Dept. of Environmental Protection Wetlands Program / United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Procedure: Determine unit peak discharge using Figure 1 or 2. Figure 2 is in tabular form so is preferred. Using the tc, read the unit peak discharge (qu) from Figure 1 or Table in Figure 2. qu is expressed in the following units: cfs/mi^2/watershed inches (csm/in).

Compute Q Rate using the following equation:

Q = (qu) (A) (WQV)

where:

Q = flow rate associated with first 1" of runoff
qu = the unit peak discharge, in csm/in.
A = impervious surface drainage area (in square miles)
WQV = water quality volume in watershed inches (1" in this case)

Structure Name	Impv. (acres)	A (miles^2)	t_c (min)	t_c (hr)	WQV (in)	qu (csm/in.)	Q (cfs)
WQU 201	0.10	0.0001531	5.0	0.083	1.00	795.00	0.12
WQU 202	0.49	0.0007688	5.0	0.083	1.00	795.00	0.61
WQU 203	0.11	0.0001734	5.0	0.083	1.00	795.00	0.14
WQU 204	0.22	0.0003438	5.0	0.083	1.00	795.00	0.27
WQU 205	0.31	0.0004813	5.0	0.083	1.00	795.00	0.38

The WQf sizing calculation selects the minimum size CDS/Cascade/StormCeptor model capable of operating at the computed WQf peak flowrate prior to bypassing. It assumes free discharge of the WQf through the unit and ignores the routing effect of any upstream storm drain piping. As with all hydrodynamic separators, there will be some impact to the Hydraulic Gradient of the corresponding drainage system, and evaluation of this impact should be considered in the design.

Brief Stormceptor Sizing Report - WQU 201

Project Information & Location			
Project Name	NOVO Riverside Commons	**Project Number**	768489
City	Concord	**State/ Province**	Massachusetts
Country	United States of America	**Date**	8/21/2023
Designer Information		**EOR Information (optional)**	
Name	Jim Lyons	**Name**	Tom Michalak
Company	Contech Engineered Solutions	**Company**	Beals & Thomas Inc
Phone #	413-246-5151	**Phone #**	508-366-0560
Email	james.lyons@conteches.com	**Email**	tmichalak@bealsandthomas.com

Stormwater Treatment Recommendation
The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	WQU 201
Target TSS Removal (%)	80
TSS Removal (%) Provided	96
Recommended Stormceptor Model	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	96
STC 900	98
STC 1200	98
STC 1800	98
STC 2400	99
STC 3600	99
STC 4800	99
STC 6000	99
STC 7200	99
STC 11000	100
STC 13000	100
STC 16000	100

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Sizing Details

Drainage Area	
Total Area (acres)	0.18
Imperviousness %	56.0

Rainfall	
Station Name	BLUE HILL
State/Province	Massachusetts
Station ID #	0736
Years of Records	58
Latitude	42°12'44"N
Longitude	71°6'53"W

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (Gal)	
Peak Conveyed Flow Rate (CFS)	
Water Quality Flow Rate (CFS)	0.12

Up Stream Storage	
Storage (ac-ft)	Discharge (cfs)
0.000	0.000

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

OK-110

Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
https://www.conteches.com/technical-guides/search?filter=1WBC0O5EYX

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CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD

NOVO RIVERSIDE COMMONS
CONCORD, MA

Area	**0.49 ac**	Unit Site Designation	**WQU 202**
Weighted C	**0.9**	Rainfall Station #	**68**
t_c	**5 min**		
CDS Model	**2015-4**	CDS Treatment Capacity	**1.4 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	9.3%	9.3%	0.01	0.01	9.3
0.04	9.5%	18.8%	0.02	0.02	9.5
0.06	8.7%	27.5%	0.03	0.03	8.7
0.08	10.1%	37.6%	0.04	0.04	10.1
0.10	7.2%	44.8%	0.04	0.04	7.2
0.12	6.0%	50.8%	0.05	0.05	6.0
0.14	6.3%	57.1%	0.06	0.06	6.3
0.16	5.6%	62.7%	0.07	0.07	5.5
0.18	4.7%	67.4%	0.08	0.08	4.6
0.20	3.6%	71.0%	0.09	0.09	3.6
0.25	8.2%	79.1%	0.11	0.11	8.0
0.50	14.9%	94.0%	0.22	0.22	14.0
0.75	3.2%	97.3%	0.33	0.33	2.9
1.00	1.2%	98.5%	0.44	0.44	1.1
1.50	0.7%	99.2%	0.66	0.66	0.6
2.00	0.8%	100.0%	0.88	0.88	0.6
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
					97.8
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**91.3%**

1 - Based on 10 years of rainfall data from NCDC station 736, Blue Hill, Norfolk County, MA

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD

NOVO RIVERSIDE COMMONS
CONCORD, MA

Area	**0.11 ac**	Unit Site Designation	**WQU 203**
Weighted C	**0.9**	Rainfall Station #	**68**
t_c	**5 min**		
CDS Model	**1515-3**	CDS Treatment Capacity	**1.0 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	9.3%	9.3%	0.00	0.00	9.3
0.04	9.5%	18.8%	0.00	0.00	9.5
0.06	8.7%	27.5%	0.01	0.01	8.7
0.08	10.1%	37.6%	0.01	0.01	10.1
0.10	7.2%	44.8%	0.01	0.01	7.2
0.12	6.0%	50.8%	0.01	0.01	6.0
0.14	6.3%	57.1%	0.01	0.01	6.3
0.16	5.6%	62.7%	0.02	0.02	5.6
0.18	4.7%	67.4%	0.02	0.02	4.7
0.20	3.6%	71.0%	0.02	0.02	3.6
0.25	8.2%	79.1%	0.02	0.02	8.2
0.50	14.9%	94.0%	0.05	0.05	14.8
0.75	3.2%	97.3%	0.07	0.07	3.2
1.00	1.2%	98.5%	0.10	0.10	1.2
1.50	0.7%	99.2%	0.15	0.15	0.7
2.00	0.8%	100.0%	0.20	0.20	0.7
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
					99.6
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**93.2%**

1 - Based on 10 years of rainfall data from NCDC station 736, Blue Hill, Norfolk County, MA
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

Brief Stormceptor Sizing Report - WQU 204

Project Information & Location			
Project Name	NOVO Riverside Commons	**Project Number**	768489
City	Concord	**State/ Province**	Massachusetts
Country	United States of America	**Date**	8/21/2023
Designer Information		**EOR Information (optional)**	
Name	Jim Lyons	**Name**	Tom Michalak
Company	Contech Engineered Solutions	**Company**	Beals & Thomas Inc
Phone #	413-246-5151	**Phone #**	508-366-0560
Email	james.lyons@conteches.com	**Email**	tmichalak@bealsandthomas.com

Stormwater Treatment Recommendation
The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	WQU 204
Target TSS Removal (%)	80
TSS Removal (%) Provided	93
Recommended Stormceptor Model	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	93
STC 900	96
STC 1200	96
STC 1800	97
STC 2400	98
STC 3600	98
STC 4800	99
STC 6000	99
STC 7200	99
STC 11000	99
STC 13000	99
STC 16000	99

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Sizing Details

Drainage Area	
Total Area (acres)	0.29
Imperviousness %	76.0

Rainfall	
Station Name	BLUE HILL
State/Province	Massachusetts
Station ID #	0736
Years of Records	58
Latitude	42°12'44"N
Longitude	71°6'53"W

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (Gal)	
Peak Conveyed Flow Rate (CFS)	
Water Quality Flow Rate (CFS)	0.27

Up Stream Storage	
Storage (ac-ft)	Discharge (cfs)
0.000	0.000

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

OK-110

Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
https://www.conteches.com/technical-guides/search?filter=1WBC0O5EYX

Brief Stormceptor Sizing Report - WQU 205

Project Information & Location			
Project Name	NOVO Riverside Commons	**Project Number**	768489
City	Concord	**State/ Province**	Massachusetts
Country	United States of America	**Date**	8/21/2023
Designer Information		**EOR Information (optional)**	
Name	Jim Lyons	**Name**	Tom Michalak
Company	Contech Engineered Solutions	**Company**	Beals & Thomas Inc
Phone #	413-246-5151	**Phone #**	508-366-0560
Email	james.lyons@conteches.com	**Email**	tmichalak@bealsandthomas.com

Stormwater Treatment Recommendation
The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	WQU 205
Target TSS Removal (%)	80
TSS Removal (%) Provided	91
Recommended Stormceptor Model	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	91
STC 900	95
STC 1200	95
STC 1800	96
STC 2400	97
STC 3600	97
STC 4800	98
STC 6000	98
STC 7200	99
STC 11000	99
STC 13000	99
STC 16000	99

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Sizing Details

Drainage Area	
Total Area (acres)	0.49
Imperviousness %	63.0

Rainfall	
Station Name	BLUE HILL
State/Province	Massachusetts
Station ID #	0736
Years of Records	58
Latitude	42°12'44"N
Longitude	71°6'53"W

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (Gal)	
Peak Conveyed Flow Rate (CFS)	
Water Quality Flow Rate (CFS)	0.38

Up Stream Storage	
Storage (ac-ft)	Discharge (cfs)
0.000	0.000

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

OK-110

Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
https://www.conteches.com/technical-guides/search?filter=1WBC0O5EYX

Attachment 7
Site Owner's Manual

BEALS AND THOMAS

Site Owner's Manual

NOVO RIVERSIDE COMMONS

292 & 294 Baker Avenue
Concord, Massachusetts

Prepared for:
Taurus Investment Holdings, LLC
Two International Place
Boston, MA 02110

Prepared by:

BEALS AND THOMAS

September 19, 2023

206327RP002A

TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 INTRODUCTION

The Site Owner's Manual complies with the Long-Term Pollution Prevention Plan (Standard 4) and the Long-Term Operation and Maintenance Plan (Standard 9) requirements of the 2008 Massachusetts Department of Environmental Protection (DEP) Stormwater Handbook. The Manual outlines source control and pollution prevention measures and maintenance requirements of stormwater best management practices (BMPs) associated with the proposed development.

2.0 SITE OWNER'S AGREEMENT

2.1 Operation and Maintenance Compliance Statement

Site Owner: Taurus Investment Holdings, LLC
Two International Place, Boston, MA 02110

Responsible Party: Taurus Investment Holdings, LLC
Two International Place, Boston, MA 02110

Taurus Investment Holdings, LLC or their successors shall maintain ownership of the on-site stormwater management system as well as the responsibility for operation and maintenance during the post-development stages of the project. The site has been inspected for erosion and appropriate measures have been taken to permanently stabilize any eroded areas. All aspects of stormwater best management practices (BMPs) have been inspected for damage, wear and malfunction, and appropriate steps have been taken to repair or replace the system or portions of the system so that the stormwater at the site may be managed in accordance with the Stormwater Management Standards. Future responsible parties shall be notified of their continuing legal responsibility to operate and maintain the BMPs. The operation and maintenance plan for the stormwater BMPs is being implemented.

_____ _____
Responsible Party Signature Date

2.2 Stormwater Maintenance Easements

There are no off-site areas utilized for stormwater control, therefore no stormwater management easements are required. The Site Owner will have access to all stormwater practices for inspection and maintenance, including direct maintenance access by heavy equipment to structures requiring regular maintenance.

2.3 Record Keeping

The Site Owner shall maintain a rolling log in which all inspections and maintenance activities for the past three years shall be recorded. The Operation and Maintenance Log includes information pertaining to inspections, repairs, and disposal relevant to the project's stormwater management system. The Log is located in Appendix A.

The Operation and Maintenance Log shall be made available to the Conservation Commission and the DEP upon request. The Conservation Commission and the DEP shall be allowed to enter and inspect the premises to evaluate and ensure that the responsible party complies with the maintenance requirements for each BMP.

2.4 Training

Employees involved in grounds maintenance and emergency response will be educated on the general concepts of stormwater management and groundwater protection. The Site Owner's Manual will be reviewed with the maintenance staff. The staff will be trained on the proper course of action for specific events expected to be incurred during routine maintenance or emergency situations.

3.0 LONG-TERM POLLUTION PREVENTION PLAN

In compliance with Standard 4 of the 2008 DEP Stormwater Management Handbook, this section outlines source control and pollution prevention measures to be employed on-site after construction.

3.1 Storage of Materials and Waste

The site shall be kept clear of trash and debris at all times. Certain materials and waste products shall be stored inside or outside upon an impervious surface and covered, as required by local and state regulations.

3.2 Vehicle Washing

No commercial vehicle washing shall take place on site.

3.3 Routine Inspections and Maintenance of Stormwater BMPs

See Section 4.0 Long-Term Operation and Maintenance Plan, for routine inspection and maintenance requirements for all proposed stormwater BMPs.

3.4 Spill Prevention and Response

A contingency plan shall be implemented to address the spill or release of petroleum products and hazardous materials and will include the following measures:

1. Equipment necessary to quickly attend to inadvertent spills or leaks shall be stored on-site in a secure but accessible location. Such equipment shall include but not be limited to the following: safety goggles, chemically resistant gloves and overshoe boots, water and chemical fire extinguishers, sand and shovels, suitable absorbent materials, storage containers and first aid equipment (i.e. Indian Valley Industries, Inc. 55-gallon Spill Containment kit or approved equivalent).

2. Spills or leaks shall be treated properly according to material type, volume of spillage and location of spill. Mitigation shall include preventing further spillage, containing the spilled material in the smallest practical area, removing spilled material in a safe and environmentally-friendly manner, and remediation of any damage to the environment.

3. For large spills, Massachusetts DEP Hazardous Waste Incident Response Group shall be notified immediately at 888-304-1133 and an emergency response contractor shall be consulted.

3.5 Maintenance of Lawns, Gardens, and other Landscaped Areas

Lawns, gardens, and other landscaped areas shall be maintained regularly by the site owner. Vegetated and landscaped BMPs will be maintained as outlined in Section 4.0.

3.6 Storage and Use of Fertilizers, Herbicides, and Pesticides

All fertilizers, herbicides, and pesticides shall be stored in accordance with local, state, and federal regulations. The application rate and use of fertilizers, herbicides, and pesticides on the site shall at no time exceed local, state, or federal specifications.

3.7 Pet Waste Management

Pet owners shall be required to pick up after their animals and dispose of waste in the trash.

3.8 Operation and Management of Septic Systems

The proposed development will be serviced by Town sewer and there are no proposed septic systems.

3.9 Snow and Deicing Chemical Management

Snow removal and use of deicing chemicals at the proposed development shall comply with the following requirements:

- Plowed snow shall be placed in the areas designated on the site plans, outside of wetland boundaries and stormwater best management practices, and removed from the premises, as needed. The following maintenance measures shall be undertaken at all snow disposal sites:
  - Debris shall be cleared from an area prior to using it for snow disposal.
  - Debris and accumulated sediments shall be cleared from the site and properly disposed of at the end of the snow season and no later than May 15.
- In accordance with the Massachusetts General Laws, Chapter 85, Section 7A, salt and other de-icing chemicals will be stored at an indoor location. Salt and other deicing chemicals shall be stored in accordance with Massachusetts General Law.
- Sand piles shall be contained and stabilized to prevent the discharge of sand to wetlands or water bodies, and, where feasible, covered.
- Salt storage piles shall be located outside of the 100-year floodplain.
- The application of salt on the proposed parking areas and driveway shall at no time exceed state or local requirements.

3.10 Nutrient Management Plan

A nutrient management plan is required if a Total Maximum Daily Load (TMDL) has been developed that indicates that use of fertilizers containing nutrients or other specific pollutants must be reduced. The proposed project is located within the Concord

(SuAsCo) Watershed. There are no TMDLs issued for the waterbodies directly downstream of the proposed project.

4.0 LONG-TERM OPERATION AND MAINTENANCE PLAN

This section outlines the stormwater best management practices (BMPs) associated with the proposed stormwater management system and identifies the long-term inspection and maintenance requirements for each BMP.

4.1 Stormwater Management System Components

The following table outlines the type and quantity of the BMPs and their general location. Please reference the site plan(s) provided in the Figures section for exact location. All basins are accessible for maintenance from either the development driveway or parking areas.

BMP Type	Quantity	Location
Catch Basins	7	Throughout paved parking/driveway areas.
Area Drains	1	Grass/landscape areas.
Water Quality Units	5	Throughout paved parking/driveway areas.
Subsurface Infiltration Systems	3	East of #292, West and Northwest of #294
Subsurface Compensation Areas	2	West of #294

4.2 Inspection and Maintenance Schedules

4.2.1 General Maintenance for Mosquito Control

If necessary to minimize mosquito breeding, a licensed pesticide applicator shall apply larvicides, such as Bacillus sphaericus (Bs) to all catch basins sumps, and water quality inlets. Larvicides shall be applied in compliance with all pesticide label requirements, and will be applied during or immediately after wet weather, unless the product used can withstand extended dry periods. Ensure all manhole covers, and inspection ports are secure to reduce the likelihood of mosquitoes laying eggs in standing water.

4.3

4.3.1 Deep Sump and Hooded Catch Basins

Catch basins shall be inspected four times per year, including after the foliage season. Other inspection and maintenance requirements include:

- Units shall be cleaned (organic material, sediment and hydrocarbons removed) four times per year or 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.
    - Cleanout shall always occur after street sweeping.
- If any evidence of hydrocarbons is found during inspection, the material shall be immediately removed using absorbent pads or other suitable measures and disposed of legally.
- Remove other accumulated debris as necessary.
- Transport and disposal of accumulated sediment off-site shall be in accordance with applicable local, state and federal guidelines and regulations.

4.3.2 Area Drains

Area drains shall be inspected and/or cleaned at least once per year.

4.3.3 Sediment Forebays

Sediment forebays shall be inspected monthly and cleaned out at least four times per year or when sediment depth is 0.5 feet, whichever is more frequent. Other inspection and maintenance requirements include:

- Vegetation shall be maintained at a height between 3 and 6 inches.
- Any erosion observed shall be repaired as needed.
- After maintenance, the forebay floor and sidewalls shall be stabilized to prevent the discharge of sediment.
- Damaged vegetation shall be replaced by either reseeding or resodding.
    - If reseeding, hydroseeding with a tackifier or blanket (or similar practice) shall be employed to prevent scour within the forebay.

4.3.4 Proprietary Separators

Maintenance of proprietary separators shall be performed according the recommendations set forth by the manufacturer (see Appendix C. Proprietary Separator Technical Manual for complete installation, operation and maintenance procedures). Inspection and maintenance procedures for proprietary devices are provided below:

- Units shall be inspected post-construction, prior to being put into service.
- Units shall be inspected not less than twice per year following installation and no less than once per year thereafter.
- Units shall be inspected immediately after any oil, fuel or chemical spill.
- All inspections shall include checking the oil level and sediment depth in the unit.

- Removal of sediments/oils shall occur per manufacturer recommendations.
- A licensed waste management company shall remove captured petroleum waste products from any oil, chemical or fuel spills and dispose.
- OSHA confined space entry protocols shall be followed if entry into the unit is required.

4.3.5 Subsurface Infiltration Systems & Compensation Areas

Subsurface infiltration and Compensation areas shall be inspected twice per year. The inlets shall be inspected, and all debris that may clog the system shall be removed.

4.3.6 Stormwater Outfalls

Flared end sections and associated riprap spillways shall be inspected at least once per year and after major storm events (rainfall totals greater than 2.5 inches in 24 hours) to ensure that the stability of the outlet area is maintained. The outfall area shall be kept clear of debris such as trash, branches, and sediment. Repairs shall be made immediately if riprap displacement or downstream channel scour is observed.

4.3.7 Street Sweeping

The TSS removal credit is dependent on the type of street sweeper used and the frequency that sweeping occurs (see table below). Street sweeping shall occur primarily in spring and fall, and always prior to catch basin cleanout.

TSS Removal Credit	Type of Sweeper		
	High Efficiency Sweeper	Regenerative Air Sweeper	Mechanical Sweeper (Rotary Broom)
10%	Monthly	Bi-weekly	Weekly
5%	Quarterly	Quarterly	Monthly
0%	Less than above	Less than above	Less than above

Once removed from paved surfaces, the sweepings shall be handled and disposed of properly, and in compliance with applicable local, state and federal guidelines and regulations.

4.4 Estimated Operation and Maintenance Budget

An operations and maintenance budget was prepared to approximate the annual cost of the inspections required in compliance with the DEP Stormwater Management Policy.

The table below estimates the annual cost to inspect and maintain each proposed BMP, based on the requirements in Section 4.2.

BMP Type	# of BMPS	Annual O&M Cost (per BMP)[1]	Total Cost
Mosquito Control	13	$100	$1,300
Catch Basin	7	$400	$2,800
Area Drain/Drop Inlet	1	$100	$100
Sediment Forebay	1	$500	$500
Water Quality Unit	5	$300	$1,500
Subsurface Infiltration Systems	3	$400	$1,200
Subsurface Compensation Areas	2	$400	$800
Riprap Spillway	4	$100	$400
Street Sweeping[2]		See footnote	$1,500
		Total	**$10,100**

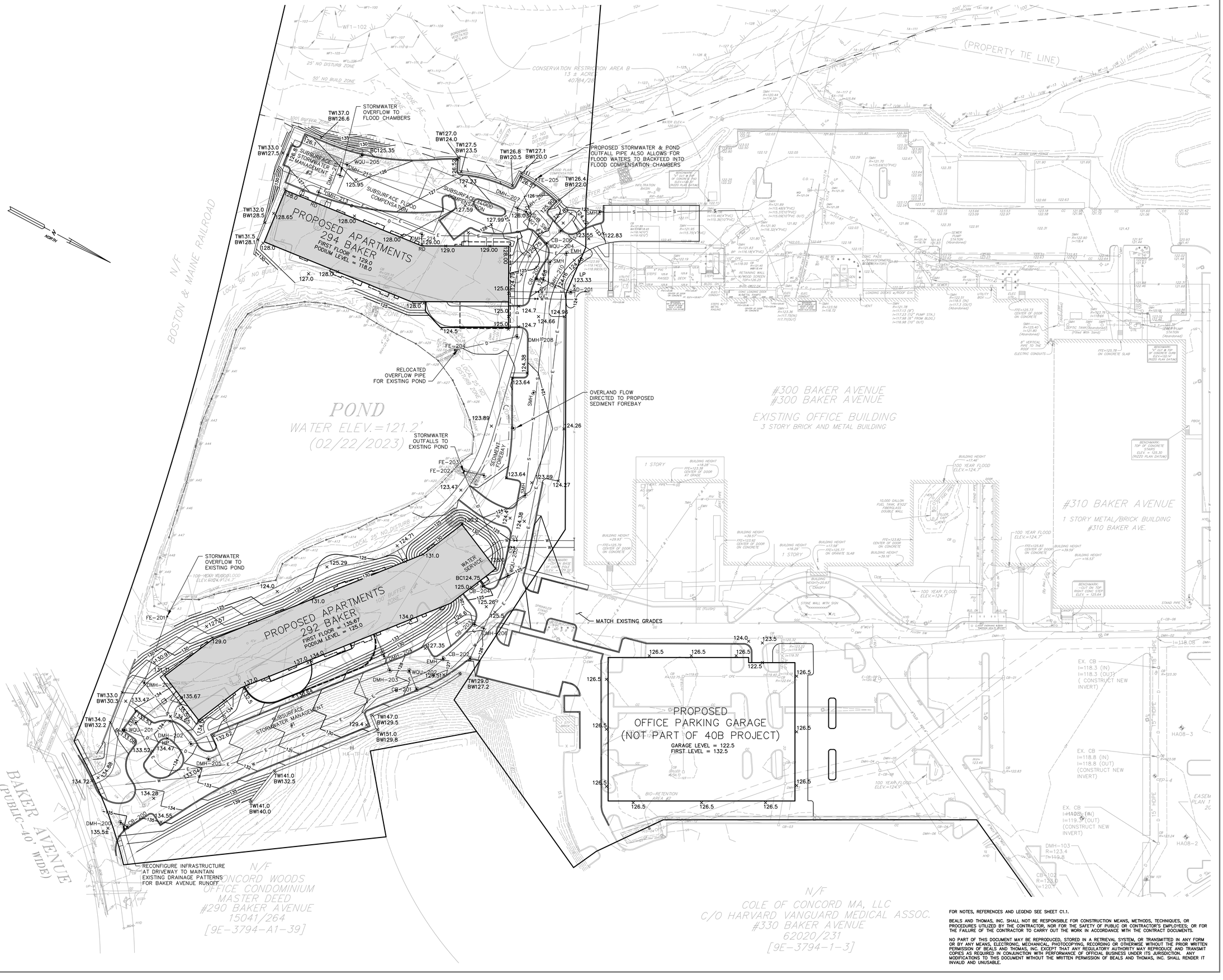
4.5 Public Safety Features

Multiple safety measures are proposed to protect the public and prevent pollutant contamination of the stormwater management system and other water resources. Guardrails and existing woodland vegetation along the access driveway will prevent cars from inadvertently detouring down steep side slopes and into adjacent wetlands or stormwater basins. It was designed to ensure protection to the public and prevent pollutant contamination of the stormwater management system and the municipal drainage system.

[1] Annual maintenance cost is based on estimate of the cost to complete all inspection and maintenance measures outlined in Section 4.2. For BMPs that require sediment removal at regular intervals (i.e. every 5 or 10 years), the annual cost includes the annual percentage of that cost.

[2] Sweeping costs are estimated as a range of $30 - $50/curb-mile per annual sweeping frequency. See section 4.2.21 for frequency requirements for each type of sweeper. Calculate the range for total annual cost based on curb-miles and frequency and insert it into the table above.

Figures



FOR NOTES, REFERENCES AND LEGEND SEE SHEET C1.1.

PREPARED FOR:

TAURUS INVESTMENT HOLDINGS, LLC

TWO INTERNATIONAL PLACE
BOSTON, MASSACHUSETTS 02110

NOT ISSUED FOR CONSTRUCTION

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5		
4		
3		
2		
1	09/19/2023	SITE OWNER'S MANUAL
0	05/22/2023	PEL SUBMISSION
	ISSUE DATE	DESCRIPTION

DES	DWN	CHK'D	APP'D

PROJECT:

NOVO RIVERSIDE COMMONS 292 & 294 BAKER AVENUE
CONCORD, MASSACHUSETTS

SCALE: 1" = 40' DATE: MAY 22, 2023

METERS 0 5 10 25
FEET 0 20 40 80 120

GRADING AND DRAINAGE PLAN

B+T JOB NO.2063.27

B+T PLAN NO. 206327P117B-001

C3.1

Appendices

Appendix A

Operation and Maintenance Log

OPERATION AND MAINTENANCE LOG

This template is intended to comply with the operation and maintenance log requirements of the 2008 DEP Stormwater Management Handbook. Copies of this log should be made for all inspections and kept on file for three years from the inspection date.

Name/Company of Inspector:
Date/Time of Inspection:
Weather Conditions: (Note current weather and any recent precipitation events)

Stormwater BMP	Inspection Observations	Actions Required

Appendix B

List of Emergency Contacts

Dial 911 in cases of emergency

Massachusetts DEP Hazardous Waste Incident Response Group
(888) 304-1133

Concord Fire Department
209 Walden Street
Concord, MA 01742
(978) 318-3488
Fire Chief Thomas M. Judge
Assistant Fire Chief Walter Latta

Concord Police Department
219 Walden Street
Concord, MA 01742
(978) 318-3400
Chief Thomas Mulcahy

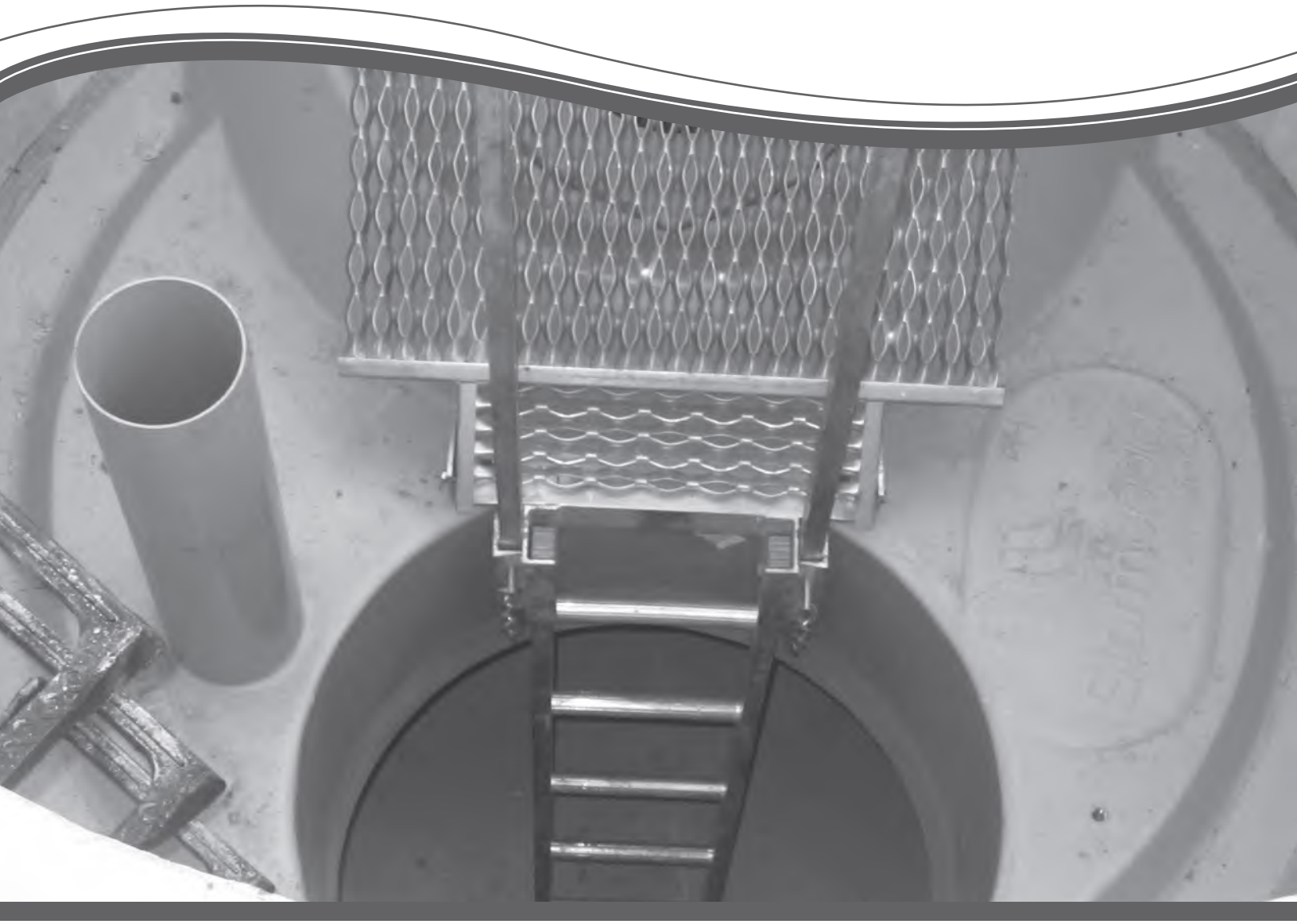
Appendix C

Proprietary Separator Technical Manual

BEALS AND THOMAS

CONTECH®
ENGINEERED SOLUTIONS

Stormceptor® STC
Operation and Maintenance Guide



Stormceptor® STC

Stormceptor Design Notes

- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.

Inlet and outlet invert elevation differences are as follows:

Inlet and Outlet Pipe Invert Elevations Differences			
Inlet Pipe Configuration	STC 450i	STC 900 to STC 7200	STC 11000 to STC 16000
Single inlet pipe	3 in. (75 mm)	1 in. (25 mm)	3 in. (75 mm)
Multiple inlet pipes	3 in. (75 mm)	3 in. (75 mm)	Only one inlet pipe.

Maximum inlet and outlet pipe diameters:

Inlet/Outlet Configuration	Inlet Unit STC 450i	In-Line Unit STC 900 to STC 7200	Series* STC 11000 to STC 16000
Straight Through	24 inch (600 mm)	42 inch (1050 mm)	60 inch (1500 mm)
Bend (90 degrees)	18 inch (450 mm)	33 inch (825 mm)	33 inch (825 mm)

- The inlet and in-line Stormceptor units can accommodate turns to a maximum of 90 degrees.
- Minimum distance from top of grade to crown is 2 feet (0.6 m)
- Submerged conditions. A unit is submerged when the standing water elevation at the proposed location of the Stormceptor unit is greater than the outlet invert elevation during zero flow conditions. In these cases, please contact your local Stormceptor representative and provide the following information:
- Top of grade elevation
- Stormceptor inlet and outlet pipe diameters and invert elevations
- Standing water elevation
- Stormceptor head loss, K = 1.3 (for submerged condition, K = 4)

Stormceptor® STC

OPERATION AND MAINTENANCE GUIDE
Table of Content

1. About Stormceptor

The Stormceptor® STC (Standard Treatment Cell) was developed by Imbrium™ Systems to address the growing need to remove and isolate pollution from the storm drain system before it enters the environment. The Stormceptor STC targets hydrocarbons and total suspended solids (TSS) in stormwater runoff. It improves water quality by removing contaminants through the gravitational settling of fine sediments and floatation of hydrocarbons while preventing the re-suspension or scour of previously captured pollutants.

The development of the Stormceptor STC revolutionized stormwater treatment, and created an entirely new category of environmental technology. Protecting thousands of waterways around the world, the Stormceptor System has set the standard for effective stormwater treatment.

1.1. Patent Information

The Stormceptor technology is protected by the following patents:

- Australia Patent No. 693,164 • 693,164 • 707,133 • 729,096 • 779401
- Austrian Patent No. 289647
- Canadian Patent No 2,009,208 •2,137,942 • 2,175,277 • 2,180,305 • 2,180,383 • 2,206,338 • 2,327,768 (Pending)
- China Patent No 1168439
- Denmark DK 711879
- German DE 69534021
- Indonesian Patent No 16688
- Japan Patent No 9-11476 (Pending)
- Korea 10-2000-0026101 (Pending)
- Malaysia Patent No PI9701737 (Pending)
- New Zealand Patent No 314646
- United States Patent No 4,985,148 • 5,498,331 • 5,725,760 • 5,753,115 • 5,849,181 • 6,068,765 • 6,371,690
- Stormceptor OSR Patent Pending • Stormceptor LCS Patent Pending

2. Stormceptor Design Overview

2.1. Design Philosophy

The patented Stormceptor System has been designed to focus on the environmental objective of providing long-term pollution control. The unique and innovative Stormceptor design allows for continuous positive treatment of runoff during all rainfall events, while ensuring that all captured pollutants are retained within the system, even during intense storm events.

An integral part of the Stormceptor design is PCSWMM for Stormceptor - sizing software developed in conjunction with Computational Hydraulics Inc. (CHI) and internationally acclaimed expert, Dr. Bill James. Using local historical rainfall data and continuous simulation modeling, this software allows a Stormceptor unit to be designed for each individual site and the corresponding water quality objectives.

By using PCSWMM for Stormceptor, the Stormceptor System can be designed to remove a wide range of particles (typically from 20 to 2,000 microns), and can also be customized to remove a specific particle size distribution (PSD). The specified PSD should accurately reflect what is in the stormwater runoff to ensure the device is achieving the desired water quality objective. Since stormwater runoff contains small particles (less than 75 microns), it is important to design a treatment system to remove smaller particles in addition to coarse particles.

2.2. Benefits

The Stormceptor System removes free oil and suspended solids from stormwater, preventing spills and non-point source pollution from entering downstream lakes and rivers. The key benefits, capabilities and applications of the Stormceptor System are as follows:

- Provides continuous positive treatment during all rainfall events
- Can be designed to remove over 80% of the annual sediment load
- Removes a wide range of particles
- Can be designed to remove a specific particle size distribution (PSD)
- Captures free oil from stormwater
- Prevents scouring or re-suspension of trapped pollutants
- Pre-treatment to reduce maintenance costs for downstream treatment measures (ponds, swales, detention basins, filters)
- Groundwater recharge protection
- Spills capture and mitigation
- Simple to design and specify
- Designed to your local watershed conditions
- Small footprint to allow for easy retrofit installations
- Easy to maintain (vacuum truck)
- Multiple inlets can connect to a single unit
- Suitable as a bend structure
- Pre-engineered for traffic loading (minimum AASHTO HS-20)
- Minimal elevation drop between inlet and outlet pipes
- Small head loss
- Additional protection provided by an 18" (457 mm) fiberglass skirt below the top of the insert, for the containment of hydrocarbons in the event of a spill.

2.3. Environmental Benefit

Freshwater resources are vital to the health and welfare of their surrounding communities. There is increasing public awareness, government regulations and corporate commitment to reducing the pollution entering our waterways. A major source of this pollution originates from stormwater runoff from urban areas. Rainfall runoff carries oils, sediment and other contaminants from roads and parking lots discharging directly into our streams, lakes and coastal waterways.

The Stormceptor System is designed to isolate contaminants from getting into the natural environment. The Stormceptor technology provides protection for the environment from spills that occur at service stations and vehicle accident sites, while also removing contaminated sediment in runoff that washes from roads and parking lots.

3. Key Operation Features

3.1. Scour Prevention

A key feature of the Stormceptor System is its patented scour prevention technology. This innovation ensures pollutants are captured and retained during all rainfall events, even extreme storms. The Stormceptor System provides continuous positive treatment for all rainfall events, including intense storms. Stormceptor slows incoming runoff, controlling and reducing velocities in the lower chamber to create a non-turbulent environment that promotes free oils and floatable debris to rise and sediment to settle.

The patented scour prevention technology, the fiberglass insert, regulates flows into the lower chamber through a combination of a weir and orifice while diverting high energy flows away through the upper chamber to prevent scouring. Laboratory testing demonstrated no scouring when tested up to 125% of the unit's operating rate, with the unit loaded to 100% sediment capacity (NJDEP, 2005). Second, the depth of the lower chamber ensures the sediment storage zone is adequately separated from the path of flow in the lower chamber to prevent scouring.

3.2. Operational Hydraulic Loading Rate

Designers and regulators need to evaluate the treatment capacity and performance of manufactured stormwater treatment systems. A commonly used parameter is the "operational hydraulic loading rate" which originated as a design methodology for wastewater treatment devices.

Operational hydraulic loading rate may be calculated by dividing the flow rate into a device by its settling area. This represents the critical settling velocity that is the prime determinant to quantify the influent particle size and density captured by the device. PCSWMM for Stormceptor uses a similar parameter that is calculated by dividing the hydraulic detention time in the device by the fall distance of the sediment.

$$v_{SC} = \frac{H}{6_H} = \frac{Q}{A_S}$$

Where:

v_{SC} = critical settling velocity, ft/s (m/s)

H = tank depth, ft (m)

$Ø_H$ = hydraulic detention time, ft/s (m/s)

Q = volumetric flow rate, ft3/s (m3/s)

A_S = surface area, ft^2 (m^2)

(Tchobanoglous, G. and Schroeder, E.D. 1987. Water Quality. Addison Wesley.)

Unlike designing typical wastewater devices, stormwater systems are designed for highly variable flow rates including intense peak flows. PCSWMM for Stormceptor incorporates all of the flows into its calculations, ensuring that the operational hydraulic loading rate is considered not only for one flow rate, but for all flows including extreme events.

3.3. Double Wall Containment

The Stormceptor System was conceived as a pollution identifier to assist with identifying illicit discharges. The fiberglass insert has a continuous skirt that lines the concrete barrel wall for a depth of 18 inches (457 mm) that provides double wall containment for hydrocarbons storage. This protective barrier ensures that toxic floatables do not migrate through the concrete wall into the surrounding soils.

4. Stormceptor Product Line

4.1. Stormceptor Models

A summary of Stormceptor models and capacities are listed in Table 1.

Table 1. Stormceptor Models

Stormceptor Model	Total Storage Volume U.S. Gal (L)	Hydrocarbon Storage Capacity U.S. Gal (L)	Maximum Sediment Capacity ft^3 (L)
STC 450i	470 (1,780)	86 (330)	46 (1,302)
STC 900	952 (3,600)	251 (950)	89 (2,520)
STC 1200	1,234 (4,670)	251 (950)	127 (3,596)
STC 1800	1,833 (6,940)	251 (950)	207 (5,861)
STC 2400	2,462 (9,320)	840 (3,180)	205 (5,805)
STC 3600	3,715 (1,406)	840 (3,180)	373 (10,562)
STC 4800	5,059 (1,950)	909 (3,440)	543 (15,376)
STC 6000	6,136 (23,230)	909 (3,440)	687 (19,453)
STC 7200	7,420 (28,090)	1,059 (4,010)	839 (23,757)
STC 11000	11,194 (42,370)	2,797 (10, 590)	1,086 (30,752)
STC 13000	13,348 (50,530)	2,797 (10, 590)	1,374 (38,907)
STC 16000	15,918 (60,260)	3,055 (11, 560)	1,677 (47,487)

NOTE: Storage volumes may vary slightly from region to region. For detailed information, contact your local Stormceptor representative.

4.2. Inline Stormceptor

The Inline Stormceptor, Figure 1, is the standard design for most stormwater treatment applications. The patented Stormceptor design allows the Inline unit to maintain continuous positive treatment of total suspended solids (TSS) year-round, regardless of flow rate. The Inline Stormceptor is composed of a precast concrete tank with a fiberglass insert situated at the invert of the storm sewer pipe, creating an upper chamber above the insert and a lower chamber below the insert.

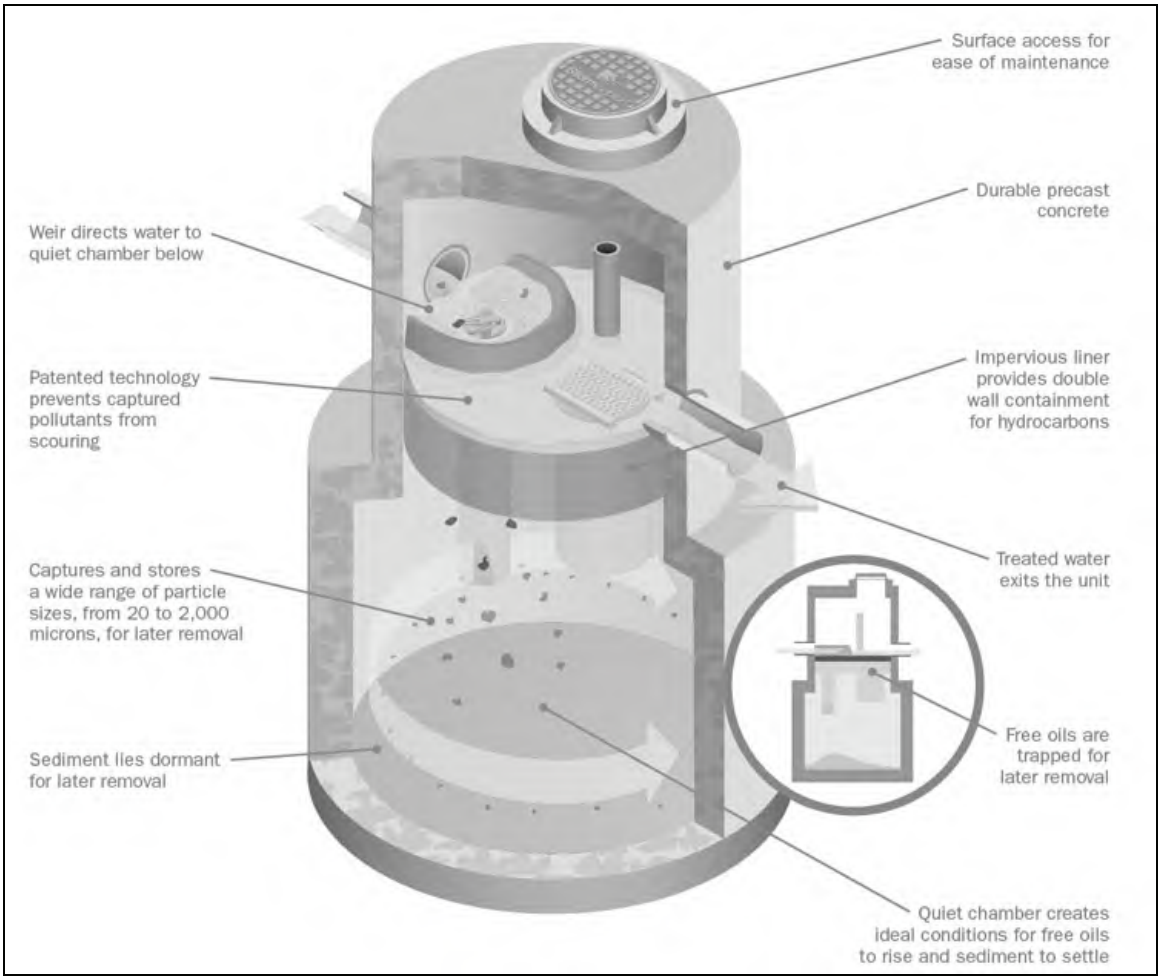


Figure 1. Inline Stormceptor

Operation

As water flows into the Stormceptor unit, it is slowed and directed to the lower chamber by a weir and drop tee. The stormwater enters the lower chamber, a non-turbulent environment, allowing free oils to rise and sediment to settle. The oil is captured underneath the fiberglass insert and shielded from exposure to the concrete walls by a fiberglass skirt. After the pollutants separate, treated water continues up a riser pipe, and exits the lower chamber on the downstream side of the weir before leaving the unit. During high flow events, the Stormceptor System's patented scour prevention technology ensures continuous pollutant removal and prevents re-suspension of previously captured pollutants.

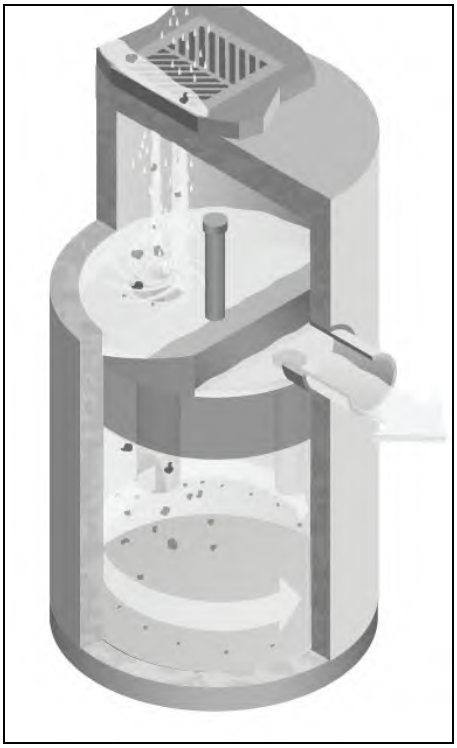


Figure 2. Inlet Stormceptor

4.3. Inlet Stormceptor

The Inlet Stormceptor System, Figure 2, was designed to provide protection for parking lots, loading bays, gas stations and other spill-prone areas. The Inlet Stormceptor is designed to remove sediment from stormwater introduced through a grated inlet, a storm sewer pipe, or both.

The Inlet Stormceptor design operates in the same manner as the Inline unit, providing continuous positive treatment, and ensuring that captured material is not re-suspended.

4.4. Series Stormceptor

Designed to treat larger drainage areas, the Series Stormceptor System, Figure 3, consists of two adjacent Stormceptor models that function in parallel. This design eliminates the need for additional structures and piping to reduce installation costs.

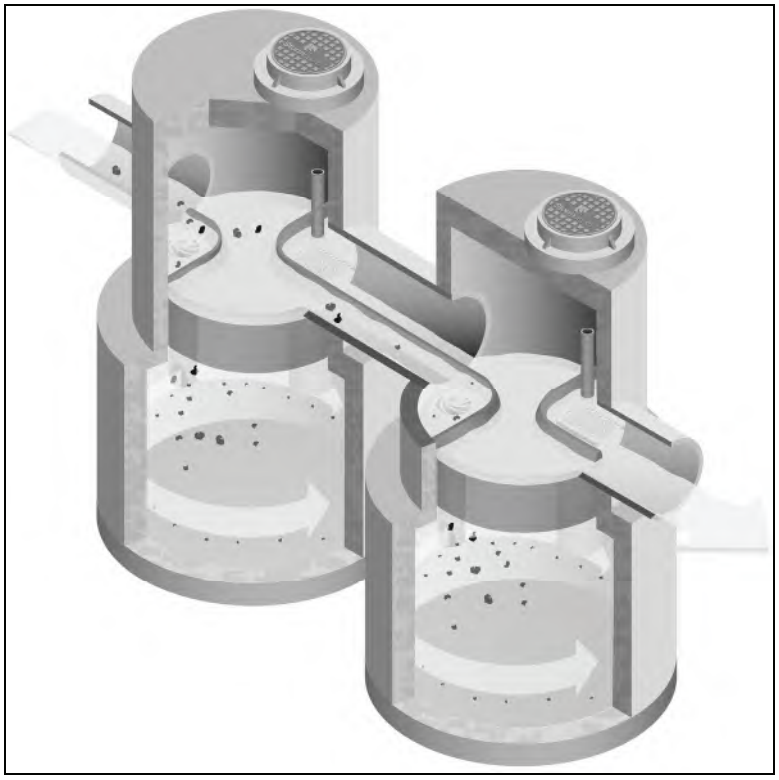


Figure 3. Series System

The Series Stormceptor design operates in the same manner as the Inline unit, providing continuous positive treatment, and ensuring that captured material is not re-suspended.

5. Sizing the Stormceptor System

The Stormceptor System is a versatile product that can be used for many different aspects of water quality improvement. While addressing these needs, there are conditions that the designer needs to be aware of in order to size the Stormceptor model to meet the demands of each individual site in an efficient and cost-effective manner.

PCSWMM for Stormceptor is the support tool used for identifying the appropriate Stormceptor model. In order to size a unit, it is recommended the user follow the seven design steps in the program. The steps are as follows:

STEP 1 – Project Details

The first step prior to sizing the Stormceptor System is to clearly identify the water quality objective for the development. It is recommended that a level of annual sediment (TSS) removal be identified and defined by a particle size distribution.

STEP 2 – Site Details

Identify the site development by the drainage area and the level of imperviousness. It is recommended that imperviousness be calculated based on the actual area of imperviousness based on paved surfaces, sidewalks and rooftops.

STEP 3 – Upstream Attenuation

The Stormceptor System is designed as a water quality device and is sometimes used in conjunction with onsite water quantity control devices such as ponds or underground detention systems. When possible, a greater benefit is typically achieved when installing a Stormceptor unit upstream of a detention facility. By placing the Stormceptor unit upstream of a detention structure, a benefit of less maintenance of the detention facility is realized.

STEP 4 – Particle Size Distribution

It is critical that the PSD be defined as part of the water quality objective. PSD is critical for the design of treatment system for a unit process of gravity settling and governs the size of a treatment system. A range of particle sizes has been provided and it is recommended that clays and silt-sized particles be considered in addition to sand and gravel-sized particles. Options and sample PSDs are provided in PCSWMM for Stormceptor. The default particle size distribution is the Fine Distribution, Table 2, option.

Table 2. Fine Distribution

Particle Size	Distribution	Specific Gravity
20	20%	1.3
60	20%	1.8
150	20%	2.2
400	20%	2.65
2000	20%	2.65

If the objective is the long-term removal of 80% of the total suspended solids on a given site, the PSD should be representative of the expected sediment on the site. For example, a system designed to remove 80% of coarse particles (greater than 75 microns) would provide relatively poor removal efficiency of finer particles that may be naturally prevalent in runoff from the site.

Since the small particle fraction contributes a disproportionately large amount of the total available particle surface area for pollutant adsorption, a system designed primarily for coarse particle capture will compromise water quality objectives.

STEP 5 – Rainfall Records

Local historical rainfall has been acquired from the U.S. National Oceanic and Atmospheric Administration, Environment Canada and regulatory agencies across North America. The rainfall data provided with PCSMM for Stormceptor provides an accurate estimation of small storm hydrology by modeling actual historical storm events including duration, intensities and peaks.

STEP 6 – Summary

At this point, the program may be executed to predict the level of TSS removal from the site. Once the simulation has completed, a table shall be generated identifying the TSS removal of each Stormceptor unit.

STEP 7 – Sizing Summary

Performance estimates of all Stormceptor units for the given site parameters will be displayed in a tabular format. The unit that meets the water quality objective, identified in Step 1, will be highlighted.

5.1. PCSWMM for Stormceptor

The Stormceptor System has been developed in conjunction with PCSWMM for Stormceptor as a technological solution to achieve water quality goals. Together, these two innovations model, simulate, predict and calculate the water quality objectives desired by a design engineer for TSS removal.

PCSWMM for Stormceptor is a proprietary sizing program which uses site specific inputs to a computer model to simulate sediment accumulation, hydrology and long-term total suspended solids removal. The model has been calibrated to field monitoring results from Stormceptor units that have been monitored in North America. The sizing methodology can be described by three processes:

1. Determination of real time hydrology
2. Buildup and wash off of TSS from impervious land areas
3. TSS transport through the Stormceptor (settling and discharge). The use of a calibrated model is the preferred method for sizing stormwater quality structures for the following reasons:
    - » The hydrology of the local area is properly and accurately incorporated in the sizing (distribution of flows, flow rate ranges and peaks, back-to-back storms, inter-event times)
    - » The distribution of TSS with the hydrology is properly and accurately considered in the sizing
    - » Particle size distribution is properly considered in the sizing
    - » The sizing can be optimized for TSS removal
    - » The cost benefit of alternate TSS removal criteria can be easily assessed
    - » The program assesses the performance of all Stormceptor models. Sizing may be selected based on a specific water quality outcome or based on the Maximum Extent Practicable

For more information regarding PCSWMM for Stormceptor, contact your local Stormceptor representative, or visit www.imbriumsystems.com to download a free copy of the program.

5.2. Sediment Loading Characteristics

The way in which sediment is transferred to stormwater can have a considerable effect on which type of system is implemented. On typical impervious surfaces (e.g. parking lots) sediment will build over time and wash off with the next rainfall. When rainfall patterns are examined, a short intense storm will have a higher concentration of sediment than a long slow drizzle. Together with rainfall data representing the site's typical rainfall patterns, sediment loading characteristics play a part in the correct sizing of a stormwater quality device.

Typical Sites

For standard site design of the Stormceptor System, PCSWMM for Stormceptor is utilized to accurately assess the unit's performance. As an integral part of the product's design, the program can be used to meet local requirements for total suspended solid removal. Typical installations of manufactured stormwater treatment devices would occur on areas such as paved parking lots or paved roads. These are considered "stable" surfaces which have non – erodible surfaces.

Unstable Sites

While standard sites consist of stable concrete or asphalt surfaces, sites such as gravel parking lots, or maintenance yards with stockpiles of sediment would be classified as "unstable". These types of sites do not exhibit first flush characteristics, are highly erodible and exhibit atypical sediment loading characteristics and must therefore be sized more carefully. Contact your local Stormceptor representative for assistance in selecting a proper unit sized for such unstable sites.

6. Spill Controls

When considering the removal of total petroleum hydrocarbons (TPH) from a storm sewer system there are two functions of the system: oil removal, and spill capture.

'Oil Removal' describes the capture of the minute volumes of free oil mobilized from impervious surfaces. In this instance relatively low concentrations, volumes and flow rates are considered. While the Stormceptor unit will still provide an appreciable oil removal function during higher flow events and/or with higher TPH concentrations, desired effluent limits may be exceeded under these conditions.

'Spill Capture' describes a manner of TPH removal more appropriate to recovery of a relatively high volume of a single phase deleterious liquid that is introduced to the storm sewer system over a relatively short duration. The two design criteria involved when considering this manner of introduction are overall volume and the specific gravity of the material. A standard Stormceptor unit will be able to capture and retain a maximum spill volume and a minimum specific gravity.

For spill characteristics that fall outside these limits, unit modifications are required. Contact your local Stormceptor Representative for more information.

One of the key features of the Stormceptor technology is its ability to capture and retain spills. While the standard Stormceptor System provides excellent protection for spill control, there are additional options to enhance spill protection if desired.

6.1. Oil Level Alarm

The oil level alarm is an electronic monitoring system designed to trigger a visual and audible alarm when a pre-set level of oil is reached within the lower chamber. As a standard, the oil

level alarm is designed to trigger at approximately 85% of the unit's available depth level for oil capture. The feature acts as a safeguard against spills caused by exceeding the oil storage capacity of the separator and eliminates the need for manual oil level inspection.

The oil level alarm installed on the Stormceptor insert is illustrated in Figure 4.

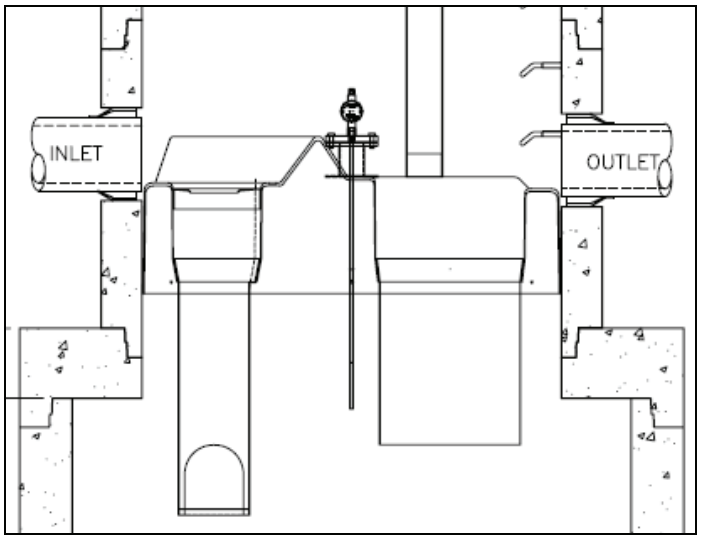


Figure 4. Oil level alarm

6.2. Increased Volume Storage Capacity

The Stormceptor unit may be modified to store a greater spill volume than is typically available. Under such a scenario, instead of installing a larger than required unit, modifications can be made to the recommended Stormceptor model to accommodate larger volumes. Contact your local Stormceptor representative for additional information and assistance for modifications.

7. Stormceptor Options

The Stormceptor System allows flexibility to incorporate to existing and new storm drainage infrastructure. The following section identifies considerations that should be reviewed when installing the system into a drainage network. For conditions that fall outside of the recommendations in this section, please contact your local Stormceptor representative for further guidance.

7.1. Installation Depth Minimum Cover

The minimum distance from the top of grade to the crown of the inlet pipe is 24 inches (600 mm). For situations that have a lower minimum distance, contact your local Stormceptor representative.

7.2. Maximum Inlet and Outlet Pipe Diameters

Maximum inlet and outlet pipe diameters are illustrated in Figure 5. Contact your local Stormceptor representative for larger pipe diameters

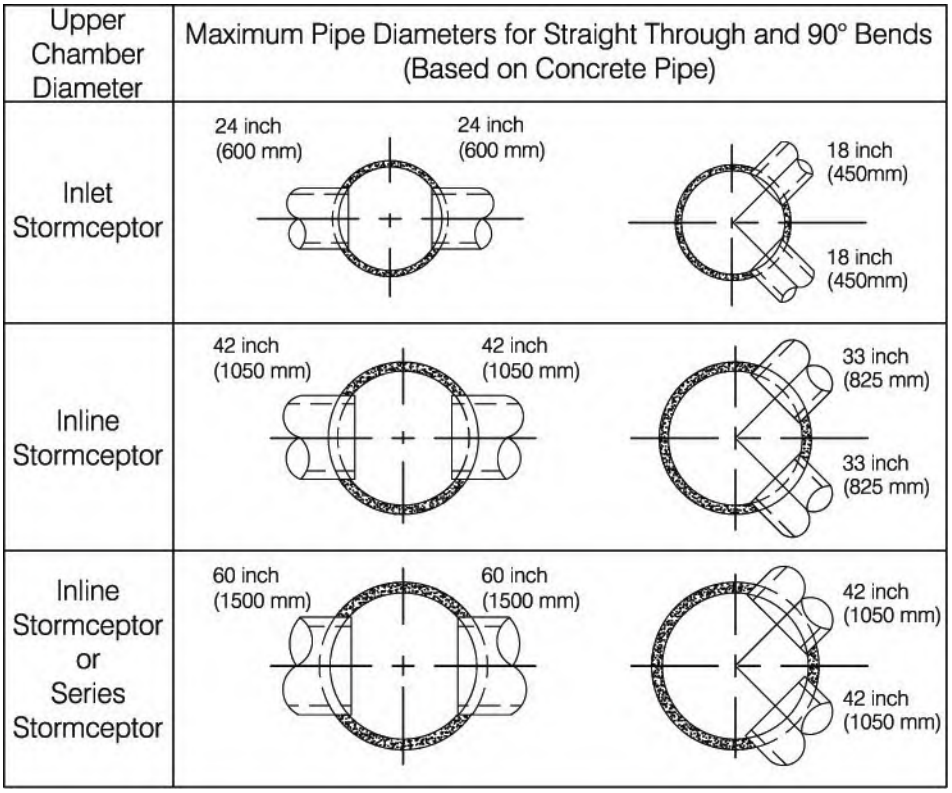


Figure 5. Maximum pipe diameters for straight through and bend applications

*The bend should only be incorporated into the second structure (downstream structure) of the Series Stormceptor System

7.3. Bends

The Stormceptor System can be used to change horizontal alignment in the storm drain network up to a maximum of 90 degrees. Figure 6 illustrates the typical bend situations of the Stormceptor System. Bends should only be applied to the second structure (downstream structure) of the Series Stormceptor System.

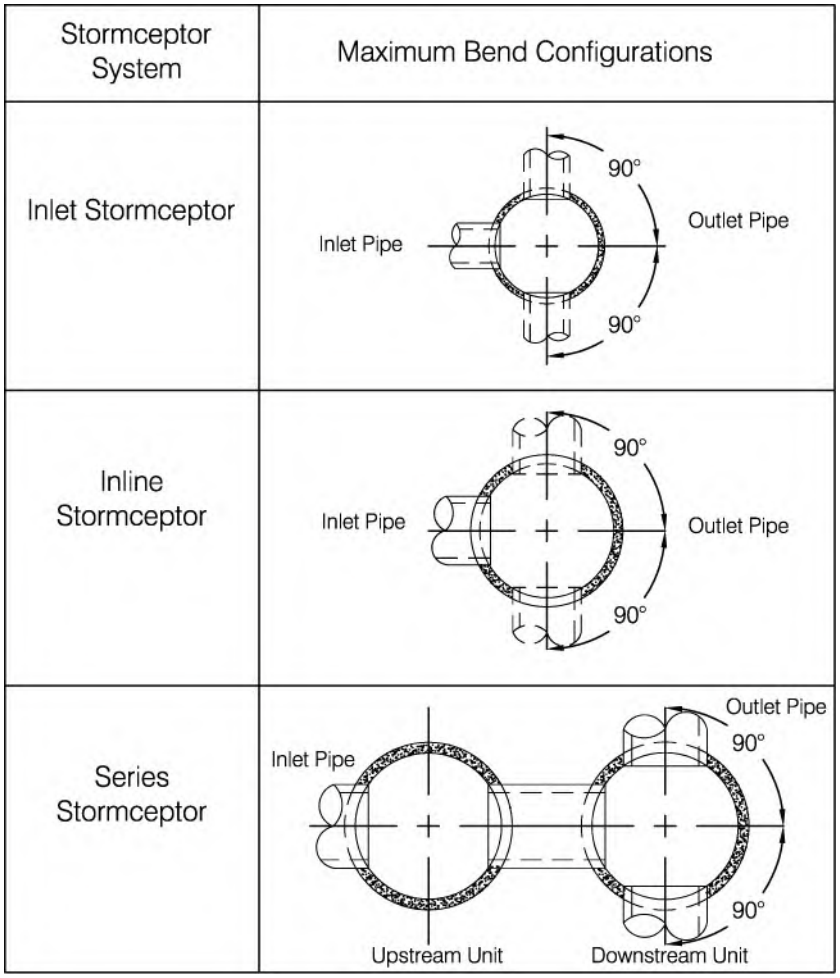


Figure 6. Maximum bend angles

7.4. Multiple Inlet Pipes

The Inlet and Inline Stormceptor System can accommodate two or more inlet pipes. The maximum number of inlet pipes that can be accommodated into a Stormceptor unit is a function of the number, alignment and diameter of the pipes and its effects on the structural integrity of the precast concrete. When multiple inlet pipes are used for new developments, each inlet pipe shall have an invert elevation 3 inches (75 mm) higher than the outlet pipe invert elevation.

7.5. Inlet/Outlet Pipe Invert Elevations

Recommended inlet and outlet pipe invert differences are listed in Table 3.

Table 3. Recommended Drops Between Inlet and Outlet Pipe Inverts

Number of Inlet Pipes	Inlet System	In-Line System	Series System
1	3 inches (75 mm)	1 inch (25 mm)	3 inches (75 mm)
>1	3 inches (75 mm)	3 inches (75 mm)	Not Applicable

7.6. Shallow Stormceptor

In cases where there may be restrictions to the depth of burial of storm sewer systems. In this situation, for selected Stormceptor models, the lower chamber components may be increased in diameter to reduce the overall depth of excavation required.

7.7. Customized Live Load

The Stormceptor system is typically designed for local highway truck loading (AASHTO HS- 20). When the project requires live loads greater than HS-20, the Stormceptor System may be customized structurally for a pre-specified live load. Contact your local Stormceptor representative for customized loading conditions.

7.8. Pre-treatment

The Stormceptor System may be sized to remove sediment and for spills control in conjunction with other stormwater BMPs to meet the water quality objective. For pretreatment applications, the Stormceptor System should be the first unit in a treatment train. The benefits of pre-treatment include the extension of the operational life (extension of maintenance frequency) of large stormwater management facilities, prevention of spills and lower total life- cycle maintenance cost.

7.9. Head loss

The head loss through the Stormceptor System is similar to a 60 degree bend at a manhole. The K value for calculating minor losses is approximately 1.3 (minor loss = k*1.3v2/2g).

However, when a Submerged modification is applied to a Stormceptor unit, the corresponding K value is 4.

7.10. Submerged

The Submerged modification, Figure 7, allows the Stormceptor System to operate in submerged or partially submerged storm sewers. This configuration can be installed on all models of the Stormceptor System by modifying the fiberglass insert. A customized weir height and a secondary drop tee are added.

Submerged instances are defined as standing water in the storm drain system during zero flow conditions. In these instances, the following information is necessary for the proper design and application of submerged modifications:

- Stormceptor top of grade elevation
- Stormceptor outlet pipe invert elevation
- Standing water elevation

Figure 7. Submerged Stormceptor

8. Comparing Technologies

Designers have many choices available to achieve water quality goals in the treatment of stormwater runoff. Since many alternatives are available for use in stormwater quality treatment it is important to consider how to make an appropriate comparison between "approved alternatives". The following is a guide to assist with the accurate comparison of differing technologies and performance claims.

8.1. Particle Size Distribution (PSD)

The most sensitive parameter to the design of a stormwater quality device is the selection of the design particle size. While it is recommended that the actual particle size distribution (PSD) for sites be measured prior to sizing, alternative values for particle size should be selected to represent what is likely to occur naturally on the site. A reasonable estimate of a particle size distribution likely to be found on parking lots or other impervious surfaces should consist of a wide range of particles such as 20 microns to 2,000 microns (Ontario MOE, 1994).

There is no absolute right particle size distribution or specific gravity and the user is cautioned to review the site location, characteristics, material handling practices and regulatory requirements when selecting a particle size distribution. When comparing technologies, designs using different PSDs will result in incomparable TSS removal efficiencies. The PSD of the TSS removed needs to be standard between two products to allow for an accurate comparison.

8.2. Scour Prevention

In order to accurately predict the performance of a manufactured treatment device, there must be confidence that it will perform under all conditions. Since rainfall patterns cannot be predicted, stormwater quality devices placed in storm sewer systems must be able to withstand extreme events, and ensure that all pollutants previously captured are retained in the system.

In order to have confidence in a system's performance under extreme conditions, independent validation of scour prevention is essential when examining different technologies. Lack of independent verification of scour prevention should make a designer wary of accepting any product's performance claims.

8.3. Hydraulics

Full scale laboratory testing has been used to confirm the hydraulics of the Stormceptor System. Results of lab testing have been used to physically design the Stormceptor System and the sewer pipes entering and leaving the unit. Key benefits of Stormceptor are:

- Low head loss (typical k value of 1.3)
- Minimal inlet/outlet invert elevation drop across the structure
- Use as a bend structure
- Accommodates multiple inlets

The adaptability of the treatment device to the storm sewer design infrastructure can affect the overall performance and cost of the site.

8.4. Hydrology

Stormwater quality treatment technologies need to perform under varying climatic conditions. These can vary from long low intensity rainfall to short duration, high intensity storms. Since a treatment device is expected to perform under all these conditions, it makes sense that any system's design should accommodate those conditions as well.

Long-term continuous simulation evaluates the performance of a technology under the varying conditions expected in the climate of the subject site. Single, peak event design does not provide this information and is not equivalent to long-term simulation. Designers should request long-term simulation performance to ensure the technology can meet the long-term water quality objective.

9. Testing

The Stormceptor System has been the most widely monitored stormwater treatment technology in the world. Performance verification and monitoring programs are completed to the strictest standards and integrity. Since its introduction in 1990, numerous independent field tests and studies detailing the effectiveness of the Stormceptor System have been completed.

- Coventry University, UK – 97% removal of oil, 83% removal of sand and 73% removal of peat
- National Water Research Institute, Canada, - scaled testing for the development of the Stormceptor System identifying both TSS removal and scour prevention.
- New Jersey TARP Program – full scale testing of an STC 900 demonstrating 75% TSS removal of particles from 1 to 1000 microns. Scour testing completed demonstrated that the system does not scour. The New Jersey Department of Environmental Protection was followed.
- City of Indianapolis – full scale testing of an STC 900 demonstrating over 80% TSS removal of particles from 50 microns to 300 microns at 130% of the unit's operating rate. Scour testing completed demonstrated that the system does not scour.
- Westwood Massachusetts (1997), demonstrated >80% TSS removal
- Como Park (1997), demonstrated 76% TSS removal
- Ontario MOE SWAMP Program – 57% removal of 1 to 25 micron particles
- Laval Quebec – 50% removal of 1 to 25 micron particles

10. Installation

The installation of the concrete Stormceptor should conform in general to state highway, or local specifications for the installation of manholes. Selected sections of a general specification that are applicable are summarized in the following sections.

10.1. Excavation

Excavation for the installation of the Stormceptor should conform to state highway, or local specifications. Topsoil removed during the excavation for the Stormceptor should be stockpiled in designated areas and should not be mixed with subsoil or other materials.

Topsoil stockpiles and the general site preparation for the installation of the Stormceptor should conform to state highway or local specifications.

The Stormceptor should not be installed on frozen ground. Excavation should extend a minimum of 12 inches (300 mm) from the precast concrete surfaces plus an allowance for shoring and bracing where required. If the bottom of the excavation provides an unsuitable foundation additional excavation may be required.

In areas with a high water table, continuous dewatering may be required to ensure that the excavation is stable and free of water.

10.2. Backfilling

Backfill material should conform to state highway or local specifications. Backfill material should be placed in uniform layers not exceeding 12 inches (300mm) in depth and compacted to state highway or local specifications.

11. Stormceptor Construction Sequence

The concrete Stormceptor is installed in sections in the following sequence:

1. Aggregate base
2. Base slab
3. Lower chamber sections
4. Upper chamber section with fiberglass insert
5. Connect inlet and outlet pipes
6. Assembly of fiberglass insert components (drop tee, riser pipe, oil cleanout port and orifice plate
7. Remainder of upper chamber
8. Frame and access cover

The precast base should be placed level at the specified grade. The entire base should be in contact with the underlying compacted granular material. Subsequent sections, complete with joint seals, should be installed in accordance with the precast concrete manufacturer's recommendations.

Adjustment of the Stormceptor can be performed by lifting the upper sections free of the excavated area, re-leveling the base and re-installing the sections. Damaged sections and gaskets should be repaired or replaced as necessary. Once the Stormceptor has been constructed, any lift holes must be plugged with mortar.

12. Maintenance

12.1. Health and Safety

The Stormceptor System has been designed considering safety first. It is recommended that confined space entry protocols be followed if entry to the unit is required. In addition, the fiberglass insert has the following health and safety features:

- Designed to withstand the weight of personnel
- A safety grate is located over the 24 inch (600 mm) riser pipe opening
- Ladder rungs can be provided for entry into the unit, if required

12.2. Maintenance Procedures

Maintenance of the Stormceptor system is performed using vacuum trucks. No entry into the unit is required for maintenance (in most cases). The vacuum service industry is a well- established sector of the service industry that cleans underground tanks, sewers and catch basins. Costs to clean a Stormceptor will vary based on the size of unit and transportation distances.

The need for maintenance can be determined easily by inspecting the unit from the surface. The depth of oil in the unit can be determined by inserting a dipstick in the oil inspection/cleanout port.

Similarly, the depth of sediment can be measured from the surface without entry into the Stormceptor via a dipstick tube equipped with a ball valve. This tube would be inserted through the riser pipe. Maintenance should be performed once the sediment depth exceeds the guideline values provided in the Table 4.

Table 4. Sediment Depths Indicating Required Servicing*

Particle Size	Specific Gravity
Model	Sediment Depth inches (mm)
450i	8 (200)
900	8 (200)
1200	10 (250)
1800	15 (381)
2400	12 (300)
3600	17 (430)
4800	15 (380)
6000	18 (460)
7200	15 (381)
11000	17 (380)
13000	20 (500)
16000	17 (380)
* based on 15% of the Stormceptor unit's total storage	

Although annual servicing is recommended, the frequency of maintenance may need to be increased or reduced based on local conditions (i.e. if the unit is filling up with sediment more quickly than projected, maintenance may be required semi-annually; conversely once the site has stabilized maintenance may only be required every two or three years).

Oil is removed through the oil inspection/cleanout port and sediment is removed through the riser pipe. Alternatively oil could be removed from the 24 inches (600 mm) opening if water is removed from the lower chamber to lower the oil level below the drop pipes.

The following procedures should be taken when cleaning out Stormceptor:

1. Check for oil through the oil cleanout port
2. Remove any oil separately using a small portable pump
3. Decant the water from the unit to the sanitary sewer, if permitted by the local regulating authority, or into a separate containment tank
4. Remove the sludge from the bottom of the unit using the vacuum truck
5. Re-fill Stormceptor with water where required by the local jurisdiction

12.3. Submerged Stormceptor

Careful attention should be paid to maintenance of the Submerged Stormceptor System. In cases where the storm drain system is submerged, there is a requirement to plug both the inlet and outlet pipes to economically clean out the unit.

12.4. Hydrocarbon Spills

The Stormceptor is often installed in areas where the potential for spills is great. The Stormceptor System should be cleaned immediately after a spill occurs by a licensed liquid waste hauler.

12.5. Disposal

Requirements for the disposal of material from the Stormceptor System are similar to that of any other stormwater Best Management Practice (BMP) where permitted. Disposal options for the sediment may range from disposal in a sanitary trunk sewer upstream of a sewage treatment plant, to disposal in a sanitary landfill site. Petroleum waste products collected in the Stormceptor (free oil/chemical/fuel spills) should be removed by a licensed waste management company.

12.6. Oil Sheens

With a steady influx of water with high concentrations of oil, a sheen may be noticeable at the Stormceptor outlet. This may occur because a rainbow or sheen can be seen at very small oil concentrations (<10 mg/L). Stormceptor will remove over 98% of all free oil spills from storm sewer systems for dry weather or frequently occurring runoff events.

The appearance of a sheen at the outlet with high influent oil concentrations does not mean the unit is not working to this level of removal. In addition, if the influent oil is emulsified the Stormceptor will not be able to remove it. The Stormceptor is designed for free oil removal and not emulsified conditions.

SUPPORT

Drawings and specifications are available at www.ContechES.com.

Site-specific design support is available from our engineers.

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, and earth stabilization products. For information, visit www.ContechES.com or call 800.338.1122

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800-925-5240
www.ContechES.com

CONTECH®
ENGINEERED SOLUTIONS

CDS® Inspection and Maintenance Guide

CDS TECHNOLOGIES

Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y^3	m^3
CDS1515	3	0.9	3.0	0.9	0.5	0.4
CDS2015	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.3	3.0	0.9	1.3	1.0
CDS2020	5	1.3	3.5	1.1	1.3	1.0
CDS2025	5	1.3	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3025	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, earth stabilization and wastewater treament products. For information, visit www.ContechES.com or call 800.338.1122

The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; 7,517,450 related foreign patents or other patents pending.

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CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.**

2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

Attachment 8
Draft Stormwater Pollution Prevention Plan

BEALS AND THOMAS

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STORMWATER POLLUTION PREVENTION PLAN

NOVO Riverside Commons

292-294 Baker Avenue
Concord, Massachusetts

March xx 2024

SWPPP Preparation Date: March 2024

Estimated Project Start Date: Insert Date

Estimated Project Completion Date: Insert Date

206327RP003A

BEALS AND THOMAS

Prepared by:
Beals and Thomas, Inc.
144 Turnpike Road
Southborough, MA 01772

Prepared for:
John Smith, Conservation Agent
Town of Anytown
123 Main Street
City, MA 02134

LIST OF APPENDICES

1.2 STORMWATER TEAM

Stormwater Team

Name and/or Position, and Contact	Responsibilities	I Have Completed Training Required by CGP Part 6.2	I Read/Understand the Applicable Requirements of the CGP
Beals and Thomas, Inc. Mark Mooney, EIT (508) 366-0560 mmooney@bealsandthomas.com	SWPPP Preparer	☒ Yes ☐ No	☒ Yes Date: 3/15/2024
Insert Company Insert Name of Responsible Person Insert Position Insert Telephone Number Insert Email	Personnel Responsible for Installation & Maintenance of Stormwater BMPs	☐ Yes ☐ No	☐ Yes Date: Click here to enter a date.
Insert Company Insert Name of Responsible Person Insert Position Insert Telephone Number Insert Email	Personnel Responsible for the Application and Storage of Treatment Chemicals (if applicable)	☐ Yes ☐ No	☐ Yes Date: Click here to enter a date.
Insert Company Insert Name of Responsible Person Insert Position Insert Telephone Number Insert Email	Inspection Personnel	☐ Yes ☐ No	☐ Yes Date: Click here to enter a date.
Insert Company Insert Name of Responsible Person Insert Position Insert Telephone Number Insert Email	Personnel Responsible for Taking Corrective Actions	☐ Yes ☐ No	☐ Yes Date: Click here to enter a date.

1.0 CONTACT INFORMATION/RESPONSIBLE PARTIES

1.1 OPERATOR(S) / SUBCONTRACTOR(S)

Operator(s):

Company:	Owner Name				
Name:	Text				
Address:	Text				
City:	Text	State:	Text	ZIP Code:	Text
Telephone:	Text	Email:	Text		

Company:	Contractor Name				
Name:	Text				
Address:	Text				
City:	Text	State:	Text	ZIP Code:	Text
Telephone:	Text	Email:	Text		

Subcontractor(s):

Company:	Subcontractor Name				
Name:	Text				
Address:	Text				
City:	Text	State:	Text	ZIP Code:	Text
Telephone:	Text	Email:	Text		
Area of Control:		Site Work Contractor			

[Repeat as necessary.]

Emergency 24-Hour Contact:

Company:	Text
Name:	Text
Telephone:	Text

2.0 SITE EVALUATION, ASSESSMENT, AND PLANNING

2.1 PROJECT/SITE INFORMATION

Project Name and Address

Project/Site Name: NOVO Riverside Commons
Street/Location: 292-294 Baker Avenue
Town: Concord
State: Massachusetts
ZIP Code: 01742
County or Similar Government Division: Middlesex County

Project Latitude/Longitude

Latitude: 42.458528° N (decimal degrees)
Longitude: - 71.387919 °W (decimal degrees)

Latitude/longitude data source: ☐ Map ☐ GPS ☒ Other (please specify): Google Earth

Horizontal Reference Datum: ☐ NAD 27 ☒ NAD 83 ☐ WGS 84

Additional Site Information

Is your site located on Indian country lands, or on a property of religious or cultural significance to an Indian Tribe? ☐ Yes ☒ No

If yes, provide the name of the Indian Tribe associated with the area of Indian country (including the name of Indian reservation if applicable), or if not in Indian country, provide the name of the Indian Tribe associated with the property: Insert Text Here

Is this project considered a federal facility? ☐ Yes ☒ No

Are you applying for permit coverage as a "federal operator" as defined in Appendix A of the 2022 CGP? ☐ Yes ☒ No

NPDES project or permit tracking number: Text

Stormwater Team Members Who Conduct Inspections Pursuant to CGP Part 4

Name and/or Position and Contact	Training(s) Received	Date Training(s) Completed	If Training is a Non-EPA Training, Confirm that it Satisfies the Minimum Elements of CGP Part 6.3.b
Insert Company Insert Name of Responsible Person Insert Position Insert Telephone Number Insert Email	Insert Title of Training Received	Date: Click here to enter a date.	☐ Principles and practices of erosion and sediment control and pollution prevention practices at construction sites ☐ Proper installation and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites ☐ Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of Part 4
Insert Company Insert Name of Responsible Person Insert Position Insert Telephone Number Insert Email	Insert Title of Training Received	Date: Click here to enter a date.	☐ Principles and practices of erosion and sediment control and pollution prevention practices at construction sites ☐ Proper installation and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites ☐ Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of Part 4

2.2 DISCHARGE INFORMATION

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)? ☐ Yes ☒ No

Are there any waters of the U.S. within 50 feet of your project's earth disturbances? ☒ Yes ☐ No

NOVO Riverside Commons
Stormwater Pollution Prevention Plan (SWPPP)
Concord, Massachusetts
206327RP003A

For each point of discharge, provide a point of discharge ID (a unique 3-digit ID, e.g., 001, 002), the name of the first receiving water that receives stormwater directly from the point of discharge and/or from the MS4 that the point of discharge discharges to, and the following receiving water information, if applicable:

Point of Discharge ID	Name of receiving water that receives stormwater discharge:	Is the receiving water impaired (on the CWA 303(d) list)?	If yes, list the pollutants that are causing the impairment:	Has a TMDL been completed for this receiving waterbody?	If yes, list TMDL Name and ID:	Pollutant(s) for which there is a TMDL:	Is this receiving water designated as a Tier 2, Tier 2.5, or Tier 3 water?	If yes, specify which Tier (2, 2.5, or 3)?
[001]	Assabet River	☒ Yes ☐ No	Phosphorus	☒ Yes ☐ No	Assabet River MA82B-07	Phosphorus	☒ Yes ☐ No	Tier 2
[002]	Pond	☐ Yes ☒ No		☐ Yes ☒ No			☒ Yes ☐ No	Tier 2

2.3 NATURE OF THE CONSTRUCTION ACTIVITIES

General Description of Project

Provide a general description of the nature of your construction activities, including the age or dates of past renovations for structures that are undergoing demolition:

The project consists of two residential apartment buildings and paved parking areas along the southern portion of the 300-310 Baker Avenue property on a new 10.2 acre parcel (the Project). The overall site currently consists of a general office building and associated parking areas. The Project includes installation of stormwater and sewer infrastructure, electric utilities, and water services.

Is this project in response to a public emergency? ☐ Yes ☒ No

Business days and hours for the project: Comply with local business day and hour regulations.

Size of Construction Site

Size of Property	±10.2 Acres
Total Area Expected to be Disturbed by Construction Activities	±5.5 Acres
Maximum Area Expected to be Disturbed at Any One Time, Including On-site and Off-site Construction Support Areas	±5.5 Acres

Type of Construction Site *(check all that apply)*:

☐ Single-Family Residential ☒ Multi-Family Residential ☐ Commercial ☐ Industrial
☐ Institutional ☐ Highway or Road ☐ Utility ☐ Other _____

Will you be discharging dewatering water from your site? ☒ Yes ☐ No

If yes, will you be discharging dewatering water from a current or former Federal or State remediation site? ☐ Yes ☒ No

Construction Support Activities

Construction support activities are not required for the project.

2.4 SEQUENCE AND ESTIMATED DATES OF CONSTRUCTION ACTIVITIES

Estimated Timeline of Activity	Construction Activity and BMP Descriptions
Date Start –Date End	***Before any site grading activities begin*** 1. Stake Limit of Construction. Workers shall be informed that no construction activity is to occur beyond this limit at any time. 2. Delineate the limit of the natural buffer to be maintained with flags, tape or other similar device. 3. Clear vegetation as necessary within the limits of construction. A stockpile of wood chips from tree cutting shall be left on site for stabilization. 4. Grub the areas where silt fence is required, removing stumps and roots as necessary. The existing ground surface shall be disturbed as little as possible prior to the start of construction. 5. Install compost filter socks and silt fence as shown on the plans. An adequate stockpile of erosion control materials shall be on site at all times for emergency or routine replacement and shall include materials to repair silt fences, straw bales, or any other devices planned for use during construction. 6. Install storm drain inlet protection. 7. Construct stabilized construction exits. 8. Construct staging and materials storage area. 9. Install temporary sanitary facilities and dumpsters or enclosed trash container if a dumpster is not feasible for the project.
Date Start –Date End	***Site grading*** 1. Begin site clearing and grubbing operations. 2. Begin overall site grading and topsoil stripping. 3. Establish topsoil stockpile. 4. Install silt fences around stockpile and cover stockpiles. 5. Disturbed areas where construction will cease for more than 14 days shall be stabilized with erosion controls.
Date Start –Date End	***Infrastructure (utilities, parking lot, etc.)*** 1. Construct temporary concrete washout area. 2. Install utilities, storm drains, sanitary sewers, and water services. 3. Install gutters, curbs, and prepare pavement subgrade.
Date Start –Date End	***Building Construction***

2.6 SITE PLANS

See Appendix A for the Site Plans. The Topographic Plan shows the undeveloped site and its current features. The Site Plans show the developed site, or the major phases of development.

The Site Plans include:

☒ Boundaries of the property and of the locations where construction will occur, including:

- Approximate slopes before and after major grading activities. Note any areas of steep slopes, as defined in CGP Appendix A;
- Locations where sediment, soil, or other construction materials will be stockpiled;
- Locations of any crossings of receiving waters;
- Designated points where vehicles will exit onto paved roads;
- Locations of structures and other impervious surfaces upon completion of construction; and

☒ Locations of any receiving waters, including wetlands, within your site and all receiving waters within one mile downstream of the site's discharge point(s). Indicate which receiving waters are listed as impaired, and which are identified by your State, Tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 waters.

☐ Any areas of Federally-listed critical habitat for endangered or threatened species within the action area of the site as defined in CGP Appendix A (Helpful resources: CGP Appendix D and www.epa.gov/npdes/construction-general-permit-cgp-threatened-and-endangered-species-eligibility).

☒ Type and extent of pre-construction cover on the site (e.g., vegetative cover, forest, pasture, pavement, structures).

☒ Drainage pattern(s) of stormwater and authorized non-stormwater before and after major grading activities.

☒ Stormwater and authorized non-stormwater discharge locations, including:

- Locations where stormwater and/or authorized non-stormwater will be discharged to storm drain inlets, including a notation of whether the inlet conveys stormwater to a sediment basin, sediment trap, or similarly effective control; and
- Locations where stormwater or allowable non-stormwater will be discharged directly to receiving waters, including wetlands (i.e., not via a storm drain inlet).
- Locations where turbidity benchmark monitoring will take place to comply with Part 3.3, if applicable to your site.

	1. Begin construction of building foundation and structure. 2. Parking lot paved, exterior building constructed 3. Remove temporary concrete washout area. 4. Implement winter stabilization procedures.
Date Start –Date End	***Final stabilization and landscaping*** 1. Finalize pavement activities. 2. Remove all temporary control BMPs and stabilize any areas disturbed by their removal with erosion controls 3. Prepare final seeding and landscaping. 4. Monitor stabilized areas until final stabilization is reached.

2.5 AUTHORIZED NON-STORMWATER DISCHARGES

List of Authorized Non-Stormwater Discharges Present at the Site

Authorized Non-Stormwater Discharge	Will or May Occur at Your Site?
Discharges from emergency fire-fighting activities	☒ Yes ☐ No
Fire hydrant flushings	☒ Yes ☐ No
Landscape irrigation	☒ Yes ☐ No
Water used to wash vehicles and equipment	☒ Yes ☐ No
Water used to control dust	☒ Yes ☐ No
Potable water including uncontaminated water line flushings	☒ Yes ☐ No
External building washdown (soaps/solvents are not used and external surfaces do not contain hazardous substances)	☒ Yes ☐ No
Pavement wash waters	☒ Yes ☐ No
Uncontaminated air conditioning or compressor condensate	☒ Yes ☐ No
Uncontaminated, non-turbid discharges of ground water or spring water	☒ Yes ☐ No
Foundation or footing drains	☒ Yes ☐ No
Uncontaminated construction dewatering water	☒ Yes ☐ No

3.0 DOCUMENTATION OF COMPLIANCE WITH OTHER FEDERAL REQUIREMENTS

3.1 ENDANGERED SPECIES PROTECTION

Eligibility Criterion

Following the process outlined in Appendix D, under which criterion are you eligible for coverage under this permit?

☐ **Criterion C:** Discharges not likely to result in any short- or long-term adverse effects to ESA-listed species and/or designated critical habitat. ESA-listed species and/or designated critical habitat(s) under the jurisdiction of the USFWS and/or NMFS are likely to occur in or near your site's "action area," and you certify to EPA that your site's discharges and discharge-related activities are not likely to result in any short- or long-term adverse effects to ESA-listed threatened or endangered species and/or designated critical habitat. This certification may include consideration of any stormwater controls and/or management practices you will adopt to ensure that your discharges and discharge-related activities are not likely to result in any short- or long-term adverse effects to ESA-listed species and/or designated critical habitat. To certify your eligibility under this criterion, indicate 1) the ESA-listed species and/or designated habitat located in your "action area" using the process outlined in Appendix D of this permit; 2) the distance between the site and the listed species and/or designated critical habitat in the action area (in miles); and 3) a rationale describing specifically how short- or long-term adverse effects to ESA-listed species will be avoided from the discharges and discharge-related activities. (Note: You must include a copy of your site map from your SWPPP showing the upland and in-water extent of your "action area" with your NOI.)

☒ Check to confirm you have provided documentation in your SWPPP as required by CGP Appendix D.

Based on information from the Information for Planning and Consultation (IPaC) tool provided by the U.S. Fish and Wildlife Services (US FWS), accessed on March 18, 2024, the Project Site's action area is within the mapped habitat zone for the Northern Long-Eared Bat (NLEB, *Myotis septentrionalis).*

US FWS listed the NLEB as a Threatened species under the Endangered Species Act (ESA, 50 CFR 17.11) on April 2, 2015 and up-listed it as an Endangered species on November 29, 2022. The majority of the state of Massachusetts is mapped as a habitat.

Impacts to the NLEB under Section 7 of the ESA were assessed following the Northern Long-eared Bat Rangewide Determination Key. The Determination Key was completed on March 18, 2024. Based on the IPaC submission, the Project has reached a determination of "No Effect" on the NLEB. Please refer to the enclosed consistency letter.

- Locations of all potential pollutant-generating activities identified in Part 7.2.3g (note: you should have those identified in Section 2.3 (Nature of the Construction Activities) in this SWPPP Template).
- Designated areas where construction wastes that are covered by the exception in Part 2.3.3e.ii (i.e., they are not pollutant-generating) will be stored.

☐ Locations of all potential pollutant-generating activities identified in Part 7.2.3g (note: you should have those identified in Section 2.3 (Nature of the Construction Activities) in this SWPPP Template).

☐ Designated areas where construction wastes that are covered by the exception in Part 2.3.3e.ii (i.e., they are not pollutant-generating) will be stored.

☒ Locations of stormwater controls, including natural buffer areas and any shared controls utilized to comply with the permit.

☐ Locations where polymers, flocculants, or other treatment chemicals will be used and stored.

The Northern Long-Eared Bat is also listed as Endangered under the Massachusetts Endangered Species Act (MESA, M.G.L. c. 131 A). Based on review of information published by the Massachusetts Natural Heritage and Endangered Species Program (NHESP), last updated June 12, 2019, the Property contains no mapped winter hibernacula or maternity roost trees for the NLEB.

The Project Site discharges to the Assabet River and an on-site pond. Based on information from the National Marine Fisheries Service (NMFS) and NOAA Fisheries Greater Atlantic Region ESA Section 7 Mapper, accessed on March 15, 2024, the receiving water do not have any mapped species or critical habitats.

Please refer to the enclosed Species List and ESA Section 7 Mapper information in Appendix K.

3.2 HISTORIC PROPERTY SCREENING PROCESS

Appendix E, Step 1

Do you plan on installing any stormwater controls that require subsurface earth disturbance, including, but not limited to, any of the following stormwater controls at your site? Check all that apply below, and proceed to Appendix E, Step 2.

- ☐ Dike
- ☐ Berm
- ☒ Catch Basin
- ☐ Pond
- ☐ Constructed Site Drainage Feature (e.g., ditch, trench, perimeter drain, swale, etc.)
- ☐ Culvert
- ☐ Channel
- ☐ Other type of ground-disturbing stormwater control: Drain Manholes, Water Quality Structures, Subsurface Stormwater Chambers

Appendix E, Step 2

If you answered yes in Step 1, have prior professional cultural resource surveys or other evaluations determined that historic properties do not exist, or have prior disturbances at the site have precluded the existence of historic properties? ☒ YES ☐ NO

- If yes, no further documentation is required for Section 3.2 of the Template and you may provide the prior documentation in your SWPPP.

Please refer to the enclosed Historic Preservation Documentation in Appendix L.

3.3 SAFE DRINKING WATER ACT UNDERGROUND INJECTION CONTROL REQUIREMENTS

Do you plan to install any of the following controls? Check all that apply below.

- ☐ Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)
- ☐ Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow
- ☐ Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)

3.4 APPLICABLE STATE OR LOCAL PROGRAMS

This SWPPP complies with the requirements of Standard 8 of the Massachusetts Department of Environmental Protection Stormwater Handbook, which states:

A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plans) shall be developed and implemented.

Sediment Control Barrier	
Installation	Compost filter socks and entrenched silt fence shall be installed prior to clearing and grubbing.
Maintenance Requirements	Damaged filter socks and silt fence shall be replaced. Concentrated flows shall be intercepted and rerouted. Sediment accumulations shall be removed before reaching a depth of 6 inches, or one-half of the above-ground height of the sock, whichever is less. Deteriorated socks and fence shall be replaced. Used socks and fence shall be properly disposed of. After a storm event, if there is evidence of stormwater circumventing or undercutting the perimeter control, extend controls and/or repair undercut areas to fix the problem.
Design Specifications	For more information, see plans and specifications. To prevent stormwater from circumventing the edge of the perimeter control, install the perimeter control on the contour of the slope and extend both ends of the control up slope (e.g., at 45 degrees) forming a crescent rather than a straight line.

4.3 SEDIMENT TRACK-OUT

General

- Vehicle use shall be restricted to properly designated exit points;
- Appropriate stabilization techniques shall be used at all points that exit onto paved roads;
- Additional track-out controls shall be implemented as necessary to ensure that sediment removal occurs prior to vehicle exit; and
- Where sediment has been tracked-out from the site onto paved roads, sidewalks, or other paved areas outside of the site, the deposited sediment shall be removed by the end of the next business day if track-out occurs on a non-business day. Track-out shall be removed by sweeping, shoveling, or vacuuming these surfaces, or by using similarly effective means of sediment removal.

Specific Track-Out Controls

Stabilized Construction Entrance/Exit	
Description: Temporary gravel or crushed stone construction entrances/exits or other means shall be used to minimize off-site movement of soil with vehicles. Construction access points shall be maintained to minimize tracking of soil onto public roads and existing parking lots to remain. If the rock entrance is not working to keep streets clean, then install wheel wash, sweep streets, or wash streets if wash water can be collected.	
Installation	Stabilized construction entrance shall be installed prior to clearing and grubbing.

4.0 EROSION AND SEDIMENT CONTROLS AND DEWATERING PRACTICES

This SWPPP contains a listing of the erosion and sediment control best management practices (BMPs) that will be implemented to control pollutants in stormwater discharges. The BMPs are categorized under one of the areas of BMP activity as described below:

- Natural Buffers or Equivalent Sediment Controls
- Establish perimeter controls and sediment barriers
- Minimize disturbed area and protect natural features and soil
- Phased construction activity
- Control stormwater flowing onto and through the project
- Stabilize soils
- Protect slopes
- Protect storm drain inlets
- Retain sediment on-site and control dewatering practices
- Establish stabilized construction exits

4.1 NATURAL BUFFERS OR EQUIVALENT SEDIMENT CONTROLS

Buffer Compliance Alternatives

Are there any receiving waters within 50 feet of your project's earth disturbances?

☒ YES ☐ NO

Check the compliance alternative that you have chosen:

☒ (iii) It is infeasible to provide and maintain an undisturbed natural buffer of any size, therefore I will implement erosion and sediment controls that achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

- The Project is a redevelopment proposing affordable housing within limited land area ; therefore, it is infeasible to provide and maintain an undisturbed natural buffer to the wetland system.
- A sediment control barrier consisting of 12" compost filter socks and entrenched silt fence staked into the ground with wooden is proposed to ensure this sediment removal efficiency.

4.2 PERIMETER CONTROLS

General

- Perimeter controls will be installed along any perimeter areas of the site that are downslope from any exposed soil or other disturbed areas.

Specific Perimeter Controls

Sediment Control Barrier
Description: Compost filter socks and entrenched silt fence shall be installed to decrease the velocity of sheet flows and intercept and detain small amount of sediment from disturbed areas.

4.4 STOCKPILES OR LAND CLEARING DEBRIS PILES COMPRISED OF SEDIMENT OR SOIL

General

- Locate the piles outside of any natural buffers established under Part 2.2.1 and away from any constructed or natural site drainage features, storm drain inlets, and areas where stormwater flow is concentrated;
- Install a sediment barrier along all downgradient perimeter areas of stockpiled soil or land clearing debris piles;
- For piles that will be unused for 14 or more days, provide cover or appropriate temporary stabilization (consistent with Part 2.2.14);
- You are prohibited from hosing down or sweeping soil or sediment accumulated on pavement or other impervious surfaces into any constructed or natural site drainage feature, storm drain inlet, or receiving water.
- Topsoil stockpiles shall be established during grading activities. The silt fence and temporary erosion controls shall be installed immediately after the stockpile has been established. For piles that will be unused for 14 or more days provide cover over the stockpile or temporary stabilization to avoid direct contract with precipitation and wind. Install a sediment barrier along all downgradient perimeter areas of stockpiles.

Specific Stockpile Controls

Stockpiling Topsoil	
Description: Topsoil stripped from the immediate construction area shall be stockpiled as identified on the Site Plans and Sitework Specifications or as approved by the SWPPP preparer. Stockpiles shall be located outside of any natural buffers and away from any stormwater conveyances, drain inlets, and areas where stormwater flow is concentrated.	
Installation	Topsoil stockpiles shall be established during grading activities. The silt fence and temporary erosion controls shall be installed immediately after the stockpile has been established. For piles that will be unused for 14 or more days provide cover over the stockpile or temporary stabilization to avoid direct contract with precipitation and wind. Install a sediment barrier along all downgradient perimeter areas of stockpiles.
Maintenance Requirements	The area shall be inspected weekly for erosion and immediately after storm events. Areas on or around the stockpile that have eroded shall be stabilized immediately with erosion controls. See following Silt Fence section for Maintenance and inspection procedures. Under no circumstances will soil or sediment accumulated on pavement or other impervious surfaces be hosed or swept into any constructed or natural site drainage feature, storm drain inlet, or receiving water.
Design Specifications	For more information, see plans and specifications.

Stabilized Construction Entrance/Exit	
Maintenance Requirements	Stabilized construction entrances shall be inspected daily. Gravel or crushed stone shall be added if the pad is no longer in accordance with the specifications. If the construction entrance/ exit is not working to keep streets clean, then install wheel wash, sweep streets, or wash streets if wash water can be collected. Where sediment has been tracked off of the site, it shall be removed by the end of the same working day, or by the end of the next working day if track-out occurs on a non-work day. Remove sediment by sweeping, shoveling, or vacuuming roadways where sediment has been tracked out. Under no circumstances will tracked-out sediment be hosed or swept into any constructed or natural site drainage feature, storm drain inlet, or receiving water.
Design Specifications	For more information, see plans and specifications.

4.5 MINIMIZE DUST

General

- On areas of exposed soil, dust will be minimized through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged in stormwater from the site.

Specific Dust Controls

Mobile Dust Control	
Description: Dust from the site shall be controlled by using a mobile pressure-type distributor truck to apply water to disturbed areas. The mobile unit shall apply water at a rate of 300 gallons per acre and minimized as necessary to prevent runoff and ponding.	
Installation	Dust control shall be implemented as needed once site grading has been initiated and during windy conditions (forecasted or actual wind conditions of 20 mph or greater) while site grading is occurring. Spraying of water shall be performed no more than three times a day during the months of May-September and once per day during the months of October-April or whenever the dryness of the soil warrants it.
Maintenance Requirements	At least one mobile unit shall be available at all times to distribute water to control dust on the project area. Each mobile unit shall be equipped with a positive shutoff valve to prevent over watering of the disturbed area.
Design Specifications	For more information, see plans and specifications.

4.6 MINIMIZE STEEP SLOPE DISTURBANCES

General

- The disturbance of steep slopes shall be minimized.

Specific Steep Slope Controls

Erosion Control Blanket	
Description: Erosion control blankets shall be used to provide stabilization for the slopes in the grass drainage channels and sediment basins, and on slopes greater than 3:1 throughout the site.	
Installation	The erosion control blankets shall be installed in areas that have reached final grades (e.g., grass drainage channels, sediment basins).
Maintenance Requirements	The erosion control blanket shall be inspected weekly and immediately after storm events to determine if cracks, tears, or breaches have formed in the fabric; if so, the blanket shall be repaired or replaced immediately. Good contact with the soil shall be maintained and erosion shall not occur under the blanket. Any areas where the blanket is not in close contact with the ground shall be repaired or replaced.
Design Specifications	For more information, see plans and specifications.

4.7 TOPSOIL

General

- Native topsoil shall be preserved, unless infeasible.

Specific Topsoil Controls

Preserve Existing Vegetation	
Description: The preserved area of existing vegetation shall be as identified on the Site Plans and Sitework Specifications.	
Installation	The preserved area of existing vegetation shall be surrounded with the orange-colored plastic mesh fence, and trees shall be marked before construction begins at the site.
Maintenance Requirements	The area shall be inspected weekly to ensure the temporary fence is intact and the trees are clearly marked. During construction, preserved areas of existing vegetation shall be surrounded by the orange-colored mesh fence and clearly marked at all times.
Design Specifications	For more information, see plans and specifications.

4.8 SOIL COMPACTION

General

In areas of the site where final vegetative stabilization will occur or where infiltration practices will be installed:

- Vehicle and equipment use shall be restricted in areas where final vegetative stabilization will occur or where infiltration practices will be installed.
- A Sediment Control Barrier shall be installed around the perimeter of all proposed infiltration areas to prevent construction vehicles from impacting the area.

Filter Bags	
Design Specifications	For more information, see plans and specifications.

4.10 CHEMICAL TREATMENT

No chemical treatment will be used at the site.

4.11 DEWATERING PRACTICES

General

Description:	All groundwater or accumulated stormwater discharged from excavations, trenches, foundations, vaults, or other similar points of accumulation shall be routed to a sediment control (e.g., sediment basins, sediment traps, pumped water filter bag) designed to prevent discharges with visual turbidity. Visual turbidity is present when there is a sediment plume in the discharge or the discharge appears cloudy, or opaque, or has a visible contrast that can be identified by an observer. All dewatering practices shall conform to the following: ▪ Visible floating solids or foam shall not be discharged; ▪ The discharge must not cause the formation of a visible sheen on the water surface, or visible oily deposits on the bottom or shoreline of the receiving water. An oil-water separator or suitable filtration device (such as a cartridge filter) designed to remove oil, grease, or other products if dewatering water is found to or expected to contain these materials shall be used; ▪ To the extent feasible, utilize well-vegetated (e.g., grassy or wooded), upland areas of the site to infiltrate dewatering water before discharge. In no case will surface waters be considered part of the treatment area; ▪ Stable, erosion-resistant surfaces (e.g., well-vegetated grassy areas, clean filter stone, geotectile underlayment) shall be used to discharge from dewatering controls; ▪ Dewatering controls, such as pumped water filter bags, shall not be placed on steep slopes; ▪ Velocity dissipaters shall be installed at all points where dewatering activities are discharged to the surface.

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Specific Soil Compaction Controls

Protect Proposed Infiltration Areas	
Description: A Sediment Control Barrier shall be installed around the perimeter of all proposed infiltration areas to prevent construction vehicles from impacting the area, to decrease the velocity of sheet flows, and to intercept and detain small amounts of sediment from disturbed areas.	
Installation	The Sediment Control Barrier shall be installed after clearing and grubbing.
Maintenance Requirements	Silt fence shall be inspected weekly, following storms, and daily during rainy periods. Damaged fencing shall be replaced. Concentrated flows shall be intercepted and rerouted. Sediment accumulations shall be removed before reaching a depth of 6 inches. Deteriorated fencing material shall be replaced. Used fencing shall be properly disposed of.
Design Specifications	For more information, see plans and specifications.

4.9 STORM DRAIN INLETS

General

- Install inlet protection measures that remove sediment from discharges prior to entry into any storm drain inlet that carries stormwater from your site to a receiving water, provided you have authority to access the storm drain inlet. Inlet protection measures are not required for storm drain inlets that are conveyed to a sediment basin, sediment trap, or similarly effective control; and
- Clean, or remove and replace, the inlet protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, remove the deposited sediment by the end of the same business day in which it is found or by the end of the following business day if removal by the same business day is not feasible.

Specific Storm Drain Inlet Controls

Filter Bags	
Description: Filter bag manufactured specifically for controlling sediment flow into all storm drain inlets to prevent coarse sediment from entering drainage systems prior to permanent stabilization of the disturbed area.	
Installation	Filter Bags shall be installed prior to clearing and grubbing.
Maintenance Requirements	Filter Bags shall be cleaned, or removed and replaced, as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, deposited sediment shall be removed by the end of the same business day in which it is found or by the end of the following business day if removal by the same business day is not feasible. Collected sediments shall NOT be washed into storm drains.

4.12 SITE STABILIZATION

Total Amount of Land Disturbance Occurring at Any One Time

☐ *Five Acres or less*
☒ *More than Five Acres*

Temporary Stabilization	
☒ *Vegetative* ☐ *Non-Vegetative* ☒ *Temporary* ☐ *Permanent*	
Description: ▪ Initiation of temporary vegetative cover shall occur immediately where construction will cease for more than 14 days. It shall be established using hydroseeding for areas of exposed soil (including stockpiles).	
Installation	Initiate the installation of stabilization measures immediately in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days.
Completion	Must be completed as soon as practicable, but no later than 14 calendar days.
Maintenance Requirements	Stabilized areas shall be inspected until a dense cover of vegetation has become established. If failure is noticed at the seeded area, the area shall be reseeded, fertilized, and mulched immediately.
Design Specifications	For more information, see plans and specifications.

Mulching	
☐ *Vegetative* ☒ *Non-Vegetative* ☒ *Temporary* ☐ *Permanent*	
Description: ▪ Hydromulching shall provide immediate protection to exposed soils during short periods of disturbance. Hydromulch shall also be applied in areas that have been seeded for temporary or permanent stabilization.	
Installation	Initiate the installation of stabilization measures immediately in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days.
Completion	Must be completed as soon as practicable, but no later than 14 calendar days.
Maintenance Requirements	Mulched areas shall be inspected to check for movement of mulch or erosion. If washout, breakage, or erosion occurs, the surface shall be repaired, and new mulch shall be applied to the damaged area.
Design Specifications	For more information, see plans and specifications.

	▪ With backwash water, either haul it away for disposal or return it to the beginning of the treatment process; and ▪ Replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications. ▪ Construction dewatering effluent shall not be discharged into stormwater infiltration systems.
Installation Schedule:	Install settling or filtration methods prior to commencing dewatering. Engineer is required to provide or approve settling of filtration method design prior to installation.
Maintenance and Inspection:	Settling of filtration controls shall be inspected weekly and following storms. Sediment shall be removed when it reaches a depth of one foot, or half the design capacity whichever is less. Dewatering practices shall be inspected during the discharge once per day on which the discharge occurs. A dewatering inspection report must be completed within 24 hours of completing the inspection. If discharging dewatering water to a sensitive water, the operator is required to conduct turbidity benchmark monitoring and report the data to the EPA. See CGP Part 3.3.

5.0 POLLUTION PREVENTION CONTROLS

5.1 POTENTIAL SOURCES OF POLLUTION

Construction Site Pollutants

Potential sources of sediment include clearing and grubbing operations, grading and site excavation operations, vehicle tracking, topsoil stripping and stockpiling, and landscaping operations.

Potential sources of non-sediment pollutants:

- Combined Staging Area – small fueling activities, minor equipment maintenance, sanitary facilities, and hazardous waste storage.
- Materials Storage Area – general building materials, solvents, adhesives, paving materials, paints, aggregates, trash, and so on.
- Construction Activity – paving, curb/gutter installation, concrete pouring/mortar/stucco, and building construction.
- Concrete Washout Area

Material/ Chemical	Physical Description	Stormwater Pollutants	Location[1]
Pesticides/ Herbicides	Various colored to colorless liquid, powder, pellets, or grains	Chlorinated hydrocaroons, organophosphates, carbamates, arsenic	Pesticides used in outdoor locations to control insects. Herbicides used for noxious weed control
[2]Fertilizer	Liquid or solid grains	Nitrogen, phosphorous	Newly seeded areas
Cleaning solvents	Colorless, blue, or yellow-green liquid	Perchloroethylene, methylene chloride, trichloroethylene, petroleum distillates	No equipment cleaning allowed in project limits
Asphalt	Black solid	Oil, petroleum distillates	Streets, parking areas, and roofing
Glue/ adhesives	White or yellow liquid	Polymers, epoxies	Building construction
Paints	Various colored liquids	Metal oxides, Stoddard solvent, talc, calcium carbonate, arsenic	Building construction

Final Stabilization	
☒ *Vegetative* ☐ *Non-Vegetative* ☐ *Temporary* ☒ *Permanent*	
Description: ▪ Initiation of permanent stabilization measures shall occur immediately after the final design grades are achieved and earth moving activities cease. Vegetative cover shall be used to stabilize exposed soils. ▪ Establish uniform, perennial vegetation (i.e., evenly distributed, without large bare areas) to provide 70 percent or more of the vegetative cover native to local undisturbed areas.	
Installation	Initiate the installation of stabilization measures immediately in any areas of exposed soil where construction activities have permanently ceased.
Completion	Must be completed as soon as practicable, but no later than 14 calendar days.
Maintenance Requirements	All seeded areas shall be inspected weekly during construction activities and after storm events until a dense cover of vegetation has been established. If failure is noticed at the seeded area, the area shall be reseeded, fertilized, and mulched immediately. Care shall be taken to avoid compacting newly placed topsoil. After construction is completed at the site, permanently stabilized areas shall be monitored until final stabilization is reached.
Design Specifications	For more information, see plans and specifications.

5.2 SPILL PREVENTION AND RESPONSE

Description:	i. Employee Training: All employees shall be trained as detailed in the Inspection and Maintenance section of this report. ii. Vehicle Maintenance: Vehicles and equipment shall be maintained off-site. All vehicles and equipment including subcontractor vehicles shall be checked for leaking oil and fluids. Vehicles leaking fluids shall not be allowed on-site. iii. Hazardous Material Storage: Hazardous materials shall be stored in accordance with this report and federal and municipal regulations. iv. Spill Kits: Spill kits shall be kept within the materials storage area. Spills: All spills shall be cleaned up immediately upon discovery. Spent absorbent materials and rags shall be hauled off-site immediately after the spill is cleaned up for disposal at an approved landfill. Spills large enough to discharge to surface water shall be reported to the National Response Center at 1-800-424-8802 and MA DEP at 888-304-1133. v. Material safety data sheets: A material inventory and emergency contact information shall be maintained at the on-site project trailer.
Installation Schedule:	The spill prevention and control procedures shall be implemented once construction begins on-site.
Maintenance and Inspection:	All personnel shall be instructed on the correct procedures for spill prevention and control. Notices that state these practices shall be posted in the office trailer, and the individual who manages day-to-day site operations shall be responsible for seeing that these procedures are followed.

Material/ Chemical	Physical Description	Stormwater Pollutants	Location[1]
Curing compounds	Creamy white liquid	Naphtha	Curb and gutter, walkways
Wood preservatives	Clear amber or dark brown liquid	Stoddard solvent, petroleum distillates, arsenic, copper, chromium	Timber pads and building construction
Hydraulic oil/fluids	Brown oily petroleum hydrocarbon	Mineral oil	Leaks or broken hoses from equipment
Gasoline	Colorless, pale brown or pink petroleum hydrocarbon	Benzene, ethyl benzene, toluene, xylene, MTBE	Secondary containment/ staging area
Diesel Fuel	Clear, blue-green to yellow liquid	Petroleum distillate, oil & grease, naphthalene, xylenes	Secondary containment/ staging area
Kerosene	Pale yellow liquid petroleum hydrocarbon	Coal oil, petroleum distillates	Secondary containment/ staging area
Antifreeze/ coolant	Clear green/yellow liquid	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)	Leaks or broken hoses from equipment
Sanitary toilets	Various colored liquid	Bacteria, parasites, and viruses	Staging area

5.3 FUELING AND MAINTENANCE OF EQUIPMENT OR VEHICLES

General

Description:	Several types of vehicles and equipment will likely be used on-site throughout the project, including graders, scrapers, excavators, loaders, paving equipment, rollers, trucks and trailers, backhoes, and forklifts. All major equipment/ vehicle fueling and maintenance shall be performed outside of wetland buffer zones. When vehicle fueling must occur on-site, the fueling activity shall occur in the staging area. Only minor equipment maintenance shall occur on-site. All equipment fluids generated from maintenance activities shall be disposed of into designated drums stored on spill pallets in accordance with the Material Handling and Waste Management Section. Absorbent, spill-cleanup materials and spill kits shall be available at the combined staging and materials storage area. Drip pans shall be placed under all equipment receiving maintenance and vehicles and equipment parked overnight.
Installation Schedule:	BMPs implemented for equipment and vehicle maintenance and fueling activities shall begin at the start of the project.
Maintenance and Inspection:	Inspect equipment/vehicle storage areas weekly and after storm events. Vehicles and equipment shall be inspected on each day of use. Leaks shall be repaired immediately, using dry cleanup measures where possible and eliminating the source of the discharge. Problem vehicle(s) or equipment shall be removed from the project site. Keep ample supply of spill-cleanup materials on-site and immediately clean up spills and dispose of materials properly. Do not clean surfaces by hosing-down the area

5.4 WASHING OF EQUIPMENT AND VEHICLES

General

- All equipment and vehicle washing shall be performed off site, except as required for wheel washes and concrete washout areas. See Concrete Washout in section 5.6 of this SWPPP.

5.5 STORAGE, HANDLING, AND DISPOSAL OF BUILDING PRODUCTS, MATERIALS, AND WASTES

5.5.1 Building Materials and Building Products

General

- Provide either (1) cover (e.g., plastic sheeting, temporary roofs) to minimize the exposure of these products to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas.
- Exception: Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use).

Specific Pollution Prevention Practices

Establish Proper Building Material Staging Areas	
Description: Construction equipment and maintenance materials shall be stored at the combined staging area and materials storage areas. A watertight shipping container shall be used to store hand tools, small parts, and other construction materials. Nonhazardous building materials such as packaging material (wood, plastic, and glass), and construction scrap material (brick, wood, steel, metal scraps, and pipe cuttings) shall be stored in a separate covered storage facility adjacent to the shipping container. Very large items, such as framing materials and stockpiled lumber, shall be stored in the open in the materials storage area. Such materials shall be elevated on wood blocks to minimize contact with runoff.	
Implementation	The materials storage area shall be installed after grading and before any infrastructure is constructed at the site.
Maintenance Requirements	The storage area shall be inspected weekly and after storm events. The storage area shall be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners shall be repaired or replaced as needed to maintain proper function.
Design Specifications	For more information, see plans and specifications.

berms, dikes, spill containment pallets, double-wall, above-ground storage tank) shall be provided.
- Have a spill kit available on site that is in good working condition (i.e., not damaged, expired, or used up) and ensure personnel are available to respond immediately in the event of a leak or spill.

If site constraints prevent you from storing chemical containers 50 feet away from receiving waters or the other site drainage features as required in CGP Part 2.3.3c.ii(b), document the specific reasons why the 50-foot setback is not feasible, and how you will store containers as far away as the site permits.

5.5.4 Hazardous or Toxic Waste

General
- Separate hazardous or toxic waste from construction and domestic waste;
- Store waste in sealed containers, constructed of suitable materials to prevent leakage and corrosion, and labeled in accordance with applicable Resource Conservation and Recovery Act (RCRA) requirements and all other applicable Federal, State, Tribal, or local requirements;
- Store all outside containers within appropriately-sized secondary containment (e.g., *spill berms, dikes, spill containment pallets*) to prevent spills from being discharged, or provide a similarly effective means designed to prevent the discharge of pollutants from these areas *(e.g., storing chemicals in a covered area, having a spill kit available on site)*
- Dispose of hazardous or toxic waste in accordance with the manufacturer's recommended method of disposal and in compliance with Federal, State, Tribal, and local requirements;
- Clean up spills immediately, using dry clean-up methods, and dispose of used materials properly. You are prohibited from hosing the area down to clean surfaces or spills. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge; and
- Follow all other Federal, State, Tribal, and local requirements regarding hazardous or toxic waste Insert general description of how you wil comply with CGP Part 2.3.3.d

5.5.2 Pesticides, Herbicides, Insecticides, Fertilizers, and Landscape Materials

General
- In storage areas, provide either (1) cover (e.g., plastic sheeting, temporary roofs) to minimize the exposure of these chemicals to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas; and
- Comply with all application and disposal requirements included on the registered pesticide, herbicide, insecticide, and fertilizer label (see also Part 2.3.5).

Specific Pollution Prevention Practices

Establish Proper Pesticide, Herbicide, Insecticide, Fertilizer, and Landscape Material Staging Areas	
Description: All fertilizers, herbicides, insecticides and pesticides shall be stored in accordance with local, state, and federal regulations. At a minimum these materials shall be covered with plastic sheeting or a temporary roof to prevent contact with rainwater.	
Implementation	The storage area shall be installed after grading and before any infrastructure is constructed at the site.
Maintenance Requirements	The storage area shall be inspected weekly and after storm events. The storage area shall be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners shall be repaired or replaced as needed to maintain proper function.
Design Specifications	If applicable include copies of design specifications here

5.5.3 Diesel Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Other Chemicals

General
For ALL chemical containers:
- The containers shall be water-tight, and shall be kept closed, sealed, and secured when not being actively used;
- A spill kit shall be available on site that is in good working condition (i.e., not damaged, expired, or used up). Personnel shall be available to respond immediately in the event of a leak or spill.

If any chemical container has a storage capacity less than 55 gallons:
- If stored outside, a spill containment pallet or similar device shall be used to capture small leaks or spills,

If any chemical container has a storage capacity of 55 gallons or more:
- Containers shall be stored a minimum of 50 feet from receiving waters, constructed or natural site drainage features, and storm drain inlets.
- Either (1) cover (e.g., temporary roofs) to minimize the exposure of these containers to precipitation and to stormwater or (2) secondary containment (e.g., curbing, spill

Solid or Construction Waste Disposal	
Description: All waste materials shall be collected and disposed of into metal trash dumpsters or enclosed trash containers in the materials storage area. Dumpsters shall have a secure watertight lid, be placed away from stormwater conveyances and drains, and meet all federal, state, and municipal regulations. Only trash and construction debris from the site shall be deposited in the dumpster. No construction materials shall be buried on-site unless authorized by a program for recycling/beneficial use. All personnel shall be instructed regarding the correct disposal of trash and construction debris. Notices that state these practices shall be posted in the office trailer and the individual who manages day-today site operations shall be responsible for seeing that these practices are followed.	
Implementation	Trash dumpsters shall be installed once the materials storage area has been established.
Maintenance Requirements	The dumpsters shall be inspected weekly and immediately after storm events. The dumpsters shall be emptied weekly and taken to an approved landfill or recycling facility. If trash and construction debris are exceeding the dumpsters' capacity, the dumpsters shall be emptied more frequently. Waste container lids shall be closed when not in use and at the end of the business day. For waste containers that do not have lids, provide cover or a similarly effective means to minimize the discharge of pollutants.
Design Specifications	For more information, see plans and specifications.

Recycling	
Description: Wood pallets, cardboard boxes, and other recyclable construction scraps shall be disposed of in a designated dumpster for recycling. The dumpster shall have a secure watertight lid, be placed away from stormwater conveyances and drains and meet all local and state solid-waste management regulations. Only solid recyclable construction scraps from the site shall be deposited in the dumpster. All personnel shall be instructed regarding the correct procedure for disposal of recyclable construction scraps. Notices that state these procedures shall be posted in the office trailer, and the individual who manages day-to-day site operations shall be responsible for seeing that these procedures are followed.	
Implementation	Designated recycling dumpsters shall be installed once the area has been established.
Maintenance Requirements	The recycling dumpster shall be inspected weekly and immediately after storm events. The recycling dumpster shall be emptied weekly and taken to an approved recycling center. If recyclable construction wastes are exceeding the dumpsters' capacity, the dumpsters shall be emptied more frequently.
Design Specifications	For more information, see plans and specifications.

Specific Pollution Prevention Practices

Hazardous Materials and Waste	
Description: All hazardous waste materials such as oil filters, petroleum products, paint, and equipment maintenance fluids shall be stored in structurally sound and sealed shipping containers, within the hazardous materials storage area. Hazardous waste materials shall be stored in appropriate and clearly marked containers and segregated from other non-waste materials. Secondary containment shall be provided for all waste materials in the hazardous materials storage area and shall consist of commercially available spill pallets. Additionally, all hazardous waste materials shall be disposed of in accordance with federal, state, and municipal regulations. Hazardous waste materials shall not be disposed of into the on-site dumpsters. All personnel shall be instructed regarding proper procedures for hazardous waste disposal. Notices that state these procedures shall be posted in the office trailer and the individual who manages day-to-day site operations shall be responsible for seeing that these procedures are followed.	
Implementation	Shipping containers used to store hazardous waste materials shall be installed once the site materials storage area has been installed.
Maintenance Requirements	The hazardous waste material storage areas shall be inspected weekly and after storm events. The storage areas shall be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Material safety data sheets, material inventory, and emergency contact numbers shall be maintained in the office trailer.
Design Specifications	For more information, see plans and specifications.

5.5.5 Construction and Domestic Waste

General

- Provide waste containers (e.g., dumpster, trash receptacle) of sufficient size and number to contain construction and domestic wastes:
  - For waste containers with lids, keep waste container lids closed when not in use, and close lids at the end of the business day and during storm events. For waste containers without lids, provide either (1) cover (e.g., a tarp, plastic sheeting, temporary roof) to minimize exposure of wastes to precipitation, or (2) a similarly effective means designed to minimize the discharge of pollutants (e.g., secondary containment).
  - On business days, clean up and dispose of waste in designated waste containers; and
  - Clean up immediately if containers overflow, and if there is litter elsewhere on the site from escaped trash.
- If there are wastes that are subject to the exception in Part 2.3.3.e.ii, describe the specific wastes that will be stored on your site.

Specific Pollution Prevention Practices

Specific Pollution Prevention Practices

Concrete Washout	
Description: A designated temporary, above-grade concrete washout area shall be constructed. The temporary concrete washout area shall be constructed with a recommended minimum length and minimum width of 10 feet, but with sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations. The washout area shall be lined with plastic sheeting at least 10 mils thick and free of any holes or tears. Signs shall be posted marking the location of the washout area to ensure that concrete equipment operators use the proper facility. Concrete pours shall not be conducted during or before an anticipated storm event. Concrete mixer trucks and chutes shall be washed in the designated area or concrete wastes shall be properly disposed of off-site. When the temporary washout area is no longer needed for the construction project, the hardened concrete and materials used to construct the area shall be removed and disposed of according to the maintenance section below, and the area shall be stabilized.	
Implementation	The washout area shall be constructed before concrete pours occur at the site.
Maintenance Requirements	The washout areas shall be inspected daily to ensure that all concrete washing is being discharged into the washout area, no leaks or tears are present, and to identify when concrete wastes need to be removed. The washout areas shall be cleaned out once the area is filled to 75 percent of the holding capacity. Once the area's holding capacity has been reached, the concrete wastes shall be allowed to harden; the concrete shall be broken up, removed, and taken to an approved landfill for disposal or recycled on-site or off-site in accordance with applicable laws. The plastic sheeting shall be replaced if tears occur during removal of concrete wastes from the washout area.
Design Specifications	1. Temporary concrete washout type Above Grade shall be constructed as shown above, with a recommended minimum length and minimum width of 10 feet. 2. The washout shall be a minimum of 50 feet from storm drain inlets. 3. Plastic lining shall be free of holes, tears, or other defects that compromise the impermeability of the material.

Applicators, Containers, and Paint Washout	
Description: A designated temporary, above-grade washout area shall be constructed as needed for the washout and cleanout of stucco, paint, or other non-hazardous construction materials. The temporary washout area shall be a leak-proof container with sufficient volume to contain all liquid and waste generated by washout operations. The temporary washout shall be sited outside of all buffer zones.	
Implementation	The washout area shall be constructed as needed.

5.5.6 Sanitary Waste

General

- Temporary sanitary facilities (portable toilets) will be positioned so they are secure and will not be tipped or knocked over, and will be located away from receiving waters, storm drain inlets, and constructed or natural site drainage features.

Specific Pollution Prevention Practices

Temporary Sanitary Facilities	
Description: Temporary sanitary facilities (portable toilets) shall be provided at the site throughout the construction phase. The portable toilets shall be located in the staging area, away from concentrated flow paths and traffic flow.	
Implementation	The portable toilets shall be brought to the site once the staging area has been established.
Maintenance Requirements	All sanitary waste shall be collected from the portable facilities on a regular basis. The portable toilets shall be inspected weekly for evidence of leaking holding tanks. Toilets with leaking holding tanks shall be removed from the site and replaced with new portable toilets.
Design Specifications	For more information, see plans and specifications.

5.6 WASHING OF APPLICATORS AND CONTAINERS USED FOR STUCCO, PAINT, CONCRETE, FORM RELEASE OILS, CUTTING COMPOUNDS, OR OTHER MATERIALS

General

- Direct wash water into a leak-proof container or leak-proof and lined pit designed so no overflows can occur due to inadequate sizing or precipitation;
- Handle washout or cleanout wastes as follows:
  - For liquid wastes:
    - Do not dump liquid wastes or allow them to enter into constructed or natural site drainage features, storm inlets, or receiving waters;
    - Do not allow liquid wastes to be disposed of through infiltration or to otherwise be disposed of on the ground;
    - Comply with applicable State, Tribal, or local requirements for disposal
  - Remove and dispose of hardened concrete waste consistent with your handling
  - of other construction wastes in CGP Part 2.3.3e; and
- Locate any washout or cleanout activities as far away as possible from receiving waters, constructed or natural site drainage features, and storm drain inlets, and, to the extent feasible, designate areas to be used for these activities and conduct such activities only in these areas.

6.0 INSPECTION, MAINTENANCE, AND CORRECTIVE ACTION

6.1 INSPECTION PERSONNEL AND PROCEDURES

Site Inspection Schedule

Select the inspection frequency(ies) that applies, based on CGP Parts 4.2, 4.3, or 4.4

(Note: you may be subject to different inspection frequencies in different areas of the site. Check all that apply and indicate which portion(s) of the site it applies to.)

Standard Frequency:
☐ Every 7 calendar days ☐ Every 14 calendar days and within 24 hours of either: ▪ A storm event that produces 0.25 inches or more of rain within a 24-hour period (including when there are multiple, smaller storms that alone produce less than 0.25 inches but together produce 0.25 inches or more in 24 hours), or ▪ A storm event that produces 0.25 inches or more of rain within a 24-hour period on the first day of a storm and continues to produce 0.25 inches or more of rain on subsequent days (you conduct an inspection within 24 hours of the first day of the storm and within 24 hours after the last day of the storm that produces 0.25 inches or more of rain (i.e., only two inspections would be required for such a storm event)), or ▪ A discharge caused by snowmelt from a storm event that produces 3.25 inches or more of snow within a 24-hour period. During the high flow periods in spring, specifically the months of April to June), inspection frequency shall be increased to once per week for all sites.
Increased Frequency (if applicable):
For areas of sites discharging to sediment or nutrient-impaired waters or to waters designated as Tier 2, Tier 2.5, or Tier 3 ☒ Every 7 days and within 24 hours of either: ▪ A storm event that produces 0.25 inches or more of rain within a 24-hour period, or ▪ A discharge caused by snowmelt from a storm event that produces 3.25 inches or more of snow within a 24-hour period.

Applicators, Containers, and Paint Washout	
Maintenance Requirements	The washout areas shall be inspected daily to ensure that all washing is being discharged into the washout area, no leaks or tears are present, and to identify when wastes need to be removed. The washout areas shall be cleaned out once the area is filled to 75 percent of the holding capacity. Washout wastes shall be handled as follows: For Liquid Wastes: • Do not dump liquid wastes or allow them to enter into constructed or natural site drainage features, storm inlets, or receiving waters; • Do not allow liquid wastes to be disposed of through infiltration or to otherwise be disposed of on the ground; • Comply with applicable State, Tribal, or local requirements for disposal.
Design Specifications	For more information, see plans and specifications.

5.7 APPLICATION OF FERTILIZERS

General

- Apply at a rate and in amounts consistent with manufacturer's specifications, or document in the SWPPP departures from the manufacturer specifications where appropriate;
- Apply at the appropriate time of year for your location, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth;
- Avoid applying before heavy rains that could cause excess nutrients to be discharged;
- Never apply to frozen ground;
- Never apply to constructed or natural site drainage features; and
- Follow all other Federal, State, Tribal, and local requirements regarding fertilizer application.

For frozen conditions where construction activities are suspended
☐ Inspections are temporarily suspended Insert beginning and ending dates of frozen conditions on your site: ▪ Beginning date of frozen conditions: Insert approximate date ▪ Ending date of frozen conditions: Insert approximate date

Dewatering Inspection Schedule

Select the inspection frequency that applies based on CGP Part 4.3.2

Dewatering Inspection
☒ Once per day on which the discharge of dewatering water occurs.

Inspection Report Forms

Inspection Report Forms are in Appendix D of this SWPPP.

(Note: EPA has developed a sample inspection form that CGP operators can use. The form is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources)

6.2 CORRECTIVE ACTION

The corrective action log describes repairs, replacements, and maintenance of BMPs undertaken as a result of the inspections and maintenance procedures. Additionally, remedies of permit violations and clean and proper disposal of spills, releases, or other deposits should be recorded.

Conditions Triggering Corrective Action:

1. A stormwater control needs a significant repair or a new or replacement control is needed, or, in accordance with CGP Part 2.1.4c, you find it necessary to repeatedly (i.e., 3 or more times) conduct the same routine maintenance fix to the same control at the same location (unless you document in your inspection report under CGP Part 4.7.1c that the specific reoccurrence of this same problem should still be addressed as a routine maintenance fix under CGP Part 2.1.4);
2. A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly;
3. The site's discharges are not meeting applicable water quality standards;
4. A prohibited discharge has occurred;
5. During discharge from site dewatering activities:
    a. The weekly average of the turbidity monitoring results exceeds the 50 NTU benchmark (or alternate benchmark if approved by EPA pursuant to CGP Part 3.3.2b); or
    b. The observation of the presence of any of the following at the point of discharge to a receiving water flowing through or immediately adjacent to

Reduced Frequency (if applicable)
For stabilized areas ☐ Twice during first month, no more than 14 calendar days apart; then once per month after first month until permit coverage is terminated consistent with Part 9 in any area of your site where the stabilization steps in 2.2.14.a have been completed. ▪ Specify locations where stabilization steps have been completed ▪ Insert date that they were completed (Note: It is likely that you will not be able to include this in your initial SWPPP. If you qualify for this reduction (see CGP Part 4.4.1), you will need to modify your SWPPP to include this information. If construction activity resumes in this portion of the site at a later date, the inspection frequency immediately increases to that required in Parts 4.2 and 4.3, as applicable.)
For stabilized areas on "linear construction sites" (as defined in Appendix A) ☐ Twice during first month, no more than 14 calendar days apart; then once more within 24 hours of a storm event that produces 0.25 inches or more of rain within a 24-hour period, or within 24 hours of a snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period ▪ Specify locations where stabilization steps have been completed ▪ Insert date that they were completed (Note: It is likely that you will not be able to include this in your initial SWPPP. If you qualify for this reduction (see CGP Part 4.4.1), you will need to modify your SWPPP to include this information.)
For arid, semi-arid, or drought-stricken areas during seasonally dry periods or during drought ☐ Once per month and within 24 hours of either: ▪ A storm event that produces 0.25 inches or more of rain within a 24-hour period, or ▪ A snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period. Insert beginning and ending month identified as the seasonally dry period for your area or the valid period of drought: ▪ Beginning month of the seasonally dry period: Insert approximate date ▪ Ending month of the seasonally dry period: Insert approximate date
For frozen conditions where construction activities are being conducted ☐ Once per month Insert beginning and ending dates of frozen conditions on your site: ▪ Beginning date of frozen conditions: Insert approximate date ▪ Ending date of frozen conditions: Insert approximate date

Personnel Responsible for Corrective Actions
Insert names of personnel or types of personnel responsible for corrective actions

Corrective Action Logs
Corrective Action Forms and the Corrective Action Logs are in Appendix E of this SWPPP.

(Note: EPA has developed a sample corrective action log that CGP operators can use. The form is available at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#resources)

6.3 DELEGATION OF AUTHORITY

Duly Authorized Representative(s) or Position(s):

Insert Company or Organization Name
Insert Name
Insert Position
Insert Address
Insert City, State, Zip Code
Insert Telephone Number
Insert Fax/Email

the site and/or to constructed or natural site drainage features or storm drain inlets:

i. A sediment plume, suspended solids, unusual color, presence of odor, decreased clarity, or presence of foam; and/or
ii. A visible sheen on the water surface or visible oily deposits on the bottom or shoreline of the receiving water

If responding to any of the first four triggering conditions listed above, the operator must:

1. Immediately take all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events; and
2. When the problem does not require a new or replacement control or significant repair, the corrective action must be completed by the close of the next business day; or
3. When the problem requires a new or replacement control or significant repair, install the new or modified control and make it operational, or complete the repair, by no later than seven (7) calendar days from the time of discovery. If it is infeasible to complete the installation or repair within seven (7) calendar days, you must document in your records why it is infeasible to complete the installation or repair within the 7-day timeframe and document your schedule for installing the stormwater control(s) and making it operational as soon as feasible after the 7-day timeframe. Where these actions result in changes to any of the stormwater controls or
procedures documented in your SWPPP, you must modify your SWPPP accordingly within seven (7) calendar days of completing this work.

If a corrective action is in response to either of the triggering conditions related to site dewatering activities, the operator must:

1. Immediately take all reasonable steps to minimize or prevent the discharge of pollutants until a solution can be implemented, including shutting off the dewatering discharge as soon as possible depending on the severity of the condition taking safety considerations into account;
2. Determine whether the dewatering controls are operating effectively and whether they are causing the conditions; and
3. Make any necessary adjustments, repairs, or replacements to the dewatering controls to lower the turbidity levels below the benchmark or remove the visible plume or sheen.

When these steps have been completed and any necessary changes have been made, discharging from the dewatering activities may resume.

Turbidity Meter:

Type of turbidity meter	Geotech Portable Turbidity Meter or approved equal

Turbidity meter manuals and manufacturer instructions
Please refer to the enclosed manual in Appendix M.

7.0 TURBIDITY BENCHMARK MONITORING FOR DEWATERING DISCHARGES

Procedures:

Collecting and evaluating samples	Collect at least one turbidity sample per day, from each discharge point, on any day there is a dewatering discharge. Samples may be taken at any time during the day while dewatering water is being discharged. Samples must be representative of the dewatering discharge for any given day. Samples must be measured using a turbidity meter that reports results in nephelometric turbidity units (NTUs) and conforms with a Part 136-approved method (e.g., methods 180.1 and 2130). You are required to use the meter, and conduct a calibration verification prior to each day's use, consistent with the manufacturer's instructions.
Reporting results and keeping monitoring information records	Compare the weekly average turbidity monitoring results to the 50 NTU benchmark (or alternate benchmark if approved by EPA). Report all weekly average turbidity monitoring results on a quarterly basis via NeT-CGP no later than 30 days following the end of each monitoring quarter. Record the monitoring information and retain all such information for a period of three years. See Appendix N: Turbidity Monitoring Sampling Documentation
Taking corrective action when necessary	If the weekly average exceeds the benchmark, you must: • Immediately take all reasonable steps to minimize or prevent the discharge of pollutants until you can implement a solution, including shutting off the dewatering discharge as soon as possible depending on the severity of the condition taking safety considerations into account. • Determine whether the dewatering controls are operating effectively and whether they are causing the conditions Make any necessary adjustments, repairs, or replacements to the dewatering controls to lower the turbidity levels below the benchmark or remove the visible plume or sheen.

4. When and how to conduct inspections, record applicable findings, and take corrective actions. training on the pollution prevention measures outlined in this SWPPP shall be provided to staff and subcontractors. maintained in Appendix G and includes additions of new BMPs, replacement

8.4 TRAINING REQUIREMENTS FOR PERSONS CONDUCTING INSPECTIONS

For projects that obtain coverage under the 2022 CGP on or after February 17, 2023, any personnel conducting site inspections must, at a minimum, either:

- Complete EPA's construction inspection training program, or
- Hold a current valid construction inspection certification or license from a program that, at a minimum, covers the following: (1) principles and practices of erosion and sediment control and pollution prevention practices at construction sites; (2) proper installation and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites; and (3) performance of inspections, including the proper completion of required reports and documentation.

Inspection certificates from the training program must be included in Appendix I.

8.0 RECORDKEEPING AND TRAINING

8.1 RECORDKEEPING

A copy of the SWPPP, along with all inspection reports and corrective action logs are required to be stored at an accessible location at the site, and shall be made available upon request of the EPA, or state or local agency approving stormwater management plans. If an on-site location is unavailable to keep the SWPPP when no personnel are present, notice of the plan's location must be posted near the main entrance of your construction site.

The SWPPP may be prepared, signed, and kept electronically, rather than in paper form, if the records are: (a) in a format that can be read in a similar manner as a paper record; (b) legally dependable with no less evidentiary value than their paper equivalent; and (c) immediately accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be, if the records were stored in paper form.

The following records shall be kept at the project site (or posted location) and shall be available for inspectors to review. These records shall be retained for a minimum period of at least 3 years after the permit is terminated.

> In Appendix I – Grading and Stabilization Activities Log, record (1) the date(s) when major grading activities occur, (2) date(s) when construction activities temporarily or permanently cease on a portion of the site, and (3) date(s) when an area is either temporarily or permanently stabilized.

8.2 LOG OF CHANGES TO THE SWPPP

The log of changes to the SWPPP is maintained in Appendix G and includes additions of new BMPs, replacement of failed BMPs, significant changes in the activities or their timing on the project, changes in personnel, changes in inspection and maintenance procedures and update to site plans.

8.3 GENERAL TRAINING REQUIREMENTS FOR STORMWATER TEAM MEMBERS

Prior to the commencement of construction activities, all persons assigned to the stormwater team must understand the requirements of the CGP and their specific responsibilities with respect to those requirements, including the following related to the scope of their job duties:

1. The permit requirements and deadlines associated with installation, maintenance, and removal of stormwater controls, as well as site stabilization;
2. The location of all stormwater controls on the site required by the CGP and how they are to be maintained;
3. The proper procedures to follow with respect to the CGP's pollution prevention requirements; and

9.0 CERTIFICATION AND NOTIFICATION

9.1 SIGNATURE, PLAN REVIEW, AND MAKING PLANS AVAILABLE

A copy of the SWPPP including a copy of the Construction General Permit, NOI, and acknowledgement letter from EPA shall be retained at the construction site (or other location easily accessible during normal business hours to EPA, a state, tribal or local agency approving sediment and erosion plans, grading plans, or storm water management plans; local government officials; the operator of a municipal separate storm sewer receiving discharges from the site; and representatives of the U.S. Fish and Wildlife Service or the National Marine Fisheries Service) from the date of commencement of construction activities to the date of final stabilization. A copy of the SWPPP shall be available at a central location on-site for the use of all those identified as having responsibilities under the SWPPP. If an on-site location is unavailable to store the SWPPP when no personnel are present, notice of the plan's location shall be posted near the main entrance at the construction site.

9.2 NOTICE OF PERMIT COVERAGE

A sign must be posted at a safe, publicly accessible location in close proximity to the construction site detailing the permit coverage. The notice must be located so that it is visible from the public road that is nearest to the active part of the construction site, and it must use a font large enough to be readily viewed from a public right-of-way. At a minimum, the notice must include:

- The NPDES Permit Tracking Number and the EPA webpage where a copy of the NOI can be found (https://permitsearch.epa.gov/epermit-search/ui/search)),
- A contact name and phone number for obtaining additional construction site information,
- The Uniform Resource Locator (URL) for the SWPPP (if available), or the following statement: "If you would like to obtain a copy of the Stormwater Pollution Prevention Plan (SWPPP) for this site, contact the EPA Regional 1 Office at (617) 918-1038,
- The following statement "If you observe indicators of stormwater pollutants in the discharge or in the receiving waterbody, contact the EPA through the following website: https://www.epa.gov/enforcement/report-environmental-violations."

9.3 OPERATOR CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____ Title: _____

Signature: _____ Date: _____

Appendix A

Site Plans

10.0 SWPPP APPENDICES

Attach the following documentation to the SWPPP:

Appendix A – Site Plans

Appendix B – Copy of 2022 CGP

Appendix C – NOI and EPA Authorization Email

Appendix D – Site Inspection Form and Dewatering Inspection Form

Appendix E – Corrective Action Log

Appendix F – SWPPP Amendment Log

Appendix G – Subcontractor Certifications/Agreements

Appendix H – Grading and Stabilization Activities Log

Appendix I – Training Documentation

Appendix J – Delegation of Authority

Appendix K – Endangered Species Documentation

Appendix L – Historic Preservation Documentation

Appendix M – Turbidity Monitoring Sampling Documentation

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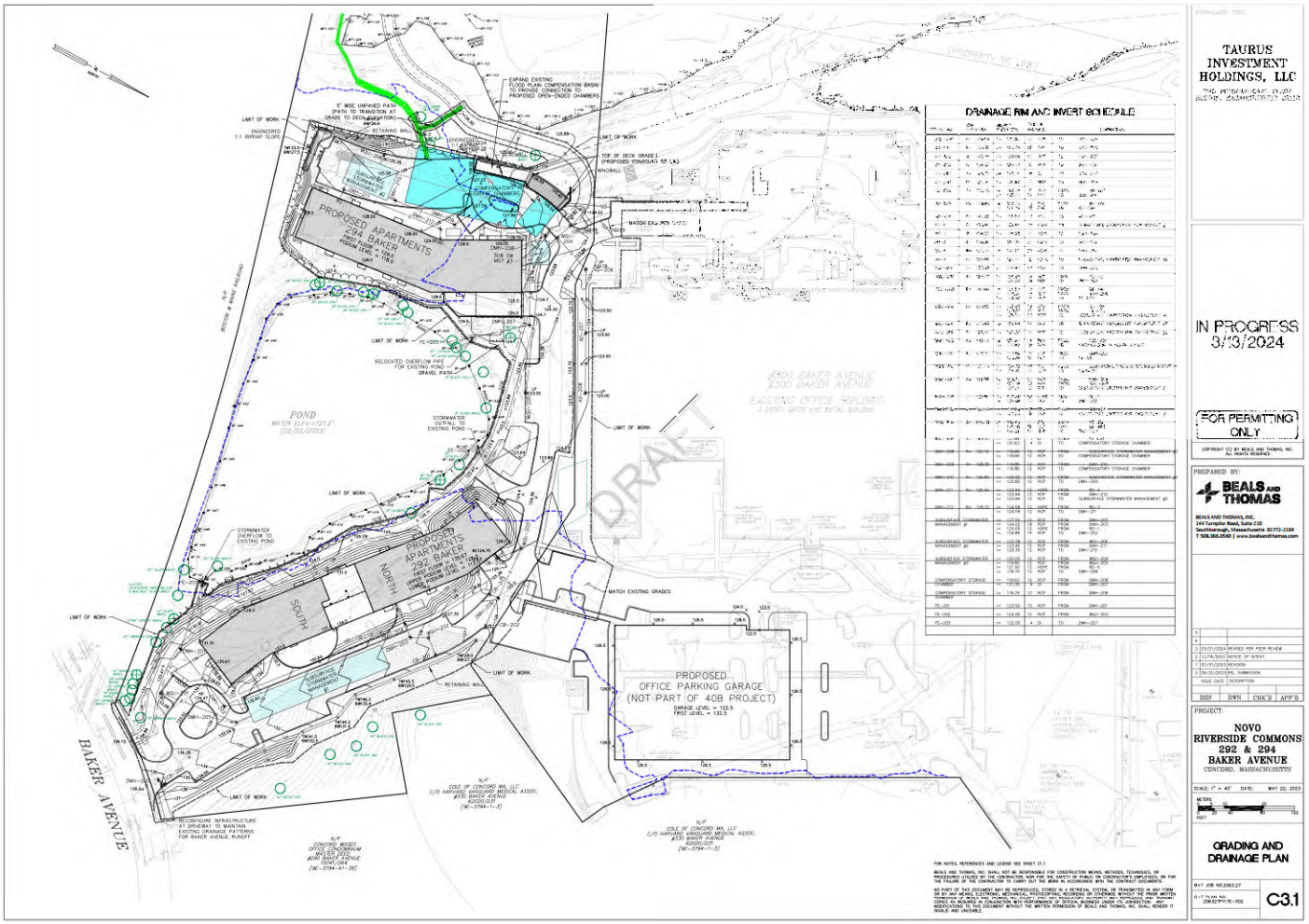

TAURUS INVESTMENT HOLDINGS, LLC

IN PROGRESS 8/13/2024

FOR PERMITTING ONLY

PREPARED BY:
BEALS AND THOMAS
BEALS AND THOMAS, INC.
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ISSUE	DATE	DESCRIPTION
4		
3	03/21/2024	REVISED PER PEER REVIEW
2	12/19/2023	NOTICE OF INTENT
1	07/25/2023	REVISION
0	06/22/2023	ENG. SUBMISSION

DSN | DWN | CHK'D | APP'D

PROJECT:
NOVO RIVERSIDE COMMONS
292 & 294 BAKER AVENUE
CONCORD, MASSACHUSETTS

SCALE: 1" = 40' DATE: MAY 22, 2023

GRADING AND DRAINAGE PLAN

B+T JOB NO.3063.27

C3.1

Appendix B

Copy of 2022 Construction General Permit (CGP)

https://www.epa.gov/npdes/2022-construction-general-permit-cgp

BEALS AND THOMAS

CONTENTS

National Pollutant Discharge Elimination System (NPDES)
Construction General Permit (CGP) for Stormwater Discharges from Construction Activities

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §1251 et. seq., (hereafter CWA), as amended by the Water Quality Act of 1987, P.L. 100-4, "operators" of construction activities (defined in Appendix A) that meet the requirements of Part 1.1 of this National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP), are authorized to discharge pollutants in accordance with the effluent limitations and conditions set forth herein. Permit coverage is required from the "commencement of construction activities" (see Appendix A) until one of the conditions for terminating CGP coverage has been met (see Part 8.2).

This permit becomes effective on 12:00 am, February 17, 2022.

This permit and the authorization to discharge expire at 11:59pm, February 16, 2027.

Signed and issued this 18 day of January 2022
DEBORAH SZARO
Digitally signed by DEBORAH SZARO
Date: 2022.01.18 08:31:14 -05'00'
Deborah Szaro,
Acting Regional Administrator, EPA Region 1.

Signed and issued this 18 day of January 2022
JAVIER LAUREANO
Digitally signed by JAVIER LAUREANO
Date: 2022.01.18 11:21:16 -05'00'
Javier Laureano,
Director, Water Division, EPA Region 2.

Signed and issued this 18 day of January 2022
CARMEN GUERRERO PEREZ
Digitally signed by CARMEN GUERRERO PEREZ
Date: 2022.01.18 10:19:51 -04'00'
Carmen Guerrero-Perez,
Director, Caribbean Environmental Protection Division, EPA Region 2.

Signed and issued this 18 day of January 2022
CATHERINE LIBERTZ
Digitally signed by CATHERINE LIBERTZ
Date: 2022.01.18 12:05:24 -05'00'
Catherine A. Libertz,
Director, Water Division, EPA Region 3.

Signed and issued this 18 day of January 2022
JEANEANNE GETTLE
Digitally signed by JEANEANNE GETTLE
Date: 2022.01.18 13:09:48 -05'00'
Jeaneanne Gettle,
Director, Water Division, EPA Region 4.

Signed and issued this 18 day of January 2022
Digitally signed by TERA FONG
Date: 2022.01.18 13:03:49 -06'00'
Tera Fong,
Director, Water Division, EPA Region 5.

Signed and issued this 18 day of January 2022
CHARLES MAGUIRE
Digitally signed by CHARLES MAGUIRE
DN: c=US, o=U.S. Government, ou=Environmental Protection Agency, cn=CHARLES MAGUIRE, 0.9.2342.19200300.100.1.1=68001003658036
Date: 2022.01.18 14:08:58 -05'00'
Charles W. Maguire,
Director, Water Division, EPA Region 6.

Signed and issued this 18 day of January 2022
JEFFERY ROBICHAUD
Digitally signed by JEFFERY ROBICHAUD
Date: 2022.01.18 14:41:37 -06'00'
Jeffery Robichaud,
Director, Water Division, EPA Region 7.

Signed and issued this 18 day of January 2022
DARCY OCONNOR
Digitally signed by DARCY OCONNOR
Date: 2022.01.18 14:00:05 -07'00'
Darcy O'Connor,
Director, Water Division, EPA Region 8.

Signed and issued this 18 day of January 2022
TOMAS TORRES
Digitally signed by TOMAS TORRES
Date: 2022.01.18 13:30:16 -08'00'
Tomás Torres,
Director, Water Division, EPA Region 9.

Signed and issued this 18 day of January 2022
DANIEL OPALSKI
Digitally signed by DANIEL OPALSKI
Date: 2022.01.18 15:10:20 -08'00'
Daniel D. Opalski,
Director, Water Division, EPA Region 10.

1 HOW TO OBTAIN COVERAGE UNDER THE CONSTRUCTION GENERAL PERMIT (CGP)

To be covered under this permit, you must meet the eligibility conditions and follow the requirements for obtaining permit coverage in this Part.

1.1 ELIGIBILITY CONDITIONS

1.1.1 You are an "operator" of a construction site for which discharges will be covered under this permit. For the purposes of this permit and in the context of stormwater discharges associated with construction activity, an "operator" is any party associated with a construction project that meets either of the following two criteria:

- **a.** The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
- **b.** The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions.

Where there are multiple operators associated with the same project, all operators must obtain permit coverage.[1] Subcontractors generally are not considered operators for the purposes of this permit.

1.1.2 Your site's construction activities:

- **a.** Will disturb one or more acres of land, or will disturb less than one acre of land but are part of a common plan of development or sale (as defined in Appendix A) that will ultimately disturb one or more acres of land; or
- **b.** Have been designated by EPA as needing permit coverage under 40 CFR § 122.26(a)(1)(v) or 40 CFR § 122.26(b)(15)(ii);

1.1.3 Your site is located in an area where EPA is the permitting authority and where coverage under this permit is available (see Appendix B);

1.1.4 Discharges from your site are not:

- **a.** Already covered by a different NPDES permit for the same discharge; or
- **b.** In the process of having coverage under a different NPDES permit for the same discharge denied, terminated, or revoked.[2, 3]

1.1.5 You can demonstrate you meet one of the criteria in the Endangered Species Protection section of the Notice of Intent (NOI) that you submit for coverage under this permit, per Part 1.4, with respect to the protection of Federally listed endangered or threatened species and Federally designated critical habitat under the Endangered Species Act

[1] If the operator of a "construction support activity" (see Part 1.2.1c) is different than the operator of the main site, that operator must also obtain permit coverage. See Part 7.1 for clarification on the sharing of permit-related functions between and among operators on the same site and for conditions that apply to developing a SWPPP for multiple operators associated with the same site.

[2] Parts 1.1.4a and 1.1.4b do not include sites currently covered under the 2017 CGP that are in the process of obtaining coverage under this permit, nor sites covered under this permit that are transferring coverage to a different operator.

[3] Notwithstanding a site being made ineligible for coverage under this permit because it falls under the description of Parts 1.1.4a or 1.1.4b, above, EPA may waive the applicable eligibility requirement after specific review if it determines that coverage under this permit is appropriate.

1.2 TYPES OF DISCHARGES AUTHORIZED[5]

1.2.1 The following stormwater discharges are authorized under this permit provided that appropriate stormwater controls are designed, installed, and maintained (see Parts 2 and 3):

- **a.** Stormwater discharges, including stormwater runoff, snowmelt runoff, and surface runoff and drainage, associated with construction activity under 40 CFR § 122.26(b)(14) or § 122.26(b)(15)(i);
- **b.** Stormwater discharges designated by EPA as needing a permit under 40 CFR §122.26(a)(1)(v) or § 122.26(b)(15)(ii);
- **c.** Stormwater discharges from on or off-site construction support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided that:
  - **i.** The support activity is directly related to the construction site required to have permit coverage for stormwater discharges;
  - **ii.** The support activity is not a commercial operation, nor does it serve multiple unrelated construction sites;
  - **iii.** The support activity does not continue to operate beyond the completion of the construction activity at the site it supports; and
  - **iv.** Stormwater controls are implemented in accordance with Part 2 and Part 3 for discharges from the support activity areas; and
- **d.** Stormwater discharges from earth-disturbing activities associated with the construction of staging areas and the construction of access roads conducted prior to active mining.

1.2.2 The following non-stormwater discharges associated with your construction activity are authorized under this permit provided that, with the exception of water used to control dust and to irrigate vegetation in stabilized areas, these discharges are not routed to areas of exposed soil on your site and you comply with any applicable requirements for these discharges in Parts 2 and 3:

- **a.** Discharges from emergency fire-fighting activities;
- **b.** Fire hydrant flushings;
- **c.** Landscape irrigation;
- **d.** Water used to wash vehicles and equipment, provided that there is no discharge of soaps, solvents, or detergents used for such purposes;
- **e.** Water used to control dust;
- **f.** Potable water including uncontaminated water line flushings;

[5] See "Discharge" as defined in Appendix A. Note: Any discharges not expressly authorized in this permit cannot become authorized or shielded from liability under CWA Section 402(k) by disclosure to EPA, State, or local authorities after issuance of this permit via any means, including the Notice of Intent (NOI) to be covered by the permit, the SWPPP, or during an inspection.

(ESA). If the EPA Regional Office grants you a waiver from electronic reporting per Part 1.4.2, you must complete the ESA worksheet in Appendix D to demonstrate you meet one of the criteria and submit it with your paper NOI (Appendix I).

1.1.6 You have completed the screening process in Appendix E relating to the protection of historic properties; and

1.1.7 You have complied with all requirements in Part 9 imposed by the applicable State, Indian Tribe, or Territory in which your construction activities and/or discharge will occur.

1.1.8 For "new sources" (as defined in Appendix A) only:

- **a.** EPA has not, prior to authorization under this permit, determined that discharges from your site will not meet applicable water quality standards. Where such a determination is made prior to authorization, EPA may notify you that an individual permit application is necessary. However, EPA may authorize your coverage under this permit after you have included appropriate controls and implementation procedures designed to bring your discharge into compliance with this permit, specifically the requirement to meet water quality standards. In the absence of information demonstrating otherwise, EPA expects that compliance with the requirements of this permit, including the requirements applicable to such discharges in Part 3, will result in discharges that meet applicable water quality standards.
- **b.** Discharges from your site to a Tier 2, Tier 2.5, or Tier 3 water[4] will not lower the water quality of the applicable water. In the absence of information demonstrating otherwise, EPA expects that compliance with the requirements of this permit, including the requirements applicable to such discharges in Part 3.2, will result in discharges that will not lower the water quality of such waters.

1.1.9 If you plan to add "cationic treatment chemicals" (as defined in Appendix A) to stormwater and/or authorized non-stormwater prior to discharge, you may not submit your NOI until you notify your applicable EPA Regional Office (see Appendix J) in advance and the EPA Regional Office authorizes coverage under this permit after you have included appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will result in discharges that meet applicable water quality standards.

[4] Note: Your site will be considered to discharge to a Tier 2, Tier 2.5, or Tier 3 water if the first receiving water to which you discharge is identified by a State, Tribe, or EPA as a Tier 2, Tier 2.5, or Tier 3 water. For discharges that enter a storm sewer system prior to discharge, the first receiving water to which you discharge is the waterbody that receives the stormwater discharge from the storm sewer system. The current list of Tier 2, Tier 2.5, and Tier 3 waters located in the areas eligible for coverage under this permit can be found at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates. You can also use EPA's Discharge Mapping Tool (https://www.epa.gov/npdes/epas-stormwater-discharge-mapping-tools) to assist you in identifying whether any receiving waters to which you discharge are listed as impaired (and the pollutant for which it is impaired) and whether an approved total maximum daily load (TMDL) exists for that waterbody.

1.4 SUBMITTING YOUR NOTICE OF INTENT (NOI)

All "operators" (as defined in Appendix A) associated with your construction site who meet the Part 1.1 eligibility conditions, and who seek coverage under this permit, must submit to EPA a complete and accurate NOI in accordance with the deadlines in Table 1 prior to commencement of construction activities (as defined in Appendix A).

Exception: If you are conducting construction activities in response to a public emergency (e.g., mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services), and the related work requires immediate authorization to avoid imminent endangerment to human health, public safety, or the environment, or to reestablish essential public services, you may discharge on the condition that a complete and accurate NOI is submitted within 30 calendar days after commencing construction activities (see Table 1) establishing that you are eligible for coverage under this permit. You must also provide documentation in your Stormwater Pollution Prevention Plan (SWPPP) to substantiate the occurrence of the public emergency pursuant to Part 7.2.3i.

1.4.1 Prerequisite for Submitting Your NOI

You must develop a SWPPP consistent with Part 7 before submitting your NOI for coverage under this permit.

1.4.2 How to Submit Your NOI

You must use EPA's NPDES eReporting Tool (NeT) to electronically prepare and submit your NOI for coverage under the 2022 CGP unless you received a waiver from your applicable EPA Regional Office.

To access NeT, go to https://cdx.epa.gov/cdx.

Waivers from electronic reporting may be granted based on one of the following conditions:

a. If your operational headquarters is physically located in a geographic area (i.e., ZIP code or census tract) that is identified as under-served for broadband Internet access in the most recent report from the Federal Communications Commission; or

b. If you have limitations regarding available computer access or computer capability.

If the EPA Regional Office grants you approval to use a paper NOI, and you elect to use it, you must complete the form in Appendix H.

1.4.3 Deadlines for Submitting Your NOI and Your Official Date of Permit Coverage

Table 1 provides the deadlines for submitting your NOI and the official start date of your permit coverage, which differ depending on when you commence construction activities.

g. External building washdown, provided soaps, solvents, and detergents are not used, and external surfaces do not contain hazardous substances (as defined in Appendix A) (e.g., paint or caulk containing polychlorinated biphenyls (PCBs));

h. Pavement wash waters, provided spills or leaks of toxic or hazardous substances have not occurred (unless all spill material has been removed) and where soaps, solvents, and detergents are not used. You are prohibited from directing pavement wash waters directly into any receiving water, storm drain inlet, or constructed or natural site drainage features, unless the feature is connected to a sediment basin, sediment trap, or similarly effective control;

i. Uncontaminated air conditioning or compressor condensate;

j. Uncontaminated, non-turbid discharges of ground water or spring water;

k. Foundation or footing drains where flows are not contaminated with process materials such as solvents or contaminated ground water; and

l. Uncontaminated construction dewatering water[6] discharged in accordance with Part 2.4.

1.2.3 Also authorized under this permit are discharges of stormwater listed above in Part 1.2.1, or authorized non-stormwater discharges listed above in Part 1.2.2, commingled with a discharge authorized by a different NPDES permit and/or a discharge that does not require NPDES permit authorization.

1.3 PROHIBITED DISCHARGES[7]

The discharges listed in this Part are prohibited outright or authorized only under the identified conditions. To prevent the discharges in Parts 1.3.1 through 1.3.5, operators must comply with the applicable pollution prevention requirements in Part 2.3 or ensure the discharge is authorized by another NPDES permit consistent with Part 1.2.3 for commingled discharges.

1.3.1 Wastewater from washout of concrete, unless managed by an appropriate control as described in Part 2.3.4;

1.3.2 Wastewater from washout and/or cleanout of stucco, paint, form release oils, curing compounds, and other construction materials;

1.3.3 Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;

1.3.4 Soaps, solvents, or detergents used in vehicle and equipment washing or external building washdown; and

1.3.5 Toxic or hazardous substances from a spill or other release.

[6] EPA notes that operators may need to comply with additional procedures to verify that the dewatering discharge is uncontaminated. Operators should review Part 9 to determine if any of these requirements apply to their discharge and should ensure that they have complied with any State, Tribal, or local dewatering requirements that apply.

[7] EPA includes these prohibited non-stormwater discharges here as a reminder to the operator that the only non-stormwater discharges authorized by this permit are at Part 1.2.2. Any unauthorized non-stormwater discharges must be covered under an individual permit or alternative general permit.

1.4.4 Modifying your NOI

If after submitting your NOI you need to correct or update any fields, you may do so by submitting a "Change NOI" form using NeT. Waivers from electronic reporting may be granted as specified in Part 1.4.2. If the EPA Regional Office has granted you approval to submit a paper NOI modification, you may indicate any NOI changes on the same NOI form in Appendix H.

When there is a change to the site's operator, the new operator must submit a new NOI, and the previous operator must submit a Notice of Termination (NOT) form as specified in Part 8.3.

The following modifications to an NOI form will result in a 14-day review process:

- Changes to the name of the operator;
- Changes to the project or site name;
- Changes to the estimated area to be disturbed;
- Changes to the name of the receiving water[10], or additions to the applicable receiving waters;
- Changes to eligibility information related to endangered species protection or historic preservation;
- Changes to information provided related to the use of chemical treatment at your site; and
- Changes to answers provided regarding the demolition of structures over 10,000 square feet of floor space built or renovated before January 1, 1980.

During the 14-day review process, you may continue to operate based on the information provided in your original NOI, but you must wait until the review period has ended before you may commence or continue activities on any portion of your site that would be affected by any of the above modifications, unless EPA notifies you that the authorization is delayed or denied.

1.4.5 Your Official End Date of Permit Coverage

Once covered under this permit, your coverage will last until the date that:

a. You terminate permit coverage consistent with Part 8; or

b. You receive permit coverage under a different NPDES permit or a reissued or replacement version of this permit after expiring on February 16, 2027; or

c. You fail to submit an NOI for coverage under a reissued or replacement version of this permit before the deadline for existing construction sites where construction activities continue after this permit has expired.

1.5 REQUIREMENT TO POST A NOTICE OF YOUR PERMIT COVERAGE

You must post a sign or other notice of your permit coverage at a safe, publicly accessible location in close proximity to the construction site. The notice must be located so it is visible from the public road that is nearest to the active part of the construction

[10] As defined in Appendix A, a "receiving water" is "a "Water of the United States" as defined in 40 CFR §122.2 into which the regulated stormwater discharges.

Table 1 NOI Submittal Deadlines and Official Start Date for Permit Coverage.

Type of Operator	NOI Submittal Deadline[8]	Permit Authorization Date[9]
Operator of a new site (i.e., a site where construction activities commence on or after February 17, 2022)	At least 14 calendar days before commencing construction activities.	14 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization is delayed or denied.
Operator of an existing site (i.e., a site with 2017 CGP coverage where construction activities commenced prior to February 17, 2022)	No later than May 18, 2022.	14 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization is delayed or denied. Provided you submit your NOI no later than May 18, 2022, your authorization under the 2017 CGP is automatically continued until you have been granted coverage under this permit or an alternative NPDES permit, or coverage is otherwise terminated.
New operator of a permitted site (i.e., an operator that through transfer of ownership and/or operation replaces the operator of an already permitted construction site that is either a "new site" or an "existing site")	At least 14 calendar days before the date the transfer to the new operator will take place.	14 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization is delayed or denied.
Operator of an "emergency-related project" (i.e., a project initiated in response to a public emergency (e.g., mud slides, earthquake, extreme flooding conditions, disruption in essential public services), for which the related work requires immediate authorization to avoid imminent endangerment to human health or the environment, or to reestablish essential public services)	No later than 30 calendar days after commencing construction activities.	You are considered provisionally covered under the terms and conditions of this permit immediately, and fully covered 14 calendar days after EPA notifies you that it has received a complete NOI, unless EPA notifies you that your authorization is delayed or denied.

[8] If you miss the deadline to submit your NOI, any and all discharges from your construction activities will continue to be unauthorized under the CWA until they are covered by this or a different NPDES permit. EPA may take enforcement action for any unpermitted discharges that occur between the commencement of construction activities and discharge authorization.

[9] Discharges are not authorized if your NOI is incomplete or inaccurate or if you are not eligible for permit coverage.

site, and it must use a font large enough to be readily viewed from a public right-of-way.[11] At a minimum, the notice must include:

a. The NPDES ID (i.e., permit tracking number assigned to your NOI and the EPA webpage where a copy of the NOI can be found (https://permitsearch.epa.gov/epermit-search/ui/search));

b. A contact name and phone number for obtaining additional construction site information;

c. The Uniform Resource Locator (URL) for the SWPPP (if available), or the following statement: "If you would like to obtain a copy of the Stormwater Pollution Prevention Plan (SWPPP) for this site, contact the EPA Regional Office at [*include the appropriate CGP Regional Office contact information found at* https://www.epa.gov/npdes/contact-us-stormwater#regional];" and

d. The following statement "If you observe indicators of stormwater pollutants in the discharge or in the receiving water, contact the EPA through the following website: https://www.epa.gov/enforcement/report-environmental-violations."

2 TECHNOLOGY-BASED EFFLUENT LIMITATIONS

You must comply with the following technology-based effluent limitations in this Part for all authorized discharges.[12]

2.1 GENERAL STORMWATER CONTROL DESIGN, INSTALLATION, AND MAINTENANCE REQUIREMENTS

You must design, install, and maintain stormwater controls required in Parts 2.2, 2.3, and 2.4 to minimize the discharge of pollutants in stormwater from construction activities.[13] To meet this requirement, you must:

2.1.1 Account for the following factors in designing your stormwater controls:

a. The expected amount, frequency, intensity, and duration of precipitation;[14]

b. The nature of stormwater runoff (i.e., flow) and run-on at the site, including factors such as expected flow from impervious surfaces, slopes, and site drainage features. You must design stormwater controls to control stormwater volume, velocity, and peak flow rates to minimize discharges of pollutants in stormwater and to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points; and

c. The soil type and range of soil particle sizes expected to be present on the site.

[11] If the active part of the construction site is not visible from a public road, then place the notice of permit coverage in a position that is visible from the nearest public road and as close as possible to the construction site.

[12] For each of the effluent limits in Part 2, as applicable to your site, you must include in your SWPPP (1) a description of the specific control(s) to be implemented to meet the effluent limit; (2) any applicable design specifications; (3) routine maintenance specifications; and (4) the projected schedule for installation/implementation. See Part 7.2.6.

[13] The permit does not recommend or endorse specific products or vendors.

[14] Stormwater controls must be designed using the most recent data available to account for recent precipitation patterns and trends.

If your site is exposed to or has previously experienced major storms, such as hurricanes, storm surge, extreme/heavy precipitation, and flood events, you should also include consideration of and contingencies for whether implementing structural improvements, enhanced/resilient stormwater controls, and other mitigation measures may help minimize impacts from stormwater discharges from such major storm events.

2.1.2 Design and install all stormwater controls in accordance with good engineering practices, including applicable design specifications.[15]

2.1.3 Complete installation of stormwater controls by the time each phase of construction activities has begun.

a. By the time construction activity in any given portion of the site begins, install and make operational any downgradient sediment controls (e.g., buffers, perimeter controls, exit point controls, storm drain inlet protection) that control discharges from the initial site clearing, grading, excavating, and other earth-disturbing activities.[16]

b. Following the installation of these initial controls, install and make operational all stormwater controls needed to control discharges prior to subsequent earth-disturbing activities.

2.1.4 Ensure all stormwater controls are maintained and remain in effective operating condition during permit coverage and are protected from activities that would reduce their effectiveness.

a. Comply with any specific maintenance requirements for the stormwater controls listed in this permit, as well as any recommended by the manufacturer.[17]

b. If at any time you find that a stormwater control needs routine maintenance (i.e., minor repairs or other upkeep performed to ensure the site's stormwater controls remain in effective operating condition, not including significant repairs or the need to install a new or replacement control), you must immediately initiate the needed work, and complete such work by the close of the next business day. If it is infeasible to complete the routine maintenance by the close of the next business day, you must document why this is the case and why the repair or other upkeep to be performed should still be considered routine maintenance in your inspection report under Part 4.7.1c and complete such work no later than seven (7) calendar days from the time of discovery of the condition requiring maintenance.

c. If you must repeatedly (i.e., three (3) or more times) make the same routine maintenance fixes to the same control at the same location, even if the fix can be completed by the close of the next business day, you must either:

i. Complete work to fix any subsequent repeat occurrences of this same problem under the corrective action procedures in Part 5, including keeping any records

[15] Design specifications may be found in manufacturer specifications and/or in applicable erosion and sediment control manuals or ordinances. Any departures from such specifications must reflect good engineering practices and must be explained in your SWPPP. You must also comply with any additional design and installation requirements specified for the effluent limits in Parts 2.2, 2.3, and 2.4.

[16] Note that the requirement to install stormwater controls prior to each phase of construction activities for the site does not apply to the earth disturbance associated with the actual installation of these controls. Operators should take all reasonable actions to minimize the discharges of pollutants during the installation of stormwater controls.

[17] Any departures from such maintenance recommendations made by the manufacturer must reflect good engineering practices and must be explained in your SWPPP.

of the condition and how it was corrected under Part 5.4; or

ii. Document in your inspection report under Part 4.7.1c why the specific reoccurrence of this same problem should still be addressed as a routine maintenance fix under this Part.[18]

d. If at any time you find that a stormwater control needs a significant repair or that a new or replacement control is needed, you must comply with the corrective action deadlines for completing such work in in Part 5.2.1c.

2.2 EROSION AND SEDIMENT CONTROL REQUIREMENTS

You must implement erosion and sediment controls in accordance with the following requirements to minimize the discharge of pollutants in stormwater from construction activities.

2.2.1 Provide and maintain natural buffers and/or equivalent erosion and sediment controls for discharges to any receiving waters that is located within 50 feet of the site's earth disturbances.

a. Compliance Alternatives. For any discharges to receiving waters located within 50 feet of your site's earth disturbances, you must comply with one of the following alternatives:

i. Provide and maintain a 50-foot undisturbed natural buffer; or

ii. Provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by erosion and sediment controls that achieve, in combination, the sediment load reduction equivalent to a 50-foot undisturbed natural buffer; or

iii. If infeasible to provide and maintain an undisturbed natural buffer of any size, implement erosion and sediment controls to achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

See Appendix F, Part F.2 for additional conditions applicable to each compliance alternative.

b. Exceptions. See Appendix F, Part F.2 for exceptions to the compliance alternatives.

2.2.2 Direct stormwater to vegetated areas and maximize stormwater infiltration and filtering to reduce pollutant discharges, unless infiltration would be inadvisable due to the underlying geology (e.g., karst topography) and ground water contamination concerns, or infeasible due to site conditions.[19]

[18] Such documentation could include, for example, that minor repairs completed within the required timeframe are all that is necessary to ensure that the stormwater control continues to operate as designed and installed and that the stormwater control remains appropriate for the flow reaching it.

[19] Operators should consider whether factors such as specific contaminant concerns from the construction site, the underlying soils or geology, hydrology, depth to the ground water table, or proximity to source water or wellhead protection area(s) make the site unsuitable for infiltrating construction stormwater. Site conditions that may be of particular concern include proximity to: a current or future drinking water aquifer; a drinking water well or spring (including private/household wells); highly conductive geology such as karst; known pollutant hot spots, such as hazardous waste sites, landfills, gas stations, brownfields; an on-site sewage system or underground storage tank; or soils that do not allow for infiltration. Operators may find it helpful to consult EPA's Drinking Water Mapping Application to Protect Source Waters (DWMAPS). DWMAPS is an online mapping tool that can be used to locate drinking water providers, potential sources of contamination, polluted waterways, and information on protection initiatives in the site area.

2.2.3 Install sediment controls along any perimeter areas of the site that are downslope from any exposed soil or other disturbed areas.[20]

a. The perimeter control must be installed upgradient of any natural buffers established under Part 2.2.1, unless the control is being implemented pursuant to Part 2.2.1a.ii-iii;

b. To prevent stormwater from circumventing the edge of the perimeter control, install the perimeter control on the contour of the slope and extend both ends of the control up slope (e.g., at 45 degrees) forming a crescent rather than a straight line;

c. After installation, to ensure that perimeter controls continue to work effectively:

i. Remove sediment before it has accumulated to one-half of the above-ground height of any perimeter control; and

ii. After a storm event, if there is evidence of stormwater circumventing or undercutting the perimeter control, extend controls and/or repair undercut areas to fix the problem.

d. Exception. For areas at "linear construction sites" (as defined in Appendix A) where perimeter controls are infeasible (e.g., due to a limited or restricted right-of-way), implement other practices as necessary to minimize pollutant discharges to perimeter areas of the site.

2.2.4 Minimize sediment track-out.

a. Restrict vehicle use to properly designated exit points;

b. Use appropriate stabilization techniques[21] at all points that exit onto paved roads;

i. **Exception**: Stabilization is not required for exit points at linear utility construction sites that are used only episodically and for very short durations over the life of the project, provided other exit point controls[22] are implemented to minimize sediment track-out;

c. Implement additional track-out controls[23] as necessary to ensure that sediment removal occurs prior to vehicle exit; and

d. Where sediment has been tracked-out from your site onto paved roads, sidewalks, or other paved areas outside of your site, remove the deposited sediment by the end of the same business day in which the track-out occurs or by the end of the next business day if track-out occurs on a non-business day. Remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. You are prohibited from hosing or sweeping tracked-out

[20] Examples of perimeter controls include filter berms; different types of silt fence such as wire-backed silt fence, super silt fence, or multi-layer geotextile silt fence; compost filter socks; gravel barriers; and temporary diversion dikes.

[21] Examples of appropriate stabilization techniques include the use of aggregate stone with an underlying geotextile or non-woven filter fabric, and turf mats.

[22] Examples of other exit point controls include preventing the use of exit points during wet periods; minimizing exit point use by keeping vehicles on site to the extent possible; limiting exit point size to the width needed for vehicle and equipment usage; using scarifying and compaction techniques on the soil; and avoiding establishing exit points in environmentally sensitive areas (e.g., *karst areas; steep slopes*).

[23] Examples of additional track-out controls include the use of wheel washing, rumble strips, and rattle plates.

a. Restrict vehicle and equipment use in these locations to avoid soil compaction; and

b. Before seeding or planting areas of exposed soil that have been compacted, use techniques that rehabilitate and condition the soils as necessary to support vegetative growth.

2.2.10 Protect storm drain inlets.

a. Install inlet protection measures that remove sediment from discharges prior to entry into any storm drain inlet that carries stormwater from your site to a receiving water, provided you have authority to access the storm drain inlet.[31] Inlet protection measures are not required for storm drain inlets that are conveyed to a sediment basin, sediment trap, or similarly effective control; and

b. Clean, or remove and replace, the inlet protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, remove the deposited sediment by the end of the same business day in which it is found or by the end of the following business day if removal by the same business day is not feasible.

2.2.11 Control stormwater discharges, including both peak flowrates and total stormwater volume, to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points.[32]

2.2.12 If you install a sediment basin or similar impoundment:

a. Situate the basin or impoundment outside of any receiving water. and any natural buffers established under Part 2.2.1;

b. Design the basin or impoundment to avoid collecting water from wetlands;

c. Design the basin or impoundment to provide storage for either:

i. The calculated volume of runoff from a 2-year, 24-hour storm;[33] or

ii. 3,600 cubic feet per acre drained.

d. Utilize outlet structures that withdraw water from the surface of the sediment basin or similar impoundment, unless infeasible;[34]

e. Use erosion controls and velocity dissipation devices to prevent erosion at inlets and outlets; and

[31] Inlet protection measures can be removed in the event of flood conditions or to prevent erosion.

[32] Examples of stormwater controls that can be used to comply with this requirement include the use of erosion controls and/or velocity dissipation devices (e.g., check dams, sediment traps), within and along the length of a constructed site drainage feature and at the outfall to slow down stormwater.

[33] Operators may refer to https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates for guidance on determining the volume of precipitation associated with their site's local 2-year, 24-hour storm event.

[34] The circumstances in which it is infeasible to design outlet structures in this manner are rare. Exceptions may include areas with extended cold weather, where using surface outlets may not be feasible during certain time periods (although they must be used during other periods). If you determine that it is infeasible to meet this requirement, you must provide documentation in your SWPPP to support your determination, including the specific conditions or time periods when this exception will apply.

sediment into any constructed or natural site drainage feature, storm drain inlet, or receiving water.[24]

2.2.5 Manage stockpiles or land clearing debris piles composed, in whole or in part, of sediment and/or soil:[25]

a. Locate the piles outside of any natural buffers established under Part 2.2.1 and away from any constructed or natural site drainage features, storm drain inlets, and areas where stormwater flow is concentrated;

b. Install a sediment barrier along all downgradient perimeter areas of stockpiled soil or land clearing debris piles;[26]

c. For piles that will be unused for 14 or more days, provide cover[27] or appropriate temporary stabilization (consistent with Part 2.2.14);

d. You are prohibited from hosing down or sweeping soil or sediment accumulated on pavement or other impervious surfaces into any constructed or natural site drainage feature, storm drain inlet, or receiving water.

2.2.6 Minimize dust. On areas of exposed soil, minimize dust through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged in stormwater from the site.

2.2.7 Minimize steep slope disturbances. Minimize the disturbance of "steep slopes" (as defined in Appendix A).[28]

2.2.8 Preserve native topsoil, unless infeasible.[29]

2.2.9 Minimize soil compaction.[30] In areas of your site where final vegetative stabilization will occur or where infiltration practices will be installed:

[24] Fine grains that remain visible (e.g., staining) on the surfaces of off-site streets, other paved areas, and sidewalks after you have implemented sediment removal practices are not a violation of Part 2.2.4.

[25] The requirements in Part 2.2.5 do not apply to the storage of rock, such as rip rap, landscape rock, pipe bedding gravel, and boulders. Refer to Part 2.3.3a for the requirements that apply to these types of materials.

[26] Examples of sediment barriers include berms, dikes, fiber rolls, silt fences, sandbags, gravel bags, or straw bale.

[27] Examples of cover include tarps, blown straw and hydroseeding.

[28] Where disturbance to steep slopes cannot be avoided. operators should consider implementing controls suitable for steep slope disturbances that are effective at minimizing erosion and sediment discharge (e.g., preservation of existing vegetation, hydraulic mulch, geotextiles and mats, compost blankets, earth dikes or drainage swales, terraces, velocity dissipation devices). To identify slopes and soil types that are of comparatively higher risk for sediment discharge in areas of the country where the CGP is in effect, operators can use the tables in Appendix F (see Tables F-2 thru F-6).

[29] Stockpiling topsoil at off-site locations, or transferring topsoil to other locations, is an example of a practice that is consistent with the requirements in Part 2.2.8. Preserving native topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed. For example, some sites may be designed to be highly impervious after construction, and therefore little or no vegetation is intended to remain, or may not have space to stockpile native topsoil on site for later use, in which case it may not be feasible to preserve topsoil.

[30] Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted.

f. Remove accumulated sediment to maintain at least one-half of the design capacity and conduct all other appropriate maintenance to ensure the basin or impoundment remains in effective operating condition.

2.2.13 If using treatment chemicals (e.g., *polymers, flocculants, coagulants*):

a. Use conventional erosion and sediment controls before and after the application of treatment chemicals. Chemicals may only be applied where treated stormwater is directed to a sediment control *(e.g., seaiment basin, perimeter control)* before discharge.

b. Select appropriate treatment chemicals. Chemicals must be appropriately suited to the types of soils likely to be exposed during construction and present in the discharges being treated *(i.e., the expected turbidity, pH, and flow rate of stormwater flowing into the chemical treatment system or area)*.

c. Minimize discharge risk from stored chemicals. Store all treatment chemicals in leak-proof containers that are kept under storm-resistant cover and surrounded by secondary containment structures *(e.g., spill berms, dikes, spill containment pallets)*, or provide equivalent measures designed and maintained to minimize the potential discharge of treatment chemicals in stormwater or by any other means *(e.g., storing chemicals in a covered area, having a spill kit available on site and ensuring personnel are available to respond expeditiously in the event of a leak or spill)*.

d. Comply with State/local requirements. Comply with applicable State and local requirements regarding the use of treatment chemicals.

e. Use chemicals in accordance with good engineering practices and specifications of the chemical provider/supplier. Use treatment chemicals and chemical treatment systems in accordance with good engineering practices, and with dosing specifications and sediment removal design specifications provided by the provider/supplier of the applicable chemicals, or document in your SWPPP specific departures from these specifications and how they reflect good engineering practice.

f. Ensure proper training. Ensure all persons who handle and use treatment chemicals at the construction site are provided with appropriate, product-specific training prior to beginning application of treatment chemicals. Among other things, the training must cover proper dosing requirements.

g. Perform additional measures specified by the EPA Regional Office for the authorized use of cationic chemicals. If you have been authorized to use cationic chemicals at your site pursuant to Part 1.1.9, you must perform all additional measures as conditioned by your authorization to ensure the use of such chemicals will not result in discharges that do not meet water quality standards.

2.2.14 Stabilize exposed portions of the site. Implement and maintain stabilization measures (*e.g., seeding protected by erosion controls until vegetation is established,*[35] *sodding, mulching, erosion control blankets, hydromulch, gravel*) that minimize erosion from any areas of exposed soil on the site in accordance with Part.

[35] If you will be evaluating the use of some type of erosion control netting to the site as part of your site stabilization, EPA encourages you to consider employing products that have been shown to minimize

a. Stabilization Deadlines:[36]

Table 2 Deadlines for Initiating and Completing Site Stabilization.

Total Amount of Land Disturbance Occurring At Any One Time[37]	**Deadline**
i. Five acres or less (≤5.0) **Note: this includes sites disturbing more than five acres (>5.0) total over the course of a project, but that limit disturbance at any one time (i.e., *phase the disturbance)* to five acres or less (≤5.0)**	• Initiate the installation of stabilization measures immediately[38] in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days;[39] and • Complete the installation of stabilization measures as soon as practicable, but no later than 14 calendar days

impacts on wildlife. For instance, the U.S. Fish & Wildlife Service provides recommendations on the type of netting practices that are considered "wildlife friendly," including those that use natural fiber or 100 percent biodegradable materials and that use a loose weave with a non-welded, movable jointed netting, as well as those products that are not wildlife friendly including square plastic netting that are degradable (e.g., photodegradable, UV-degradable, oxo-degradable), netting made from polypropylene, nylon, polyethylene, or polyester. Other recommendations include removing the netting product when it is no longer needed. See https://www.fws.gov/midwest/eastlansing/library/pdf/WildlifeFriendlyErosionControlProducts_revised.pdf for further information. There also may be State, Tribal, or local requirements about using wildlife friendly erosion control products.

[36] EPA may determine, based on an inspection carried out under Part 4.8 and corrective actions required under Part 5.3, that the level of sediment discharge on the site makes it necessary to require a faster schedule for completing stabilization. For instance, if sediment discharges from an area of exposed soil that is required to be stabilized are compromising the performance of existing stormwater controls, EPA may require stabilization to correct this problem.

[37] Limiting disturbances to five (5) acres or less at any one time means that at no time during the project do the cumulative earth disturbances exceed five (5) acres. The following examples would qualify as limiting disturbances at any one time to five (5) acres or less:

1. The total area of disturbance for a project is five (5) acres or less.
2. The total area of disturbance for a project will exceed five (5) acres, but the operator ensures that no more than five (5) acres will be disturbed at any one time through implementation of stabilization measures. In this way, site stabilization can be used to "free up" land that can be disturbed without exceeding the five (5)-acre cap to qualify for the 14-day stabilization deadline. For instance, if an operator completes stabilization of two (2) acres of land on a five (5)-acre disturbance, then two (2) additional acres could be disturbed while still qualifying for the longer 14-day stabilization deadline.

[38] The following are examples of activities that would constitute the immediate initiation of stabilization:

1. Prepping the soil for vegetative or non-vegetative stabilization as long as seeding, planting, and/or installation of non-vegetative stabilization products takes place as soon as practicable, but no later than one (1) calendar day of completing soil preparation;
2. Applying mulch or other non-vegetative product to the exposed area;
3. Seeding or planting the exposed area;
4. Starting any of the activities in # 1 – 3 on a portion of the entire area that will be stabilized; and
5. Finalizing arrangements to have stabilization product fully installed in compliance with the deadlines for completing stabilization.

[39] The requirement to initiate stabilization immediately is triggered as soon as you know that construction work on a portion of the site is temporarily ceased and will not resume for 14 or more days, or as soon as you know that construction work is permanently ceased. In the context of this provision, "immediately" means as soon as practicable, but no later than the end of the next business day, following the day when the construction activities have temporarily or permanently ceased.

Total Amount of Land Disturbance Occurring At Any One Time[37]	Deadline
	after stabilization has been initiated.[40]
ii. More than five acres (>5.0)	• Initiate the installation of stabilization measures immediately[41] in any areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for 14 or more calendar days;[42] and • Complete the installation of stabilization measures as soon as practicable, but no later than seven (7) calendar days after stabilization has been initiated.[43]

b. Exceptions:

i. Arid, semi-arid, and drought-stricken areas (as defined in Appendix A)**.** If it is the seasonally dry period (as defined in Appendix A)[44] or a period in which drought is occurring, and vegetative stabilization measures are being used:

(a) Immediately initiate and, within 14 calendar days of temporary or permanent cessation of work in any portion of your site, complete the installation of temporary non-vegetative stabilization measures to the extent necessary to prevent erosion;

(b) As soon as practicable, given conditions or circumstances on the site, complete all activities necessary to seed or plant the area to be stabilized; and

(c) If construction is occurring during the seasonally dry period, indicate in your SWPPP the beginning and ending dates of the seasonally dry period and your site conditions. Also include the schedule you will follow for initiating and completing vegetative stabilization.

ii. Unforeseen circumstances. Operators that are affected by unforeseen circumstances[45] that delay the initiation and/or completion of vegetative stabilization:

[40] If vegetative stabilization measures are being implemented, stabilization is considered "installed" when all activities necessary to seed or plant the area are completed, including the application of any non-vegetative protective cover (e.g., mulch, erosion control blanket), if applicable. If non-vegetative stabilization measures are being implemented, stabilization is considered "installed" when all such measures are implemented or applied.

[41] See footnote 38.

[42] See footnote 39.

[43] See footnote 40.

[44] The term "seasonally dry period" as defined in Appendix A refers to a month in which the long-term average total precipitation is less than or equal to 0.5 inches. Refer to EPA's Seasonally Dry Period Locator Tool at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates and supporting maps for assistance in determining whether a site is operating during a seasonally dry period for the area.

[45] Examples include problems with the supply of seed stock or with the availability of specialized equipment and unsuitability of soil conditions due to excessive precipitation and/or flooding.

(a) Immediately initiate and, within 14 calendar days, complete the installation of temporary non-vegetative stabilization measures to prevent erosion;

(b) Complete all soil conditioning, seeding, watering or irrigation installation, mulching, and other required activities related to the planting and initial establishment of vegetation as soon as conditions or circumstances allow it on your site; and

(c) Document in the SWPPP the circumstances that prevent you from meeting the deadlines in Part 2.2.14a and the schedule you will follow for initiating and completing stabilization.

iii. Discharges to a sediment- or nutrient-impaired water or to a water that is identified by your State, Tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes. Complete stabilization as soon as practicable, but no later than seven (7) calendar days after stabilization has been initiated.

c. Final Stabilization Criteria (for any areas not covered by permanent structures)**:**

i. Establish uniform, perennial vegetation *(i.e., evenly distributed, without large bare areas)* to provide 70 percent or more of the vegetative cover native to local undisturbed areas; and/or

ii. Implement permanent non-vegetative stabilization measures[46] to provide effective cover of any areas of exposed soil.

iii. Exceptions:

(a) **Arid, semi-arid, and drought-stricken areas** (as defined in Appendix A). Final stabilization is met if the area has been seeded or planted to establish vegetation that provides 70 percent or more of the vegetative cover native to local undisturbed areas within three (3) years and, to the extent necessary to prevent erosion on the seeded or planted area, non-vegetative erosion controls have been applied to provide cover for at least three years without active maintenance.

(b) **Disturbed areas on agricultural land that are restored to their preconstruction agricultural use.** The Part 2.2.14c final stabilization criteria do not apply.

(c) **Areas that need to remain disturbed.** In limited circumstances, stabilization may not be required if the intended function of a specific area of the site necessitates that it remain disturbed, and only the minimum area needed remains disturbed *(e.g., dirt access roads, utility pole pads, areas being used for storage of vehicles, equipment, materials)*.

2.3 POLLUTION PREVENTION REQUIREMENTS[47]

You must implement pollution prevention controls in accordance with the following requirements to minimize the discharge of pollutants in stormwater and to prevent the discharge of pollutants from spilled or leaked materials from construction activities.

[46] Examples of permanent non-vegetative stabilization measures include riprap, gravel, gabions, and geotextiles.

[47] Under this permit, you are not required to minimize exposure for any products or materials where the exposure to precipitation and to stormwater will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use).

precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas.

Exception: Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use).

b. *For pesticides, herbicides, insecticides, fertilizers, and landscape materials:*

i. In storage areas, provide either (1) cover (e.g., *plastic sheeting, temporary roofs*) to minimize the exposure of these chemicals to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas; and

ii. Comply with all application and disposal requirements included on the registered pesticide, herbicide, insecticide, and fertilizer label (see also Part 2.3.5).

c. *For diesel fuel, oil, hydraulic fluids, other petroleum products, and other chemicals:* The following requirements apply to the storage and handling of chemicals on your site. If you are already implementing controls as part of an SPCC or other spill prevention plan that meet or exceed the requirements of this Part, you may continue to do so and be considered in compliance with these provisions provided you reference the applicable parts of the SPCC or other plans in your SWPPP as required in Part 7.2.6b.viii.

i. If any chemical container has a storage capacity of less than 55 gallons:
(a) The containers must be water-tight, and must be kept closed, sealed, and secured when not being actively used;

(b) If stored outside, use a spill containment pallet or similar device to capture small leaks or spills; and

(c) Have a spill kit available on site that is in good working condition (i.e., not damaged, expired, or used up) and ensure personnel are available to respond immediately in the event of a leak or spill.

ii. If any chemical container has a storage capacity of 55 gallons or more:
(a) The containers must be water-tight, and must be kept closed, sealed, and secured when not being actively used;

(b) Store containers a minimum of 50 feet from receiving waters, constructed or natural site drainage features, and storm drain inlets. If infeasible due to site constraints, store containers as far away from these features as the site permits. If site constraints prevent you from storing containers 50 feet away from receiving waters or the other features identified, you must document in your SWPPP the specific reasons why the 50-foot setback is infeasible, and how you will store containers as far away as the site permits;

(c) Provide either (1) cover (e.g., temporary roofs) to minimize the exposure of these containers to precipitation and to stormwater, or (2) secondary containment (e.g., curbing, spill berms, dikes, spill containment pallets, double-wall, above-ground storage tank); and

(d) Have a spill kit available on site that is in good working condition (i.e., not

2.3.1 For equipment and vehicle fueling and maintenance:

a. Provide an effective means of eliminating the discharge of spilled or leaked chemicals, including fuels and oils, from these activities;[48]

b. If applicable, comply with the Spill Prevention Control and Countermeasures (SPCC) requirements in 40 CFR part 112 and Section 311 of the CWA;

c. Ensure adequate supplies are available at all times to handle spills, leaks, and disposal of used liquids;

d. Use drip pans and absorbents under or around leaky vehicles;

e. Dispose of or recycle oil and oily wastes in accordance with other Federal, State, Tribal, or local requirements; and

f. Clean up spills or contaminated surfaces immediately, using dry clean up measures (do not clean contaminated surfaces by hosing the area down), and eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge.

2.3.2 For equipment and vehicle washing:

a. Provide an effective means of minimizing the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other types of wash waters;[49]

b. Ensure there is no discharge of soaps, solvents, or detergents in equipment and vehicle wash water; and

c. For storage of soaps, detergents, or solvents, provide either (1) cover *(e.g., plastic sheeting, temporary roofs)* to minimize the exposure of these detergents to precipitation and to stormwater, or (2) a similarly effective means designed to minimize the discharge of pollutants from these areas.

2.3.3 For storage, handling, and disposal of building products, materials, and wastes:[50]

a. *For building materials and building products,*[51] provide either (1) cover (e.g., *plastic sheeting, temporary roofs*) to minimize the exposure of these products to

[48] Examples of effective means include:

- Locating activities away from receiving waters, storm drain inlets, and constructed or natural site drainage feature so that stormwater coming into contact with these activities cannot reach waters of the U.S.;
- Providing secondary containment (e.g., *spill berms, dikes, spill containment pallets*) and cover where appropriate; and
- Having a spill kit available on site and ensuring personnel are available to respond expeditiously in the event of a leak or spill.

[49] Examples of effective means include locating activities away from receiving waters and storm drain inlets or constructed or natural site drainage features and directing wash waters to a sediment basin or sediment trap, using filtration devices, such as filter bags or sand filters, or using other similarly effective controls.

[50] Compliance with the requirements of this permit does not relieve compliance requirements with respect to Federal, State, or local laws and regulations governing the storage, handling, and disposal of solid, hazardous, or toxic wastes and materials.

[51] Examples of building materials and building products typically present at construction sites include asphalt sealants, copper flashing, roofing materials, adhesives, concrete admixtures, and gravel and mulch stockpiles.

containers; and

(c) Clean up immediately if containers overflow, and if there is litter elsewhere on the site from escaped trash.

ii. Waste containers are not required for the waste remnant or unused portions of construction materials or final products that are covered by the exception in Part 2.2.3a provided that:

(a) These wastes are stored separately from other construction or domestic wastes addressed by Part 2.3.3e.i (i.e., wastes not covered by the exception in Part 2.3.3a). If the wastes are mixed, they must be stored in waste containers as required in Part 2.3.3e.i; and

(b) These wastes are stored in designated areas of the site, the wastes are described in the SWPPP (see Part 7.2.6b.ix), and identified in the site plan (see Part 7.2.4i).

f. *For sanitary waste*, position portable toilets so they are secure and will not be tipped or knocked over, and are located away from receiving waters, storm drain inlets, and constructed or natural site drainage features.

2.3.4 For washing applicators and containers used for stucco, paint, concrete, form release oils, curing compounds, or other materials:

a. Direct wash water into a leak-proof container or leak-proof and lined pit designed so no overflows can occur due to inadequate sizing or precipitation;

b. Handle washout or cleanout wastes as follows:

i. For liquid wastes:

(a) Do not dump liquid wastes or allow them to enter into constructed or natural site drainage features, storm inlets, or receiving waters;

(b) Do not allow liquid wastes to be disposed of through infiltration or to otherwise be disposed of on the ground;

(c) Comply with applicable State, Tribal, or local requirements for disposal

ii. Remove and dispose of hardened concrete waste consistent with your handling of other construction wastes in Part 2.3.3e; and

c. Locate any washout or cleanout activities as far away as possible from receiving waters, constructed or natural site drainage features, and storm drain inlets, and, to the extent feasible, designate areas to be used for these activities and conduct such activities only in these areas.

2.3.5 For the application of fertilizers:

a. Apply at a rate and in amounts consistent with manufacturer's specifications, or document in the SWPPP departures from the manufacturer specifications where appropriate in accordance with Part 7.2.6b.x;

b. Apply at the appropriate time of year for your location, and preferably timed to coincide as closely as possible to the period of maximum vegetation uptake and growth;

damaged, expired, or used up) and ensure personnel are available to respond immediately in the event of a leak or spill. Additional secondary containment measures are listed at 40 CFR § 112.7(c)(1).

iii. Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. You are prohibited from hosing the area down to clean surfaces or spills. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge.

d. *For hazardous or toxic wastes:*[52]

i. Separate hazardous or toxic waste from construction and domestic waste;

ii. Store waste in sealed containers, constructed of suitable materials to prevent leakage and corrosion, and labeled in accordance with applicable Resource Conservation and Recovery Act (RCRA) requirements and all other applicable Federal, State, Tribal, or local requirements;

iii. Store all outside containers within appropriately-sized secondary containment (e.g., *spill berms, dikes, spill containment pallets*) to prevent spills from being discharged, or provide a similarly effective means designed to prevent the discharge of pollutants from these areas *(e.g., storing chemicals in a covered area, having a spill kit available on site);*

iv. Dispose of hazardous or toxic waste in accordance with the manufacturer's recommended method of disposal and in compliance with Federal, State, Tribal, and local requirements;

v. Clean up spills immediately, using dry clean-up methods, and dispose of used materials properly. You are prohibited from hosing the area down to clean surfaces or spills. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge; and

vi. Follow all other Federal, State, Tribal, and local requirements regarding hazardous or toxic waste.

e. *For construction and domestic wastes:*[53]

i. Provide waste containers *(e.g., dumpster, trash receptacle)* of sufficient size and number to contain construction and domestic wastes;

(a) For waste containers with lids, keep waste container lids closed when not in use, and close lids at the end of the business day and during storm events. For waste containers without lids, provide either (1) cover *(e.g., a tarp, plastic sheeting, temporary roof)* to minimize exposure of wastes to precipitation, or (2) a similarly effective means designed to minimize the discharge of pollutants *(e.g., secondary containment)*;

(b) On business days, clean up and dispose of waste in designated waste

[52] Examples of hazardous or toxic waste that may be present at construction sites include paints, caulks, sealants, fluorescent light ballasts, solvents, petroleum-based products, wood preservatives, additives, curing compounds, and acids.

[53] Examples of construction and domestic wastes include packaging materials, scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, styrofoam, concrete, demolition debris; and other trash or discarded materials.

b. Do not place dewatering controls, such as pumped water filter bags, on steep slopes (as defined in Appendix A); and

c. At all points where dewatering water is discharged, comply with the velocity dissipation requirements of Part 2.2.11.

2.4.6 For backwash water, either haul it away for disposal or return it to the beginning of the treatment process;

2.4.7 Replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications; and

2.4.8 Comply with dewatering-specific inspection requirements in Part 4.

3 WATER QUALITY-BASED EFFLUENT LIMITATIONS

3.1 GENERAL EFFLUENT LIMITATION TO MEET APPLICABLE WATER QUALITY STANDARDS

Discharges must be controlled as necessary to meet applicable water quality standards. Discharges must also comply with any additional State or Tribal requirements that are in Part 9.

In the absence of information demonstrating otherwise, EPA expects that compliance with the conditions in this permit will result in stormwater discharges being controlled as necessary to meet applicable water quality standards. If at any time you become aware, or EPA determines, that discharges are not being controlled as necessary to meet applicable water quality standards, you must take corrective action as required in Parts 5.1 and 5.2, and document the corrective actions as required in Part 5.4.

EPA may insist that you install additional controls (to meet the narrative water quality-based effluent limit above) on a site-specific basis, or require you to obtain coverage under an individual permit, if information in your NOI or from other sources indicates that your discharges are not controlled as necessary to meet applicable water quality standards. This includes situations where additional controls are necessary to comply with a wasteload allocation in an EPA-established or approved TMDL.

If during your coverage under a previous permit, you were required to install and maintain stormwater controls specifically to meet the assumptions and requirements of an EPA-approved or established TMDL (for any parameter) or to otherwise control your discharge to meet water quality standards, you must continue to implement such controls as part of your coverage under this permit.

3.2 WATER QUALITY-BASED CONDITIONS FOR SITES DISCHARGING TO CERTAIN IMPAIRED AND HIGH QUALITY RECEIVING WATERS

For any portion of the site that discharges to a sediment or nutrient-impaired water or to a water that is identified by your State, Tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes,[57] you must comply with the inspection frequency specified in Part 4.3 and you must comply with the stabilization deadline specified in Part 2.2.14b.iii.[58]

[57] Refer to Appendix A for definitions of "impaired water" and "Tier 2," "Tier 2.5," and "Tier 3" waters. For assistance in determining whether your site discharges to impaired waters, EPA has developed a tool that is available at https://www.epa.gov/npdes/epas-stormwater-discharge-mapping-tools. For assistance in determining whether your site discharges to a Tier 2, 2.5, or 3 water, refer to the list of such waters at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates.

[58] If you qualify for any of the reduced inspection frequencies in Part 4.4, you may conduct inspections in

c. Avoid applying before heavy rains that could cause excess nutrients to be discharged;

d. Never apply to frozen ground;

e. Never apply to constructed or natural site drainage features; and

f. Follow all other Federal, State, Tribal, and local requirements regarding fertilizer application.

2.3.6 Emergency Spill Notification Requirements

Discharges of toxic or hazardous substances from a spill or other release are prohibited, consistent with Part 1.3.5. Where a leak, spill, or other 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 24-hour period, you must notify the National Response Center (NRC) at (800) 424-8802 or, in the Washington, DC metropolitan area, call (202) 267-2675 in accordance with the requirements of 40 CFR part 110, 40 CFR part 117, and 40 CFR part 302 as soon as you have knowledge of the release. You must also, within seven (7) calendar days of knowledge of the release, provide a description of the release, the circumstances leading to the release, and the date of the release. State, Tribal, or local requirements may necessitate additional reporting of spills or discharges to local emergency response, public health, or drinking water supply agencies.

2.4 CONSTRUCTION DEWATERING REQUIREMENTS

Comply with the following requirements to minimize the discharge of pollutants from dewatering[54] operations.

2.4.1 Route dewatering water through a sediment control (e.g., sediment trap or basin, pumped water filter bag) designed to prevent discharges with visual turbidity;[55]

2.4.2 Do not discharge visible floating solids or foam;

2.4.3 The discharge must not cause the formation of a visible sheen on the water surface, or visible oily deposits on the bottom or shoreline of the receiving water. Use an oil-water separator or suitable filtration device (such as a cartridge filter) designed to remove oil, grease, or other products if dewatering water is found to or expected to contain these materials;

2.4.4 To the extent feasible, use well-vegetated (e.g., grassy or wooded), upland areas of the site to infiltrate dewatering water before discharge.[56] You are prohibited from using receiving waters as part of the treatment area;

2.4.5 To prevent dewatering-related erosion and related sediment discharges:

a. Use stable, erosion-resistant surfaces (e.g., well-vegetated grassy areas, clean filter stone, geotextile underlayment) to discharge from dewatering controls;

[54] "Dewatering" is defined in Appendix A as "the act of draining accumulated stormwater and/or ground water from building foundations, vaults, and trenches, or other similar points of accumulation."

[55] For the purposes of this permit, visual turbidity is present where there is a sediment plume in the discharge or the discharge appears cloudy, or opaque, or has a visible contrast that can be identified by an observer.

[56] See footnote 19.

responsibilities for monitoring and reporting, each operator remains responsible for compliance with these requirements.[60]

3.3.1 Turbidity monitoring requirements[61]

a. Sampling frequency. You must collect at least one turbidity sample from your dewatering discharge each day a discharge occurs.

b. Sampling location. Samples must be taken at all points where dewatering water is discharged. Samples must be taken after the dewatering water has been treated by installed treatment devices pursuant to Parts 2.4.1 and 2.4.3 and prior to its discharge off site into a receiving water, constructed or natural site drainage feature, or storm drain inlet.

c. Representative samples. Samples taken must be representative of the dewatering discharge for any given day as required in Appendix G (standard permit conditions), Part G.10.2.

d. Test methods. Samples must be measured using a turbidity meter that reports results in nephelometric turbidity units (NTUs) and conforms with a Part 136-approved method (e.g., methods 180.1 and 2130). You are required to use the meter, and conduct a calibration verification prior to each day's use, consistent with the manufacturer's instructions.

3.3.2 Turbidity benchmark

a. The benchmark threshold for turbidity for this permit is 50 NTUs (referred to elsewhere in this permit as the "standard 50 NTU benchmark") unless EPA has authorized the use of an alternate benchmark in accordance with Part 3.3.2b.

b. Request for alternate benchmark threshold.

i. At any time prior to or during your coverage under this permit, you may request that EPA approve a benchmark for your site that is higher than 50 NTUs if you have information demonstrating the higher number is the same as your receiving water's water quality standard for turbidity. Unless EPA approves an alternate benchmark, you will be required to use the standard 50 NTU benchmark. To request approval of an alternate benchmark, you must submit the following information to your applicable EPA Regional Office (see Appendix K):
(a) The current turbidity water quality standard that applies to your receiving

[60] For instance, if Operator A relies on Operator B to meet the Part 3.3.1 turbidity monitoring requirements, the Part 3.3.4 reporting and recordkeeping requirements, and the Part 5.2.2 corrective action provisions when applicable, Operator A does not have to duplicate these same functions if Operator B is implementing them for both operators to be in compliance with the permit. However, Operator A remains responsible for complying with these permit requirements if Operator B fails to take actions that were necessary for Operator A to comply with the permit. See also footnote 83. EPA notes that both Operator A and B are required to submit turbidity monitoring reports as required under Part 3.3.4, however, Operator A's report does not need to include the data collected by Operator B as long as Operator B submits the required data and Operator A's report indicates that it is relying on Operator B to report the data. See Part 3.3.4a.

[61] Operators may find it useful to consult EPA's *Monitoring and Inspection Guide for Construction Dewatering*, available at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates, which provides guidelines on how to correctly monitor for turbidity, determine if the weekly average exceeds the benchmark, and, if so, how to proceed with corrective action.

If you discharge to a water that is impaired for a parameter other than a sediment-related parameter or nutrients, EPA will inform you if any additional controls are necessary for your discharge to be controlled as necessary to meet water quality standards. These controls might include those necessary for your discharge to be consistent with the assumptions of any available wasteload allocation in any applicable TMDL. In addition, EPA may require you to apply for and obtain coverage under an individual NPDES permit.

In addition, on a case-by-case basis, EPA may notify operators of new sites or operators of existing sites with increased discharges that additional analyses, stormwater controls, and/or other measures are necessary to comply with the applicable antidegradation requirements, or notify you that an individual permit application is necessary.

If you discharge to a water that is impaired for polychlorinated biphenyls (PCBs) and are engaging in demolition of any structure with at least 10,000 square feet of floor space built or renovated before January 1, 1980, you must:

a. Implement controls[59] to minimize the exposure of PCB-containing building materials, including paint, caulk, and pre-1980 fluorescent lighting fixtures, to precipitation and to stormwater; and

b. Ensure that disposal of such materials is performed in compliance with applicable State, Federal, and local laws.

3.3 TURBIDITY BENCHMARK MONITORING FOR SITES DISCHARGING DEWATERING WATER TO PROTECT THE WATER QUALITY OF SENSITIVE WATERS

For sites discharging dewatering water to "sensitive waters" (i.e., receiving waters listed as impaired for sediment or a sediment-related parameter (as defined in Appendix A), or receiving waters designated as a Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes) you are required to comply with the benchmark monitoring requirements in this Part and document the procedures you will use at your site in your SWPPP pursuant to Part 7.2.8. A summary of these requirements is included in Table 1.

EPA notes that the benchmark threshold is not an effluent limitation, rather it is an indicator that the dewatering controls may not be working to protect water quality, which the operator must investigate and correct as appropriate. A benchmark exceedance is not a permit violation. However, if a benchmark exceedance triggers corrective action in Part 5.1.5a, failure to conduct any required action is a permit violation.

Where there are multiple operators associated with the same site, the operators may coordinate with one another to carry out the monitoring requirements of this Part in order to avoid duplicating efforts. Such coordinating arrangements must be described in the SWPPP consistent with Part 7.2.8. Regardless of how the operators divide the

accordance with Part 4.4 for any portion of your site that discharges to a sensitive water.

[59] Examples of controls to minimize exposure of PCBs to precipitation and stormwater include separating work areas from non-work areas and selecting appropriate personal protective equipment and tools, constructing a containment area so that all dust or debris generated by the work remains within the protected area, and using tools that minimize dust and heat (<212°F). For additional information, refer to Part 2.3.3 of the CGP Fact Sheet.

water and the source/citation.[62]

(b) If the applicable turbidity water quality standard requires information on natural or background turbidity levels (e.g., "no more than 10 NTU above natural turbidity levels") to determine the specific standard for the receiving water, include available data that can be used to establish the natural turbidity levels of your receiving water (including literature studies or Federal, State, Tribal, or local government data). Data must be representative of the natural turbidity levels of your specific receiving water. Identify the source(s) of all data provided, including if the data are from samples you collected of the receiving water.

ii. EPA will inform you of its decision on whether to approve the requested alternate benchmark within 30 days. EPA may approve your request, request additional time (e.g., if additional information is needed to substantiate the data you provided), or deny your request. Unless and until EPA approves your request to use an alternate benchmark, you are required to use the standard benchmark of 50 NTUs and take any required corrective actions if an exceedance occurs.

3.3.3 Comparison of turbidity samples to benchmark. Compare the weekly average[63] of your turbidity monitoring results to the standard 50 NTU benchmark, or alternate benchmark if approved by EPA.

a. If the weekly average of your turbidity monitoring results exceeds the standard benchmark (or your approved alternate benchmark), you are required to conduct follow-up corrective action in accordance with Part 5.2.2 and document any corrective action taken in your corrective action log in accordance with Part 5.4.

b. For averaging purposes, a "monitoring week" starts with a Monday and ends on Sunday. Once a new monitoring week starts, you will need to calculate a new average for that week of turbidity monitoring results.[64] A weekly average may consist of one or more turbidity monitoring results.

c. Although you are not required to collect and analyze more than one turbidity sample per day from your dewatering discharge, if you do collect and analyze more than one sample on any given day, you must include any additional results in the

[62] For instance, if your site is located in Washington, DC, and you are discharging to a Class B water, for which the water quality standard is that turbidity may not increase above ambient levels by more than 20 percent, you would reference "Water Quality Standards for the District of Columbia, Chapter 11, Section 1104.8."

[63] A "weekly average" is defined as the sum of all of the turbidity samples taken during a "monitoring week" divided by the number of samples measured during that week. Average values should be calculated to the nearest whole number.

[64] For example, if turbidity samples from your dewatering discharge in week 1 result in values of 30 NTU on Tuesday, 40 NTU on Wednesday, and 45 NTU on Thursday, your weekly average turbidity value would be 38.33 NTU ((30+40+45) ÷ 3 = 38 NTU). If in week 2, your turbidity samples resulted in values of 45 NTU on Monday, 30 NTU on Tuesday, 25 NTU on Wednesday, and 15 NTU on Thursday, you would calculate a new average for that week, which would yield an average turbidity value of 28.75 NTU ((45+30+25+15) ÷ 4 = 29 NTU). By comparison, if your samples on consecutive days from Friday to Monday were 60 NTU, 45 NTU, 40 NTU, and 43 NTU, respectively, and there are no other dewatering discharges for the remainder of the week, you would calculate one weekly average for the Friday to Sunday to be 48 NTU ((60+45+40) ÷ 3 = 48 NTU), and a separate weekly average for the one Monday to be 43 NTU (43 ÷ 1 = 43 NTU).

calculation of your weekly average (i.e., add all individual results for that monitoring week and divide by the total number of samples).[65]

d. If you are conducting turbidity monitoring for more than one dewatering discharge point, you must calculate a weekly average turbidity value for each discharge point and compare each to the turbidity benchmark.

3.3.4 Reporting and recordkeeping.

a. You must submit reports of your weekly average turbidity data to EPA no later than 30 days following the end of each monitoring quarter. If there are monitoring weeks in which there was no dewatering discharge, or if there is a monitoring quarter with no dewatering discharge, indicate this in your turbidity monitoring report. If another operator associated with your same site is conducting turbidity monitoring on your behalf pursuant to Part 3.3, indicate this in your turbidity monitoring report.

b. For the purposes of this permit, the following monitoring quarters and reporting deadlines apply:

Table 3. Monitoring Quarters and Deadlines for Reporting Turbidity Benchmark Monitoring Data.

Monitoring Quarter #	**Months**	**Reporting Deadline** (no later than 30 days after end of the monitoring quarter)
1	January 1 – March 31	April 30
2	April 1 – June 30	July 30
3	July 1 – September 30	October 30
4	October 1 – December 31	January 30

c. You must use EPA's NPDES eReporting Tool (NeT) to electronically submit your quarterly turbidity data, unless, consistent with Part 1.4.2, you received a waiver from your applicable EPA Regional Office. If the EPA Regional Office grants you approval to use a paper turbidity monitoring report form, and you elect to use it, you must complete the form in Appendix K. If EPA approves of your request to use an alternate turbidity benchmark pursuant to Part 3.3.2b, EPA will substitute the alternate benchmark in your NeT account.

d. For each day in which you are required to monitor, you must record the monitoring information required by Appendix G, Parts G.10.2 and G.10.3 and retain all such information for a period of at least three years from the date this permit expires or from the date your authorization is terminated.

[65] For example, if during a monitoring week you take two turbidity samples on Tuesday with a value of 30 NTU and 35 NTU, three samples on Wednesday with a value of 40 NTU, 45 NTU, and 48 NTU, and one sample on Thursday with a value of 45 NTU, your weekly average turbidity value for this week would be 41 NTU ((30+35+40+45+48+45) ÷ 6 = 41 NTU).

Table 4. Summary of Turbidity Benchmark Monitoring Requirements.

Applicability	Sampling Requirement	Turbidity Benchmark	Corrective Action	Reporting
Sites discharging dewatering water to a sediment-impaired water or to a water designated as a Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes.	Collect at least one turbidity sample per day, from each discharge point, on any day there is a dewatering discharge. Use turbidity sampling procedures specified in Part 3.3.1.	Compare the weekly average of your turbidity monitoring results to the 50 NTU benchmark (or alternate benchmark if approved by EPA).	If the weekly average of turbidity monitoring results exceeds the 50 NTU turbidity benchmark (or alternate benchmark if approved by EPA), you are required to take follow-up corrective action in accordance with Part 5.2.2.	Report all weekly average turbidity monitoring results on a quarterly basis via NeT-CGP (unless use of the paper monitoring form in Appendix K is approved by EPA) no later than 30 days following the end of each monitoring quarter.

4 INSPECTION REQUIREMENTS

4.1 PERSON(S) RESPONSIBLE FOR CONDUCTING SITE AND DEWATERING INSPECTIONS

The person(s) inspecting your site may be a person on your staff or a third party you hire to conduct such inspections. You are responsible for ensuring that any person conducting inspections pursuant to this Part is a "qualified person." A qualified person is someone who has completed the training required by Part 6.3.

4.2 FREQUENCY OF INSPECTIONS.[66]

At a minimum, you must conduct a site inspection in accordance with one of the two schedules listed below, unless you are subject to the Part 4.3 site inspection frequency for discharges to sediment or nutrient-impaired or high quality waters, or qualify for a Part 4.4 reduction in the inspection frequency:

4.2.1 At least once every seven (7) calendar days; *or*

4.2.2 Once every 14 calendar days *and* within 24 hours[67] of the occurrence of:

a. A storm event that produces 0.25 inches or more of rain within a 24-hour period.

i. If a storm event produces 0.25 inches or more of rain within a 24-hour period (including when there are multiple, smaller storms that alone produce less than 0.25 inches but together produce 0.25 inches or more in 24 hours), you are required to conduct one inspection within 24 hours of when 0.25 inches of rain or more has fallen.

[66] Inspections are only required during the site's normal working hours.

[67] For the purposes of the inspection requirements in this Part, conducting an inspection "within 24 hours" means that once either of the two conditions in Parts 4.2.2a or 4.2.2b are met you have 24 hours from that time to conduct an inspection. For clarification, the 24 hours is counted as a continuous passage of time, and not counted by business hours (e.g., 3 business days of 8 hours each). When the 24-hour inspection time frame occurs entirely outside of normal working hours, you must conduct an inspection by no later than the end of the next business day.

ii. If a storm event produces 0.25 inches or more of rain within a 24-hour period on the first day of a storm and continues to produce 0.25 inches or more of rain on subsequent days, you must conduct an inspection within 24 hours of the first day of the storm and within 24 hours after the last day of the storm that produces 0.25 inches or more of rain (i.e., only two inspections would be required for such a storm event).[68]

b. A discharge caused by snowmelt from a storm event that produces 3.25 inches[69] or more of snow within a 24-hour period. You are required to conduct one inspection once the discharge of snowmelt from a 3.25-inch or more snow accumulation occurs. Additional snowmelt inspections are only required if following the discharge from the first snowmelt, there is a discharge from a separate storm event that produces 3.25 inches or more of snow.

4.2.3 To determine whether a storm event meets either of the thresholds in Parts 4.2.2a or 4.2.2b:

a. For rain, you must either keep a properly maintained rain gauge on your site, or obtain the storm event information from a weather station that is representative of your location. For any 24-hour period during which there is 0.25 inches or more of rainfall, you must record the total rainfall measured for that day in accordance with Part 4.7.1d.

b. For snow, you must either take measurements of snowfall at your site,[70] or rely on similar information from a local weather forecasting provider that is representative of your location.

4.3 INCREASE IN INSPECTION FREQUENCY FOR CERTAIN SITES.

The increased inspection frequencies established in this Part take the place of the Part 4.2 inspection frequencies for the portion of the site affected.

4.3.1 **For any portion of the site that discharges to a sediment or nutrient-impaired water or to a water that is identified by your State, Tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes (see Part 3.2),** you must conduct an once every seven (7) calendar days *and* within 24 hours of the occurrence of a storm event that produces 0.25 inches or more of rain within a 24-hour period, or within 24 hours of a snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period.

[68] For example, if 0.30 inches of rain falls on Day 1, 0.25 inches of rain falls on Day 2, and 0.10 inches of rain fall on Day 3, you would be required to conduct a first inspection within 24 hours of the Day 1 rainfall and a second inspection within 24 hours of the Day 2 rainfall, but a third inspection would not be required within 24 hours of the Day 3 rainfall.

[69] This is the amount of snow that is equivalent to 0.25 inches of rain, based on information from the National Oceanic and Atmospheric Administration (NOAA) indicating that 13 inches of snow is, on average, equivalent to 1 inch of rain. See https://www.nssl.noaa.gov/education/svrwx101/winter/faq/.

[70] For snowfall measurements, EPA suggests use of NOAA's National Weather Service guidelines at https://www.weather.gov/jkl/snow_measurement. These guidelines recommend use of a "snowboard" (a piece of wood about 16 inches by 16 inches) that is placed in an unobstructed part of the site on a hard surface.

Refer to Parts 4.2.3a and 4.2.3b for the requirements to determine if a storm event produces enough rain or snow to trigger the inspection requirement.

4.3.2 **For sites discharging dewatering water,** you must conduct an inspection in accordance with Part 4.6.3 during the discharge once per day on which the discharge occurs. The Part 4.2 inspection frequency still applies to all other portions of the site, unless the site is affected by either the increased frequency in Part 4.3.1 or the reduced frequency in Part 4.4.

4.4 REDUCTIONS IN INSPECTION FREQUENCY

4.4.1 Stabilized areas.

a. You may reduce the frequency of inspections to twice per month for the first month, no more than 14 calendar days apart, then once per month until permit coverage is terminated consistent with Part 8 in any area of your site where the stabilization steps in Part 2.2.14a have been completed. If construction activity resumes in this portion of the site at a later date, the inspection frequency immediately increases to that required in Parts 4.2 and 4.3, as applicable. You must document the beginning and ending dates of this period in your SWPPP.

b. **Exception.** For "linear construction sites" (as defined in Appendix A) where disturbed portions have undergone final stabilization at the same time active construction continues on others, you may reduce the frequency of inspections to twice per month for the first month, no more than 14 calendar days apart, in any area of your site where the stabilization steps in Part 2.2.14a have been completed. After the first month, inspect once more within 24 hours of the occurrence of a storm event that produces 0.25 inches of rain or more within a 24-hour period, or within 24 hours of a snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period. If there are no issues or evidence of stabilization problems, you may suspend further inspections. If "wash-out" of stabilization materials and/or sediment is observed, following re-stabilization, inspections must resume at the inspection frequency required in Part 4.4.1a. Inspections must continue until final stabilization is visually confirmed following a storm event that produces 0.25 inches of rain or more within a 24-hour period.

4.4.2 **Arid, semi-arid, or drought-stricken areas** (as defined in Appendix A). If it is the seasonally dry period[71] or a period in which drought is occurring, you may reduce the frequency of inspections to once per month and within 24 hours of the occurrence of a storm event that produces 0.25 inches of rain or more within a 24-hour period, or within 24 hours of a snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period. You must document that you are using this reduced schedule and the beginning and ending dates of the seasonally dry period in your SWPPP. Follow the procedures in Part 4.2.3a and 4.2.3b, accordingly, to determine if a storm event occurs that produces 0.25 inches or more of rain or 3.25 inches or more of snow within a 24-hour period. For any 24-hour period during which there is 0.25 inches or more of rainfall, or 3.25 inches or more of snow, you must record the total rainfall or snow measured for that day in accordance with Part 4.7.1d.

[71] See footnote 44.

4.4.3 **Frozen conditions:**

a. If you are suspending construction activities due to frozen conditions, you may temporarily suspend inspections on your site until thawing conditions (as defined in Appendix A) begin to occur if:

i. Discharges are unlikely due to continuous frozen conditions that are likely to continue at your site for at least three (3) months based on historic seasonal averages.[72] If unexpected weather conditions (such as above freezing temperatures or rain events) make discharges likely, you must immediately resume your regular inspection frequency as described in Parts 4.2 and 4.3, as applicable;

ii. Land disturbances have been suspended; and

iii. All disturbed areas of the site have been stabilized in accordance with Part 2.2.14a.

b. If you are still conducting construction activities during frozen conditions, you may reduce your inspection frequency to once per month if:

i. Discharges are unlikely due to continuous frozen conditions that are likely to continue at your site for at least three (3) months based on historic seasonal averages. If unexpected weather conditions (such as above freezing temperatures or rain events) make discharges likely, you must immediately resume your regular inspection frequency as described in Parts 4.2 and 4.3, as applicable; and

ii. Except for areas in which you are actively conducting construction activities, disturbed areas of the site have been stabilized in accordance with Part 2.2.14a.

You must document the beginning and ending dates of this period in your SWPPP.

4.5 AREAS THAT MUST BE INSPECTED

During your site inspection, you must at a minimum inspect the following areas of your site:

4.5.1 All areas that have been cleared, graded, or excavated and that have not yet completed stabilization consistent with Part 2.2.14a;

4.5.2 All stormwater controls, including pollution prevention controls, installed at the site to comply with this permit;[73]

4.5.3 Material, waste, borrow, and equipment storage and maintenance areas that are covered by this permit;

4.5.4 All areas where stormwater typically flows within the site, including constructed or natural site drainage features designed to divert, convey, and/or treat stormwater;

4.5.5 All areas where construction dewatering is taking place, including controls to treat the dewatering discharge and any channelized flow of water to and from those controls;

[72] Use data sets that include the most recent data available to account for recent precipitation patterns and trends.

[73] This includes the requirement to inspect for sediment that has been tracked out from the site onto paved roads, sidewalks, or other paved areas consistent with Part 2.2.4.

e. Whether or not any of the following indications of pollutant discharge were observed at the point of discharge to any receiving waters flowing through or immediately adjacent to the site and/or to constructed or natural site drainage features or storm drain inlets:[75]

i. a sediment plume, suspended solids, unusual color, presence of odor, decreased clarity, or presence of foam; and/or

ii. a visible sheen on the water surface or visible oily deposits on the bottom or shoreline of the receiving water; and

f. Photographs of (1) the dewatering water prior to treatment by a dewatering control(s) and the final discharge after treatment; (2) the dewatering control(s); and (3) the point of discharge to any receiving waters flowing through or immediately adjacent to the site and/or to constructed or natural site drainage features, storm drain inlets, and other conveyances to receiving waters.

You must also comply with the Part 4.7.2, 4.7.3, and 4.7.4 requirements for signing the reports, keeping them available on site, and retaining copies.

4.6.4 Based on the results of your inspection:

a. Complete any necessary maintenance repairs or replacements under Part 2.1.4 or under Part 5, whichever applies; and

b. Modify your SWPPP site map in accordance with Part 7.4.1 to reflect changes to your stormwater controls that are no longer accurately reflected on the current site map.

4.7 INSPECTION REPORT

4.7.1 You must complete an inspection report within 24 hours of completing any site inspection. Each inspection report (except for dewatering inspection reports, which are covered in Part 4.6.3) must include the following:

a. The inspection date;

b. Names and titles of personnel making the inspection;

c. A summary of your inspection findings, covering at a minimum the observations you made in accordance with Part 4.6, including any problems found during your inspection that make it necessary to perform routine maintenance pursuant to Part 2.1.4b or corrective action pursuant to Part 5. Include also any documentation as to why the corrective action procedures under Part 5 are unnecessary to fix a problem that repeatedly occurs as described in Part 2.1.4c;

d. If you are inspecting your site at the frequency specified in Part 4.2.2, Part 4.3, or Part 4.4.1b, and you conducted an inspection because of a storm event that produced rainfall measuring 0.25 inches or more within a 24-hour period, you must include the applicable rain gauge or weather station readings that triggered the inspection. Similarly, if you conducted an inspection because of a snowmelt discharge from a storm event that produced 3.25 inches or more of snow within a 24-hour period, you must include any measurements taken of snowfall at your site, or weather station information you relied on; and

[75] If the operator observes any of these indicators of pollutant discharge, corrective action is required consistent with Parts 5.1.5b and 5.2.2.

4.5.6 All points of discharge from the site; and

4.5.7 All locations where stabilization measures have been implemented.

You are not required to inspect areas that, at the time of the inspection, are considered unsafe to your inspection personnel.

4.6 REQUIREMENTS FOR INSPECTIONS

4.6.1 During each site inspection, you must at a minimum:

a. Check whether all stormwater controls *(i.e., erosion and sediment controls and pollution prevention controls)* are properly installed, appear to be operational, and are working as intended to minimize pollutant discharges.

b. Check for the presence of conditions that could lead to spills, leaks, or other accumulations of pollutants on the site.

c. Identify any locations where new or modified stormwater controls are necessary to meet the requirements of Parts 2 and/or 3.

d. Check for signs of visible erosion and sedimentation *(i.e., sediment deposits)* that have occurred and are attributable to your discharge at points of discharge and, if applicable, on the banks of any receiving waters flowing within or immediately adjacent to the site;

e. Check for signs of sediment deposition that are visible from your site and attributable to your discharge (e.g., sand bars with no vegetation growing on top in receiving waters or in other constructed or natural site drainage features, or the buildup of sediment deposits on nearby streets, curbs, or open conveyance channels).

f. Identify any incidents of noncompliance observed.

4.6.2 If a discharge is occurring during your inspection:

a. Identify all discharge points at the site; and

b. Observe and document the visual quality of the discharge, and take note of the characteristics of the stormwater discharge, including color; odor; floating, settled, or suspended solids; foam; oil sheen; and other indicators of stormwater pollutants. Check also for signs of these same pollutant characteristics that are visible from your site and attributable to your discharge in receiving waters or in other constructed or natural site drainage features.

4.6.3 For dewatering inspections conducted pursuant to Parts 4.3.2, record the following in a report within 24 hours of completing the inspection:

a. The inspection date;

b. Names and titles of personnel making the inspection;

c. Approximate times that the dewatering discharge began and ended on the day of inspection;[74]

d. Estimates of the rate (in gallons per day) of discharge on the day of inspection;

[74] If the dewatering discharge is a continuous discharge that continues after normal business hours, indicate that the discharge is continuous.

5.1.3 Your discharges are not meeting applicable water quality standards;

5.1.4 A prohibited discharge has occurred (see Part 1.3); or

5.1.5 During discharge from site dewatering activities:

a. The weekly average of your turbidity monitoring results exceeds the 50 NTU benchmark (or alternate benchmark if approved by EPA pursuant to Part 3.3.2b); or

b. You observe or you are informed by EPA, State, or local authorities of the presence of the conditions specified in Part 4.6.3e.

5.2 CORRECTIVE ACTION DEADLINES

5.2.1 If responding to any of the Part 5.1.1, 5.1.2, 5.1.3, or 5.1.4 triggering conditions, you must:

a. Immediately take all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events; and

b. When the problem does not require a new or replacement control or significant repair, the corrective action must be completed by the close of the next business day; or

c. When the problem requires a new or replacement control or significant repair, install the new or modified control and make it operational, or complete the repair, by no later than seven (7) calendar days from the time of discovery. If it is infeasible to complete the installation or repair within seven (7) calendar days, you must document in your records why it is infeasible to complete the installation or repair within the 7-day timeframe and document your schedule for installing the stormwater control(s) and making it operational as soon as feasible after the 7-day timeframe. Where these actions result in changes to any of the stormwater controls or procedures documented in your SWPPP, you must modify your SWPPP accordingly within seven (7) calendar days of completing this work.

5.2.2 If responding to either of the Part 5.1.5 triggering conditions related to site dewatering activities, you must:

a. Immediately take all reasonable steps to minimize or prevent the discharge of pollutants until you can implement a solution, including shutting off the dewatering discharge as soon as possible depending on the severity of the condition[77] taking safety considerations into account;

b. Determine whether the dewatering controls are operating effectively and whether they are causing the conditions; and

c. Make any necessary adjustments, repairs, or replacements to the dewatering controls to lower the turbidity levels below the benchmark or remove the visible plume or sheen.

[77] For instance, if the weekly average of your turbidity monitoring results or a single sample is extremely high (e.g., a single turbidity sample results in 355 NTUs or higher), you should take action to safely shut off the discharge so that you can evaluate the cause of the high turbidity. Note: A single turbidity sample of 355 NTUs or higher means that the weekly average turbidity value will exceed 50 NTU regardless of the turbidity values the other days during the week.

e. If you determined that it is unsafe to inspect a portion of your site, you must describe the reason you found it to be unsafe and specify the locations to which this condition applies.

4.7.2 Each inspection report must be signed by the operator's signatory in accordance with Appendix G, Part G.11 of this permit.

4.7.3 You must keep a copy of all inspection reports at the site or at an easily accessible location, so that it can be made immediately available at the time of an on-site inspection or upon request by EPA.[76]

4.7.4 You must retain all inspection reports completed for this Part for at least three (3) years from the date that your permit coverage expires or is terminated.

4.8 INSPECTIONS BY EPA

You must allow EPA, or an authorized representative of EPA, to conduct the following activities at reasonable times. To the extent that you are utilizing shared controls, that are not on site, to comply with this permit, you must make arrangements for EPA to have access at all reasonable times to those areas where the shared controls are located.

4.8.1 Enter onto all areas of the site, including any construction support activity areas covered by this permit, any off-site areas where shared controls are utilized to comply with this permit, discharge locations, adjoining waterbodies, and locations where records are kept under the conditions of this permit;

4.8.2 Access and copy any records that must be kept under the conditions of this permit;

4.8.3 Inspect your construction site, including any construction support activity areas covered by this permit (see Part 1.2.1c), any stormwater controls installed and maintained at the site, and any off-site shared controls utilized to comply with this permit; and

4.8.4 Sample or monitor for the purpose of ensuring compliance.

5 CORRECTIVE ACTIONS

5.1 CONDITIONS TRIGGERING CORRECTIVE ACTION.

You must take corrective action to address any of the following conditions identified at your site:

5.1.1 A stormwater control needs a significant repair or a new or replacement control is needed, or, in accordance with Part 2.1.4c, you find it necessary to repeatedly (i.e., three (3) or more times) conduct the same routine maintenance fix to the same control at the same location (unless you document in your inspection report under Part 4.7.1c that the specific reoccurrence of this same problem should still be addressed as a routine maintenance fix under Part 2.1.4); or

5.1.2 A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly; or

[76] Inspection reports may be prepared, signed, and kept electronically, rather than in paper form, if the records are: (a) in a format that can be read in a similar manner as a paper record; (b) legally dependable with no less evidentiary value than their paper equivalent; and (c) immediately accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be, if the records were stored in paper form. For additional guidance on the proper practices to follow for the electronic retention of inspection report records, refer to the Fact Sheet discussion related to Part 4.7.3.

When you have completed these steps and made any changes deemed necessary, you may resume discharging from your dewatering activities.

5.3 CORRECTIVE ACTION REQUIRED BY EPA

You must comply with any corrective actions required by EPA as a result of permit violations found during an inspection carried out under Part 4.8.

5.4 CORRECTIVE ACTION LOG

5.4.1 For each corrective action taken in accordance with this Part, you must record the following in a corrective action log:

- **a.** Within 24 hours of identifying the corrective action condition, document the specific condition and the date and time it was identified.
- **b.** Within 24 hours of completing the corrective action (in accordance with the deadlines in Part 5.2), document the actions taken to address the condition, including whether any SWPPP modifications are required.

5.4.2 Each entry into the corrective action log, consisting of the information required by both Parts 5.4.1a and 5.4.1b, must be signed by the operator's signatory in accordance with Appendix G, Part G.11.2 of this permit.

5.4.3 You must keep a copy of the corrective action log at the site or at an easily accessible location, so that it can be made immediately available at the time of an on-site inspection or upon request by EPA.[78]

5.4.4 You must retain the corrective action log for at least three (3) years from the date that your permit coverage expires or is terminated.

6 STORMWATER TEAM FORMATION/STAFF TRAINING REQUIREMENTS

6.1 STORMWATER TEAM

Each operator, or group of multiple operators, must assemble a "stormwater team" that will be responsible for carrying out activities necessary to comply with this permit. The stormwater team must include the following people:

- **a.** Personnel who are responsible for the design, installation, maintenance, and/or repair of stormwater controls (including pollution prevention controls);
- **b.** Personnel responsible for the application and storage of treatment chemicals (if applicable);
- **c.** Personnel who are responsible for conducting inspections as required in Part 4.1; and
- **d.** Personnel who are responsible for taking corrective actions as required in Part 5.

Members of the stormwater team must be identified in the SWPPP pursuant to Part 7.2.2.

[78] The corrective action log may be prepared, signed, and kept electronically, rather than in paper form, if the records are: (a) in a format that can be read in a similar manner as a paper record; (b) legally dependable with no less evidentiary value than their paper equivalent; and (c) immediately accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be, if the records were stored in paper form. For additional guidance on the proper practices to follow for the electronic retention of corrective action log records, refer to the Fact Sheet discussion related to Part 4.7.3.

6.2 GENERAL TRAINING REQUIREMENTS FOR STORMWATER TEAM MEMBERS

Prior to the commencement of construction activities, you must ensure that all persons[79] assigned to the stormwater team understand the requirements of this permit and their specific responsibilities with respect to those requirements, including the following related to the scope of their job duties:

- **a.** The permit requirements and deadlines associated with installation, maintenance, and removal of stormwater controls, as well as site stabilization;
- **b.** The location of all stormwater controls on the site required by this permit and how they are to be maintained;
- **c.** The proper procedures to follow with respect to the permit's pollution prevention requirements; and
- **d.** When and how to conduct inspections, record applicable findings, and take corrective actions. Specific training requirements for persons conducting site inspections are included in Part 6.3.

You are responsible for ensuring that all activities on the site comply with the requirements of this permit. You are not required to provide or document formal training for subcontractors or other outside service providers (unless the subcontractors or outside service providers are responsible for conducting the inspections required in Part 4, in which case you must provide such documentation consistent with Part 7.2.2), but you must ensure that such personnel understand any requirements of this permit that may be affected by the work they are subcontracted to perform.

6.3 TRAINING REQUIREMENTS FOR PERSONS CONDUCTING INSPECTIONS

For projects that receive coverage under this permit on or after February 17, 2023, to be considered a qualified person under Part 4.1 for conducting inspections under Part 4, you must, at a minimum, either:

- **a.** Have completed the EPA construction inspection course developed for this permit and have passed the exam; or
- **b.** Hold a current valid construction inspection certification or license from a program that, at a minimum, covers the following:[80]
  - **i.** Principles and practices of erosion and sediment control and pollution prevention practices at construction sites;
  - **ii.** Proper installation and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites; and
  - **iii.** Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of Part 4.

[79] If the person requiring training is a new employee who starts after you commence construction activities, you must ensure that this person has the proper understanding as required above prior to assuming particular responsibilities related to compliance with this permit. For emergency-related projects, the requirement to train personnel prior to commencement of construction activities does not apply, however, such personnel must have the required training prior to NOI submission.

[80] If one of the following topics (e.g., installation and maintenance of pollution prevention practices) is not covered by the non-EPA training program, you may consider supplementing the training with the analogous module of the EPA course (e.g., Module 4) that covers the missing topic.

7.2.2 **Stormwater Team.** Identify the personnel (by name and position) that you have made part of the stormwater team pursuant to Part 6.1, as well as their individual responsibilities, including which members are responsible for conducting inspections.

Include verification that each member of the stormwater team has received the training required by Part 6.2. Include documentation that members of the stormwater team responsible for conducting inspections pursuant to Part 4 have received the training required by Part 6.3. If personnel on your team elect to complete the EPA inspector training program pursuant to Part 6.3a, you must include copies of the certificate showing that the relevant personnel have completed the training and passed the exam. If personnel on your team elect to complete a non-EPA inspector training program pursuant to Part 6.3b, you must include documentation showing that these persons have successfully completed the program and their certification or license is still current. You must also confirm that the non-EPA inspector training program satisfies the minimum elements for such programs in Part 6.3b.

7.2.3 **Nature of Construction Activities.** Include the following:

- **a.** A description of the nature of your construction activities, including the age or dates of past renovations for structures that are undergoing demolition;
- **b.** The size of the property (in acres or length in miles if a linear construction site);
- **c.** The total area expected to be disturbed by the construction activities (to the nearest quarter acre or nearest quarter mile if a linear construction site);
- **d.** A description of any on-site and off-site construction support activity areas covered by this permit (see Part 1.2.1c);
- **e.** The maximum area expected to be disturbed at any one time, including on-site and off-site construction support activity areas;
- **f.** A description and projected schedule for the following:[85]
  - **i.** Commencement of construction activities in each portion of the site, including clearing and grubbing, mass grading, demolition activities, site preparation (i.e., excavating, cutting and filling), final grading, and creation of soil and vegetation stockpiles requiring stabilization;
  - **ii.** Temporary or permanent cessation of construction activities in each portion of the site;
  - **iii.** Temporary or final stabilization of exposed areas for each portion of the site; and
  - **iv.** Removal of temporary stormwater controls and construction equipment or vehicles, and the cessation of construction-related pollutant-generating activities.

[85] If plans change due to unforeseen circumstances or for other reasons, the requirement to describe the sequence and estimated dates of construction activities is not meant to "lock in" the operator to meeting these dates. When departures from initial projections are necessary, this should be documented in the SWPPP itself, or in associated records, as appropriate.

For projects that receive coverage under this permit prior to February 17, 2023, any personnel conducting site inspections pursuant to Part 4 on your site must, at a minimum, be a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the appropriate skills and training to assess conditions at the construction site that could impact stormwater quality, and the appropriate skills and training to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.[81]

6.4 STORMWATER TEAM'S ACCESS TO PERMIT DOCUMENTS

Each member of the stormwater team must have easy access to an electronic or paper copy of applicable portions of this permit, the most updated copy of your SWPPP, and other relevant documents or information that must be kept with the SWPPP.

7 STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

7.1 GENERAL REQUIREMENTS

All operators associated with a construction site under this permit must develop a SWPPP consistent with the requirements in Part 7 prior to their submittal of the NOI.[82, 83, 84] The SWPPP must be kept up-to-date throughout coverage under this permit.

If a SWPPP was prepared under a previous version of this permit, the operator must review and update the SWPPP to ensure that this permit's requirements are addressed prior to submitting an NOI for coverage under this permit.

7.2 SWPPP CONTENTS

At a minimum, the SWPPP must include the information specified in this Part and as specified in other parts of this permit.

7.2.1 **All Site Operators.** Include a list of all other operators who will be engaged in construction activities at the site, and the areas of the site over which each operator has control.

[81] If you receive coverage for a project prior to February 17, 2023, and construction activities for the same project will continue after February 17, 2023, the personnel conducting inspections do not need to take the additional training specified in Parts 6.3a and 6.3b for inspections conducted on the project site. If the same operator obtains coverage for a different project on or after February 17, 2023, personnel conducting inspections would be required to meet the requirements for a qualified person by completing the training in either Part 6.3a or Part 6.3b.

[82] The SWPPP does not establish the effluent limits and/or other permit terms and conditions that apply to your site's discharges; these limits, terms, and conditions are established in this permit.

[83] Where there are multiple operators associated with the same site, they may develop a group SWPPP instead of multiple individual SWPPPs. Regardless of whether there is a group SWPPP or multiple individual SWPPPs, each operator is responsible for compliance with the permit's terms and conditions. In other words, if Operator A relies on Operator B to satisfy its permit obligations, Operator A does not have to duplicate those permit-related functions if Operator B is implementing them such that both operators are in compliance with the permit. However, Operator A remains responsible for permit compliance if Operator B fails to take actions necessary for Operator A to comply with the permit. In addition, all operators must ensure, either directly or through coordination with other operators, that their activities do not cause a violation or compromise any other operators' controls and/or any shared controls. See also footnote 60.

[84] There are a number of commercially available products to assist operators in developing the SWPPP, as well as companies that can be hired to help develop a site-specific SWPPP. The permit does not state which are recommended, nor does EPA endorse any specific products or vendors. Where operators choose to rely on these products or services, the choice of which ones to use to comply with the requirements of this Part is a decision for the operator alone.

g. A list and description of all pollutant-generating activities[86] on the site. For each pollutant-generating activity, include an inventory of pollutants or pollutant constituents (e.g., *sediment, fertilizers, pesticides, paints, caulks, sealants, fluorescent light ballasts, contaminated substrates, solvents, fuels*) associated with that activity, which could be discharged in stormwater from your construction site. You must take into account where potential spills and leaks could occur that contribute pollutants to stormwater discharges, and any known hazardous or toxic substances, such as PCBs and asbestos, that will be disturbed or removed during construction;

h. Business days and hours for the project;

i. If you are conducting construction activities in response to a public emergency (see Part 1.4), a description of the cause of the public emergency *(e.g., mud slides, earthquake, extreme flooding conditions, widespread disruption in essential public services)*, information substantiating its occurrence *(e.g., State disaster declaration or similar State or local declaration)*, and a description of the construction necessary to reestablish affected public services.

7.2.4 Site Map. Include a legible map, or series of maps, showing the following features of the site:

a. Boundaries of the property;

b. Locations where construction activities will occur, including:

i. Locations where earth-disturbing activities will occur (note any phasing), including any demolition activities;

ii. Approximate slopes before and after major grading activities (note any steep slopes (as defined in Appendix A));

iii. Locations where sediment, soil, or other construction materials will be stockpiled;

iv. Any receiving water crossings;

v. Designated points where vehicles will exit onto paved roads;

vi. Locations of structures and other impervious surfaces upon completion of construction; and

vii. Locations of on-site and off-site construction support activity areas covered by this permit (see Part 1.2.1c).

c. Locations of any receiving waters within the site and all receiving waters within one mile downstream of the site's discharge point(s). Also identify if any of these receiving waters are listed as impaired or are identified as a Tier 2, Tier 2.5, or Tier 3 water;

d. Any areas of Federally listed critical habitat within the action area of the site as defined in Appendix A;

e. Type and extent of pre-construction cover on the site (e.g., vegetative cover, forest, pasture, pavement, structures);

f. Drainage patterns of stormwater and authorized non-stormwater before and after major grading activities;

[86] Examples of pollutant-generating activities include paving operations; concrete, paint, and stucco washout and waste disposal; solid waste storage and disposal; and dewatering activities.

g. Stormwater and authorized non-stormwater discharge locations, including:

i. Locations where stormwater and/or authorized non-stormwater will be discharged to storm drain inlets, including a notation of whether the inlet conveys stormwater to a sediment basin, sediment trap, or similarly effective control;[87]

ii. Locations where stormwater or authorized non-stormwater will be discharged directly to receiving waters (i.e., not via a storm drain inlet); and

iii. Locations where turbidity benchmark monitoring will take place to comply with Part 3.3, if applicable to your site.

h. Locations of all potential pollutant-generating activities identified in Part 7.2.3g;

i. Designated areas where construction wastes that are covered by the exception in Part 2.3.3e.ii because they are not pollutant-generating will be stored;

j. Locations of stormwater controls, including natural buffer areas and any shared controls utilized to comply with this permit; and

k. Locations where polymers, flocculants, or other treatment chemicals will be used and stored.

7.2.5 Non-Stormwater Discharges. Identify all authorized non-stormwater discharges in Part 1.2.2 that will or may occur.

7.2.6 Description of Stormwater Controls.

a. For each of the Part 2.2 erosion and sediment control requirements, Part 2.3 pollution prevention requirements, and Part 2.4 construction dewatering requirements, as applicable to your site, you must include the following:

i. A description of the specific control(s) to be implemented to meet these requirements;

ii. The design specifications for controls described in Part 7.2.6a.i (including references to any manufacturer specifications and/or erosion and sediment control manuals/ordinances relied upon);[88]

iii. Routine stormwater control maintenance specifications; and

iv. The projected schedule for stormwater control installation/implementation.

b. You must also include any of the following additional information as applicable.

i. **Natural buffers and/or equivalent sediment controls** (see Part 2.2.1 and Appendix F). You must include the following:

(a) The compliance alternative to be implemented;

(b) If complying with alternative 2, the width of natural buffer retained;

[87] The requirement to show storm drain inlets in the immediate vicinity of the site on your site map only applies to those inlets that are easily identifiable from your site or from a publicly accessible area immediately adjacent to your site.

[88] Design specifications may be found in manufacturer specifications and/or in applicable erosion and sediment control manuals or ordinances. Any departures from such specifications must reflect good engineering practice and must be explained in the SWPPP.

(c) If complying with alternative 2 or 3, the erosion and sediment control(s) you will use to achieve an equivalent sediment reduction, and any information you relied upon to demonstrate the equivalency;

(d) If complying with alternative 3, a description of why it is infeasible for you to provide and maintain an undisturbed natural buffer of any size;

(e) For "linear construction sites" where it is infeasible to implement compliance alternative 1, 2, or 3, a rationale for this determination, and a description of any buffer width retained and/or supplemental erosion and sediment controls installed; and

(f) A description of any disturbances that are exempt under Part 2.2.1 that occur within 50 feet of a receiving water.

ii. **Perimeter controls for a "linear construction site"** (see Part 2.2.3d). For areas where perimeter controls are not feasible, include documentation to support this determination and a description of the other practices that will be implemented to minimize discharges of pollutants in stormwater associated with construction activities.

Note: Routine maintenance specifications for perimeter controls documented in the SWPPP must include the Part 2.2.3c.i requirement that sediment be removed before it has accumulated to one-half of the above-ground height of any perimeter control.

iii. **Sediment track-out controls** (see Parts 2.2.4b and 2.2.4c)**.** Document the specific stabilization techniques and/or controls that will be implemented to remove sediment prior to vehicle exit.

iv. **Inlet protection measures** (see Part 2.2.10a). Where inlet protection measures are not required because the storm drain inlets to which your site discharges are conveyed to a sediment basin, sediment trap, or similarly effective control, include a short description of the control that receives the stormwater flow from the site.

v. **Sediment basins** (see Part 2.2.12). In circumstances where it is infeasible to utilize outlet structures that withdraw water from the surface, include documentation to support this determination, including the specific conditions or time periods when this exception will apply.

vi. **Treatment chemicals** (see Part 2.2.13), you must include the following:

(a) A listing of the soil types that are expected to be exposed during construction in areas of the project that will drain to chemical treatment systems. Also include a listing of soil types expected to be found in fill material to be used in these same areas, to the extent you have this information prior to construction;

(b) A listing of all treatment chemicals to be used at the site and why the selection of these chemicals is suited to the soil characteristics of your site;

(c) If the applicable EPA Regional Office authorized you to use cationic treatment chemicals for sediment control, include the specific controls and implementation procedures designed to ensure that your use of cationic

treatment chemicals will not lead to a discharge that does not meet water quality standards;

(d) The dosage of all treatment chemicals to be used at the site or the methodology to be used to determine dosage;

(e) Information from any applicable Safety Data Sheet (SDS);

(f) Schematic drawings of any chemically enhanced stormwater controls or chemical treatment systems to be used for application of the treatment chemicals;

(g) A description of how chemicals will be stored consistent with Part 2.2.13c;

(h) References to applicable State or local requirements affecting the use of treatment chemicals, and copies of applicable manufacturer's specifications regarding the use of your specific treatment chemicals and/or chemical treatment systems; and

(i) A description of the training that personnel who handle and apply chemicals have received prior to permit coverage, or will receive prior to use of the treatment chemicals at your site.

vii. **Stabilization measures** (see Part 2.2.14). You must include the following:

(a) The specific vegetative and/or non-vegetative practices that will be used;

(b) The stabilization deadline that will be met in accordance with Part 2.2.14;

(c) If complying with the deadlines for sites in arid, semi-arid, or drought-stricken areas, the beginning and ending dates of the seasonally dry period (as defined in Appendix A)[89] and the schedule you will follow for initiating and completing vegetative stabilization; and

(d) If complying with deadlines for sites affected by unforeseen circumstances that delay the initiation and/or completion of vegetative stabilization, document the circumstances and the schedule for initiating and completing stabilization.

viii. **Spill prevention and response procedures** (see Parts 1.3.5, 2.3.3c, 2.3.3d, and 2.3.6). You must include the following:

(a) Procedures for expeditiously stopping, containing, and cleaning up spills, leaks, and other releases. Identify the name or position of the employee(s) responsible for detection and response of spills or leaks; and

(b) Procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity consistent with Part 2.3.6 and established under either 40 CFR part 110, 40 CFR part 117, or 40 CFR part 302, occurs

[89] See footnote 44.

during a 24-hour period. Contact information must be in locations that are readily accessible and available to all employees.

You may also reference the existence of SPCC plans developed for the construction activity under Section 311 of the CWA, or spill control programs otherwise required by an NPDES permit for the construction activity, provided that you keep a copy of that other plan on site.[90]

ix. Waste management procedures (see Part 2.3.3). Describe the procedures you will follow for handling, storing, and disposing of all wastes generated at your site consistent with all applicable Federal, State, Tribal, and local requirements, including clearing and demolition debris, sediment removed from the site, construction and domestic waste, hazardous or toxic waste, and sanitary waste. You must also include the following additional information:

(a) If site constraints prevent you from storing chemical containers 50 feet away from receiving waters or the other site drainage features as required in Part 2.3.3c.ii(b), document in your SWPPP the specific reasons why the 50-foot setback is not feasible, and how you will store containers as far away as the site permits; and

(b) If there are construction wastes that are subject to the exception in Part 2.3.3e.ii, describe the specific wastes that will be stored on your site.

x. Application of fertilizers (see Part 2.3.5). Document any departures from the manufacturer specifications where appropriate.

7.2.7 Procedures for Inspection, Maintenance, and Corrective Action. Describe the procedures you will follow for maintaining your stormwater controls, conducting site inspections, and, where necessary, taking corrective actions, in accordance with Part 2.1.4, Part 4, and Part 5 of this permit, accordingly. Also include:

a. The inspection schedule you will follow, which is based on whether your site is subject to Part 4.2 or Part 4.3, or whether your site qualifies for any of the reduced inspection frequencies in Part 4.4;

b. If you will be conducting inspections in accordance with the inspection schedule in Part 4.2.2, Part 4.3, or Part 4.4.1b, the location of the rain gauge or the address of the weather station you will be using to obtain rainfall data;

c. If you will be reducing your inspection frequency in accordance with Part 4.4.1b, the beginning and ending dates of the seasonally defined arid period for your area or the valid period of drought;

d. If you will be reducing your inspection frequency in accordance with Part 4.4.3, the beginning and ending dates of frozen conditions on your site; and

e. Any maintenance or inspection checklists or other forms that will be used.

7.2.8 Procedures for Turbidity Benchmark Monitoring from Dewatering Discharges (if applicable). If you are required to comply with the Part 3.3 turbidity benchmark

[90] Even if you already have an SPCC or other spill prevention plan in existence, your plans will only be considered adequate if they meet all of the requirements of this Part, either as part of your existing plan or supplemented as part of the SWPPP.

monitoring requirements, describe the procedures you will follow to collect and evaluate samples, report results to EPA and keep records of monitoring information, and take corrective action when necessary. Include the specific type of turbidity meter you will use for monitoring, as well as any manuals or manufacturer instructions on how to operate and calibrate the meter. Describe any coordinating arrangement you may have with any other permitted operators on the same site with respect to compliance with the turbidity monitoring requirements, including which parties are tasked with specific responsibilities. If EPA has approved of an alternate turbidity benchmark pursuant to Part 3.3.2b, include any data and other documentation you relied on to request use of the specific alternative benchmark.

7.2.9 Compliance with Other Requirements.

a. Threatened and Endangered Species Protection. Include documentation required in the Endangered Species Protection section of the NOI in NeT, or the ESA worksheet in Appendix D, supporting your eligibility with regard to the protection of threatened and endangered species and designated critical habitat.

b. Historic Properties. Include documentation required in Appendix E supporting your eligibility with regard to the protection of historic properties.

c. Safe Drinking Water Act Underground Injection Control (UIC) Requirements for Certain Subsurface Stormwater Controls. If you are using any of the following stormwater controls at your site, document any contact you have had with the applicable State agency[91] or EPA Regional Office responsible for implementing the requirements for underground injection wells in the Safe Drinking Water Act and EPA's implementing regulations at 40 CFR § 144 -147. Such controls would generally be considered Class V UIC wells:

i. Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system);

ii. Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow; and

iii. Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system).

7.2.10 SWPPP Certification. Your signatory must sign and date your SWPPP in accordance with Appendix G, Part G.11.

7.2.11 Post-Authorization Additions to the SWPPP. Once you are authorized for coverage under this permit, you must include the following documents as part of your SWPPP:

a. A copy of your NOI submitted to EPA along with any correspondence exchanged between you and EPA related to coverage under this permit;

b. A copy of the acknowledgment letter you receive from NeT assigning your NPDES ID (i.e., *permit tracking number*);

[91] For State UIC program contacts, refer to the following EPA website: https://www.epa.gov/uic.

ii. A description of the controls that will be used to meet such requirements.

e. To reflect any revisions to applicable Federal, State, Tribal, or local requirements that affect the stormwater controls implemented at the site; and

f. If applicable, if a change in chemical treatment systems or chemically enhanced stormwater control is made, including use of a different treatment chemical, different dosage rate, or different area of application.

7.4.2 You must maintain records showing the dates of all SWPPP modifications. The records must include the name of the person authorizing each change (see Part 7.2.9 above) and a brief summary of all changes.

7.4.3 All modifications made to the SWPPP consistent with Part 7.4 must be authorized by a person identified in Appendix G, Part G.11.b.

7.4.4 Upon determining that a modification to your SWPPP is required, if there are multiple operators covered under this permit, you must immediately notify any operators who may be impacted by the change to the SWPPP.

8 HOW TO TERMINATE COVERAGE

Until you terminate coverage under this permit, you must comply with all conditions and effluent limitations in the permit. To terminate permit coverage, you must submit to EPA a complete and accurate Notice of Termination (NOT), which certifies that you have met the requirements for terminating in Part 8.

8.1 MINIMUM INFORMATION REQUIRED IN NOT

8.1.1 NPDES ID (i.e., *permit tracking number)* provided by EPA when you received coverage under this permit;

8.1.2 Basis for submission of the NOT (see Part 8.2);

8.1.3 Operator contact information;

8.1.4 Name of site and address (or a description of location if no street address is available); and

8.1.5 NOT certification.

8.2 CONDITIONS FOR TERMINATING CGP COVERAGE

You may terminate CGP coverage only if one or more of the conditions in Parts 8.2.1, 8.2.2, or 8.2.3 has occurred. Until your termination is effective consistent with Part 8.5, you must continue to comply with the conditions of this permit.

8.2.1 You have completed all construction activities at your site and, if applicable, construction support activities covered by this permit (see Part 1.2.1c), and you have met all of the following requirements:

a. For any areas that (1) were disturbed during construction, (2) are not covered by permanent structures, and (3) over which you had control during the construction activities, you have met the requirements for final vegetative or non-vegetative stabilization in Part 2.2.14c.

To document that you have met these stabilization requirements, you must take either ground or aerial photographs that show your site's compliance with the Part 2.2.14 stabilization requirements and submit them with your NOT. If any portion of your

c. A copy of this permit (an electronic copy easily available to the stormwater team is also acceptable).

7.3 ON-SITE AVAILABILITY OF YOUR SWPPP

You must keep a current copy of your SWPPP at the site or at an easily accessible location so that it can be made available at the time of an on-site inspection or upon request by EPA; a State, Tribal, or local agency approving stormwater management plans; the operator of a storm sewer system receiving discharges from the site; or representatives of the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS).[92]

EPA may provide access to portions of your SWPPP to a member of the public upon request. Confidential Business Information (CBI) will be withheld from the public, but may not be withheld from EPA, USFWS, or NMFS.[93]

If an on-site location is unavailable to keep the SWPPP when no personnel are present, notice of the plan's location must be posted near the main entrance of your construction site.

7.4 SWPPP MODIFICATIONS

7.4.1 You must modify your SWPPP, including the site map(s), within seven (7) days of any of the following conditions:

a. Whenever new operators become active in construction activities on your site, or you make changes to your construction plans, stormwater controls, or other activities at your site that are no longer accurately reflected in your SWPPP. This includes changes made in response to corrective actions triggered under Part 5. You do not need to modify your SWPPP if the estimated dates in Part 7.2.3f change during the course of construction;

b. To reflect areas on your site map where operational control has been transferred (and the date of transfer) since initiating permit coverage;

c. If inspections or investigations by EPA or its authorized representatives determine that SWPPP modifications are necessary for compliance with this permit;

d. Where EPA determines it is necessary to install and/or implement additional controls at your site in order to meet the requirements of this permit, the following must be included in your SWPPP:

i. A copy of any correspondence describing such measures and requirements; and

[92] The SWPPP may be prepared, signed, and kept electronically, rather than in paper form, if the records are: (a) in a format that can be read in a similar manner as a paper record; (b) legally dependable with no less evidentiary value than their paper equivalent; and (c) immediately accessible to the inspector during an inspection to the same extent as a paper copy stored at the site would be, if the records were stored in paper form. For additional guidance on the proper practices to follow for the electronic retention of the SWPPP, refer to the Fact Sheet discussion related to Part 4.7.3.

[93] Information covered by a claim of confidentiality will be disclosed by EPA only to the extent of, and by means of, the procedures set forth in 40 CFR part 2, Subpart B. In general, submitted information protected by a business confidentiality claim may be disclosed to other employees, officers, or authorized representatives of the United States concerned with implementing the CWA. The authorized representatives, including employees of other executive branch agencies, may review CBI during the course of reviewing draft regulations.

site is covered by one of the exceptions in Part 2.2.14c.iii, indicate which exception applies and include a supplementary explanation with your photographs that provides the necessary context for why this portion of the site is in compliance with the final stabilization criteria even though it appears to be unstabilized. You are not required to take photographs of every distinct part of your site that is being stabilized, however, the conditions of the site portrayed in any photographs that are submitted must be substantially similar[94] to those of the areas that are not photographed. You must also comply with the following related to these photographs:

- **i.** Take photographs both before and after the site has met the final stabilization criteria in Part 2.2.14c;
- **ii.** All photographs must be clear and in focus, and in the original format and resolution; and
- **iii.** Include the date each photograph was taken, and a brief description of the area of the site captured by the photograph (e.g., photo shows application of seed and erosion control mats to remaining exposed surfaces on northeast corner of site).

b. You have removed and properly disposed of all construction materials, waste and waste handling devices, and have removed all equipment and vehicles that were used during construction, unless intended for long-term use following your termination of permit coverage;

c. You have removed all stormwater controls that were installed and maintained during construction, except those that are intended for long-term use following your termination of permit coverage or those that are biodegradable (as defined in Appendix A); and

d. You have removed all potential pollutants and pollutant-generating activities associated with construction, unless needed for long-term use following your termination of permit coverage; or

8.2.2 You have transferred control of all areas of the site for which you are responsible under this permit to another operator, and that operator has submitted an NOI and obtained coverage under this permit; or

8.2.3 Coverage under an individual or alternative general NPDES permit has been obtained.

8.3 HOW TO SUBMIT YOUR NOT

You must use EPA's NPDES eReporting Tool (NeT) to electronically prepare and submit an NOT for the 2022 CGP.

To access NeT, go to https://cdx.epa.gov/cdx.

Waivers from electronic reporting may be granted as specified in Part 1.4.2. If the EPA Regional Office grants you approval to use a paper NOT, and you elect to use it, you must complete the form in Appendix I.

[94] Stabilization conditions that are substantially similar would include areas that are using the same type of stabilization measures and that have similar slopes, soils, and topography, and have achieved the same level of stabilization.

8.4 DEADLINE FOR SUBMITTING THE NOT

You must submit an NOT within 30 calendar days after any one of the conditions in Part 8.2 occurs.

8.5 EFFECTIVE DATE OF TERMINATION OF COVERAGE

Your authorization to discharge under this permit terminates at midnight of the calendar day that a complete NOT is submitted to EPA.

9 PERMIT CONDITIONS APPLICABLE TO SPECIFIC STATES, INDIAN COUNTRY LANDS, OR TERRITORIES

The provisions in this Part provide additions to the applicable conditions of this permit to reflect specific additional conditions required as part of the State or Tribal CWA Section 401 certification process, or the Coastal Zone Management Act (CZMA) certification process, or as otherwise established by the permitting authority. The specific additional revisions and requirements only apply to activities in those specific States, Indian country, and areas in certain States with Federal Facilities or areas subject to construction projects by Federal Operators. States, Indian country, and other areas not included in this Part do not have any additions to the applicable conditions of this permit.

9.1 EPA REGION 1

9.1.1 NHR100000 State of New Hampshire

a. Should the permit coverage for an individual applicant be insufficient to achieve water quality standards, the New Hampshire Department of Environmental Services (NHDES) may prepare additional 401 certification conditions for that applicant. Any additional 401 certification conditions will follow all required NHDES public participation requirements.

b. If you disturb 100,000 square feet or more of contiguous area, you must also comply with RSA 485-A:17 and Env-Wq 1500, and, unless exempt, apply for an Alteration of Terrain (AoT) permit from NHDES. This requirement also applies to a lower disturbance threshold of 50,000 square feet or more when construction occurs within the protected shoreline under the Shoreland Water Quality Protection Act (see RSA 483-B and Env-Wq 1400). A permit application must also be filed if your project disturbs an area of greater than 2,500 square feet, is within 50 feet of any surface water, and has a flow path of 50 feet or longer disturbing a grade of 25 percent or greater. Project sites with disturbances smaller than those discussed above, that have the potential to adversely affect state surface waters, are subject to the conditions of an AoT General Permit by Rule (Env-Wq 1503.03).

c. You must determine that any excavation dewatering discharges are not contaminated before they will be authorized as an allowable non-stormwater discharge under this permit (see Part 1.2.2 of the Construction General Permit or CGP). In the absence of information demonstrating otherwise, the water is considered uncontaminated if there is no groundwater contamination within 1,000 feet of the groundwater dewatering location. Information on groundwater contamination can be generated over the Internet via the NHDES web site http://des.nh.gov/ by using the One Stop Data Mapper. For a toxic substance included in the New Hampshire surface water quality standards, see Env-Wq 1703.21 (see https://www.des.nh.gov/sites/g/fi1es/ehbemt 341/files/documents/2020-01/Env-Wq

1700.pdf). If it is determined that the groundwater to be dewatered is near a remediation or other waste site, you must apply for the Remediation General Permit (see https://www3.epa.gov/region1/npdes/rgp.html)

d. As a minimum, you must treat any uncontaminated excavation "dewatering" discharges and "stormwater" discharges, as those terms are defined in Appendix A of the CGP, as necessary, to remove suspended solids and turbidity so that the surface waters receiving the construction discharges[95] meet New Hampshire surface water quality standards for turbidity (Env-Wq 1703.11 and Env-Wq 1703.03(c)(1)c), benthic deposits (Env-Wq 1703.03(c)(1)a), and Env-Wq 1703.08) and foam, debris, scum or other visible substances (i.e., plumes or visual turbidity)[96] (Env-Wq 1703.03(c)(1)b).

i. For all Construction Activities covered under this CGP, the following shall apply to ensure compliance with the aforementioned regulations for turbidity, benthic deposits and visible substances:

Unless otherwise specified, site inspection requirements shall comply with Part 4 of the CGP. As a minimum site inspection frequency shall be in accordance with Part 4.2.2 of the CGP (and Part 4.3.2 of the CGP for sites discharging dewatering water). Site inspection frequency may be reduced in accordance with Part 4.4 of the CGP (Reductions in Inspection Frequency). Monitoring of the receiving water for visible turbidity and benthic sediment deposits shall be conducted each site inspection and results reported in the Inspection Report required in Part 4.7 of the CGP. Should visible turbidity or benthic sediment deposits attributable or partly attributable to your construction activities be present in the receiving water, the "Corrective Actions" specified in Part 5 shall be immediately implemented to correct the water quality standard violations. In addition, daily monitoring (including photographs) of the receiving water shall be conducted until there is no visible turbidity or benthic deposits. Inspection Reports required in Part 4.7 of the CGP shall include, but not be limited to, the distance downstream and the percent of the river width[97] where visible turbidity was observed, and the period of time that the visible turbidity persisted. A copy of the Inspection Report(s) shall be made available to NHDES within 24 hours of receiving a written request from NHDES.

ii. For Construction Activities, disturbing 5 acres or more of land at any one time (excluding areas that have been completely stabilized in accordance with the final stabilization criteria specified in Part 2.2.14.c of the CGP), the following shall

[95] Construction Discharges include uncontaminated "dewatering" and "stormwater" discharges as those terms are defined in Appendix A of the CGP. Controlled construction discharges are construction discharges where the rate of flow can be regulated such as from a construction settling basin or NHDES approved flocculation system.

[96] For the definition of visual turbidity, see the definition for "Non-Turbid" in Appendix A of the CGP, which states the following:" "Non-Turbid" - a discharge that is free from visual turbidity. For the purposes of this permit, visual turbidity refers to a sediment plume or other cloudiness in the water caused by sediment that can be identified by an observer." *[EPA interprets the text of this footnote as intending to reference the Appendix A definitions of "visual turbidity" and "non-turbid" in the final permit.]*

[97] The distance downstream and the percent of river width where visible turbidity (i.e., plume) is observed is required to determine the extent of the river affected and to determine if there was a "zone of passage" (i.e., a portion of the receiving water where there was no visible turbidity where mobile organisms could pass without being adversely impacted). The percent of river width affected is equal 100 multiplied by the width of the plume (in feet) divided by the width of the receiving water (in feet).

apply to ensure compliance with the aforementioned regulations for turbidity, benthic deposits and visible substances.

Item 9.1.1.d.i) above shall apply to all construction discharges and the minimum site inspection frequency shall comply with Part 4.3.1 of the CGP (and Part 4.3.2 of the CGP for sites discharging dewatering water). Site inspection frequency may be reduced in accordance with Part 4.4 of the CGP (Reductions in Inspection Frequency).

With regards to controlled construction discharges, if there is no visible turbidity (i.e., plumes) or benthic deposits, and, in the absence of information demonstrating otherwise, turbidity measurements of less than or equal to 50 nephelometric turbidity units (NTU) in the controlled construction discharges at the outlet prior to mixing with the receiving surface waters, shall be presumed to meet New Hampshire surface water quality standards for the parameters listed above. As a minimum, the controlled construction discharges must be sampled at each site inspection.

If any controlled construction discharge exceeds 50 NTU, or if visible turbidity or benthic sediment deposits attributable or partly attributable to any construction discharge are observed in the receiving water, then the "Corrective Actions" specified in Part 5 of the CGP shall be immediately implemented.

In addition, should such violation occur, and, in order to determine compliance with surface water quality standards for turbidity (Env-Wq 1703.11 and Env-Wq 1703.03(c)(1)c), benthic deposits (Env-Wq 1703.03(c)(1)a), and Env-Wq 1703.08) and foam, debris, scum or other visible substances (Env-Wq 1703.03(c)(1)b)), turbidity monitoring shall be immediately implemented as specified below:

Turbidity samples of the receiving water shall be immediately taken in the receiving water upstream and beyond the influence of the construction activity, and, unless a mixing zone[98] is approved by NHDES, no more than 75 feet downstream of each controlled construction discharge that exceeded 50 NTU and no more than 75 feet downstream of each construction discharge that caused visible turbidity.

Downstream samples shall be taken at locations in the receiving water that are most likely influenced by the discharge (e.g., if visible turbidity (i.e., a plume) is present, the sample shall be taken in the plume). Samples shall be collected a minimum of 2 times per day during the daylight hours at times when construction activities are most likely to cause turbidity in the receiving water and shall continue until the turbidity water quality standards are met in the receiving water (i.e., the difference between the upstream and downstream turbidity level is no greater than 10 NTU).

[98] Permittees may request a distance greater than 75 feet downstream of a construction discharge for determining compliance with turbidity standards in Class B surface waters, by submitting a mixing zone request to NHDES that complies with Env-Wq 1707.02. If a mixing zone is approved, NHDES is required to include conditions to ensure that the criteria on which the approval is based are met (Env-Wq 1707.03).

i. A list of all non-stormwater discharges that occur at the facility, including their source locations and the control measures being used (see Part 1.2.2 of the CGP).

ii. Records of sampling and analysis required for construction dewatering and stormwater discharges (see 9.1.1.d above).

h. All required or requested documents must be sent to: NH Department of Environmental Services, Watershed Management Bureau, P.O. Box 95 Concord, NH 03302-0095.

9.1.2 MAR100000 Commonwealth of Massachusetts (except Indian country)

a. All discharges covered by the Construction General Permit shall comply with the provisions pursuant to 314 CMR 3.00, 314 CMR 4.00, 314 CMR 9.00, including applicable construction stormwater standards and 310 CMR 10.00.

b. Pursuant to 314 CMR 3.11 (2)(a)6., and in accordance with MassDEP's obligation under 314 CMR 4.05(5)(e) to maintain surface waters free from pollutants in concentrations or combinations that are toxic to humans, aquatic life, or wildlife, permittees are prohibited from discharging dewatering water under the CGP from sites that are designated as Superfund/CERCLA or RCRA, and must make accommodations to dispose of the dewatering discharges appropriately, such as coverage under the Remediation General Permit (RGP).

c. Pursuant to 314 CMR 3.11 (2)(a), and in accordance with MassDEP's obligation to protect Outstanding Resource Waters under 314 CMR 4.04(3), applicants seeking coverage under the 2022 CGP that propose to carry out construction activities near Outstanding Resource Waters as identified in 314 CMR 4.06, shall submit to MassDEP for review:

i. a copy of the Stormwater Pollution Prevention Plan (SWPPP),

ii. a copy of the EPA NOI, and

iii. MassDEP's Stormwater BMP Checklist.

For purposes of this review, the permittee shall submit these documents to MassDEP at the same time they are submitted to EPA. Instructions on how to submit these documents to MassDEP and where to find the MassDEP Stormwater BMP Checklist and obtain authorization to discharge can be found here: https://www.mass.gov/how-to/wm-15-npdes-general-permit-notice-of- intent.

d. Pursuant to 314 CMR 3.11 (2)(a)6., and in accordance with MassDEP's obligation under 314 CMR 4.05(5)(e) to maintain surface waters free from pollutants in concentrations or combinations that are toxic to humans, aquatic life, or wildlife, applicants that propose to dewater under the 2022 CGP and plan to discharge to certain waters as described below, shall determine that any dewatering discharges are not contaminated by testing the proposed discharge as described below as part of the application for WM15 authorization. Unless otherwise specified, testing described in this section should be conducted using the methods in 40 CFR 136.

i. Applicants for sites that plan to discharge to Outstanding Resource Waters as identified in 314 CMR 4.06 shall test one sample of the proposed dewatering discharge water for pH, E. Coli (for discharges to freshwater), fecal coliform (for

If water quality standards are not met during daylight hours on any day, sampling shall resume the next day and continue no fewer than 2 times per day until water quality standards are met. The date, time, location and results of turbidity measurements, as well as a summary identifying the cause of the violations, corrective actions that were implemented, the period of time that the receiving water exceeded turbidity standards and the distance downstream and the percent of the river width where visible turbidity was observed, and the period of time that the visible turbidity persisted, shall be recorded and included in the Inspection Report required in Part 4.7 of the CGP. Turbidity measurements shall be conducted via a field meter in accordance with the requirements for turbidity specified in Table 1B in 40 CFR 136.3 (see 40 CFR §136.3 Identification of test procedures - Code of Federal Regulations ecfr.io). Field meters shall be calibrated every day sampling is conducted and prior to the first sample.

e. Construction site owners and operators are encouraged to consider opportunities for post- construction groundwater recharge using infiltration best management practices (BMPs) during site design and preparation of the SWPPP in order to assure compliance with Env-Wq 1703.03 and Env-Wq 1703.11. If your construction site is in a town that is required to obtain coverage under the NPDES General Permit for discharges from Municipal Separate Storm Sewer Systems (MS4) you may be required to use such practices. The SWPPP must include a description of any on-site infiltration that will be installed as a post-construction stormwater management measure or reasons for not employing such measures such as 1) The facility is located in a wellhead protection area as defined in RSA 485- C:2; or 2) The facility is located in an area where groundwater has been reclassified to GAA, GA1 or GA2 pursuant to RSA 485-C and Env-DW 901; or 3) Any areas that would be exempt from the groundwater recharge requirements contained in Env-Wq 1507.04, including all land uses or activities considered to be a "High-load Area" (see Env-Wq 1502.30). For design considerations for infiltration measures see Env-Wq 1508.06. Note that there may be additional local requirements that fall under the NH MS4 permittee's Authorization to Discharge Permit for those regulated areas.

f. Appendix F of the CGP contains information regarding Tier 2, or high quality waters in the various states. ***[EPA notes that this information has now been moved to https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates]*** Although there is no official list of tier 2 waters for New Hampshire, it can be assumed that all New Hampshire surface waters are tier 2 for turbidity unless 1) the surface water that you are proposing to discharge into is listed as impaired for turbidity in the states listing of impaired waters (see https://nhdes-surface-water-quality-assessment-site-nhdes.hub.arcgis.com/) or 2) sampling upstream of the proposed discharge location shows turbidity values greater than 10 NTU (Env-Wq 1703.11). A single grab sample collected during dry weather (no precipitation within 48 hours) is acceptable.

g. To ensure compliance with RSA 485-C, RSA 485-A, RSA 485-A:13, I(a), Env-Wq 1700 and Env-Wq 302, the following information may be requested by NHDES. This information must be kept on site unless you receive a written request from NHDES that it be sent to the address shown below in 9.1.1.h.

proposed dewatering discharge water, the applicant shall test one sample of the proposed dewatering discharge water for the pollutants known or believed to be present. To determine if the dewatering discharge could be covered under the 2022 CGP, the effluent at zero dilution must meet numeric water quality criteria. If the effluent does not meet numeric water quality criteria, the applicant shall contact EPA Region 1 to discuss coverage under the Remediation General Permit.

e. Pursuant to 314 CMR 3.11 (2)(a), and in accordance with MassDEP's obligation to protect Outstanding Resource Waters under 314 CMR 4.04(3), applicants that propose to dewater under the 2022 CGP and discharge to Outstanding Resource Waters as identified in 314 CMR 4.06, shall submit the SWPPP and associated documents to MassDEP to review. MassDEP shall complete review within 30 daysof receipt.

f. Pursuant to 314 CMR 3.11 (2)(a)6., and in accordance with MassDEP's obligation under 314 CMR 4.05 to maintain surface waters free from color and turbidity in concentrations or combinations that are aesthetically objectionable or would impair any use assigned to the waterbody, permittees that have been authorized to dewater under the 2022 CGP and that discharge to Outstanding Resource Waters as identified in 314 CMR 4.06 shall carry out daily benchmark monitoring for turbidity[100] for the duration of dewatering. Permittees shall compare the weekly average of the turbidity monitoring results with the established benchmark turbidity value of 25 Nephelometric Turbidity Units (NTU). If a permittee's weekly average turbidity results exceed the benchmark, the operator shall conduct follow-up corrective action to determine the source of the problem and to make any necessary repairs or upgrades to the dewatering controls to lower the turbidity levels. The permittee shall document any corrective action taken in its corrective action log. Furthermore, permittees at these sites shall carry out inspections at higher frequency, specifically, daily inspections of the dewatering discharge treatment for the duration of the discharge. The permittee shall inspect the site for sediment plume or whether a hydrocarbon sheen is visible at the point of discharge, estimate the flow rate at the point of discharge, and inspect the site downstream to assess whether sedimentation is attributable to the dewatering discharges.

g. Pursuant to 314 CMR 3.11 (2)(a)6., and in accordance with MassDEP's obligation under 314 CMR 4.05 to maintain surface waters free from color and turbidity in concentrations or combinations that are aesthetically objectionable or would impair any use assigned to the waterbody, permittees shall store materials outside the Base Flood Elevation[101] when feasible to prevent displacing runoff and erosion.

h. Pursuant to 314 CMR 3.11 (2)(a), and in accordance with MassDEP's obligation to maintain surface waters free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses under 314 CMR 4.05(5)(c), all applicants who apply for coverage under the 2022 CGP shall follow guidelines on fertilizer application, including use of fertilizer containing no phosphorus, in accordance with 330 CMR 31.00 Plant Nutrient Application Requirements for

[100] Applicants shall follow EPA Method 180.1 to monitor for turbidity

[101] Base Flood Elevation (BFE) is the elevation of surface water resulting from a flood that has a 1% chance of equaling or exceeding that level in any given year. The BFE is shown on the Flood Insurance Rate Map (FIRM) for zones AE, AH, A1–A30, AR, AR/A, AR/AE, AR/A1– A30, AR/AH, AR/AO, V1–V30 and VE. (Source: https://www.fema.gov/node/404233).

discharges to salt water), Enterococci (for discharges to salt water), total suspended solids, oil and grease, total nitrogen, total phosphorus, and all parameters with numeric criteria listed in the Massachusetts Surface Water Quality Standards at 314 CMR 4.05(e). Results shall be reported to MassDEP as part of the WM15 application. To determine if the dewatering discharge could be covered under the 2022 CGP, the effluent at zero dilution must meet numeric water quality criteria. If the effluent does not meet numeric water quality criteria, the applicant shall contact EPA Region 1 to discuss coverage under the Remediation General Permit.

ii. Applicants for sites that propose to discharge to Public Water Supplies (314 CMR 4.06(1)(d)1) shall also test one sample of the proposed dewatering discharge water for per- and polyfluoroalkyl substances (PFAS), as outlined in the table below. Results shall be reported to MassDEP as part of the WM15 application. If any PFAS compounds are detected, the applicant shall apply for coverage under the NPDES Remediation General Permit for Massachusetts if required.

PFAS Testing Parameters for Discharges to Public Drinking Water Supplies[99]	
Perfluorohexanesulfonic acid (PFHxS), grab	Report ng/L
Perfluoroheptanoic acid (PFHpA), grab	Report ng/L
Perfluorononanoic acid (PFNA), grab	Report ng/L
Perfluorooctanesulfonic acid (PFOS), grab	Report ng/L
Perfluorooctanoic acid (PFOA), grab	Report ng/L
Perfluorodecanoic acid (PFDA), grab	Report ng/L

iii. Applicants for sites that propose to discharge to an impaired water as identified in the most recent final Massachusetts Integrated List of Waters,shall test one sample of the proposed dewatering discharge water for the parameter(s) for which the waterbody is impaired. To determine if the dewatering discharge could be covered under the 2022 CGP, the effluent at zero dilution must meet numeric water quality criteria. If the effluent does not meet numeric water quality criteria, the applicant shall contact EPA Region 1 to discuss coverage under the Remediation GeneralPermit and shall apply for RGP coverage if required.

iv. For dewatering discharges to all other waters, if any pollutants are knownor believed present in the proposed dewatering discharge water, the applicant shall apply for coverage under the NPDES Remediation General Permit for Massachusetts if required. For the purposes of this condition, a pollutant is "known present" if measured above the analytical detection limit using a sufficiently sensitive test method in an environmental sample, and "believed present" if a pollutant has not been measured in an environmental sample but will be added or generated prior to discharge, such as through a treatment process. Consequently, a pollutant is "known absent" if measured as non-detect relative to the analytical detection limit using a sufficiently sensitive test method in an environmental sample, and "believed absent" if a pollutant has not been measured in an environmentalsample but will not be added or generated prior to discharge and is not a parameter that applies to the applicable activity category for a site. If any pollutants are known or believed present in the

[99] PFAS testing shall follow established EPA methods 537 or 537.1 for drinking water until EPA Method 3512 for non-potable water becomes available.

iv. Temporarily store materials and waste above the Base Flood Elevation ***[EPA notes that it has deleted a footnote reference to the term "Base Flood Elevation" since the same footnote is already included in Part 9.1.2.g, above.]*** level;

v. Temporarily reduce or eliminate outdoor storage;

vi. Temporarily relocate any mobile vehicles and equipment to higher ground;

vii. Develop scenario-based emergency procedures for major storms that are complementary to regular stormwater pollution prevention planning andidentify emergency contacts for staff and contractors; and

viii. Conduct staff training for implementing your emergency procedures atregular intervals.

k. Pursuant to 314 CMR 3.11 (2)(a)6., and in accordance with MassDEP's obligation under 314 CMR 4.05(5)(e) to maintain surface waters free from pollutants in concentrations or combinations that are toxic to humans, aquatic life, or wildlife, permittees who seek coverage under the 2022 CGP and anticipate to carry out dust control shall limit their dust control methodology to using water only and specifically avoid using other techniques, such as solutions containing calcium chloride.

l. If MassDEP requests a copy of the Stormwater Pollution Prevention Plan (SWPPP) for any construction site at any time, the permittee shall submit the SWPPP to MassDEP within 14 days of such a request. MassDEP may conduct an inspection of any site covered by this permit to ensure compliance with state lawrequirements, including state water quality standards.

9.1.3 MTR10F000 Areas in the State of Vermont located at a federal facility

a. Earth disturbance at any one time is limited to five acres.

b. All areas of earth disturbance must have temporary or final stabilization within 14 days of the initial disturbance. After this time, disturbed areas must be temporarily or permanently stabilized in advance of any runoff producing event. A runoff producing event is an event that produces runoff from the construction site. Temporary stabilization is not required if precipitation is not forecast and work is to continue in the next 24-hours or if the work is occurring in a self-contained excavation (i.e. no outlet) with a depth of two feet or greater (e.g. house foundation excavation, utility trenches). Areas of a construction site that drain to sediment basins are not considered eligible for this exemption, and the exemption applies only to the excavated area itself.

c. Site inspections on active construction sites shall be conducted daily during the period from October 15 through April 15.

d. The use of chemical treatments (e.g. polymers, flocculants, and coagulants) for the settling and/or removal of sediment from stormwater runoff associated with construction and construction-related activities requires prior written approval and an approved site and project-specific plan, from the Vermont Agency of Natural Resources. In addition, the use of cationic polymers is prohibited unless approved by the Vermont Agency of Natural Resources under a site and project-specific plan.

e. Any applicant under EPA's CGP shall allow authorized Vermont Agency of Natural Resources representatives, at reasonable times and upon presentation of credentials, to enter upon the project site for purposes of inspecting the project and determining

Agricultural Land and Non-Agricultural Turf and Lawns. Further, fertilizer shall never be applied to a site when a rain event greater than 0.5 inches is forecast in the next 48 hours.

i. Pursuant to 314 CMR 3.11 (2)(a), all applicants who apply for coverage under the 2022 CGP and elect to carry out site inspections every 14 days shall also inspect sites within 24 hours of 0.25 inches of precipitation events or greater over 24 hours,or within 24 hours of a discharge that occurred due to snowmelt from 3.25 inches or greater of snow accumulation.[102] During the high flow periods in spring (i.e., months of April to June), inspection frequency shall be increased to once per week for all sites.

i. To determine whether 3.25 inches or greater of snow accumulation has occurred at a site, snowfall measurements can be taken at the site,[103] or theoperator can rely on similar information from a local weather forecast.

j. Implementing structural improvements, enhanced/resilient pollution prevention measures, and other mitigation measures can help to minimize impacts from stormwater discharges from major storm events such as hurricanes, storm surge, extreme/heavy precipitation,[104] and flood events. Pursuant to 314 CMR 3.11 (2)(a), if such stormwater control measures are already in place due to existing requirements mandated by other state, local or federal agencies, the SWPPP shall include a brief description of the controls and a reference to the existing requirement(s). If the site may be exposed to or has previously experienced suchmajor storm events[105], additional stormwater control measures that may be considered, and implemented as necessary, include, but are not limited to:

i. Reinforce materials storage structures to withstand flooding and additional exertion of force;

ii. Prevent floating of semi-stationary structures by elevating to the Base Flood Elevation (BFE) level or securing with non-corrosive device;

iii. When a delivery of exposed materials is expected, and a storm is anticipated within 48 hours, delay delivery until after the storm or storematerials as appropriate (refer to emergency procedures);

[102] This is the amount of snow that is equivalent to 0.25 inches of rain, based on information from the National Oceanic and Atmospheric Administration (NOAA) indicating that 13 inches of snow is, on average, equivalent to 1 inch of rain. See https://www.nssl.noaa.gov/education/svrwx101/winter/faq/.

[103] NOAA's National Weather Service has guidelines on snowfall measurements at https://www.weather.gov/jkl/snow_measurement. These guidelines recommend use of a "snowboard" (a piece of wood about 16 inches by 16 inches) that is placed in an unobstructed part of the site on a hard surface.

[104] Heavy precipitation refers to instances during which the amount of rain or snow experienced in a location substantially exceeds what is normal. What constitutes a period of heavy precipitation varies according to location and season. Heavy precipitation does not necessarily mean the total amount of precipitation at a location has increased— just that precipitation is occurring in more intense or more frequent events.

[105] To determine if your facility is susceptible to an increased frequency of major storm events that could impact the discharge of pollutants in stormwater, you may reference FEMA, NOAA, or USGS flood map products at https://www.usgs.gov/faqs/where-can-i-find-flood-maps?qt-news_science_products=0#qtnews_science_products.

compliance with this Certification.

f. The Vermont Agency of Natural Resources may reopen and alter or amend the conditions of this Certification over the life of the EPA 2022 Construction General Permit when such action is necessary to assure compliance with the VWQS.

9.2 EPA REGION 2

9.2.1 NYR10I000 Indian country within the State of New York

a. Saint Regis Mohawk Tribe

i. Any Responsible-Person/Decision-Maker required under the CGP to submit a Notice of Intent (NOI) to EPA for coverage under the CGP, must concurrently submit an electronic copy of the NOI to the SRMT Environmental Division, Water Resource Program Manager. Additionally, an electronic copy of the Notice of Termination (NOT) must be provided within three business days after electronic confirmation is received from EPA that the NOT has been accepted. The NOI and NOT must be electronically provided to the following addresses:

Mr. Tieman W. Smith
Water Resources Program Manager Saint Regis Mohawk Tribe
449 Frogtown Road
Akwesasne, NY 13655 Tiernan.Smith@srmt-nsn.gov 518.358.2272 ext. 5073

ii. Any Responsible-Person/Decision-Maker that is required as part of the CGP to prepare a Discharge Management Plan (OMP) or Storm Water Management Plan (SWMP) and/or Storm Water Pollution Prevention Plan (SWPPP) must submit an electronic copy of the DMP. SWMP and/or SWPPP to the SRMT Environment Division, Water Resources Program Manager IO business days prior to the start of construction of any work to be conducted under the CGP. The applicable documents must be provided to the electronic address listed above.

iii. Any Responsible-Person/Decision-Maker that is required under the CGP to submit an annual report to EPA must submit an electronic copy of the annual report concurrently to the SRMT Water Resource Program. Additionally, any correspondences between the applicant and EPA related to analytical data, written reports, corrective action, en'orcement, monitoring, or an adverse incident must likewise be routed to the SRMT Water Resources Program at the above electronic address.

iv. An "Authorization to Proceed Letter" with site-specific mitigation requirements may be sent out to the permittee when a review of the NOI and OMP, SWMP and /or SWPPP on a case-by-case basis, is completed by the SRMT Environment Division, Water Resource Program. This approval will allow the application to proceed if all mitigation requirements are met.

b. Seneca Nation

i. Under Part 1.1.5 of the CGP, the Seneca Nation requests that an applicant must demonstrate that they meet the eligibility criteria listed in Appendix D (certify in your Notice of Intent (NOI) that you meet one of the eligibility criteria [Criterion A-F]) as well as species and critical habitats that are listed under the Seneca Nation's "Fishing and Conservation Laws" and the "Seneca Nation of Indians Comprehensive Conservation Law".

ii. The Tribal Historic Preservation Office (THPO) was established in 2000 after the Seneca Nation received a recognition letter from the National Park Service (NPS); therefore under Part 1.1.6 of the CGP (Appendix E) and prior to submitting a Notice of Intent (NOI) operators must complete the Nation's TPHO, Project Review Form (https://sni.org/media/246603/sni-thpo-project-review-form.pdf) and submit the completed form with associated information to the Tribal Historic Preservation Officer at 90 Ohi:yo' Way, Salamanca, NY 14779. Federal agencies engaging in construction activities must provide for construction review by a certified construction reviewer in accordance with 7 Del. C. §§4010 & 4013 and 7 DE Admin. Code 5101, subsection 6.1.6.

iii. Under Part 1.2 of the CGP, discharges must also follow the Section 13 of the Guide for Construction (Seneca Nation of Indians Source Water Code) and respectively, Council Resolution, dated April 13, 2013 (CN: R-04-13-13-11) to ensure that the health, safety and welfare of the citizens of the Seneca Nation, and all other within the Lands and Territories of the Seneca Nation of Indians, and to facilitate the adequate provisions of water through the elimination or prevention of ground water contamination in the vicinity of wells that supply drinking water for the Nation. The area is known as the Source Water Protection Area (SWPA) and specified activities are regulated within this SWPA, as cited in Section 13 of the Guide for Construction and Section VI, of CN: R-04-13-13-11.

iv. Under Part 1.4, any operator who seeks coverage of the CGP, and is required to submit a notice of intent NOI and Notice of Termination (NOT) (as necessary) to the EPA for coverage, under Part 1.4.2 must also submit a copy of the NOI to the Seneca Nation's Environmental Protection Department (EPD) within three business days of submittal to the EPA, (address shown below). Respectively, a copy of the NOT (as described under Part 8.3 of the CGP), which certifies that you have met the requirements of Part 8, must be provided within three business days after electronic confirmation is received from the EPA that the NOT has been accepted. In addition to a NOI and NOT, the Seneca Nation (Environmental Protection Department [EPD]) would require an Environmental Impact Assessment (EA) (Long Form), as shown in Section 2 of the Seneca Nation of Indians Laws, Ordinances & Policies (Guide for Construction), to be completed and submitted to the EPD prior to any project to determine whether the impacts from a project would create significant and detrimental effects to the Nation's lands, water (violate WQS), and environment. The NOI, NOT, and EA must be submitted electronically to epd@sni.org and provided to the following address:

Seneca Nation
Environmental Protection Department (EPD) Attn: Director of EPD
12837 Route 438
Irving, NY 14081

v. Under Part 3.0 of the CGP, discharges must be controlled as necessary to meet applicable WQS. The Seneca Nation is working actively towards finalizing and implementing the; therefore, the EPD would require an applicant to submit or grant access to the permit to obtain information on the impact of effluents on receiving waters, including the capability of receiving waters to support future designated uses and achieve the WQS of the Nation; and to advise prospective dischargers of discharge requirements, and coordinate with the appropriate

c. The permittee shall comply with the District of Columbia Stormwater Management and Soil Erosion and Sediment Control regulations in Chapter 5 of Title 21 of the District of Columbia Municipal Regulations.

d. The permittee shall comply with the District of Columbia Flood Management Control regulations in Chapter 31 of Title 20 of the District of Columbia Municipal Regulations.

e. The permittee shall submit a copy of the Stormwater Pollution Prevention Plan (SWPPP) to the Regulatory Review Division, Department of Energy & Environment, Government of the District of Columbia, 1200 First Street, NE, 5th Floor, Washington, DC 20002, during the review and approval of the permittee's DOEE Erosion and Sediment Control Plan in accordance with the provisions of Chapter 542 of Title 21 of the District of Columbia Municipal Regulations.

f. Upon request, the permittee shall submit all inspection and monitoring reports as required by this permit and 40 CFR § 122.41 to the Associate Director, Inspection and Enforcement Division, Department of Energy & Environment, Government of the District of Columbia, 1200 First Street, NE, 5th Floor, Washington, DC 20002; telephone (202) 535-2226, or by email at Joshua.Rodriguez@dc.gov.

g. In the event the permittee intends to discharge dewatering water, groundwater, or groundwater comingled with stormwater from a known contaminated site, the permittee shall contact the Regulatory Review Division, Department of Energy & Environment, Government of the District of Columbia, 1200 First Street, NE, 5th Floor, Washington, DC 20002; telephone (202) 535-2600, or by email at MS4DischargeAuthorization@dc.gov to request authorization to discharge dewatering water, groundwater, or groundwater comingled with stormwater to the District's Municipal Separate Storm Sewer System (MS4) or to a surface water body pursuant to §§ 8-103.02, 8-103.06, and 8-103.07 of the District of Columbia Water Pollution Control Act of 1984, as amended.

9.3.2 DER10F000 Areas in the State of Delaware located at a federal facility (as defined in Appendix A)

a. Federal agencies must submit a sediment and stormwater management plan (SSMP) and receive Department approval prior to undertaking any land clearing, soil movement or construction activity unless conducting an exempt activity.

b. Federal construction activities are required to have a third-party Certified Construction Reviewer (CCR) perform weekly reviews to ensure the adequacy of construction activities pursuant to the approved SSMP and regulations.

Implementation of approved SSMPs requires the daily oversight of construction activity by certified responsible personnel.

c. Implementation of approved SSMPs requires the daily oversight of construction activity by certified responsible personnel.

d. A current copy of the SSMP must be maintained at the construction site.

e. Unless authorized by the Department, not more than 20 acres may be disturbed at any one time.

9.4 EPA REGION 4

No additional conditions

permitting agencies. As stated in the Decision Document, under Section 303(c) of the CWA, 33 U.S.C. § 1313(c), states develop, review, and revise (as appropriate) water quality standards for surface waters of the United States. At a minimum, such standards are to include designated water uses, water quality criteria to protect such uses, and an antidegradation policy. 40 C.F.R. § 131.6. In addition, under Section 401 of the CWA states may grant, condition, or deny "certification" for federally permitted or licensed activities that may result in a discharge to the waters of the United States 33 U.S.C. § 1341.

vi. Under Part 7.2.8(a)(b)(c) and for Part 9 of the CGP, the following Sections of the Seneca Nation's Guide for Construction shall be considered, in conjunction with the CGP:

(a) Section 1. Executive Order - To Establish a Policy for Governing Access to Nation Territories and Facilities by Officials of Foreign Government, dated March 31, 2011

(b) Section 3. Natural Resources Committee, Sand and Gravel Law (CN: R-06-24-05-08)

(c) Section 4. Fishing and Conservation Laws - Part 1.1.5 of the CGP

(d) Section 5. Seneca Nation of Indians Comprehensive Conservation Law, adopted January 14, 2012

(e) Section 9. Food is Our Medicine (FIOM) Program/Native Planting Policy (CN: R-03- 08-14-14)

(f) Section 10. Forestry Management Plan (CN: R-08-14-10-23)

(g) Section 11. Timber Ordinance #411-092, dated May 8, 1982

(h) Section 14. Flood Damage Prevention Local Law, dated September 27, 1988

(i) Section 16. Utilities Ordinance No. 87-100

(j) Authorizing Emergency Action and Contingency Plan to Restrain Pollution of Nations Waters, (Council Resolution: R-03-01-18-10), dated March 10, 2018 Seneca Nation of Indians Permit Application for Construction within Waterways Permit, Form NR98-01.00

9.3 EPA REGION 3

9.3.1 DCR100000 District of Columbia

a. Discharges authorized by this permit shall comply with the District of Columbia Water Pollution Control Act of 1984, as amended (DC Official Code § 8-103.01 and § 8-103.06, et seq.) to ensure that District of Columbia waters, waters in adjacent and downstream states, and the beneficial uses of these waters will not be harmed or degraded by the discharges.

b. Discharges authorized by this permit must comply with §§ 1104.1 and 1104.8 of Chapter 11 and the provisions of Chapter 19 of Title 21of District of Columbia Municipal Regulations in order to attain and maintain designated uses of the District of Columbia waters.

Reservation for any of the uses designated in the Water Quality Standards of the Fond du Lac Reservation. These uses include wildlife, aquatic life, warm water fisheries, cold water fisheries, subsistence fishing (netting), primary contact recreation, secondary contact recreation, cultural, wild rice areas, aesthetic waters, agriculture, navigation, commercial and wetlands. It also includes the designated uses of wetlands including, but not limited to, baseflow discharge, cultural opportunities, flood flow attenuation, groundwater recharge, indigenous floral and fauna) diversity and abundance, nutrient cycling, organic carbon export/cycling, protection of downstream water quality, recreation, resilience against climactic effects, sediment/shoreline stabilization, surface water storage, wild rice, and water dependent wildlife. [In addition to listing the designated uses of waters of the Fond du Lac Reservation, this condition also limits the project proponent to discharges that will not violate our Water Quality Standards. FDL Water Quality Certification Ordinance, Section 204 (a) (7)].

vii. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the Fond du Lac Reservation. All spills must be reported to the appropriate emergency management Agency (National Response Center AND the State Duty Officer), and measures shall be taken immediately to prevent the pollution of waters of the Fond du Lac Reservation, including groundwater. The Fond du Lac Office of Water Protection must also be notified immediately of any spill regardless of size. [This condition helps protect water quality and also reminds project proponents of their responsibility in reporting spill events. FDL Water Quality Certification Ordinance, Section 204 (b) (3)].

viii. All seed mixes, whether used for temporary stabilization or permanent seeding, shall NOT contain any annual ryegrass (Lolium species). Wild rye (Elymus species) or Oats (Avena species) may be used as a replacement in seed mixes. [This condition prevents the use of annual ryegrass on the Reservation. Annual ryegrass is allelopathic, which means it produces biochemical in its roots that inhibit the growth of native plants. If used in seed mixes, annual ryegrass could contribute to erosion, especially on slopes. However, the condition also specifies substitute grasses that germinate almost as fast as annual ryegrass for use as a cover crop to help prevent erosion. FDL Water Quality Certification Ordinance, Section 204 (t) (1)].

ix. To prevent the introduction of invasive species, ALL contractors and subcontractors MUST disclose information stating prior equipment location(s) and ALL known invasive species potentially being transported from said location(s). All equipment MUST undergo a high pressure wash (including any equipment mats) BEFORE ENTERING the Fond du Lac Reservation. Personal equipment such as work boots, gloves, vest, etc. MUST be clean of debris, dirt and plant and animal material BEFORE ENTERING the Fond du Lac Reservation. Equipment being transported from known infested areas MUST undergo a high pressure wash as soon as possible after leaving the infested site and again BEFORE ENTERING the Fond du Lac Reservation, to avoid transport of invasive species into areas surrounding the Reservation. Written certification of equipment cleaning MUST be provided to the Fond du Lac Office of Water Protection. Upon arrival, ALL contractor and subcontractor equipment will be inspected by appointed Fond du Lac staff. If equipment is deemed unsatisfactory, the equipment MUST

9.5 EPA REGION 5

9.5.1 MIR10I000 Indian country within the State of Minnesota

a. Fond du Lac Reservation

i. New dischargers wishing to discharge to an Outstanding Reservation Resource Water (ORRW)[106] must obtain an individual permit from EPA for storm water discharges from large and small construction activities.

ii. A copy of the Storm Water Pollution Prevention Plan (SWPPP) must be submitted to the Office of Water Protection at least fifteen (15) days in advance of sending the Notice of Intent to EPA. The SWPPP can be submitted electronically to richardgitar@FDLREZ.com or by hardcopy sent to:

Fond du Lac Reservation
Office of Water Protection
1720 Big Lake Road
Cloquet, MN 55720

iii. Copies of the Notice of Intent (NOI) and the Notice of Termination (NOT) must be sent to the Fond du Lac Office of Water Protection at the same time they are submitted to EPA. [The condition helps the Office of Water Protection keep track of when a project is about to start and when it has ended. FDL Water Quality Certification Ordinance, Section 204 (a) (2)].

iv. If the project will entail a discharge to any watercourse or open water body, the turbidity limit shall NOT exceed 10% of natural background within the receiving water(s) as determined by Office of Water Protection staff. For such discharges, turbidity sampling must take place within 24 hours of a ½-inch or greater rainfall event. The results of the sampling must be reported to the Office of Water Protection within 7 days of the sample collection. All sample reporting must include the date and time, location (GPS: UTM/Zone 15), and NTU. CGP applicants are encouraged to work with the Office of Water Protection in determining the most appropriate location(s) for sampling. [This condition helps both the Office of Water Protection and the project proponent in knowing whether or not their erosion control efforts are effective. FDL Water Quality Certification, Section 204 (b) (1)].

v. Receiving waters with open water must be sampled for turbidity prior to any authorized discharge as determined by Office of Water Protection staff. This requirement only applies to receiving waters which no ambient turbidity data exists. [This condition allows the Office of Water Protection to obtain a baseline turbidity sample in which to compare to other samples. FDL Water Quality Certification Ordinance, Section 204 (b) (2)].

vi. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in the Water Quality Standards of the Fond du Lac Reservation, Ordinance #12/98, as amended. This includes, but is not limited to, the prevention of any discharge that causes a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of water of the Fond du Lac

[106] Although additional waters may be designated in the future, currently Perch Lake, Rice Portage Lake, Miller Lake, Deadfish Lake, and Jaskari Lake are designated as ORRWs.

v. If requested by the Grand Portage Environmental Department, the permittee must provide additional information necessary for a case-by-case eligibility determination to assure compliance with the Water Quality Standards and any Applicable Federal Standards. The burden is on the applicant to demonstrate compliance with the Water Quality Standards, the Water Resources Ordinance, and Applicable Federal Standards whether or not the application is ultimately eligible for the CGP.

vi. CGP discharges must not cause nuisance conditions as defined in Grand Portage Water Quality Standards.

vii. The Board retains full authority to ensure compliance with and to enforce the provisions of the Water Resource Ordinance and Water Quality Standards, Applicable Federal Standards, and these Certification conditions. Nothing herein affects the scope or applicability of other controlling tribal or federal requirements, including but not limited to impacts to cultural, historical, or archeological features or sites, or properties that may be eligible for listing on the National Register of Historic Places under the National Historic Preservation Act, 54 U.S.C. §§ 300101 et seq.

viii. Appeals related to Board actions taken in accordance with any of the preceding conditions may be heard by the Grand Portage Tribal Court.

c. Leech Lake Band of Ojibwe

i. The water quality standards that apply to the construction site are the standards at the time the operator submits its Notice of Intent (NOI) to EPA and the LLBO WRP (see conditions # 2 and # 3).

ii. A copy of the Stormwater Pollution Prevention Plan (SWPPP) must be submitted to the LLBO WRP at least 30 days in advance of sending the NOI for the project to EPA. See attached LLBO 401 Water Quality Certification Ordinance. Section 304(a)(1). The SWPPP should be submitted electronically to Jeff.Harper@llojibwe.net and by hardcopy sent to:

Leech Lake Band of Ojibwe
ATTN: Water Resources Program - 401 Cert
Division of Resource Management
190 Sailstar Drive NW
Cass Lake, Minnesota 56633

iii. Copies of the NOI and the Notice of Termination (NOT) must be submitted to the LLBO WRP at the same time they are submitted to EPA. See attached LLBO 401 Water Quality Certification Ordinance, Section 304(a)(2). The NOI and NOT should be submitted electronically to Jeff.Harper@llojibwe.net and sent by hardcopy to the address cited in condition # 2.

iv. Any and all other conditions listed in Section 304 of the attached LLBO 401 Water Quality Certification Ordinance shall be observed unless the LLBO WRP deems that certain conditions therein are not applicable to the project in need of a permit under this certification.

v. A copy of this certification MUST be kept by the contractor on-site at all times and be available for viewing by all personnel, including inspectors.

undergo a high pressure washing until the equipment is cleared by the inspector, until such time, minimal travel will be allowed through the Reservation. The contractor shall be held responsible for the control of any invasive species introduced as a result of their project. [This condition requires the project proponent to prevent the inadvertent introduction of invasive species by taking an active role in cleaning all vehicles, equipment, and equipment mats before entering the Reservation. This condition has been placed in certifications since 2012, due to the introduction of Wild Parsnip in 2011 from a pipeline contractor. It is much easier to prevent the introduction of an invasive species than it is to eradicate it once it has been introduced. Many invasive plant species form monocultures, preventing native plants from growing. This situation often leads to cases of erosion, which in turn effects water quality. FOL Water Quality Certification Ordinance, Section 204 (g) (1)].

x. A copy of this certification MUST be kept by the contractor on-site at all times and be available for viewing by all personnel, including inspectors. [This condition ensures that the information contained in the certification, especially the conditions, is readily available onsite for reference. FOL Water Quality Certification Ordinance, Section 204 (a) (9)].

b. The Grand Portage Band of Lake Superior Chippewa

i. The CGP authorization is for construction activities that may occur within the exterior boundaries of the Grand Portage Reservation in accordance to the Grand Portage Land Use Ordinance. The CGP regulates stormwater discharges associated with construction sites of one acre or more in size. Only those activities specifically authorized by the CGP are authorized by this certification (the "Certification").

ii. All construction stormwater discharges authorized by the CGP must comply with the Water Quality Standards and Water Resources Ordinance, as well as Applicable Federal Standards (as defined in the Water Resources Ordinance).

iii. All appropriate steps must be taken to ensure that petroleum products or other chemical pollutants are prevented from entering the Waters of the Reservation. All spills must be reported to the appropriate emergency-management agency, and measures must be taken to prevent the pollution of the Waters of the Reservation, including groundwater.

iv. The 2022 CGP requires inspections and monitoring reports of the construction site stormwater discharges by a qualified person. Monitoring and inspection reports must comply with the minimum requirements contained in the 2022 CGP. The monitoring plan must be prepared and incorporated into the Storm Water Pollution Prevention Plan (the "SWPP"). A copy of the SWPP must be submitted to the Board at least 30 days in advance of sending the requisite Notice of Intent to EPA. The SWPP should be sent to:

Grand Portage Environmental Resources Board
P.O. Box 428
Grand Portage, MN 55605

Copies of the Notice of Intent and Notice of Termination required under the General Permit must be submitted to the Board at the address above at the same time they are submitted to the EPA.

https://www.arcgis.com/apps/View/index.html?appid=6f44c371217e4ee8b5f1c2c705c 7c7c5. The antidegradation demonstration materials described in provision E.4.ii., and included on the antidegradation demonstration template found at: https://www.badriver-nsn.gov/natural-resources/projectreviews/, must be submitted to the following address:

Bad River Tribe's Natural Resources Department
Attn: Water Regulatory Specialist
P.O. Box 39 Odanah, WI 54861
WaterReg@badriver-nsn.gov

vi. Projects utilizing cationic treatment chemicals within the Bad River Reservation boundaries are not eligible for coverage under the CGP.

vii. A discharge to a surface water within the Bad River Reservation boundaries shall not cause or contribute to an exceedance of the turbidity criterion included in the Tribe's WQS, which states: Turbidity shall not exceed 5 NTU over natural background turbidity when the background turbidity is 50 NTU or less, or turbidity shall not increase more than 10% when the background turbidity is more than 50 NTU.

viii. All projects which are eligible for coverage under the CGP within the exterior boundaries of the Bad River Reservation must comply with the Bad River Reservation Wetland and Watercourse Protection Ordinance, or Chapter 323 of the Bad River Tribal Ordinances, including the erosion and sedimentation control, natural buffer, and stabilization requirements. Questions regarding Chapter 323 and requests for permit applications can be directed to the Wetlands Specialist in the Tribe's Natural Resources Department at (715) 682-7123 or wetlands@badriver-nsn.gov.

ix. An operator of a project, which is eligible for coverage under the CGP, that would result in an allowable discharge under the CGP occurring within the exterior boundaries of the Bad River Reservation must notify the Tribe prior to the commencing earth-disturbing activities. The operator must submit a copy of the Notice of Intent (NOI) to the following addresses at the same time it is submitted to the U.S. EPA:

Bad River Tribe's Natural Resources Department
Attn: Water Regulatory Specialist
P.O. Box 39 Odanah, WI 54861
WaterReg@badriver-nsn.gov

Bad River Tribe's Natural Resources Department
Attn: Tribal Historic Preservation Officer (THPO)
P.O. Box 39 Odanah, WI 54861
THPO@badriver-nsn.gov

The operator must also submit a copy of the Notice of Termination (NOT) to the above addresses at the same time it is submitted to the U.S. EPA. Photographs showing the current site conditions must be included as part of the NOT to document the stabilization requirements have been met.

x. The THPO must be provided 30 days to comment on the project.

vi. Upon consideration of the NOI, if the LLBO WRP finds that the discharge will not be controlled as necessary to meet applicable water quality standards, the LLBO WRP may insist, consistent with Part 3.1 of the CGP, that additional controls are installed to meet applicable water quality standards, or recommend to EPA that the operator obtain coverage under an individual permit.

9.5.2 WIR10I000 Indian country within the State of Wisconsin

a. Bad River Band of Lake Superior Tribe of Chippewa Indians

i. Only those activities specifically authorized by the CGP are authorized by this Certification. This Certification does not authorize impacts to cultural properties, orhistorical sites, or properties that may be eligible for listing as such.

ii. All projects which are eligible for coverage under the CGP and are located within the exterior boundaries of the Bad River Reservation shall be implemented in such a manner that is consistent with the Tribe's Water Quality Standards (WQS). The Tribe's WQS can be viewed at: http://www.badriver-nsn.gov/wp-content/uploads/2020/01/NRD_WaterQualityStandards_2011.pdf

iii. Operators are not eligible to obtain authorization under the CGP for all new discharges to an Outstanding Tribal Resource Water (OTRW or Tier 3 water). OTRWs, or Tier 3 waters, include the following: Kakagon Slough and the lower wetland reaches of its tributaries that support wild rice, Kakagon River, Bad River Slough, Honest John Lake, Bog Lake, a portion of Bad River, from where it enters the Reservation through the confluence with the White River, and Potato River. OTRWs can be viewed at: https://www.arcgis.com/apps/View/index.html?appid=6f44c371217e4ee8b5f1c2c705c 7c7c5

iv. An operator proposing to discharge to an Outstanding Resource Water (ORW or Tier 2.5 water) under the CGP must comply with the antidegradation provisions of the Tribe's WQS. ORWs, or Tier 2.5 waters, include the following: a portion of Bad River, from downstream the confluence with the White River to Lake Superior, White River, Marengo River, Graveyard Creek, Bear Trap Creek, Wood Creek, Brunsweiler River, Tyler Forks, Bell Creek, and Vaughn Creek. ORWs can be viewed at: https://www.arcgis.com/apps/View/index.html?appid=6f44c371217e4ee8b5f1c2c705c 7c7c5. The antidegradation demonstration materials described in provision E.4.iii., and included on the antidegradation demonstration template found at: https://www.badriver-nsn.gov/natural-resources/projectreviews/, must be submitted to the following address:

Bad River Tribe's Natural Resources Department
Attn: Water Regulatory Specialist
P.O. Box 39 Odanah, WI 54861
WaterReg@badriver-nsn.gov

v. An operator proposing to discharge to an Exceptional Resource Water (ERW or Tier 2 water) under the CGP must comply with the antidegradation provisions of the Tribe's WQS. ERWs, or Tier 2 waters, include the following: any surface water within the exterior boundaries of the Reservation that is not specifically classified as an Outstanding Resource Water (Tier 2.5 water) or an Outstanding Tribal Resource Water (Tier 3 water). ERWs can be viewed at:

adhere to the requirements in 20.6.4.8(A)(3)(c) NMAC, including notifying the New Mexico Environment Department (NMED) within seven days of initiation of the emergency action and providing NMED with a summary of the action taken within 30 days of initiation of the emergency action.

ii. For all other scenarios, Operators with proposed discharges to ONRWs in New Mexico shall obtain coverage from EPA under an NPDES Individual Permit and will comply with the additional standards and regulations related to discharges to ONRWs in 20.6.4.8(A) NMAC. Additional information is available from:

New Mexico Environment Department Surface Water Quality Bureau
P.O. Box 5469
Santa Fe, NM 87502-5469 Telephone: 505-827-0187
https://www.env.nm.gov/surface-water-quality/wqs/
https://gis.web.env.nm.gov/oem/?map=swab

b. If construction dewatering activities are anticipated at a construction site and non-stormwater discharges of groundwater, subsurface water, spring water, and/or other dewatering water are anticipated, the Operators/Permittees must complete the following steps:

1. Review the state's Ground Water Quality Bureau Mapper (https://gis.web.env.nm.gov/GWQB/) and Petroleum Storage Tank Bureau Mapper (https://gis.web.env.nm.gov/GWQB/).

   Check if the following sources are located within the noted distance from the anticipated construction dewatering activity. At a minimum, a list of the following potential sources of contaminants and pollutants at the noted distance is to be kept in the SWPPP.

xi. The operator must obtain THPO concurrence in writing. This written concurrence will outline measures to be taken to prevent or mitigate effects to historic properties. For more information regarding the specifics of the cultural resources process, see 36 CFR Part 800. A best practice for an operator is to consult with the THPO during the planning stages of an undertaking.

xii. An operator of a project, which is eligible for coverage under the CGP, that would result in an allowable discharge under the CGP occurring within the exterior boundaries of the Bad River Reservation must submit a copy of the Stormwater Pollution Prevention Plan (SWPPP) to the following address at the same time as submitting the NOI:

Bad River Tribe's Natural Resources Department
Attn: Water Regulatory Specialist
P.O. Box 39 Odanah, WI 54861
WaterReg@badriver-nsn.gov

xiii. Any corrective action reports that are required under the CGP must be submitted to the following address within one (1) working day of the report completion:

Bad River Tribe's Natural Resources Department
P.O. Box 39 Odanah, WI 54861
WaterReg@badriver-nsn.gov

xiv. An operator of a project, which is eligible for coverage under the CGP, that would result in an allowable discharge under the CGP occurring within the exterior boundaries of the Bad River Reservation must submit a copies of the inspection reports (including photographs) to the following address within 24 hours of completing any site inspection required:

Bad River Tribe's Natural Resources Department Attn: Water Regulatory Specialist
P.O. Box 39 Odanah, WI 54861
WaterReg@badriver-nsn.gov

xv. An operator shall be responsible for meeting any additional permit requirements imposed by the U.S. EPA necessary to comply with the Tribe's antidegradation policies if the discharge point is located upstream of waters designated by the Tribe.

9.6 EPA REGION 6

9.6.1 NMR100000 State of New Mexico, except Indian country

a. In Outstanding National Resource Waters (ONRWs) in New Mexico, no degradation is permitted except in limited, specifically defined instances. Therefore, Operators are not eligible to obtain authorization under this general permit for stormwater discharges to waters classified as ONRWs listed in Paragraph D of 20.6.4.9 New Mexico Administrative Code (NMAC), also referred to as "Tier 3 waters" as defined in Appendix A of this permit. Exception: When construction activities are in response to a public emergency (e.g., wildfire, extreme flooding, etc.) and the related work requires immediate authorization to avoid a threat to public health or safety.

i. Operators who conduct construction activities in response to a public emergency to mitigate an immediate threat to public health or safety shall

Source of Potential Contamination or Pollutants*	Constituents likely to be required for testing*
Within 0.5 mile of an open Leaking Underground Storage Tank (LUST) site	BTEX (Benzene, Toluene, Ethylbenzene, and Xylene) plus additional parameters depending on site conditions**
Within 0.5 mile of an open Voluntary Remediation site	All applicable parameters or pollutants listed in 20.6.4.13, 20.6.4.52, 20.6.4.54, 20.6.4.97 thru 20.6.4.99, 20.6.4.101 through 20.6.4.899, and 20.6.4.900 NMAC (or an alternate list approved by the NMED-SWQB)*
Within 0.5 mile of an open RCRA Corrective Action Site	
Within 0.5 mile of an open Abatement Site	
Within 0.5 mile of an open Brownfield Site	
Within 1.0 mile or more of a Superfund site or National Priorities List (NPL) site with associated groundwater contamination.	
Construction activity contaminants and/or natural water pollutants	Additional parameters depending on site activities and conditions (Contact NMED- SWQB for an alternate list)*

*For further assistance determining whether dewatering may encounter contaminated sources, please contact the NMED Ground Water Quality Bureau at 505-827-2965 or NMED Surface Water Quality Bureau (SWQB) at 505-827-0187.

** EPA approved sufficiently sensitive methods must be used. For known PCB sources and analysis, EPA Method 1668C must be used (see https://www.epa.gov/cwa-methods).

2. If dewatering activities are anticipated, information on the flow rate and potential to encounter contaminated groundwater, subsurface water, spring water, or dewatering water must be provideddirectly to NMED at the following address:

   NMED Surface Water Quality Bureau

   Program Manager, Point Source Regulation SectionPO Box 5469, Santa Fe, NM 87502

   Please call the SWQB to obtain the appropriate email address (505-827-0187).

3. In addition, the Operator/Permittee must characterize the quality of the groundwater and subsurface water, spring water, or dewatering water being considered for discharge according to the table above and including dissolved hardness and pH. Considering the contaminant sources listed in the table above, water quality data may already be available. For further assistance, contactthe

NMED Surface Water Quality Bureau (505-827-0187), Ground Water Quality Bureau (505-827- 2965), Petroleum Storage Tank Bureau (505-476-4397), or Hazardous Waste Bureau (505-476- 6000).

   i. The Operator/Permittee must submit recent analytical test results (i.e., within the past 5 years) according to the table above, and including dissolved hardness and pH, to the EPA Region 6 Stormwater Permit Contact and the NMED Surface Water Quality Bureau (see contact information in #2 above). If the test data exceed applicable water quality standards, then the groundwater, subsurface water, spring water, or dewatering water cannot be discharged into surface waters under this general permit. Operators/Permittees may submit an NPDES Individual Permit application to treat and discharge to waters of the U.S. or find alternative disposal measures. No discharges to surface waters are allowed until authorized.

   ii. If the discharge has the potential to affect groundwater (e.g., land application), the Operator/Permittee must submit an NOI to the NMED Ground Water Quality Bureau (see 20.6.2.1201 NMAC – Notice of Intent to Discharge).

4. The Operator/Permittee must document any findings and all correspondence with NMED and EPA in the SWPPP.

c. Operators who intend to obtain authorization under this permit for new and existing storm water dischargesfrom construction sites must satisfy the following condition:

i. The SWPPP must include site-specific interim and permanent stabilization, managerial, and structural solids, erosion and sediment control best management practices (BMPs) and/or other controls that are designed to prevent to the maximum extent practicable an increase in the sediment yield and flow velocity from pre-construction, pre-development conditions to assure thatapplicable standards in 20.6.4 NMAC, including the antidegradation policy, and TMDL waste load allocations (WLAs) are met. This requirement applies to discharges both during construction and after construction operations have been completed. The SWPPP must identify and document the rationale for selecting these BMPs and/or other controls. The SWPPP must also describe design specifications, construction specifications, maintenance schedules (including a long-term maintenance plan), criteria for inspections, and expected performance and longevity of these BMPs.For sites greater than 5 acres in size, BMP selection must be made based on the use of appropriatesoil loss prediction models (i.e. SEDCAD, RUSLE, SEDIMOT, MULTISED, etc.) OR equivalent generallyaccepted (by professional erosion control specialists) soil loss prediction tools.

ii. For all sites, the Operator(s) must demonstrate, and include documentation in the SWPPP, that implementation of the site-specific practices will ensure that the applicable standards and TMDL WLAs are met, and will result in sediment yields and flow velocities that, to the maximum extent practicable, will not be greater than the sediment yield levels and flow velocities from preconstruction, pre-development conditions.

iii. All SWPPPs must be prepared in accordance with good engineering practices by qualified (e.g., CPESC certified, engineers with appropriate training) erosion control specialists familiar with the use of soil loss prediction models and design of erosion and sediment control systems based on these models (or equivalent soil

Naomi L. Archuleta - Environmental Programs Manager Ohkay Owingeh Office of Environmental Affairs
P.O. Box 717
Ohkay Owingeh, NM 87566
naomi.archuleta@ohkay.org

Noah Kaniatobe - Environmental Specialist Ohkay Owingeh, Office of Environmental Affairs
P.O. Box 717
Ohkay Owingeh, NM 87566
noah.kaniatohe@ohkay.org

ii. All operators obtaining permit coverage under the EPA CGP, must submit an electronic copy of the Storm Water Pollution Prevention Plan (SWPPP) to Ohkay Owingeh Office of Environmental Affairsat the same time that the NOI is submitted to the tribe (see contact information listed above).

iii. Following each incident where the operator takes a corrective action the operator must provide thecorrective action log to the Ohkay Owingeh Office of Environmental Affairs.

iv. The operator must notify Ohkay Owingeh Office of Environmental Affairs within 24 hours, in the event of an emergency spill in addition to the notification requirements at Part 2.3.6 of the CGP. Please contact: Ohkay Owingeh Tribal Police Department at 505.852.2757.

Please contact:
Ohkay Owingeh
Tribal Police Department
505.852.2757

c. Pueblo of Isleta

i. All operators obtaining permit coverage under the EPA CGP must submit a copy of the certified Notice ofIntent (NOI) to the Pueblo of Isleta at the same time it is submitted to EPA for projects occurring within the exterior boundaries of the Pueblo of Isleta. Additionally, a copy of NOI modifications and the Notice of Termination (NOT), must be provided within three business days after EPA provides electronic confirmation that the submission has been received. The Notices must be provided to the following address:

Water Quality Control OfficerPueblo of Isleta
Environment DepartmentPO Box 1270
Isleta NM 87022
505-869-7565
WQCO@isletapueblo.com

ii. The operator must notify the Pueblo of Isleta's Dispatch at 505-869-3030 as soon as possible and thePueblo of Isleta Water Quality Control Officer within 10 hours, in the event of a spill of hazardous ortoxic substances or if health or the

loss prediction tools). Qualifications of the preparer (e.g., professional certifications, description of appropriate training) must be documented in the SWPPP.The Operator(s) must design, implement, and maintain BMPs in the manner specified in the SWPPP.

NMED supports the use of EPA's small residential lot template if a site qualifies to use it as explained inthe permit, as long as it is consistent with the above requirements. NMED's requirement does not preclude small residential sites from using the template, but it may require an additional short paragraphto justify the selection of specific BMPs for the site.

d. Operators must notify NMED when discharges of toxic or hazardous substances or oil from a spill or other release occurs - see Emergency Spill Notification Requirements, Part 2.3.6 of the permit. For emergencies, Operators can call 505-827-9329 at any time. For non-emergencies, Operators can call 866-428-6535 (voice mail 24-hours per day) or 505-476-6000 during business hours from 8am-5pm, Monday through Friday. Operators can also call the NMED Surface Water Quality Bureau directly at 505-827-0187.

e. Operators of small construction activities (i.e., 1-5 acres) are not eligible to qualify for a waiver in lieu of needing to obtain coverage under this general permit based on Item C.3 of Appendix C (Equivalent Analysis Waiver) in the State of New Mexico.

9.6.2 NMR10I000 Indian country within the State of New Mexico, except Navajo Reservation Lands that are covered under Arizona permit AZR10000I and Ute Mountain Reservation Lands that are covered under Colorado permit COR10000I.

a. Nambe Pueblo

i. The operator must provide a copy of the Notice of Intent (NOI) and Notice of Termination (NOT) to the Nambe Pueblo Governor's Office at the same time it is provided to the US Environmental Protection Agency. The NOI and NOT should be provided to the following address:

Office of the Governor Nambe Pueblo
ISA NPI02 WEST
Nambe Pueblo, New Mexico 87506

ii. The operator must provide a copy of the Storm Water Pollution Prevention Plan (SWPPP) to Nambe Pueblo at the same time it is submitted to the EPA, either by email to governor@nambepueblo.org or mailed to the above address.

iii. The operator must provide copies of inspection reports, a copy of the corrective action log, and modifications made to the SWPPP as a result of inspection findings, upon request by the Nambe Pueblo Department of Environmental and Natural Resources or Nam be Governor.

b. Ohkay Owingeh Tribe

i. All operators obtaining permit coverage under the EPA CGP, must submit a copy of the certified (signed) Notice of Intent (NOI) to the Ohkay Owingeh Office of Environmental Affairs, a copy of NOI modifications and the Notice of Termination (NOT), must be provided within three business days after EPA provides electronic confirmation that the submission has been received. The NOI and NOT must be provided to the following address:

environment become endangered in addition to the notification requirements at Part 2.3.6 and at I.12.6.1 of the CGP.

iii. All operators obtaining permit coverage under the EPA CGP must submit an electronic copy of the Stormwater Pollution Prevention Plan (SWPPP) to the Pueblo of Isleta Water Quality Control Officer atthe above address, 30 days prior to submitting the certified NOI to EPA. If the electronic file is too largeto send through e-mail, a zip file or flash drive may be submitted.

iv. All operators obtaining permit coverage under the EPA CGP must give 2 days advance notice to the Pueblo of Isleta Water Quality Control Officer of any planned changes in the permitted activity whichmay result in noncompliance with permit requirements.

v. All operators obtaining permit coverage under the EPA CGP must post a sign or other notice of permit coverage at a safe, publicly accessible location in close proximity to the construction site. The notice mustbe located so that it is visible from the public road or tribal road that is nearest to the active part of the construction site. The sign must be maintained on-site from the time construction activities begin until final stabilization is met.

vi. Erosion and sediment controls shall be designed to retain sediment on-site and project-generatedwaste materials that have the potential to discharge pollutants shall not be placed on open soil oron a surface that is not stabilized. Volumes of sediment over five (5) cubic yards must be removed from the active construction site; additionally, if sediment is placed for disposal withinthe exterior boundaries of the Pueblo of Isleta, disposal must be within a tribally approved sediment disposal site.

d. Pueblo of Laguna

i. All operators obtaining permit coverage under the EPA CGP must submit an electronic copy of the certified (signed) Notice of Intent (NOI) to the Pueblo of Laguna's Environmental & Natural Resources Department (ENRD) within three business days of submittal to the EPA. Additionally, a copy of NOI modifications and the Notice of Termination (NOT), must be provided within three business days after the EPA provides electronic confirmation that the submission has been received. The NOI and NOT must be electronically submitted to info.environmental@pol-nsn.gov.

ii. All operators obtaining permit coverage under the EPA CGP must submit an electronic copy of the Stormwater Pollution Prevention Plan (SWPPP) to the Pueblo of Laguna's ENRD 14 days prior to the submittal of the NOI (see contact information listed above).

iii. The operator must provide copies of corrective actions logs and modifications made to the SWPPP as a result of inspection findings to the Pueblo of Laguna ENRD (see contact information above).

iv. In addition to the notification requirements of Part 2.3.6 of the CPG ***[EPA interprets this intending to refer to the CGP]***, the operator must notify the Pueblo of Laguna ENRD at 505-552-7512 in the event of an emergency spill as soon as possible.

e. Pueblo of Sandia. The following conditions apply only to discharges on the Pueblo of Sandia Reservation:

i. All operators obtaining permit coverage under the EPA CGP, must submit a copy of the certified (signed) Notice of Intent (NOI) to the Pueblo of Sandia Environment Department concurrently with submittal to the EPA. Additionally, a copy of NOI modifications and the Notice of Termination (NOT), must be provided concurrently with submittal to the EPA. The NOI and NOT must be provided electronically to the following addresses:

Electronic Addresses:

Amy Rosebrough (Water Quality Manager): rosebrough@sanidapueblo.nsn.us
Greg Kaufman (Environment Director):gkaufman@sandiapueblo.nsn.us

ii. All operators obtaining permit coverage under the EPA CGP, must submit an electronic copy of the Stormwater Pollution Prevention Plan (SWPPP) to the Pueblo of Sandia Environment. Department at least 14 days prior to submittal of the NOI to the Pueblo (see contact information listed above).

iii. If requested by the Pueblo of Sandia Environment Department, the permittee must provide additional information necessary on a case-by-case basis to assure compliance with the Pueblo of Sandia Water Quality Standards and/or applicable Federal Standards.

iv. An "Authorization to Proceed Letter" with site specific mitigation requirements may be sent out to the permittee when a review of the NOI and SWPPP, on a case-by-case basis, is completed by the Pueblo of Sandia Environment Department. This approval will allow the application to proceed if all mitigation requirements are met.

v. The Pueblo of Sandia will not allow Small Construction Waivers (Appendix C) to be granted for any small construction activities.

vi. The operator must provide copies of inspection reports, a copy of the corrective action log, and modifications made to the SWPPP as a result of inspection findings to the Pueblo of Sandia Environment Department upon request. An inspection report and corrective action log must be submitted to the Pueblo within 3 days of any inspection that results in corrective action (see contact information listed above).

vii. The operator must notify the Pueblo of Sandia within 24 hours in the event of an emergency spill, in addition to the notification requirements at Part 2.3.6 of the COP (see contact information listed above).

viii. Before submitting a Notice of Termination (NOT) to the EPA, permittees must clearly demonstrate to the Pueblo of Sandia Environment Department through a site visit or documentation that requirements for site stabilization have been met and any temporary erosion control structures have been removed. A short letter stating that the NOT is acceptable and all requirements have been met will be sent to the permittee to add to the permittee's NOT submission to the EPA.

f. Pueblo of Santa Ana. The following conditions apply only to discharges on the Pueblo of Santa Ana Reservation:

i. All operators obtaining permit coverage under the EPA CGP, must submit a copy of the certified (signed) Notice of Intent (NOI) to the Pueblo's Department of Natural Resources within three business days of submittal to EPA. Additionally, a copy of NOI modifications and the Notice of Termination (NOT), must be

provided within three business days after EPA provides electronic confirmation that the submission has been received. The NOI and NOT must be provided to the following address:

Regular U.S. Delivery Mail:
Pueblo of Santa Ana
Department of Natural Resources Water Resources Division
Attn: Andrew Sweetman 02 Dove Rd
Santa Ana Pueblo, NM 87004

Electronically:
Andrew Sweetman
Water Resources Division Manager Andrew.Sweetman@santaana-nsn.gov
Tammy Montoya Hydrologist
Tammy.Montoya@santaana-nsn.gov

ii. All operators obtaining permit coverage under the EPA CGP, must submit an electronic copyof the Stormwater Pollution Prevention Plan (SWPPP) to the to the Pueblo's Department of Natural Resources at the same time that the NOI is submitted to the tribe (see contact information listed above).

iii. The operator must provide copies of inspection reports, a copy of the corrective action log, and modifications made to the SWPPP as a result of inspection findings, upon request by the Pueblo's Department of Natural Resources.

iv. The operator must notify the Pueblo's Department of Natural Resources within 24 hours in the event of an emergency spill, in addition to the notification requirements at Part 2.3.6 of the CGP.

g. Pueblo of Taos

i. All operators obtaining permit coverage under the EPA CGP, must submit a copy of the certified (signed) Notice of Intent (NOi) to the Taos Pueblo Environmental Office and Taos Pueblo Governor's Office within three business days of submittal to EPA. Additionally, a copy of NOi modifications and the Notice of Termination (NOT), must be provided within three business days after EPA provides electronic confirmation that the submission has been received. The NOi and NOTmust be provided to the following addresses:

Honorable Governor of Taos Pueblo PO Box 1846
Taos, New Mexico 87571

Taos Pueblo Environmental Office PO Box 1846
Taos, New Mexico 87571

ii. All operators obtaining permit coverage under the EPA CGP, must submit an electronic copy of theStormwater Pollution Prevention Plan (SWPPP) to the Taos Pueblo Environmental Office when the NOI is submitted to the tribe. Electronic copy of SWPPP downloaded on flash drive may be sent to the above address for the Taos Pueblo Environmental Office.

iii. The operator must provide a copy of the corrective action log following each corrective action undertaken and modifications made to the SWPPP as a result of

a corrective action to the Taos Pueblo Environmental Office at address listed above.

h. Pueblo of Tesuque.

i. All operators obtaining permit coverage under the EPA CGP, must submit a copy of the certified (signed) Notice of Intent (NOI) to the Pueblo of Tesuque Department of Environment and Natural Resources (DENR) and the Pueblo's Governor within three business days of submittal to EPA. Additionally, a copy of any NOi modifications and the Notice of Termination (NOT), must be provided within three business days after EPA provides electronic confirmation that the submission has been received. The NOI and NOT must be provided to the following address:

Governor Mark Mitchell Pueblo of Tesuque
20 TP 828
Santa Fe, NM 87506 governor@pueblooftesuque.org

Sage Mountain.flower Pueblo of Tesuque
Department of Environment and Natural Resources Director
20 TP 828

ii. All operators obtaining permit coverage under the EPA CGP, must submit an electronic copyof the Stormwater Pollution Prevention Plan (SWPPP) to Pueblo of Tesuque DENR and the Pueblo's Governor at the same time that the NOI is submitted to the EPA (see contact information listed above).

iii. The operator must provide a copy of the corrective action log, and any modifications made tothe SWPPP as a result of inspection findings, or upon request by the Pueblo of Tesuque DENR.

iv. The operator must notify the Pueblo of Tesuque DENR within 24 hours in the event of an emergency spill, in addition to the notification requirements at Part 2.3.6 of the CGP (seecontact information listed above).

i. Santa Clara Indian Pueblo.

i. All operators obtaining permit coverage under the EPA CGP, must submit a copy of the certified (signed) Notice of Intent (NOI) to the Santa Clara Pueblo Office of Environmental Affairs at the same time the NOI is submitted to the U.S. EPA. Additionally, a copy of the NOI modifications and the Notice of Termination (NOT), must be provided at the same time after electronic confirmation is received from EPA that the NOT has been accepted. The NOI and NOT shall be provided to the following address in electronic format:

Dino Chavarria,
Santa Clara Pueblo
Office of Environmental Affairs
dinoc@santaclarapueblo.org

ii. All operators obtaining permit coverage under the EPA CGP, must submit an electronic copy of the Stormwater Pollution Prevention Plan to the Santa Clara Pueblo Office of Environmental Affairs at the same time the NOI is submitted to the U.S. EPA (see contact information listed above).

c. Dewatering discharges into sediment or nutrient-impaired waters, and waters identified as Tier 2, Tier 2.5, or Tier 3 (OAC 785:46-13) shall be controlled to meet water quality standards for turbidity in those waters as follows:

i. Cool Water Aquatic Community/Trout Fisheries: 10 NTUs (OAC 785: 45-5-12(f)(7)(A)(i)

ii. Lakes: 25 NTUs (OAC 785: 45-5-12(f)(7)(A)(ii)

iii. In waters where background turbidity exceeds these values, turbidity from dewatering discharges should be restricted to not exceed ambient levels (OAC 785: 45-5-12(f)(7)(B)

9.7 EPA REGION 7

No additional conditions.

9.8 EPA REGION 8

9.8.1 MTR10I000 Indian country within the State of Montana

a. Blackfeet Nation.

i. The Applicant and applicants for projects authorized under the NWPs should obtain all other permits, licenses, and certifications that may be required by federal, state, or tribal authority. Primary relevant tribal permit will be ALPO (Ordinance 117). Others may apply. It is the applicant's responsibility to know the tribal and local ordinances and complete all necessary permissions before they can commence work.

ii. If a project is unable to meet the enclosed conditions, or if certification is denied for an applicable NWP, the Applicant may request an individual certification from Blackfeet. An individual certification request must follow the requirements outlined in 40 CFR 121.5 of EPA's CWA § 401 Certification Rule, effective September 11, 2020.

iii. Copies of this certification should be kept on the job site and readily available for reference.

iv. If the project is constructed and/or operated in a manner not consistent with the applicable NWP, general conditions, or regional conditions, the permittee may be in violation of this certification.

v. Blackfeet and EPA representatives may inspect the authorized activity and any mitigation areas to determine compliance with the terms and conditions of the NWP.

vi. This NWP Reissuance does not reduce Tribal authority under any other rule.

vii. The project, including any stream relocations and restoration, must be built as shown and as otherwise described in the application, the construction plans, cross sections, mitigation plans and other supporting documents submitted to this office. Impacts to aquatic systems and restoration efforts will be monitored by an appropriate aquatic resource professional to ensure that disturbed areas are restored to at least their original condition.

viii. All existing water uses will be fully maintained during and after the completion of the project. (If applicable)

iii. The operator must notify the Santa Clara Pueblo Office of Environmental Affairs at the address above within 24 hours, in the event of an emergency spill, in addition to the notification requirements at Part 2.3.6 of the CGP

9.6.3 OKR10I000 Indian country within the State of Oklahoma, except areas of Indian country covered by an extension of state program authority pursuant to Section 10211 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA).

a. Pawnee Nation. The following conditions apply only to discharges within Pawnee Indian country:

i. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be provided to the Pawnee Nation at the same time it is submitted to the Environmental Protection Agency to the following address:

Pawnee Nation Department of Environmental Conservation and Safety
P.O. Box 470
Pawnee, OK 74058
Or email to dnrs@pawneenation.org

ii. An electronic copy of the Storm Water Pollution Prevention Plan (SWPPP) must be submitted to the Pawnee Nation Department of Environmental Conservation and Safety at the same time the NOI is submitted.

iii. The operator must provide access to the site for inspections and for copies of inspection reports, copy of the corrective action log and modifications, made to the SWPPP because of inspection findings, upon request by the Pawnee Nation DECS.

iv. The Pawnee Nation Department of Environmental Conservation and Safety must be notified at 918.762.3655 immediately upon discovery of any noncompliance with any provision of the permit conditions.

9.6.4 OKR10F000 Discharges in the State of Oklahoma that are not under the authority of the Oklahoma Department of Environmental Quality, or the Oklahoma Department of Agriculture and Forestry including activities associated with oil and gas exploration, drilling, operations, and pipelines (includes SIC Groups 13 and 46, and SIC codes 492 and 5171), and point source discharges associated with agricultural production, services, and silviculture (includes SIC Groups 01, 02, 07, 08, 09).

a. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Lee Creek or any water or watershed designated "ORW" in Oklahoma's Water Quality Standards, this permit may only be used to authorize discharges from temporary construction activities. Certification is denied for any on-going activities such as sand and gravel mining or any other mineral mining.

b. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Lee Creek or any water or watershed designated "ORW" in Oklahoma's Water Quality Standards, certification is denied for any discharges originating from support activities, including, but not limited to, concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, or borrow areas.

(c) All equipment is to be inspected and cleaned before and after use to minimize the spread or introduction of invasive or undesirable species.

(d) Construction equipment shall not operate below the existing water surface except as follows:

- Impacts from construction should be minimized through the use of best management practices submitted in the permit application.
- Essential work below the waterline shall be done in a manner to minimize impacts to aquatic system and water quality.

(e) Containment booms and/or absorbent material must be available onsite. Any spills of petroleum products must be reported to the Army Corps, Blackfeet Nation BEO Office and the US EPA within 24 hours.

xx. Upland, riparian and in-stream vegetation should be protected except where its removal is necessary for completion of work. Revegetation should be completed as soon as possible. Applicant/contractor should revegetate disturbed soil in a manner that optimizes plant establishment for the site. Revegetation must include topsoil replacement, planting, seeding, fertilization, liming and weed-free mulching as necessary. Applicant must use native plant material and soils where appropriate and feasible. This certification does not allow for the introduction of non-native flora and fauna. All disturbed surface areas must be restored to pre-construction contours and elevation.

xxi. Spoils piles should not be placed or stored within the delineated wetlands or streams unless protected by a temporary structure designed to divert and handle high flows that can be anticipated during permit activity. Spoils piles should be placed on landscaping fabric or some other material to separate spoils material and allow retrieval of spoils material with minimal impact.

xxii. Impacts to wetlands shall not exceed 4.92 acres.

xxiii. Any unexpected and additional impacts to waters of the US should be reported to the

xxiv. Army Corps, Blackfeet Environmental Office Water Quality Coordinator and the US EPA.

xxv. All instream and stream channel reconstruction work must be completed before the stream is diverted into the new channel.

xxvi. Any temporary crossings, bridge supports, cofferdams, or other structures that are necessary during permit activity should be designed to handle high flows that can be anticipated during permit activity. All temporary structures should be completely removed from the water body at the conclusion of the permitted activity and the area restored to a natural function and appearance.

xxvii. The certification does not authorize any unconfined discharge of liquid cement into the waters of the United States. Grouting riprap must occur under dry conditions with no exposure of wet concrete to the water body.

xxviii. BMPs shall include application of certified weed-free straw or hay across all disturbed wetland areas that are temporarily impacted; installation and maintenance of sediment control measures during construction and if necessary, after construction is completed; use of heavy mud mats if necessary; separation,

ix. Where practicable, perform all in-channel and wetland work during periods of low flow or drawn—down or when dry

x. Equipment staging areas must be located out of all delineated wetlands

xi. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during and immediately after construction, and all exposed soil and other fills, as well as any work below the ordinary high-water mark or in a wetland, must be permanently stabilized as soon as possible

xii. Materials such as piling, culverts, sandbags, fabric, mats, timbers used for temporary facilities in wetlands or below the high- water mark of Waters of the US must be free from oil, gas, excess dirt, loose paint and other pollutants.

xiii. Equipment staging areas in wetlands or in stream or river channels must be placed on mats, or other measures must be taken to minimize soil disturbance and compaction.

xiv. Clearing of riparian or wetland vegetation for the sole purpose of constructing work bridges, detours, staging areas or other temporary facilities must be limited to the absolute minimum necessary. When temporary impacts to native riparian or wetland vegetation are unavoidable, it must be mowed or cut above ground with the topsoil and root mass left intact.

xv. Remove all temporary fills and structures in the entirety when they are no longer needed. Restore affected areas to the appropriate original and planned contours where possible. Re-vegetate disturbed areas with appropriate native species when native species are impacted.

xvi. Construction methods and best management practices (BMPs) must minimize aquatic resource impacts to the maximum extent possible. Any BMPs described in the Joint Application must be followed. BMPs should include installation and maintenance of sediment control measures; separation, storage and reuse of any topsoil; and recovery of all disturbed areas where possible. All best management practices must in place prior to the onset of construction or as soon as practicable during the construction process.

xvii. Best available technology and/or best management practices must be utilized to protect existing water uses and maintain turbidity and sedimentation at the lowest practical level.

xviii. Applicant/contractor should manage disturbed streambank topsoil in a manner that optimizes plant establishment for the site.

xix. When operating equipment or otherwise undertaking construction in wetlands and water bodies the following conditions apply:

(a) Work should be done in dry conditions if possible.

(b) All equipment is to be inspected for oil, gas, diesel, anti-freeze, hydraulic fluid or other petroleum leaks. All such leaks will be properly repaired and equipment cleaned prior to being allowed on the project site. Leaks that occur after the equipment is moved to the project site will be fixed the same day or the next day or removed from the project area. The equipment is not allowed to continue operation once a leak is discovered.

xxxvi. Vegetation should be protected except where its removal is necessary for completion of the work. Locations disturbed by construction activities should be revegetated with appropriate native vegetation in a manner that optimizes plant establishment for the specific site.

xxxvii. Revegetation may include topsoil replacement, planting, seeding, fertilization, liming, and weed-free mulching, as necessary. Where practical, stockpile weed- seed-free topsoil and replace it on disturbed areas. All revegetation materials, including plants and plant seed shall be on site or scheduled for delivery prior to or upon completion of the earth moving activities.

xxxviii. Activities may not result in any unconfined discharge of liquid cement into waters of the U.S. Grouting riprap must occur under dry conditions with no exposure of wet concrete to the waterbody.

xxxix. Activities that may result in a point source discharge shall occur during seasonal low flow or no flow periods to the extent practicable.

xl. The placement of material (discharge) for the construction of new dams is not certified, except for stream restoration projects.

xli. Any decision-maker that is required under 7.0 of the CGP to prepare a Stormwater Pollution Prevention Plan (SWPPP), must submit an electronic copy of the SWPPP to the Blackfeet Environmental Office at least 30 days before construction starts for review and approval. Any modifications to the SWPPP should be submitted to the Blackfeet Environmental Office.

xlii. Any Decision-maker required under Part 1.4 of the CGP to submit a Notice of Intent (NOI) to EPA for coverage under the CGP, must submit a copy of the NOI to the Blackfeet Environmental Office within three business days of submittal to EPA. Additionally, a copy of the Notice of Termination (NOT) must be provided within three business days after electronic confirmation is received from EPA that the NOT has been accepted. The NOI and NOT must be provided to the following address Gerald Wagner, Blackfeet Environmental Office Director.

62 Hospital Drive, Browning, MT 59417

beo.director@gmail.com

b. Fort Peck Tribes.

i. Any Decision-maker required under Part 1.4 of the CGP to submit a Notice of Intent (NOI) to EPA for coverage under the CGP, must submit a copy of the NOI to the Fort Peck Tribes Office of Environmental Protection within three business days of submittal to EPA. Additionally, a copy of the Notice of Termination (NOT) must be provided within three business days after electronic confirmation is received from EPA that the NOT has been accepted. The NOI and NOT must be provided to the following address:

Martina Wilson, Office of Environmental Protection Director

501 Medicine Bear Rd Poplar, MT 59255

martinawilson@fortpecktribes.net

ii. Any Decision-maker that is required under Part 7.0 of the CGP to prepare a Stormwater Pollution Prevention Plan (SWPPP), must submit an electronic copy of the SWPPP to the Fort Peck Tribes Office of Environmental Protection at least 30 days before construction starts for review and approval. Any modifications to the

storage and reuse of all streambank topsoil and wetland topsoil, as appropriate; and recovery of all disturbed wetland and streambank areas where possible. All conditions set by the Blackfeet Tribe and US Army Corps must be followed.

xxix. All applicants, including federal agencies, must notify EPA and the Blackfeet Environmental Office of the use of all NWPs for which certification has been granted prior to commencing work on the project. Notifications must include:

(a) project location (lat. Long., exact point on map);

(b) NWP that will be used and the specific activity that will be authorized under the NWP;

(c) amount of permanent and temporary fills;

(d) a short summary of the proposed activity, and all other federal, state, tribal or local permits or licenses required for the project;

(e) complete contact information of both the applicant and contractor (name, name of the company or property if applicable, telephone, mobile, and email); and,

(f) Summary of best management practices that will be used.

(g) A summary of communications with the affected Tribe's water quality staff regarding the project, including any concerns or issues.

(h) Notify Blackfeet and EPA at least 7 days before the completion of construction and operations begin.

xxx. Point source discharges may not occur: (1) in fens, bogs or other peatlands; (2) within 100 feet of the point of discharge of a known natural spring source; or (3) hanging gardens.

xxxi. Except as specified in the application, no debris, silt, sand, cement, concrete, oil or petroleum, organic material, or other construction related materials or wastes shall be allowed to enter into or be stored where it may enter into waters of the U.S.

xxxii. Silt fences, straw wattles, and other techniques shall be employed as appropriate to protect waters of the U.S. from sedimentation and other pollutants.

xxxiii. Water used in dust suppression shall not contain contaminants that could violate water quality standards.

xxxiv. Erosion control matting that is either biodegradable blankets or loose-weave mesh must be used to the maximum extent practicable.

xxxv. All equipment used in waters of the U.S. must be inspected for fluid leaks and invasive species prior to use on a project. All fluid leaks shall be repaired and cleaned prior to use or when discovered, or if the fluid leak can't be repaired, the equipment shall not be used on site. Equipment used in waters with the possibility of aquatic nuisance species infestation must be thoroughly cleaned and effectively decontaminated before they are used on the project.

Subcontractors generally are not considered operators for the purposes of this permit.

c. The Project Proponent shall enforce the proposed 2022 CGP and ensure that the Operator complies with the conditions of the permit at all times.[107] (40 CFR §121.11(c))

d. All submittals required by this Order shall be sent to the Guam Environmental Protection Agency Attn: 401 Federal Permit Manager, Non-Point Source Program, EMAS Division, 3304 Mariner Avenue, Bldg. 17-3304, Barrigada, Guam 96913, AND via email to jesse.cruz@epa.guam.gov. The submittals shall be identified with WQC Order #2021- 04 and include the COP Permit Number, certifying representative's name, title, mailing address and phone number. (§51060)(4) 2017 GWQS)

e. A copy of the Operator's signed Stormwater Pollution Prevention Plan (SWPPP) and signed Notice of Intent (NOI) and Notice of Termination (NOT) submitted to EPA for review and approval, shall concurrently be submitted to Guam EPA, consistent with condition A4. Coordination with Guam EPA is encouraged when the receiving water(s) for the proposed discharge is/are being identified. (§10105.B.5.d.) GSESCR; (§51060)(4) 2017 GWQS)

f. The Operator must comply with the conditions and requirements set forth in 22 GAR 10, Guam Soil Erosion and Sediment Control Regulations (GSESCR).

g. Before submitting the NOT to EPA, Operators shall comply with GSESC regulations at §10105.B10. (Stabilization of Affected Areas) and §10107.B. {Final Inspection and Approval)

h. All operators/owners shall comply with the general design criteria for best management practices (BMPs) acceptable for meeting the Construction and Post-construction stormwater criteria in the 2006 CNMI and Guam Stormwater Management Manual. (E.O. 2012-02)

i. Operating reports and monitoring and analytical data (e.g. Discharge Monitoring Reports (DMRs), follow-up monitoring reports, Exceedance Reports for Numerical Effluent Limits, etc.) submitted to EPA shall be concurrently submitted to Guam EPA, consistent with condition A4. §51060)(4) 2017 GWQS

j. The Operators who install a sediment basin or similar impoundment shall maintain the storage capacity of five thousand cubic feet {5,000 cu. ft.) per acre of project area tributary to the basin. (§10105.B.5.i.) GSESCR

k. (1) This Order does not authorize EPA to qualify Rainfall Erosivity Waivers to stormwater discharges associated with small construction activities (i.e. 1-5 acres). Operators are required to apply for an NOI for those projects eligible for coverage under the proposed 2022 CGP. An Erosion and Sediment Control Plan is required for every site that would be covered by the proposed 2022 CGP. (22 GAR §10104) The average annual rainfall for Guam and the CNMI exceeds I00 inches per year in many locations. These climatic conditions combined with the region's unique limestone, volcanic geologic formations, sensitive water resources and significant land

[107] By incorporating this condition into the permit, EPA acknowledges receipt of Guam's certification conditions.

SWPPP should be submitted to the Fort Peck Tribes Office of Environmental Protection.

iii. Any Decision-maker that is required under Part 8.0 of the CGP to submit a weekly, bi-weekly, and/or annual report to EPA, must submit an electronic copy of the annual report to the Fort Peck Tribes Office of Environmental Protection within three business days after submittal tc EPA.

9.9 EPA REGION 9

9.9.1 CAR10I000 Indian country within the State of California

a. Morongo Band of Mission Indians

i. A copy of the Stormwater Pollution Prevention Plan (SWPPP) must be submitted (either mailed or electronically) to the MEPD no less than thirty (30) days before commencing construction activities:

Morongo Band of Mission Indians
Environmental Protection Department
12700 Pumarra Road
Banning, CA 92220
Email: epd@morongo-nsn.gov

ii. Copies of the Notice of Intent (NOI) and the Notice of Termination (NOT) must be sent to the MEPD at the same time they are submitted to EPA.

iii. Operators of an "emergency-related project" must submit notice to the MEPD within twenty- four (24) hours after commencing construction activities.

iv. Spills, leaks, or unpermitted discharges must be reported to the MEPD within twenty-four (24) hours of the incident, in addition to the reporting requirements of the CGP.

v. Projects utilizing cationic treatment chemicals (as defined in Appendix A of the CGP) within the Morongo Reservation are not eligible for coverage under this certification of the CGP.

vi. Facilities covered under the CGP will be subject to compliance inspections by MEPD staff, including compliance with final site stabilization criteria prior to submitting an NOI ***[EPA assumes this intended to refer to an NOT]***.

9.9.2 GUR100000 Island of Guam

a. For purposes of this Order, the term "Project Proponent" shall mean U.S. Environmental Protection Agency, and its agents, assignees, and contractors.

b. For purposes of this Order, the permit "Operator" shall mean any party associated with a construction project that meets either of the following two criteria:

i. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications (e.g. in most cases this is the owner of the site); or

ii. The party has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the permit; in most cases this is the general contractor of the project).

(a) Guam's Emergency 911 system

(b) Guam EPA's 24-Hour Spill Response Team at (671) 888-6488 or during working hours (671) 300-4751

(c) US Coast Guard Sector Guam (671) 355-4824

(d) National Response Center 1-800-424-8802

iv. Submit a detailed written report to Guam EPA within five days of noncompliance that describes the nature of the event corrective action taken and/or planned, steps to be taken to prevent a recurrence, results of any samples taken, and any other pertinent information.

t. Compliance with this condition does not relieve the Operator from responsibility to maintain continuous compliance with the terms and conditions of this Order or the resulting liability from failure to comply.

u. Submittal or reporting of any of this information does not provide relief from any subsequent enforcement actions for unpermitted discharges to waters of the United States.

v. This Order is valid for five (5) Years from Date of Certification, unless otherwise approved by the Guam EPA Administrator.

w. The Operator shall be required to adhere to the current Guam Coral Spawning Moratorium dates for both hard and soft corals where in-water activities and/or construction activity in close proximity with marine waters may impair water quality. These dates can be obtained from the Guam Department of Agriculture, Division of Aquatic and Wildlife Resources, or the NOAA NMFS Pacific Islands Regional Office Habitat Conservation Division.

x. The Operator shall provide notice to Guam EPA consistent with Condition A4:

(a) Immediately upon discovery of noncompliance with the provisions of this Order.

y. A Notice of Violation/Work Stop Order will be issued if certification conditions are not adhered to or when significant or sustained water quality degradation occurs. Work or discharge shall be suspended or halted until the Operator addresses environmental problems/concerns to Guam EPA's satisfaction. Guam EPA may also levy penalties and fines (10 GCA §47111). Invalidity or enforceability of one or more provisions of this certification shall not affect any other provision of this certification.

9.10 EPA REGION 10

9.10.1 IDR10I000 Indian country within the State of Idaho, except Duck Valley Reservation lands (see Region 9)

a. Shoshone-Bannock Tribes

i. Copies of the following information must be sent to the SBT-WRD:
(a) Notice of Intents (NOI)

The Notice of Intent shall be forwarded to the SBT-WRD within thirty (30) days of receipt of submitting NOI to the USEPA.

development forces make stormwater discharges a very significant environmental and economic issue. (2006 CNMJ/Guam Stormwater Management Manual) E.O. 2012-02

(2) This Order does not authorize EPA to approve a Sediment TMDL Waiver for the Ugum River. Operators of construction activities eligible for a TMDL Waiver in lieu of coverage under the proposed 2022 CGP, shall submit a complete and accurate waiver certification as described in C.2., Appendix C - (Small Construction Waivers) to Guam EPA per condition A4., prior to notifying EPA of its intention to obtain a waiver. §51060)(4) 2017 GWQS

l. The Project Proponent shall submit to Guam EPA a signed Statement of Understanding of Water Quality Certification Conditions.[108] (see Attachment A for an example) per condition A4. §51060)(4) 2017 GWQS

m. The Operator shall comply with applicable provisions of the Guam Pesticides Act of2007 (10 GCA Chapter 50) and implementing regulations at Title 22 GAR Chapter 15 for any use and application of pesticides.

n. Point source discharge(s) to waterbodies under the jurisdiction of Guam EPA must be consistent with the antidegradation policy in 22 GAR §510l(b).

o. The operator shall carry out construction activities in such a manner that will not violate Guam Water Quality Standards (GWQS). Proposed 2022 CGP discharges are prohibited as follows:

i. In Marine Waters, Category M-1 Excellent 22 GAR Chapter 5 §5102(b)(I); and

ii. In Surface Waters, Category S-1 High 22 GAR Chapter 5 §5102(c)(I)

p. In addition to complying with construction dewatering requirements in Part 2.4 and site inspection requirements for all areas where construction dewatering is taking place in Part 4 of the proposed 2022 CGP, Operators shall comply with all dewatering conditions and requirements set forth in 22 GAR 7, Water Resources Development and Operating Regulations, to include securing Guam EPA permits prior to any dewatering activities.

q. The Operator shall develop and implement a Spill Prevention and Containment Plan.

r. The Operator shall have adequate and appropriate spill response materials on hand to respond to emergency release of oil, petroleum or any other material into waters of the territory.

s. Any unpermitted discharge into territorial waters or onto land with a potential for entry into territorial waters, is prohibited. If this occurs, the Operator shall immediately take the following actions:

i. Cease operations at the location of the violation or spill.

ii. Assess the cause of the water quality problem and take appropriate measures to correct the problem and/or prevent further environmental damage.

iii. Notify Guam EPA of the failure to comply. All petroleum spills shall be reported immediately to:

[108] By incorporating this condition into the permit, EPA acknowledges receipt of Guam's certification conditions.

Confederated Tribes of the Umatilla Indian Reservation's (CTUIR) Water Quality Standards.

ii. The operator shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to the CTUIR Water Resources Program at the address below, at the same time it is submitted to EPA.

iii. The operator shall be responsible for submitting all Stormwater Pollution Prevention Plans (SWPPP) required under this general permit to the CTUIR Water Resources Program for review and determination that the SWPPP is sufficient to meet Tribal Water Quality Standards, prior to the beginning of any discharge activities taking place.

iv. The operator shall be responsible for reporting an exceedance to Tribal Water QualityStandards to the CTUIR Water Resources Program at the same time it is reported to EPA.

Confederated Tribes of the Umatilla Indian Reservation
Water Resources Program
46411 Timíne Way
Pendleton, OR 97801
(541) 429-7200

v. The THPO will be provided 30 days to comment on the APE as defined in the permit application.

vi. If the project is an undertaking, a cultural resource assessment must occur. All fieldwork must be permitted by the Tribal Historic Preservation Office (as appropriate), conducted by qualified personnel (as outlined by the Secretary of Interior's Standards and Guidelines; http://www.nps.gov/history/local-law/arch_stnds_0.htm) and documented according to Oregon Reporting Standards (Reporting_Guidelines.pdf (oregon.gov). The resulting report must be submitted to the THPO and the THPO must concur with the finding of effect and recommendations before any ground disturbing work can occur. The THPO requires 30 days to review all reports.

vii. The operator must obtain THPO concurrence in writing. If historic properties are present, this written concurrence will outline measures to be taken to prevent or mitigate adverse effects to historic properties.

9.10.3 WAR10F000 Areas in the State of Washington, except those located on Indian country, subject to construction activity by a Federal Operator

a. For purposes of this Order, the term "Project Proponent" shall mean those that are seeking coverage under this permit, and its agents, assignees and contractors.

b. The Federal Agency shall mean the US Environmental Protection Agency. The Federal Agency shall enforce the permit and ensure that the Project Proponent complies with the conditions of the permits at all times.

c. Failure of any person or entity to comply with this Certification may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce the terms of this Certification.

d. The Certification conditions within this Order must be incorporated into EPA's final NPDES permit. Per 40 CFR 121.10(a), all certification conditions herein that satisfy the

Shoshone-Bannock Tribes Water Resources Department
PO Box 306 Pima Drive
Fort Hall, ID 83203 Phone: (208) 239-4582
Fax: (208) 239-4592
Or Email ctanaka@sbtribes.com

b. If requested by the SBT-WRD, the permittee must submit a copy of the SWPPP to SBT-WRD within fourteen (14) days of the request.

9.10.2 ORR10I000 Indian country within the State of Oregon, except Fort McDermitt Reservation lands (see Region 9)

a. Confederated Tribes of Coos, Lower Umpqua, and Siuslaw

i. No activities allowed under the CGP shall result in the degradation of any Tribal waters or affect resident aquatic communities or resident or migratory wildlife species at any life stage.

ii. The operator shall be responsible for achieving compliance with CTCLUSI Water Quality Standards and all other tribal codes, regulations, and laws as they exist at the time that the permit is submitted.

iii. The operator shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to the CTCLUSI Water Quality Program before, or at the same time as, it is submitted to EPA.

iv. The operator shall be responsible for submitting all Stormwater Pollution Prevention Plans (SWPPP) required under this general permit to the CTCLUSI Water Quality Program for review and determination that the SWPPP is sufficient to meet Tribal Water Quality Standards, prior to the beginning of any discharge activities taking place.

v. The operator shall be responsible for reporting an exceedance to Tribal Water Quality Standards to the CTCLUSI Water Quality Program at the same time it is reported to EPA.

vi. The THPO will be provided 30 days to comment on the APE as defined in the permit application.

vii. If the project is an undertaking, a cultural resource assessment must occur. All fieldwork must be permitted by the THPO (as appropriate), conducted by qualified personnel (as outlined by the Secretary of Interior's Standards and Guidelines; http://www.nps.gov/history/local-law/arch_stnds_O.htm) and documented according to Oregon Reporting Standards (Reporting_Guidelines.pdf) (oregon.gov). The resulting report must be submitted to the THPO and the THPO must concur with the finding of effect and recommendations before any ground disturbing work can occur. The THPO requires 30 days to review all reports.

viii. The operator must obtain THPO concurrence in writing. If historic properties are present, this written concurrence will outline measures to be taken to prevent or mitigate adverse effects to historic properties.

b. Confederated Tribes of the Umatilla Indian Reservation

i. The operator shall be responsible for achieving compliance with the

requirements of 40 CFR 121.7(d) must be incorporated into the permit. Per 40 CFR 121.10(b), the permit must clearly identify all certification conditions.

e. This Certification does not authorize exceedances of water quality standards established in chapter 173-201A WAC.

f. Discharges from construction activity must not cause or contribute to violations of the Water Quality Standards for Surface Water of the State of Washington (chapter 173-201A WAC), Ground Water Quality Standards (chapter 173- 200 WAC), Sediment Management Standards (chapter 173-204 WAC), and standards in the EPA's Revision of certain Federal water quality criteria applicable to Washington (40 CFR 131.45). Discharges that do not comply with these standards are prohibited.

g. Prior to discharge of stormwater and non-stormwater to waters of the State, the Permittee must apply all known, available, and reasonable methods of prevention, control, and treatment (AKART). This includes the preparation and implementation of an adequate Stormwater Pollution Prevention Plan (SWPPP), with all appropriate Best Management Practices (BMPs) installed and maintained in accordance with the SWPPP and the terms and conditions of the permit.

i. BMPs must be consistent with:

(a) The Stormwater Management Manual for Western Washington (most current approved edition at the time this permit was issued), for sites west of the crest of the Cascade Mountains; or

(b) The Stormwater Management Manual for Eastern Washington (most current approved edition at the time this permit was issued), for sites east of the crest of the Cascade Mountains; or

(c) Revisions to either manual, or other stormwater management guidance documents or manuals which provide equivalent level of pollution prevention, that are approved by Ecology and incorporated into this permit in accordance with the permit modification requirements of WAC 173-226-230. (For purposes of this section, the stormwater manuals listed in Appendix 10 of the Phase I Municipal Stormwater Permit are approved by Ecology); or

(d) Documentation in the SWPPP that the BMPs selected provided an equivalent level of pollution prevention, compared to the applicable stormwater management manuals, including:

- The technical basis for the selection of all stormwater BMPs (scientific, technical studies, and/or modeling) that support the performance claims for the BMPs being selected.
- An assessment of how the selected BMP will satisfy AKART requirements and the applicable federal technology-based treatment requirements under 40 CFR part 125.3.

The Stormwater Management Manuals for Eastern and Western Washington can be found at: https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Stormwater-manuals.

ii. An adequate SWPPP must include a narrative and drawings. All BMPs must be clearly referenced in the narrative and marked on the drawings. The SWPPP

narrative must include documentation to explain and justify the pollution prevention decisions made for the project. Documentation must include:

(a) Information about existing site conditions (topography, drainage, soils, vegetation, etc.).

(b) Potential erosion problem areas.

(c) The 13 elements of a SWPPP, including BMPs used to address each element. Unless site conditions render the element unnecessary and the exemption is clearly justified in the SWPPP, the 13 elements are as follows:

- Preserve Vegetation/Mark Clearing Limits
- Establish Construction Access
- Control Flow Rates
- Install Sediment Controls
- Stabilize Soils
- Protect Slopes
- Protect Drain Inlets
- Stabilize Channels and Outlets
- Control Pollutants
- Control Dewatering
- Maintain BMPs
- Manage the Project
- Protect Low Impact Development (LID) BMPs

h. Discharges of stormwater and authorized non-stormwater must be monitored for turbidity (or transparency) and, in the event of significant concrete work or engineered soils, pH must also be monitored. As applicable based on project specifics, monitoring, benchmarks, and reporting requirements contained in Condition S.4. (pp.10-16) of the Washington State Construction Stormwater General Permit, effective January 1, 2021, shall apply.

i. Discharges to segments of waterbodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, phosphorus, or pH must comply with the following numeric effluent limits:

Parameter identified in 303(d) listing	Parameter Sampled	Unit	Analytical Method	Numeric Effluent Limit
• Turbidity • Fine Sediment • Phosphorus	Turbidity	NTU	SM2130	25 NTUs at the point where the stormwater is discharged from the site.
High pH	pH	su	pH meter	In the range of 6.5 – 8.5

All references and requirements associated with Section 303(d) of the Clean Water Act mean the most current EPA-approved listing of impaired waters that exists on the

effective date of the permit, or the date when the operator's complete permit application is received by EPA, whichever is later.

The EPA approved WQ Assessment can be found at: https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-improvement/Assessment-of-state-waters-303d

j. Discharges to a waterbody that is subject to a Total Maximum Daily Load (TMDL) for turbidity, fine sediment, high pH, or phosphorus must be consistent with the TMDL.

- **i.** Where an applicable TMDL sets specific waste load allocations or requirements for discharges covered by this permit, discharges shall be consistent with any specific waste load allocations or requirements established by the applicable TMDL.
- **ii.** Where an applicable TMDL has established a general waste load allocation for construction stormwater discharges, but no specific requirements have been identified, compliance with this permit will be assumed to be consistent with the approved TMDL.
- **iii.** Where an applicable TMDL has not specified a waste load allocation for construction stormwater discharges, but has not excluded these discharges, compliance with this permit will be assumed to be consistent with the approved TMDL.
- **iv.** Where an applicable TMDL specifically precludes or prohibits discharges from construction activity, the operator is not eligible for coverage under this permit.

Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus which has been completed and approved by EPA as of the effective date of the permit, or prior to the date of the operator's complete application for permit coverage is received by EPA, whichever is later.

k. Discharges to waters of the state from the following activities are prohibited:

- **i.** Concrete wastewater.
- **ii.** Wastewater from washout and clean-up of stucco, paint, form release oils, curing compounds and other construction materials.
- **iii.** Process wastewater as defined by 40 Code of Federal Regulations (CFR) 122.2.
- **iv.** Slurry materials and waste from shaft drilling, including process wastewater from shaft drilling for construction of building, road, and bridge foundations unless managed to prevent discharge to surface water.
- **v.** Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance.
- **vi.** Soaps or solvents used in vehicle and equipment washing.
- **vii.** Wheel wash wastewater, unless managed to prevent discharge to surface water.
- **viii.** Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, unless managed according to appropriate controls described within the permit.

l. This Certification is valid until the expiration date including any administrative extension or termination date of the NPDES 2022 Construction General Permit. (40 CFR § 122.46)

m. The Federal Agency shall enforce and the Project Proponent must comply with all the reporting and notification conditions of the NPDES 2022 Construction General Permit in order to comply with this Order and the certification conditions herein (40 CFR § 121.11).

n. You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do all of the following within 30 days of the date of receipt of this Order:

- File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person (see addresses below). E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503 **Pollution Control Hearings Board** 1111 Israel RD SW STE 301 Tumwater, WA 98501	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

CONTACT INFORMATION

Please direct all questions about this Order to:

Noel Tamboer
Department of Ecology
P.O. Box 47600
Olympia, WA 98503-7600

(360) 701-6171
noel.tamboer@ecy.wa.gov

9.10.4 WAR10I000 Indian country within the State of Washington

a. Lummi Nation

i. This certification does not exempt and is provisional upon compliance with other applicable statutes and codes administered by federal and Lummi tribal agencies. Pursuant to Lummi Code of Laws (LCL) 17.05.020(a), the operator must also obtaina land use permit from the Lummi Planning Department as provided in Title 15 of theLummi Code of Laws and regulations adopted thereunder.

ii. Pursuant to LCL 17.05.020(a), each operator shall develop and submit a Storm WaterPollution Prevention Plan to the Lummi Water Resources Division for review and approval by the Water Resources Manager prior to beginning any discharge activities.

iii. Pursuant to LCL Title 17, each operator shall be responsible for achieving compliance with the Water Quality Standards for Surface Waters of the Lummi

iv. Indian Reservation (Lummi Administrative Regulations [LAR] 17 LAR 07.010 through 17 LAR 07.210 together with supplements and amendments thereto).

v. Each operator shall submit a signed copy of the Notice of Intent (NOI) to the Lummi Water Resources Division at the same time it is submitted electronically to the Environmental Protection Agency (EPA) and shall provide the Lummi Water Resources Division the acknowledgement of receipt of the NOI from the EPA and the associated NPDES tracking number provided by the EPA within 7 calendar days of receipt from the EPA.

vi. Each operator shall submit a signed copy of the Notice of Termination (NOT) to the Lummi Water Resources Division at the same time it is submitted electronically to the EPA and shall provide the Lummi Water Resources Division the EPA acknowledgement of receipt of the NOT.

vii. Storm Water Pollution Prevention Plans, Notice of Intent, Notice of Termination and associated correspondence with the EPA shall be submitted to:

Lummi Natural Resources Department
ATTN: Water Resources Manager 2665 Kwina Road
Bellingham, WA 98226-9298

b. Port Gamble S'Klallam Tribe

i. No discharge from the project site shall cause exceedances of Port Gamble S'KlallamSurface Water Quality Standards narrative or numeric criteria in Tribal waters. This includes activities outside of Tribal lands that occur upstream of Tribal waters.

(a) If any exceedance of these water quality standards occurred, the Natural Resources Department shall be notified immediately.

- The Department shall additionally be provided a complete draft of the proposed corrective action within a reasonable timeframe and its approval will be required before any corrective action may be taken.

ii. Operators performing activities under the CGP that may affect Tribal waters will requirea permit and shall submit their plans to the Port Gamble S'Klallam Natural Resources Department for review.

- The Department has the right to require conditions outside of this Water QualityCertification prior to permit approval.

iii. No activities allowed under the CGP shall result in the degradation of any Tribal watersor change in designated uses.

iv. No activities allowed under the CGP shall affect resident aquatic communities or resident/migratory wildlife species at any life stage.

- Biological assessment methods used to determine the effect of an activity allowedunder the CGP shall be approved by the PGST Natural Resources Department.

v. No activities allowed under the CGP shall be conducted within wetland and stream bufferzones, nor shall said activities affect in any way wetland or stream buffers, as defined by *PGST Law and Order Code 24.08.01(c)*.

vi. Concentrations for substances listed within the table in *Water Quality Standards for Surface Waters* sec. 7(7) shall not be exceeded by activities allowed under the CGP.

c. Spokane Tribe of Indians

i. Pursuant to Tribal Law and Order Code (TLOC) Chapter 30 each operator shall be responsible for achieving compliance with the Surface Water Quality Standards of the Spokane Tribe. The operator shall notify the Spokane Tribe, Water Control Board (WCB) of any spills of hazardous material and;

ii. Each operator shall submit a signed hard copy of the Notice of Intent (NOI) to the WCB at the same time it is submitted to EPA.

iii. The permittee shall allow the Tribal Water Control Board or its designee to inspect and sample at the construction site as needed.

iv. Each operator shall submit a signed copy of the Notice of Termination (NOT) to the WCB at the same time it is submitted to EPA

The correspondence address for the Spokane Tribe Water Control Board is:

Water Control Board c/o Brian Crossley PO Box480
Wellpinit WA 99040
(509)626-4409
crossley@spokanetribe.com

d. Swinomish Tribe

i. Owners and operators seeking coverage under this permit must submit a copy of the Notice of Intent (NOI) to the DEP at the same time the NOI is submitted to EPA.

ii. Owners and operators must also submit to the DEP changes in NOI and/or Notices of Termination at the same time they are submitted to EPA.

iii. Owners and operators seeking coverage under this permit must also submit a Stormwater Pollution Prevention Plan to the DEP for review and approval by DEP prior to beginning any discharge activities.

e. Tulalip Tribes

i. Submission of NOI: Copies of the Notice of Intent (NOI),) Certification shall be submitted to the Tribe's Natural Resources Department to notify the Tribes of the

pending project and in order for the Tribes to review the projects potential impacts to endangered or threatened species.

ii. Submission of SWPPP: A copy of the Stormwater Pollution Plans (SWPPPs) shall be submitted to the Tribe's Natural Resources Department along with the NOI during the 30 day waiting period.

iii. Submission of Monitoring Data and Reports: The results of any monitoring required by this permit and reports must be sent to the Tribe's Natural Resources Depa1tment,

iv. The Tulalip Tribes are federally recognized successors in the interest to the Snohomish, Snoqualmie, Skykomish, and other allied tribes and bands signatory to the Treaty of Point Elliott.

v. including a description of the corrective actions required and undertaken to meet effluent limits or benchmarks (as applicable).

vi. Authorization to Inspect: The Tribe's Natural Resources Department may conduct an inspection of any facility covered by this permit to ensure compliance with tribal water quality standards. The Department may enforce its certification conditions.

vii. Submission of Inspection Reports: Inspection reports must be sent to the Tribe's Natural Resources Department, including a description of the corrective actions required and undertaken to meet effluent limits or benchmarks (as applicable).

viii. Permits on-site: A copy of the pe1mit shall be kept on the job site and readily available for reference by the construction supervisor, construction managers and foreman, and Tribal inspectors.

ix. Project Management: The applicant shall ensure that project managers, construction managers and foreman, and other responsible parties have read and understand conditions of the permit, this certification, and other relevant documents, to avoid violations or noncompliance with this certification.

x. Emergency Spill Notification Requirements: In the event of a spill or the contractor shall immediately take action to stop the violation and correct the problem, and immediately repo1t spill to the Tulalip Tribes Police Department (425) 508-1565. Compliance with this condition does not relieve the applicant from responsibility to maintain continuous compliance with the tem1S and conditions of this certification or the resulting liability from failure to comply.

xi. Discharges to CERCLA Sites: This permit does not autho1ize direct stormwater discharges to certain sites undergoing remedial cleanup actions pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) unless first approved by the appropriate EPA Regional office. In the case of the Tulalip Landfill site (WAD980639256), the Tulalip Tribes also requests notification by the facility and consultation with EPA prior to discharge. Contaminants at this site may include but are not limited to: dioxins, furans, arsenic, copper, lead, zinc, 4- methyl-phenol, Hex-CB, HPAHs, PCBs, PCE, cadmium, mercury, and LPAHs.

xii. Discharge-related Activities that have Potential to Cause an Adverse Effect on Historic Properties: Installation of stormwater controls that involve subsurface disturbances may potentially have an adverse impact on historic properties.

xiii. Procedures detailed in the permit shall be completed. Richard Young, of the Tulalip Tribe's Cultural Resources Department shall be contacted prior to initiating discharge- related activities that may have an impact on historic properties. His contact information is (360) 716-2652, ryoung@tulaliptribes-nsn.gov.

xiv. Invalidation: This certification will cease to be valid if the project is constructed and/or operated in a manner not consistent with the project description contained in

xv. the permit. This certification will also cease to be valid and the applicant must reapply with an updated application if info1mation contained in the permit is voided by subsequent submittals.

xvi. Modification: Nothing in this certification waives the Tulalip Tribes of Washington's authority to issue modifications to this ce1iification if additional impacts due to operational changes are identified, or if additional conditions are necessary to protect water quality or further protect the Tribal Communities interest.

xvii. incorporation by reference: TI1is certification does not exempt the applicant from compliance with other statues and codes administered by the Tribes, county, state and federal agencies.

xviii. Compliance with Tribe's I996 Water Quality Standards: Each permittee shall be responsible for controlling discharges and achieving compliance with the T1ibe's Water Quality Standards.

xix. Compliant with Tulalip Tribes Tidelands Management Policy: Permittee shall be responsible for achieving compliance with applicable sections of the Tulalip Tribe's Tidelands Management Policy. (Tulalip Tribal Code Title 8 Chapter 8.30).

xx. Compliant with Tulalip Tribes Environmental Infractions: Permittee shall be responsible for achieving compliance with applicable sections of the Tulalip Tribe's Environmental Infractions. (Tulalip Tribal Code Title 8 Chapter 8.20).

xxi. Where to Submit information and for further Coordination: All requested documents should be sent to the: Tulalip Tribes Natural Resources Environmental Department c/o Kurt Nelson and Valerie Streeter, 6704 Marine Drive, Tulalip, Washington 98271. For further 40 I Certification coordination with the Tulalip Tribes Natural Resources Department, please contact Mr. Kurt Nelson (360) 716-4617 knelson@tu1aliptribes- nsn.gov. 6406 Marine Dr., Tulalip WA 98271.

f. Makah Tribe

i. The permittee shall be responsible for meeting any additional permit requirements imposed by EPA necessary to comply with the Makah Tribe's Water Quality Standards if the discharge point is located within the Makah's U&A treaty reserved areas.

ii. Each permittee shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to Makah Fisheries Management, Water Quality Department at the address listed below at the same time it is submitted to the EPA.

Makah Water Quality
Makah Fisheries Management (MFM)
ray.colby@makah.com

other storage areas, treat dewatering discharges with controls necessary to minimize discharges of pollutants. Examples of appropriate controls include sediment basins or sediment traps, sediment socks, dewatering tanks, tube settlers, weir tanks, and filtration systems (e.g., bag or sand filters) that are designed to remove sediment.

To the extent feasible, utilize vegetated, upland areas of the site to infiltrate dewatering water before discharge. At all points where dewatering water is discharged, utilize velocity dissipation controls. Examples of velocity dissipation devices include check dams, sediment traps, riprap, and grouted riprap at outlets.

viii. The permittee shall provide and maintain natural buffers to the maximum extent possible (and/or equivalent erosion and sediment controls) when tribal waters are located within 100 feet of the boundaries. If infeasible to provide and maintain an undisturbed 100 foot natural buffer, erosion and sediment controls to achieve the sediment load reduction equivalent to a 100-foot undisturbed natural buffer shall be required.

PO Box 115
Neah bay, WA 98357

iii. All supporting documentation and certifications in the NOI related to coverage under the general permit for Endangered Species Act purposes shall be submitted to the Tribe's Habitat programs for their review.

iv. If EPA requires coverage under an individual or alternative permit, the permittee shall submit a copy of the permit to Assistant Fisheries Director, ray.colby@makah.com.

v. The permittee shall submit all Stormwater Pollution Prevention plan (SWPP) to MFM for review and approval prior to beginning any activities resulting in a discharge to Makah tribal waters.

vi. The permittee shall notify Ray Colby, ray.colby@makah.com (360) 645-3150 prior to conducting inspections at construction sites generating stormwater discharges to tribal waters.

vii. The operator shall treat dewatering discharges with controls necessary to minimize discharges of pollutants to surface waters, or ground waters, and from stormwater runoff onsite from excavations, trenches, foundations, or storage areas. To the extent feasible, at all points where dewatering is discharged, comply with the velocity dissipation using check dams, sediment traps, and grouted outlets.

g. Puyallup Tribe of Indians

i. The permittee shall be responsible for meeting any additional permit requirements imposed by EPA necessary to comply with the Puyallup Tribe's antidegradation procedures.

ii. Each permittee shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to Char Naylor, Tribal Water Quality Manager at the following e-mail address: (char.naylor@puyalluptribe-nsn.gov) at the same time it is submitted to EPA.

iii. All supporting documentation and certifications in the NOI related to coverage under the general permit for Endangered Species Act purposes shall be submitted to Char Naylor, Tribal Water Quality Manager/Assistant Fisheries Director (char.naylor@puyalluptribe-nsn.gov) for review.

iv. If EPA requires coverage under an individual or alternative permit, the permittee shall submit a copy of the permit to Char Naylor at the email address listed above.

v. The permittee shall submit all stormwater pollution prevention plans to Char Naylor for review and approval prior to beginning any activities resulting in a discharge to Puyallup tribal waters.

vi. The permittee shall contact Brandon Reynon (Brandon.reynon@puyalluptribe-nsn-gov), Tribe's Historic Preservation Officer or Jennifer Keating (Jennifer.keating@puyalluptribe-nsn.gov), Tribe's Assistant Historic Preservation Officer regarding historic properties and cultural resources.

vii. To minimize the discharge of pollutants to groundwater or surface waters from stormwater that is removed from excavations, trenches, foundations, vaults, or

Appendix D

Site and Dewatering Inspection Forms

The following pages should be copied and completed for each inspection. All inspection forms should be compiled in a binder to prove compliance with this SWPPP.

Further instructions and general tips on how to properly complete the site and dewatering inspection forms can be found in the templates that the EPA has developed. The templates are available at:
https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates

Appendix C

NOI and EPA Authorization Email

Section A – General Information (If necessary, complete additional inspection reports for each separate inspection location.)	
Inspector Information	
Inspector Name:	**Title:**
Company Name:	**Email:**
Address:	**Phone Number:**
Inspection Details	
Inspection Date:	**Inspection Location:**
Inspection Start Time:	**Inspection End Time:**
Current Phase of Construction:	**Weather Conditions During Inspection:**

Did you determine that any portion of your site was unsafe for inspection per CGP Part 4.5? ☐ Yes ☐ No

If "Yes," provide the following information:

Location of unsafe conditions:

The conditions that prevented you inspecting this location:

Indicate the required inspection frequency: (Check all that apply. You may be subject to different inspection frequencies in different areas of the site.)

Standard Frequency (CGP Part 4.2):

☐ At least once every 7 calendar days; **OR**

☐ Once every 14 calendar days *and* within 24 hours of the occurrence of either:

- A storm event that produces 0.25 inches or more of rain within a 24-hour period, or
- A snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period

Increased Frequency (CGP Part 4.3.1) (If site discharges to sediment or nutrient-impaired waters or to waters designated as Tier 2, Tier 2.5, or Tier 3):

☐ Once every 7 calendar days *and* within 24 hours of the occurrence of either:

- A storm event that produces 0.25 inches or more of rain within a 24-hour period, or
- A snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period

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Reduced Frequency (CGP Part 4.4):

☐ For stabilized areas: Twice during first month, no more than 14 calendar days apart; then once per month after first month until permit coverage is terminated

☐ For stabilized areas on "linear construction sites": Twice during first month, no more than 14 calendar days apart; then once more within 24 hours of the occurrence of either:

- A storm event that produces 0.25 inches or more of rain within a 24-hour period, or
- A snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period

☐ For arid, semi-arid, or drought-stricken areas during seasonally dry periods or during drought: Once per month and within 24 hours of the occurrence of either:

- A storm event that produces 0.25 inches or more of rain within a 24-hour period, or
- A snowmelt discharge from a storm event that produces 3.25 inches or more of snow within a 24-hour period

☐ For frozen conditions where construction activities are being conducted: Once per month

Was this inspection triggered by a storm event producing 0.25 inches or more of rain within a 24-hour period? ☐ Yes ☐ No

If "Yes," how did you determine whether the storm produced 0.25 inches or more of rain?

☐ On-site rain gauge

☐ Weather station representative of site.
Weather station location:

Total rainfall amount that triggered the inspection (inches):

Was this inspection triggered by a snowmelt discharge from a storm event producing 3.25 inches or more of snow within a 24-hour period? ☐ Yes ☐ No

If "Yes," how did you determine whether the storm produced 3.25 inches or more of snow?

☐ On-site rain gauge

☐ Weather station representative of site.
Weather station location:

Total snowfall amount that triggered the inspection (inches):

Section B – Condition and Effectiveness of Erosion and Sediment (E&S) Controls (CGP Part 2.2) (Insert additional rows if needed)					
Type and Location of E&S Control	**Conditions Requiring Routine Maintenance?[1]**	**If "Yes," How Many Times (Including This Occurrence) Has This Condition Been Identified?**	**Conditions Requiring Corrective Action?[2, 3]**	**Date on Which Condition First Observed (If Applicable)?**	**Description of Conditions Observed**
1.	☐ Yes ☐ No		☐ Yes ☐ No		
2.	☐ Yes ☐ No		☐ Yes ☐ No		
3.	☐ Yes ☐ No		☐ Yes ☐ No		
4.	☐ Yes ☐ No		☐ Yes ☐ No		
5.	☐ Yes ☐ No		☐ Yes ☐ No		
If the same routine maintenance was found to be necessary three or more times for the same control at the same location (including this occurrence), follow the corrective action requirements and record the required information in your corrective action log, or describe here why you believe the specific condition should still be addressed as routine maintenance:					

[1] Routine maintenance includes minor repairs or other upkeep performed to ensure that the site's stormwater controls remain in effective operating condition, not including significant repairs or the need to install a new or replacement control. Routine maintenance is also required for specific conditions: (1) for perimeter controls, whenever sediment has accumulated to half or more the above-ground height of the control (CGP Part 2.2.3.c.i); (2) where sediment has been tracked-out from the site onto paved roads, sidewalks, or other paved areas (CGP Part 2.2.4.d); (3) for inlet protection measures, when sediment accumulates, the filter becomes clogged, and/or performance is compromised (CGP Part 2.2.10.b); and (4) for sediment basins, as necessary to maintain at least half of the design capacity of the basin (CGP Part 2.2.12.f)

[2] Corrective actions are triggered only for specific conditions (CGP Part 5.1):

1. A stormwater control needs a significant repair or a new or replacement control is needed, or, in accordance with Part 2.1.4.c, you find it necessary to repeatedly (i.e., three (3) or more times) conduct the same routine maintenance fix to the same control at the same location (unless you document in your inspection report under Part 4.7.1.c that the specific reoccurrence of this same problem should still be addressed as a routine maintenance fix under 2.1.4); or
2. A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly; or
3. Your discharges are not meeting applicable water quality standards; or
4. A prohibited discharge has occurred (see CGP Part 1.3); or
5. During the discharge from site dewatering activities:
   a. The weekly average of your turbidity monitoring results exceeds the 50 NTU benchmark (or alternate benchmark if approved by EPA pursuant to Part 3.3.2.b); or
   b. You observe or you are informed by EPA, State, or local authorities of the presence of the conditions specified in Part 4.6.3.e.

[3] If a condition on your site requires a corrective action, you must also fill out a corrective action log found at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates. See CGP Part 5.4 for more information.

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Section C – Condition and Effectiveness of Pollution Prevention (P2) Practices and Controls (CGP Part 2.3) (Insert additional rows if needed)					
Type and Location of P2 Practices and Controls	**Conditions Requiring Routine Maintenance?[1]**	**If "Yes," How Many Times (Including This Occurrence) Has This Condition Been Identified?**	**Conditions Requiring Corrective Action?[2, 3]**	**Date on Which Condition First Observed (If Applicable)?**	**Description of Conditions Observed**
1.	☐ Yes ☐ No		☐ Yes ☐ No		
2.	☐ Yes ☐ No		☐ Yes ☐ No		
3.	☐ Yes ☐ No		☐ Yes ☐ No		
4.	☐ Yes ☐ No		☐ Yes ☐ No		
5.	☐ Yes ☐ No		☐ Yes ☐ No		
If the same routine maintenance was found to be necessary three or more times for the same control at the same location (including this occurrence), follow the corrective action requirements and record the required information in your corrective action log, or describe here why you believe the specific condition should still be addressed as routine maintenance:					

Section D – Stabilization of Exposed Soil (CGP Part 2.2.14) (Insert additional rows if needed)					
Specific Location That Has Been or Will Be Stabilized	**Stabilization Method and Applicable Deadline**	**Stabilization Initiated?**	**Final Stabilization Criteria Met?**	**Final Stabilization Photos Taken?**	**Notes**
1.		☐ Yes ☐ No If "Yes," date initiated:	☐ Yes ☐ No If "Yes," date criteria met:	☐ Yes ☐ No	
2.		☐ Yes ☐ No If "Yes," date initiated:	☐ Yes ☐ No If "Yes," date criteria met:	☐ Yes ☐ No	
3.		☐ Yes ☐ No If "Yes," date initiated:	☐ Yes ☐ No If "Yes," date criteria met:	☐ Yes ☐ No	
4.		☐ Yes ☐ No If "Yes," date initiated:	☐ Yes ☐ No If "Yes," date criteria met:	☐ Yes ☐ No	
5.		☐ Yes ☐ No If "Yes," date initiated:	☐ Yes ☐ No If "Yes," date criteria met:	☐ Yes ☐ No	

Section E – Description of Discharges (CGP Part 4.6.2)
(Insert additional rows if needed)

Was a discharge (not including dewatering) occurring from any part of your site at the time of the inspection?[4] ☐ Yes ☐ No

If "Yes," for each point of discharge, document the following:

- The visual quality of the discharge.
- The characteristics of the discharge, including color; odor; floating, settled, or suspended solids; foam; oil sheen; and other indicators of stormwater pollutants.
- Signs of the above pollutant characteristics that are visible from your site and attributable to your discharge in receiving waters or in other constructed or natural site drainage features.

Discharge Location	Observations
1.	
2.	
3.	
4.	
5.	

[4] If a dewatering discharge was occurring, you must conduct a dewatering inspection pursuant to CGP Part 4.3.2 and complete a separate dewatering inspection report.

Section F – Signature and Certification (CGP Part 4.7.2)	
"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information contained is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."	
MANDATORY: Signature of Operator or "Duly Authorized Representative:"	
Signature:	**Date:**
Printed Name:	**Affiliation:**
OPTIONAL: Signature of Contractor or Subcontractor	
Signature:	**Date:**
Printed Name:	**Affiliation:**

NOVO Riverside Commons
Stormwater Pollution Prevention Plan (SWPPP)
Concord, Massachusetts
206327RP003A

SWPPP PHOTOGRAPHIC LOG

Client Name:	**Photo Location:**	**Project No:**	
Photo No: 1	**Date:**		
Description:			
Client Name:	**Photo Location:**	**Project No:**	
Photo No: 2	**Date:**		
Description:			
Client Name:	**Photo Location:**	**Project No:**	

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Photo No: 5 **Date:**		
Description:		
Client Name:	**Photo Location:**	**Project No:**
Photo No: 6 **Date:**		
Description:		
Client Name:	**Photo Location:**	**Project No:**

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Stormwater Pollution Prevention Plan (SWPPP)
Concord, Massachusetts
206327RP003A

Photo No: 3 **Date:**		
Description:		
Client Name:	**Photo Location:**	**Project No:**
Photo No: 4 **Date:**		
Description:		
Client Name:	**Photo Location:**	**Project No:**

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Section A – Dewatering Discharges (CGP Part 4.6.3) Complete this section within 24 hours of completing the inspection. (If necessary, complete additional inspection reports for each separate inspection location.)	
Inspector Information	
Inspector Name:	**Title:**
Company Name:	**Email:**
Address:	**Phone Number:**
Inspection Details	
Inspection Date:	**Inspection Location:**
Discharge Start Time:	**Discharge End Time:**
Rate of Discharge (gallons per day):	**Corrective Action Required?**[1] ☐ Yes ☐ No
Describe Indicators of Pollutant Discharge at Point of Dewatering Discharge:[1]	
Attach Photographs of: 1. Dewatering water prior to treatment by a dewatering control(s) and the final discharge after treatment; and 2. Dewatering control(s); and 3. Point of discharge to any receiving waters flowing through or immediately adjacent to the site and/or to constructed or natural site drainage features, storm drain inlets, and other conveyances to receiving waters.	

[1] If you observe any of the following indicators of pollutant discharge, you are required to take corrective action under Part 5.1.5.b:

- a sediment plume, suspended solids, unusual color, presence of odor, decreased clarity, or presence of foam; or
- a visible sheen on the water surface or visible oily deposits on the bottom or shoreline of the receiving water.

NOVO Riverside Commons
Stormwater Pollution Prevention Plan (SWPPP)
Concord, Massachusetts
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Photo No: 7	**Date:**	
Description:		
Client Name:	**Photo Location:**	**Project No:**
Photo No: 8	**Date:**	
Description:		
Client Name:	**Photo Location:**	**Project No:**

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Appendix E

Corrective Action Log

Further instructions and general tips on how to properly complete the corrective action log can be found in the template that the EPA has developed. The template is available at:
https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates

Section B – Signature and Certification (CGP Part 4.7.2)	
"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information contained is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."	
MANDATORY: Signature of Operator or "Duly Authorized Representative:"	
Signature:	**Date:**
Printed Name:	**Affiliation:**
OPTIONAL: Signature of Contractor or Subcontractor	
Signature:	**Date:**
Printed Name:	**Affiliation:**

☐ Immediately took all reasonable steps to minimize or prevent the discharge of pollutants until a solution could be implemented, including shutting off the dewatering discharge as soon as possible depending on the severity of the condition taking safety considerations into account.

☐ Determined whether the dewatering controls were operating effectively and whether they were causing the conditions.

☐ Made any necessary adjustments, repairs, or replacements to the dewatering controls to lower the turbidity levels below the benchmark or remove the visible plume or sheen.

Describe any modification(s) made as part of corrective action: (Insert additional rows below if applicable)	**Date of completion:**	**SWPPP update necessary?**	**If yes, date SWPPP was updated:**
1.		☐ Yes ☐ No	
2.		☐ Yes ☐ No	

Section D - Signature and Certification (CGP Part 5.4.2)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information contained is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

MANDATORY: Signature of Operator or "Duly Authorized Representative:"	
Signature:	**Date:**
Printed Name:	**Affiliation:**
OPTIONAL: Signature of Contractor or Subcontractor	
Signature:	**Date:**
Printed Name:	**Affiliation:**

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2022 CGP Corrective Action Log
Project Name: _____
NPDES ID Number: _____

Section A - Individual Completing this Log	
Name:	**Title:**
Company Name:	**Email:**
Address:	**Phone Number:**
Section B - Details of the Problem (CGP Part 5.4.1.a) Complete this section within 24 hours of discovering the condition that triggered corrective action.	
Date problem was first identified:	**Time problem was first identified:**
What site conditions triggered this corrective action? *(Check the box that applies. See instructions for a description of each triggering condition (1 thru 6).)* ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5a ☐ 5b ☐ 6	
Specific location where problem identified:	
Provide a description of the specific condition that triggered the need for corrective action and the cause (if identifiable):	
Section C - Corrective Action Completion (CGP Part 5.4.1.b) Complete this section within 24 hours after completing the corrective action.	
For site condition # 1, 2, 3, 4, or 6 (those not related to a dewatering discharge) confirm that you met the following deadlines (CGP Part 5.2.1):	
☐ Immediately took all reasonable steps to address the condition, including cleaning up any contaminated surfaces so the material will not discharge in subsequent storm events. **AND**	
☐ Completed corrective action by the close of the next business day, unless a new or replacement control, or significant repair, was required. **OR**	
☐ Completed corrective action within seven (7) calendar days from the time of discovery because a new or replacement control, or significant repair, was necessary to complete the installation of the new or modified control or complete the repair. **OR**	
☐ It was infeasible to complete the installation or repair within 7 calendar days from the time of discovery. Provide the following additional information: Explain why 7 calendar days was infeasible to complete the installation or repair:	
Provide your schedule for installing the stormwater control and making it operational as soon as feasible after the 7 calendar days:	
For site condition # 5a, 5b, or 6 (those related to a dewatering discharge), confirm that you met the following deadlines:	

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SWPPP Amendment Log

No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
		INSERT DATE	
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Appendix F

SWPPP Amendment Log

The SWPPP, including the site plans, shall be amended whenever there is a change in design, construction, operation, or maintenance at the construction site that has or could have a significant effect on the discharge of pollutants to the waters of the United States that has not been previously addressed in the SWPPP.

The SWPPP shall be amended if during inspections or investigations by site staff, or by local, state, tribal or federal officials, it is determined that the SWPPP is ineffective in eliminating or significantly minimizing pollutants in storm water discharges from the construction site.

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Sample Subcontractor Certifications/Agreements

SUBCONTRACTOR CERTIFICATION
STORMWATER POLLUTION PREVENTION PLAN

Project Number: _____

Project Title: _____

Operator(s): _____

As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that you perform on-site. Any person or group who violates any condition of the SWPPP may be subject to substantial penalties or loss of contract. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement:

I certify under the penalty of law that I have read and understand the terms and conditions of the SWPPP for the above designated project and agree to follow the practices described in the SWPPP.

This certification is hereby signed in reference to the above named project:

Company: _____

Address: _____

Telephone Number: _____

Type of construction service to be provided: _____

_____

_____

Signature: _____

Title: _____

Date: _____

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Appendix H

Grading and Stabilization Activities Log

Site Plans in Appendix A should be annotated to indicate areas where final stabilization has been accomplished and no further construction-phase permit requirements apply.

Grading and Stabilization Activities Log

The following records are to be kept by each Site Operator throughout the construction period and maintained in the SWPPP. Insert additional documentation for record keeping as necessary.

Date Grading Activity Initiated	**Description of Grading Activity**	**Description of Stabilization Measure and Location**	**Date Grading Activity Ceased** (Indicate Temporary or Permanent)	**Date When Stabilization Measures Initiated**
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE
INSERT DATE			INSERT DATE ☐ Temporary ☐ Permanent	INSERT DATE

Training Log

Date	Training Topic	Attendee	Signature of Training Coordinator

Appendix I

Training Documentation

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Sample Delegation of Authority Form

Delegation of Authority

I, _____ (name), hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the EPA's Construction General Permit (CGP), at the _____ construction site. The designee is authorized to sign any reports, stormwater pollution prevention plans and all other documents required by the permit.

_____ (name of person or position)
_____ (company)
_____ (address)
_____ (city, state, zip)
_____ (phone)

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in Appendix G of EPA's Construction General Permit (CGP), and that the designee above meets the definition of a "duly authorized representative" as set forth in Appendix G.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____

Company: _____

Title: _____

Signature: _____

Date: _____

Delegation of Authority Form

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To: 03/18/2024 18:21:49 UTC
Project Code: 2024-0064305
Project Name: NOVO Riverside Commons

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through IPaC by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see Migratory Bird Permit | What We Do | U.S. Fish & Wildlife Service (fws.gov).

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

ENDANGERED SPECIES ACT SPECIES

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

PROJECT SUMMARY

Project Code: 2024-0064305
Project Name: NOVO Riverside Commons
Project Type: Commercial Development
Project Description: The project consists of two residential apartment buildings and paved parking areas along the southern portion of the 300-310 Baker Avenue property on a new 10.2 acre parcel (the Project). The overall site currently consists of a general office building and associated parking areas. The Project includes installation of stormwater and sewer infrastructure, electric utilities, and water services.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.458638449999995,-71.38761433076714,14z

Counties: Middlesex County, Massachusetts

IPAC USER CONTACT INFORMATION

Agency: Beals and Thomas, Inc.
Name: Mark Mooney
Address: 144 Turnpike Rd
City: Southborough
State: MA
Zip: 01772
Email mmooney@bealsandthomas.com
Phone: 5083660560

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis*	Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9045

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus*	Candidate

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9743

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (See § 402.17).

Under Section 7 of the ESA, if a federal action agency makes a no effect determination, no consultation with the Service is required (ESA §7). If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required except when the Service concurs, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat [50 CFR §402.02, 50 CFR§402.13].

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination for the northern long-eared bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Monarch Butterfly *Danaus plexippus* Candidate

You may coordinate with our Office to determine whether the Action may affect the animal species listed above and, if so, how they may be affected.

Next Steps

Based upon your IPaC submission, your project has reached the determination of “No Effect” on the northern long-eared bat. If there are no updates on listed species, no further consultation/ coordination for this project is required with respect to the northern long-eared bat. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions occurs, additional coordination with the Service should take place to ensure compliance with the Act.

If you have any questions regarding this letter or need further assistance, please contact the New England Ecological Services Field Office and reference Project Code 2024-0064305 associated with this Project.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To: 03/18/2024 18:27:44 UTC
Project code: 2024-0064305
Project Name: NOVO Riverside Commons

Federal Action Agency (if applicable): Environmental Protection Agency

Subject: Record of project representative’s no effect determination for 'NOVO Riverside Commons'

Dear Mark Mooney:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on March 18, 2024, for 'NOVO Riverside Commons' (here forward, Project). This project has been assigned Project Code 2024-0064305 and all future correspondence should clearly reference this number. **Please carefully review this letter.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species’ determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project.

Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat Rangewide Determination Key (Dkey), invalidates this letter. ***Answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid.***

Determination for the Northern Long-Eared Bat

Based upon your IPaC submission and a standing analysis, your project has reached the determination of “No Effect” on the northern long-eared bat. To make a no effect determination, the full scope of the proposed project implementation (action) should not have any effects (either positive or negative), to a federally listed species or designated critical habitat. Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed

DETERMINATION KEY RESULT

Based on the information you provided, you have determined that the Proposed Action will have no effect on the Endangered northern long-eared bat (Myotis septentrionalis). Therefore, no consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required for those species.

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of the northern long-eared bat or any other listed species?

   Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

   No

2. The proposed action does not intersect an area where the northern long-eared bat is likely to occur, based on the information available to U.S. Fish and Wildlife Service as of the most recent update of this key. If you have data that indicates that northern long-eared bats are likely to be present in the action area, answer "NO" and continue through the key.

   Do you want to make a no effect determination?

   Yes

Project code: 2024-0064305 IPaC Record Locator: 091-140271704 03/18/2024 18:27:44 UTC

Action Description

You provided to IPaC the following name and description for the subject Action.

1. Name

NOVO Riverside Commons

2. Description

The following description was provided for the project 'NOVO Riverside Commons':

> The project consists of two residential apartment buildings and paved parking areas along the southern portion of the 300-310 Baker Avenue property on a new 10.2 acre parcel (the Project). The overall site currently consists of a general office building and associated parking areas. The Project includes installation of stormwater and sewer infrastructure, electric utilities, and water services.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.458638449999995,-71.38761433076714,14z

DRAFT

IPAC USER CONTACT INFORMATION

Agency: Beals and Thomas, Inc.
Name: Mark Mooney
Address: 144 Turnpike Rd
City: Southborough
State: MA
Zip: 01772
Email mmooney@bealsandthomas.com
Phone: 5083660560

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Environmental Protection Agency

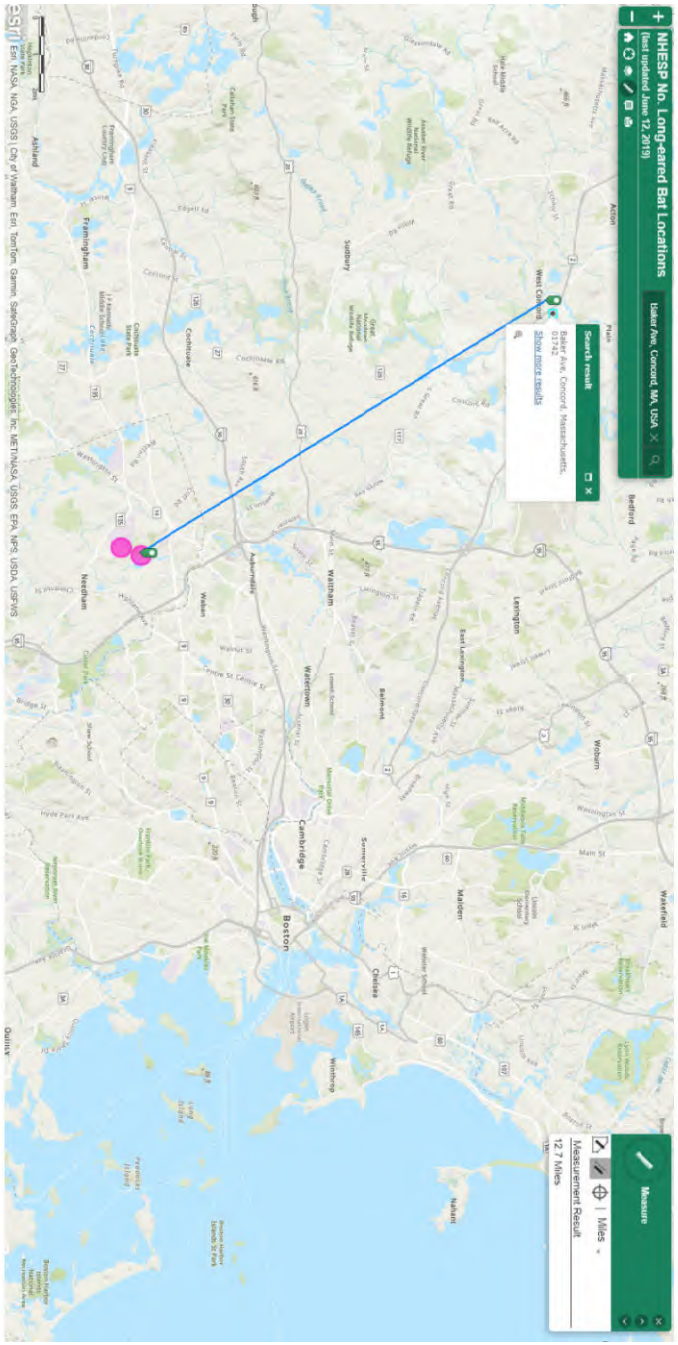
PROJECT QUESTIONNAIRE

Drawn Action Area & Overlapping S7 Consultation Areas

Area of Interest (AOI) Information

Area : 2,283.67 acres

Mar 15 2024 17:43:17 Eastern Daylight Time



Appendix L

Historic Preservation Documentation

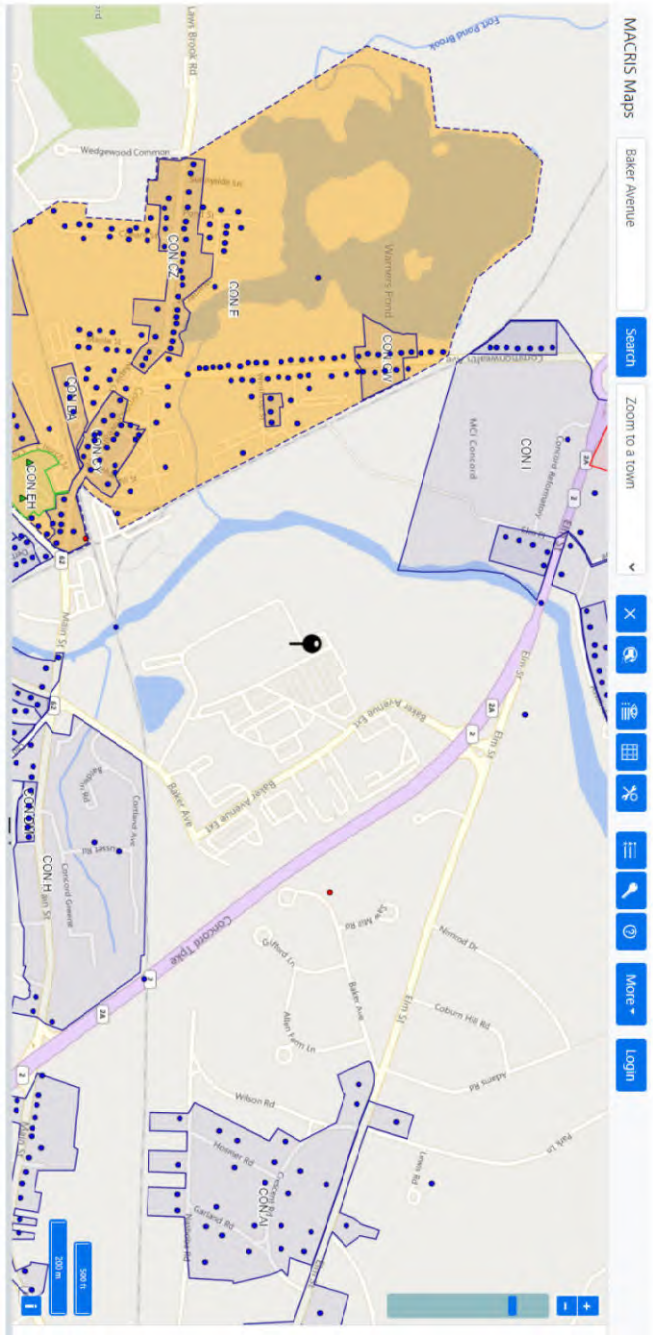
Summary

Name	Count	Area(acres)	Length(mi)
Atlantic Sturgeon	0	0	N/A
Shortnose Sturgeon	0	0	N/A
Atlantic Salmon	0	0	N/A
Sea Turtles	0	0	N/A
Atlantic Large Whales	0	0	N/A
In or Near Critical Habitat	0	0	N/A

DISCLAIMER: Use of this App does NOT replace the Endangered Species Act (ESA) Section 7 consultation process; it is a first step in determining if a proposed Federal action overlaps with listed species or critical habitat presence. Because the data provided through this App are updated regularly, reporting results must include the date they were generated. The report outputs (map/tables) depend on the options picked by the user, including the shape and size of the action area drawn, the layers marked as visible or selectable, and the buffer distance specified when using the "Draw your Action Area" function. Area calculations represent the size of overlap between the user-drawn Area of Interest (with buffer) and the specified S7 Consultation Area. Summary table areas represent the sum of these overlapping areas for each species group.

Appendix M

Turbidity Monitoring Sampling Documentation



BEALS AND THOMAS

Table of Contents

geotech

Portable Turbidity Meter

Installation and Operation Manual

Rev 8/5/2021 Part # 22100045

DOCUMENTATION CONVENTIONS

This uses the following conventions to present information:

WARNING

An exclamation point icon indicates a **WARNING** of a situation or condition that could lead to personal injury or death. You should not proceed until you read and thoroughly understand the **WARNING** message.

CAUTION

A raised hand icon indicates **CAUTION** information that relates to a situation or condition that could lead to equipment malfunction or damage. You should not proceed until you read and thoroughly understand the **CAUTION** message.

NOTE

A note icon indicates **NOTE** information. Notes provide additional or supplementary information about an activity or concept.

General Information

In no event will the manufacturer be liable for direct, indirect, special, incidental or consequential damages resulting from any defect or omission in this manual. The manufacturer reserves the right to make changes in this manual and the products it describes at any time, without notice or obligation. Revised editions are found on the manufacturer's website.

In order to ensure your Turbidity Meter has a long service life and operates properly, adhere to the following cautions and read this manual before use.

- **Disconnect from power source when not in use.**
- **Power input source must not exceed maximum ratings.**
- **Equipment must be wired to a negative ground system.**
- **Equipment may not operate properly with excess wiring not supplied by manufacturer.**
- **Avoid spraying fluid directly at equipment.**
- **Never submerge equipment.**
- **Avoid pulling on wires to unplug equipment wiring.**
- **Avoid using equipment with obvious physical damage.**
- **To prevent equipment damage, avoid dropping it.**

WARNING

Do not operate this equipment if it has visible signs of significant physical damage other than normal wear and tear.

Notice for consumers in Europe:

This symbol indicates that this product is to be collected separately.

The following applies only to users in European countries:

- This product is designated for separate collection at an appropriate collection point. Do not dispose of as household waste.
- For more information, contact the seller or the local authorities in charge of waste management.

Section 1: System Description

Function and Theory

Geotech's Portable Turbidity Meter offers great precision, repeatability and ease of use in a low cost extremely robust portable/laboratory instrument. Data points from field sample events can be stored to memory and transferred to computer or other storage device.

Turbidity Meters provide fluid clarity insight by shining light onto a sample and measuring the amount of light scattered by suspended particles in the fluid.

The Geotech Portable Turbidity Meter has two light source models to fulfill specific customer and site requirements:

Model GTW: White Light source, compliant to US EPA method 180.1
Model GTI: Infrared light source, compliant to ISO 7027 standards

Instrument Features

- Sample chamber with lid
- Data port/ power supply (serial output, USB to Mini-B cable not included)
- Sealed battery compartment (4x AA batteries)
- IP67 Seal for extension into hazardous environments
- Digital display and navigation keypad

System Components

- Economy carry case included, optional custom foam cut case available
- Lint-free cleaning cloth
- 2 sample vials
- Primary Calibration Standards: 0.10, 20, 100, 800 NTU

Figure 1-1: Instrument Features

Section 2: System Installation & Navigation

Install the battery

1. With a small Phillips screwdriver, remove the battery cover (located on the backside of the instrument).
    - Take care to keep the small screws and washers safe when removing the battery cover.
2. Install four (4) AA alkaline or nickel metal hydride (NiMH) batteries.
    - Make sure that batteries are installed in the correct orientation.
3. Replace the battery cover.
    - For optimal seal, we recommend using a torque screwdriver set to 4N-m.

Figure 2-1: Replacing the batteries

Sample Vial Handling

Handle calibration and sample vials by caps only. Any scratches on the vials will compromise accurate turbidity readings.

When placing the vials into the instrument, ensure that the white line on the sample vial is aligned with the black arrow on the bottom edge of the instrument's sample chamber.

The sample vials must be very clean while calibrating or doing field readings; no debris or fingerprints should be visible on the glass. Use a soft cleaning cloth to ensure clarity before each measurement. Do no store samples and vial in extreme temperatures or direct sunlight.

Figure 2-2: Sample chamber

Section 3: System Operation

3.1 Quick Start Guide

To turn ON unit: press and hold the **READ** button for 3 seconds.

To turn OFF unit: press and hold the **ESC** button for 3 seconds.

Figure 3-1: Read (ON/Enter) ESC (OFF/Back)

Basic Operation

1. Turn instrument on by pressing **READ** for 3 seconds.
    a. Once through the welcome screens, the unit will automatically begin reading a sample.
    b. See *Section 3.2.2: Calibrate* if Calibration is required.
2. Rinse the inside of each sample vial three times with the sample to be tested.
3. Completely fill sample vial with sample, then dry and clean the outside of vial.
    - Handle vial by the cap.
4. Align white mark on vial with arrow on bottom of sample chamber.
    - See "Sample Vial Handling" in *Section 2: System Installation & Navigation* for details.
5. Close the sample chamber cap.
6. Press **READ** button again to take sample, NTU reading will appear after status bar is complete.
7. Press **SAVE** button to mark reading, "M" will flash for 3 seconds in upper left corner of display.

Figure 3-1: Basic Operation

User Interface

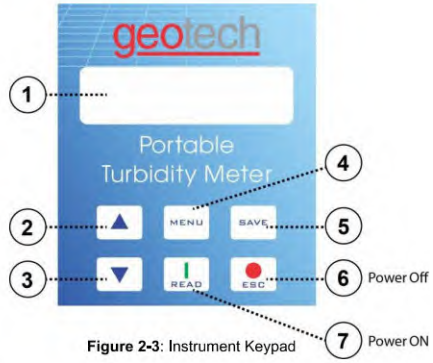


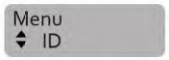
Figure 2-3: Instrument Keypad

1. **DISPLAY**
   Displays readings, diagnostics, and operational data.
2. **UP ARROW (▲)**
   Scroll through menus, enter numbers and letters
3. **DOWN ARROW (▼)**
   Scroll through menus, enter numbers and letters
4. **MENU**
   Enters into main menu function, selects options to configure the instrument, select analysis, and moves cursor to the right.
5. **SAVE**
   Store Selections and data, saves the result to be USB transferred and selects the parameters.
6. **ESC/OFF**
   Powers off the instrument (hold for 3 seconds), aborts operations, return to the previous screen.
7. **READ/ON**
   Powers on the instrument (hold for 3 seconds), confirms options, initiates sample reading, moves cursor to the left.

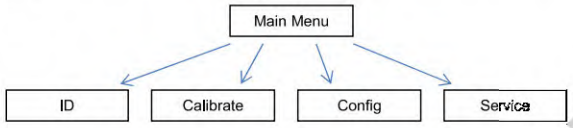
3.2 Menu Navigation

The Geotech Portable Turbidity Meter has several configuration capabilities. The menu structure is easy and simple to operate, please follow the steps below to configure the unit according to your needs.

To Enter Main Menu: With instrument turned on, press **MENU** key for 3 seconds to enter the Menu Function. You will see the following screen:



Using ▲ or ▼ the user can navigate between the main menu functions. When you reach the desired menu or function press **READ** to enter, or **ESC** to go back to the previous screen.



The four main sub menus are listed below:

- ID - Access the user identification function
- Calibrate - Access the calibration functions
- Config - Access the configuration functions
- Service - Access the service functions (only for certified technicians)

The fifth menu item is "Back" – when selected will navigate to the ready-to-sample screen.

Please reference the following pages for an explanation of instrument configuration and menu navigation. See section *3.4: Menu Structure* for an overview of the complete menu structure.

3.2.1 ID (Identification)

From the main menu, use the ▲ or ▼ keys select the ID function, then press **READ** to enter that submenu.

Sample

Use the ▲ or ▼ keys to set sample number from 0-99. Use the **READ** or **SAVE** button to set the sample number and exit to the ID menu.

User

Use the ▲ or ▼ keys to set user number from 0-99. Use the **READ** or **SAVE** button to set the user number and exit to the ID menu.

3.2.2 Calibrate

From the main menu, use the ▲ or ▼ keys select the Calibrate function, then press **READ** to enter that submenu.

The Standard vials must be thoroughly cleaned before each measurement, using a lint-free cloth.

Guided Cal.

The complete calibration procedure, as outlined below, should be performed by the user according to required quality and maintenance programs.

1. Gather the four (4) calibration sample vials with formula standards of <0.10 (i.e. 0.02), 20.0, 100, 800 NTU (or stabilized primary standards in the same concentrations).
   - Ensure each vial is cleaned with a soft cloth.
2. Hold **MENU** button for 3 seconds until the main menu is displayed.

3. Scroll through the menu using the ▲ or ▼ keys until "Calibrate" is displayed.
4. Press the **READ** button to enter into the calibration menu.
5. Select "Guided Cal" and follow the scrolling prompts on the screen.
   - Before placing each vial into the sample chamber, gently invert the vial to ensure a homogeneous mix.
6. Once done calibrating to the four standards, the instrument will return to the calibration menu.
7. Press the **ESC** key twice to navigate to the ready-to-sample screen.

Free Cal.

Free Calibration allows for a single calibration point. For many users, this single point calibration will be sufficient for routine work.

1. Follow steps 1-3 from "Guided Cal" above.
2. Select "Free Cal"
3. On the "Cal. Auto" screen, there will be a value displayed from the previous calibration. Place one of the calibration standards into the sample chamber.

4. Press READ button and wait for result.

5. If necessary use ▲ or ▼ keys to change the displayed value for this standard to match its label, press and hold **SAVE** for 3 seconds.
   - "Saving" will be displayed.

6. After the value is saved, the display returns to the "Calibrate" menu.

7. Recalibrate against the same standard for better accuracy, or perform the "Guided Cal" routine.

NOTE 1: If an error message displays, check the standards and repeat the previous steps.

NOTE 2: After the calibration, perform standard readings for verification, and if needed repeat the calibration procedure.

3.2.3 Config (Configuration)

From the main menu, use the ▲ or ▼ keys select the Config function, then press **READ** to enter that submenu.

Time/Date

When inside this configuration you can change ***Time*** and ***Date***.

Use **MENU/READ** to move the cursor right/left and ▲ or ▼ keys to adjust the numbers as desired. Press and hold **SAVE** for 3 seconds to store the data, or **ESC** to return to the previous menu without saving any changes.

Display

When inside this configuration you can set and change Contrast, Backlight Time and Backlight Brightness (Time and Contrast only on instruments with Backlight optional installed), use ▲ or ▼ to select between the options and **READ** to enter it or **ESC** to go back to the previous menu.

Contrast

Using ▲ or ▼, you can change the contrast to the desired level: 00-30. When done, press and hold **SAVE** for 3 seconds to store the data and **ESC** to return to the previous menu.

Backlight Time

From 0 up to 60 minutes of backlight on.

Using ▲ or ▼ change the time to the desired backlight time, when done, press and hold **SAVE** for 3 seconds to store the data and **ESC** to return to the previous menu.

Backlight Level

From 0 up to 100 (intensity level).

Using ▲ or ▼ change the level to the desired, when done, press and hold **SAVE** for 3 seconds to store the data and **ESC** to return to the previous menu.

Partial Res.

Using ▲ or ▼ to choose Yes or No.

Big Number

Using ▲ or ▼ to choose Yes or No to show the large number displayed on the Auto screen.

Instrument

When inside this configuration you can set Auto off, Readings, Color compensation, curves, fast settling, Sampling, ID, Calibration interval, personalization, patrimony, use ▲

or ▼ to select between the options and **READ** to enter it or **ESC** to go back to the previous menu.

Auto off

The Auto off function shall be activated to save the batteries; it can be configured to turn the unit off after 0 to 60 minutes of inactivity.

Using ▲ or ▼ change the time to the desired level, when done, press and hold **SAVE** for 3 seconds to store the data and **ESC** to return to the previous menu.

NOTE: When the time is in 0 minutes the auto off will not be operational.

Auto Reading

The Auto reading function can be activated from 1 to 250 seconds; this will set the time between readings.

NOTE: If you configure the Auto reading for 5 seconds the unit will make readings every 5 seconds until it is turned off.

Using ▲ or ▼ change the desired time between readings, press and hold **SAVE** for 3 seconds to store the data and **ESC** to return to the previous menu.

Color Compensation

The instrument can compensate for the color of the sample for a more accurate reading.

A password is required to access this feature. Default password is **9999.** Input password and hold **SAVE** for 3 seconds to proceed.

Using ▲ or ▼ select Yes or No, when done, press and hold **SAVE** for 3 seconds to store the data and **ESC** to return to the previous menu.

NOTE: When activated (Yes selected) "C" will appear in the upper right corner of the display in the reading mode screen.

Test Curves

You can define which curves will appear in the curve selection menu (when you press and release the Menu key).

Press **ESC** to remove the * icon from the curves you don´t want and **READ** to put the * icon in the ones you want.

Press and hold **SAVE** for 3 seconds to store the data and **ESC** to return to the previous menu.

Measure Mode/ Fast Settling

When selected, instrument will take a snapshot of the sample and display the immediate reading before particles settle in the vial (for high solids samples).

Using ▲ or ▼ select yes or no, when done, press and hold **SAVE** for 3 seconds to store the data and **ESC** to return to the previous menu.

Sample

This function can be used to set the number of readings the unit will take to calculate the average and present it as a measurement in the display. Number of samples ranges from 8-100.

1. User ID

Here you can set up user names/passwords and when they shall be requested by the unit.

Edit

To create users and its passwords:

- Choose the user number between 00 and 50 , press **READ**
- Choose a name for this user using ▲ to scroll faster to letters , ▼ to scroll faster to numbers (both can be used to go up or down) and **MENU/READ** (send the cursor to the right/left), press and hold **SAVE** for 3 seconds to store the data. Name can be a maximum of thirteen (13) characters.
- You will see "PIN:" on the Display, use ▲ to scroll faster to letters , ▼ to scroll faster to numbers (both can be used to go up or down) and **MENU/READ** (send the cursor to the right/left), press and hold **SAVE** for 3 seconds to store the data. Pin must be four (4) characters.
- Press and Hold **ESC for 3 seconds** to return to the previous menu.

Request

To define when the user ID and password will be required:

- Choose between the following options using ▲ or ▼, when done, press and hold **SAVE** for 3 seconds to store the data and **ESC** to return to the previous menu.

Always	– ID and password will be request at every measurement.
On Start	– ID and password will be request at Instrument Start Up.
MEMO	– ID and password will be request when **SAVE** is pressed.
Previous	– ID and password will not be requested, the previous user informed will be assigned for all operations.
No	– ID and password will not be requested.

2. Sample ID

Here you can set up sample names /passwords and when they shall be requested by the unit.

Edit

To create sample names and their passwords:

- Choose the user number between 00 and 50, press **READ**
- Choose a name for this sample using ▲ to scroll faster to letters , ▼ to scroll faster to numbers (both can be used to go up or down) and **MENU/READ** (send the cursor to the right/left), press and hold **SAVE** for 3 seconds to store the data.
- Press and Hold **ESC for 3 seconds** to return to the previous menu.

Request

To define when the sample name will be required:

- Choose between the following options using ▲ or ▼, when done, press and hold **SAVE** for 3 seconds to store the data and **ESC** to return to the previous menu.

Always	–Sample name will be request at every measurement.
On Start	–Sample name will be request at Instrument Start Up.
MEMO	–Sample name will be request when **SAVE** is pressed.
Previous	–Sample name will not be requested, the previous user informed will be assigned for all operations.
No	–Sample name will not be request.

Schedule Cal.

Access this function to set up the time (Days/hours) before calibration is requested.

A password is required to access this feature. Default password is **9999.** Input password and hold **SAVE** for 3 seconds to proceed.

F.Scale

- Choose the number of days and hours before the calibration warning graph will appear on the display using ▲ or ▼ and **MENU/READ** (send the cursor to the right/left), press and hold **SAVE** for 3 seconds to store the data.

NOTE: When the calibration schedule is programmed, a graph will be displayed in the upper right corner during measurements, when the calibration date arrives, a bar will appear in the graph and a Calibration warning will be displayed.

Customize

Use ▲ or ▼ and **MENU/READ** (send the cursor to the right/left) to set an ID for the unit, press and hold **SAVE** for 3 seconds to store the data. ID must be four (4) characters.

Tag Number

Use ▲ or ▼ and **MENU/READ** (send the cursor to the right/left) to set an ID number for the unit, press and hold **SAVE** for 3 seconds to store the data. ID must be four (4) characters.

Language

Use ▲ or ▼ to select the desired language from the list below, press and hold **SAVE** for 3 seconds to store the data.

- US – English
- ES – Spanish
- BR – Portuguese

Communication

Use ▲ or ▼ to select between Eco Result or Log Transmit and **READ** to enter it or **ESC** to go back to the previous menu.

Eco Result

In this mode, the measurement displayed is sent to the USB port. You can select to send all measurements only part of them.

Using ▲ or ▼ select Auto, Manual and Off, when done, press and hold **SAVE** for 3 seconds to store the data and **ESC** to return to the previous menu.

- Auto – Sends all measurements to the USB (when they are performed)
- Manual – Sends measurements that are selected (**SAVE** pressed during on measurement mode)
- Off – No measurement will be sent to the USB

Log Transmit

Here you can select 4 ways to send the instrument measurement log

Using ▲ or ▼ select between, New Mark, All Mark, New, All, Press and hold **SAVE** for 3 seconds to store the data and **ESC** to return to the previous menu.

Auto - Sends all measurements to the USB (when they are performed)

Manual - Sends measurements that are selected (**SAVE** pressed during on measurement mode)

Off - No measurement will be sent to the USB

NOTE: When the time is in 0 minutes the instrument will not be shut off.

Serial Baud

Sets the data rate in bits for data transmission.

Options include: 57600, 38400, 19200, and 9600. Default/suggested configuration is 19200bits/sec. Press and hold **SAVE** for 3 seconds to store the data and **ESC** to return to the previous menu.

Sec. Level
Choose the user number between 0 and 5, press and hold **SAVE** for 3 seconds to store the data.

Password
Using ▲ to scroll faster to letters, ▼ to scroll faster to numbers (both can be used to go up or down) and **MENU/READ** (send the cursor to the right/left), press and hold **SAVE** for 3 seconds to store the data.

Config.
Here you will assign a security level and password to access all the Configurable functions.

Using ▲ or ▼ select the desired security level, when done, press and hold **SAVE** for 3 seconds to store the data.

Sec. Level
Choose the user number between 0 and 5, press and hold **SAVE** for 3 seconds to store the data.

Password
Using ▲ to scroll faster to letters, ▼ to scroll faster to numbers (both can be used to go up or down) and **MENU/READ** (send the cursor to the right/left), press and hold **SAVE** for 3 seconds to store the data.

Service
Here you will assign a security level and password to access all the service functions.

Using ▲ or ▼ select the desired security level, when done, press and hold **SAVE** for 3 seconds to store the data.

Sec. Level
Choose the user number between 0 and 5, press and hold **SAVE** for 3 seconds to store the data.

Password
Using ▲ to scroll faster to letters, ▼ to scroll faster to numbers (both can be used to go up or down) and **MENU/READ** (send the cursor to the right/left), press and hold **SAVE** for 3 seconds to store the data.

3.3 USB Connection

1. Plug the unit into the computer; wait for device driver to download. Device connection is successful if an additional COM port is recognized in the Device Manager.

Header

Select Yes or No to display header. Press and hold **SAVE** for 3 seconds to store the data and **ESC** to return to the previous menu.

CSV Separator

Determines character to be placed in between spaces. Select a symbol then press and hold **SAVE** for 3 seconds to store the data and **ESC** to return to the previous menu.

User Test

The instrument allows users to calibrate a user curve.

NOTE: When user curve is calibrated, the instrument performance might change due to standard and procedures adopted, factory calibrated curve is made with 100% traceable standards and reference materials in controlled environment, use it in order to have full confidence in instrument performance.

Security/Password

Here you can set up the security level and password for the Calibration, configuration and service functions.

The Factory pre-saved password is 9999, if this is required during configuration or operation use ▲ to scroll faster to letters , ▼ to scroll faster to numbers (both can be used to go up or down) and **MENU/READ** (send the cursor to the right/left), press and hold **SAVE** for 3 seconds to store the data.

ID
Here you will assign a security level and password to access all the ID functions.

Using ▲ or ▼ select the desired security level, when done, press and hold **SAVE** for 3 seconds to store the data.

Sec. Level
Choose the user number between 0 and 5, press and hold **SAVE** for 3 seconds to store the data.

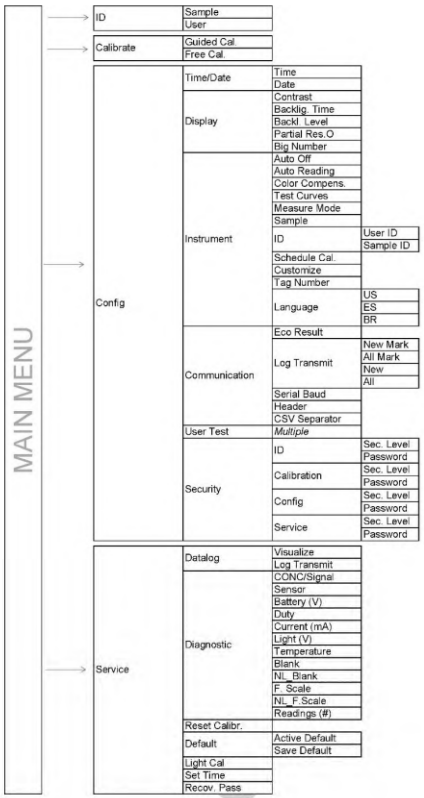
Password
Using ▲ to scroll faster to letters, ▼ to scroll faster to numbers (both can be used to go up or down) and **MENU/READ** (send the cursor to the right/left), press and hold **SAVE** for 3 seconds to store the data. Password must be four (4) characters.

Calibration
Here you will assign a security level and password to access all the calibration functions.

Using ▲ or ▼ select the desired security level, when done, press and hold **SAVE** for 3 seconds to store the data.

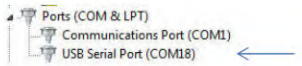
3.4 Menu Structure

Use the "**READ**" button to enter into a sub menu, use the "**ESC**" button to exit a sub menu.



2. Identify a communication port for the connection, look in the computer's Device Manager (example: COM2, COM18).

If unsure of which communication port, disconnect and then reconnect the Turbidity Meter while Device Manager is open and notice which new communication/USB serial port opens, look under "Ports (COM & LPT)".



3. Open a serial terminal connection to access the saved data.

Serial terminal programs are available to download from the internet. For example, "PuTTY" or "TeraTerm" are two serial terminal programs which are quick and free to download, and simple to use.

4. Configure the serial terminal interface as follows:

Parameter	**Value**
Speed	19200 bits/sec (baud rate)
Data bits	8
Parity	None
Stop Bits	1
Flow Control	None

5. To transmit the Data use the menu structure diagram (*see Section 3.4*) to navigate to Service > Datalog > Log Transmit.

The display will read, "Wait…" and the serial terminal on the computer will begin the data log transfer. The data output could be copied and pasted into a data processing program, such as MS Excel or Word (comma delineated import).

Note: Some variables will appear in the data collected,

"M": Marked
"D": Point where the data has already being transmitted
"E": Clock not adjusted in last transmission

Section 4: System Maintenance

The Geotech Portable Turbidity Meter is designed to be a low-maintenance lab instrument that can be used in the field.

General cleaning guidelines:
- Use a soft cloth with mild soap and warm water to clean the unit.
- Clean and dry the sample chamber to ensure no water droplets accumulate on the lens, as this can affect the accuracy of turbidity readings.

Per each use:
- Keep unit clean and free of debris when traveling - build up on sample chamber lenses could permanently damage the instrument
- Calibrate before each use to ensure good data

Seasonal use:
- Keep unit clean and free of debris when storing - build up on lenses could permanently damage the instrument
- Remove batteries when storing long term
- Ensure a complete calibration is conducted when bringing unit out of storage

Calibration Solutions:
- Avoid exposing calibration standards to extreme temperatures. Do not store below the freezing point, or above 122 °F (55°C)

Section 5: System Troubleshooting

Problem: Unit will not turn on.

Solution:
- No power to unit:
  - Check that batteries are installed and in the correct orientation (+/- polarity)

Problem: Cannot get accurate readings on control samples.

Solution:
- Recalibrate unit
- Clean lenses inside sample chamber to ensure a clear read
- Clean outside of bottles
- Check the expiration date on the calibration standards. Expired standards will result in an inaccurate reading.

Problem: Calibration failure. Screen reads, "Same Standard" or will not accept standard.

Solution:
Reset calibration using the following steps:

1. Hold MENU for 3 seconds
2. Scroll down to "Service" and press READ
3. Screen will tell read "Wait…" and kick back out to same "Reset Calbr." screen.
4. Press ESC to go back to the "Calibration" screen and attempt another calibration.

If the calibration still fails to read, new calibration standards may be required. Contact Geotech for further assistance.

Problem: Unit only reads 0.02 NTU.

Solution:
The Geotech Turbidity Meter is not reading the standards/samples.
1. Check if lamp is powering on.
2. If lamp is powering on, check if the vial centralizer in the sample chamber is correctly oriented with the arrow on bottom pointing up.
3. If the issue is not resolved after verifying the lamp and vial centralizer positioning, remove the centralizer and check that the sample chamber cup is correctly positioned.
   - The side of the cup that does not have the "window" should be positioned on the left side.
4. Ensure light is entering from the 90° and 180° angle (front and back).

Problem: Unit is not reading above 0-9.99NTU, 0-40NTU, 0-99NTU etc.

Solution: Measurement parameters are limited

1. Go to the MAIN MENU.
2. Go to the "Configuration" menu and press READ.

3. Go to the “Instrument” menu and press READ.
4. In the “Instrument” menu, select “Test Curves” by pressing READ.
    - This will show you what the test curves are set to.
    - If the test curves are set to multiple parameters, one of these settings may be overriding the other.
    - Example: If you are reading the 800NTU standard and the meter only reads 9.99 NTU, parameters in the “Test Curves” menu, specific parameters might be selected (ex: 0-9.99 NTU, 0-40 NTU. AUTO NTU).
5. Deselect the limiting options for your testing and save your changes.

Sample should no longer be limited to the test curve ranges.

If these troubleshooting guidelines have not resolved the problem, contact Geotech Environmental Equipment at 1-800-833-7958.