# *DRAINAGE REPORT*

***For***

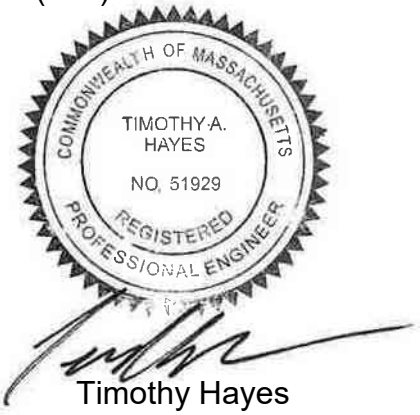
# *RTE. 85 REALTY CORP.*

***HERITAGE ON MAIN***
***Proposed Mixed-Use Development***

***107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St***
***Town of Medway, Massachusetts***
***Norfolk County***

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# I. EXECUTIVE SUMMARY

This report examines the changes in drainage that can be expected as the result of the proposed mixed-use development project at 107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St (the "Project Site"). The Project Site is currently occupied by multiple retail storefronts including an automotive dealer, autobody repair, car wash, United States Postal Service (USPS) Office, fast food restaurant with drive through, gas station and other retailers. The remaining portion of the site consists of a mix of landscaped areas, wooded areas, and Bordering Vegetated Wetlands (BVWs) and an Isolated Vegetated Wetland (IVW).

Rte 85 Realty Corp. (the "Applicant") is proposing to redevelop the existing site with a residential building, one (1) restaurant with drive-through facilities, one (1) bank with drive-through facilities, and one (1) fueling station with a convenience store, along with paved parking areas, landscaping, and associated stormwater management system(s) and utilities. This report addresses a comparative analysis of the pre- and post-development site runoff conditions. Additionally, this report provides calculations documenting the design of the proposed stormwater conveyance/management system(s) as illustrated within the accompanying Site Development Plans prepared by Bohler. The Project will also provide erosion and sedimentation controls during the demolition and construction periods, as well as long term stabilization of the site.

For the purposes of this analysis the pre- and post-development drainage conditions were analyzed at five (5) "design points" where stormwater runoff currently drains to under existing conditions. These design points are described in further detail in **Section II** below. A summary of the existing and proposed conditions peak runoff rates for the 2-, 10-, 25-, and 100-year storms can be found in **Table 1.1** below. The stormwater management system has been designed to retain and infiltrate at least 1" of runoff from the project's total proposed impervious area. In addition, the project has been designed to meet or exceed the Massachusetts Stormwater Management Standards and Article 26 (Stormwater Management and Land Disturbance ordinance approved 11/13/2023) of the Town of Medway General Bylaws as detailed herein.

## Table 1.1: Design Point Peak Runoff Rate Summary

| Point of Analysis | 2-Year Storm | | | 10-Year Storm | | | 25-Year Storm | | | 100-Year Storm | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pre | Post | Δ | Pre | Post | Δ | Pre | Post | Δ | Pre | Post | Δ |
| **DP1** | 5.56 | 3.49 | **-2.07** | 9.07 | 4.79 | **-4.28** | 11.84 | 5.79 | **-6.05** | 16.44 | 7.30 | **-9.14** |
| **DP2** | 6.60 | 3.20 | **-3.40** | 11.89 | 8.82 | **-3.07** | 16.23 | 11.72 | **-4.51** | 23.57 | 21.53 | **-2.04** |
| **DP3** | 2.60 | 2.31 | **-0.29** | 6.04 | 4.16 | **-1.88** | 8.98 | 5.67 | **-3.31** | 14.03 | 8.20 | **-5.83** |
| **DP4** | 4.48 | 2.75 | **-1.73** | 11.69 | 5.29 | **-6.40** | 17.10 | 11.69 | **-5.41** | 25.03 | 24.96 | **-0.07** |
| **DP5** | 1.33 | 0.81 | **-0.52** | 3.52 | 2.00 | **-1.52** | 4.98 | 2.84 | **-2.14** | 7.34 | 6.02 | **-1.32** |

**Flows are represented in cubic feet per second (cfs)*

## II. EXISTING SITE CONDITIONS

### Existing Site Description

The site consists of approximately 21.1 acres of land located at 107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St. The site is currently occupied by multiple retail storefronts including an automotive dealer, autobody repair, car wash, US Postal Service Office, fast food restaurant with drive through, gas station and other retailers. The remaining portion of the site consists of a mix of landscaping, wooded areas, as well as Bordering Vegetated Wetlands (BVW) and a non-jurisdictional Isolated Vegetated Wetlands (IVW). The IVW is less than 5,000-sf and is considered non-jurisdictional under the Definitions in Section 4 for the "Rules and Regulations of the Town of Medway Conservation Commission", amended June 25, 2020. The project Site is bound by Main Street and commercial properties to the north, Elm Street to the west, residential properties to the southwest, Kelley Street to the south, residential properties to the east, and commercial properties to the northeast.

### On-Site Soil Information

Soils within the analyzed area consist of the following as classified by the Natural Resource Conservation Service (NRCS):

**Table 2.1: Existing Soil Information**

| Soil Unit Symbol | Soil Name / Description | Hydrologic Soil Group (HSG) |
|---|---|---|
| 602 | Urban land | N/A |
| 312B | Woodbridge fine sandy loam, extremely stony | C/D |
| 71B | Ridgebury fine sandy loam, extremely stony | D |

On-site soil testing was performed by Sanborn, Head & Associates, Inc. (Sanborn Head) in May 2023. Twelve test (12) pits were conducted throughout the site to obtain the preliminary soil data for the stormwater design using the United States Department of Agriculture (USDA) Textural Classification System. Additionally, five (5) soil samples were collected for laboratory sieve analysis which included hydrometer testing.

Per the testing data provided, the majority of the site is identified as Sandy Loam or Loamy Sand, HSG C, generally reflecting findings in the NRCS Soil Report. Groundwater was estimated between 2.1-ft to 14.2-ft below surface elevation and likely flows towards the on-site and off-site BVWs. Sanborn Head generally recommends 1.02 in/hr for the infiltration rate based on lab test

data and on-site evaluation of the soil conditions. This infiltration rate is non-measured and based on Table 2.3.3., Rawls Rates, from the Massachusetts Stormwater handbook. Refer to **Appendix C** for additional information.

**Existing Collection and Conveyance**

Under existing conditions, the stormwater management system includes a limited number of on-site catch basins that appear to drain to the municipal storm drain system. Runoff not captured by the catch basins drain to the abutters or Bordering Vegetated Wetlands (BVW) generally to the south and west of the site. Some of the runoff flows overland flows to the municipal catch basins on Main Street. On-site elevations (NAVD88) range from 266 adjacent to Main Street at the northeast corner of the site to 219 at the southwest corner of the property.

**Existing Watersheds and Design Point Information**

For the purposes of this analysis, the pre- and post-development drainage conditions were analyzed at five (5) “design points” as described below where stormwater runoff currently drains to under existing conditions. The existing site was subdivided into subcatchments to analyze existing flow rates at each design point. The minimum time of concentration is calculated as 6 minutes (0.1 hr).

Design Point #1 (DP1) is the municipal storm drain system in Main Street. Portions of the existing development drain to on-site catch basins and/or flows overland to municipal catch basins before connecting to the municipal storm drain system.

Design Point #2 (DP2) is the on-site BVW located in the western portion of the Project Site.

Design Point #3 (DP3) is the abutting property (Parcel I.D. 48-48) located southwest of the Project Site.

Design Point #4 (DP4) is the on-site BVW located in the central portion of the Project Site.

Design Point #5 (DP5) are the abutting properties (Parcel I.D. 49-01, 49-04, 40-111, 40-113) located near the center of the Project Site. Per LiDAR data obtained on 02/22/2023 to review off-site drainage patterns, a majority of the runoff in the aforementioned abutting parcels eventually leads to the on-site BVW located in the central portion of the Project Site.

Refer to **Table 1.1 and 6.1** for the existing conditions peak rates of runoff. Refer to **Appendix D** and the Drainage Area Maps in the appendices of this report for a graphical representation of the existing drainage areas.

## III. PROPOSED SITE CONDITIONS

### Proposed Development Description

The project currently proposes to redevelop the existing site with a 76,700-sf± residential building, one (1) 2,000-sf± restaurant with drive-through facilities, one (1) 3,500-sf± bank with drive-through facilities, and one (1) fueling station with an associated 5,400-sf± convenience store, along with paved parking areas, landscaping, and associated stormwater management system(s) and utilities.

### Proposed Development Collection and Conveyance

Generally, the site has been designed to drain to a mix of deep-sump, hooded catch basins, trench drains, or water quality inlets (hydrodynamic separators). The inlet structures will capture and convey stormwater runoff, via an underground pipe system, to infiltration systems or detention systems. Infiltration systems are composed of either subsurface chambers / structures or above-ground basins. The proposed detention systems are subsurface chambers / structures with Outlet Control Structures (OCS) to manage the outflow from their respective basins. Pretreatment of stormwater runoff will be provided by a combination of the deep-sump, hooded catch basins, hydrodynamic separators, and/or isolator rows within the subsurface infiltration system(s), prior to discharge into the proposed corresponding basins. Rooftop runoff has been designed to flow to the basins as well. Pipes are designed for the 25-year storm using the Rational Method. Pipes downstream of the proposed drainage basins are designed for the 100-yr storm as to not impede the functions of the basins.

The best management practices (BMPs) incorporated into the proposed stormwater management system have been designed to meets, or exceeds, the standards set forth in the Massachusetts Department of Environmental Protection (MADEP) Stormwater Management Standards. Additionally, the BMPs will meet, or exceed, the municipal standards for new developments as set forth in Article 26 (Stormwater Management and Land Disturbance ordinance approved 11/13/2023) of the Town of Medway General Bylaws. Refer to **Section V** for additional information.

**Proposed Watersheds and Design Point Information**

The project has been designed to maintain existing drainage watersheds to the greatest extent possible, with the same five (5) design points as described in **Section II** above. The minimum time of concentration for all proposed subcatchment is calculated as 6 minutes (0.1 hr).

Refer to **Table 1.1 and 6.1** for the calculated proposed conditions peak rates of runoff. For additional hydrologic information, refer to **Appendix E** and the Drainage Area Maps in the appendices of this report for a graphical representation of the proposed drainage areas. An analysis of the Phase I Conditions is also provided in the appendix.

## IV. METHODOLOGY

**Peak Flow Calculations**

Methodology utilized to design the proposed stormwater management system includes compliance with the guidelines set forth in the latest edition of the MADEP Stormwater Management Standards. The pre- and post-development runoff rates being discharged from the site were computed using the HydroCAD computer program. The drainage area and outlet information were entered into the program, which routes storm flows based on NRCS TR-20 and TR-55 methods. The other components of the model were determined following standard NRCS procedures for Curve Numbers (CNs) and times of concentrations documented in the appendices of this report. The rainfall data utilized and listed below in **Table 4.1** below for stormwater calculations is based on NOAA Plus methodology, as required under local regulations, utilizing 90% of the upper bound of each recurrence interval. Refer to **Appendix F** for more information.

**Table 4.1: NOAA+ Rainfall Intensities**

| Frequency | 2 year | 10 year | 25 year | 100 year |
|---|---|---|---|---|
| Rainfall* (inches) | 3.84 | 6.06 | 7.81 | 10.71 |

*Values derived from NOAA ATLAS on 02/02/2026

The proposed stormwater management as designed will provide a decrease in peak rates of runoff from the proposed facility for the 2-, 10-, 25- and 100-year design storm events. Additionally, the proposed project meets, or exceeds, the MADEP Stormwater Management and municipal standards. Compliance with these standards is described further below.

## V. STORMWATER MANAGEMENT STANDARDS

### Standard #1: No New Untreated Discharges

The project has been designed so that the majority of proposed impervious areas (including the building roof and paved parking/driveway areas) shall be collected and passed through the proposed drainage system for treatment prior to discharge. Additionally, all proposed outfalls are design as to not cause erosion to the on-site wetlands. Please see Rip Rap Apron Sizing Calculations in **Appendix F**.

### Standard #2: Peak Rate Attenuation

As outlined in **Table 1.1** and **Table 6.1**, the development of the site and the proposed stormwater management system, have been designed so that post-development peak rates of runoff are at or below pre-development conditions for the 2-, 10-, 25-, and 100-year storm events at all design points.

### Standard #3: Recharge

A majority of the stormwater runoff from the project will be collected and diverted to a number of proposed infiltration systems. The Project as proposed will result in approximately 8.4± acres of impervious area, a net increase of approximately 4± acres over existing. Per the municipal stormwater regulations, the project is required to infiltrate 1.0-inch times the proposed impervious area for New Development projects which exceeds the requirements set in Standard 3. This amounts to 30,708 cubic feet of stormwater, which is adjusted to 36,739 cubic feet to compensate for impervious areas not captured by the infiltration system. The proposed infiltration basins will provide a combined 46,516 cubic feet of volume below the lowest outlet for groundwater recharge. Refer to **Appendix F** of this report for calculations documenting required and provided recharge volumes.

MADEP Stormwater Management Standards require that Infiltration BMPs drain completely within 72 hours of the end of the storm event. Calculations showing that each of the proposed infiltration systems will drain within 72 hours are included in **Appendix F** of this report.

Infiltration is not used as a peak rate mitigator therefore a ground water mounding analysis is not required.

**Standard #4: Water Quality**

In addition to the water quality requirements set forth under Standard 4, the Town of Medway requires projects to remove 90% of Total Suspended Solids (TSS) and 60% of Total Phosphorus (TP) post-construction for New Developments. Water quality treatment is provided via a combination of deep sump catch basins, hydrodynamic separators, isolator rows, and infiltration basins. TSS removal calculations are included in Appendix F of this report. The project will involve the creation of approximately 8.5± acres of proposed impervious area and is required to treat 30,708 cubic feet of water quality volume per the municipal stormwater regulations. The proposed infiltration basin provides 46,516 cubic feet of water quality volume below the lowest outlet for water quality treatment. Where feasible, impervious areas not directed to infiltration systems will be treated with hydrodynamic separators. Refer to **Appendix F** of this report for calculations documenting required and provided water quality volumes.

Surface runoff captured by deep sump catch basins are typically directed to an isolator row of an infiltration/detention BMP or a Water Quality Unit, i.e., a hydrodynamic separator, prior to discharge into the respective infiltration/detention BMP. Water Quality Inlets, i.e., inlet structures with hydrodynamic separators, are used where an inlet structure drains to the infiltration/detention BMP directly. Roof areas drain to the infiltration or detention BMP directly.

**Standard #5: Land Use with Higher Potential Pollutant Loads**

The northeast portion of the proposed project includes a fueling station and generates more than 1,000 trips a day, which would classify as “Land Uses with Higher Potential Pollutant Loads” or “LUHPPL”. Accordingly, the stormwater management system includes oil-grit separators prior to discharge. In addition, the project will already provide the minimum 44% TSS removal prior to infiltration and treat the 1.0 in water quality depth, as further illustrated in **Appendix E** of this report.

**Standard #6: Critical Areas**

Not Applicable for this project.

**Standard #7: Redevelopment**

Not Applicable for this project.

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

The proposed project will provide construction period erosion and sedimentation controls as indicated within the site plan set provided for this project. This includes a proposed construction exit, protection for stormwater inlets, protection around temporary material stock piles and various other techniques as outlined on the erosion and sediment control sheets. Additionally, the project is required to file a Notice of Intent with the US EPA and implement a Stormwater Pollution Prevention Plan (SWPPP) during the construction period. The SWPPP will be prepared prior to the start of construction and will be implemented by the site contractor under the guidance and responsibility of the project's proponent. Refer to **Appendix H**.

**Standard #9: Operation and Maintenance Plan (O&M Plan)**

An Operation and Maintenance (O&M) Plan for this site has been prepared and is included in **Appendix G** of this report. The O&M Plan outlines procedures and timetables for the long-term operation and maintenance of the proposed site stormwater management system, including initial inspections upon completion of construction, and periodic monitoring of the system components, in accordance with established practices and the manufacturer's recommendations. The O&M Plan includes a list of responsible parties for inspections and maintenance.

**Standard #10: Prohibition of Illicit Discharges**

The proposed stormwater system will only convey allowable non-stormwater discharges (firefighting waters, irrigation, air conditioning condensates, etc.) and will not contain any illicit discharges from prohibited sources. An Illicit Discharge Statement is included in **Appendix G** of this report.

## VI. SUMMARY

In summary, the proposed stormwater management system illustrated on the drawings prepared by Bohler results in a reduction in peak rates of runoff from the subject site when compared to pre-development conditions for the 2-, 10-, 25- and 100-year storm frequencies. In addition, the proposed best management practices will result in an effective removal of total suspended solids from the post-development runoff. The pre-development versus post-development stormwater discharge comparisons are contained in **Table 6.1** below:

**Table 1.1: Design Point Peak Runoff Rate Summary**

| Point of Analysis | 2-Year Storm | | | 10-Year Storm | | | 25-Year Storm | | | 100-Year Storm | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pre | Post | Δ | Pre | Post | Δ | Pre | Post | Δ | Pre | Post | Δ |
| **DP1** | 5.56 | 3.49 | **-2.07** | 9.07 | 4.79 | **-4.28** | 11.84 | 5.79 | **-6.05** | 16.44 | 7.30 | **-9.14** |
| **DP2** | 6.60 | 3.20 | **-3.40** | 11.89 | 8.82 | **-3.07** | 16.23 | 11.72 | **-4.51** | 23.57 | 21.53 | **-2.04** |
| **DP3** | 2.60 | 2.31 | **-0.29** | 6.04 | 4.16 | **-1.88** | 8.98 | 5.67 | **-3.31** | 14.03 | 8.20 | **-5.83** |
| **DP4** | 4.48 | 2.75 | **-1.73** | 11.69 | 5.29 | **-6.40** | 17.10 | 11.69 | **-5.41** | 25.03 | 24.96 | **-0.07** |
| **DP5** | 1.33 | 0.81 | **-0.52** | 3.52 | 2.00 | **-1.52** | 4.98 | 2.84 | **-2.14** | 7.34 | 6.02 | **-1.32** |

**Flows are represented in cubic feet per second (cfs)*

## APPENDIX A: CHECKLISTS

- *MASSACHUSETTS STORMWATER MANAGEMENT CHECKLIST*
- *MUNICIPAL LAND DISTURBANCE CHECKLIST*

**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.

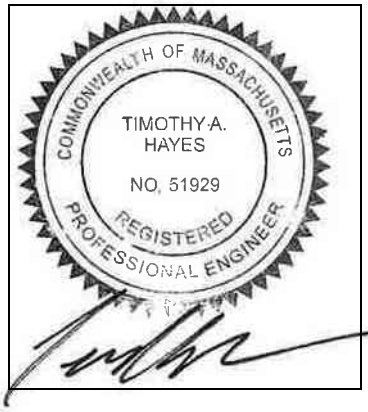
*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that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




09/28/2026

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.

## LAND DISTURBANCE PERMIT APPLICATION CHECKLIST

**Submit 3 copies of each of the following documents to the Medway Community and Economic Development Department. Incomplete applications will not be accepted.**

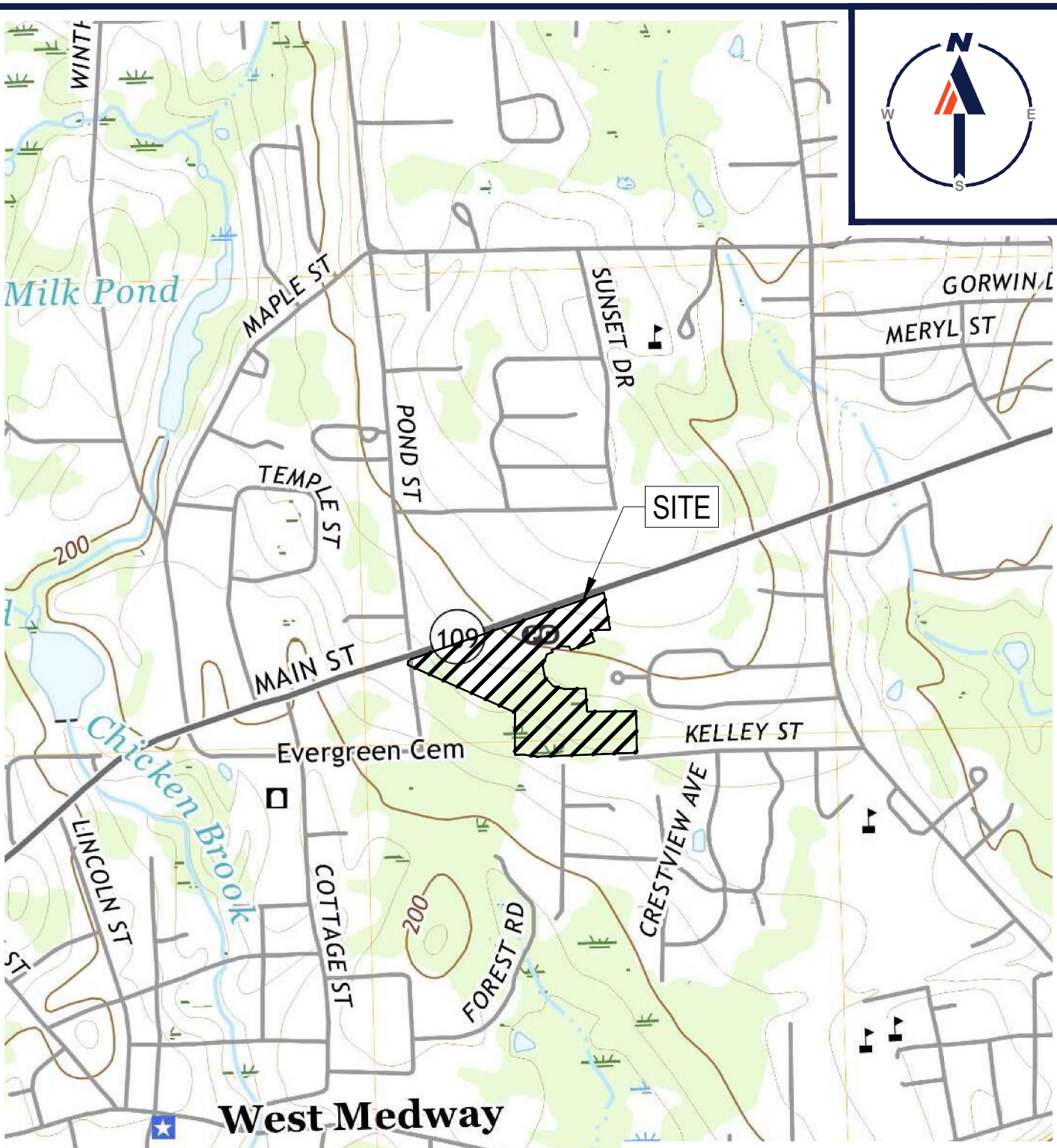
**Also provide a flash drive or email all documents.**

**This application must be filed at the same time as the corresponding application(s) (Notice of Intent and/or Site Plan Review or Subdivision Approval) are filed with the Conservation Commission and/or the Planning and Economic Development Board.**

- **X** Land Disturbance Permit Application Form with original signatures of applicant, owner and designated representative
- **X** Erosion and Sediment Control Plan and associated documents prepared as specified in Medway General Bylaws, ARTICLE XXVI, Section 26.5.6
- **X** Drainage Calculations in compliance with the most current Massachusetts Stormwater Management Standards and the NOAA Atlas 14 precipitation rates
- **X** Narrative on how the project meets the most current Massachusetts Stormwater Management Standards
- **X** Construction sequencing/phasing plan
- **X** Stormwater Operations and Maintenance Plan for Construction
- **X** Post-Construction Stormwater Management Plan as specified in Medway General Bylaws, ARTICLE XXVI, Section 26.5.8
- **X** Post-Construction Long Term Stormwater Operations and Maintenance Plan as specified in Medway General Bylaws, ARTICLE XXVI, Section 26.5.9
- **N/A** Other permits already received for the project
- **X** If necessary, Request(s) for Waivers from the provisions of Medway General Bylaws, ARTICLE XXVI, Section 26.5
- **X** Application/filing fee when applicable

## APPENDIX B: PROJECT LOCATION MAPS

- *USGS MAP*
- *FEMA FIRMETTE*




# USGS MAP

107-119 MAIN ST, 1 & 3 ELM ST, 0 & 26 KELLEY ST
MEDWAY, MASSACHUSETTS

***PREPARED BY***

**BOHLER**

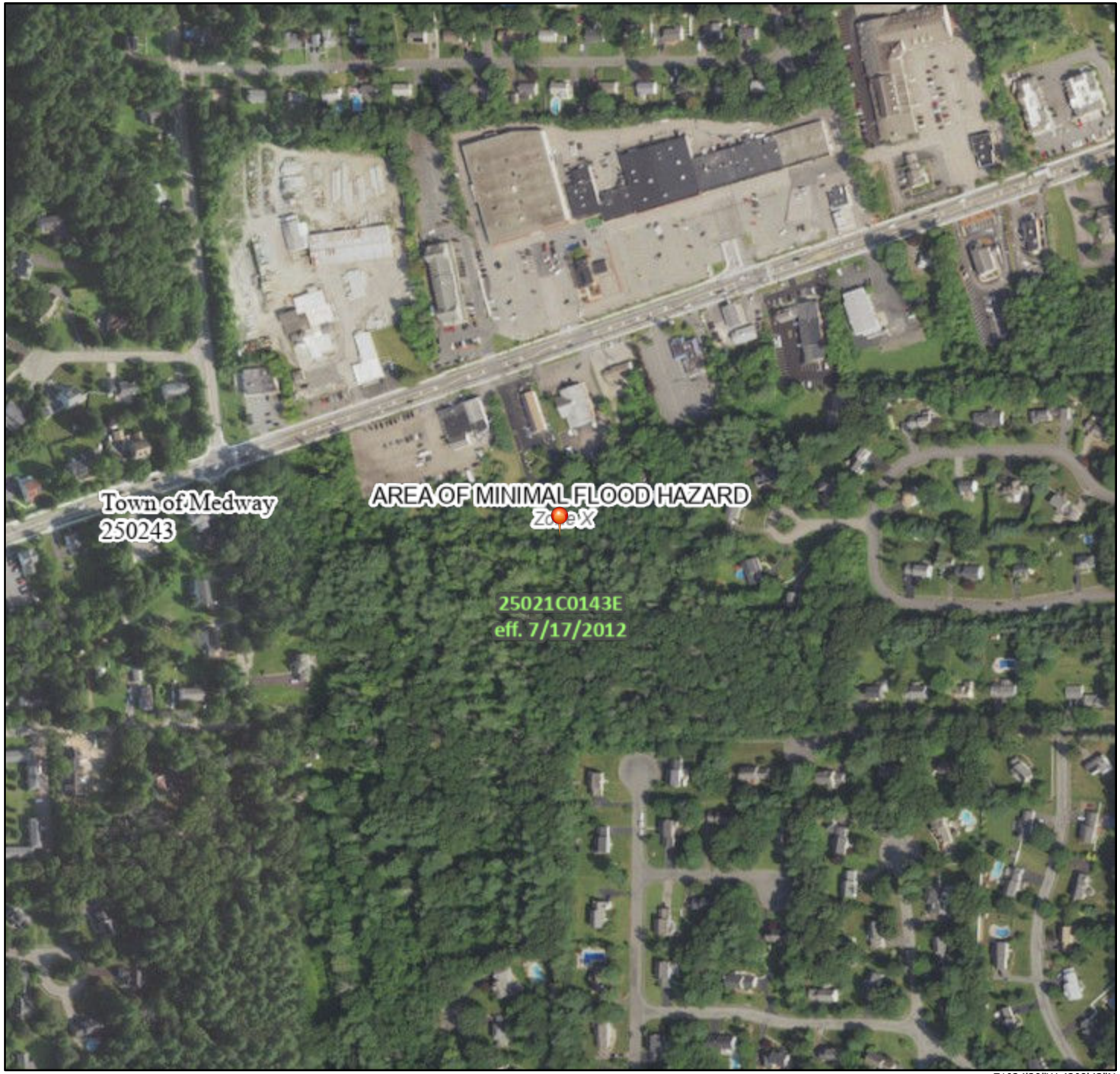
SCALE:1"=1000' DATE: 01/13/2025

P:\21\W211301\CAD\Drawings\Plan Sets\Civil Site Plans\W211301-SPPD-2c.dwg

# National Flood Hazard Layer FIRMette

FEMA

71°25'17"W 42°9'9"N




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

1:6,000

71°24'39"W 42°8'42"N

*Basemap Imagery Source: USGS National Map 2023*

## Legend

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

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

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

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

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

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

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

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/1/2023 at 10:18 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

## APPENDIX C: SOIL AND WETLAND INFORMATION

- *NCRS CUSTOM SOIL RESOURCE REPORT*
- *REPORT OF GEOTECHNICAL INVESTIGATION*
- *ORAD*

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Norfolk and Suffolk Counties, Massachusetts




February 4, 2026

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report
## Soil Map




Map Scale: 1:3,650 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

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

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

**Water Features**
- Streams and Canals

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

**Background**
- Aerial Photography

## MAP INFORMATION

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

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: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 21, Sep 5, 2025

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.

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| 70A | Ridgebury fine sandy loam, 0 to 3 percent slopes | 0.1 | 0.3% |
| 71B | Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony | 2.9 | 6.1% |
| 310B | Woodbridge fine sandy loam, 3 to 8 percent slopes | 2.7 | 5.8% |
| 312B | Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony | 30.6 | 65.7% |
| 602 | Urban land, 0 to 15 percent slopes | 10.3 | 22.1% |
| **Totals for Area of Interest** | | **46.6** | **100.0%** |

# Map Unit Descriptions

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, 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 and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils 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. Other minor components, however, have properties and behavioral 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*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one 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.

# Norfolk and Suffolk Counties, Massachusetts

## 70A—Ridgebury fine sandy loam, 0 to 3 percent slopes

### Map Unit Setting

*National map unit symbol:* 2w69f
*Landscape:* Glaciated uplands
*Elevation:* 0 to 1,480 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

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

### Description of Ridgebury

#### Setting

*Landscape:* Glaciated uplands
*Landform:* Ground moraines, Hills, Drumlins, Depressions, Drainageways
*Landform position (two-dimensional):* Footslope, toeslope
*Landform position (three-dimensional):* Head slope, base slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

#### Typical profile

*Oe - 0 to 1 inches:* moderately decomposed plant material
*A - 1 to 6 inches:* fine sandy loam
*Bw - 6 to 10 inches:* sandy loam
*Bg - 10 to 19 inches:* gravelly sandy loam
*Cd - 19 to 66 inches:* gravelly sandy loam

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* 15 to 35 inches to densic material
*Drainage class:* Poorly drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.14 in/hr)
*Depth to water table:* About 0 to 6 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 3.0 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 4w
*Hydrologic Soil Group:* D
*Ecological site:* F144AY009CT - Wet Till Depressions

*Hydric soil rating:* Yes

**Minor Components**

**Woodbridge**

*Percent of map unit:* 9 percent
*Landscape:* Glaciated uplands
*Landform:* Ground moraines, Hills, Drumlins
*Landform position (two-dimensional):* Summit, footslope
*Landform position (three-dimensional):* Crest, base slope
*Down-slope shape:* Convex
*Across-slope shape:* Linear
*Hydric soil rating:* No

**Whitman**

*Percent of map unit:* 5 percent
*Landscape:* Glaciated uplands
*Landform:* Hills, Drainageways, Drumlins, Ground moraines, Depressions
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Base slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

**Leicester**

*Percent of map unit:* 1 percent
*Landscape:* Glaciated uplands
*Landform:* Ground moraines, Hills, Drainageways, Depressions
*Landform position (two-dimensional):* Footslope, toeslope
*Landform position (three-dimensional):* Base slope
*Down-slope shape:* Concave, linear
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

## 71B—Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony

**Map Unit Setting**

*National map unit symbol:* 2w69c
*Landscape:* Glaciated uplands
*Elevation:* 0 to 1,290 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**

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

## Description of Ridgebury, Extremely Stony

### Setting

*Landscape:* Glaciated uplands
*Landform:* Drumlins, Depressions, Ground moraines, Hills, Drainageways
*Landform position (two-dimensional):* Footslope, toeslope
*Landform position (three-dimensional):* Head slope, base slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

### Typical profile

*Oe - 0 to 1 inches:* moderately decomposed plant material
*A - 1 to 6 inches:* fine sandy loam
*Bw - 6 to 10 inches:* sandy loam
*Bg - 10 to 19 inches:* gravelly sandy loam
*Cd - 19 to 66 inches:* gravelly sandy loam

### Properties and qualities

*Slope:* 3 to 8 percent
*Surface area covered with cobbles, stones or boulders:* 9.0 percent
*Depth to restrictive feature:* 15 to 35 inches to densic material
*Drainage class:* Poorly drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.14 in/hr)
*Depth to water table:* About 0 to 6 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 3.0 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7s
*Hydrologic Soil Group:* D
*Ecological site:* F144AY009CT - Wet Till Depressions
*Hydric soil rating:* Yes

## Minor Components

### Woodbridge, extremely stony

*Percent of map unit:* 10 percent
*Landscape:* Glaciated uplands
*Landform:* Ground moraines, Hills, Drumlins
*Landform position (two-dimensional):* Summit, backslope, footslope
*Landform position (three-dimensional):* Crest, side slope
*Down-slope shape:* Convex
*Across-slope shape:* Linear
*Hydric soil rating:* No

### Whitman, extremely stony

*Percent of map unit:* 8 percent
*Landscape:* Glaciated uplands
*Landform:* Depressions

*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

**Paxton, extremely stony**

*Percent of map unit:* 2 percent
*Landscape:* Glaciated uplands
*Landform:* Ground moraines, Hills, Drumlins
*Landform position (two-dimensional):* Summit, shoulder, backslope
*Landform position (three-dimensional):* Crest, side slope
*Down-slope shape:* Convex, linear
*Across-slope shape:* Linear, convex
*Hydric soil rating:* No

## 310B—Woodbridge fine sandy loam, 3 to 8 percent slopes

**Map Unit Setting**

*National map unit symbol:* 2t2ql
*Landscape:* Uplands
*Elevation:* 0 to 1,470 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:* All areas are prime farmland

**Map Unit Composition**

*Woodbridge, fine sandy loam, and similar soils:* 82 percent
*Minor components:* 18 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Woodbridge, Fine Sandy Loam**

**Setting**

*Landscape:* Uplands
*Landform:* Ground moraines, Drumlins, Hills
*Landform position (two-dimensional):* Summit, backslope, footslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Linear
*Parent material:* Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

**Typical profile**

*Ap - 0 to 7 inches:* fine sandy loam
*Bw1 - 7 to 18 inches:* fine sandy loam
*Bw2 - 18 to 30 inches:* fine sandy loam
*Cd - 30 to 65 inches:* gravelly fine sandy loam

**Properties and qualities**

*Slope:* 3 to 8 percent
*Depth to restrictive feature:* 20 to 39 inches to densic material

*Drainage class:* Moderately well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.14 in/hr)
*Depth to water table:* About 18 to 30 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 3.6 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 2w
*Hydrologic Soil Group:* C/D
*Ecological site:* F144AY037MA - Moist Dense Till Uplands
*Hydric soil rating:* No

**Minor Components**

**Paxton**

*Percent of map unit:* 10 percent
*Landscape:* Uplands
*Landform:* Drumlins, Ground moraines, Hills
*Landform position (two-dimensional):* Summit, shoulder, backslope
*Landform position (three-dimensional):* Nose slope, crest, side slope
*Down-slope shape:* Convex, linear
*Across-slope shape:* Convex
*Hydric soil rating:* No

**Ridgebury**

*Percent of map unit:* 8 percent
*Landscape:* Uplands
*Landform:* Depressions, Ground moraines, Hills, Drainageways
*Landform position (two-dimensional):* Toeslope, backslope, footslope
*Landform position (three-dimensional):* Base slope, head slope, dip
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

## 312B—Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony

**Map Unit Setting**

*National map unit symbol:* 2t2qs
*Landscape:* Uplands
*Elevation:* 0 to 1,580 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**

*Woodbridge, extremely stony, and similar soils:* 82 percent
*Minor components:* 18 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Woodbridge, Extremely Stony**

**Setting**

*Landscape:* Uplands
*Landform:* Ground moraines, Hills, Drumlins
*Landform position (two-dimensional):* Summit, backslope, footslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Linear
*Parent material:* Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

**Typical profile**

*Oe - 0 to 2 inches:* moderately decomposed plant material
*A - 2 to 9 inches:* fine sandy loam
*Bw1 - 9 to 20 inches:* fine sandy loam
*Bw2 - 20 to 32 inches:* fine sandy loam
*Cd - 32 to 67 inches:* gravelly fine sandy loam

**Properties and qualities**

*Slope:* 0 to 8 percent
*Surface area covered with cobbles, stones or boulders:* 9.0 percent
*Depth to restrictive feature:* 20 to 43 inches to densic material
*Drainage class:* Moderately well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.14 in/hr)
*Depth to water table:* About 19 to 27 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 4.0 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7s
*Hydrologic Soil Group:* C/D
*Ecological site:* F144AY037MA - Moist Dense Till Uplands
*Hydric soil rating:* No

**Minor Components**

**Paxton, extremely stony**

*Percent of map unit:* 10 percent
*Landscape:* Uplands
*Landform:* Ground moraines, Hills, Drumlins
*Landform position (two-dimensional):* Summit, shoulder, backslope
*Landform position (three-dimensional):* Crest, side slope
*Down-slope shape:* Convex, linear
*Across-slope shape:* Linear, convex
*Hydric soil rating:* No

**Ridgebury, extremely stony**

*Percent of map unit:* 8 percent
*Landscape:* Uplands
*Landform:* Hills, Drainageways, Drumlins, Depressions, Ground moraines
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Base slope, head slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Hydric soil rating:* Yes

## 602—Urban land, 0 to 15 percent slopes

### Map Unit Setting

*National map unit symbol:* vkyj
*Mean annual precipitation:* 32 to 50 inches
*Mean annual air temperature:* 45 to 50 degrees F
*Frost-free period:* 120 to 200 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Urban land:* 99 percent
*Minor components:* 1 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Urban Land

#### Setting

*Parent material:* Excavated and filled land

### Minor Components

#### Rock outcrops

*Percent of map unit:* 1 percent
*Hydric soil rating:* Unranked

SANBORN HEAD

Mr. Tariq H. Fayyad, M.S.
Real Estate Development & Acquisitions Manager
The Meehan Group
32 Hastings Street, P.O. Box 444
Mendon, Massachusetts 01756

January 29, 2026
File No. 5722.000

Re: Subsurface Information for Stormwater Design
Heritage on Main
119 Main Street
Medway, Massachusetts

Dear Mr. Fayyad:

This letter summarizes the results of subsurface explorations completed to support stormwater design for the proposed Heritage on Main development located at 119 Main Street in Medway, Massachusetts (Site) as shown on the Locus Plan in Figure 1.

This report has been prepared by Sanborn, Head & Associates, Inc. (Sanborn Head) on behalf of The Meehan Group (Meehan, Client) in accordance with our proposal dated February 21, 2023. This report is subject to the limitations stated in Attachment A.

**SITE AND PROJECT DESCRIPTION**

The Site comprises thirteen (13) adjacent parcels identified as 107, 111, 113, 115, 115A, 117, 119, 119A, and 119B Main Street, 1 and 3 Elm Street, and 0 and 26 Kelley Street. The parcels located along Main Street consist of commercial properties including a gasoline station, a restaurant, a dental office, a smoothie café, a U.S. Post Office, a car wash, a pool supply store, an auto repair, and a used car sales office and associated paved parking, driveways and landscaped areas. The southern portion of these parcels and the parcels located on Elm Street and Kelley Street generally consist of woodland and wetlands.

The Site elevation ranges between approximately elevation (El.) 267 feet and El. 220 feet and generally slopes down to the southwest, with a steep slope located within the wooded area to the west and south of the commercial properties. Wetlands are present in the western and southern Site areas.

The proposed development project will include the construction of four (4) buildings consisting of the following:

- **Bldg A**: A multi-story mixed-use residential/retail building
- **Bldg B and C**: One-story retail buildings
- **Bldg D**: One-story retail building with a fueling station

The development also includes associated drive aisles, parking lots and stormwater management features.

Referenced elevations are based on an existing conditions plan prepared by Control Point Associates, Inc. of Southborough, Massachusetts, dated April 14, 2023, and reproduced on Figure 2. Elevations in the report reference the North American Vertical Datum of 1988 (NAVD88).

Proposed stormwater management areas are shown on Figure 2, adapted from draft plans provided by Bohler on January 27, 2026.

**SUBSURFACE EXPLORATION PROGRAM**

Between May 23 and 25, 2023, Machine Time, LLC of Hudson, New Hampshire, excavated twelve (12) stormwater test pits designated SH-TP-1 through SH-TP-12. The test pits were completed to obtain preliminary soil data to aid with the stormwater design. The test pits were advanced under the observation of Sanborn Head to depths ranging between approximately 9.8 and 15.0 feet below ground surface (bgs). The approximate locations of the test pits are shown on Figure 2.

The explorations were observed by Sanborn Head personnel on a full-time basis. Logs of the subsurface explorations were prepared by a Soil Evaluator certified in Massachusetts. Soil samples were field classified based on visual estimates of grain size distribution and plasticity using the United States Department of Agriculture (USDA) Textural Classification System. USDA test pit logs are included in Attachment B.

To evaluate the soils at the Site, five (5) representative soil samples were collected from test pits and were submitted to a geotechnical laboratory for grain size distribution (sieve) analysis in accordance with ASTM D6913, and USDA Textural Classification which includes hydrometer testing in accordance with ASTM D7928. The soil laboratory tests were completed by GeoTesting Express, Inc. of Acton, MA and copies of the laboratory reports are included in Attachment C.

**SUBSURFACE CONDITIONS**

In the wooded areas, the explorations generally encountered a surface layer of organic topsoil and subsoil (also identified as soil horizon/layer A and B) to approximately 1.3 to 3.4 feet below ground surface, underlain by natural glacial till (also identified as soil horizon/layer C). The natural glacial till strata generally consists of fine to coarse sand with varying quantities of silt, gravel, cobbles, and boulders. The USDA Textural Classification for the natural glacial till in the observed stormwater test pit locations varies from Sandy Loam to Loamy Sand throughout the Site.

A layer of fill approximately 2.3 to 6.5 feet thick was encountered in test pits SH-TP-1, -3, -6, -7, -8 and -10, typically underlain by a buried topsoil and subsoil layer and the glacial till.

Weathered rock (also identified as soil horizon/layer Cr) was encountered in test pits SH-TP-4, -5, -7, -9, and -12 at depths between approximately 7.8 and 14.6 feet bgs, corresponding to approximate elevations El. 214.3 and 246.2 feet.

Groundwater was observed weeping from test pit sidewalls between approximately 2.1 to 14.2 feet bgs, corresponding to approximately El. 222.3 feet to 248.7 feet. Observed groundwater was generally interpreted as ESHGW.

## PRELIMINARY DESIGN CONSIDERATIONS AND RECOMMENDATIONS

The following sections include our preliminary recommendations for the design and construction of the stormwater management areas to be constructed at the Site.

### Soil Receiving Layer and Estimated Seasonal High Groundwater

We recommend that the natural glacial till layer be considered the receiving layer for proposed stormwater infiltration system(s). Based on the USDA Textual Classification and the geotechnical laboratory results, the glacial till is categorized as either Sandy Loam or Loamy Sand. Figure 3 shows the elevations of the glacial till and ESHGW at each test pit location.

The table below summarizes the USDA Textual Classification, hydrologic soil group, and infiltration rate of the receiving layer and the ESHGW at the proposed stormwater management areas. The recommended type of stormwater management is based on the depth to the receiving layer relative to ESHGW. Detention is recommended in areas where fill is present and the over-excavation and replacement of fill soil is likely not economical. Infiltration could be evaluated if additional infiltration is needed.

| Stormwater Management Area | Test Pit ID [1] | Recommended Type | USDA Soil Texture[2] | Infiltration Rate[3,4] (in/hr) | ESHGW (feet) |
|---|---|---|---|---|---|
| IS-1 | SH-TP-2 | Infiltration | Sandy Loam | 1.02 | 226.9 |
| IS-2 | SH-TP-5 | Infiltration | Sandy Loam | 1.02 | 222.3 |
| IS-3 | SH-TP-5 | Infiltration | Sandy Loam | 1.02 | 222.3 |
| IS-4 | SH-TP-1 | Infiltration | Sandy Loam | 1.02 | 234.5 |
| DS-5 | SH-TP-3<br>SH-TP-6 | Detention | -- | -- | 242.0 |
| DS-6 | SH-TP-6 | Detention | -- | -- | 242.0 |

[1] Recommendations for stormwater are based on a limited set of data. We recommend additional test pits be performed prior to finalizing the stormwater design.
[2] United Stated Department of Agriculture (USDA) Textual Classification are based on the textual triangle and particle-size limits; see USDA, 2007 National Soil Survey Handbook, Part 618, Exhibit 8.
[3] Infiltration rates are taken from the *Massachusetts Stormwater Handbook, Table 2.3.3.*
[4] Infiltration is not recommended in areas designated as "detention."

| Stormwater Management Area | Test Pit ID [1] | Recommended Type | USDA Soil Texture[2] | Infiltration Rate[3,4] (in/hr) | ESHGW (feet) |
|---|---|---|---|---|---|
| IS-7 | SH-TP-10 | Infiltration | Sandy Loam | 1.02 | 244.8 |
| IS-8 | SH-TP-12 | Infiltration | Sandy Loam | 1.02 | 248.7 |

We recommend additional explorations be conducted to fill in data gaps in the proposed stormwater management areas.

We trust this data report meets the current needs of the project. If you should have any questions, please call us at (978) 392-0900.

Very truly yours,
SANBORN, HEAD & ASSOCIATES, INC.

Quincy Pratt, P.E.
*Project Director*

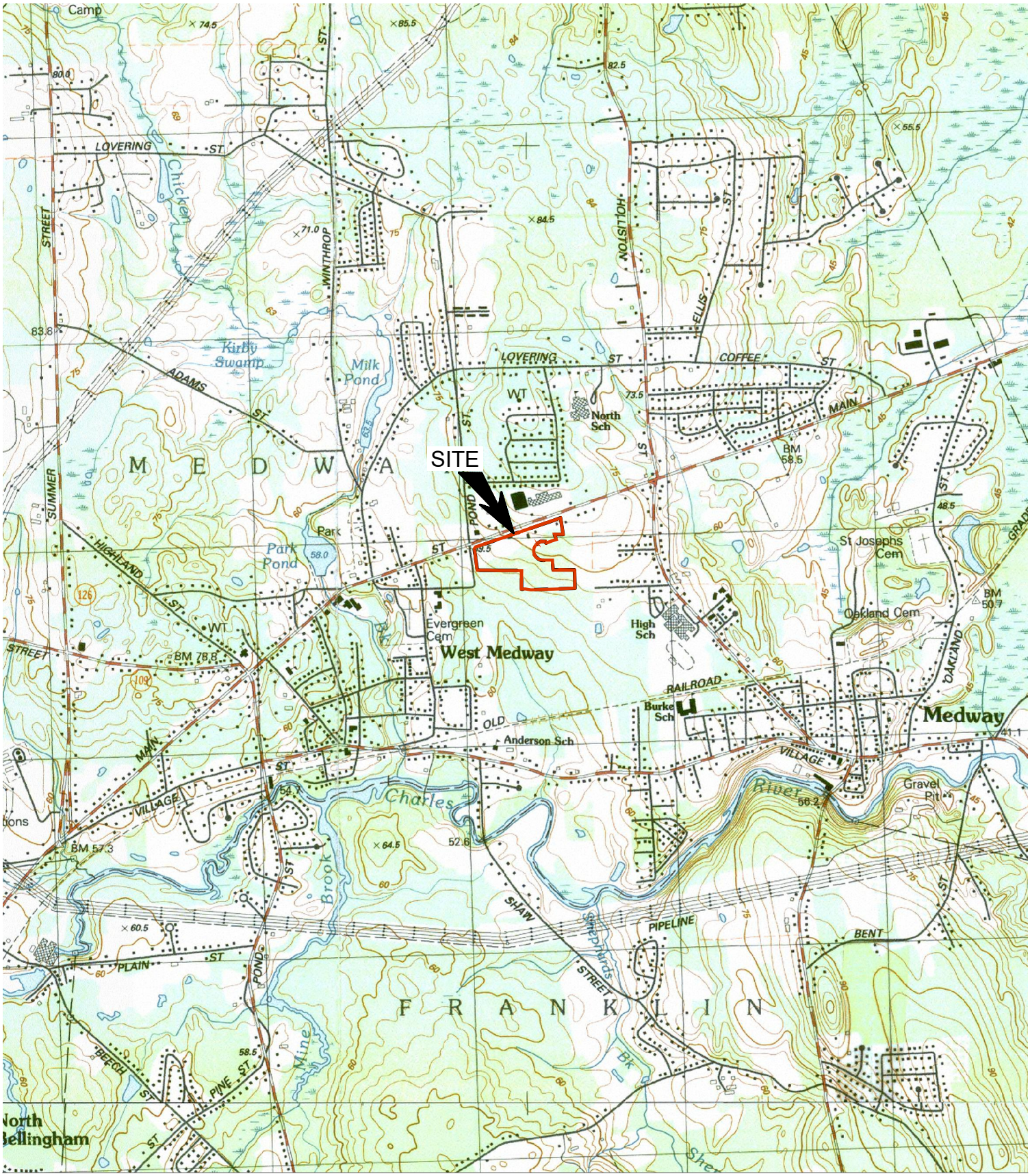
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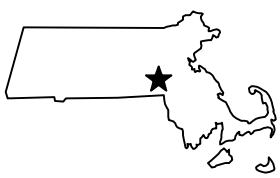
Encl. Figure 1 – Locus Plan
Figure 2 – Exploration Location Plan
Attachment A – Limitations
Attachment B – Subsurface Exploration Logs
Attachment C – Geotechnical Laboratory Results

# Figures

File:P:\5700s\5722.00\Graphics Files\CAD\SW MEMO-JUN23\ELP.dwg Plot Date: 6-14-23

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NOTES:
Base map was taken from the "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Information Technology Division"
7.5 minute USGS Quadrangle Maps: Hollistion, MA, REV: 1987

Drawn By: B. Daily
Designed By: Q. Pratt
Reviewed By: C. Disenhof
Project No: 5722.00
Date: January 2026

SCALE: 1:25,000

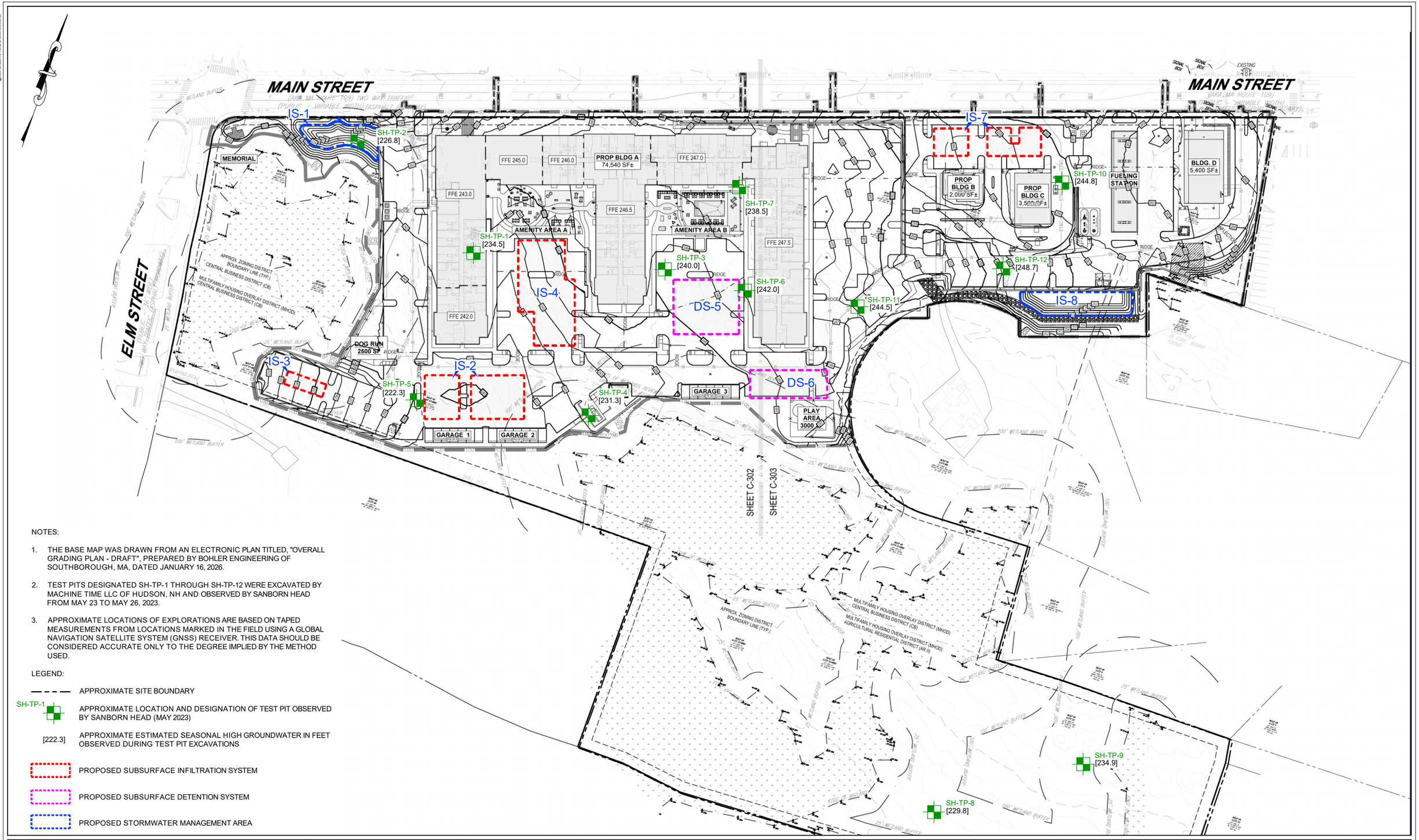
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Figure 1

# Locus Plan

## Stormwater Design Letter

119 Main Street
Medway, Massachusetts




NOTES:

1. THE BASE MAP WAS DRAWN FROM AN ELECTRONIC PLAN TITLED, "OVERALL GRADING PLAN - DRAFT", PREPARED BY BOHLER ENGINEERING OF SOUTHBOROUGH, MA, DATED JANUARY 16, 2026.
2. TEST PITS DESIGNATED SH-TP-1 THROUGH SH-TP-12 WERE EXCAVATED BY MACHINE TIME LLC OF HUDSON, NH AND OBSERVED BY SANBORN HEAD FROM MAY 23 TO MAY 26, 2023.
3. APPROXIMATE LOCATIONS OF EXPLORATIONS ARE BASED ON TAPED MEASUREMENTS FROM LOCATIONS MARKED IN THE FIELD USING A GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS) RECEIVER. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

LEGEND:

- APPROXIMATE SITE BOUNDARY
- SH-TP-1 — APPROXIMATE LOCATION AND DESIGNATION OF TEST PIT OBSERVED BY SANBORN HEAD (MAY 2023)
- [222.3] — APPROXIMATE ESTIMATED SEASONAL HIGH GROUNDWATER IN FEET OBSERVED DURING TEST PIT EXCAVATIONS
- PROPOSED SUBSURFACE INFILTRATION SYSTEM
- PROPOSED SUBSURFACE DETENTION SYSTEM
- PROPOSED STORMWATER MANAGEMENT AREA

SANBORN HEAD

GRAPHICAL SCALE
60' 30' 0' 60' 120'

| NO. | DATE | DESCRIPTION | BY |
|---|---|---|---|

DRAWN BY: B. DAILEY
DESIGNED BY: Q. PRATT
REVIEWED BY: Q. PRATT
PROJECT MGR: C. DISENHOF
PIC: Q. PRATT
DATE: JANUARY 2026

STORMWATER DESIGN LETTER
119 MAIN STREET
MEDWAY, MASSACHUSETTS

EXPLORATION LOCATION PLAN

PROJECT NUMBER: 5722.00

FIGURE NUMBER: 2

# Attachment A

# Limitations

# ATTACHMENT A
# LIMITATIONS

**Explorations**

1. The analyses, recommendations, and design submitted in this report are based in part on the data obtained from subsurface explorations by Sanborn Head. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.
2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and have been developed by interpretation of widely spaced explorations and samples; actual soil transitions may be more or less gradual than indicated. For specific information, refer to the subsurface exploration logs.
3. Water level readings have been made in the test pits at the times and under the conditions stated on the exploration logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from those occurring at the time measurements were made.

**Review**

4. In the event that any changes in the nature, design, or location of the proposed water storage tank are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of the report modified or verified in writing by Sanborn Head.

**Construction**

5. It is recommended that this firm be retained to provide soil engineering services during the excavation and earthwork construction phases of the work. This is to observe compliance with the design concepts, specifications, or recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

**Use of Report**

6. This report has been prepared for the exclusive use of The Meehan Group for the proposed development at 119 Main Street in Medway, Massachusetts, in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.
7. This subsurface evaluation report has been prepared for this project by Sanborn Head for design purposes only. Contractors using this report to prepare a bid for site work, acknowledge that its scope is limited to design considerations only.

# Attachment B

# Subsurface Exploration Logs

# Deep Observation Hole

| | | | |
|---|---|---|---|
| Site Name: | Medway Heritage on Main | Date: | 5/24/2023 |
| Site Address: | 119 Main St, Medway, MA | Time: | 10:30 |
| Project No.: | 5722.00 | | |
| Ground Surface Elev. (ft.): | 243 | Weather : | 65°F, Sunny |

Logged by: H. Child

Test Pit Number: SH-TP-1 Reviewed by: Q. Pratt

| Depth (inches) | Soil Horizon or Layer | Soil Matrix Color (Moist) | Redoximorphic Features | | | Soil Texture (NRCS) | Coarse Fragments (% by Volume) | | Soil Structure | Soil Consistence (Moist) | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Color | Percent | | Gravel | Cobbles | | | |
| 0 - 6 | A | 7.5 YR 3/2 | - | - | - | Gravelly Loamy Sand | 15 | < 5 | Granular | Very Friable | |
| 6 - 84 | Fill | 10 YR 4/3 | - | - | - | Gravelly Sandy Loam | 20 | 10 | Massive | Very Friable | Note 1, Note 4 |
| 84 - 90 | $A_b$ | 7.5 YR 2.5/1 | 84 - 90 | 2.5 YR 3/4 | 5 | Sandy Loam | 10 | < 5 | Granular | Firm | |
| 90 - 102 | $B_W$ | 7.5 YR 4/6 | - | - | - | Sandy Loam | 10 | 5 | Massive | Friable | Note 2 |
| 102 - 180 | C | 10 YR 5/3 | 102 - 126 | 5 YR 4/6 | 35 | Gravelly Loamy Sand | 25 | 10 | Massive | Firm | Note 3 |
| | | | 126 - 180 | 5 YR 4/6 | 5 | | | | | | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |

**Test Pit Termination Depth (in** 180 **Reason for Termination:** Excavator reach

| **Groundwater Observations:** | | | | **In-Situ Testing:** | | | |
|---|---|---|---|---|---|---|---|
| Depth to water weeping from pit face (in.): | 132 | | | Percolation Test: | N/A | Depth (in.): | N/A |
| Depth to standing water in hole (in.): | 174 | Stabilization Time: | 35 min | Permeameter Test: | N/A | Depth (in.): | N/A |
| Depth to estimated seasonal high groundwater [ESHGW] (in.): | 102 | Basis for ESHGW: | Redoximorphic features | Falling Head Test: | N/A | Depth (in.): | N/A |
| | | | | Other Test: | N/A | Depth (in.): | N/A |

**Additional Notes:**

1. Observed three approximately 3 to 4 foot dia. boulders
2. Observed four approximately 2 to 4 foot dia. boulders
3. Observed two approximately 2 to 3 foot dia. boulders
4. Observed metal debris in excavated soil

## Deep Observation Hole

| | | | |
|---|---|---|---|
| Site Name: | Medway Heritage on Main | Date: | 5/24/2023 |
| Site Address: | 119 Main St, Medway, MA | Time: | 11:35 |
| Project No.: | 5722.00 | | |
| Ground Surface Elev. (ft.): | 232 | Weather : | 60°F, Partly Cloudy |

Logged by: H. Child

Test Pit Number: SH-TP-2 Reviewed by: Q. Pratt

| Depth (inches) | Soil Horizon or Layer | Soil Matrix Color (Moist) | Redoximorphic Features | | | Soil Texture (NRCS) | Coarse Fragments (% by Volume) | | Soil Structure | Soil Consistence (Moist) | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Color | Percent | | Gravel | Cobbles | | | |
| 0 - 10 | A | 7.5 YR 3/2 | - | - | - | Sandy Loam | 5 | - | Granular | Friable | |
| 10 - 29 | $B_W$ | 10 YR 5/4 | - | - | - | Gravelly Sandy Loam | 15 | - | Massive | Friable | |
| 29 - 173 | C | 5Y 6/2 | 29 - 52 | 7.5 YR 5/8 | 15 | Sandy Loam | 35 | 10 | Massive | Firm | Note 1 |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |

**Test Pit Termination Depth (in** 173 **Reason for Termination:** Sidewall fall-in

| **Groundwater Observations:** | | | | **In-Situ Testing:** | | | |
|---|---|---|---|---|---|---|---|
| Depth to water weeping from pit face (in.): | 63 | | | Percolation Test: | N/A | Depth (in.): | N/A |
| Depth to standing water in hole (in.): | 14.3 | Stabilization Time: | 5 min | Permeameter Test: | N/A | Depth (in.): | N/A |
| Depth to estimated seasonal high groundwater [ESHGW] (in.): | 63 | Basis for ESHGW: | Groundwater observed | Falling Head Test: | N/A | Depth (in.): | N/A |
| | | | | Other Test: | N/A | Depth (in.): | N/A |

**Additional Notes:**

1. Redoximorphic features not interpreted as evidence of ESHGW

## Deep Observation Hole

| | | | |
|---|---|---|---|
| Site Name: | Medway Heritage on Main | Date: | 5/24/2023 |
| Site Address: | 119 Main St, Medway, MA | Time: | 10:00 |
| Project No.: | 5722.00 | | |
| Ground Surface Elev. (ft.): | 246 | Weather : | 60°F, Partly Cloudy |

Logged by: H. Child

Test Pit Number: SH-TP-3 Reviewed by: Q. Pratt

| Depth (inches) | Soil Horizon or Layer | Soil Matrix Color (Moist) | Redoximorphic Features | | | Soil Texture (NRCS) | Coarse Fragments (% by Volume) | | Soil Structure | Soil Consistence (Moist) | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Color | Percent | | Gravel | Cobbles | | | |
| 0 - 11 | A | 10 YR 4/2 | - | - | - | Sandy Loam | 5 | - | Granular | Very Friable | |
| 11 - 72 | Fill | 7.5 YR 2.5/1 | - | - | - | Gravelly Sandy Loam | 20 | 5 | Massive | Friable | Note 1 |
| 72 - 77 | $A_b$ | 7.5 YR 2.5/1 | - | - | - | Fine Sandy Loam | < 5 | - | Massive | Firm | |
| 77 - 88 | B | 2.5 Y 5/3 | 77 - 88 | 5 YR 4/6 | < 5 | Fine Sandy Loam | < 5 | - | Massive | Friable | |
| 88 - 167 | C | 2.5 Y 5/2 | 88 - 112 | 7.5 YR 4/6 | 50 | Gravelly Sandy Loam | 15 | < 5 | Massive | Firm | Note 2 |
| | | | 112 - 167 | 7.5 YR 4/6 | 5 | | | | | | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |

**Test Pit Termination Depth (in** 167 **Reason for Termination:** Sidewall fall-in

| **Groundwater Observations:** | | | | **In-Situ Testing:** | | | |
|---|---|---|---|---|---|---|---|
| Depth to water weeping from pit face (in.): | 72 | | | Percolation Test: | N/A | Depth (in.): | N/A |
| Depth to standing water in hole (in.): | 160 | Stabilization Time: | 5 min | Permeameter Test: | N/A | Depth (in.): | N/A |
| Depth to estimated seasonal high groundwater [ESHGW] (in.): | 72 | Basis for ESHGW: | Groundwater observed | Falling Head Test: | N/A | Depth (in.): | N/A |
| | | | | Other Test: | N/A | Depth (in.): | N/A |

**Additional Notes:**

1 Observed three 1-foot dia. boulders and one 2-foot dia. boulder

2. Silt Loam seams throughout

## Deep Observation Hole

| | | | |
|---|---|---|---|
| Site Name: | Medway Heritage on Main | Date: | 5/25/2023 |
| Site Address: | 119 Main St, Medway, MA | Time: | 10:20 |
| Project No.: | 5722.00 | | |
| Ground Surface Elev. (ft.): | 234 | Weather : | 57°F, Partly Cloudy |

Logged by: H. Child

Test Pit Number: SH-TP-4 Reviewed by: Q. Pratt

| Depth (inches) | Soil Horizon or Layer | Soil Matrix Color (Moist) | Redoximorphic Features | | | Soil Texture (NRCS) | Coarse Fragments (% by Volume) | | Soil Structure | Soil Consistence (Moist) | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Color | Percent | | Gravel | Cobbles | | | |
| 0 - 12 | A | 7.5 YR 3/1 | - | - | - | Fine Sandy Loam | 5 | < 5 | Granular | Very Friable | |
| 12 - 34 | $B_W$ | 10 YR 4/4 | - | - | - | Fine Sandy Loam | 5 | < 5 | Massive | Very Friable | |
| 34 - 168 | C | 2.5 Y 5/2 | 34 - 57 | 7.5 YR 5/8 | 20 | Gravelly Sandy Loam | 25 | 10 | Massive | Firm | Note 1 |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |

**Test Pit Termination Depth (in** 168 **Reason for Termination:** Refusal on rock

| **Groundwater Observations:** | | | | **In-Situ Testing:** | | | |
|---|---|---|---|---|---|---|---|
| Depth to water weeping from pit face (in.): | 32 | | | Percolation Test: | N/A | Depth (in.): | N/A |
| Depth to standing water in hole (in.): | 167 | Stabilization Time: | 10 min | Permeameter Test: | N/A | Depth (in.): | N/A |
| Depth to estimated seasonal high groundwater [ESHGW] (in.): | 32 | Basis for ESHGW: | Groundwater observed | Falling Head Test: | N/A | Depth (in.): | N/A |
| | | | | Other Test: | N/A | Depth (in.): | N/A |

**Additional Notes:**

1. Observed two 2-foot dia. boulders
2. Redoximorphic features not interpreted as evidence of ESHGW

## Deep Observation Hole

| | | | |
|---|---|---|---|
| Site Name: | Medway Heritage on Main | Date: | 5/25/2023 |
| Site Address: | 119 Main St, Medway, MA | Time: | 9:00 |
| Project No.: | 5722.00 | | |
| Ground Surface Elev. (ft.): | 229 | Weather : | 53°, Sunny |

Logged by: H. Child

Test Pit Number: SH-TP-5 Reviewed by: Q. Pratt

| Depth (inches) | Soil Horizon or Layer | Soil Matrix Color (Moist) | Redoximorphic Features | | | Soil Texture (NRCS) | Coarse Fragments (% by Volume) | | Soil Structure | Soil Consistence (Moist) | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Color | Percent | | Gravel | Cobbles | | | |
| 0 - 11 | A | 7.5 YR 3/2 | - | - | - | Sandy Loam | 5 | < 5 | Granular | Friable | |
| 11 - 29 | $B_W$ | 10 YR 4/4 | - | - | - | Sandy Loam | 10 | < 5 | Massive | Friable | |
| 29 - 176 | C | 2.5 Y 5/2 | 32 - 48 | 7.5 YR 5/8 | 30 | Sandy Loam | 25 | 10 | Massive | Firm | Note 1, 2, and 3 |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |

**Test Pit Termination Depth (in** 176 **Reason for Termination:** Refusal on rock

| **Groundwater Observations:** | | | | **In-Situ Testing:** | | | |
|---|---|---|---|---|---|---|---|
| Depth to water weeping from pit face (in.): | 80 | | | Percolation Test: | N/A | Depth (in.): | N/A |
| Depth to standing water in hole (in.): | 175 | Stabilization Time: | 5 min | Permeameter Test: | N/A | Depth (in.): | N/A |
| Depth to estimated seasonal high groundwater [ESHGW] (in.): | 80 | Basis for ESHGW: | Groundwater observed | Falling Head Test: | N/A | Depth (in.): | N/A |
| | | | | Other Test: | N/A | Depth (in.): | N/A |

**Additional Notes:**

1. Observed five approximately 1-foot dia. boulders and two approximately 2-foot dia. boulders
2. Observed weeping groundwater between 32 and 48 inches in southern pit face, assumed to be perched groundwater
3. Redoximorphic features not interpreted as evidence of ESHGW

## Deep Observation Hole

| | | | |
|---|---|---|---|
| Site Name: | Medway Heritage on Main | Date: | 5/23/2023 |
| Site Address: | 119 Main St, Medway, MA | Time: | 12:15 |
| Project No.: | 5722.00 | | |
| Ground Surface Elev. (ft.): | 248 | Weather : | 66°F, Clear |

Logged by: H. Child

Test Pit Number: SH-TP-6 Reviewed by: Q. Pratt

| Depth (inches) | Soil Horizon or Layer | Soil Matrix Color (Moist) | Redoximorphic Features | | | Soil Texture (NRCS) | Coarse Fragments (% by Volume) | | Soil Structure | Soil Consistence (Moist) | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Color | Percent | | Gravel | Cobbles | | | |
| 0 - 5 | A | 7.5 YR 3/2 | - | - | - | Sandy Loam | 5 | < 5 | Granular | Very Friable | |
| 5 - 72 | Fill | 2.5 Y 4/3 | - | - | - | Gravelly Sandy Loam | 15 | < 5 | Massive | Very Friable | Note 1 |
| 72 - 78 | $A_b$ | 2.5 Y 2.5/1 | 72 - 78 | 2.5 YR 3/6 | 2 | Silt Loam | < 5 | < 5 | Massive | Firm | |
| 78 - 108 | $B_W$ | 2.5 Y 5/4 | 78 - 108 | 5 YR 4/6 | 2 | Silt Loam | < 5 | - | Massive | Firm | |
| 108 - 144 | C | 5 Y 6/2 | 108 - 144 | 10 YR 5/8 | 5 | Sandy Loam | 10 | 5 | Massive | Friable | Note 2 |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |

**Test Pit Termination Depth (in** 144 **Reason for Termination:** Excavator reach and fall-in

| **Groundwater Observations:** | | | | **In-Situ Testing:** | | | |
|---|---|---|---|---|---|---|---|
| Depth to water weeping from pit face (in.): | 72 | | | Percolation Test: | N/A | Depth (in.): | N/A |
| Depth to standing water in hole (in.): | 139 | Stabilization Time: | 5 min | Permeameter Test: | N/A | Depth (in.): | N/A |
| Depth to estimated seasonal high groundwater [ESHGW] (in.): | 72 | Basis for ESHGW: | Groundwater observed | Falling Head Test: | N/A | Depth (in.): | N/A |
| | | | | Other Test: | N/A | Depth (in.): | N/A |

**Additional Notes:**

1. Fill contained brick, concrete, plastic, and corrugated drainage pipe
2. Observed silty loam seams and one approximately 2-foot dia. boulder

## Deep Observation Hole

| | | | |
|---|---|---|---|
| Site Name: | Medway Heritage on Main | Date: | 5/24/2023 |
| Site Address: | 119 Main St, Medway, MA | Time: | 12:30 |
| Project No.: | 5722.00 | | |
| Ground Surface Elev. (ft.): | 247 | Weather : | 74°F, Sunny |

Logged by: H. Child

Test Pit Number: SH-TP-7 Reviewed by: Q. Pratt

| Depth (inches) | Soil Horizon or Layer | Soil Matrix Color (Moist) | Redoximorphic Features | | | Soil Texture (NRCS) | Coarse Fragments (% by Volume) | | Soil Structure | Soil Consistence (Moist) | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Color | Percent | | Gravel | Cobbles | | | |
| 0 - 2 | Asphalt | - | - | - | - | - | - | - | - | - | |
| 2 - 30 | Fill | 2.5 YR 2.5/1 | - | - | - | Loamy Sand | 10 | < 5 | Massive | Very Friable | Note 1 and 2 |
| 30 - 90 | $C_1$ | 5 Y 6/1 | 30 - 90 | 10 YR 54/4 | 5 | Fine Sandy Loam | 10 | 5 | Massive | Friable | Note 3 |
| 90 - 150 | $C_2$ | 5 Y 5/2 | 90 - 150 | 10 YR 5/8 | 5 | Sandy Loam | 10 | 5 | Massive | Friable | Note 3 and 4 |
| 150 - 156 | $C_R$ | 7.5 YR 5/6 | - | - | - | - | - | - | - | - | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |

**Test Pit Termination Depth (in** 156 **Reason for Termination: Refusal on rock**

| **Groundwater Observations:** | | | | **In-Situ Testing:** | | | |
|---|---|---|---|---|---|---|---|
| Depth to water weeping from pit face (in.): | 102 | | | Percolation Test: | N/A | Depth (in.): | N/A |
| Depth to standing water in hole (in.): | 152 | Stabilization Time: | 35 min | Permeameter Test: | N/A | Depth (in.): | N/A |
| Depth to estimated seasonal high groundwater [ESHGW] (in.): | 102 | Basis for ESHGW: | Groundwater observed | Falling Head Test: | N/A | Depth (in.): | N/A |
| | | | | Other Test: | N/A | Depth (in.): | N/A |

**Additional Notes:**

1. Metal debris observed in excavated fill soil
2. Odor observed from excavated fill soils.
3. Boulders observed
4. Sheen observed on standing water in test pit.

## Deep Observation Hole

| | | | |
|---|---|---|---|
| Site Name: | Medway Heritage on Main | Date: | 5/26/2023 |
| Site Address: | 119 Main St, Medway, MA | Time: | 7:22 |
| Project No.: | 5722.00 | | |
| Ground Surface Elev. (ft.): | 232 | Weather : | 50°F, Clear |

Test Pit Number: SH-TP-8

Logged by: H. Child

Reviewed by: Q. Pratt

| Depth (inches) | Soil Horizon or Layer | Soil Matrix Color (Moist) | Redoximorphic Features | | | Soil Texture (NRCS) | Coarse Fragments (% by Volume) | | Soil Structure | Soil Consistence (Moist) | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Color | Percent | | Gravel | Cobbles | | | |
| 0 - 5 | A | 7.5 YR 3/2 | - | - | - | Fine Sandy Loam | - | - | Granular | Friable | |
| 5 - 15 | $B_W$ | 10 YR 4/4 | - | - | - | Fine Sandy Loam | - | - | Massive | Friable | |
| 15 - 127 | C | 5 Y 5/2 | 15 - 127 | 10 YR 5/6 | 5 | Very Gravelly Loamy Sand | 35 | 15 | Massive | Friable | Note 1, Note 2 |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |

**Test Pit Termination Depth (in** 127 **Reason for Termination:** Excavator reach

| **Groundwater Observations:** | | | | **In-Situ Testing:** | | | |
|---|---|---|---|---|---|---|---|
| Depth to water weeping from pit face (in.): | 27 | | | Percolation Test: | N/A | Depth (in.): | N/A |
| Depth to standing water in hole (in.): | 126 | Stabilization Time: | 5 min | Permeameter Test: | N/A | Depth (in.): | N/A |
| Depth to estimated seasonal high groundwater [ESHGW] (in.): | 27 | Basis for ESHGW: | Groundwater observed | Falling Head Test: | N/A | Depth (in.): | N/A |
| | | | | Other Test: | N/A | Depth (in.): | N/A |

**Additional Notes:**

1. Observed three approximately 1-foot dia. boulders
2. Redoximorphic features not interpreted as evidence of ESHGW

## Deep Observation Hole

| | | | |
|---|---|---|---|
| Site Name: | Medway Heritage on Main | Date: | 5/26/2023 |
| Site Address: | 119 Main St, Medway, MA | Time: | 9:00 |
| Project No.: | 5722.00 | | |
| Ground Surface Elev. (ft.): | 237 | Weather : | 58°F, Clear |

Logged by: H. Child

Test Pit Number: SH-TP-9 Reviewed by: Q. Pratt

| Depth (inches) | Soil Horizon or Layer | Soil Matrix Color (Moist) | Redoximorphic Features | | | Soil Texture (NRCS) | Coarse Fragments (% by Volume) | | Soil Structure | Soil Consistence (Moist) | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Color | Percent | | Gravel | Cobbles | | | |
| 0 - 10 | A | 7.5 YR 3/1 | - | - | - | Sandy Loam | - | - | Granular | Friable | |
| 10 - 26 | $B_W$ | 10 YR 4/4 | - | - | - | Sandy Loam | < 5 | - | Massive | Friable | |
| 26 - 136 | C | 2.5 Y 5/3 | 26 - 136 | 7.5 YR 4/6 | 5 | Gravelly Loamy Sand | 20 | 10 | Massive | Friable | Note 1 |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |

**Test Pit Termination Depth (in** 136 **Reason for Termination:** Refusal on rock

| **Groundwater Observations:** | | | | **In-Situ Testing:** | | | |
|---|---|---|---|---|---|---|---|
| Depth to water weeping from pit face (in.): | 25 | | | Percolation Test: | N/A | Depth (in.): | N/A |
| Depth to standing water in hole (in.): | 135 | Stabilization Time: | 10 min | Permeameter Test: | N/A | Depth (in.): | N/A |
| Depth to estimated seasonal high groundwater [ESHGW] (in.): | 25 | Basis for ESHGW: | Groundwater observed | Falling Head Test: | N/A | Depth (in.): | N/A |
| | | | | Other Test: | N/A | Depth (in.): | N/A |

**Additional Notes:**

1. Observed three approximately 1-foor dia. boulders
2. Redoximorphic features not interpreted as evidence of ESHGW

## Deep Observation Hole

| | | | |
|---|---|---|---|
| Site Name: | Medway Heritage on Main | Date: | 5/23/2023 |
| Site Address: | 119 Main St, Medway, MA | Time: | 7:27 |
| Project No.: | 5722.00 | | |
| Ground Surface Elev. (ft.): | 259 | Weather : | 50°F, Lightly Overcast |

Logged by: H. Child

Test Pit Number: SH-TP-10 Reviewed by: Q. Pratt

| Depth (inches) | Soil Horizon or Layer | Soil Matrix Color (Moist) | Redoximorphic Features | | | Soil Texture (NRCS) | Coarse Fragments (% by Volume) | | Soil Structure | Soil Consistence (Moist) | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Color | Percent | | Gravel | Cobbles | | | |
| 0 - 2 | Asphalt | - | - | - | - | - | - | - | - | - | |
| 2 - 8 | Fill 1 | 10 YR 5/4 | - | - | - | Gravelly Loamy Sand | 15 | 5 | Massive | Very Friable | |
| 8 - 44 | Fill 2 | 2.5 Y 5/1 | - | - | - | Gravelly Loamy Sand | 20 | 10 | Massive | Friable | Note 1 |
| 44 - 50 | $A_b$ | 10 YR 3/1 | - | - | - | Sandy Loam | < 5 | - | Massive | Firm | Note 2 |
| 50 - 172 | C | 5 Y 5/1 | 50 - 172 | 2.5 Y 6/6 | 10 | Sandy Loam | < 5 | < 5 | Massive | Firm | Note 3 |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |

**Test Pit Termination Depth (in** 174 **Reason for Termination:** Excavator reach

| **Groundwater Observations:** | | | | **In-Situ Testing:** | | | |
|---|---|---|---|---|---|---|---|
| Depth to water weeping from pit face (in.): | 170 | | | Percolation Test: | N/A | Depth (in.): | N/A |
| Depth to standing water in hole (in.): | 172 | Stabilization Time: | 5 min | Permeameter Test: | N/A | Depth (in.): | N/A |
| Depth to estimated seasonal high groundwater [ESHGW] (in.): | 170 | Basis for ESHGW: | Groundwater observed | Falling Head Test: | N/A | Depth (in.): | N/A |
| | | | | Other Test: | N/A | Depth (in.): | N/A |

**Additional Notes:**

1. Observed ten approximately 1 to 2 foot dia. boulders. Observed roots
2. Observed roots, twigs, and leaves
3. Redoximorphic features not interpreted as evidence of ESHGW

## Deep Observation Hole

| | | | |
|---|---|---|---|
| Site Name: | Medway Heritage on Main | Date: | 5/23/2023 |
| Site Address: | 119 Main St, Medway, MA | Time: | 10:45 |
| Project No.: | 5722.00 | | |
| Ground Surface Elev. (ft.): | 248 | Weather : | 63°F, Clear |

Logged by: H. Child

Test Pit Number: SH-TP-11 Reviewed by: Q. Pratt

| Depth (inches) | Soil Horizon or Layer | Soil Matrix Color (Moist) | Redoximorphic Features | | | Soil Texture (NRCS) | Coarse Fragments (% by Volume) | | Soil Structure | Soil Consistence (Moist) | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Color | Percent | | Gravel | Cobbles | | | |
| 0 - 22 | A | 10 YR 2/2 | - | - | - | Fine Sandy Loam | < 5 | < 5 | Granular | Very Friable | |
| 22 - 41 | $B_W$ | 10 YR 4/4 | - | - | - | Fine Sandy Loam | < 5 | < 5 | Massive | Very Friable | |
| 41 - 162 | C | 2.5 Y 5/3 | 41 - 162 | 7.5 YR 5/8 | < 5 | Gravelly Sandy Loam | 20 | 10 | Massive | Friable | Note 1, Note 2 |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |

**Test Pit Termination Depth (in** 162 **Reason for Termination:** Excavator reach

| **Groundwater Observations:** | | | | **In-Situ Testing:** | | | |
|---|---|---|---|---|---|---|---|
| Depth to water weeping from pit face (in.): | 42 | | | Percolation Test: | N/A | Depth (in.): | N/A |
| Depth to standing water in hole (in.): | 148 | Stabilization Time: | 5 min | Permeameter Test: | N/A | Depth (in.): | N/A |
| Depth to estimated seasonal high groundwater [ESHGW] (in.): | 42 | Basis for ESHGW: | Groundwater observed | Falling Head Test: | N/A | Depth (in.): | N/A |
| | | | | Other Test: | N/A | Depth (in.): | N/A |

**Additional Notes:**

1. Observed four approximately 1-foot dia. boulders and three approximately 2-foot dia. boulders
2. Observed Cr layer in northern side of pit only.

## Deep Observation Hole

| | | | |
|---|---|---|---|
| Site Name: | Medway Heritage on Main | Date: | 5/23/2023 |
| Site Address: | 119 Main St, Medway, MA | Time: | 9:27 |
| Project No.: | 5722.00 | | |
| Ground Surface Elev. (ft.): | 254 | Weather : | 57°F, Clear |

Logged by: H. Child

Test Pit Number: SH-TP-12 Reviewed by: Q. Pratt

| Depth (inches) | Soil Horizon or Layer | Soil Matrix Color (Moist) | Redoximorphic Features | | | Soil Texture (NRCS) | Coarse Fragments (% by Volume) | | Soil Structure | Soil Consistence (Moist) | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Color | Percent | | Gravel | Cobbles | | | |
| 0 - 8 | A | 7.5 YR 2.5/1 | - | - | - | Sandy Loam | 5 | - | Granular | Very Friable | |
| 8 - 28 | $B_W$ | 10 YR 4/6 | - | - | - | Sandy Loam | 5 | - | Massive | Very Friable | |
| 28 - 94 | C | 5 Y 5/2 | 28 - 58 | 7.5 YR 5/6 | 5 | Sandy Loam | 10 | < 5 | Massive | Friable | |
| 94 - 118 | $C_R$ | 10 YR 8/2 | - | - | - | - | - | - | Massive | Rigid | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |
| - | | | | | | | | | | | |

**Test Pit Termination Depth (in** 118 **Reason for Termination:** Refusal on rock

| **Groundwater Observations:** | | | | **In-Situ Testing:** | | | |
|---|---|---|---|---|---|---|---|
| Depth to water weeping from pit face (in.): | 64 | | | Percolation Test: | N/A | Depth (in.): | N/A |
| Depth to standing water in hole (in.): | NE | Stabilization Time: | N/A | Permeameter Test: | N/A | Depth (in.): | N/A |
| Depth to estimated seasonal high groundwater [ESHGW] (in.): | 64 | Basis for ESHGW: | Groundwater observed | Falling Head Test: | N/A | Depth (in.): | N/A |
| | | | | Other Test: | N/A | Depth (in.): | N/A |

**Additional Notes:**

1. No standing water observed prior to sidewall fall-in
2. Redoximorphic features not interpreted as evidence of ESHGW

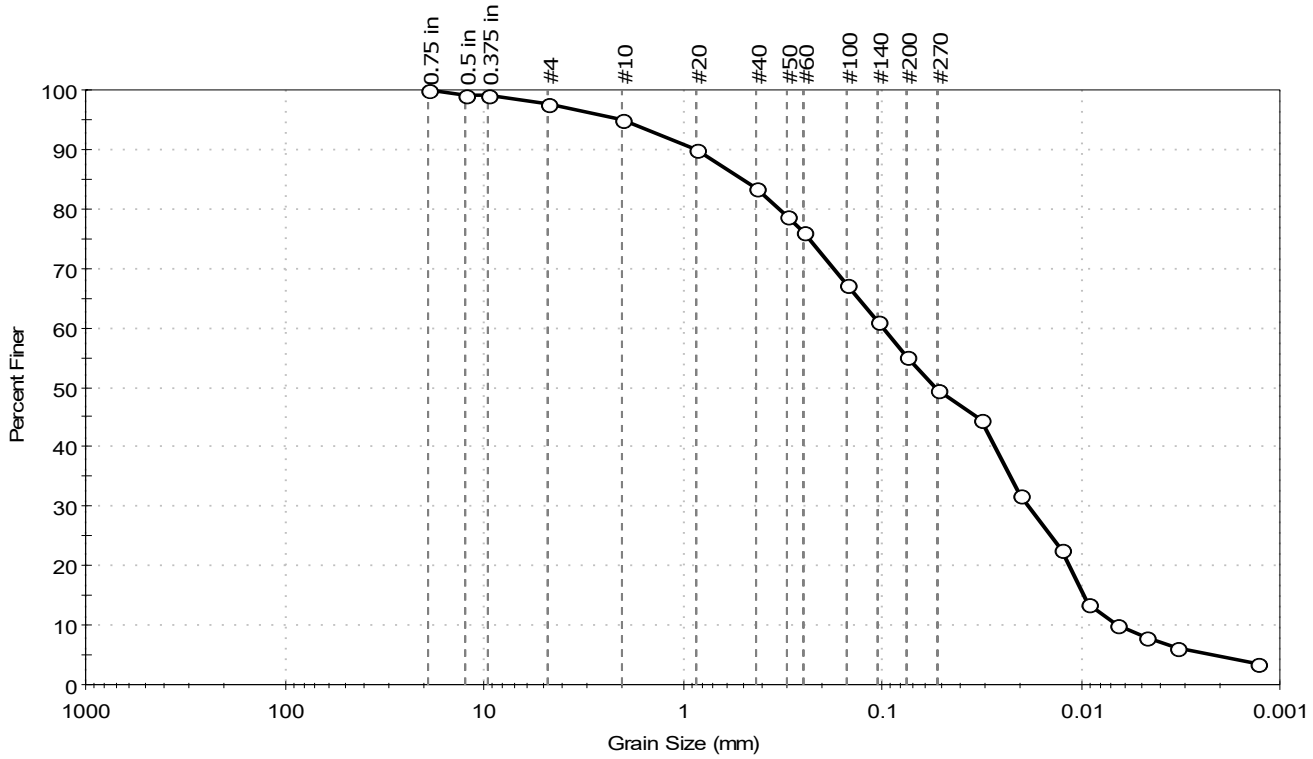
# Attachment C

# Geotechnical Laboratory Results

GeoTesting EXPRESS

| | | | | | |
|---|---|---|---|---|---|
| Client: | Sanborn, Head & Associates, Inc. | | | | |
| Project: | Heritage Medway | | | | |
| Location: | Medway, MA | | | Project No: | GTX-317343 |
| Boring ID: | SH-TP-10 | Sample Type: | bag | Tested By: | ckg |
| Sample ID: | SH-TP-10 C | Test Date: | 06/12/23 | Checked By: | ank |
| Depth : | 50-172 inches | Test Id: | 718933 | | |
| Test Comment: | --- | | | | |
| Visual Description: | Moist, gray sandy silt | | | | |
| Sample Comment: | --- | | | | |

# Particle Size Analysis - ASTM D6913/D7928




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| -- | 2.5 | 42.4 | 55.1 |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|---|---|---|---|---|
| 0.75 in | 19.00 | 100 | | |
| 0.5 in | 12.50 | 99 | | |
| 0.375 in | 9.50 | 99 | | |
| #4 | 4.75 | 98 | | |
| #10 | 2.00 | 95 | | |
| #20 | 0.85 | 90 | | |
| #40 | 0.42 | 84 | | |
| #50 | 0.30 | 79 | | |
| #60 | 0.25 | 76 | | |
| #100 | 0.15 | 67 | | |
| #140 | 0.11 | 61 | | |
| #200 | 0.075 | 55 | | |
| #270 | 0.053 | 50 | | |
| Hydrometer | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0321 | 45 | | |
| --- | 0.0201 | 32 | | |
| --- | 0.0127 | 23 | | |
| --- | 0.0092 | 14 | | |
| --- | 0.0066 | 10 | | |
| --- | 0.0047 | 8 | | |
| --- | 0.0033 | 6 | | |
| --- | 0.0013 | 4 | | |
| | | | | |

**Coefficients**

| | |
|---|---|
| $D_{85}$ = 0.4970 mm | $D_{30}$ = 0.0183 mm |
| $D_{60}$ = 0.0996 mm | $D_{15}$ = 0.0097 mm |
| $D_{50}$ = 0.0544 mm | $D_{10}$ = 0.0066 mm |
| $C_u$ = 15.091 | $C_c$ = 0.509 |

**Classification**

ASTM N/A

AASHTO Silty Soils (A-4 (0))

**Sample/Test Description**

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

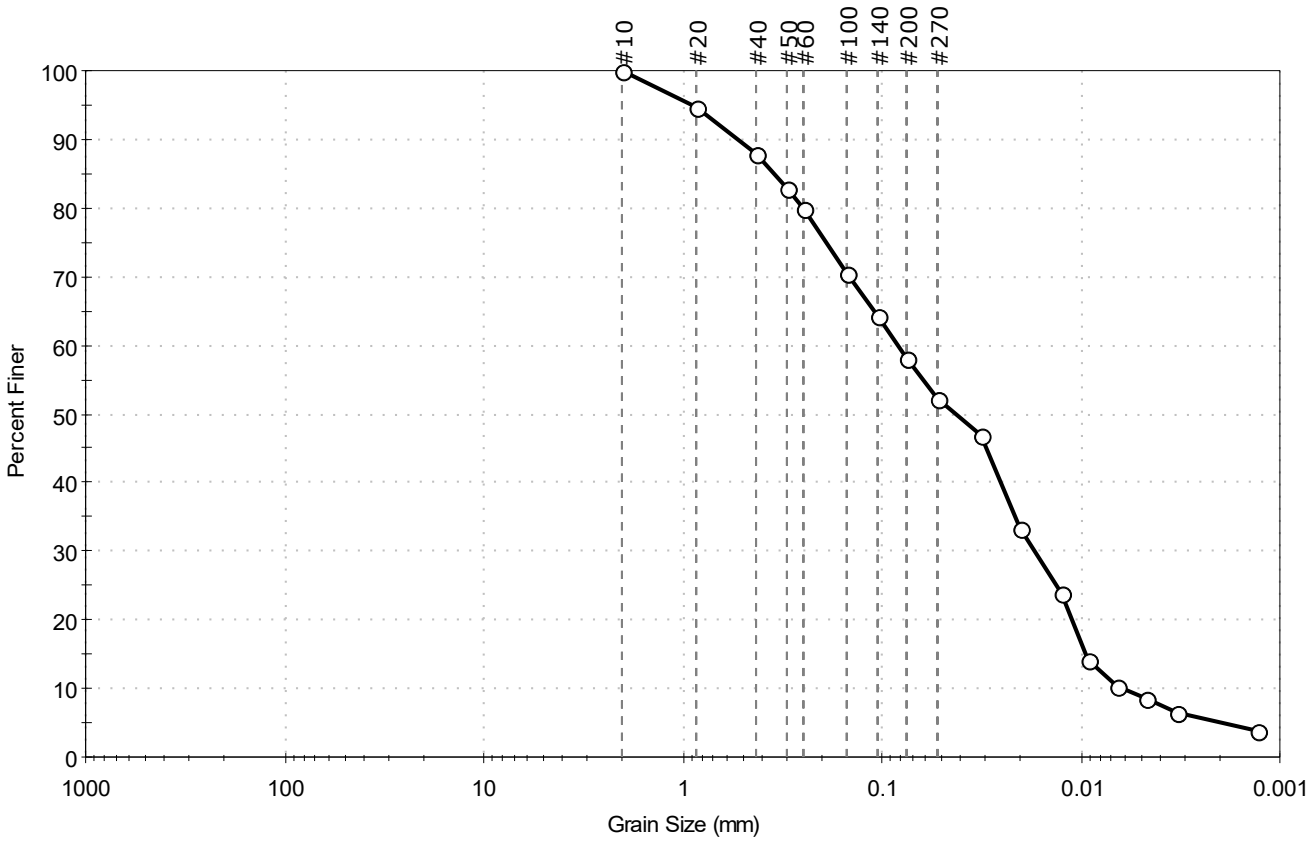
Separation of Sample: #200 Sieve

GeoTesting EXPRESS

| | | | | | |
|---|---|---|---|---|---|
| Client: | Sanborn, Head & Associates, Inc. | | | | |
| Project: | Heritage Medway | | | | |
| Location: | Medway, MA | | | Project No: | GTX-317343 |
| Boring ID: | SH-TP-10 | Sample Type: | bag | Tested By: | ckg |
| Sample ID: | SH-TP-10 C | Test Date: | 06/12/23 | Checked By: | ank |
| Depth : | 50-172 inches | Test Id: | 718933 | | |

Test Comment: ---
Visual Description: Moist, gray sandy silt
Sample Comment: Only minus No. 10 sieve for USDA classification

# Particle Size Analysis - ASTM D6913/D7928




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| — | 0.0 | 42.0 | 58.0 |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|---|---|---|---|---|
| #10 | 2.00 | 100 | | |
| #20 | 0.85 | 95 | | |
| #40 | 0.42 | 88 | | |
| #50 | 0.30 | 83 | | |
| #60 | 0.25 | 80 | | |
| #100 | 0.15 | 71 | | |
| #140 | 0.11 | 64 | | |
| #200 | 0.075 | 58 | | |
| #270 | 0.053 | 52 | | |
| Hydrometer | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0321 | 47 | | |
| --- | 0.0201 | 33 | | |
| --- | 0.0127 | 24 | | |
| --- | 0.0092 | 14 | | |
| --- | 0.0066 | 10 | | |
| --- | 0.0047 | 9 | | |
| --- | 0.0033 | 7 | | |
| --- | 0.0013 | 4 | | |
| | | | | |

**Coefficients**

$D_{85}$ = 0.3477 mm  $D_{30}$ = 0.0170 mm
$D_{60}$ = 0.0837 mm  $D_{15}$ = 0.0094 mm
$D_{50}$ = 0.0432 mm  $D_{10}$ = 0.0061 mm
$C_u$ = 13.721  $C_c$ = 0.566

**Classification**

ASTM N/A

AASHTO Silty Soils (A-4 (0))

**Sample/Test Description**

Sand/Gravel Particle Shape : ---
Sand/Gravel Hardness : ---
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.65
Separation of Sample: #200 Sieve

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| | | | | | |
|---|---|---|---|---|---|
| Client: | Sanborn, Head & Associates, Inc. | | | | |
| Project: | Heritage Medway | | | | |
| Location: | Medway, MA | | | Project No: | GTX-317343 |
| Boring ID: | SH-TP-10 | Sample Type: | bag | Tested By: | ckg |
| Sample ID: | SH-TP-10 C | Test Date: | 06/13/23 | Checked By: | ank |
| Depth : | 50-172 inches | Test Id: | 718938 | | |
| Test Comment: | --- | | | | |
| Visual Description: | Moist, gray sandy silt | | | | |
| Sample Comment: | --- | | | | |

# USDA Textural Classification

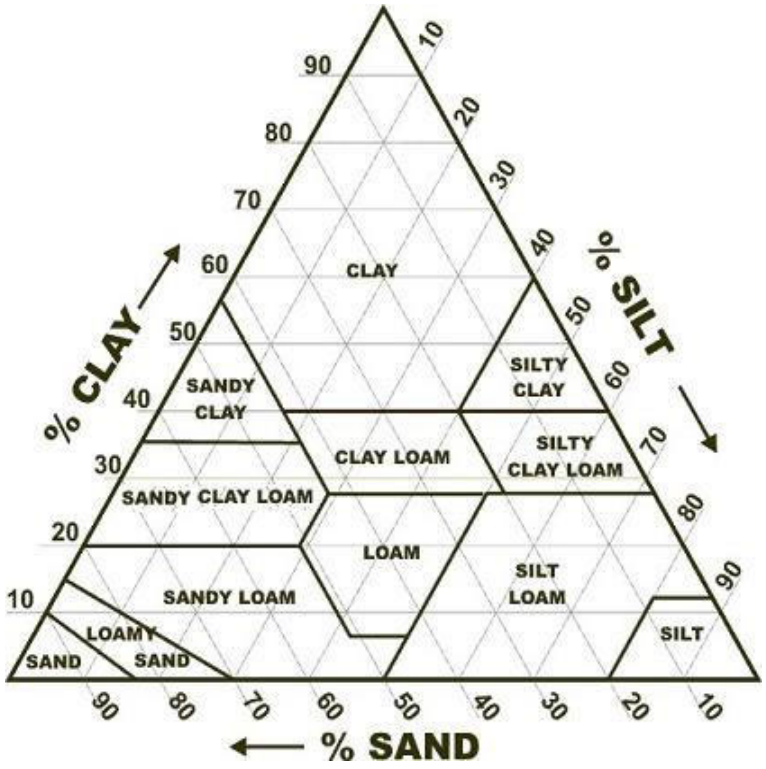
| Boring ID | Sample ID | Depth | Sand, % | Silt, % | Clay, % | Classification |
|---|---|---|---|---|---|---|
| SH-TP-10 | SH-TP-10 C | 50-172 inches | 49 | 46 | 5 | Sandy Loam |

Classifications based only on material passing the #10 sieve

Sand: material passing 2.0 mm and retained on 0.05 mm diameter

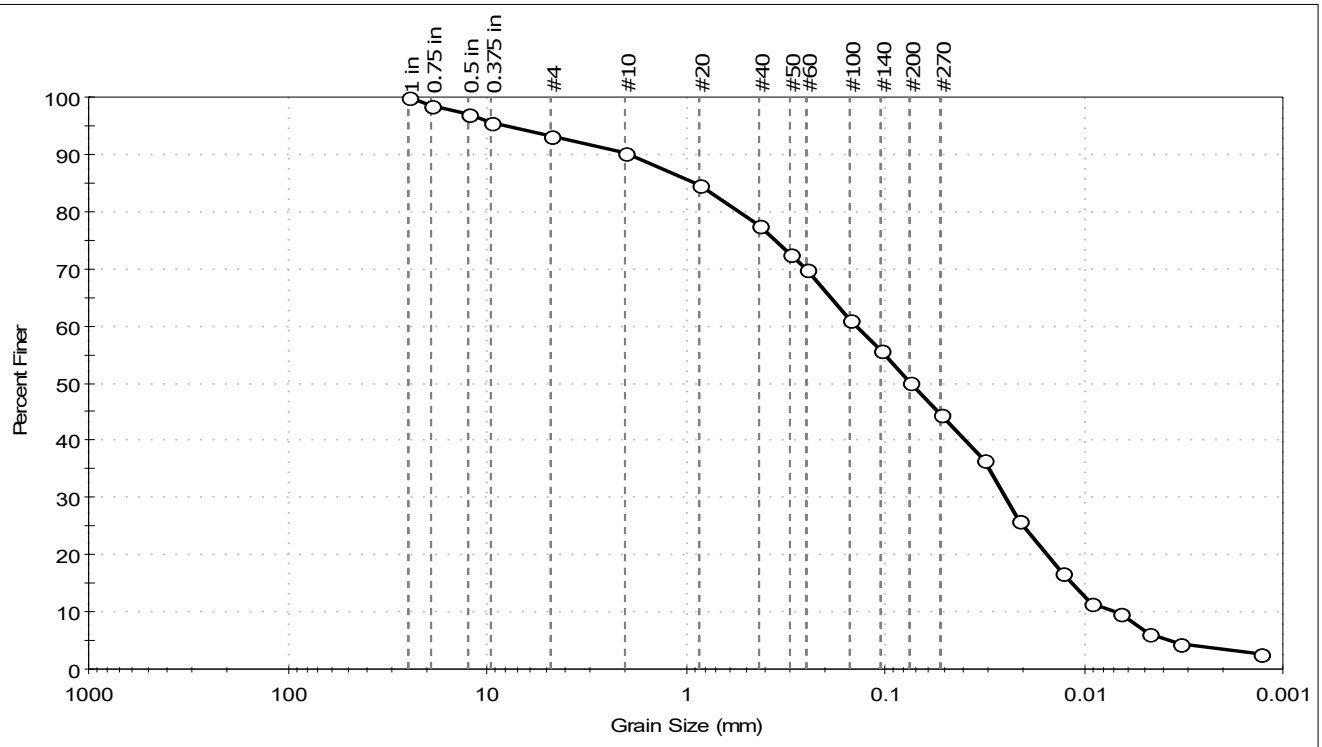
Silt: material passing 0.05 mm and retained on 0.002 mm diameter

Clay: material passing 0.002 mm diameter



| | | | | | |
|---|---|---|---|---|---|
| Client: | Sanborn, Head & Associates, Inc. | | | | |
| Project: | Heritage Medway | | | | |
| Location: | Medway, MA | | | Project No: | GTX-317343 |
| Boring ID: | SH-TP-12 | Sample Type: | bag | Tested By: | ckg |
| Sample ID: | SH-TP-12 C | Test Date: | 06/12/23 | Checked By: | ank |
| Depth : | 28-94 inches | Test Id: | 718934 | | |
| Test Comment: | --- | | | | |
| Visual Description: | Moist, light olive brown sandy silt | | | | |
| Sample Comment: | --- | | | | |

# Particle Size Analysis - ASTM D6913/D7928




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| — | 6.6 | 43.1 | 50.3 |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|---|---|---|---|---|
| 1 in | 25.00 | 100 | | |
| 0.75 in | 19.00 | 99 | | |
| 0.5 in | 12.50 | 97 | | |
| 0.375 in | 9.50 | 96 | | |
| #4 | 4.75 | 93 | | |
| #10 | 2.00 | 90 | | |
| #20 | 0.85 | 85 | | |
| #40 | 0.42 | 78 | | |
| #50 | 0.30 | 73 | | |
| #60 | 0.25 | 70 | | |
| #100 | 0.15 | 61 | | |
| #140 | 0.11 | 56 | | |
| #200 | 0.075 | 50 | | |
| #270 | 0.053 | 44 | | |
| Hydrometer | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0318 | 37 | | |
| --- | 0.0210 | 26 | | |
| --- | 0.0128 | 17 | | |
| --- | 0.0092 | 12 | | |
| --- | 0.0065 | 10 | | |
| --- | 0.0047 | 6 | | |
| --- | 0.0033 | 4 | | |
| --- | 0.0013 | 3 | | |
| | | | | |

## Coefficients

$D_{85}$ = 0.9015 mm  $D_{30}$ = 0.0247 mm
$D_{60}$ = 0.1391 mm  $D_{15}$ = 0.0114 mm
$D_{50}$ = 0.0738 mm  $D_{10}$ = 0.0068 mm
$C_u$ = 20.456  $C_c$ = 0.645

## Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

## Sample/Test Description

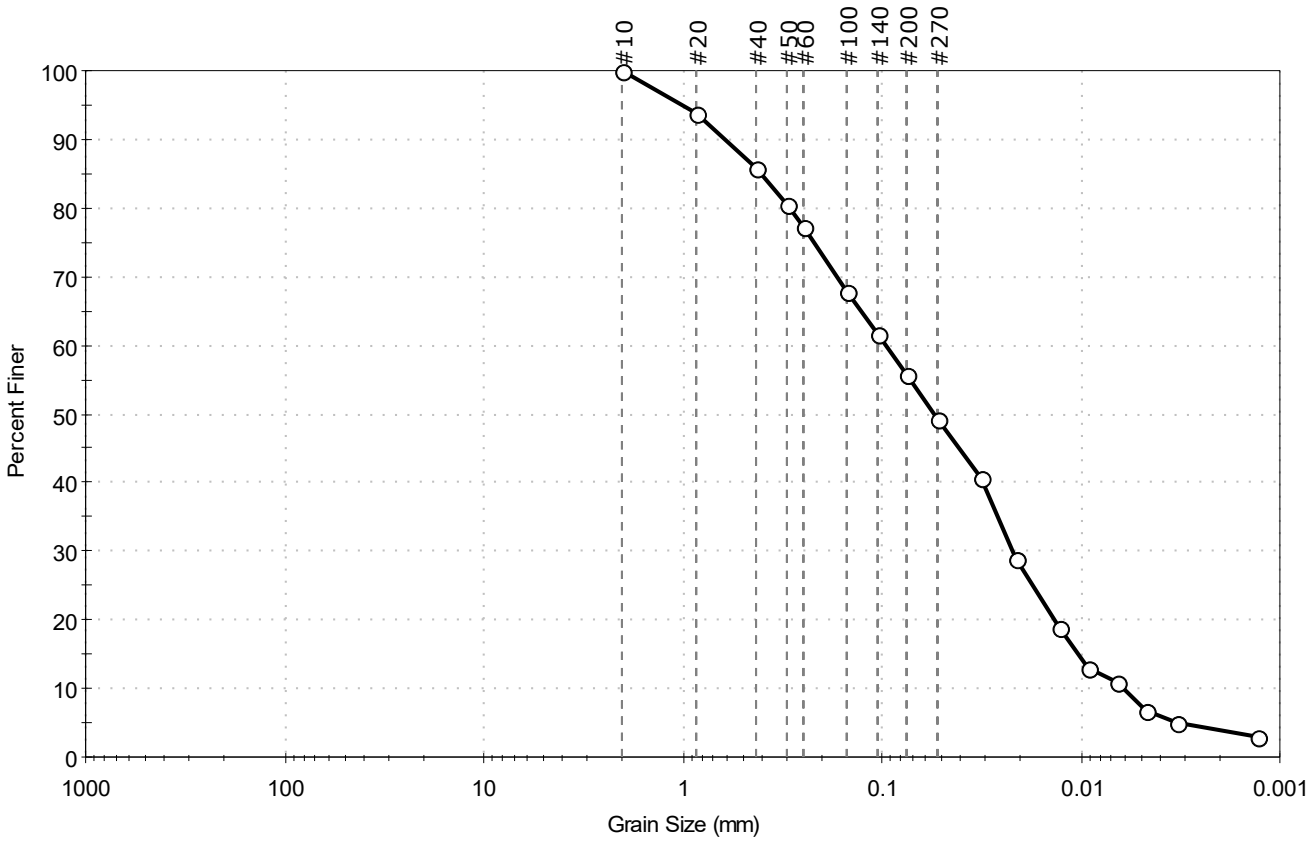
Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.65
Separation of Sample: #200 Sieve

GeoTesting EXPRESS

| | | | | | |
|---|---|---|---|---|---|
| Client: | Sanborn, Head & Associates, Inc. | | | | |
| Project: | Heritage Medway | | | | |
| Location: | Medway, MA | | | Project No: | GTX-317343 |
| Boring ID: | SH-TP-12 | Sample Type: | bag | Tested By: | ckg |
| Sample ID: | SH-TP-12 C | Test Date: | 06/12/23 | Checked By: | ank |
| Depth : | 28-94 inches | Test Id: | 718934 | | |

Test Comment: ---
Visual Description: Moist, light olive brown sandy silt
Sample Comment: Only minus No. 10 sieve for USDA classification

# Particle Size Analysis - ASTM D6913/D7928




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| — | 0.0 | 44.3 | 55.7 |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|---|---|---|---|---|
| #10 | 2.00 | 100 | | |
| #20 | 0.85 | 94 | | |
| #40 | 0.42 | 86 | | |
| #50 | 0.30 | 80 | | |
| #60 | 0.25 | 77 | | |
| #100 | 0.15 | 68 | | |
| #140 | 0.11 | 62 | | |
| #200 | 0.075 | 56 | | |
| #270 | 0.053 | 49 | | |
| Hydrometer | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0318 | 41 | | |
| --- | 0.0210 | 29 | | |
| --- | 0.0128 | 19 | | |
| --- | 0.0092 | 13 | | |
| --- | 0.0065 | 11 | | |
| --- | 0.0047 | 7 | | |
| --- | 0.0033 | 5 | | |
| --- | 0.0013 | 3 | | |
| | | | | |

**Coefficients**

$D_{85}$ = 0.4023 mm
$D_{30}$ = 0.0219 mm
$D_{60}$ = 0.0966 mm
$D_{15}$ = 0.0104 mm
$D_{50}$ = 0.0554 mm
$D_{10}$ = 0.0061 mm
$C_u$ = 15.836
$C_c$ = 0.814

**Classification**

ASTM N/A

AASHTO Silty Soils (A-4 (0))

**Sample/Test Description**

Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.65
Separation of Sample: #200 Sieve

| | | | | | |
|---|---|---|---|---|---|
| Client: | Sanborn, Head & Associates, Inc. | | | | |
| Project: | Heritage Medway | | | | |
| Location: | Medway, MA | | | Project No: | GTX-317343 |
| Boring ID: | SH-TP-12 | Sample Type: | bag | Tested By: | ckg |
| Sample ID: | SH-TP-12 C | Test Date: | 06/13/23 | Checked By: | ank |
| Depth : | 28-94 inches | Test Id: | 718939 | | |
| Test Comment: | --- | | | | |
| Visual Description: | Moist, light olive brown sandy silt | | | | |
| Sample Comment: | --- | | | | |

# USDA Textural Classification

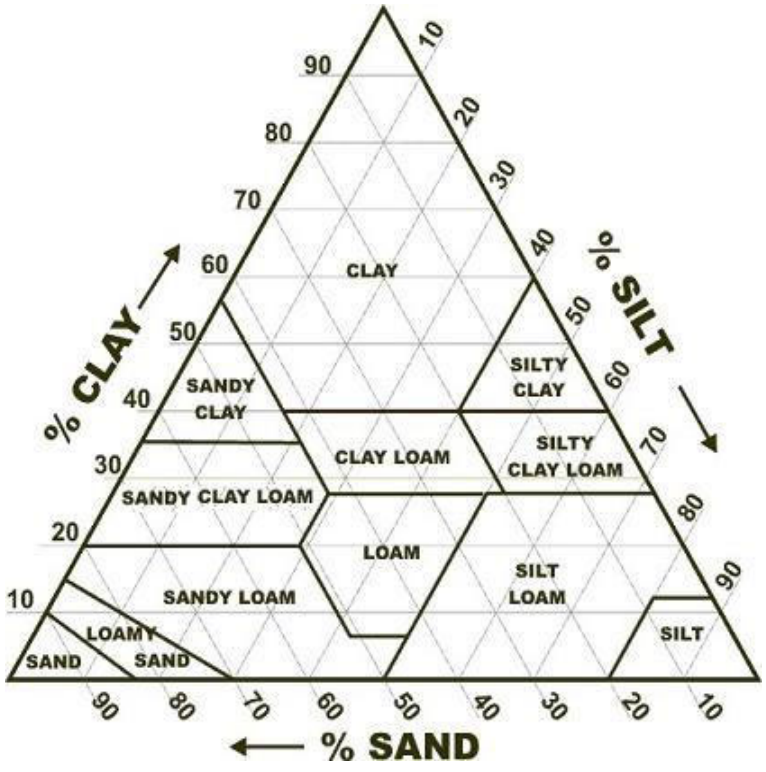
| Boring ID | Sample ID | Depth | Sand, % | Silt, % | Clay, % | Classification |
|---|---|---|---|---|---|---|
| SH-TP-12 | SH-TP-12 C | 28-94 inches | 52 | 45 | 3 | Sandy Loam |

Classifications based only on material passing the #10 sieve

Sand: material passing 2.0 mm and retained on 0.05 mm diameter

Silt: material passing 0.05 mm and retained on 0.002 mm diameter

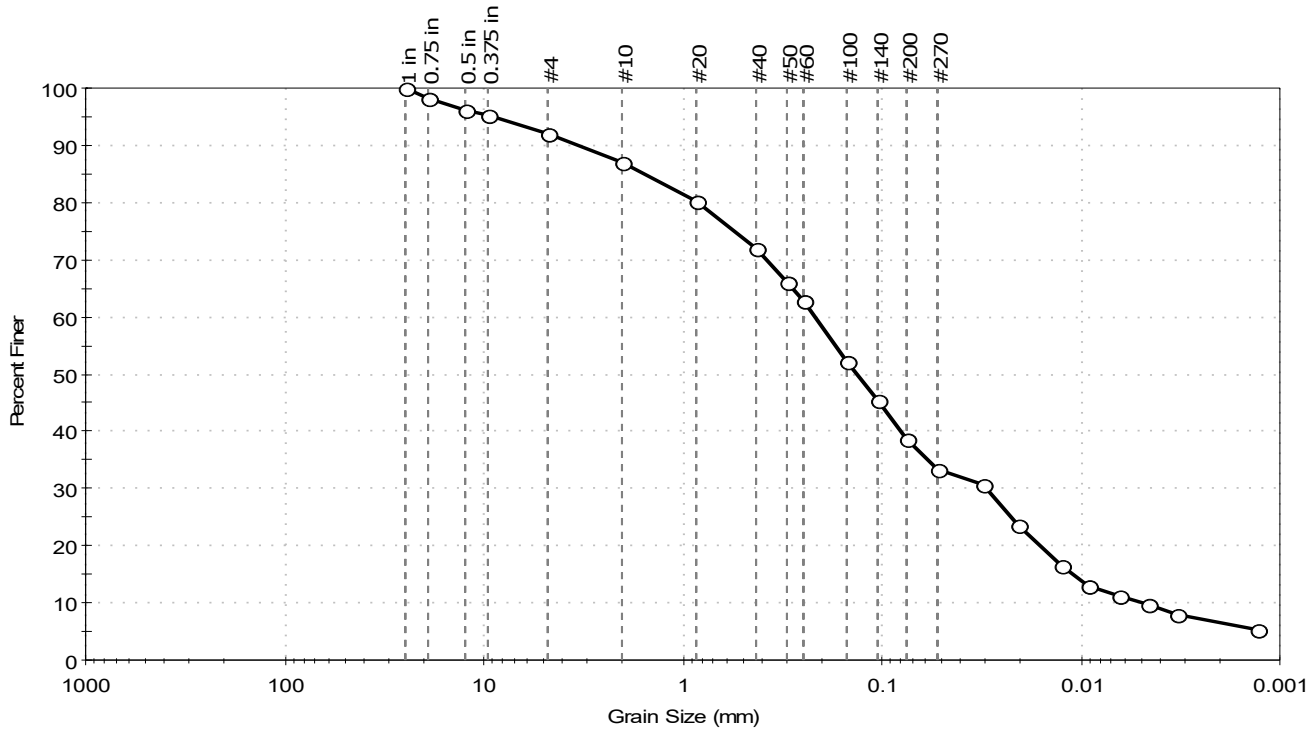
Clay: material passing 0.002 mm diameter



GeoTesting EXPRESS

| | | | | | |
|---|---|---|---|---|---|
| Client: | Sanborn, Head & Associates, Inc. | | | | |
| Project: | Heritage Medway | | | | |
| Location: | Medway, MA | | | Project No: | GTX-317343 |
| Boring ID: | SH-TP-2 | Sample Type: | bag | Tested By: | ckg |
| Sample ID: | SH-TP-2 C | Test Date: | 06/12/23 | Checked By: | ank |
| Depth : | 29-173 inches | Test Id: | 718930 | | |
| Test Comment: | --- | | | | |
| Visual Description: | Moist, light grayish brown silty sand | | | | |
| Sample Comment: | --- | | | | |

# Particle Size Analysis - ASTM D6913/D7928




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| — | 7.8 | 53.5 | 38.7 |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|---|---|---|---|---|
| 1 in | 25.00 | 100 | | |
| 0.75 in | 19.00 | 98 | | |
| 0.5 in | 12.50 | 96 | | |
| 0.375 in | 9.50 | 95 | | |
| #4 | 4.75 | 92 | | |
| #10 | 2.00 | 87 | | |
| #20 | 0.85 | 80 | | |
| #40 | 0.42 | 72 | | |
| #50 | 0.30 | 66 | | |
| #60 | 0.25 | 63 | | |
| #100 | 0.15 | 52 | | |
| #140 | 0.11 | 45 | | |
| #200 | 0.075 | 39 | | |
| #270 | 0.053 | 33 | | |
| Hydrometer | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0311 | 31 | | |
| --- | 0.0206 | 24 | | |
| --- | 0.0127 | 17 | | |
| --- | 0.0092 | 13 | | |
| --- | 0.0064 | 11 | | |
| --- | 0.0046 | 10 | | |
| --- | 0.0033 | 8 | | |
| --- | 0.0013 | 5 | | |
| | | | | |

## Coefficients

$D_{85}$ = 1.5523 mm
$D_{30}$ = 0.0297 mm
$D_{60}$ = 0.2183 mm
$D_{15}$ = 0.0109 mm
$D_{50}$ = 0.1339 mm
$D_{10}$ = 0.0050 mm
$C_u$ = 43.660
$C_c$ = 0.808

## Classification

ASTM N/A

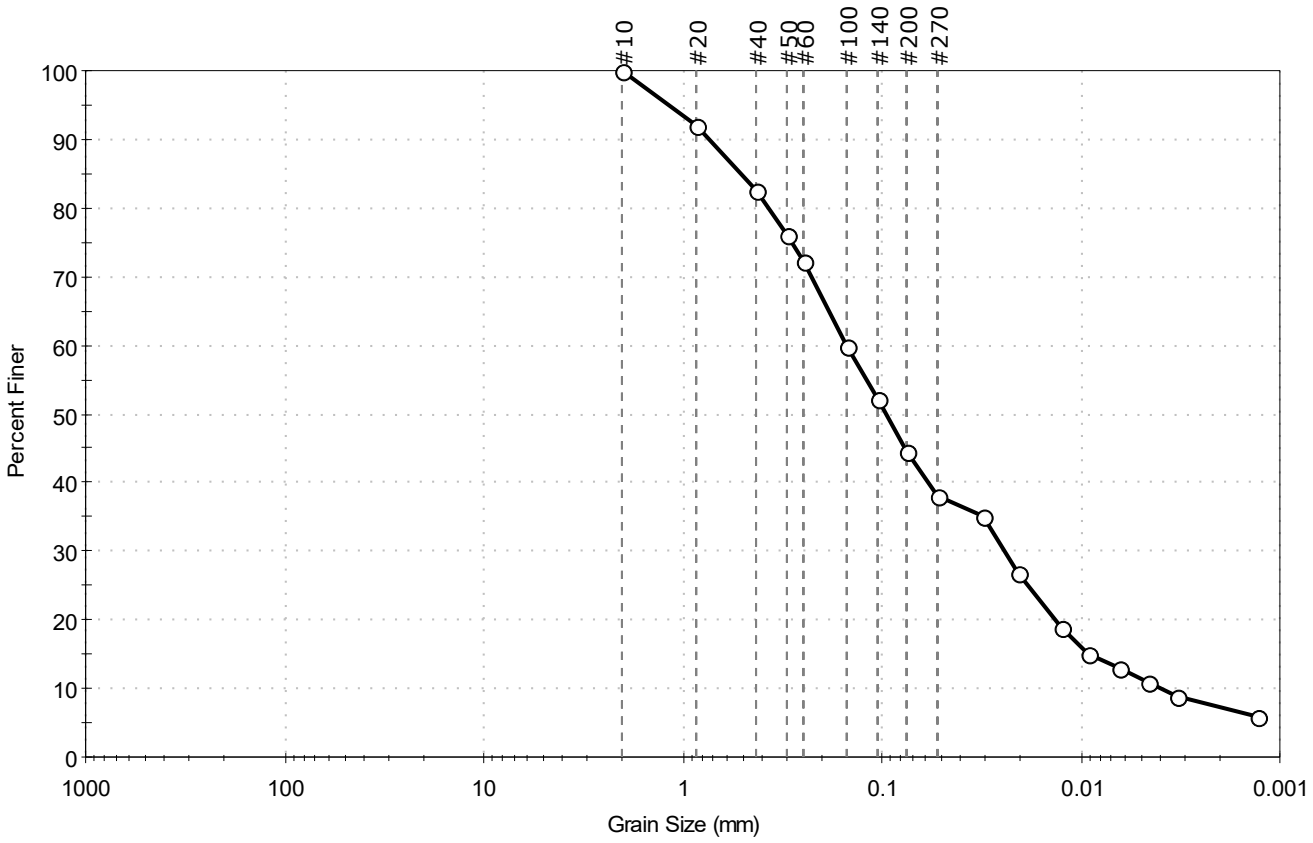
AASHTO Silty Soils (A-4 (0))

## Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.65
Separation of Sample: #200 Sieve

| | | | | | |
|---|---|---|---|---|---|
| Client: | Sanborn, Head & Associates, Inc. | | | | |
| Project: | Heritage Medway | | | | |
| Location: | Medway, MA | | | Project No: | GTX-317343 |
| Boring ID: | SH-TP-2 | Sample Type: | bag | Tested By: | ckg |
| Sample ID: | SH-TP-2 C | Test Date: | 06/12/23 | Checked By: | ank |
| Depth : | 29-173 inches | Test Id: | 718930 | | |
| Test Comment: | --- | | | | |
| Visual Description: | Moist, light grayish brown silty sand | | | | |
| Sample Comment: | Only minus No. 10 sieve for USDA classification | | | | |

# Particle Size Analysis - ASTM D6913/D7928




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| — | 0.0 | 55.6 | 44.4 |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|---|---|---|---|---|
| #10 | 2.00 | 100 | | |
| #20 | 0.85 | 92 | | |
| #40 | 0.42 | 83 | | |
| #50 | 0.30 | 76 | | |
| #60 | 0.25 | 72 | | |
| #100 | 0.15 | 60 | | |
| #140 | 0.11 | 52 | | |
| #200 | 0.075 | 44 | | |
| #270 | 0.053 | 38 | | |
| Hydrometer | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0311 | 35 | | |
| --- | 0.0206 | 27 | | |
| --- | 0.0127 | 19 | | |
| --- | 0.0092 | 15 | | |
| --- | 0.0064 | 13 | | |
| --- | 0.0046 | 11 | | |
| --- | 0.0033 | 9 | | |
| --- | 0.0013 | 6 | | |
| | | | | |

**Coefficients**

| | |
|---|---|
| $D_{85}$ = 0.5065 mm | $D_{30}$ = 0.0241 mm |
| $D_{60}$ = 0.1499 mm | $D_{15}$ = 0.0092 mm |
| $D_{50}$ = 0.0961 mm | $D_{10}$ = 0.0040 mm |
| $C_u$ = 37.475 | $C_c$ = 0.969 |

**Classification**

ASTM N/A

AASHTO Silty Soils (A-4 (0))

**Sample/Test Description**

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

| | | | | | |
|---|---|---|---|---|---|
| Client: | Sanborn, Head & Associates, Inc. | | | | |
| Project: | Heritage Medway | | | | |
| Location: | Medway, MA | | | Project No: | GTX-317343 |
| Boring ID: | SH-TP-2 | Sample Type: | bag | Tested By: | ckg |
| Sample ID: | SH-TP-2 C | Test Date: | 06/13/23 | Checked By: | ank |
| Depth : | 29-173 inches | Test Id: | 718935 | | |
| Test Comment: | --- | | | | |
| Visual Description: | Moist, light grayish brown silty sand | | | | |
| Sample Comment: | --- | | | | |

# USDA Textural Classification

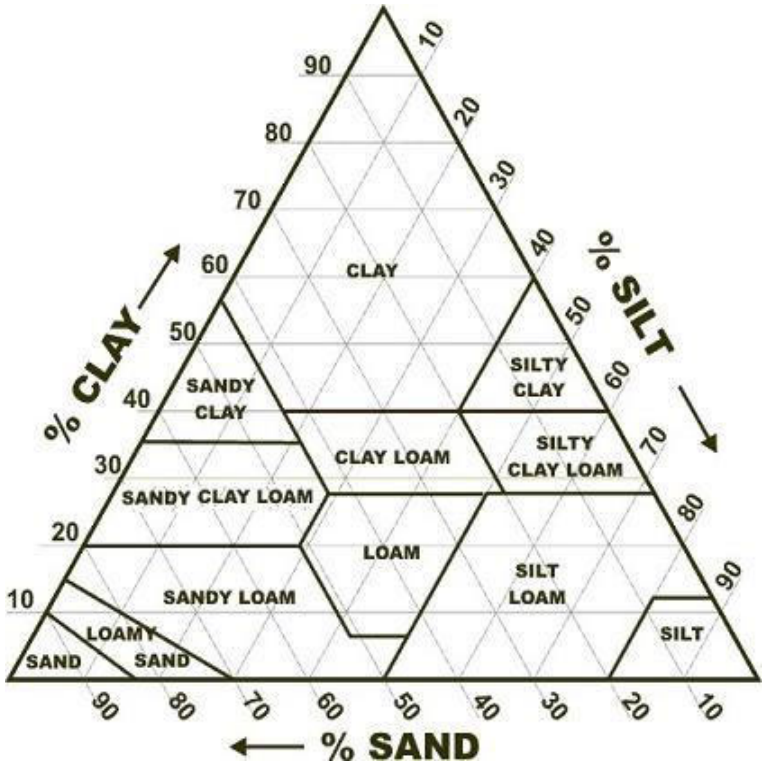
| Boring ID | Sample ID | Depth | Sand, % | Silt, % | Clay, % | Classification |
|---|---|---|---|---|---|---|
| SH-TP-2 | SH-TP-2 C | 29-173 inches | 63 | 31 | 6 | Sandy Loam |

Classifications based only on material passing the #10 sieve

Sand: material passing 2.0 mm and retained on 0.05 mm diameter

Silt: material passing 0.05 mm and retained on 0.002 mm diameter

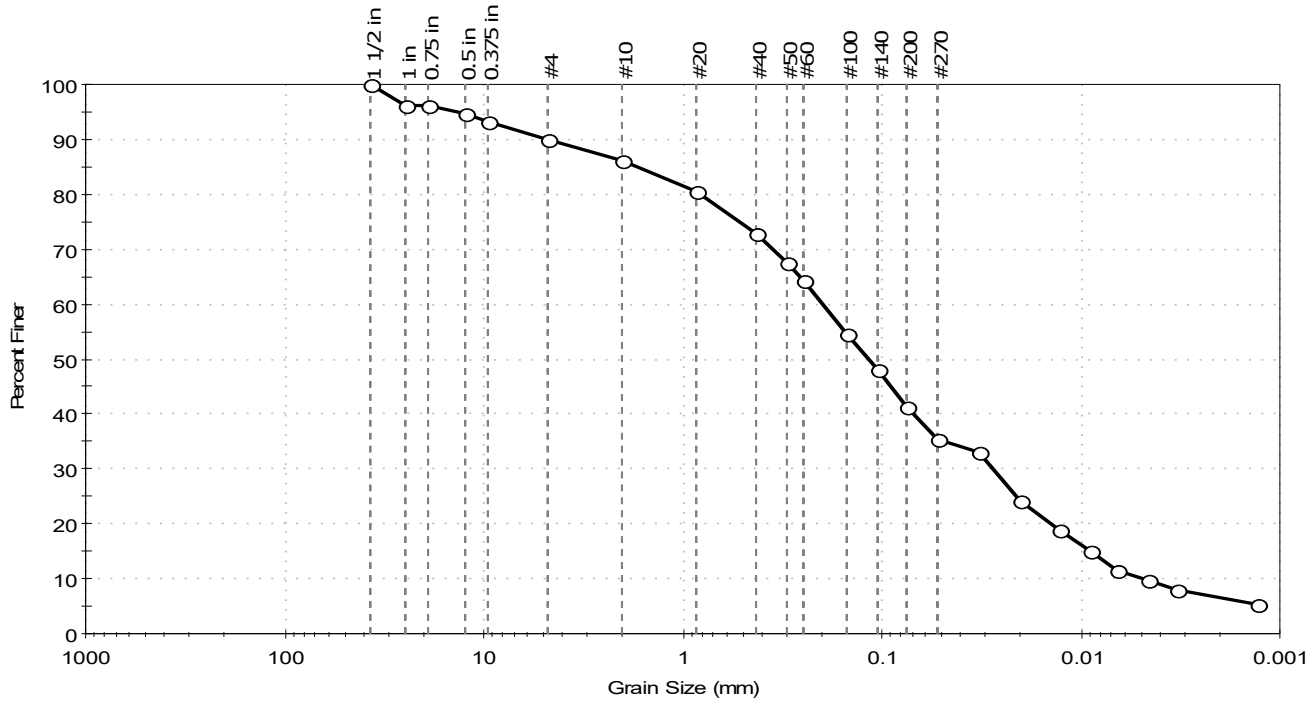
Clay: material passing 0.002 mm diameter



GeoTesting EXPRESS

| | | | | | |
|---|---|---|---|---|---|
| Client: | Sanborn, Head & Associates, Inc. | | | | |
| Project: | Heritage Medway | | | | |
| Location: | Medway, MA | | | Project No: | GTX-317343 |
| Boring ID: | SH-TP-5 | Sample Type: | bag | Tested By: | ckg |
| Sample ID: | SH-TP-5 C | Test Date: | 06/12/23 | Checked By: | ank |
| Depth : | 29-176 inches | Test Id: | 718931 | | |
| Test Comment: | --- | | | | |
| Visual Description: | Moist, light grayish brown silty sand | | | | |
| Sample Comment: | --- | | | | |

# Particle Size Analysis - ASTM D6913/D7928




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| — | 9.9 | 48.8 | 41.3 |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|---|---|---|---|---|
| 1 1/2 in | 37.50 | 100 | | |
| 1 in | 25.00 | 96 | | |
| 0.75 in | 19.00 | 96 | | |
| 0.5 in | 12.50 | 95 | | |
| 0.375 in | 9.50 | 93 | | |
| #4 | 4.75 | 90 | | |
| #10 | 2.00 | 86 | | |
| #20 | 0.85 | 80 | | |
| #40 | 0.42 | 73 | | |
| #50 | 0.30 | 67 | | |
| #60 | 0.25 | 64 | | |
| #100 | 0.15 | 54 | | |
| #140 | 0.11 | 48 | | |
| #200 | 0.075 | 41 | | |
| #270 | 0.053 | 35 | | |
| Hydrometer | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0325 | 33 | | |
| --- | 0.0203 | 24 | | |
| --- | 0.0127 | 19 | | |
| --- | 0.0091 | 15 | | |
| --- | 0.0065 | 12 | | |
| --- | 0.0047 | 10 | | |
| --- | 0.0033 | 8 | | |
| --- | 0.0013 | 5 | | |
| | | | | |

## Coefficients

$D_{85}$ = 1.6972 mm  $D_{30}$ = 0.0276 mm
$D_{60}$ = 0.1993 mm  $D_{15}$ = 0.0090 mm
$D_{50}$ = 0.1182 mm  $D_{10}$ = 0.0049 mm
$C_u$ = 40.673  $C_c$ = 0.780

## Classification

ASTM N/A

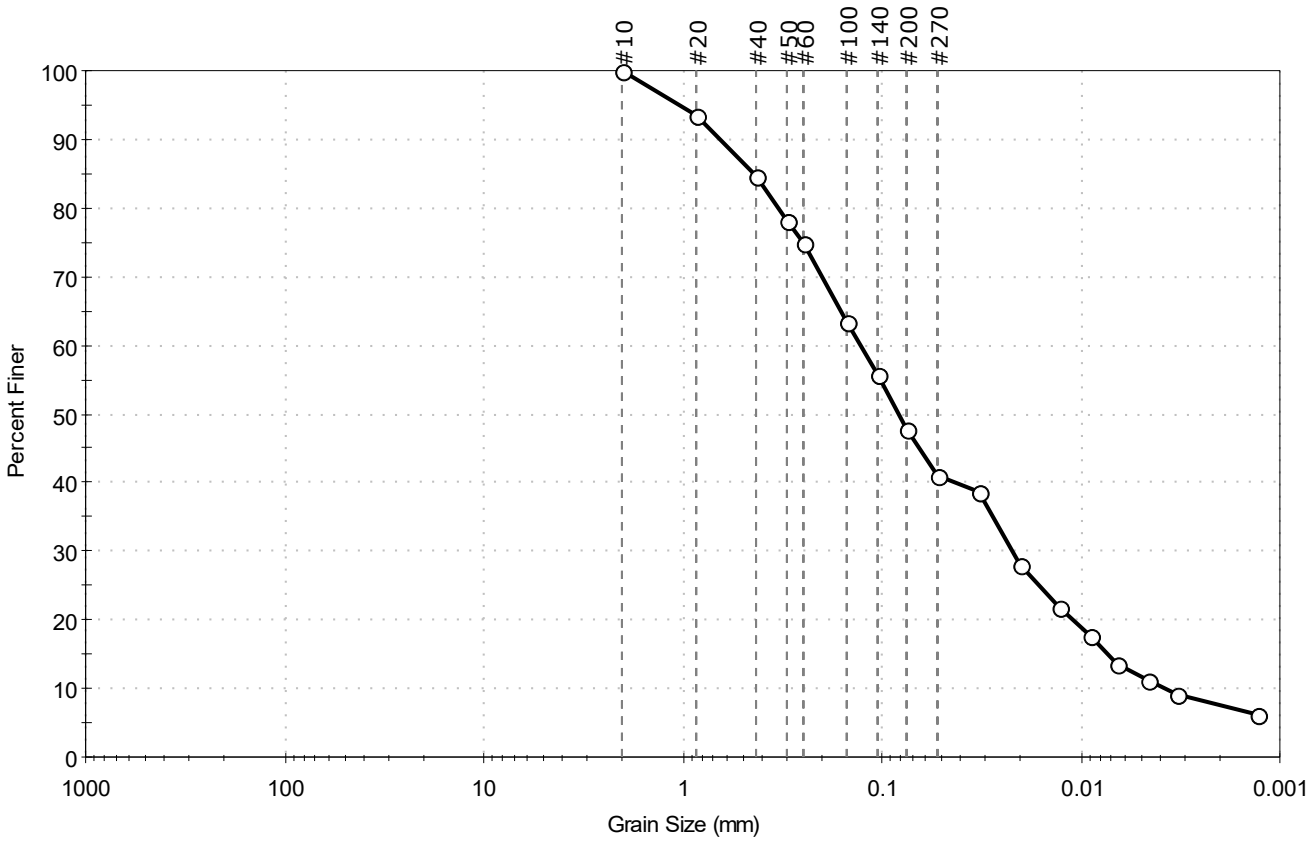
AASHTO Silty Soils (A-4 (0))

## Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.65
Separation of Sample: #200 Sieve

| | | | | | |
|---|---|---|---|---|---|
| Client: | Sanborn, Head & Associates, Inc. | | | | |
| Project: | Heritage Medway | | | | |
| Location: | Medway, MA | | | Project No: | GTX-317343 |
| Boring ID: | SH-TP-5 | Sample Type: | bag | Tested By: | ckg |
| Sample ID: | SH-TP-5 C | Test Date: | 06/12/23 | Checked By: | ank |
| Depth : | 29-176 inches | Test Id: | 718931 | | |
| Test Comment: | --- | | | | |
| Visual Description: | Moist, light grayish brown silty sand | | | | |
| Sample Comment: | Only minus No. 10 sieve for USDA classification | | | | |

# Particle Size Analysis - ASTM D6913/D7928




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| -- | 0.0 | 52.1 | 47.9 |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|---|---|---|---|---|
| #10 | 2.00 | 100 | | |
| #20 | 0.85 | 93 | | |
| #40 | 0.42 | 85 | | |
| #50 | 0.30 | 78 | | |
| #60 | 0.25 | 75 | | |
| #100 | 0.15 | 63 | | |
| #140 | 0.11 | 56 | | |
| #200 | 0.075 | 48 | | |
| #270 | 0.053 | 41 | | |
| Hydrometer | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0325 | 39 | | |
| --- | 0.0203 | 28 | | |
| --- | 0.0127 | 22 | | |
| --- | 0.0091 | 18 | | |
| --- | 0.0065 | 13 | | |
| --- | 0.0047 | 11 | | |
| --- | 0.0033 | 9 | | |
| --- | 0.0013 | 6 | | |
| | | | | |

**Coefficients**

| | |
|---|---|
| $D_{85}$ =0.4414 mm | $D_{30}$ =0.0222 mm |
| $D_{60}$ =0.1290 mm | $D_{15}$ =0.0074 mm |
| $D_{50}$ =0.0822 mm | $D_{10}$ =0.0037 mm |
| $C_u$ =34.865 | $C_c$ =1.033 |

**Classification**

ASTM N/A

AASHTO Silty Soils (A-4 (0))

**Sample/Test Description**

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

| | | | | | |
|---|---|---|---|---|---|
| Client: | Sanborn, Head & Associates, Inc. | | | | |
| Project: | Heritage Medway | | | | |
| Location: | Medway, MA | | | Project No: | GTX-317343 |
| Boring ID: | SH-TP-5 | Sample Type: | bag | Tested By: | ckg |
| Sample ID: | SH-TP-5 C | Test Date: | 06/13/23 | Checked By: | ank |
| Depth : | 29-176 inches | Test Id: | 718936 | | |
| Test Comment: | --- | | | | |
| Visual Description: | Moist, light grayish brown silty sand | | | | |
| Sample Comment: | --- | | | | |

# USDA Textural Classification

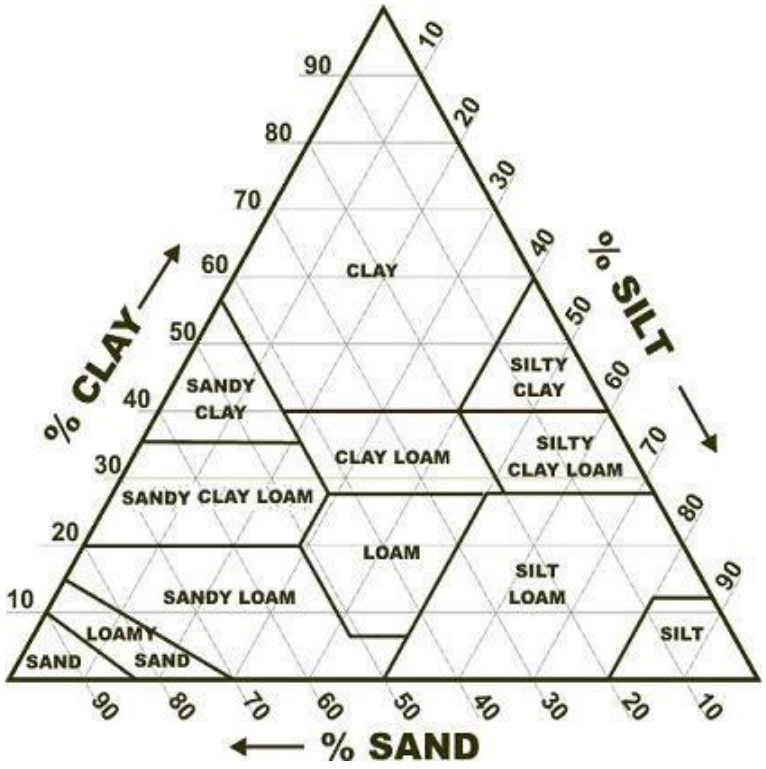
| Boring ID | Sample ID | Depth | Sand, % | Silt, % | Clay, % | Classification |
|---|---|---|---|---|---|---|
| SH-TP-5 | SH-TP-5 C | 29-176 inches | 60 | 34 | 6 | Sandy Loam |

Classifications based only on material passing the #10 sieve

Sand: material passing 2.0 mm and retained on 0.05 mm diameter

Silt: material passing 0.05 mm and retained on 0.002 mm diameter

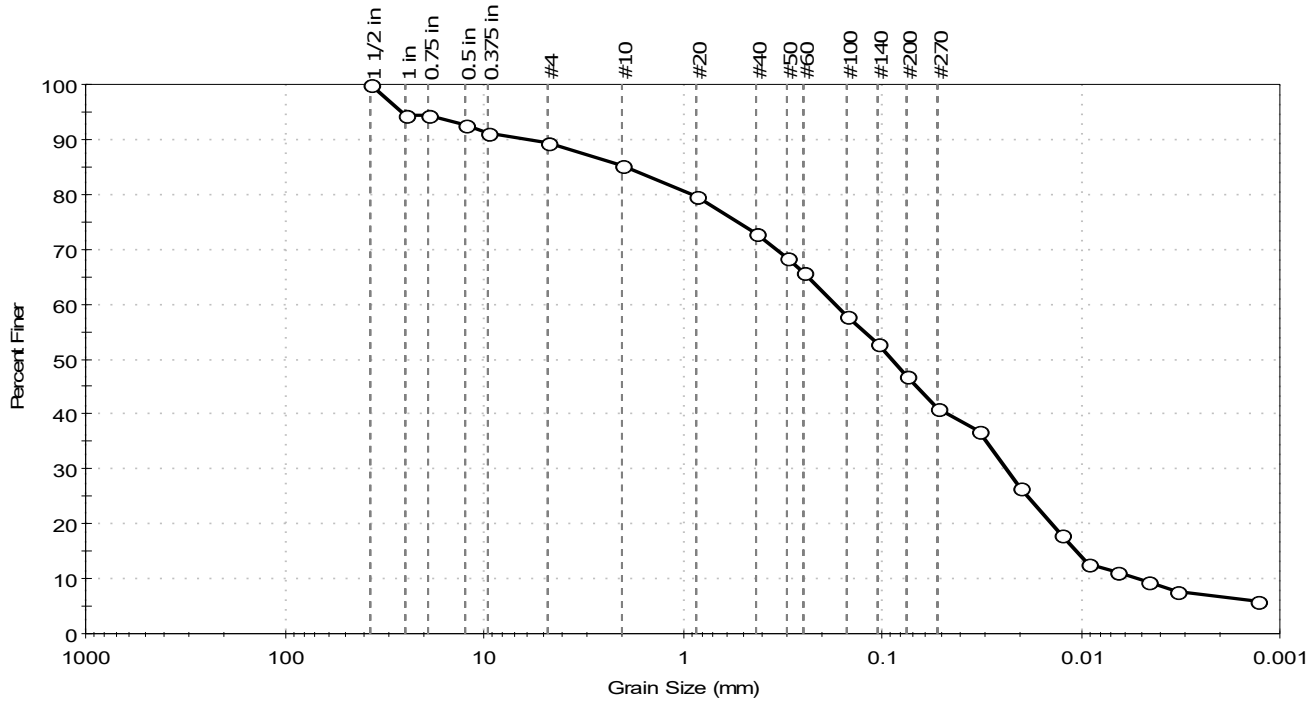
Clay: material passing 0.002 mm diameter



GeoTesting EXPRESS

| | | | | | |
|---|---|---|---|---|---|
| Client: | Sanborn, Head & Associates, Inc. | | | | |
| Project: | Heritage Medway | | | | |
| Location: | Medway, MA | | | Project No: | GTX-317343 |
| Boring ID: | SH-TP-7 | Sample Type: | bag | Tested By: | ckg |
| Sample ID: | SH-TP-7 C1 | Test Date: | 06/12/23 | Checked By: | ank |
| Depth : | 30-90 inches | Test Id: | 718932 | | |
| Test Comment: | --- | | | | |
| Visual Description: | Moist, grayish brown silty sand | | | | |
| Sample Comment: | --- | | | | |

# Particle Size Analysis - ASTM D6913/D7928




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| — | 10.7 | 42.4 | 46.9 |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|---|---|---|---|---|
| 1 1/2 in | 37.50 | 100 | | |
| 1 in | 25.00 | 94 | | |
| 0.75 in | 19.00 | 94 | | |
| 0.5 in | 12.50 | 93 | | |
| 0.375 in | 9.50 | 91 | | |
| #4 | 4.75 | 89 | | |
| #10 | 2.00 | 85 | | |
| #20 | 0.85 | 80 | | |
| #40 | 0.42 | 73 | | |
| #50 | 0.30 | 68 | | |
| #60 | 0.25 | 66 | | |
| #100 | 0.15 | 58 | | |
| #140 | 0.11 | 53 | | |
| #200 | 0.075 | 47 | | |
| #270 | 0.053 | 41 | | |
| Hydrometer | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0322 | 37 | | |
| --- | 0.0204 | 27 | | |
| --- | 0.0125 | 18 | | |
| --- | 0.0091 | 13 | | |
| --- | 0.0065 | 11 | | |
| --- | 0.0046 | 9 | | |
| --- | 0.0033 | 8 | | |
| --- | 0.0013 | 6 | | |
| | | | | |

## Coefficients

$D_{85}$ = 1.9536 mm  $D_{30}$ = 0.0237 mm
$D_{60}$ = 0.1712 mm  $D_{15}$ = 0.0105 mm
$D_{50}$ = 0.0898 mm  $D_{10}$ = 0.0053 mm
$C_u$ = 32.302  $C_c$ = 0.619

## Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

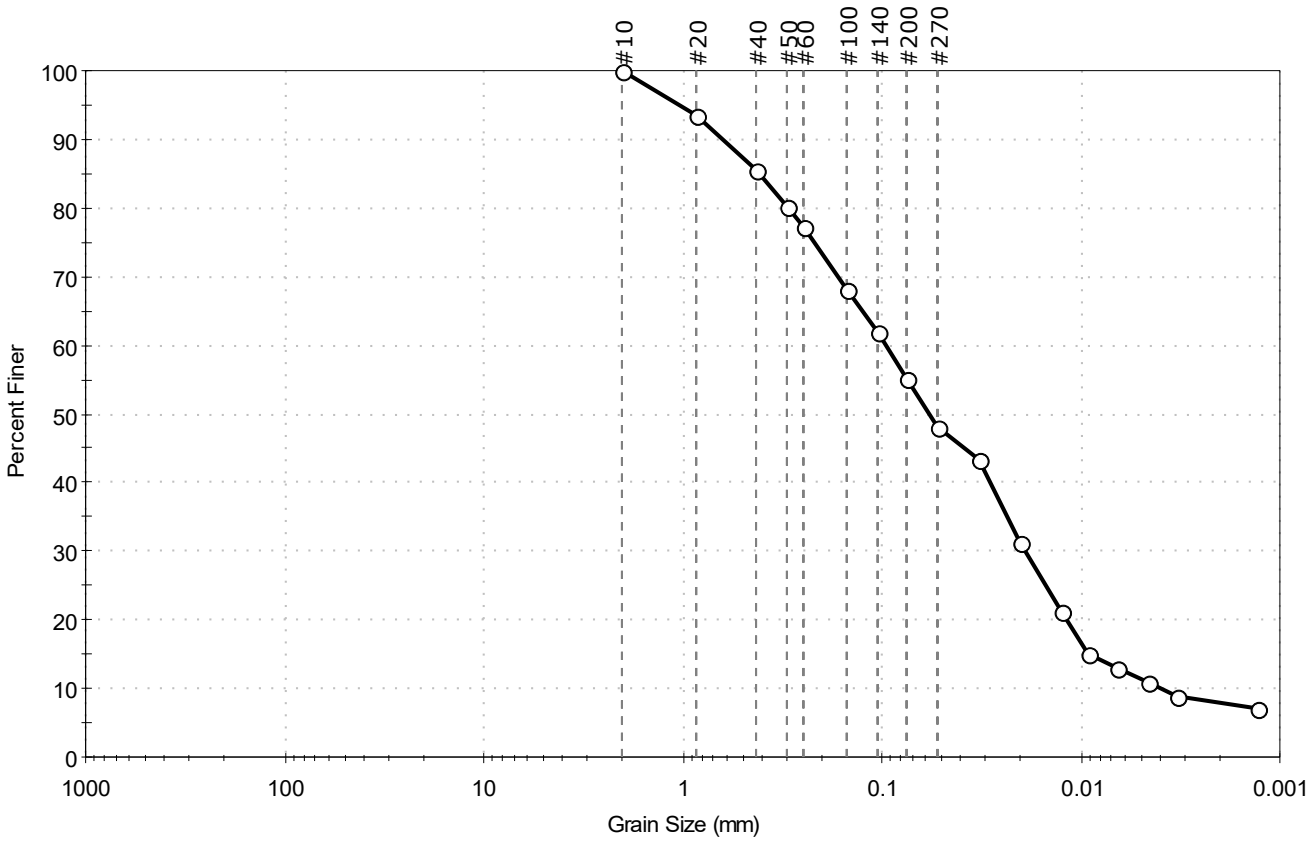
## Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD
Dispersion Device : Apparatus A - Mech Mixer
Dispersion Period : 1 minute
Est. Specific Gravity : 2.65
Separation of Sample: #200 Sieve

GeoTesting EXPRESS

| | | | | | |
|---|---|---|---|---|---|
| Client: | Sanborn, Head & Associates, Inc. | | | | |
| Project: | Heritage Medway | | | | |
| Location: | Medway, MA | | | Project No: | GTX-317343 |
| Boring ID: | SH-TP-7 | Sample Type: | bag | Tested By: | ckg |
| Sample ID: | SH-TP-7 C1 | Test Date: | 06/12/23 | Checked By: | ank |
| Depth : | 30-90 inches | Test Id: | 718932 | | |
| Test Comment: | --- | | | | |
| Visual Description: | Moist, grayish brown silty sand | | | | |
| Sample Comment: | Only minus No. 10 sieve for USDA classification | | | | |

# Particle Size Analysis - ASTM D6913/D7928




| % Cobble | % Gravel | % Sand | % Silt & Clay Size |
|---|---|---|---|
| — | 0.0 | 44.8 | 55.2 |

| Sieve Name | Sieve Size, mm | Percent Finer | Spec. Percent | Complies |
|---|---|---|---|---|
| #10 | 2.00 | 100 | | |
| #20 | 0.85 | 94 | | |
| #40 | 0.42 | 86 | | |
| #50 | 0.30 | 80 | | |
| #60 | 0.25 | 77 | | |
| #100 | 0.15 | 68 | | |
| #140 | 0.11 | 62 | | |
| #200 | 0.075 | 55 | | |
| #270 | 0.053 | 48 | | |
| Hydrometer | Particle Size (mm) | Percent Finer | Spec. Percent | Complies |
| --- | 0.0322 | 43 | | |
| --- | 0.0204 | 31 | | |
| --- | 0.0125 | 21 | | |
| --- | 0.0091 | 15 | | |
| --- | 0.0065 | 13 | | |
| --- | 0.0046 | 11 | | |
| --- | 0.0033 | 9 | | |
| --- | 0.0013 | 7 | | |
| | | | | |

**Coefficients**

| | |
|---|---|
| $D_{85}$ = 0.4068 mm | $D_{30}$ = 0.0192 mm |
| $D_{60}$ = 0.0958 mm | $D_{15}$ = 0.0091 mm |
| $D_{50}$ = 0.0583 mm | $D_{10}$ = 0.0039 mm |
| $C_u$ = 24.564 | $C_c$ = 0.987 |

**Classification**

ASTM N/A

AASHTO Silty Soils (A-4 (0))

**Sample/Test Description**

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Dispersion Device : Apparatus A - Mech Mixer

Dispersion Period : 1 minute

Est. Specific Gravity : 2.65

Separation of Sample: #200 Sieve

| | | | | | |
|---|---|---|---|---|---|
| Client: | Sanborn, Head & Associates, Inc. | | | | |
| Project: | Heritage Medway | | | | |
| Location: | Medway, MA | | | Project No: | GTX-317343 |
| Boring ID: | SH-TP-7 | Sample Type: | bag | Tested By: | ckg |
| Sample ID: | SH-TP-7 C1 | Test Date: | 06/13/23 | Checked By: | ank |
| Depth : | 30-90 inches | Test Id: | 718937 | | |
| Test Comment: | --- | | | | |
| Visual Description: | Moist, grayish brown silty sand | | | | |
| Sample Comment: | --- | | | | |

# USDA Textural Classification

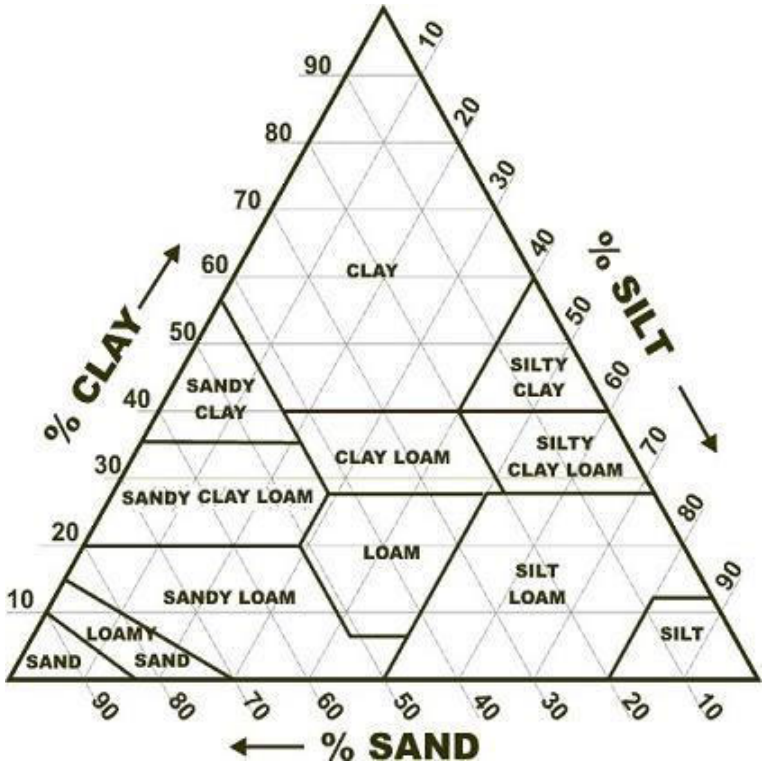
| Boring ID | Sample ID | Depth | Sand, % | Silt, % | Clay, % | Classification |
|---|---|---|---|---|---|---|
| SH-TP-7 | SH-TP-7 C1 | 30-90 inches | 53 | 40 | 7 | Sandy Loam |

Classifications based only on material passing the #10 sieve

Sand: material passing 2.0 mm and retained on 0.05 mm diameter

Silt: material passing 0.05 mm and retained on 0.002 mm diameter

Clay: material passing 0.002 mm diameter



Commission Members
David Travalini, Chair
Ken McKay
David Blackwell
Dayna Gill
Michael Narducci
Sean Green
James Dacier

Medway Town Hall
155 Village Street
Medway, MA 02053
Telephone (508) 533-3292
bgraziano@townofmedway.org

# TOWN OF MEDWAY
## COMMONWEALTH OF MASSACHUSETTS
## CONSERVATION COMMISSION

August 7, 2023

Tariq Fayad
Rte 86 Realty Corp
PO Box 444
Mendon, MA 01756

Dear Mx. Fayad,

Enclosed is the wetland permit (Order of Area Resource Delineation) issued **August 7, 2022 DEP #216-1034**. The appeal period is 10 days. No work should be performed prior to the end of the 10-day appeal period.

**Please carefully read the ORAD. This must be recorded at the Norfolk Registry of Deeds, you have to send a check to our office for $106.00. Therefore, after the 10-day appeal period our office can complete the recording on your behalf.**

We thank you for the opportunity to review this work and trusts that it will be carried out in such a way that protects our wetland resources. The Order of Conditions DEP #216-1034 shall **expire August 7, 2026**. If you have any questions, please contact me at bgraziano@townofmedway.org .

Sincerely,

Bridget R Graziano

Bridget R. Graziano, Conservation Agent
Medway Conservation Commission

For Registry of Deeds Use Only

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

# WPA Form 4B – Order of Resource Area Delineation

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

Provided by MassDEP:
216-1034
MassDEP File Number

eDEP Transaction Number

Medway
City/Town

## A. General Information

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




**Note:** Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

From: Medway
1. Conservation Commission

2. This Issuance is for (check one):

a. ☒ Order of Resource Area Delineation

b. ☐ Amended Order of Resource Area Delineation

3. Applicant:

Tariq
a. First Name

Fayad
b. Last Name

Rte 86 Realty Corp
c. Organization

PO Box 444
d. Mailing Address

Mendon
e. City/Town

MA
f. State

01756
g. Zip Code

4. Property Owner (if different from applicant):

Kevin
a. First Name

Meehan
b. Last Name

Milford East Main Street LLC (OWNER: Map 40 Lot 073
c. Organization

60 Causeway Street
d. Mailing Address

Millis
e. City/Town

MA
f. State

01532
g. Zip Code

5. Project Location:

1, 3 Elm Street 107, 111, 115, 115A, 117 119, 119A, 119B Main Street, 26 Kelley Street
d. Assessors Map/Plat Number

Map 40, 48, 49 (respectively)

Medway
b. City/Town

02053
c. Zip Code

Lot 71, 72, 73, 74, 75, 76; 46, 47, 47-0001, 47-0002, 47-0003; 32, 32-0001

Latitude and Longitude (in degrees, minutes, seconds):

d m s
f. Latitude

d m s
g. Longitude

6. Dates:

May 25, 2023
a. Date ANRAD filed

July 27, 2023
b. Date Public Hearing Closed

August 7, 2023
c. Date of Issuance

## A. General Information (cont.)

7. Title and Date (or Revised Date if applicable) of Final Plans and Other Documents:

Boundry, Topographic Utility Survey 107, 111, 113, 115, 117, 119 Main Street 1, 3 Elm Street 0 & 26 Kelley Street by Control Point Associates — c. Title

final 7/17/2023 — b. Date

d. Date

## B. Order of Delineation

1. The Conservation Commission has determined the following (check whichever is applicable):

a. ☒ **Accurate**: The boundaries described on the referenced plan(s) above and in the Abbreviated Notice of Resource Area Delineation are accurately drawn for the following resource area(s):

1. ☒ Bordering Vegetated Wetlands
2. ☒ Other resource area(s), specifically:

a. as determined by approved plans and specified in etter from Eco Tec, Inc. titled, " Wetland Peer Review Results 1 & 3 Elm Street, 107, 111, 113, 115,115A, 117, 119, 119A and 119B Main Street, 0 & 26 Kelley Street, Medway, MA dated July 25, 2023.

b. ☐ **Modified**: The boundaries described on the plan(s) referenced above, as modified by the Conservation Commission from the plans contained in the Abbreviated Notice of Resource Area Delineation, are accurately drawn from the following resource area(s):

1. ☐ Bordering Vegetated Wetlands
2. ☐ Other resource area(s), specifically:

a.

c. ☒ **Inaccurate**: The boundaries described on the referenced plan(s) and in the Abbreviated Notice of Resource Area Delineation were found to be inaccurate and cannot be confirmed for the following resource area(s):

1. ☒ Bordering Vegetated Wetlands
2. ☐ Other resource area(s), specifically:

Wetland A and C, (specifically A-1 through A31, A50 through A54, and C1 through C11, as noted on letter from Eco Tec, Inc. titled, " Wetland Peer Review Results 1 & 3 Elm Street, 107, 111, 113, 115,115A, 117, 119, 119A and 119B Main Street, 0 & 26 Kelley Street, Medway, MA dated July 25, 2023.

## B. Order of Delineation (cont.)

3. ☒ The boundaries were determined to be inaccurate because:

As the notes on the plan show an expired ORAD which have flags that are no longer valid. Additionally, applicant has chosen to not refresh/update the flags for Medway Conservation Commission review, therefore, the Commission is requiring these be flagged and reviewed under furture NOI applications.

## C. Findings

This Order of Resource Area Delineation determines that the boundaries of those resource areas noted above, have been delineated and approved by the Commission and are binding as to all decisions rendered pursuant to the Massachusetts Wetlands Protection Act (M.G.L. c.131, § 40) and its regulations (310 CMR 10.00). This Order does not, however, determine the boundaries of any resource area or Buffer Zone to any resource area not specifically noted above, regardless of whether such boundaries are contained on the plans attached to this Order or to the Abbreviated Notice of Resource Area Delineation.

This Order must be signed by a majority of the Conservation Commission. The Order must be sent by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate DEP Regional Office (see http://www.mass.gov/eea/agencies/massdep/about/contacts/find-the-massdep-regional-office-for-your-city-or-town.html).

## D. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate DEP Regional Office to issue a Superseding Order of Resource Area Delineation. When requested to issue a Superseding Order of Resource Area Delineation, the Department's review is limited to the objections to the resource area delineation(s) stated in the appeal request. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order of Resource Area Delineation will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order or Determination, or providing written information to the Department prior to issuance of a Superseding Order or Determination.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act, (M.G.L. c. 131, § 40) and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal bylaw or ordinance, and not on the Massachusetts Wetlands Protection Act or regulations, the Department of Environmental Protection has no appellate jurisdiction.

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

# WPA Form 4B – Order of Resource Area Delineation

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

Provided by MassDEP:
216-1034
MassDEP File Number

eDEP Transaction Number

Medway
City/Town

## E. Signatures

8/7/2023
Date of Issuance

Please indicate the number of members who will sign this form.

4
1. Number of Signers

David A Travalini
Signature of Conservation Commission Member

Signature of Conservation Commission Member

James Dacier
Signature of Conservation Commission Member

David J. Blackwell
Signature of Conservation Commission Member

Signature of Conservation Commission Member

Michael Narducci
Signature of Conservation Commission Member

**This Order is valid for three years from the date of issuance.**

If this Order constitutes an Amended Order of Resource Area Delineation, this Order does not extend the issuance date of the original Final Order, which expires on unless extended in writing by the issuing authority.

This Order is issued to the applicant and the property owner (if different) as follows:

2. ☐ By hand delivery on

a. Date

3. ☒ By certified mail, return receipt requested on

8/7/2023
a. Date

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

# WPA Form 4B – Order of Resource Area Delineation

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

Provided by MassDEP:

MassDEP File Number

eDEP Transaction Number

City/Town

## Recording Information

Prior to commencement of work, this Order of Resource Area Delineation must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Resource Area Delineation. The recording information on this page shall be submitted to the Conservation Commission listed below.

Medway
Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

---

To:

Medway
Conservation Commission

Please be advised that the Order of Resource Area Delineation for the Project at:

Project Location

MassDEP File Number

Has been recorded at the Registry of Deeds of:

County

Book

Page

For:

Property Owner

and has been noted in the chain of title of the affected property in:

Book

Page

In accordance with the Order of Resource Area Delineation issued on:

Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant

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

# Request for Departmental Action Fee Transmittal Form

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

DEP File Number:

216-1034
Provided by DEP

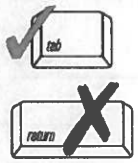
## A. Request Information

1. Location of Project

a. Street Address | b. City/Town, Zip

c. Check number | d. Fee amount

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




2. Person or party making request (if appropriate, name the citizen group's representative):

Name

Mailing Address

City/Town | State | Zip Code

Phone Number | Fax Number (if applicable)

3. Applicant (as shown on Determination of Applicability (Form 2), Order of Resource Area Delineation (Form 4B), Order of Conditions (Form 5), Restoration Order of Conditions (Form 5A), or Notice of Non-Significance (Form 6)):

Name

Mailing Address

City/Town | State | Zip Code

Phone Number | Fax Number (if applicable)

4. DEP File Number:

216-1010

## B. Instructions

1. When the Departmental action request is for (check one):

☐ Superseding Order of Conditions – Fee: $120.00 (single family house projects) or $245 (all other projects)

☐ Superseding Determination of Applicability – Fee: $120

☐ Superseding Order of Resource Area Delineation – Fee: $120

Send this form and check or money order, payable to the *Commonwealth of Massachusetts,* to:

Department of Environmental Protection
Box 4062
Boston, MA 02211

# Request for Departmental Action Fee Transmittal Form

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

## B. Instructions (cont.)

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

3. Send a **copy** of this form and a **copy** of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see http://www.mass.gov/eea/agencies/massdep/about/contacts/).

4. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

## APPENDIX D: EXISTING CONDITIONS HYDROLOGIC ANALYSIS

- *EXISTING CONDITIONS DRAINAGE MAP*
- *EXISTING CONDITIONS HYDROCAD COMPUTATIONS*

# MAIN STREET

(AKA MA ROUTE 109)

(PUBLIC - VARIABLE WIDTH)

## ELM STREET

(PUBLIC - 36' WIDE)

## KELLEY STREET

(STATUS UNDETERMINED - VARI

DP-1 DP-2 DP-3 DP-4 DP-5

CB1.1 CB1.2 CB1.3

EX1.1 EX1.2 EX1.3 EX1.4 EX1.5 EX2.1 EX3.1 EX4.1 EX4.2 EX5.1 EX5.3

DEP-4 DEP-5

602 (C) 312B (C)

100' WETLAND BUFFER 50' WETLAND BUFFER 25' WETLAND BUFFER EDGE OF WETLAND EDGE OF WOODS

1 STORY MASONRY BUILDING BFPH=9.1&3.9' 1 STORY FRAME BUILDING BFPH=8.5&7.2' 1 STORY FRAME BUILDING BFPH=8.5&7.2' 1 STORY MASONRY BUILDING

## LEGEND

- DP# — DESIGN POINT
- EX-# — EXISTING SUBCATCHMENT
- XX# — BASIN OR MODELED DRAINAGE STRUCTURE
- A/B/C/D — HYDROLOGIC SOIL GROUP RATING
- UNIT — NRCS SOIL MAP UNIT
- X-# — SWALE OR MODELED JUNCTION
- OVERALL ANALYSIS BOUNDARY
- SUBCATCHMENT BOUNDARY
- NRCS SOIL BOUNDARY
- TIME OF CONCENTRATION
- CONCRETE OR PAVEMENT
- ROOF
- SURFACE WATER (IMPERVIOUS)
- GRASS OR LANDSCAPED AREA
- UNIT PAVER OR GRAVEL (PERVIOUS)
- WOODS OR UNDEVELOPED AREA

60 30 15 0 60

SCALE: 1" = 60'

P:\MA\0224\MAA240482.00\CAD\DRAWINGS\EXHIBITS\GENERAL EXHIBIT\P-GNRE-HYDR-MAA240482.00-1A---1A\YOUT: EX-PR EXDM

BOHLER

SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
ENVIRONMENTAL SERVICES
PERMITTING SERVICES
TRANSPORTATION SERVICES

THE INFORMATION, DESIGN AND CONTENTS OF THIS PLAN ARE PROPRIETARY AND SHALL NOT BE DISCLOSED OR USED FOR ANY PURPOSE, WITHOUT THE EXPRESS WRITTEN CONSENT OF BOHLER. ONLY APPROVED, SEALED PLANS SHALL BE UTILIZED FOR CONSTRUCTION PURPOSES. ACCEPTANCE OF THESE PLANS CONSTITUTES ACCEPTANCE OF THE ABOVE CONDITIONS.

### REVISIONS

| REV | DATE | COMMENT | DRAWN BY / CHECKED BY |
|---|---|---|---|
| 1 | 09/25/2026 | MUNICIPAL COMMENTS | AP, SW / TH, MM |

811 Know what's below. Call before you dig.

ALWAYS CALL 811

It's fast. It's free. It's the law.

**PERMIT SET**

THIS DRAWING IS INTENDED FOR MUNICIPAL AND/OR AGENCY REVIEW AND APPROVAL. IT IS NOT INTENDED AS A CONSTRUCTION DOCUMENT UNLESS INDICATED OTHERWISE.

| | |
|---|---|
| PROJECT No.: | MAA240482.00-1A |
| DRAWN BY: | AP, JK, SW |
| CHECKED BY: | TH, MM |
| DATE: | 02/02/2026 |
| CAD I.D.: | P-GNRE-HYDR |

PROJECT:

**HERITAGE ON MAIN**

FOR

RTE. 85 REALTY CORP
P.O. BOX 2440

PROPOSED MIXED-USE DEVELOPMENT

107-119 MAIN ST, 1 & 3 ELM ST, 0 & 26 KELLEY ST, NORFOLK COUNTY, TOWN OF MEDWAY, MASSACHUSETTS

BOHLER
352 TURNPIKE ROAD, 3rd FLOOR
SOUTHBOROUGH, MA 01772
Phone: (508) 480-9900
www.BohlerEngineering.com

S.P. MARTORANO
PROFESSIONAL ENGINEER
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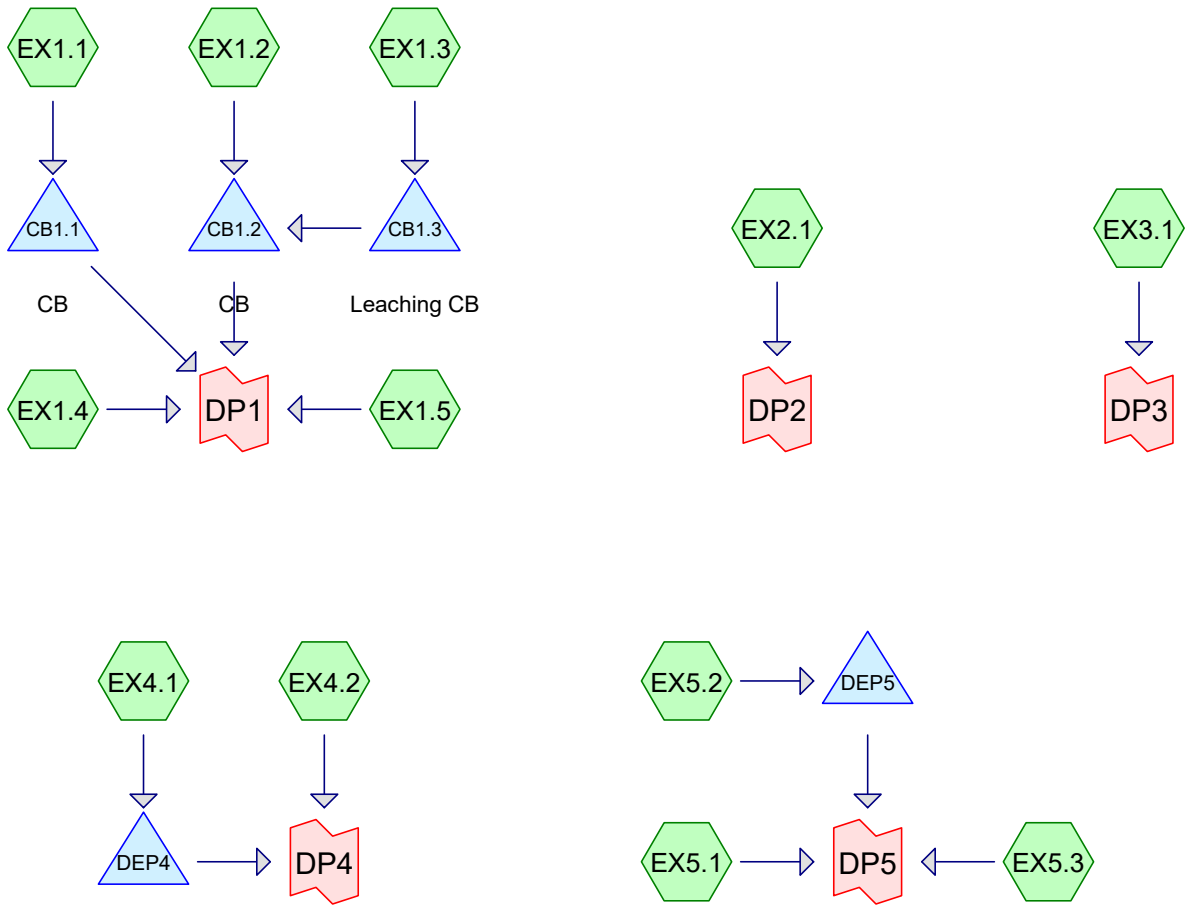
SHEET TITLE:

**EXISTING CONDITIONS DRAINAGE AREA MAP**

SHEET NUMBER:

**EX-PR**

REVISION 1 - 09/25/2026




Subcat Reach Pond Link

**Routing Diagram for W211301_Pre-6a**
Prepared by Bohler Engineering, PC, Printed 9/28/2026
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## Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 1.776 | 79 | 50-75% Grass cover, Fair, HSG C (EX1.1, EX1.2, EX1.3, EX1.4, EX1.5, EX2.1, EX3.1, EX4.1, EX4.2, EX5.1, EX5.2, EX5.3) |
| 0.025 | 89 | Gravel roads, HSG C (EX4.2) |
| 3.701 | 98 | Paved parking, HSG C (EX1.1, EX1.2, EX1.3, EX1.4, EX1.5, EX2.1, EX3.1, EX4.1, EX4.2, EX5.1) |
| 0.663 | 98 | Roofs, HSG C (EX1.1, EX1.2, EX1.3, EX1.5, EX2.1, EX4.1, EX4.2, EX5.2) |
| 0.058 | 98 | Water Surface, HSG C (EX5.2) |
| 5.835 | 70 | Woods, Good, HSG C (EX2.1, EX3.1, EX4.1, EX4.2, EX5.1, EX5.2, EX5.3) |
| **12.058** | **82** | **TOTAL AREA** |

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment EX1.1:** Runoff Area=20,340 sf 82.79% Impervious Runoff Depth=3.30"
Tc=6.0 min CN=WQ Runoff=1.62 cfs 0.128 af

**Subcatchment EX1.2:** Runoff Area=21,080 sf 91.08% Impervious Runoff Depth=3.45"
Tc=6.0 min CN=WQ Runoff=1.74 cfs 0.139 af

**Subcatchment EX1.3:** Runoff Area=10,960 sf 67.34% Impervious Runoff Depth=3.03"
Tc=6.0 min CN=WQ Runoff=0.81 cfs 0.063 af

**Subcatchment EX1.4:** Runoff Area=1,140 sf 24.56% Impervious Runoff Depth=2.27"
Tc=6.0 min CN=WQ Runoff=0.07 cfs 0.005 af

**Subcatchment EX1.5:** Runoff Area=16,080 sf 92.29% Impervious Runoff Depth=3.47"
Tc=6.0 min CN=WQ Runoff=1.34 cfs 0.107 af

**Subcatchment EX2.1:** Runoff Area=161,730 sf 51.25% Impervious Runoff Depth=2.50"
Flow Length=264' Tc=20.4 min CN=WQ Runoff=6.60 cfs 0.773 af

**Subcatchment EX3.1:** Runoff Area=118,100 sf 0.93% Impervious Runoff Depth=1.38"
Flow Length=389' Tc=24.3 min CN=WQ Runoff=2.60 cfs 0.313 af

**Subcatchment EX4.1:** Runoff Area=24,350 sf 53.76% Impervious Runoff Depth=2.68"
Flow Length=245' Tc=9.6 min CN=WQ Runoff=1.42 cfs 0.125 af

**Subcatchment EX4.2:** Runoff Area=114,000 sf 18.44% Impervious Runoff Depth=1.75"
Flow Length=344' Tc=9.1 min CN=WQ Runoff=4.48 cfs 0.382 af

**Subcatchment EX5.1:** Runoff Area=19,100 sf 65.03% Impervious Runoff Depth=2.78"
Tc=6.0 min CN=WQ Runoff=1.28 cfs 0.102 af

**Subcatchment EX5.2:** Runoff Area=16,850 sf 21.13% Impervious Runoff Depth=1.86"
Tc=6.0 min CN=WQ Runoff=0.78 cfs 0.060 af

**Subcatchment EX5.3:** Runoff Area=1,520 sf 0.00% Impervious Runoff Depth=1.32"
Tc=6.0 min CN=WQ Runoff=0.05 cfs 0.004 af

**Pond CB1.1: CB** Inflow=1.62 cfs 0.128 af
Primary=1.62 cfs 0.128 af

**Pond CB1.2: CB** Inflow=2.54 cfs 0.200 af
Primary=2.54 cfs 0.200 af

**Pond CB1.3: Leaching CB** Peak Elev=260.00' Storage=121 cf Inflow=0.81 cfs 0.063 af
Discarded=0.00 cfs 0.000 af Primary=0.81 cfs 0.061 af Outflow=0.81 cfs 0.061 af

**Pond DEP4:** Peak Elev=247.34' Storage=2,126 cf Inflow=1.42 cfs 0.125 af
Discarded=0.05 cfs 0.090 af Primary=0.91 cfs 0.035 af Outflow=0.96 cfs 0.125 af

**Pond DEP5:** Peak Elev=258.09' Storage=1,288 cf Inflow=0.78 cfs 0.060 af
Outflow=0.22 cfs 0.032 af

**Link DP1:** Inflow=5.56 cfs 0.440 af
Primary=5.56 cfs 0.440 af

**Link DP2:** Inflow=6.60 cfs 0.773 af
Primary=6.60 cfs 0.773 af

**Link DP3:** Inflow=2.60 cfs 0.313 af
Primary=2.60 cfs 0.313 af

**Link DP4:** Inflow=4.48 cfs 0.417 af
Primary=4.48 cfs 0.417 af

**Link DP5:** Inflow=1.33 cfs 0.138 af
Primary=1.33 cfs 0.138 af

**Total Runoff Area = 12.058 ac Runoff Volume = 2.201 af Average Runoff Depth = 2.19"**
**63.33% Pervious = 7.636 ac 36.67% Impervious = 4.422 ac**

## Summary for Subcatchment EX1.1:

Runoff = 1.62 cfs @ 12.08 hrs, Volume= 0.128 af, Depth= 3.30"
Routed to Pond CB1.1 : CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 460 | 98 | Roofs, HSG C |
| 16,380 | 98 | Paved parking, HSG C |
| 3,500 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 20,340 | | Weighted Average |
| 3,500 | | 17.21% Pervious Area |
| 16,840 | | 82.79% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.2:

Runoff = 1.74 cfs @ 12.08 hrs, Volume= 0.139 af, Depth= 3.45"
Routed to Pond CB1.2 : CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 2,630 | 98 | Roofs, HSG C |
| 16,570 | 98 | Paved parking, HSG C |
| 1,880 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 21,080 | | Weighted Average |
| 1,880 | | 8.92% Pervious Area |
| 19,200 | | 91.08% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.3:

Runoff = 0.81 cfs @ 12.08 hrs, Volume= 0.063 af, Depth= 3.03"
Routed to Pond CB1.3 : Leaching CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 2,660 | 98 | Roofs, HSG C |
| 4,720 | 98 | Paved parking, HSG C |
| 3,580 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 10,960 | | Weighted Average |
| 3,580 | | 32.66% Pervious Area |
| 7,380 | | 67.34% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.4:

Runoff = 0.07 cfs @ 12.09 hrs, Volume= 0.005 af, Depth= 2.27"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 280 | 98 | Paved parking, HSG C |
| 860 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 1,140 | | Weighted Average |
| 860 | | 75.44% Pervious Area |
| 280 | | 24.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.5:

Runoff = 1.34 cfs @ 12.08 hrs, Volume= 0.107 af, Depth= 3.47"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 2,980 | 98 | Roofs, HSG C |
| 11,860 | 98 | Paved parking, HSG C |
| 1,240 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 16,080 | | Weighted Average |
| 1,240 | | 7.71% Pervious Area |
| 14,840 | | 92.29% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX2.1:

Runoff = 6.60 cfs @ 12.27 hrs, Volume= 0.773 af, Depth= 2.50"
Routed to Link DP2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 10,610 | 98 | Roofs, HSG C |
| 72,280 | 98 | Paved parking, HSG C |
| 14,600 | 79 | 50-75% Grass cover, Fair, HSG C |
| 64,240 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 161,730 | | Weighted Average |
| 78,840 | | 48.75% Pervious Area |
| 82,890 | | 51.25% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.4 | 50 | 0.0120 | 0.05 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10" |
| 4.0 | 117 | 0.0094 | 0.48 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 18 | 0.4400 | 3.32 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.9 | 79 | 0.0770 | 1.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 20.4 | 264 | Total | | | |

## Summary for Subcatchment EX3.1:

Runoff = 2.60 cfs @ 12.36 hrs, Volume= 0.313 af, Depth= 1.38"
Routed to Link DP3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 1,100 | 98 | Paved parking, HSG C |
| 26,740 | 79 | 50-75% Grass cover, Fair, HSG C |
| 90,260 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 118,100 | | Weighted Average |
| 117,000 | | 99.07% Pervious Area |
| 1,100 | | 0.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.0 | 68 | 0.0130 | 0.06 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10" |
| 0.1 | 12 | 0.5000 | 3.54 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 5.1 | 309 | 0.0400 | 1.00 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 24.3 | 389 | Total | | | |

## Summary for Subcatchment EX4.1:

Runoff = 1.42 cfs @ 12.13 hrs, Volume= 0.125 af, Depth= 2.68"
Routed to Pond DEP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 5,120 | 98 | Roofs, HSG C |
| 7,970 | 98 | Paved parking, HSG C |
| 7,030 | 79 | 50-75% Grass cover, Fair, HSG C |
| 4,230 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 24,350 | | Weighted Average |
| 11,260 | | 46.24% Pervious Area |
| 13,090 | | 53.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.1 | 50 | 0.0260 | 0.16 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.10" |
| 3.1 | 58 | 0.0020 | 0.31 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 38 | 0.0240 | 3.14 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 70 | 0.0440 | 1.47 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 29 | 0.0660 | 1.28 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 9.6 | 245 | Total | | | |

## Summary for Subcatchment EX4.2:

Runoff = 4.48 cfs @ 12.13 hrs, Volume= 0.382 af, Depth= 1.75"
Routed to Link DP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 3,370 | 98 | Roofs, HSG C |
| 17,650 | 98 | Paved parking, HSG C |
| 13,980 | 79 | 50-75% Grass cover, Fair, HSG C |
| 77,900 | 70 | Woods, Good, HSG C |
| 1,100 | 89 | Gravel roads, HSG C |
| 114,000 | | Weighted Average |
| 92,980 | | 81.56% Pervious Area |
| 21,020 | | 18.44% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 75 | 0.0470 | 0.22 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.10" |
| 0.1 | 19 | 0.0160 | 2.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.4 | 250 | 0.0600 | 1.22 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 9.1 | 344 | Total | | | |

## Summary for Subcatchment EX5.1:

Runoff = 1.28 cfs @ 12.09 hrs, Volume= 0.102 af, Depth= 2.78"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 12,420 | 98 | Paved parking, HSG C |
| 200 | 79 | 50-75% Grass cover, Fair, HSG C |
| 6,480 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 19,100 | | Weighted Average |
| 6,680 | | 34.97% Pervious Area |
| 12,420 | | 65.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX5.2:

Runoff = 0.78 cfs @ 12.09 hrs, Volume= 0.060 af, Depth= 1.86"
Routed to Pond DEP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 1,030 | 98 | Roofs, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 3,530 | 79 | 50-75% Grass cover, Fair, HSG C |
| 9,760 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 2,530 | 98 | Water Surface, HSG C |
| 16,850 | | Weighted Average |
| 13,290 | | 78.87% Pervious Area |
| 3,560 | | 21.13% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX5.3:

Runoff = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af, Depth= 1.32"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 230 | 79 | 50-75% Grass cover, Fair, HSG C |
| 1,290 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 1,520 | | Weighted Average |
| 1,520 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Pond CB1.1: CB

Inflow Area = 0.467 ac, 82.79% Impervious, Inflow Depth = 3.30" for 2-Year event
Inflow = 1.62 cfs @ 12.08 hrs, Volume= 0.128 af
Primary = 1.62 cfs @ 12.08 hrs, Volume= 0.128 af, Atten= 0%, Lag= 0.0 min
Routed to Link DP1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

## Summary for Pond CB1.2: CB

Inflow Area = 0.736 ac, 82.96% Impervious, Inflow Depth = 3.26" for 2-Year event
Inflow = 2.54 cfs @ 12.09 hrs, Volume= 0.200 af
Primary = 2.54 cfs @ 12.09 hrs, Volume= 0.200 af, Atten= 0%, Lag= 0.0 min
Routed to Link DP1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

## Summary for Pond CB1.3: Leaching CB

Inflow Area = 0.252 ac, 67.34% Impervious, Inflow Depth = 3.03" for 2-Year event
Inflow = 0.81 cfs @ 12.08 hrs, Volume= 0.063 af
Outflow = 0.81 cfs @ 12.09 hrs, Volume= 0.061 af, Atten= 1%, Lag= 0.5 min
Discarded = 0.00 cfs @ 1.70 hrs, Volume= 0.000 af
Primary = 0.81 cfs @ 12.09 hrs, Volume= 0.061 af
Routed to Pond CB1.2 : CB

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 260.00' @ 12.09 hrs Surf.Area= 13 sf Storage= 121 cf

Plug-Flow detention time= 42.2 min calculated for 0.061 af (97% of inflow)
Center-of-Mass det. time= 21.8 min ( 791.2 - 769.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 251.89' | 101 cf | **4.00'D x 8.00'H Vertical Cone/Cylinder** |
| #2 | 259.89' | 157 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) -Impervious |
| | | 257 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 259.89 | 10 | 0 | 0 |
| 260.20 | 1,000 | 157 | 157 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 251.89' | **0.270 in/hr Exfiltration over Surface area** |
| #2 | Primary | 259.90' | **10.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Discarded OutFlow** Max=0.00 cfs @ 1.70 hrs HW=251.97' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=0.80 cfs @ 12.09 hrs HW=260.00' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.80 cfs @ 0.80 fps)

## Summary for Pond DEP4:

Inflow Area = 0.559 ac, 53.76% Impervious, Inflow Depth = 2.68" for 2-Year event
Inflow = 1.42 cfs @ 12.13 hrs, Volume= 0.125 af
Outflow = 0.96 cfs @ 12.25 hrs, Volume= 0.125 af, Atten= 32%, Lag= 7.2 min
Discarded = 0.05 cfs @ 12.25 hrs, Volume= 0.090 af
Primary = 0.91 cfs @ 12.25 hrs, Volume= 0.035 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 247.34' @ 12.25 hrs Surf.Area= 2,250 sf Storage= 2,126 cf

Plug-Flow detention time= 389.1 min calculated for 0.125 af (100% of inflow)
Center-of-Mass det. time= 388.5 min ( 1,169.9 - 781.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 244.70' | 2,498 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 244.70 | 10 | 0 | 0 |
| 245.00 | 40 | 8 | 8 |
| 246.00 | 570 | 305 | 313 |
| 247.00 | 1,700 | 1,135 | 1,448 |
| 247.50 | 2,500 | 1,050 | 2,498 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 244.70' | **1.020 in/hr Exfiltration over Surface area** |
| #2 | Primary | 247.30' | **40.0' long Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 |
| | | | Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Discarded OutFlow** Max=0.05 cfs @ 12.25 hrs HW=247.34' (Free Discharge)
**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=0.91 cfs @ 12.25 hrs HW=247.34' TW=0.00' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** (Weir Controls 0.91 cfs @ 0.52 fps)

## Summary for Pond DEP5:

Inflow Area = 0.387 ac, 21.13% Impervious, Inflow Depth = 1.86" for 2-Year event
Inflow = 0.78 cfs @ 12.09 hrs, Volume= 0.060 af
Outflow = 0.22 cfs @ 12.46 hrs, Volume= 0.032 af, Atten= 71%, Lag= 22.3 min
Primary = 0.22 cfs @ 12.46 hrs, Volume= 0.032 af
Routed to Link DP5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 258.09' @ 12.46 hrs Surf.Area= 2,326 sf Storage= 1,288 cf

Plug-Flow detention time= 250.1 min calculated for 0.032 af (54% of inflow)
Center-of-Mass det. time= 125.7 min ( 938.0 - 812.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 256.00' | 1,889 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 256.00 | 10 | 0 | 0 |
| 257.00 | 190 | 100 | 100 |
| 258.00 | 1,800 | 995 | 1,095 |
| 258.30 | 3,490 | 794 | 1,889 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 258.05' | **10.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=0.22 cfs @ 12.46 hrs HW=258.09' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.22 cfs @ 0.52 fps)

## Summary for Link DP1:

Inflow Area = 1.598 ac, 84.11% Impervious, Inflow Depth = 3.31" for 2-Year event
Inflow = 5.56 cfs @ 12.09 hrs, Volume= 0.440 af
Primary = 5.56 cfs @ 12.09 hrs, Volume= 0.440 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP2:

Inflow Area = 3.713 ac, 51.25% Impervious, Inflow Depth = 2.50" for 2-Year event
Inflow = 6.60 cfs @ 12.27 hrs, Volume= 0.773 af
Primary = 6.60 cfs @ 12.27 hrs, Volume= 0.773 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP3:

Inflow Area = 2.711 ac, 0.93% Impervious, Inflow Depth = 1.38" for 2-Year event
Inflow = 2.60 cfs @ 12.36 hrs, Volume= 0.313 af
Primary = 2.60 cfs @ 12.36 hrs, Volume= 0.313 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP4:

Inflow Area = 3.176 ac, 24.65% Impervious, Inflow Depth = 1.57" for 2-Year event
Inflow = 4.48 cfs @ 12.13 hrs, Volume= 0.417 af
Primary = 4.48 cfs @ 12.13 hrs, Volume= 0.417 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP5:

Inflow Area = 0.860 ac, 42.65% Impervious, Inflow Depth = 1.92" for 2-Year event
Inflow = 1.33 cfs @ 12.09 hrs, Volume= 0.138 af
Primary = 1.33 cfs @ 12.09 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment EX1.1:** Runoff Area=20,340 sf 82.79% Impervious Runoff Depth=5.46"
Tc=6.0 min CN=WQ Runoff=2.65 cfs 0.213 af

**Subcatchment EX1.2:** Runoff Area=21,080 sf 91.08% Impervious Runoff Depth=5.64"
Tc=6.0 min CN=WQ Runoff=2.81 cfs 0.227 af

**Subcatchment EX1.3:** Runoff Area=10,960 sf 67.34% Impervious Runoff Depth=5.14"
Tc=6.0 min CN=WQ Runoff=1.36 cfs 0.108 af

**Subcatchment EX1.4:** Runoff Area=1,140 sf 24.56% Impervious Runoff Depth=4.25"
Tc=6.0 min CN=WQ Runoff=0.12 cfs 0.009 af

**Subcatchment EX1.5:** Runoff Area=16,080 sf 92.29% Impervious Runoff Depth=5.66"
Tc=6.0 min CN=WQ Runoff=2.15 cfs 0.174 af

**Subcatchment EX2.1:** Runoff Area=161,730 sf 51.25% Impervious Runoff Depth=4.45"
Flow Length=264' Tc=20.4 min CN=WQ Runoff=11.89 cfs 1.378 af

**Subcatchment EX3.1:** Runoff Area=118,100 sf 0.93% Impervious Runoff Depth=3.08"
Flow Length=389' Tc=24.3 min CN=WQ Runoff=6.04 cfs 0.696 af

**Subcatchment EX4.1:** Runoff Area=24,350 sf 53.76% Impervious Runoff Depth=4.70"
Flow Length=245' Tc=9.6 min CN=WQ Runoff=2.50 cfs 0.219 af

**Subcatchment EX4.2:** Runoff Area=114,000 sf 18.44% Impervious Runoff Depth=3.53"
Flow Length=344' Tc=9.1 min CN=WQ Runoff=9.31 cfs 0.769 af

**Subcatchment EX5.1:** Runoff Area=19,100 sf 65.03% Impervious Runoff Depth=4.79"
Tc=6.0 min CN=WQ Runoff=2.21 cfs 0.175 af

**Subcatchment EX5.2:** Runoff Area=16,850 sf 21.13% Impervious Runoff Depth=3.66"
Tc=6.0 min CN=WQ Runoff=1.58 cfs 0.118 af

**Subcatchment EX5.3:** Runoff Area=1,520 sf 0.00% Impervious Runoff Depth=2.99"
Tc=6.0 min CN=WQ Runoff=0.12 cfs 0.009 af

**Pond CB1.1: CB** Inflow=2.65 cfs 0.213 af
Primary=2.65 cfs 0.213 af

**Pond CB1.2: CB** Inflow=4.15 cfs 0.333 af
Primary=4.15 cfs 0.333 af

**Pond CB1.3: Leaching CB** Peak Elev=260.04' Storage=139 cf Inflow=1.36 cfs 0.108 af
Discarded=0.00 cfs 0.000 af Primary=1.36 cfs 0.105 af Outflow=1.36 cfs 0.106 af

**Pond DEP4:** Peak Elev=247.38' Storage=2,218 cf Inflow=2.50 cfs 0.219 af
Discarded=0.05 cfs 0.105 af Primary=2.41 cfs 0.114 af Outflow=2.47 cfs 0.219 af

**Pond DEP5:** Peak Elev=258.19' Storage=1,545 cf Inflow=1.58 cfs 0.118 af
Outflow=1.34 cfs 0.091 af

**Link DP1:** Inflow=9.07 cfs 0.729 af
Primary=9.07 cfs 0.729 af

**Link DP2:** Inflow=11.89 cfs 1.378 af
Primary=11.89 cfs 1.378 af

**Link DP3:** Inflow=6.04 cfs 0.696 af
Primary=6.04 cfs 0.696 af

**Link DP4:** Inflow=11.69 cfs 0.883 af
Primary=11.69 cfs 0.883 af

**Link DP5:** Inflow=3.52 cfs 0.275 af
Primary=3.52 cfs 0.275 af

**Total Runoff Area = 12.058 ac Runoff Volume = 4.095 af Average Runoff Depth = 4.08"**
**63.33% Pervious = 7.636 ac 36.67% Impervious = 4.422 ac**

## Summary for Subcatchment EX1.1:

Runoff = 2.65 cfs @ 12.08 hrs, Volume= 0.213 af, Depth= 5.46"
Routed to Pond CB1.1 : CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 460 | 98 | Roofs, HSG C |
| 16,380 | 98 | Paved parking, HSG C |
| 3,500 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 20,340 | | Weighted Average |
| 3,500 | | 17.21% Pervious Area |
| 16,840 | | 82.79% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.2:

Runoff = 2.81 cfs @ 12.08 hrs, Volume= 0.227 af, Depth= 5.64"
Routed to Pond CB1.2 : CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 2,630 | 98 | Roofs, HSG C |
| 16,570 | 98 | Paved parking, HSG C |
| 1,880 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 21,080 | | Weighted Average |
| 1,880 | | 8.92% Pervious Area |
| 19,200 | | 91.08% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.3:

Runoff = 1.36 cfs @ 12.08 hrs, Volume= 0.108 af, Depth= 5.14"
Routed to Pond CB1.3 : Leaching CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 2,660 | 98 | Roofs, HSG C |
| 4,720 | 98 | Paved parking, HSG C |
| 3,580 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 10,960 | | Weighted Average |
| 3,580 | | 32.66% Pervious Area |
| 7,380 | | 67.34% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.4:

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 0.009 af, Depth= 4.25"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 280 | 98 | Paved parking, HSG C |
| 860 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 1,140 | | Weighted Average |
| 860 | | 75.44% Pervious Area |
| 280 | | 24.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.5:

Runoff = 2.15 cfs @ 12.08 hrs, Volume= 0.174 af, Depth= 5.66"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 2,980 | 98 | Roofs, HSG C |
| 11,860 | 98 | Paved parking, HSG C |
| 1,240 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 16,080 | | Weighted Average |
| 1,240 | | 7.71% Pervious Area |
| 14,840 | | 92.29% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX2.1:

Runoff = 11.89 cfs @ 12.27 hrs, Volume= 1.378 af, Depth= 4.45"
Routed to Link DP2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 10,610 | 98 | Roofs, HSG C |
| 72,280 | 98 | Paved parking, HSG C |
| 14,600 | 79 | 50-75% Grass cover, Fair, HSG C |
| 64,240 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 161,730 | | Weighted Average |
| 78,840 | | 48.75% Pervious Area |
| 82,890 | | 51.25% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.4 | 50 | 0.0120 | 0.05 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10" |
| 4.0 | 117 | 0.0094 | 0.48 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 18 | 0.4400 | 3.32 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.9 | 79 | 0.0770 | 1.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 20.4 | 264 | Total | | | |

## Summary for Subcatchment EX3.1:

Runoff = 6.04 cfs @ 12.34 hrs, Volume= 0.696 af, Depth= 3.08"
Routed to Link DP3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 1,100 | 98 | Paved parking, HSG C |
| 26,740 | 79 | 50-75% Grass cover, Fair, HSG C |
| 90,260 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 118,100 | | Weighted Average |
| 117,000 | | 99.07% Pervious Area |
| 1,100 | | 0.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.0 | 68 | 0.0130 | 0.06 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10" |
| 0.1 | 12 | 0.5000 | 3.54 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 5.1 | 309 | 0.0400 | 1.00 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 24.3 | 389 | Total | | | |

## Summary for Subcatchment EX4.1:

Runoff = 2.50 cfs @ 12.13 hrs, Volume= 0.219 af, Depth= 4.70"
Routed to Pond DEP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 5,120 | 98 | Roofs, HSG C |
| 7,970 | 98 | Paved parking, HSG C |
| 7,030 | 79 | 50-75% Grass cover, Fair, HSG C |
| 4,230 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 24,350 | | Weighted Average |
| 11,260 | | 46.24% Pervious Area |
| 13,090 | | 53.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.1 | 50 | 0.0260 | 0.16 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.10" |
| 3.1 | 58 | 0.0020 | 0.31 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 38 | 0.0240 | 3.14 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 70 | 0.0440 | 1.47 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 29 | 0.0660 | 1.28 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 9.6 | 245 | Total | | | |

## Summary for Subcatchment EX4.2:

Runoff = 9.31 cfs @ 12.13 hrs, Volume= 0.769 af, Depth= 3.53"
Routed to Link DP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 3,370 | 98 | Roofs, HSG C |
| 17,650 | 98 | Paved parking, HSG C |
| 13,980 | 79 | 50-75% Grass cover, Fair, HSG C |
| 77,900 | 70 | Woods, Good, HSG C |
| 1,100 | 89 | Gravel roads, HSG C |
| 114,000 | | Weighted Average |
| 92,980 | | 81.56% Pervious Area |
| 21,020 | | 18.44% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 75 | 0.0470 | 0.22 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.10" |
| 0.1 | 19 | 0.0160 | 2.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.4 | 250 | 0.0600 | 1.22 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 9.1 | 344 | Total | | | |

## Summary for Subcatchment EX5.1:

Runoff = 2.21 cfs @ 12.09 hrs, Volume= 0.175 af, Depth= 4.79"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 12,420 | 98 | Paved parking, HSG C |
| 200 | 79 | 50-75% Grass cover, Fair, HSG C |
| 6,480 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 19,100 | | Weighted Average |
| 6,680 | | 34.97% Pervious Area |
| 12,420 | | 65.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX5.2:

Runoff = 1.58 cfs @ 12.09 hrs, Volume= 0.118 af, Depth= 3.66"
Routed to Pond DEP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 1,030 | 98 | Roofs, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 3,530 | 79 | 50-75% Grass cover, Fair, HSG C |
| 9,760 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 2,530 | 98 | Water Surface, HSG C |
| 16,850 | | Weighted Average |
| 13,290 | | 78.87% Pervious Area |
| 3,560 | | 21.13% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX5.3:

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 0.009 af, Depth= 2.99"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 230 | 79 | 50-75% Grass cover, Fair, HSG C |
| 1,290 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 1,520 | | Weighted Average |
| 1,520 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Pond CB1.1: CB

Inflow Area = 0.467 ac, 82.79% Impervious, Inflow Depth = 5.46" for 10-Year event
Inflow = 2.65 cfs @ 12.08 hrs, Volume= 0.213 af
Primary = 2.65 cfs @ 12.08 hrs, Volume= 0.213 af, Atten= 0%, Lag= 0.0 min
Routed to Link DP1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

## Summary for Pond CB1.2: CB

Inflow Area = 0.736 ac, 82.96% Impervious, Inflow Depth = 5.43" for 10-Year event
Inflow = 4.15 cfs @ 12.09 hrs, Volume= 0.333 af
Primary = 4.15 cfs @ 12.09 hrs, Volume= 0.333 af, Atten= 0%, Lag= 0.0 min
Routed to Link DP1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

## Summary for Pond CB1.3: Leaching CB

Inflow Area = 0.252 ac, 67.34% Impervious, Inflow Depth = 5.14" for 10-Year event
Inflow = 1.36 cfs @ 12.08 hrs, Volume= 0.108 af
Outflow = 1.36 cfs @ 12.09 hrs, Volume= 0.106 af, Atten= 1%, Lag= 0.6 min
Discarded = 0.00 cfs @ 1.11 hrs, Volume= 0.000 af
Primary = 1.36 cfs @ 12.09 hrs, Volume= 0.105 af
Routed to Pond CB1.2 : CB

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 260.04' @ 12.09 hrs Surf.Area= 13 sf Storage= 139 cf

Plug-Flow detention time= 27.2 min calculated for 0.106 af (98% of inflow)
Center-of-Mass det. time= 14.7 min ( 776.6 - 761.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 251.89' | 101 cf | **4.00'D x 8.00'H Vertical Cone/Cylinder** |
| #2 | 259.89' | 157 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) -Impervious |
| | | 257 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 259.89 | 10 | 0 | 0 |
| 260.20 | 1,000 | 157 | 157 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 251.89' | **0.270 in/hr Exfiltration over Surface area** |
| #2 | Primary | 259.90' | **10.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Discarded OutFlow** Max=0.00 cfs @ 1.11 hrs HW=251.98' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=1.35 cfs @ 12.09 hrs HW=260.04' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 1.35 cfs @ 0.96 fps)

## Summary for Pond DEP4:

Inflow Area = 0.559 ac, 53.76% Impervious, Inflow Depth = 4.70" for 10-Year event
Inflow = 2.50 cfs @ 12.13 hrs, Volume= 0.219 af
Outflow = 2.47 cfs @ 12.15 hrs, Volume= 0.219 af, Atten= 1%, Lag= 0.9 min
Discarded = 0.05 cfs @ 12.15 hrs, Volume= 0.105 af
Primary = 2.41 cfs @ 12.15 hrs, Volume= 0.114 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 247.38' @ 12.15 hrs Surf.Area= 2,314 sf Storage= 2,218 cf

Plug-Flow detention time= 264.0 min calculated for 0.219 af (100% of inflow)
Center-of-Mass det. time= 262.9 min ( 1,037.3 - 774.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 244.70' | 2,498 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 244.70 | 10 | 0 | 0 |
| 245.00 | 40 | 8 | 8 |
| 246.00 | 570 | 305 | 313 |
| 247.00 | 1,700 | 1,135 | 1,448 |
| 247.50 | 2,500 | 1,050 | 2,498 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 244.70' | **1.020 in/hr Exfiltration over Surface area** |
| #2 | Primary | 247.30' | **40.0' long Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 |
| | | | Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Discarded OutFlow** Max=0.05 cfs @ 12.15 hrs HW=247.38' (Free Discharge)
**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

**Primary OutFlow** Max=2.41 cfs @ 12.15 hrs HW=247.38' TW=0.00' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** (Weir Controls 2.41 cfs @ 0.72 fps)

## Summary for Pond DEP5:

Inflow Area = 0.387 ac, 21.13% Impervious, Inflow Depth = 3.66" for 10-Year event
Inflow = 1.58 cfs @ 12.09 hrs, Volume= 0.118 af
Outflow = 1.34 cfs @ 12.14 hrs, Volume= 0.091 af, Atten= 16%, Lag= 3.1 min
Primary = 1.34 cfs @ 12.14 hrs, Volume= 0.091 af
Routed to Link DP5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 258.19' @ 12.14 hrs Surf.Area= 2,884 sf Storage= 1,545 cf

Plug-Flow detention time= 148.2 min calculated for 0.091 af (77% of inflow)
Center-of-Mass det. time= 62.1 min ( 864.2 - 802.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 256.00' | 1,889 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 256.00 | 10 | 0 | 0 |
| 257.00 | 190 | 100 | 100 |
| 258.00 | 1,800 | 995 | 1,095 |
| 258.30 | 3,490 | 794 | 1,889 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 258.05' | **10.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=1.34 cfs @ 12.14 hrs HW=258.19' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 1.34 cfs @ 0.94 fps)

## Summary for Link DP1:

Inflow Area = 1.598 ac, 84.11% Impervious, Inflow Depth = 5.47" for 10-Year event
Inflow = 9.07 cfs @ 12.09 hrs, Volume= 0.729 af
Primary = 9.07 cfs @ 12.09 hrs, Volume= 0.729 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP2:

Inflow Area = 3.713 ac, 51.25% Impervious, Inflow Depth = 4.45" for 10-Year event
Inflow = 11.89 cfs @ 12.27 hrs, Volume= 1.378 af
Primary = 11.89 cfs @ 12.27 hrs, Volume= 1.378 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP3:

Inflow Area = 2.711 ac, 0.93% Impervious, Inflow Depth = 3.08" for 10-Year event
Inflow = 6.04 cfs @ 12.34 hrs, Volume= 0.696 af
Primary = 6.04 cfs @ 12.34 hrs, Volume= 0.696 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP4:

Inflow Area = 3.176 ac, 24.65% Impervious, Inflow Depth = 3.34" for 10-Year event
Inflow = 11.69 cfs @ 12.13 hrs, Volume= 0.883 af
Primary = 11.69 cfs @ 12.13 hrs, Volume= 0.883 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP5:

Inflow Area = 0.860 ac, 42.65% Impervious, Inflow Depth = 3.83" for 10-Year event
Inflow = 3.52 cfs @ 12.10 hrs, Volume= 0.275 af
Primary = 3.52 cfs @ 12.10 hrs, Volume= 0.275 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment EX1.1:** Runoff Area=20,340 sf 82.79% Impervious Runoff Depth=7.19"
Tc=6.0 min CN=WQ Runoff=3.46 cfs 0.280 af

**Subcatchment EX1.2:** Runoff Area=21,080 sf 91.08% Impervious Runoff Depth=7.37"
Tc=6.0 min CN=WQ Runoff=3.65 cfs 0.297 af

**Subcatchment EX1.3:** Runoff Area=10,960 sf 67.34% Impervious Runoff Depth=6.84"
Tc=6.0 min CN=WQ Runoff=1.81 cfs 0.143 af

**Subcatchment EX1.4:** Runoff Area=1,140 sf 24.56% Impervious Runoff Depth=5.88"
Tc=6.0 min CN=WQ Runoff=0.17 cfs 0.013 af

**Subcatchment EX1.5:** Runoff Area=16,080 sf 92.29% Impervious Runoff Depth=7.40"
Tc=6.0 min CN=WQ Runoff=2.79 cfs 0.228 af

**Subcatchment EX2.1:** Runoff Area=161,730 sf 51.25% Impervious Runoff Depth=6.07"
Flow Length=264' Tc=20.4 min CN=WQ Runoff=16.23 cfs 1.878 af

**Subcatchment EX3.1:** Runoff Area=118,100 sf 0.93% Impervious Runoff Depth=4.57"
Flow Length=389' Tc=24.3 min CN=WQ Runoff=8.98 cfs 1.031 af

**Subcatchment EX4.1:** Runoff Area=24,350 sf 53.76% Impervious Runoff Depth=6.36"
Flow Length=245' Tc=9.6 min CN=WQ Runoff=3.37 cfs 0.296 af

**Subcatchment EX4.2:** Runoff Area=114,000 sf 18.44% Impervious Runoff Depth=5.05"
Flow Length=344' Tc=9.1 min CN=WQ Runoff=13.39 cfs 1.102 af

**Subcatchment EX5.1:** Runoff Area=19,100 sf 65.03% Impervious Runoff Depth=6.44"
Tc=6.0 min CN=WQ Runoff=2.96 cfs 0.235 af

**Subcatchment EX5.2:** Runoff Area=16,850 sf 21.13% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=WQ Runoff=2.26 cfs 0.168 af

**Subcatchment EX5.3:** Runoff Area=1,520 sf 0.00% Impervious Runoff Depth=4.46"
Tc=6.0 min CN=WQ Runoff=0.18 cfs 0.013 af

**Pond CB1.1: CB** Inflow=3.46 cfs 0.280 af
Primary=3.46 cfs 0.280 af

**Pond CB1.2: CB** Inflow=5.43 cfs 0.438 af
Primary=5.43 cfs 0.438 af

**Pond CB1.3: Leaching CB** Peak Elev=260.07' Storage=155 cf Inflow=1.81 cfs 0.143 af
Discarded=0.00 cfs 0.000 af Primary=1.79 cfs 0.141 af Outflow=1.79 cfs 0.141 af

**Pond DEP4:** Peak Elev=247.40' Storage=2,262 cf Inflow=3.37 cfs 0.296 af
Discarded=0.06 cfs 0.113 af Primary=3.28 cfs 0.183 af Outflow=3.33 cfs 0.295 af

**Pond DEP5:** Peak Elev=258.24' Storage=1,674 cf Inflow=2.26 cfs 0.168 af
Outflow=1.98 cfs 0.141 af

**Link DP1:** Inflow=11.84 cfs 0.958 af
Primary=11.84 cfs 0.958 af

**Link DP2:** Inflow=16.23 cfs 1.878 af
Primary=16.23 cfs 1.878 af

**Link DP3:** Inflow=8.98 cfs 1.031 af
Primary=8.98 cfs 1.031 af

**Link DP4:** Inflow=16.63 cfs 1.284 af
Primary=16.63 cfs 1.284 af

**Link DP5:** Inflow=4.98 cfs 0.389 af
Primary=4.98 cfs 0.389 af

**Total Runoff Area = 12.058 ac Runoff Volume = 5.684 af Average Runoff Depth = 5.66"**
**63.33% Pervious = 7.636 ac 36.67% Impervious = 4.422 ac**

## Summary for Subcatchment EX1.1:

Runoff = 3.46 cfs @ 12.08 hrs, Volume= 0.280 af, Depth= 7.19"
Routed to Pond CB1.1 : CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 460 | 98 | Roofs, HSG C |
| 16,380 | 98 | Paved parking, HSG C |
| 3,500 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 20,340 | | Weighted Average |
| 3,500 | | 17.21% Pervious Area |
| 16,840 | | 82.79% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.2:

Runoff = 3.65 cfs @ 12.08 hrs, Volume= 0.297 af, Depth= 7.37"
Routed to Pond CB1.2 : CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 2,630 | 98 | Roofs, HSG C |
| 16,570 | 98 | Paved parking, HSG C |
| 1,880 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 21,080 | | Weighted Average |
| 1,880 | | 8.92% Pervious Area |
| 19,200 | | 91.08% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.3:

Runoff = 1.81 cfs @ 12.08 hrs, Volume= 0.143 af, Depth= 6.84"
Routed to Pond CB1.3 : Leaching CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 2,660 | 98 | Roofs, HSG C |
| 4,720 | 98 | Paved parking, HSG C |
| 3,580 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 10,960 | | Weighted Average |
| 3,580 | | 32.66% Pervious Area |
| 7,380 | | 67.34% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.4:

Runoff = 0.17 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 5.88"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 280 | 98 | Paved parking, HSG C |
| 860 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 1,140 | | Weighted Average |
| 860 | | 75.44% Pervious Area |
| 280 | | 24.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.5:

Runoff = 2.79 cfs @ 12.08 hrs, Volume= 0.228 af, Depth= 7.40"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 2,980 | 98 | Roofs, HSG C |
| 11,860 | 98 | Paved parking, HSG C |
| 1,240 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 16,080 | | Weighted Average |
| 1,240 | | 7.71% Pervious Area |
| 14,840 | | 92.29% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX2.1:

Runoff = 16.23 cfs @ 12.27 hrs, Volume= 1.878 af, Depth= 6.07"
Routed to Link DP2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 10,610 | 98 | Roofs, HSG C |
| 72,280 | 98 | Paved parking, HSG C |
| 14,600 | 79 | 50-75% Grass cover, Fair, HSG C |
| 64,240 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 161,730 | | Weighted Average |
| 78,840 | | 48.75% Pervious Area |
| 82,890 | | 51.25% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.4 | 50 | 0.0120 | 0.05 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10" |
| 4.0 | 117 | 0.0094 | 0.48 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 18 | 0.4400 | 3.32 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.9 | 79 | 0.0770 | 1.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 20.4 | 264 | Total | | | |

## Summary for Subcatchment EX3.1:

Runoff = 8.98 cfs @ 12.34 hrs, Volume= 1.031 af, Depth= 4.57"
Routed to Link DP3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 1,100 | 98 | Paved parking, HSG C |
| 26,740 | 79 | 50-75% Grass cover, Fair, HSG C |
| 90,260 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 118,100 | | Weighted Average |
| 117,000 | | 99.07% Pervious Area |
| 1,100 | | 0.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.0 | 68 | 0.0130 | 0.06 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10" |
| 0.1 | 12 | 0.5000 | 3.54 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 5.1 | 309 | 0.0400 | 1.00 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 24.3 | 389 | Total | | | |

## Summary for Subcatchment EX4.1:

Runoff = 3.37 cfs @ 12.13 hrs, Volume= 0.296 af, Depth= 6.36"
Routed to Pond DEP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 5,120 | 98 | Roofs, HSG C |
| 7,970 | 98 | Paved parking, HSG C |
| 7,030 | 79 | 50-75% Grass cover, Fair, HSG C |
| 4,230 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 24,350 | | Weighted Average |
| 11,260 | | 46.24% Pervious Area |
| 13,090 | | 53.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.1 | 50 | 0.0260 | 0.16 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.10" |
| 3.1 | 58 | 0.0020 | 0.31 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 38 | 0.0240 | 3.14 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 70 | 0.0440 | 1.47 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 29 | 0.0660 | 1.28 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 9.6 | 245 | Total | | | |

## Summary for Subcatchment EX4.2:

Runoff = 13.39 cfs @ 12.13 hrs, Volume= 1.102 af, Depth= 5.05"
Routed to Link DP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 3,370 | 98 | Roofs, HSG C |
| 17,650 | 98 | Paved parking, HSG C |
| 13,980 | 79 | 50-75% Grass cover, Fair, HSG C |
| 77,900 | 70 | Woods, Good, HSG C |
| 1,100 | 89 | Gravel roads, HSG C |
| 114,000 | | Weighted Average |
| 92,980 | | 81.56% Pervious Area |
| 21,020 | | 18.44% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 75 | 0.0470 | 0.22 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.10" |
| 0.1 | 19 | 0.0160 | 2.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.4 | 250 | 0.0600 | 1.22 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 9.1 | 344 | Total | | | |

## Summary for Subcatchment EX5.1:

Runoff = 2.96 cfs @ 12.08 hrs, Volume= 0.235 af, Depth= 6.44"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 12,420 | 98 | Paved parking, HSG C |
| 200 | 79 | 50-75% Grass cover, Fair, HSG C |
| 6,480 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 19,100 | | Weighted Average |
| 6,680 | | 34.97% Pervious Area |
| 12,420 | | 65.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX5.2:

Runoff = 2.26 cfs @ 12.09 hrs, Volume= 0.168 af, Depth= 5.21"
Routed to Pond DEP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 1,030 | 98 | Roofs, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 3,530 | 79 | 50-75% Grass cover, Fair, HSG C |
| 9,760 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 2,530 | 98 | Water Surface, HSG C |
| 16,850 | | Weighted Average |
| 13,290 | | 78.87% Pervious Area |
| 3,560 | | 21.13% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX5.3:

Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 4.46"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 230 | 79 | 50-75% Grass cover, Fair, HSG C |
| 1,290 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 1,520 | | Weighted Average |
| 1,520 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Pond CB1.1: CB

Inflow Area = 0.467 ac, 82.79% Impervious, Inflow Depth = 7.19" for 25-Year event
Inflow = 3.46 cfs @ 12.08 hrs, Volume= 0.280 af
Primary = 3.46 cfs @ 12.08 hrs, Volume= 0.280 af, Atten= 0%, Lag= 0.0 min
Routed to Link DP1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

## Summary for Pond CB1.2: CB

Inflow Area = 0.736 ac, 82.96% Impervious, Inflow Depth = 7.15" for 25-Year event
Inflow = 5.43 cfs @ 12.09 hrs, Volume= 0.438 af
Primary = 5.43 cfs @ 12.09 hrs, Volume= 0.438 af, Atten= 0%, Lag= 0.0 min
Routed to Link DP1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

## Summary for Pond CB1.3: Leaching CB

Inflow Area = 0.252 ac, 67.34% Impervious, Inflow Depth = 6.84" for 25-Year event
Inflow = 1.81 cfs @ 12.08 hrs, Volume= 0.143 af
Outflow = 1.79 cfs @ 12.09 hrs, Volume= 0.141 af, Atten= 1%, Lag= 0.6 min
Discarded = 0.00 cfs @ 0.88 hrs, Volume= 0.000 af
Primary = 1.79 cfs @ 12.09 hrs, Volume= 0.141 af
Routed to Pond CB1.2 : CB

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 260.07' @ 12.09 hrs Surf.Area= 13 sf Storage= 155 cf

Plug-Flow detention time= 21.2 min calculated for 0.141 af (98% of inflow)
Center-of-Mass det. time= 11.7 min ( 769.6 - 758.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 251.89' | 101 cf | **4.00'D x 8.00'H Vertical Cone/Cylinder** |
| #2 | 259.89' | 157 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) -Impervious |
| | | 257 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 259.89 | 10 | 0 | 0 |
| 260.20 | 1,000 | 157 | 157 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 251.89' | **0.270 in/hr Exfiltration over Surface area** |
| #2 | Primary | 259.90' | **10.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Discarded OutFlow** Max=0.00 cfs @ 0.88 hrs HW=251.98' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=1.79 cfs @ 12.09 hrs HW=260.07' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 1.79 cfs @ 1.05 fps)

## Summary for Pond DEP4:

Inflow Area = 0.559 ac, 53.76% Impervious, Inflow Depth = 6.36" for 25-Year event
Inflow = 3.37 cfs @ 12.13 hrs, Volume= 0.296 af
Outflow = 3.33 cfs @ 12.14 hrs, Volume= 0.295 af, Atten= 1%, Lag= 0.8 min
Discarded = 0.06 cfs @ 12.14 hrs, Volume= 0.113 af
Primary = 3.28 cfs @ 12.14 hrs, Volume= 0.183 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 247.40' @ 12.14 hrs Surf.Area= 2,344 sf Storage= 2,262 cf

Plug-Flow detention time= 213.0 min calculated for 0.295 af (100% of inflow)
Center-of-Mass det. time= 211.4 min ( 981.8 - 770.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 244.70' | 2,498 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 244.70 | 10 | 0 | 0 |
| 245.00 | 40 | 8 | 8 |
| 246.00 | 570 | 305 | 313 |
| 247.00 | 1,700 | 1,135 | 1,448 |
| 247.50 | 2,500 | 1,050 | 2,498 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 244.70' | **1.020 in/hr Exfiltration over Surface area** |
| #2 | Primary | 247.30' | **40.0' long Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 |
| | | | Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Discarded OutFlow** Max=0.06 cfs @ 12.14 hrs HW=247.40' (Free Discharge)
**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=3.27 cfs @ 12.14 hrs HW=247.40' TW=0.00' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** (Weir Controls 3.27 cfs @ 0.80 fps)

## Summary for Pond DEP5:

Inflow Area = 0.387 ac, 21.13% Impervious, Inflow Depth = 5.21" for 25-Year event
Inflow = 2.26 cfs @ 12.09 hrs, Volume= 0.168 af
Outflow = 1.98 cfs @ 12.13 hrs, Volume= 0.141 af, Atten= 12%, Lag= 2.6 min
Primary = 1.98 cfs @ 12.13 hrs, Volume= 0.141 af
Routed to Link DP5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 258.24' @ 12.13 hrs Surf.Area= 3,125 sf Storage= 1,674 cf

Plug-Flow detention time= 119.0 min calculated for 0.141 af (84% of inflow)
Center-of-Mass det. time= 49.7 min ( 845.5 - 795.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 256.00' | 1,889 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 256.00 | 10 | 0 | 0 |
| 257.00 | 190 | 100 | 100 |
| 258.00 | 1,800 | 995 | 1,095 |
| 258.30 | 3,490 | 794 | 1,889 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 258.05' | **10.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=1.98 cfs @ 12.13 hrs HW=258.24' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 1.98 cfs @ 1.07 fps)

## Summary for Link DP1:

Inflow Area = 1.598 ac, 84.11% Impervious, Inflow Depth = 7.20" for 25-Year event
Inflow = 11.84 cfs @ 12.09 hrs, Volume= 0.958 af
Primary = 11.84 cfs @ 12.09 hrs, Volume= 0.958 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP2:

Inflow Area = 3.713 ac, 51.25% Impervious, Inflow Depth = 6.07" for 25-Year event
Inflow = 16.23 cfs @ 12.27 hrs, Volume= 1.878 af
Primary = 16.23 cfs @ 12.27 hrs, Volume= 1.878 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP3:

Inflow Area = 2.711 ac, 0.93% Impervious, Inflow Depth = 4.57" for 25-Year event
Inflow = 8.98 cfs @ 12.34 hrs, Volume= 1.031 af
Primary = 8.98 cfs @ 12.34 hrs, Volume= 1.031 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP4:

Inflow Area = 3.176 ac, 24.65% Impervious, Inflow Depth = 4.85" for 25-Year event
Inflow = 16.63 cfs @ 12.13 hrs, Volume= 1.284 af
Primary = 16.63 cfs @ 12.13 hrs, Volume= 1.284 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP5:

Inflow Area = 0.860 ac, 42.65% Impervious, Inflow Depth = 5.42" for 25-Year event
Inflow = 4.98 cfs @ 12.10 hrs, Volume= 0.389 af
Primary = 4.98 cfs @ 12.10 hrs, Volume= 0.389 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment EX1.1:** Runoff Area=20,340 sf 82.79% Impervious Runoff Depth=10.06"
Tc=6.0 min CN=WQ Runoff=4.81 cfs 0.391 af

**Subcatchment EX1.2:** Runoff Area=21,080 sf 91.08% Impervious Runoff Depth=10.26"
Tc=6.0 min CN=WQ Runoff=5.04 cfs 0.414 af

**Subcatchment EX1.3:** Runoff Area=10,960 sf 67.34% Impervious Runoff Depth=9.69"
Tc=6.0 min CN=WQ Runoff=2.54 cfs 0.203 af

**Subcatchment EX1.4:** Runoff Area=1,140 sf 24.56% Impervious Runoff Depth=8.66"
Tc=6.0 min CN=WQ Runoff=0.25 cfs 0.019 af

**Subcatchment EX1.5:** Runoff Area=16,080 sf 92.29% Impervious Runoff Depth=10.28"
Tc=6.0 min CN=WQ Runoff=3.85 cfs 0.316 af

**Subcatchment EX2.1:** Runoff Area=161,730 sf 51.25% Impervious Runoff Depth=8.82"
Flow Length=264' Tc=20.4 min CN=WQ Runoff=23.57 cfs 2.729 af

**Subcatchment EX3.1:** Runoff Area=118,100 sf 0.93% Impervious Runoff Depth=7.17"
Flow Length=389' Tc=24.3 min CN=WQ Runoff=14.03 cfs 1.621 af

**Subcatchment EX4.1:** Runoff Area=24,350 sf 53.76% Impervious Runoff Depth=9.15"
Flow Length=245' Tc=9.6 min CN=WQ Runoff=4.82 cfs 0.426 af

**Subcatchment EX4.2:** Runoff Area=114,000 sf 18.44% Impervious Runoff Depth=7.70"
Flow Length=344' Tc=9.1 min CN=WQ Runoff=20.37 cfs 1.680 af

**Subcatchment EX5.1:** Runoff Area=19,100 sf 65.03% Impervious Runoff Depth=9.22"
Tc=6.0 min CN=WQ Runoff=4.23 cfs 0.337 af

**Subcatchment EX5.2:** Runoff Area=16,850 sf 21.13% Impervious Runoff Depth=7.88"
Tc=6.0 min CN=WQ Runoff=3.40 cfs 0.254 af

**Subcatchment EX5.3:** Runoff Area=1,520 sf 0.00% Impervious Runoff Depth=7.05"
Tc=6.0 min CN=WQ Runoff=0.29 cfs 0.020 af

**Pond CB1.1: CB** Inflow=4.81 cfs 0.391 af
Primary=4.81 cfs 0.391 af

**Pond CB1.2: CB** Inflow=7.54 cfs 0.614 af
Primary=7.54 cfs 0.614 af

**Pond CB1.3: Leaching CB** Peak Elev=260.11' Storage=183 cf Inflow=2.54 cfs 0.203 af
Discarded=0.00 cfs 0.000 af Primary=2.52 cfs 0.201 af Outflow=2.52 cfs 0.201 af

**Pond DEP4:** Peak Elev=247.43' Storage=2,329 cf Inflow=4.82 cfs 0.426 af
Discarded=0.06 cfs 0.120 af Primary=4.72 cfs 0.305 af Outflow=4.78 cfs 0.425 af

**Pond DEP5:** Peak Elev=258.29' Storage=1,868 cf Inflow=3.40 cfs 0.254 af
Outflow=3.02 cfs 0.227 af

**Link DP1:** Inflow=16.44 cfs 1.341 af
Primary=16.44 cfs 1.341 af

**Link DP2:** Inflow=23.57 cfs 2.729 af
Primary=23.57 cfs 2.729 af

**Link DP3:** Inflow=14.03 cfs 1.621 af
Primary=14.03 cfs 1.621 af

**Link DP4:** Inflow=25.03 cfs 1.985 af
Primary=25.03 cfs 1.985 af

**Link DP5:** Inflow=7.34 cfs 0.584 af
Primary=7.34 cfs 0.584 af

**Total Runoff Area = 12.058 ac Runoff Volume = 8.411 af Average Runoff Depth = 8.37"**
**63.33% Pervious = 7.636 ac 36.67% Impervious = 4.422 ac**

## Summary for Subcatchment EX1.1:

Runoff = 4.81 cfs @ 12.08 hrs, Volume= 0.391 af, Depth=10.06"
Routed to Pond CB1.1 : CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 460 | 98 | Roofs, HSG C |
| 16,380 | 98 | Paved parking, HSG C |
| 3,500 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 20,340 | | Weighted Average |
| 3,500 | | 17.21% Pervious Area |
| 16,840 | | 82.79% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.2:

Runoff = 5.04 cfs @ 12.08 hrs, Volume= 0.414 af, Depth=10.26"
Routed to Pond CB1.2 : CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 2,630 | 98 | Roofs, HSG C |
| 16,570 | 98 | Paved parking, HSG C |
| 1,880 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 21,080 | | Weighted Average |
| 1,880 | | 8.92% Pervious Area |
| 19,200 | | 91.08% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.3:

Runoff = 2.54 cfs @ 12.08 hrs, Volume= 0.203 af, Depth= 9.69"
Routed to Pond CB1.3 : Leaching CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 2,660 | 98 | Roofs, HSG C |
| 4,720 | 98 | Paved parking, HSG C |
| 3,580 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 10,960 | | Weighted Average |
| 3,580 | | 32.66% Pervious Area |
| 7,380 | | 67.34% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.4:

Runoff = 0.25 cfs @ 12.08 hrs, Volume= 0.019 af, Depth= 8.66"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 280 | 98 | Paved parking, HSG C |
| 860 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 1,140 | | Weighted Average |
| 860 | | 75.44% Pervious Area |
| 280 | | 24.56% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX1.5:

Runoff = 3.85 cfs @ 12.08 hrs, Volume= 0.316 af, Depth=10.28"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 2,980 | 98 | Roofs, HSG C |
| 11,860 | 98 | Paved parking, HSG C |
| 1,240 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 16,080 | | Weighted Average |
| 1,240 | | 7.71% Pervious Area |
| 14,840 | | 92.29% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX2.1:

Runoff = 23.57 cfs @ 12.26 hrs, Volume= 2.729 af, Depth= 8.82"
Routed to Link DP2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 10,610 | 98 | Roofs, HSG C |
| 72,280 | 98 | Paved parking, HSG C |
| 14,600 | 79 | 50-75% Grass cover, Fair, HSG C |
| 64,240 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 161,730 | | Weighted Average |
| 78,840 | | 48.75% Pervious Area |
| 82,890 | | 51.25% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 15.4 | 50 | 0.0120 | 0.05 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10" |
| 4.0 | 117 | 0.0094 | 0.48 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.1 | 18 | 0.4400 | 3.32 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 0.9 | 79 | 0.0770 | 1.39 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 20.4 | 264 | Total | | | |

## Summary for Subcatchment EX3.1:

Runoff = 14.03 cfs @ 12.34 hrs, Volume= 1.621 af, Depth= 7.17"
Routed to Link DP3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 1,100 | 98 | Paved parking, HSG C |
| 26,740 | 79 | 50-75% Grass cover, Fair, HSG C |
| 90,260 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 118,100 | | Weighted Average |
| 117,000 | | 99.07% Pervious Area |
| 1,100 | | 0.93% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 19.0 | 68 | 0.0130 | 0.06 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10" |
| 0.1 | 12 | 0.5000 | 3.54 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 5.1 | 309 | 0.0400 | 1.00 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 24.3 | 389 | Total | | | |

## Summary for Subcatchment EX4.1:

Runoff = 4.82 cfs @ 12.13 hrs, Volume= 0.426 af, Depth= 9.15"
Routed to Pond DEP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 5,120 | 98 | Roofs, HSG C |
| 7,970 | 98 | Paved parking, HSG C |
| 7,030 | 79 | 50-75% Grass cover, Fair, HSG C |
| 4,230 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 24,350 | | Weighted Average |
| 11,260 | | 46.24% Pervious Area |
| 13,090 | | 53.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.1 | 50 | 0.0260 | 0.16 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.10" |
| 3.1 | 58 | 0.0020 | 0.31 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.2 | 38 | 0.0240 | 3.14 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 0.8 | 70 | 0.0440 | 1.47 | | **Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps |
| 0.4 | 29 | 0.0660 | 1.28 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 9.6 | 245 | Total | | | |

## Summary for Subcatchment EX4.2:

Runoff = 20.37 cfs @ 12.12 hrs, Volume= 1.680 af, Depth= 7.70"
Routed to Link DP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 3,370 | 98 | Roofs, HSG C |
| 17,650 | 98 | Paved parking, HSG C |
| 13,980 | 79 | 50-75% Grass cover, Fair, HSG C |
| 77,900 | 70 | Woods, Good, HSG C |
| 1,100 | 89 | Gravel roads, HSG C |
| 114,000 | | Weighted Average |
| 92,980 | | 81.56% Pervious Area |
| 21,020 | | 18.44% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 5.6 | 75 | 0.0470 | 0.22 | | **Sheet Flow,** Grass: Short n= 0.150 P2= 3.10" |
| 0.1 | 19 | 0.0160 | 2.57 | | **Shallow Concentrated Flow,** Paved Kv= 20.3 fps |
| 3.4 | 250 | 0.0600 | 1.22 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 9.1 | 344 | Total | | | |

## Summary for Subcatchment EX5.1:

Runoff = 4.23 cfs @ 12.08 hrs, Volume= 0.337 af, Depth= 9.22"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 12,420 | 98 | Paved parking, HSG C |
| 200 | 79 | 50-75% Grass cover, Fair, HSG C |
| 6,480 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 19,100 | | Weighted Average |
| 6,680 | | 34.97% Pervious Area |
| 12,420 | | 65.03% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX5.2:

Runoff = 3.40 cfs @ 12.09 hrs, Volume= 0.254 af, Depth= 7.88"
Routed to Pond DEP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 1,030 | 98 | Roofs, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 3,530 | 79 | 50-75% Grass cover, Fair, HSG C |
| 9,760 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 2,530 | 98 | Water Surface, HSG C |
| 16,850 | | Weighted Average |
| 13,290 | | 78.87% Pervious Area |
| 3,560 | | 21.13% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment EX5.3:

Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.020 af, Depth= 7.05"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 98 | Roofs, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 230 | 79 | 50-75% Grass cover, Fair, HSG C |
| 1,290 | 70 | Woods, Good, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 1,520 | | Weighted Average |
| 1,520 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Pond CB1.1: CB

Inflow Area = 0.467 ac, 82.79% Impervious, Inflow Depth = 10.06" for 100-Year event
Inflow = 4.81 cfs @ 12.08 hrs, Volume= 0.391 af
Primary = 4.81 cfs @ 12.08 hrs, Volume= 0.391 af, Atten= 0%, Lag= 0.0 min
Routed to Link DP1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

## Summary for Pond CB1.2: CB

Inflow Area = 0.736 ac, 82.96% Impervious, Inflow Depth = 10.02" for 100-Year event
Inflow = 7.54 cfs @ 12.09 hrs, Volume= 0.614 af
Primary = 7.54 cfs @ 12.09 hrs, Volume= 0.614 af, Atten= 0%, Lag= 0.0 min
Routed to Link DP1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

## Summary for Pond CB1.3: Leaching CB

Inflow Area = 0.252 ac, 67.34% Impervious, Inflow Depth = 9.69" for 100-Year event
Inflow = 2.54 cfs @ 12.08 hrs, Volume= 0.203 af
Outflow = 2.52 cfs @ 12.09 hrs, Volume= 0.201 af, Atten= 1%, Lag= 0.7 min
Discarded = 0.00 cfs @ 0.66 hrs, Volume= 0.000 af
Primary = 2.52 cfs @ 12.09 hrs, Volume= 0.201 af
Routed to Pond CB1.2 : CB

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 260.11' @ 12.09 hrs Surf.Area= 13 sf Storage= 183 cf

Plug-Flow detention time= 15.6 min calculated for 0.201 af (99% of inflow)
Center-of-Mass det. time= 8.7 min ( 762.1 - 753.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 251.89' | 101 cf | **4.00'D x 8.00'H Vertical Cone/Cylinder** |
| #2 | 259.89' | 157 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) -Impervious |
| | | 257 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 259.89 | 10 | 0 | 0 |
| 260.20 | 1,000 | 157 | 157 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 251.89' | **0.270 in/hr Exfiltration over Surface area** |
| #2 | Primary | 259.90' | **10.0' long x 2.0' breadth Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50<br>Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32 |

**Discarded OutFlow** Max=0.00 cfs @ 0.66 hrs HW=251.98' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

**Primary OutFlow** Max=2.51 cfs @ 12.09 hrs HW=260.11' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 2.51 cfs @ 1.18 fps)

## Summary for Pond DEP4:

Inflow Area = 0.559 ac, 53.76% Impervious, Inflow Depth = 9.15" for 100-Year event
Inflow = 4.82 cfs @ 12.13 hrs, Volume= 0.426 af
Outflow = 4.78 cfs @ 12.14 hrs, Volume= 0.425 af, Atten= 1%, Lag= 0.7 min
Discarded = 0.06 cfs @ 12.14 hrs, Volume= 0.120 af
Primary = 4.72 cfs @ 12.14 hrs, Volume= 0.305 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 247.43' @ 12.14 hrs Surf.Area= 2,390 sf Storage= 2,329 cf

Plug-Flow detention time= 159.3 min calculated for 0.425 af (100% of inflow)
Center-of-Mass det. time= 157.9 min ( 923.3 - 765.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 244.70' | 2,498 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 244.70 | 10 | 0 | 0 |
| 245.00 | 40 | 8 | 8 |
| 246.00 | 570 | 305 | 313 |
| 247.00 | 1,700 | 1,135 | 1,448 |
| 247.50 | 2,500 | 1,050 | 2,498 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Discarded | 244.70' | **1.020 in/hr Exfiltration over Surface area** |
| #2 | Primary | 247.30' | **40.0' long Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 |
| | | | Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Discarded OutFlow** Max=0.06 cfs @ 12.14 hrs HW=247.43' (Free Discharge)
**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

**Primary OutFlow** Max=4.72 cfs @ 12.14 hrs HW=247.43' TW=0.00' (Dynamic Tailwater)
**2=Broad-Crested Rectangular Weir** (Weir Controls 4.72 cfs @ 0.90 fps)

## Summary for Pond DEP5:

Inflow Area = 0.387 ac, 21.13% Impervious, Inflow Depth = 7.88" for 100-Year event
Inflow = 3.40 cfs @ 12.09 hrs, Volume= 0.254 af
Outflow = 3.02 cfs @ 12.13 hrs, Volume= 0.227 af, Atten= 11%, Lag= 2.5 min
Primary = 3.02 cfs @ 12.13 hrs, Volume= 0.227 af
Routed to Link DP5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 258.29' @ 12.13 hrs Surf.Area= 3,457 sf Storage= 1,868 cf

Plug-Flow detention time= 92.2 min calculated for 0.227 af (89% of inflow)
Center-of-Mass det. time= 40.2 min ( 827.9 - 787.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 256.00' | 1,889 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 256.00 | 10 | 0 | 0 |
| 257.00 | 190 | 100 | 100 |
| 258.00 | 1,800 | 995 | 1,095 |
| 258.30 | 3,490 | 794 | 1,889 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 258.05' | **10.0' long Broad-Crested Rectangular Weir** |
| | | | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 |
| | | | Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |

**Primary OutFlow** Max=3.02 cfs @ 12.13 hrs HW=258.29' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 3.02 cfs @ 1.24 fps)

## Summary for Link DP1:

Inflow Area = 1.598 ac, 84.11% Impervious, Inflow Depth = 10.07" for 100-Year event
Inflow = 16.44 cfs @ 12.09 hrs, Volume= 1.341 af
Primary = 16.44 cfs @ 12.09 hrs, Volume= 1.341 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP2:

Inflow Area = 3.713 ac, 51.25% Impervious, Inflow Depth = 8.82" for 100-Year event
Inflow = 23.57 cfs @ 12.26 hrs, Volume= 2.729 af
Primary = 23.57 cfs @ 12.26 hrs, Volume= 2.729 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP3:

Inflow Area = 2.711 ac, 0.93% Impervious, Inflow Depth = 7.17" for 100-Year event
Inflow = 14.03 cfs @ 12.34 hrs, Volume= 1.621 af
Primary = 14.03 cfs @ 12.34 hrs, Volume= 1.621 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP4:

Inflow Area = 3.176 ac, 24.65% Impervious, Inflow Depth = 7.50" for 100-Year event
Inflow = 25.03 cfs @ 12.13 hrs, Volume= 1.985 af
Primary = 25.03 cfs @ 12.13 hrs, Volume= 1.985 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

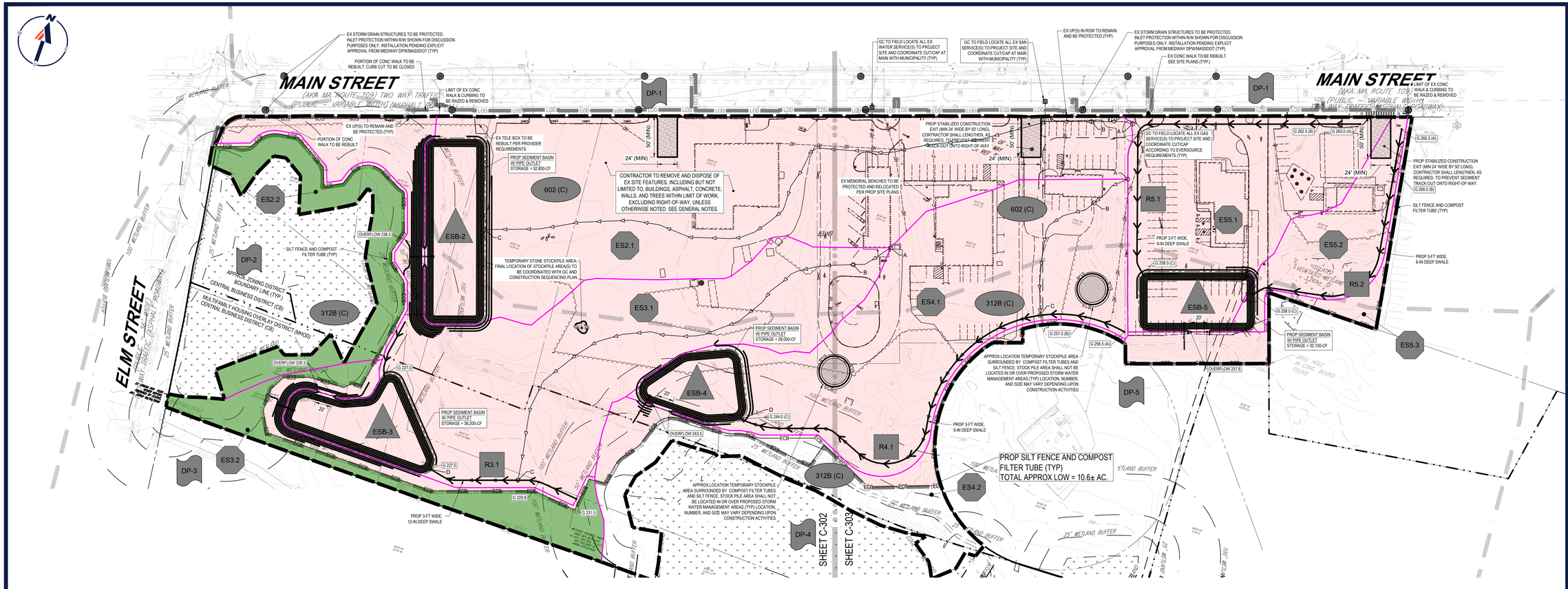
## Summary for Link DP5:

Inflow Area = 0.860 ac, 42.65% Impervious, Inflow Depth = 8.15" for 100-Year event
Inflow = 7.34 cfs @ 12.10 hrs, Volume= 0.584 af
Primary = 7.34 cfs @ 12.10 hrs, Volume= 0.584 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## APPENDIX E: PROPOSED CONDITIONS HYDROLOGIC ANALYSIS

- *PHASE I CONDITIONS DRAINAGE MAP*
- *PHASE I CONDITIONS HYDROCAD CALCULATIONS*
- *PROPOSED CONDITIONS DRAINAGE MAP*
- *PROPOSED CONDITIONS HYDROCAD CALCULATIONS*




## LEGEND

- DP# — DESIGN POINT
- EX-# — EXISTING SUBCATCHMENT
- XX# — BASIN OR MODELED DRAINAGE STRUCTURE
- A/B/C/D — HYDROLOGIC SOIL GROUP RATING
- UNIT — NRCS SOIL MAP UNIT
- X-# — SWALE OR MODELED JUNCTION
- OVERALL ANALYSIS BOUNDARY
- SUBCATCHMENT BOUNDARY
- NRCS SOIL BOUNDARY
- TIME OF CONCENTRATION
- UNIT PAVER OR GRAVEL (PERVIOUS)
- WOODS OR UNDEVELOPED AREA

**THIS PLAN TO BE UTILIZED FOR REFERENCE USE ONLY. SEE BOUNDARY, TOPOGRAPHIC & UTILITY SURVEY ENCLOSED SEPARATELY.**

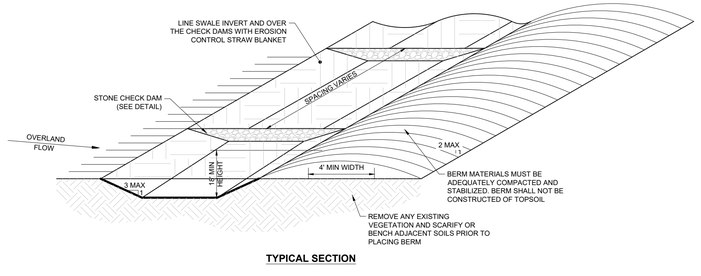
60 30 15 0 60

SCALE: 1" = 60'

## PEDB APPROVAL

**APPROVED BY THE TOWN OF MEDWAY PLANNING AND ECONOMIC DEVELOPMENT BOARD.**

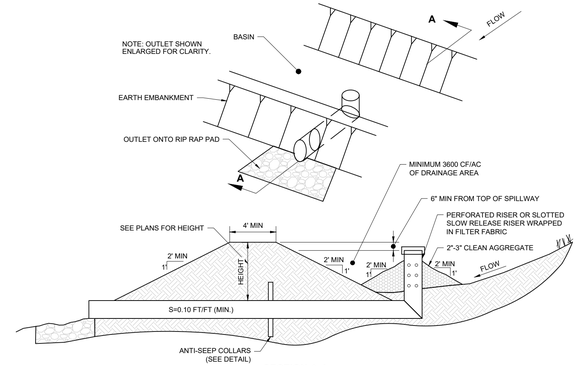
APPROVAL DATE _____ ENDORSEMENT DATE _____




**TYPICAL SECTION**

## TEMPORARY DIVERSION SWALE

NOT TO SCALE (NE-0010103 - 09/2023)




**SECTION A-A**

NOTES:
1. PIPE MATERIAL - CORRUGATED METAL PIPE, PVC, HDPE OR OTHER PLASTIC MATERIAL.
2. ALL PIPE CONNECTION SHALL BE WATERTIGHT.
3. FILL MATERIAL AROUND PIPE SHALL BE COMPACTED IN 4 INCHES LIFTS. A MINIMUM OF 2 FEET OF COMPACTED BACKFILL SHALL BE PLACED OVER THE PIPE BEFORE CROSSING IT WITH CONSTRUCTION TRAFFIC.
4. PONDING OF SEDIMENT LADEN RUNOFF IN SEDIMENT BASIN ACCOMPLISHED BY EMBANKMENT OR EXCAVATION DEPENDING ON TERRAIN.
5. SIDE SLOPES SHALL BE 2:1 OR FLATTER.

## SEDIMENT BASIN WITH PIPE OUTLET

NOT TO SCALE (NE-0049903 - 02/2026)


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PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
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PERMITTING SERVICES
TRANSPORTATION SERVICES



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### REVISIONS

| REV | DATE | COMMENT | DRAWN BY / CHECKED BY |
|---|---|---|---|
| 1 | 09/29/2026 | MUNICIPAL REVIEW COMMENTS | AP, SW / TH, MM |

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**PERMIT SET**

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| | |
|---|---|
| PROJECT No.: | MAA240482.00-1F |
| DRAWN BY: | AP, JK, SW |
| CHECKED BY: | TH, MM |
| DATE: | 02/02/2026 |
| CAD I.D.: | P-CIVL-PROP |

PROJECT:

**HERITAGE ON MAIN**

FOR

**RTE. 85 REALTY CORP**
P.O. BOX 2440

**PROPOSED MIXED-USE DEVELOPMENT**

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SHEET TITLE:

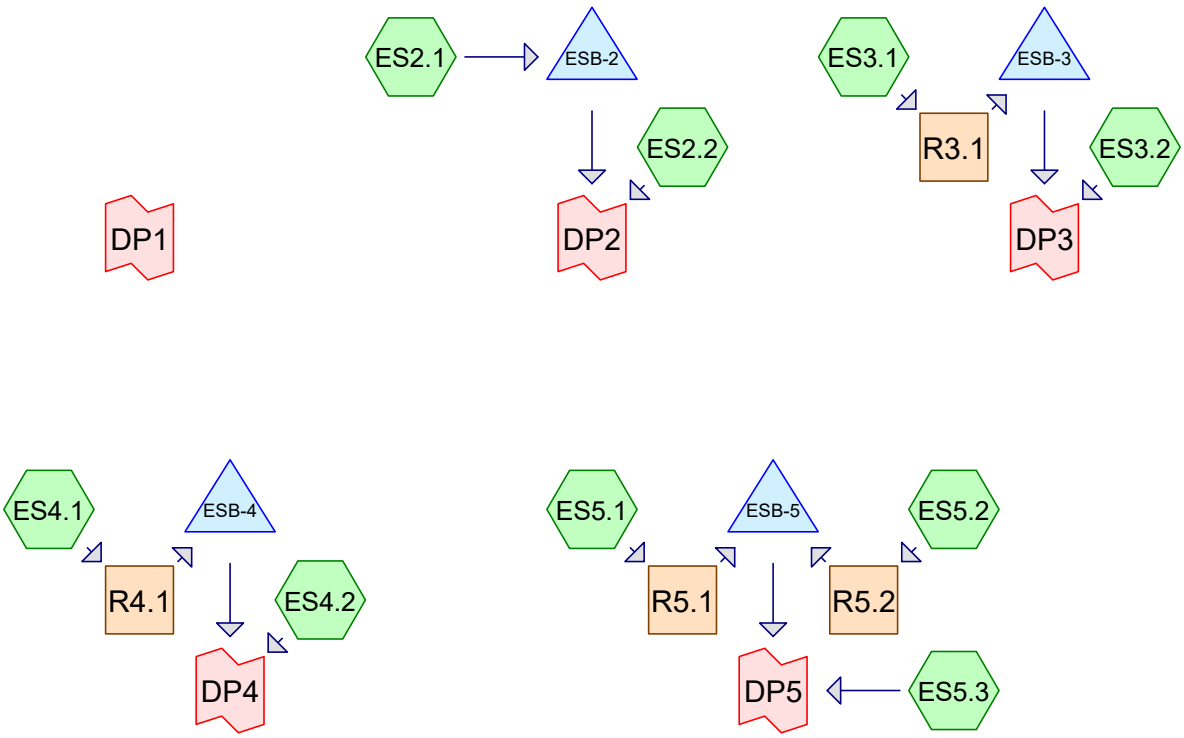
**SOIL EROSION & SEDIMENT CONTROL PLAN PHASE 1**

SHEET NUMBER:

**C-801**

REVISION 1 - 09/25/2026

P:\MA\2024\MAA240482.00\CAD\DRAWINGS\PLAN SETS\CIVIL SITE PLANS\P-CIVL-PROP-MAA240482.00-1F---LAYOUT C-801 ESC1
AP




Subcat Reach Pond Link

**Routing Diagram for W211301_Phs1-1a**
Prepared by Bohler Engineering, PC, Printed 8/31/2026
HydroCAD® 10.20-8a s/n 03478 © 2025 HydroCAD Software Solutions LLC

## Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 10.508 | 87 | Dirt roads, HSG C (ES2.1, ES2.2, ES3.1, ES3.2, ES4.1, ES4.2, ES5.1, ES5.2, ES5.3) |
| 1.550 | 70 | Woods, Good, HSG C (ES2.2, ES3.2, ES4.2) |
| **12.058** | **85** | **TOTAL AREA** |

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment ES2.1:** Runoff Area=140,600 sf 0.00% Impervious Runoff Depth=2.49"
Flow Length=880' Tc=6.0 min CN=87 Runoff=9.37 cfs 0.670 af

**Subcatchment ES2.2:** Runoff Area=39,460 sf 0.00% Impervious Runoff Depth=1.82"
Tc=6.0 min CN=WQ Runoff=1.89 cfs 0.138 af

**Subcatchment ES3.1:** Runoff Area=98,750 sf 0.00% Impervious Runoff Depth=2.49"
Flow Length=810' Tc=6.0 min CN=87 Runoff=6.58 cfs 0.470 af

**Subcatchment ES3.2:** Runoff Area=26,620 sf 0.00% Impervious Runoff Depth=1.57"
Tc=6.0 min CN=WQ Runoff=1.09 cfs 0.080 af

**Subcatchment ES4.1:** Runoff Area=94,800 sf 0.00% Impervious Runoff Depth=2.49"
Flow Length=720' Tc=6.0 min CN=87 Runoff=6.32 cfs 0.452 af

**Subcatchment ES4.2:** Runoff Area=36,610 sf 0.00% Impervious Runoff Depth=1.54"
Tc=6.0 min CN=WQ Runoff=1.47 cfs 0.108 af

**Subcatchment ES5.1:** Runoff Area=57,090 sf 0.00% Impervious Runoff Depth=2.49"
Tc=6.0 min CN=87 Runoff=3.80 cfs 0.272 af

**Subcatchment ES5.2:** Runoff Area=21,060 sf 0.00% Impervious Runoff Depth=2.49"
Tc=6.0 min CN=87 Runoff=1.40 cfs 0.100 af

**Subcatchment ES5.3:** Runoff Area=10,240 sf 0.00% Impervious Runoff Depth=2.49"
Tc=6.0 min CN=87 Runoff=0.68 cfs 0.049 af

**Reach R3.1:** Avg. Flow Depth=0.38' Max Vel=4.14 fps Inflow=6.58 cfs 0.470 af
n=0.025 L=180.0' S=0.0250 '/' Capacity=42.03 cfs Outflow=6.54 cfs 0.470 af

**Reach R4.1:** Avg. Flow Depth=0.38' Max Vel=3.82 fps Inflow=6.32 cfs 0.452 af
n=0.025 L=580.0' S=0.0216 '/' Capacity=21.89 cfs Outflow=5.97 cfs 0.452 af

**Reach R5.1:** Avg. Flow Depth=0.34' Max Vel=2.59 fps Inflow=3.80 cfs 0.272 af
n=0.025 L=450.0' S=0.0111 '/' Capacity=15.72 cfs Outflow=3.55 cfs 0.272 af

**Reach R5.2:** Avg. Flow Depth=0.16' Max Vel=2.35 fps Inflow=1.40 cfs 0.100 af
n=0.025 L=350.0' S=0.0214 '/' Capacity=10.00 cfs Outflow=1.33 cfs 0.100 af

**Pond ESB-2:** Peak Elev=237.23' Storage=27,292 cf Inflow=9.37 cfs 0.670 af
Outflow=0.05 cfs 0.131 af

**Pond ESB-3:** Peak Elev=225.15' Storage=18,666 cf Inflow=6.54 cfs 0.470 af
Outflow=0.05 cfs 0.122 af

**Pond ESB-4:** Peak Elev=242.64' Storage=17,267 cf Inflow=5.97 cfs 0.452 af
Outflow=0.06 cfs 0.156 af

**Pond ESB-5:** Peak Elev=256.00' Storage=14,547 cf Inflow=4.88 cfs 0.372 af
Outflow=0.04 cfs 0.110 af

**Link DP1:**
Primary=0.00 cfs 0.000 af

**Link DP2:** Inflow=1.90 cfs 0.269 af
Primary=1.90 cfs 0.269 af

**Link DP3:** Inflow=1.10 cfs 0.202 af
Primary=1.10 cfs 0.202 af

**Link DP4:** Inflow=1.48 cfs 0.264 af
Primary=1.48 cfs 0.264 af

**Link DP5:** Inflow=0.69 cfs 0.159 af
Primary=0.69 cfs 0.159 af

**Total Runoff Area = 12.058 ac Runoff Volume = 2.339 af Average Runoff Depth = 2.33"**
**100.00% Pervious = 12.058 ac 0.00% Impervious = 0.000 ac**

## Summary for Subcatchment ES2.1:

Runoff = 9.37 cfs @ 12.09 hrs, Volume= 0.670 af, Depth= 2.49"
Routed to Pond ESB-2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 140,600 | 87 | Dirt roads, HSG C |
| 140,600 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.5 | 50 | 0.0500 | 1.70 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10" |
| 5.4 | 830 | 0.0250 | 2.55 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.9 | 880 | Total, Increased to minimum Tc = 6.0 min | | | |

## Summary for Subcatchment ES2.2:

Runoff = 1.89 cfs @ 12.09 hrs, Volume= 0.138 af, Depth= 1.82"
Routed to Link DP2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 18,620 | 87 | Dirt roads, HSG C |
| 20,840 | 70 | Woods, Good, HSG C |
| 39,460 | | Weighted Average |
| 39,460 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES3.1:

Runoff = 6.58 cfs @ 12.09 hrs, Volume= 0.470 af, Depth= 2.49"
Routed to Reach R3.1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 98,750 | 87 | Dirt roads, HSG C |
| 98,750 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.7 | 50 | 0.0200 | 1.18 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10" |
| 2.9 | 550 | 0.0380 | 3.14 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.8 | 210 | 0.0040 | 4.47 | 26.81 | **Channel Flow,** Area= 6.0 sf Perim= 18.3' r= 0.33' n= 0.010 |
| 4.4 | 810 | Total, Increased to minimum Tc = 6.0 min | | | |

## Summary for Subcatchment ES3.2:

Runoff = 1.09 cfs @ 12.09 hrs, Volume= 0.080 af, Depth= 1.57"
Routed to Link DP3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 7,280 | 87 | Dirt roads, HSG C |
| 19,340 | 70 | Woods, Good, HSG C |
| 26,620 | | Weighted Average |
| 26,620 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES4.1:

Runoff = 6.32 cfs @ 12.09 hrs, Volume= 0.452 af, Depth= 2.49"
Routed to Reach R4.1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 94,800 | 87 | Dirt roads, HSG C |
| 94,800 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 50 | 0.1280 | 2.48 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10" |
| 1.2 | 170 | 0.0220 | 2.39 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.3 | 500 | 0.0370 | 3.67 | 22.04 | **Channel Flow,** Area= 6.0 sf Perim= 18.3' r= 0.33' n= 0.037 |
| 3.8 | 720 | Total, Increased to minimum Tc = 6.0 min | | | |

## Summary for Subcatchment ES4.2:

Runoff = 1.47 cfs @ 12.09 hrs, Volume= 0.108 af, Depth= 1.54"
Routed to Link DP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 9,270 | 87 | Dirt roads, HSG C |
| 27,340 | 70 | Woods, Good, HSG C |
| 36,610 | | Weighted Average |
| 36,610 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES5.1:

Runoff = 3.80 cfs @ 12.09 hrs, Volume= 0.272 af, Depth= 2.49"
Routed to Reach R5.1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 57,090 | 87 | Dirt roads, HSG C |
| 57,090 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES5.2:

Runoff = 1.40 cfs @ 12.09 hrs, Volume= 0.100 af, Depth= 2.49"
Routed to Reach R5.2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 21,060 | 87 | Dirt roads, HSG C |
| 21,060 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES5.3:

Runoff = 0.68 cfs @ 12.09 hrs, Volume= 0.049 af, Depth= 2.49"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 10,240 | 87 | Dirt roads, HSG C |
| 10,240 | | 100.00% Pervious Area |

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

## Summary for Reach R3.1:

Inflow Area = 2.267 ac, 0.00% Impervious, Inflow Depth = 2.49" for 2-Year event
Inflow = 6.58 cfs @ 12.09 hrs, Volume= 0.470 af
Outflow = 6.54 cfs @ 12.10 hrs, Volume= 0.470 af, Atten= 1%, Lag= 0.5 min
Routed to Pond ESB-3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 4.14 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.18 fps, Avg. Travel Time= 2.5 min

Peak Storage= 285 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.38' , Surface Width= 5.29'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 42.03 cfs

3.00' x 1.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 9.00'
Length= 180.0' Slope= 0.0250 '/'
Inlet Invert= 231.50', Outlet Invert= 227.00'



‡

## Summary for Reach R4.1:

Inflow Area = 2.176 ac, 0.00% Impervious, Inflow Depth = 2.49" for 2-Year event
Inflow = 6.32 cfs @ 12.09 hrs, Volume= 0.452 af
Outflow = 5.97 cfs @ 12.11 hrs, Volume= 0.452 af, Atten= 5%, Lag= 1.7 min
Routed to Pond ESB-4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.82 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 1.02 fps, Avg. Travel Time= 9.5 min

Peak Storage= 906 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.38' , Surface Width= 5.27'
Bank-Full Depth= 0.75' Flow Area= 3.9 sf, Capacity= 21.89 cfs

3.00' x 0.75' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 7.50'
Length= 580.0' Slope= 0.0216 '/'
Inlet Invert= 256.50', Outlet Invert= 244.00'



‡

## Summary for Reach R5.1:

Inflow Area = 1.311 ac, 0.00% Impervious, Inflow Depth = 2.49" for 2-Year event
Inflow = 3.80 cfs @ 12.09 hrs, Volume= 0.272 af
Outflow = 3.55 cfs @ 12.12 hrs, Volume= 0.272 af, Atten= 7%, Lag= 1.9 min
Routed to Pond ESB-5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 2.59 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 0.68 fps, Avg. Travel Time= 11.0 min

Peak Storage= 617 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.34' , Surface Width= 5.04'
Bank-Full Depth= 0.75' Flow Area= 3.9 sf, Capacity= 15.72 cfs

3.00' x 0.75' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 7.50'
Length= 450.0' Slope= 0.0111 '/'
Inlet Invert= 263.00', Outlet Invert= 258.00'



‡

## Summary for Reach R5.2:

Inflow Area = 0.483 ac, 0.00% Impervious, Inflow Depth = 2.49" for 2-Year event
Inflow = 1.40 cfs @ 12.09 hrs, Volume= 0.100 af
Outflow = 1.33 cfs @ 12.11 hrs, Volume= 0.100 af, Atten= 5%, Lag= 1.6 min
Routed to Pond ESB-5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 2.35 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.60 fps, Avg. Travel Time= 9.6 min

Peak Storage= 198 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.16' , Surface Width= 3.98'
Bank-Full Depth= 0.50' Flow Area= 2.3 sf, Capacity= 10.00 cfs

3.00' x 0.50' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 6.00'
Length= 350.0' Slope= 0.0214 '/'
Inlet Invert= 265.50', Outlet Invert= 258.00'



‡

## Summary for Pond ESB-2:

Inflow Area = 3.228 ac, 0.00% Impervious, Inflow Depth = 2.49" for 2-Year event
Inflow = 9.37 cfs @ 12.09 hrs, Volume= 0.670 af
Outflow = 0.05 cfs @ 24.08 hrs, Volume= 0.131 af, Atten= 99%, Lag= 719.8 min
Primary = 0.05 cfs @ 24.08 hrs, Volume= 0.131 af
Routed to Link DP2 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 237.23' @ 24.08 hrs Surf.Area= 13,433 sf Storage= 27,292 cf

Plug-Flow detention time= 1,140.2 min calculated for 0.131 af (20% of inflow)
Center-of-Mass det. time= 983.9 min ( 1,795.3 - 811.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 235.00' | 52,800 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 235.00 | 11,060 | 0 | 0 |
| 236.00 | 12,110 | 11,585 | 11,585 |
| 237.00 | 13,180 | 12,645 | 24,230 |
| 238.00 | 14,280 | 13,730 | 37,960 |
| 239.00 | 15,400 | 14,840 | 52,800 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 238.50' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 235.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.05 cfs @ 24.08 hrs HW=237.23' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 5.02 fps)

## Summary for Pond ESB-3:

Inflow Area = 2.267 ac, 0.00% Impervious, Inflow Depth = 2.49" for 2-Year event
Inflow = 6.54 cfs @ 12.10 hrs, Volume= 0.470 af
Outflow = 0.05 cfs @ 24.10 hrs, Volume= 0.122 af, Atten= 99%, Lag= 720.1 min
Primary = 0.05 cfs @ 24.10 hrs, Volume= 0.122 af
Routed to Link DP3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 225.15' @ 24.10 hrs Surf.Area= 9,671 sf Storage= 18,666 cf

Plug-Flow detention time= 1,109.5 min calculated for 0.122 af (26% of inflow)
Center-of-Mass det. time= 968.8 min ( 1,781.8 - 813.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 223.00' | 38,185 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 223.00 | 7,710 | 0 | 0 |
| 224.00 | 8,610 | 8,160 | 8,160 |
| 225.00 | 9,530 | 9,070 | 17,230 |
| 226.00 | 10,470 | 10,000 | 27,230 |
| 227.00 | 11,440 | 10,955 | 38,185 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 226.50' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 223.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.05 cfs @ 24.10 hrs HW=225.15' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 4.79 fps)

## Summary for Pond ESB-4:

Inflow Area = 2.176 ac, 0.00% Impervious, Inflow Depth = 2.49" for 2-Year event
Inflow = 5.97 cfs @ 12.11 hrs, Volume= 0.452 af
Outflow = 0.06 cfs @ 24.10 hrs, Volume= 0.156 af, Atten= 99%, Lag= 718.8 min
Primary = 0.06 cfs @ 24.10 hrs, Volume= 0.156 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 242.64' @ 24.10 hrs Surf.Area= 7,406 sf Storage= 17,267 cf

Plug-Flow detention time= 1,080.5 min calculated for 0.156 af (34% of inflow)
Center-of-Mass det. time= 951.9 min ( 1,769.0 - 817.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 240.00' | 28,005 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 240.00 | 5,720 | 0 | 0 |
| 241.00 | 6,340 | 6,030 | 6,030 |
| 242.00 | 6,980 | 6,660 | 12,690 |
| 243.00 | 7,650 | 7,315 | 20,005 |
| 244.00 | 8,350 | 8,000 | 28,005 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 243.50' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 240.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.06 cfs @ 24.10 hrs HW=242.64' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 5.97 fps)

## Summary for Pond ESB-5:

Inflow Area = 1.794 ac, 0.00% Impervious, Inflow Depth = 2.49" for 2-Year event
Inflow = 4.88 cfs @ 12.12 hrs, Volume= 0.372 af
Outflow = 0.04 cfs @ 24.14 hrs, Volume= 0.110 af, Atten= 99%, Lag= 721.1 min
Primary = 0.04 cfs @ 24.14 hrs, Volume= 0.110 af
Routed to Link DP5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 256.00' @ 24.14 hrs Surf.Area= 8,001 sf Storage= 14,547 cf

Plug-Flow detention time= 1,099.9 min calculated for 0.110 af (29% of inflow)
Center-of-Mass det. time= 964.4 min ( 1,782.2 - 817.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 254.00' | 32,055 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 254.00 | 6,550 | 0 | 0 |
| 255.00 | 7,260 | 6,905 | 6,905 |
| 256.00 | 8,000 | 7,630 | 14,535 |
| 257.00 | 8,750 | 8,375 | 22,910 |
| 258.00 | 9,540 | 9,145 | 32,055 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 257.70' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 254.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.04 cfs @ 24.14 hrs HW=256.00' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
**2=Orifice/Grate** (Orifice Controls 0.04 cfs @ 5.17 fps)

## Summary for Link DP1:

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP2:

Inflow Area = 4.134 ac, 0.00% Impervious, Inflow Depth > 0.78" for 2-Year event
Inflow = 1.90 cfs @ 12.09 hrs, Volume= 0.269 af
Primary = 1.90 cfs @ 12.09 hrs, Volume= 0.269 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP3:

Inflow Area = 2.878 ac, 0.00% Impervious, Inflow Depth > 0.84" for 2-Year event
Inflow = 1.10 cfs @ 12.09 hrs, Volume= 0.202 af
Primary = 1.10 cfs @ 12.09 hrs, Volume= 0.202 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP4:

Inflow Area = 3.017 ac, 0.00% Impervious, Inflow Depth > 1.05" for 2-Year event
Inflow = 1.48 cfs @ 12.09 hrs, Volume= 0.264 af
Primary = 1.48 cfs @ 12.09 hrs, Volume= 0.264 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP5:

Inflow Area = 2.029 ac, 0.00% Impervious, Inflow Depth > 0.94" for 2-Year event
Inflow = 0.69 cfs @ 12.09 hrs, Volume= 0.159 af
Primary = 0.69 cfs @ 12.09 hrs, Volume= 0.159 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment ES2.1:** Runoff Area=140,600 sf 0.00% Impervious Runoff Depth=4.57"
Flow Length=880' Tc=6.0 min CN=87 Runoff=16.81 cfs 1.230 af

**Subcatchment ES2.2:** Runoff Area=39,460 sf 0.00% Impervious Runoff Depth=3.67"
Tc=6.0 min CN=WQ Runoff=3.82 cfs 0.277 af

**Subcatchment ES3.1:** Runoff Area=98,750 sf 0.00% Impervious Runoff Depth=4.57"
Flow Length=810' Tc=6.0 min CN=87 Runoff=11.81 cfs 0.864 af

**Subcatchment ES3.2:** Runoff Area=26,620 sf 0.00% Impervious Runoff Depth=3.32"
Tc=6.0 min CN=WQ Runoff=2.35 cfs 0.169 af

**Subcatchment ES4.1:** Runoff Area=94,800 sf 0.00% Impervious Runoff Depth=4.57"
Flow Length=720' Tc=6.0 min CN=87 Runoff=11.33 cfs 0.830 af

**Subcatchment ES4.2:** Runoff Area=36,610 sf 0.00% Impervious Runoff Depth=3.29"
Tc=6.0 min CN=WQ Runoff=3.20 cfs 0.230 af

**Subcatchment ES5.1:** Runoff Area=57,090 sf 0.00% Impervious Runoff Depth=4.57"
Tc=6.0 min CN=87 Runoff=6.83 cfs 0.500 af

**Subcatchment ES5.2:** Runoff Area=21,060 sf 0.00% Impervious Runoff Depth=4.57"
Tc=6.0 min CN=87 Runoff=2.52 cfs 0.184 af

**Subcatchment ES5.3:** Runoff Area=10,240 sf 0.00% Impervious Runoff Depth=4.57"
Tc=6.0 min CN=87 Runoff=1.22 cfs 0.090 af

**Reach R3.1:** Avg. Flow Depth=0.52' Max Vel=4.92 fps Inflow=11.81 cfs 0.864 af
n=0.025 L=180.0' S=0.0250 '/' Capacity=42.03 cfs Outflow=11.76 cfs 0.864 af

**Reach R4.1:** Avg. Flow Depth=0.52' Max Vel=4.56 fps Inflow=11.33 cfs 0.830 af
n=0.025 L=580.0' S=0.0216 '/' Capacity=21.89 cfs Outflow=10.86 cfs 0.830 af

**Reach R5.1:** Avg. Flow Depth=0.47' Max Vel=3.10 fps Inflow=6.83 cfs 0.500 af
n=0.025 L=450.0' S=0.0111 '/' Capacity=15.72 cfs Outflow=6.48 cfs 0.500 af

**Reach R5.2:** Avg. Flow Depth=0.23' Max Vel=2.87 fps Inflow=2.52 cfs 0.184 af
n=0.025 L=350.0' S=0.0214 '/' Capacity=10.00 cfs Outflow=2.43 cfs 0.184 af

**Pond ESB-2:** Peak Elev=238.53' Storage=45,727 cf Inflow=16.81 cfs 1.230 af
Outflow=0.37 cfs 0.328 af

**Pond ESB-3:** Peak Elev=226.52' Storage=32,779 cf Inflow=11.76 cfs 0.864 af
Outflow=0.19 cfs 0.251 af

**Pond ESB-4:** Peak Elev=243.56' Storage=24,401 cf Inflow=10.86 cfs 0.830 af
Outflow=0.81 cfs 0.412 af

**Pond ESB-5:** Peak Elev=257.42' Storage=26,695 cf Inflow=8.90 cfs 0.684 af
Outflow=0.07 cfs 0.202 af

**Link DP1:**
Primary=0.00 cfs 0.000 af

**Link DP2:** Inflow=3.85 cfs 0.604 af
Primary=3.85 cfs 0.604 af

**Link DP3:** Inflow=2.38 cfs 0.420 af
Primary=2.38 cfs 0.420 af

**Link DP4:** Inflow=3.24 cfs 0.642 af
Primary=3.24 cfs 0.642 af

**Link DP5:** Inflow=1.25 cfs 0.292 af
Primary=1.25 cfs 0.292 af

**Total Runoff Area = 12.058 ac Runoff Volume = 4.374 af Average Runoff Depth = 4.35"**
**100.00% Pervious = 12.058 ac 0.00% Impervious = 0.000 ac**

## Summary for Subcatchment ES2.1:

Runoff = 16.81 cfs @ 12.09 hrs, Volume= 1.230 af, Depth= 4.57"
Routed to Pond ESB-2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 140,600 | 87 | Dirt roads, HSG C |
| 140,600 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.5 | 50 | 0.0500 | 1.70 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10" |
| 5.4 | 830 | 0.0250 | 2.55 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.9 | 880 | Total, Increased to minimum Tc = 6.0 min | | | |

## Summary for Subcatchment ES2.2:

Runoff = 3.82 cfs @ 12.09 hrs, Volume= 0.277 af, Depth= 3.67"
Routed to Link DP2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 18,620 | 87 | Dirt roads, HSG C |
| 20,840 | 70 | Woods, Good, HSG C |
| 39,460 | | Weighted Average |
| 39,460 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES3.1:

Runoff = 11.81 cfs @ 12.09 hrs, Volume= 0.864 af, Depth= 4.57"
Routed to Reach R3.1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 98,750 | 87 | Dirt roads, HSG C |
| 98,750 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.7 | 50 | 0.0200 | 1.18 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10" |
| 2.9 | 550 | 0.0380 | 3.14 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.8 | 210 | 0.0040 | 4.47 | 26.81 | **Channel Flow,** Area= 6.0 sf Perim= 18.3' r= 0.33' n= 0.010 |
| 4.4 | 810 | Total, Increased to minimum Tc = 6.0 min | | | |

## Summary for Subcatchment ES3.2:

Runoff = 2.35 cfs @ 12.09 hrs, Volume= 0.169 af, Depth= 3.32"
Routed to Link DP3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 7,280 | 87 | Dirt roads, HSG C |
| 19,340 | 70 | Woods, Good, HSG C |
| 26,620 | | Weighted Average |
| 26,620 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES4.1:

Runoff = 11.33 cfs @ 12.09 hrs, Volume= 0.830 af, Depth= 4.57"
Routed to Reach R4.1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 94,800 | 87 | Dirt roads, HSG C |
| 94,800 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 50 | 0.1280 | 2.48 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10" |
| 1.2 | 170 | 0.0220 | 2.39 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.3 | 500 | 0.0370 | 3.67 | 22.04 | **Channel Flow,** Area= 6.0 sf Perim= 18.3' r= 0.33' n= 0.037 |
| 3.8 | 720 | Total, Increased to minimum Tc = 6.0 min | | | |

## Summary for Subcatchment ES4.2:

Runoff = 3.20 cfs @ 12.09 hrs, Volume= 0.230 af, Depth= 3.29"
Routed to Link DP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 9,270 | 87 | Dirt roads, HSG C |
| 27,340 | 70 | Woods, Good, HSG C |
| 36,610 | | Weighted Average |
| 36,610 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES5.1:

Runoff = 6.83 cfs @ 12.09 hrs, Volume= 0.500 af, Depth= 4.57"
Routed to Reach R5.1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 57,090 | 87 | Dirt roads, HSG C |
| 57,090 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES5.2:

Runoff = 2.52 cfs @ 12.09 hrs, Volume= 0.184 af, Depth= 4.57"
Routed to Reach R5.2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 21,060 | 87 | Dirt roads, HSG C |
| 21,060 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES5.3:

Runoff = 1.22 cfs @ 12.09 hrs, Volume= 0.090 af, Depth= 4.57"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 10,240 | 87 | Dirt roads, HSG C |
| 10,240 | | 100.00% Pervious Area |

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

## Summary for Reach R3.1:

Inflow Area = 2.267 ac, 0.00% Impervious, Inflow Depth = 4.57" for 10-Year event
Inflow = 11.81 cfs @ 12.09 hrs, Volume= 0.864 af
Outflow = 11.76 cfs @ 12.09 hrs, Volume= 0.864 af, Atten= 0%, Lag= 0.4 min
Routed to Pond ESB-3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 4.92 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.40 fps, Avg. Travel Time= 2.1 min

Peak Storage= 430 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.52' , Surface Width= 6.14'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 42.03 cfs

3.00' x 1.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 9.00'
Length= 180.0' Slope= 0.0250 '/'
Inlet Invert= 231.50', Outlet Invert= 227.00'



‡

## Summary for Reach R4.1:

Inflow Area = 2.176 ac, 0.00% Impervious, Inflow Depth = 4.57" for 10-Year event
Inflow = 11.33 cfs @ 12.09 hrs, Volume= 0.830 af
Outflow = 10.86 cfs @ 12.11 hrs, Volume= 0.830 af, Atten= 4%, Lag= 1.4 min
Routed to Pond ESB-4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 4.56 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 1.21 fps, Avg. Travel Time= 8.0 min

Peak Storage= 1,381 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.52' , Surface Width= 6.13'
Bank-Full Depth= 0.75' Flow Area= 3.9 sf, Capacity= 21.89 cfs

3.00' x 0.75' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 7.50'
Length= 580.0' Slope= 0.0216 '/'
Inlet Invert= 256.50', Outlet Invert= 244.00'



‡

## Summary for Reach R5.1:

Inflow Area = 1.311 ac, 0.00% Impervious, Inflow Depth = 4.57" for 10-Year event
Inflow = 6.83 cfs @ 12.09 hrs, Volume= 0.500 af
Outflow = 6.48 cfs @ 12.11 hrs, Volume= 0.500 af, Atten= 5%, Lag= 1.6 min
Routed to Pond ESB-5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.10 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 0.81 fps, Avg. Travel Time= 9.2 min

Peak Storage= 939 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.47' , Surface Width= 5.83'
Bank-Full Depth= 0.75' Flow Area= 3.9 sf, Capacity= 15.72 cfs

3.00' x 0.75' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 7.50'
Length= 450.0' Slope= 0.0111 '/'
Inlet Invert= 263.00', Outlet Invert= 258.00'



‡

## Summary for Reach R5.2:

Inflow Area = 0.483 ac, 0.00% Impervious, Inflow Depth = 4.57" for 10-Year event
Inflow = 2.52 cfs @ 12.09 hrs, Volume= 0.184 af
Outflow = 2.43 cfs @ 12.11 hrs, Volume= 0.184 af, Atten= 4%, Lag= 1.3 min
Routed to Pond ESB-5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 2.87 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.72 fps, Avg. Travel Time= 8.1 min

Peak Storage= 296 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.23' , Surface Width= 4.37'
Bank-Full Depth= 0.50' Flow Area= 2.3 sf, Capacity= 10.00 cfs

3.00' x 0.50' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 6.00'
Length= 350.0' Slope= 0.0214 '/'
Inlet Invert= 265.50', Outlet Invert= 258.00'



‡

## Summary for Pond ESB-2:

Inflow Area = 3.228 ac, 0.00% Impervious, Inflow Depth = 4.57" for 10-Year event
Inflow = 16.81 cfs @ 12.09 hrs, Volume= 1.230 af
Outflow = 0.37 cfs @ 17.35 hrs, Volume= 0.328 af, Atten= 98%, Lag= 315.8 min
Primary = 0.37 cfs @ 17.35 hrs, Volume= 0.328 af
Routed to Link DP2 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 238.53' @ 17.35 hrs Surf.Area= 14,877 sf Storage= 45,727 cf

Plug-Flow detention time= 930.1 min calculated for 0.328 af (27% of inflow)
Center-of-Mass det. time= 778.5 min ( 1,572.8 - 794.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 235.00' | 52,800 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 235.00 | 11,060 | 0 | 0 |
| 236.00 | 12,110 | 11,585 | 11,585 |
| 237.00 | 13,180 | 12,645 | 24,230 |
| 238.00 | 14,280 | 13,730 | 37,960 |
| 239.00 | 15,400 | 14,840 | 52,800 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 238.50' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 235.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.37 cfs @ 17.35 hrs HW=238.53' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 0.30 cfs @ 0.45 fps)
**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 7.57 fps)

## Summary for Pond ESB-3:

Inflow Area = 2.267 ac, 0.00% Impervious, Inflow Depth = 4.57" for 10-Year event
Inflow = 11.76 cfs @ 12.09 hrs, Volume= 0.864 af
Outflow = 0.19 cfs @ 19.18 hrs, Volume= 0.251 af, Atten= 98%, Lag= 425.1 min
Primary = 0.19 cfs @ 19.18 hrs, Volume= 0.251 af
Routed to Link DP3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 226.52' @ 19.18 hrs Surf.Area= 10,972 sf Storage= 32,779 cf

Plug-Flow detention time= 1,040.3 min calculated for 0.251 af (29% of inflow)
Center-of-Mass det. time= 895.3 min ( 1,690.9 - 795.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 223.00' | 38,185 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 223.00 | 7,710 | 0 | 0 |
| 224.00 | 8,610 | 8,160 | 8,160 |
| 225.00 | 9,530 | 9,070 | 17,230 |
| 226.00 | 10,470 | 10,000 | 27,230 |
| 227.00 | 11,440 | 10,955 | 38,185 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 226.50' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 223.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.19 cfs @ 19.18 hrs HW=226.52' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 0.12 cfs @ 0.33 fps)
**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 7.54 fps)

## Summary for Pond ESB-4:

Inflow Area = 2.176 ac, 0.00% Impervious, Inflow Depth = 4.57" for 10-Year event
Inflow = 10.86 cfs @ 12.11 hrs, Volume= 0.830 af
Outflow = 0.81 cfs @ 13.47 hrs, Volume= 0.412 af, Atten= 93%, Lag= 81.4 min
Primary = 0.81 cfs @ 13.47 hrs, Volume= 0.412 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 243.56' @ 13.47 hrs Surf.Area= 8,042 sf Storage= 24,401 cf

Plug-Flow detention time= 682.5 min calculated for 0.412 af (50% of inflow)
Center-of-Mass det. time= 568.2 min ( 1,367.2 - 799.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 240.00' | 28,005 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 240.00 | 5,720 | 0 | 0 |
| 241.00 | 6,340 | 6,030 | 6,030 |
| 242.00 | 6,980 | 6,660 | 12,690 |
| 243.00 | 7,650 | 7,315 | 20,005 |
| 244.00 | 8,350 | 8,000 | 28,005 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 243.50' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 240.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.81 cfs @ 13.47 hrs HW=243.56' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 0.74 cfs @ 0.61 fps)
**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 7.61 fps)

## Summary for Pond ESB-5:

Inflow Area = 1.794 ac, 0.00% Impervious, Inflow Depth = 4.57" for 10-Year event
Inflow = 8.90 cfs @ 12.11 hrs, Volume= 0.684 af
Outflow = 0.07 cfs @ 24.11 hrs, Volume= 0.202 af, Atten= 99%, Lag= 720.1 min
Primary = 0.07 cfs @ 24.11 hrs, Volume= 0.202 af
Routed to Link DP5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 257.42' @ 24.11 hrs Surf.Area= 9,085 sf Storage= 26,695 cf

Plug-Flow detention time= 1,122.9 min calculated for 0.202 af (30% of inflow)
Center-of-Mass det. time= 979.2 min ( 1,778.8 - 799.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 254.00' | 32,055 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 254.00 | 6,550 | 0 | 0 |
| 255.00 | 7,260 | 6,905 | 6,905 |
| 256.00 | 8,000 | 7,630 | 14,535 |
| 257.00 | 8,750 | 8,375 | 22,910 |
| 258.00 | 9,540 | 9,145 | 32,055 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 257.70' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 254.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.07 cfs @ 24.11 hrs HW=257.42' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)
**2=Orifice/Grate** (Orifice Controls 0.07 cfs @ 7.39 fps)

## Summary for Link DP1:

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP2:

Inflow Area = 4.134 ac, 0.00% Impervious, Inflow Depth > 1.75" for 10-Year event
Inflow = 3.85 cfs @ 12.09 hrs, Volume= 0.604 af
Primary = 3.85 cfs @ 12.09 hrs, Volume= 0.604 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP3:

Inflow Area = 2.878 ac, 0.00% Impervious, Inflow Depth > 1.75" for 10-Year event
Inflow = 2.38 cfs @ 12.09 hrs, Volume= 0.420 af
Primary = 2.38 cfs @ 12.09 hrs, Volume= 0.420 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP4:

Inflow Area = 3.017 ac, 0.00% Impervious, Inflow Depth > 2.55" for 10-Year event
Inflow = 3.24 cfs @ 12.09 hrs, Volume= 0.642 af
Primary = 3.24 cfs @ 12.09 hrs, Volume= 0.642 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP5:

Inflow Area = 2.029 ac, 0.00% Impervious, Inflow Depth > 1.73" for 10-Year event
Inflow = 1.25 cfs @ 12.09 hrs, Volume= 0.292 af
Primary = 1.25 cfs @ 12.09 hrs, Volume= 0.292 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment ES2.1:** Runoff Area=140,600 sf 0.00% Impervious Runoff Depth=6.26"
Flow Length=880' Tc=6.0 min CN=87 Runoff=22.65 cfs 1.685 af

**Subcatchment ES2.2:** Runoff Area=39,460 sf 0.00% Impervious Runoff Depth=5.23"
Tc=6.0 min CN=WQ Runoff=5.41 cfs 0.395 af

**Subcatchment ES3.1:** Runoff Area=98,750 sf 0.00% Impervious Runoff Depth=6.26"
Flow Length=810' Tc=6.0 min CN=87 Runoff=15.91 cfs 1.184 af

**Subcatchment ES3.2:** Runoff Area=26,620 sf 0.00% Impervious Runoff Depth=4.84"
Tc=6.0 min CN=WQ Runoff=3.41 cfs 0.246 af

**Subcatchment ES4.1:** Runoff Area=94,800 sf 0.00% Impervious Runoff Depth=6.26"
Flow Length=720' Tc=6.0 min CN=87 Runoff=15.27 cfs 1.136 af

**Subcatchment ES4.2:** Runoff Area=36,610 sf 0.00% Impervious Runoff Depth=4.80"
Tc=6.0 min CN=WQ Runoff=4.66 cfs 0.336 af

**Subcatchment ES5.1:** Runoff Area=57,090 sf 0.00% Impervious Runoff Depth=6.26"
Tc=6.0 min CN=87 Runoff=9.20 cfs 0.684 af

**Subcatchment ES5.2:** Runoff Area=21,060 sf 0.00% Impervious Runoff Depth=6.26"
Tc=6.0 min CN=87 Runoff=3.39 cfs 0.252 af

**Subcatchment ES5.3:** Runoff Area=10,240 sf 0.00% Impervious Runoff Depth=6.26"
Tc=6.0 min CN=87 Runoff=1.65 cfs 0.123 af

**Reach R3.1:** Avg. Flow Depth=0.61' Max Vel=5.36 fps Inflow=15.91 cfs 1.184 af
n=0.025 L=180.0' S=0.0250 '/' Capacity=42.03 cfs Outflow=15.85 cfs 1.184 af

**Reach R4.1:** Avg. Flow Depth=0.61' Max Vel=4.97 fps Inflow=15.27 cfs 1.136 af
n=0.025 L=580.0' S=0.0216 '/' Capacity=21.89 cfs Outflow=14.71 cfs 1.136 af

**Reach R5.1:** Avg. Flow Depth=0.56' Max Vel=3.39 fps Inflow=9.20 cfs 0.684 af
n=0.025 L=450.0' S=0.0111 '/' Capacity=15.72 cfs Outflow=8.78 cfs 0.684 af

**Reach R5.2:** Avg. Flow Depth=0.27' Max Vel=3.17 fps Inflow=3.39 cfs 0.252 af
n=0.025 L=350.0' S=0.0214 '/' Capacity=10.00 cfs Outflow=3.29 cfs 0.252 af

**Pond ESB-2:** Peak Elev=238.63' Storage=47,112 cf Inflow=22.65 cfs 1.685 af
Outflow=2.29 cfs 0.782 af

**Pond ESB-3:** Peak Elev=226.59' Storage=33,608 cf Inflow=15.85 cfs 1.184 af
Outflow=1.48 cfs 0.570 af

**Pond ESB-4:** Peak Elev=243.73' Storage=25,759 cf Inflow=14.71 cfs 1.136 af
Outflow=5.52 cfs 0.718 af

**Pond ESB-5:** Peak Elev=257.75' Storage=29,730 cf Inflow=12.07 cfs 0.937 af
Outflow=0.70 cfs 0.404 af

**Link DP1:**
Primary=0.00 cfs 0.000 af

**Link DP2:** Inflow=5.46 cfs 1.176 af
Primary=5.46 cfs 1.176 af

**Link DP3:** Inflow=3.46 cfs 0.816 af
Primary=3.46 cfs 0.816 af

**Link DP4:** Inflow=7.20 cfs 1.054 af
Primary=7.20 cfs 1.054 af

**Link DP5:** Inflow=1.69 cfs 0.527 af
Primary=1.69 cfs 0.527 af

**Total Runoff Area = 12.058 ac Runoff Volume = 6.041 af Average Runoff Depth = 6.01"**
**100.00% Pervious = 12.058 ac 0.00% Impervious = 0.000 ac**

## Summary for Subcatchment ES2.1:

Runoff = 22.65 cfs @ 12.08 hrs, Volume= 1.685 af, Depth= 6.26"
Routed to Pond ESB-2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 140,600 | 87 | Dirt roads, HSG C |
| 140,600 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.5 | 50 | 0.0500 | 1.70 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10" |
| 5.4 | 830 | 0.0250 | 2.55 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.9 | 880 | Total, Increased to minimum Tc = 6.0 min | | | |

## Summary for Subcatchment ES2.2:

Runoff = 5.41 cfs @ 12.09 hrs, Volume= 0.395 af, Depth= 5.23"
Routed to Link DP2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 18,620 | 87 | Dirt roads, HSG C |
| 20,840 | 70 | Woods, Good, HSG C |
| 39,460 | | Weighted Average |
| 39,460 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES3.1:

Runoff = 15.91 cfs @ 12.08 hrs, Volume= 1.184 af, Depth= 6.26"
Routed to Reach R3.1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 98,750 | 87 | Dirt roads, HSG C |
| 98,750 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.7 | 50 | 0.0200 | 1.18 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10" |
| 2.9 | 550 | 0.0380 | 3.14 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.8 | 210 | 0.0040 | 4.47 | 26.81 | **Channel Flow,** Area= 6.0 sf Perim= 18.3' r= 0.33' n= 0.010 |
| 4.4 | 810 | Total, Increased to minimum Tc = 6.0 min | | | |

## Summary for Subcatchment ES3.2:

Runoff = 3.41 cfs @ 12.09 hrs, Volume= 0.246 af, Depth= 4.84"
Routed to Link DP3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 7,280 | 87 | Dirt roads, HSG C |
| 19,340 | 70 | Woods, Good, HSG C |
| 26,620 | | Weighted Average |
| 26,620 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES4.1:

Runoff = 15.27 cfs @ 12.08 hrs, Volume= 1.136 af, Depth= 6.26"
Routed to Reach R4.1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 94,800 | 87 | Dirt roads, HSG C |
| 94,800 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 50 | 0.1280 | 2.48 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10" |
| 1.2 | 170 | 0.0220 | 2.39 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.3 | 500 | 0.0370 | 3.67 | 22.04 | **Channel Flow,** Area= 6.0 sf Perim= 18.3' r= 0.33' n= 0.037 |
| 3.8 | 720 | Total, Increased to minimum Tc = 6.0 min | | | |

## Summary for Subcatchment ES4.2:

Runoff = 4.66 cfs @ 12.09 hrs, Volume= 0.336 af, Depth= 4.80"
Routed to Link DP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 9,270 | 87 | Dirt roads, HSG C |
| 27,340 | 70 | Woods, Good, HSG C |
| 36,610 | | Weighted Average |
| 36,610 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES5.1:

Runoff = 9.20 cfs @ 12.08 hrs, Volume= 0.684 af, Depth= 6.26"
Routed to Reach R5.1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 57,090 | 87 | Dirt roads, HSG C |
| 57,090 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES5.2:

Runoff = 3.39 cfs @ 12.08 hrs, Volume= 0.252 af, Depth= 6.26"
Routed to Reach R5.2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 21,060 | 87 | Dirt roads, HSG C |
| 21,060 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES5.3:

Runoff = 1.65 cfs @ 12.08 hrs, Volume= 0.123 af, Depth= 6.26"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 10,240 | 87 | Dirt roads, HSG C |
| 10,240 | | 100.00% Pervious Area |

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

## Summary for Reach R3.1:

Inflow Area = 2.267 ac, 0.00% Impervious, Inflow Depth = 6.26" for 25-Year event
Inflow = 15.91 cfs @ 12.08 hrs, Volume= 1.184 af
Outflow = 15.85 cfs @ 12.09 hrs, Volume= 1.184 af, Atten= 0%, Lag= 0.4 min
Routed to Pond ESB-3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 5.36 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.54 fps, Avg. Travel Time= 1.9 min

Peak Storage= 532 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.61' , Surface Width= 6.67'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 42.03 cfs

3.00' x 1.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 9.00'
Length= 180.0' Slope= 0.0250 '/'
Inlet Invert= 231.50', Outlet Invert= 227.00'



‡

## Summary for Reach R4.1:

Inflow Area = 2.176 ac, 0.00% Impervious, Inflow Depth = 6.26" for 25-Year event
Inflow = 15.27 cfs @ 12.08 hrs, Volume= 1.136 af
Outflow = 14.71 cfs @ 12.11 hrs, Volume= 1.136 af, Atten= 4%, Lag= 1.3 min
Routed to Pond ESB-4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 4.97 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 1.34 fps, Avg. Travel Time= 7.2 min

Peak Storage= 1,715 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.61' , Surface Width= 6.67'
Bank-Full Depth= 0.75' Flow Area= 3.9 sf, Capacity= 21.89 cfs

3.00' x 0.75' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 7.50'
Length= 580.0' Slope= 0.0216 '/'
Inlet Invert= 256.50', Outlet Invert= 244.00'



‡

## Summary for Reach R5.1:

Inflow Area = 1.311 ac, 0.00% Impervious, Inflow Depth = 6.26" for 25-Year event
Inflow = 9.20 cfs @ 12.08 hrs, Volume= 0.684 af
Outflow = 8.78 cfs @ 12.11 hrs, Volume= 0.684 af, Atten= 4%, Lag= 1.5 min
Routed to Pond ESB-5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.39 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 0.90 fps, Avg. Travel Time= 8.4 min

Peak Storage= 1,166 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.56' , Surface Width= 6.33'
Bank-Full Depth= 0.75' Flow Area= 3.9 sf, Capacity= 15.72 cfs

3.00' x 0.75' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 7.50'
Length= 450.0' Slope= 0.0111 '/'
Inlet Invert= 263.00', Outlet Invert= 258.00'



‡

## Summary for Reach R5.2:

Inflow Area = 0.483 ac, 0.00% Impervious, Inflow Depth = 6.26" for 25-Year event
Inflow = 3.39 cfs @ 12.08 hrs, Volume= 0.252 af
Outflow = 3.29 cfs @ 12.11 hrs, Volume= 0.252 af, Atten= 3%, Lag= 1.2 min
Routed to Pond ESB-5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.17 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.80 fps, Avg. Travel Time= 7.3 min

Peak Storage= 363 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.27' , Surface Width= 4.63'
Bank-Full Depth= 0.50' Flow Area= 2.3 sf, Capacity= 10.00 cfs

3.00' x 0.50' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 6.00'
Length= 350.0' Slope= 0.0214 '/'
Inlet Invert= 265.50', Outlet Invert= 258.00'



‡

## Summary for Pond ESB-2:

Inflow Area = 3.228 ac, 0.00% Impervious, Inflow Depth = 6.26" for 25-Year event
Inflow = 22.65 cfs @ 12.08 hrs, Volume= 1.685 af
Outflow = 2.29 cfs @ 12.86 hrs, Volume= 0.782 af, Atten= 90%, Lag= 46.4 min
Primary = 2.29 cfs @ 12.86 hrs, Volume= 0.782 af
Routed to Link DP2 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 238.63' @ 12.86 hrs Surf.Area= 14,981 sf Storage= 47,112 cf

Plug-Flow detention time= 507.4 min calculated for 0.782 af (46% of inflow)
Center-of-Mass det. time= 388.9 min ( 1,174.7 - 785.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 235.00' | 52,800 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 235.00 | 11,060 | 0 | 0 |
| 236.00 | 12,110 | 11,585 | 11,585 |
| 237.00 | 13,180 | 12,645 | 24,230 |
| 238.00 | 14,280 | 13,730 | 37,960 |
| 239.00 | 15,400 | 14,840 | 52,800 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 238.50' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 235.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=2.29 cfs @ 12.86 hrs HW=238.63' TW=0.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 2.22 cfs @ 0.88 fps)
└─**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 7.71 fps)

## Summary for Pond ESB-3:

Inflow Area = 2.267 ac, 0.00% Impervious, Inflow Depth = 6.26" for 25-Year event
Inflow = 15.85 cfs @ 12.09 hrs, Volume= 1.184 af
Outflow = 1.48 cfs @ 12.95 hrs, Volume= 0.570 af, Atten= 91%, Lag= 51.6 min
Primary = 1.48 cfs @ 12.95 hrs, Volume= 0.570 af
Routed to Link DP3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 226.59' @ 12.95 hrs Surf.Area= 11,045 sf Storage= 33,608 cf

Plug-Flow detention time= 581.6 min calculated for 0.570 af (48% of inflow)
Center-of-Mass det. time= 465.2 min ( 1,252.2 - 787.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 223.00' | 38,185 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 223.00 | 7,710 | 0 | 0 |
| 224.00 | 8,610 | 8,160 | 8,160 |
| 225.00 | 9,530 | 9,070 | 17,230 |
| 226.00 | 10,470 | 10,000 | 27,230 |
| 227.00 | 11,440 | 10,955 | 38,185 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 226.50' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 223.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=1.48 cfs @ 12.95 hrs HW=226.59' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 1.41 cfs @ 0.76 fps)
**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 7.66 fps)

## Summary for Pond ESB-4:

Inflow Area = 2.176 ac, 0.00% Impervious, Inflow Depth = 6.26" for 25-Year event
Inflow = 14.71 cfs @ 12.11 hrs, Volume= 1.136 af
Outflow = 5.52 cfs @ 12.37 hrs, Volume= 0.718 af, Atten= 63%, Lag= 15.9 min
Primary = 5.52 cfs @ 12.37 hrs, Volume= 0.718 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 243.73' @ 12.37 hrs Surf.Area= 8,160 sf Storage= 25,759 cf

Plug-Flow detention time= 445.4 min calculated for 0.718 af (63% of inflow)
Center-of-Mass det. time= 345.0 min ( 1,135.0 - 790.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 240.00' | 28,005 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 240.00 | 5,720 | 0 | 0 |
| 241.00 | 6,340 | 6,030 | 6,030 |
| 242.00 | 6,980 | 6,660 | 12,690 |
| 243.00 | 7,650 | 7,315 | 20,005 |
| 244.00 | 8,350 | 8,000 | 28,005 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 243.50' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 240.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=5.51 cfs @ 12.37 hrs HW=243.73' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 5.44 cfs @ 1.19 fps)
**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 7.86 fps)

## Summary for Pond ESB-5:

Inflow Area = 1.794 ac, 0.00% Impervious, Inflow Depth = 6.26" for 25-Year event
Inflow = 12.07 cfs @ 12.11 hrs, Volume= 0.937 af
Outflow = 0.70 cfs @ 14.05 hrs, Volume= 0.404 af, Atten= 94%, Lag= 116.2 min
Primary = 0.70 cfs @ 14.05 hrs, Volume= 0.404 af
Routed to Link DP5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 257.75' @ 14.05 hrs Surf.Area= 9,345 sf Storage= 29,730 cf

Plug-Flow detention time= 749.2 min calculated for 0.404 af (43% of inflow)
Center-of-Mass det. time= 625.5 min ( 1,416.1 - 790.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 254.00' | 32,055 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 254.00 | 6,550 | 0 | 0 |
| 255.00 | 7,260 | 6,905 | 6,905 |
| 256.00 | 8,000 | 7,630 | 14,535 |
| 257.00 | 8,750 | 8,375 | 22,910 |
| 258.00 | 9,540 | 9,145 | 32,055 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 257.70' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 254.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=0.70 cfs @ 14.05 hrs HW=257.75' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 0.62 cfs @ 0.58 fps)
**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 7.90 fps)

## Summary for Link DP1:

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP2:

Inflow Area = 4.134 ac, 0.00% Impervious, Inflow Depth > 3.41" for 25-Year event
Inflow = 5.46 cfs @ 12.09 hrs, Volume= 1.176 af
Primary = 5.46 cfs @ 12.09 hrs, Volume= 1.176 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP3:

Inflow Area = 2.878 ac, 0.00% Impervious, Inflow Depth > 3.40" for 25-Year event
Inflow = 3.46 cfs @ 12.09 hrs, Volume= 0.816 af
Primary = 3.46 cfs @ 12.09 hrs, Volume= 0.816 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP4:

Inflow Area = 3.017 ac, 0.00% Impervious, Inflow Depth > 4.19" for 25-Year event
Inflow = 7.20 cfs @ 12.36 hrs, Volume= 1.054 af
Primary = 7.20 cfs @ 12.36 hrs, Volume= 1.054 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP5:

Inflow Area = 2.029 ac, 0.00% Impervious, Inflow Depth > 3.12" for 25-Year event
Inflow = 1.69 cfs @ 12.09 hrs, Volume= 0.527 af
Primary = 1.69 cfs @ 12.09 hrs, Volume= 0.527 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment ES2.1:** Runoff Area=140,600 sf 0.00% Impervious Runoff Depth=9.10"
Flow Length=880' Tc=6.0 min CN=87 Runoff=32.22 cfs 2.449 af

**Subcatchment ES2.2:** Runoff Area=39,460 sf 0.00% Impervious Runoff Depth=7.92"
Tc=6.0 min CN=WQ Runoff=8.10 cfs 0.598 af

**Subcatchment ES3.1:** Runoff Area=98,750 sf 0.00% Impervious Runoff Depth=9.10"
Flow Length=810' Tc=6.0 min CN=87 Runoff=22.63 cfs 1.720 af

**Subcatchment ES3.2:** Runoff Area=26,620 sf 0.00% Impervious Runoff Depth=7.48"
Tc=6.0 min CN=WQ Runoff=5.22 cfs 0.381 af

**Subcatchment ES4.1:** Runoff Area=94,800 sf 0.00% Impervious Runoff Depth=9.10"
Flow Length=720' Tc=6.0 min CN=87 Runoff=21.72 cfs 1.651 af

**Subcatchment ES4.2:** Runoff Area=36,610 sf 0.00% Impervious Runoff Depth=7.43"
Tc=6.0 min CN=WQ Runoff=7.15 cfs 0.521 af

**Subcatchment ES5.1:** Runoff Area=57,090 sf 0.00% Impervious Runoff Depth=9.10"
Tc=6.0 min CN=87 Runoff=13.08 cfs 0.994 af

**Subcatchment ES5.2:** Runoff Area=21,060 sf 0.00% Impervious Runoff Depth=9.10"
Tc=6.0 min CN=87 Runoff=4.83 cfs 0.367 af

**Subcatchment ES5.3:** Runoff Area=10,240 sf 0.00% Impervious Runoff Depth=9.10"
Tc=6.0 min CN=87 Runoff=2.35 cfs 0.178 af

**Reach R3.1:** Avg. Flow Depth=0.73' Max Vel=5.92 fps Inflow=22.63 cfs 1.720 af
n=0.025 L=180.0' S=0.0250 '/' Capacity=42.03 cfs Outflow=22.57 cfs 1.720 af

**Reach R4.1:** Avg. Flow Depth=0.74' Max Vel=5.50 fps Inflow=21.72 cfs 1.651 af
n=0.025 L=580.0' S=0.0216 '/' Capacity=21.89 cfs Outflow=21.05 cfs 1.651 af

**Reach R5.1:** Avg. Flow Depth=0.67' Max Vel=3.75 fps Inflow=13.08 cfs 0.994 af
n=0.025 L=450.0' S=0.0111 '/' Capacity=15.72 cfs Outflow=12.58 cfs 0.994 af

**Reach R5.2:** Avg. Flow Depth=0.33' Max Vel=3.54 fps Inflow=4.83 cfs 0.367 af
n=0.025 L=350.0' S=0.0214 '/' Capacity=10.00 cfs Outflow=4.70 cfs 0.367 af

**Pond ESB-2:** Peak Elev=238.95' Storage=52,028 cf Inflow=32.22 cfs 2.449 af
Outflow=15.73 cfs 1.545 af

**Pond ESB-3:** Peak Elev=226.86' Storage=36,590 cf Inflow=22.57 cfs 1.720 af
Outflow=11.07 cfs 1.106 af

**Pond ESB-4:** Peak Elev=243.99' Storage=27,931 cf Inflow=21.05 cfs 1.651 af
Outflow=18.14 cfs 1.232 af

**Pond ESB-5:** Peak Elev=257.95' Storage=31,621 cf Inflow=17.28 cfs 1.361 af
Outflow=6.52 cfs 0.828 af

**Link DP1:**
Primary=0.00 cfs 0.000 af

**Link DP2:** Inflow=19.92 cfs 2.143 af
Primary=19.92 cfs 2.143 af

**Link DP3:** Inflow=13.69 cfs 1.486 af
Primary=13.69 cfs 1.486 af

**Link DP4:** Inflow=23.77 cfs 1.753 af
Primary=23.77 cfs 1.753 af

**Link DP5:** Inflow=7.31 cfs 1.006 af
Primary=7.31 cfs 1.006 af

**Total Runoff Area = 12.058 ac Runoff Volume = 8.859 af Average Runoff Depth = 8.82"**
**100.00% Pervious = 12.058 ac 0.00% Impervious = 0.000 ac**

## Summary for Subcatchment ES2.1:

Runoff = 32.22 cfs @ 12.08 hrs, Volume= 2.449 af, Depth= 9.10"
Routed to Pond ESB-2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 140,600 | 87 | Dirt roads, HSG C |
| 140,600 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.5 | 50 | 0.0500 | 1.70 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10" |
| 5.4 | 830 | 0.0250 | 2.55 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 5.9 | 880 | Total, Increased to minimum Tc = 6.0 min | | | |

## Summary for Subcatchment ES2.2:

Runoff = 8.10 cfs @ 12.09 hrs, Volume= 0.598 af, Depth= 7.92"
Routed to Link DP2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 18,620 | 87 | Dirt roads, HSG C |
| 20,840 | 70 | Woods, Good, HSG C |
| 39,460 | | Weighted Average |
| 39,460 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES3.1:

Runoff = 22.63 cfs @ 12.08 hrs, Volume= 1.720 af, Depth= 9.10"
Routed to Reach R3.1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 98,750 | 87 | Dirt roads, HSG C |
| 98,750 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.7 | 50 | 0.0200 | 1.18 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10" |
| 2.9 | 550 | 0.0380 | 3.14 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 0.8 | 210 | 0.0040 | 4.47 | 26.81 | **Channel Flow,** Area= 6.0 sf Perim= 18.3' r= 0.33' n= 0.010 |
| 4.4 | 810 | Total, Increased to minimum Tc = 6.0 min | | | |

## Summary for Subcatchment ES3.2:

Runoff = 5.22 cfs @ 12.09 hrs, Volume= 0.381 af, Depth= 7.48"
Routed to Link DP3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 7,280 | 87 | Dirt roads, HSG C |
| 19,340 | 70 | Woods, Good, HSG C |
| 26,620 | | Weighted Average |
| 26,620 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES4.1:

Runoff = 21.72 cfs @ 12.08 hrs, Volume= 1.651 af, Depth= 9.10"
Routed to Reach R4.1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 94,800 | 87 | Dirt roads, HSG C |
| 94,800 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 0.3 | 50 | 0.1280 | 2.48 | | **Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.10" |
| 1.2 | 170 | 0.0220 | 2.39 | | **Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps |
| 2.3 | 500 | 0.0370 | 3.67 | 22.04 | **Channel Flow,** Area= 6.0 sf Perim= 18.3' r= 0.33' n= 0.037 |
| 3.8 | 720 | Total, Increased to minimum Tc = 6.0 min | | | |

## Summary for Subcatchment ES4.2:

Runoff = 7.15 cfs @ 12.09 hrs, Volume= 0.521 af, Depth= 7.43"
Routed to Link DP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 9,270 | 87 | Dirt roads, HSG C |
| 27,340 | 70 | Woods, Good, HSG C |
| 36,610 | | Weighted Average |
| 36,610 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES5.1:

Runoff = 13.08 cfs @ 12.08 hrs, Volume= 0.994 af, Depth= 9.10"
Routed to Reach R5.1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 57,090 | 87 | Dirt roads, HSG C |
| 57,090 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES5.2:

Runoff = 4.83 cfs @ 12.08 hrs, Volume= 0.367 af, Depth= 9.10"
Routed to Reach R5.2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 21,060 | 87 | Dirt roads, HSG C |
| 21,060 | | 100.00% Pervious Area |

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

## Summary for Subcatchment ES5.3:

Runoff = 2.35 cfs @ 12.08 hrs, Volume= 0.178 af, Depth= 9.10"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 10,240 | 87 | Dirt roads, HSG C |
| 10,240 | | 100.00% Pervious Area |

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

## Summary for Reach R3.1:

Inflow Area = 2.267 ac, 0.00% Impervious, Inflow Depth = 9.10" for 100-Year event
Inflow = 22.63 cfs @ 12.08 hrs, Volume= 1.720 af
Outflow = 22.57 cfs @ 12.09 hrs, Volume= 1.720 af, Atten= 0%, Lag= 0.4 min
Routed to Pond ESB-3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 5.92 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.74 fps, Avg. Travel Time= 1.7 min

Peak Storage= 687 cf @ 12.09 hrs
Average Depth at Peak Storage= 0.73' , Surface Width= 7.40'
Bank-Full Depth= 1.00' Flow Area= 6.0 sf, Capacity= 42.03 cfs

3.00' x 1.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 9.00'
Length= 180.0' Slope= 0.0250 '/'
Inlet Invert= 231.50', Outlet Invert= 227.00'



‡

## Summary for Reach R4.1:

Inflow Area = 2.176 ac, 0.00% Impervious, Inflow Depth = 9.10" for 100-Year event
Inflow = 21.72 cfs @ 12.08 hrs, Volume= 1.651 af
Outflow = 21.05 cfs @ 12.10 hrs, Volume= 1.651 af, Atten= 3%, Lag= 1.2 min
Routed to Pond ESB-4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 5.50 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 1.50 fps, Avg. Travel Time= 6.4 min

Peak Storage= 2,220 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.74' , Surface Width= 7.41'
Bank-Full Depth= 0.75' Flow Area= 3.9 sf, Capacity= 21.89 cfs

3.00' x 0.75' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 7.50'
Length= 580.0' Slope= 0.0216 '/'
Inlet Invert= 256.50', Outlet Invert= 244.00'



‡

## Summary for Reach R5.1:

Inflow Area = 1.311 ac, 0.00% Impervious, Inflow Depth = 9.10" for 100-Year event
Inflow = 13.08 cfs @ 12.08 hrs, Volume= 0.994 af
Outflow = 12.58 cfs @ 12.11 hrs, Volume= 0.994 af, Atten= 4%, Lag= 1.4 min
Routed to Pond ESB-5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.75 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 1.01 fps, Avg. Travel Time= 7.4 min

Peak Storage= 1,509 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.67' , Surface Width= 7.02'
Bank-Full Depth= 0.75' Flow Area= 3.9 sf, Capacity= 15.72 cfs

3.00' x 0.75' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 7.50'
Length= 450.0' Slope= 0.0111 '/'
Inlet Invert= 263.00', Outlet Invert= 258.00'



‡

## Summary for Reach R5.2:

Inflow Area = 0.483 ac, 0.00% Impervious, Inflow Depth = 9.10" for 100-Year event
Inflow = 4.83 cfs @ 12.08 hrs, Volume= 0.367 af
Outflow = 4.70 cfs @ 12.10 hrs, Volume= 0.367 af, Atten= 3%, Lag= 1.1 min
Routed to Pond ESB-5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Max. Velocity= 3.54 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 0.90 fps, Avg. Travel Time= 6.5 min

Peak Storage= 464 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.33' , Surface Width= 4.99'
Bank-Full Depth= 0.50' Flow Area= 2.3 sf, Capacity= 10.00 cfs

3.00' x 0.50' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 3.0 '/' Top Width= 6.00'
Length= 350.0' Slope= 0.0214 '/'
Inlet Invert= 265.50', Outlet Invert= 258.00'



‡

## Summary for Pond ESB-2:

Inflow Area = 3.228 ac, 0.00% Impervious, Inflow Depth = 9.10" for 100-Year event
Inflow = 32.22 cfs @ 12.08 hrs, Volume= 2.449 af
Outflow = 15.73 cfs @ 12.23 hrs, Volume= 1.545 af, Atten= 51%, Lag= 8.9 min
Primary = 15.73 cfs @ 12.23 hrs, Volume= 1.545 af
Routed to Link DP2 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 238.95' @ 12.23 hrs Surf.Area= 15,344 sf Storage= 52,028 cf

Plug-Flow detention time= 320.8 min calculated for 1.545 af (63% of inflow)
Center-of-Mass det. time= 220.3 min ( 996.4 - 776.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 235.00' | 52,800 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 235.00 | 11,060 | 0 | 0 |
| 236.00 | 12,110 | 11,585 | 11,585 |
| 237.00 | 13,180 | 12,645 | 24,230 |
| 238.00 | 14,280 | 13,730 | 37,960 |
| 239.00 | 15,400 | 14,840 | 52,800 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 238.50' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 235.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=15.73 cfs @ 12.23 hrs HW=238.95' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 15.65 cfs @ 1.74 fps)
**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 8.19 fps)

## Summary for Pond ESB-3:

Inflow Area = 2.267 ac, 0.00% Impervious, Inflow Depth = 9.10" for 100-Year event
Inflow = 22.57 cfs @ 12.09 hrs, Volume= 1.720 af
Outflow = 11.07 cfs @ 12.24 hrs, Volume= 1.106 af, Atten= 51%, Lag= 9.0 min
Primary = 11.07 cfs @ 12.24 hrs, Volume= 1.106 af
Routed to Link DP3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 226.86' @ 12.24 hrs Surf.Area= 11,304 sf Storage= 36,590 cf

Plug-Flow detention time= 361.5 min calculated for 1.105 af (64% of inflow)
Center-of-Mass det. time= 262.5 min ( 1,039.7 - 777.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 223.00' | 38,185 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 223.00 | 7,710 | 0 | 0 |
| 224.00 | 8,610 | 8,160 | 8,160 |
| 225.00 | 9,530 | 9,070 | 17,230 |
| 226.00 | 10,470 | 10,000 | 27,230 |
| 227.00 | 11,440 | 10,955 | 38,185 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 226.50' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 223.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=11.06 cfs @ 12.24 hrs HW=226.86' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 10.99 cfs @ 1.53 fps)
**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 8.06 fps)

## Summary for Pond ESB-4:

Inflow Area = 2.176 ac, 0.00% Impervious, Inflow Depth = 9.10" for 100-Year event
Inflow = 21.05 cfs @ 12.10 hrs, Volume= 1.651 af
Outflow = 18.14 cfs @ 12.16 hrs, Volume= 1.232 af, Atten= 14%, Lag= 3.0 min
Primary = 18.14 cfs @ 12.16 hrs, Volume= 1.232 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 243.99' @ 12.16 hrs Surf.Area= 8,344 sf Storage= 27,931 cf

Plug-Flow detention time= 304.0 min calculated for 1.232 af (75% of inflow)
Center-of-Mass det. time= 218.1 min ( 998.0 - 779.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 240.00' | 28,005 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 240.00 | 5,720 | 0 | 0 |
| 241.00 | 6,340 | 6,030 | 6,030 |
| 242.00 | 6,980 | 6,660 | 12,690 |
| 243.00 | 7,650 | 7,315 | 20,005 |
| 244.00 | 8,350 | 8,000 | 28,005 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 243.50' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 240.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=18.11 cfs @ 12.16 hrs HW=243.99' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 18.03 cfs @ 1.84 fps)
**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 8.25 fps)

## Summary for Pond ESB-5:

Inflow Area = 1.794 ac, 0.00% Impervious, Inflow Depth = 9.10" for 100-Year event
Inflow = 17.28 cfs @ 12.11 hrs, Volume= 1.361 af
Outflow = 6.52 cfs @ 12.36 hrs, Volume= 0.828 af, Atten= 62%, Lag= 15.5 min
Primary = 6.52 cfs @ 12.36 hrs, Volume= 0.828 af
Routed to Link DP5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 257.95' @ 12.36 hrs Surf.Area= 9,504 sf Storage= 31,621 cf

Plug-Flow detention time= 437.2 min calculated for 0.828 af (61% of inflow)
Center-of-Mass det. time= 333.7 min ( 1,114.0 - 780.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 254.00' | 32,055 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 254.00 | 6,550 | 0 | 0 |
| 255.00 | 7,260 | 6,905 | 6,905 |
| 256.00 | 8,000 | 7,630 | 14,535 |
| 257.00 | 8,750 | 8,375 | 22,910 |
| 258.00 | 9,540 | 9,145 | 32,055 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Primary | 257.70' | **20.0' long Broad-Crested Rectangular Weir**<br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60<br>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64 |
| #2 | Primary | 254.00' | **0.3" Vert. Orifice/Grate X 4.00 columns**<br>X 5 rows with 6.0" cc spacing C= 0.600<br>Limited to weir flow at low heads |

**Primary OutFlow** Max=6.51 cfs @ 12.36 hrs HW=257.95' TW=0.00' (Dynamic Tailwater)
**1=Broad-Crested Rectangular Weir** (Weir Controls 6.43 cfs @ 1.27 fps)
**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 8.20 fps)

## Summary for Link DP1:

Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP2:

Inflow Area = 4.134 ac, 0.00% Impervious, Inflow Depth > 6.22" for 100-Year event
Inflow = 19.92 cfs @ 12.21 hrs, Volume= 2.143 af
Primary = 19.92 cfs @ 12.21 hrs, Volume= 2.143 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP3:

Inflow Area = 2.878 ac, 0.00% Impervious, Inflow Depth > 6.20" for 100-Year event
Inflow = 13.69 cfs @ 12.23 hrs, Volume= 1.486 af
Primary = 13.69 cfs @ 12.23 hrs, Volume= 1.486 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP4:

Inflow Area = 3.017 ac, 0.00% Impervious, Inflow Depth > 6.97" for 100-Year event
Inflow = 23.77 cfs @ 12.14 hrs, Volume= 1.753 af
Primary = 23.77 cfs @ 12.14 hrs, Volume= 1.753 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP5:

Inflow Area = 2.029 ac, 0.00% Impervious, Inflow Depth > 5.95" for 100-Year event
Inflow = 7.31 cfs @ 12.36 hrs, Volume= 1.006 af
Primary = 7.31 cfs @ 12.36 hrs, Volume= 1.006 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

# MAIN STREET

(AKA MA ROUTE 109)

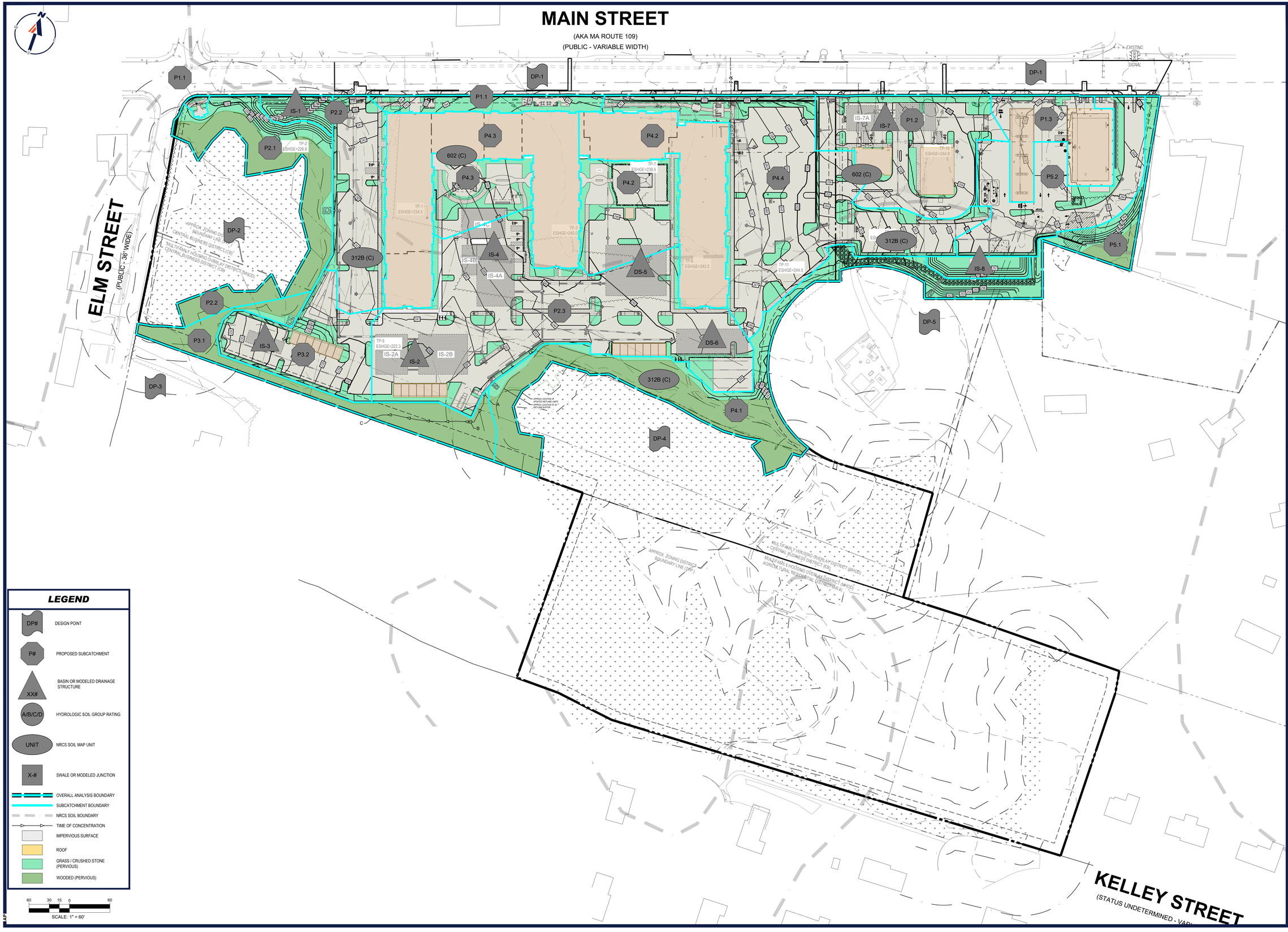
(PUBLIC - VARIABLE WIDTH)

## ELM STREET

(PUBLIC - 36' WIDE)

## KELLEY STREET

(STATUS UNDETERMINED - VARI...




## LEGEND

- DP# — DESIGN POINT
- P# — PROPOSED SUBCATCHMENT
- XX# — BASIN OR MODELED DRAINAGE STRUCTURE
- A/B/C/D — HYDROLOGIC SOIL GROUP RATING
- UNIT — NRCS SOIL MAP UNIT
- X-# — SWALE OR MODELED JUNCTION
- OVERALL ANALYSIS BOUNDARY
- SUBCATCHMENT BOUNDARY
- NRCS SOIL BOUNDARY
- TIME OF CONCENTRATION
- IMPERVIOUS SURFACE
- ROOF
- GRASS / CRUSHED STONE (PERVIOUS)
- WOODED (PERVIOUS)

60 30 15 0 60

SCALE: 1" = 60'

P:\MA\2024\MA240482.00\CAD\DRAWINGS\EXHIBITS\GENERAL EXHIBIT\P-GNRE-HYDR-MAA240482.00-1A_---=LAYOUT: EX-PS PSDM

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| PROJECT No.: | MAA240482.00-1A |
| DRAWN BY: | AP, JK, SW |
| CHECKED BY: | TH, MM |
| DATE: | 02/02/2026 |
| CAD I.D.: | P-GNRE-HYDR |

PROJECT:

**HERITAGE ON MAIN**

FOR

**RTE. 85 REALTY CORP**
P.O. BOX 2440

PROPOSED
MIXED-USE DEVELOPMENT

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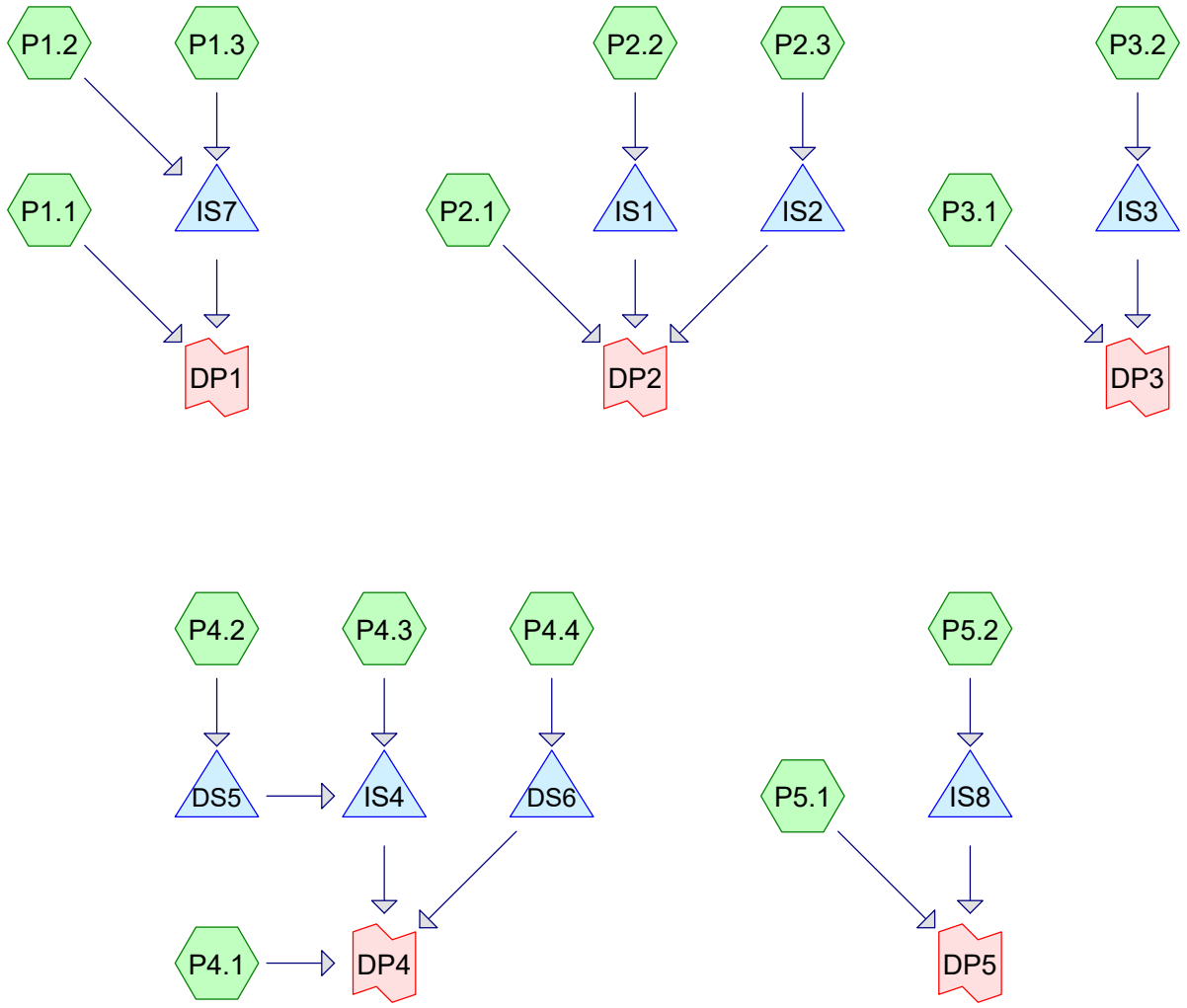
SHEET TITLE:

**OVERALL GRADING PLAN**

SHEET NUMBER:

**EX-PS**

REVISION 1 - 09/25/2026




Subcat Reach Pond Link

**Routing Diagram for W211301_Post-6a**
Prepared by Bohler Engineering, PC, Printed 9/28/2026
HydroCAD® 10.20-8a s/n 03478 © 2025 HydroCAD Software Solutions LLC

## Area Listing (all nodes)

| Area (acres) | CN | Description (subcatchment-numbers) |
|---|---|---|
| 2.234 | 79 | 50-75% Grass cover, Fair, HSG C (P1.1, P1.2, P1.3, P2.1, P2.2, P2.3, P3.1, P3.2, P4.1, P4.2, P4.3, P4.4, P5.1, P5.2) |
| 6.383 | 98 | Paved parking, HSG C (P1.1, P1.2, P1.3, P2.1, P2.2, P2.3, P3.2, P4.2, P4.3, P4.4, P5.1, P5.2) |
| 2.076 | 98 | Roofs, HSG C (P1.2, P1.3, P4.2, P4.3) |
| 1.365 | 70 | Woods, Good, HSG C (P2.1, P3.1, P4.1, P5.1) |
| **12.058** | **91** | **TOTAL AREA** |

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentP1.1:** Runoff Area=11,110 sf 32.76% Impervious Runoff Depth=2.41"
Tc=6.0 min CN=WQ Runoff=0.68 cfs 0.051 af

**SubcatchmentP1.2:** Runoff Area=37,050 sf 86.83% Impervious Runoff Depth=3.37"
Tc=6.0 min CN=WQ Runoff=3.00 cfs 0.239 af

**SubcatchmentP1.3:** Runoff Area=18,020 sf 96.45% Impervious Runoff Depth=3.54"
Tc=6.0 min CN=WQ Runoff=1.52 cfs 0.122 af

**SubcatchmentP2.1:** Runoff Area=27,240 sf 2.39% Impervious Runoff Depth=1.45"
Tc=6.0 min CN=WQ Runoff=1.02 cfs 0.075 af

**SubcatchmentP2.2:** Runoff Area=30,860 sf 72.20% Impervious Runoff Depth=3.11"
Tc=6.0 min CN=WQ Runoff=2.33 cfs 0.184 af

**SubcatchmentP2.3:** Runoff Area=90,530 sf 89.84% Impervious Runoff Depth=3.43"
Tc=6.0 min CN=WQ Runoff=7.44 cfs 0.593 af

**SubcatchmentP3.1:** Runoff Area=19,800 sf 0.00% Impervious Runoff Depth=1.36"
Flow Length=180' Tc=12.4 min CN=WQ Runoff=0.56 cfs 0.051 af

**SubcatchmentP3.2:** Runoff Area=23,910 sf 82.48% Impervious Runoff Depth=3.30"
Tc=6.0 min CN=WQ Runoff=1.90 cfs 0.151 af

**SubcatchmentP4.1:** Runoff Area=35,780 sf 0.00% Impervious Runoff Depth=1.44"
Tc=6.0 min CN=WQ Runoff=1.35 cfs 0.099 af

**SubcatchmentP4.2:** Runoff Area=50,120 sf 90.38% Impervious Runoff Depth=3.44"
Tc=6.0 min CN=WQ Runoff=4.13 cfs 0.329 af

**SubcatchmentP4.3:** Runoff Area=60,510 sf 95.32% Impervious Runoff Depth=3.52"
Tc=6.0 min CN=WQ Runoff=5.09 cfs 0.408 af

**SubcatchmentP4.4:** Runoff Area=67,980 sf 83.63% Impervious Runoff Depth=3.32"
Tc=6.0 min CN=WQ Runoff=5.43 cfs 0.431 af

**SubcatchmentP5.1:** Runoff Area=17,110 sf 0.58% Impervious Runoff Depth=1.78"
Tc=6.0 min CN=WQ Runoff=0.81 cfs 0.058 af

**SubcatchmentP5.2:** Runoff Area=35,240 sf 89.10% Impervious Runoff Depth=3.41"
Tc=6.0 min CN=WQ Runoff=2.89 cfs 0.230 af

**Pond DS5:** Peak Elev=239.64' Storage=9,776 cf Inflow=4.13 cfs 0.329 af
Outflow=0.95 cfs 0.110 af

**Pond DS6:** Peak Elev=240.05' Storage=5,621 cf Inflow=5.43 cfs 0.431 af
Outflow=1.73 cfs 0.431 af

**Pond IS1:** Peak Elev=232.89' Storage=2,433 cf Inflow=2.33 cfs 0.184 af
Outflow=2.20 cfs 0.136 af

**Pond IS2:** Peak Elev=235.51' Storage=15,900 cf Inflow=7.44 cfs 0.593 af
Outflow=1.38 cfs 0.301 af

**Pond IS3:** Peak Elev=229.27' Storage=1,987 cf Inflow=1.90 cfs 0.151 af
Outflow=1.85 cfs 0.109 af

**Pond IS4:** Peak Elev=239.64' Storage=20,631 cf Inflow=5.93 cfs 0.518 af
Outflow=0.11 cfs 0.051 af

**Pond IS7:** Peak Elev=252.27' Storage=6,773 cf Inflow=4.53 cfs 0.361 af
Outflow=2.94 cfs 0.239 af

**Pond IS8:** Peak Elev=254.49' Storage=6,618 cf Inflow=2.89 cfs 0.230 af
Outflow=0.24 cfs 0.113 af

**Link DP1:** Inflow=3.49 cfs 0.291 af
Primary=3.49 cfs 0.291 af

**Link DP2:** Inflow=3.20 cfs 0.512 af
Primary=3.20 cfs 0.512 af

**Link DP3:** Inflow=2.31 cfs 0.161 af
Primary=2.31 cfs 0.161 af

**Link DP4:** Inflow=2.75 cfs 0.580 af
Primary=2.75 cfs 0.580 af

**Link DP5:** Inflow=0.81 cfs 0.171 af
Primary=0.81 cfs 0.171 af

**Total Runoff Area = 12.058 ac Runoff Volume = 3.022 af Average Runoff Depth = 3.01"**
**29.84% Pervious = 3.599 ac 70.16% Impervious = 8.460 ac**

## Summary for Subcatchment P1.1:

Runoff = 0.68 cfs @ 12.09 hrs, Volume= 0.051 af, Depth= 2.41"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 7,470 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 3,640 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 11,110 | | Weighted Average |
| 7,470 | | 67.24% Pervious Area |
| 3,640 | | 32.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P1.2:

Runoff = 3.00 cfs @ 12.08 hrs, Volume= 0.239 af, Depth= 3.37"
Routed to Pond IS7 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 4,880 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 26,670 | 98 | Paved parking, HSG C |
| 5,500 | 98 | Roofs, HSG C |
| 37,050 | | Weighted Average |
| 4,880 | | 13.17% Pervious Area |
| 32,170 | | 86.83% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P1.3:

Runoff = 1.52 cfs @ 12.08 hrs, Volume= 0.122 af, Depth= 3.54"
Routed to Pond IS7 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 640 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 6,970 | 98 | Paved parking, HSG C |
| 5,010 | 98 | Roofs, HSG C |
| 5,400 | 98 | Roofs, HSG C |
| 18,020 | | Weighted Average |
| 640 | | 3.55% Pervious Area |
| 17,380 | | 96.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P2.1:

Runoff = 1.02 cfs @ 12.09 hrs, Volume= 0.075 af, Depth= 1.45"
Routed to Link DP2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 19,200 | 70 | Woods, Good, HSG C |
| 7,390 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 650 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 27,240 | | Weighted Average |
| 26,590 | | 97.61% Pervious Area |
| 650 | | 2.39% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P2.2:

Runoff = 2.33 cfs @ 12.08 hrs, Volume= 0.184 af, Depth= 3.11"
Routed to Pond IS1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 8,580 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 22,280 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 30,860 | | Weighted Average |
| 8,580 | | 27.80% Pervious Area |
| 22,280 | | 72.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P2.3:

Runoff = 7.44 cfs @ 12.08 hrs, Volume= 0.593 af, Depth= 3.43"
Routed to Pond IS2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 9,200 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 81,330 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 90,530 | | Weighted Average |
| 9,200 | | 10.16% Pervious Area |
| 81,330 | | 89.84% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P3.1:

Runoff = 0.56 cfs @ 12.18 hrs, Volume= 0.051 af, Depth= 1.36"
Routed to Link DP3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 15,510 | 70 | Woods, Good, HSG C |
| 4,290 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 19,800 | | Weighted Average |
| 19,800 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.7 | 50 | 0.0380 | 0.09 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10" |
| 2.7 | 130 | 0.0250 | 0.79 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 12.4 | 180 | Total | | | |

## Summary for Subcatchment P3.2:

Runoff = 1.90 cfs @ 12.08 hrs, Volume= 0.151 af, Depth= 3.30"
Routed to Pond IS3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 4,190 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 19,720 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 23,910 | | Weighted Average |
| 4,190 | | 17.52% Pervious Area |
| 19,720 | | 82.48% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.1:

Runoff = 1.35 cfs @ 12.09 hrs, Volume= 0.099 af, Depth= 1.44"
Routed to Link DP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 22,930 | 70 | Woods, Good, HSG C |
| 12,850 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 35,780 | | Weighted Average |
| 35,780 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.2:

Runoff = 4.13 cfs @ 12.08 hrs, Volume= 0.329 af, Depth= 3.44"
Routed to Pond DS5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 4,820 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 16,360 | 98 | Paved parking, HSG C |
| 28,940 | 98 | Roofs, HSG C |
| 50,120 | | Weighted Average |
| 4,820 | | 9.62% Pervious Area |
| 45,300 | | 90.38% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.3:

Runoff = 5.09 cfs @ 12.08 hrs, Volume= 0.408 af, Depth= 3.52"
Routed to Pond IS4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 2,830 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 12,080 | 98 | Paved parking, HSG C |
| 45,600 | 98 | Roofs, HSG C |
| 60,510 | | Weighted Average |
| 2,830 | | 4.68% Pervious Area |
| 57,680 | | 95.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.4:

Runoff = 5.43 cfs @ 12.08 hrs, Volume= 0.431 af, Depth= 3.32"
Routed to Pond DS6 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 11,130 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 56,850 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 67,980 | | Weighted Average |
| 11,130 | | 16.37% Pervious Area |
| 56,850 | | 83.63% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P5.1:

Runoff = 0.81 cfs @ 12.09 hrs, Volume= 0.058 af, Depth= 1.78"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 1,820 | 70 | Woods, Good, HSG C |
| 15,190 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 100 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 17,110 | | Weighted Average |
| 17,010 | | 99.42% Pervious Area |
| 100 | | 0.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P5.2:

Runoff = 2.89 cfs @ 12.08 hrs, Volume= 0.230 af, Depth= 3.41"
Routed to Pond IS8 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.84"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 3,840 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 31,400 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 35,240 | | Weighted Average |
| 3,840 | | 10.90% Pervious Area |
| 31,400 | | 89.10% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Pond DS5:

Inflow Area = 1.151 ac, 90.38% Impervious, Inflow Depth = 3.44" for 2-Year event
Inflow = 4.13 cfs @ 12.08 hrs, Volume= 0.329 af
Outflow = 0.95 cfs @ 12.14 hrs, Volume= 0.110 af, Atten= 77%, Lag= 3.2 min
Primary = 0.95 cfs @ 12.14 hrs, Volume= 0.110 af
Routed to Pond IS4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 239.64' @ 21.36 hrs Surf.Area= 6,713 sf Storage= 9,776 cf

Plug-Flow detention time= 222.2 min calculated for 0.110 af (33% of inflow)
Center-of-Mass det. time= 50.0 min ( 807.1 - 757.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 238.00' | 0 cf | **89.63'W x 74.90'L x 4.50'H Field A**<br>30,206 cf Overall - 30,206 cf Embedded = 0 cf x 40.0% Voids |
| #2A | 238.00' | 23,891 cf | **StormTrap SingleTrap 4-0** x 36 Inside #1<br>Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf<br>Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf<br>36 Chambers in 9 Rows<br>76.31' x 61.58' Core + 6.66' Border = 89.63' x 74.90' System |
| | | 23,891 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 4 | 241.40' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Device 4 | 239.60' | **6.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Device 4 | 238.00' | **6.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #4 | Primary | 238.00' | **15.0" Round Culvert**<br>L= 140.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 238.00' / 237.00' S= 0.0071 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf |

**Primary OutFlow** Max=0.95 cfs @ 12.14 hrs HW=238.76' TW=238.50' (Dynamic Tailwater)
└**4=Culvert** (Passes 0.95 cfs of 0.95 cfs potential flow)
  ├**1=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)
  ├**2=Orifice/Grate** ( Controls 0.00 cfs)
  └**3=Orifice/Grate** (Orifice Controls 0.95 cfs @ 2.42 fps)

## Pond DS5: - Chamber Wizard Field A

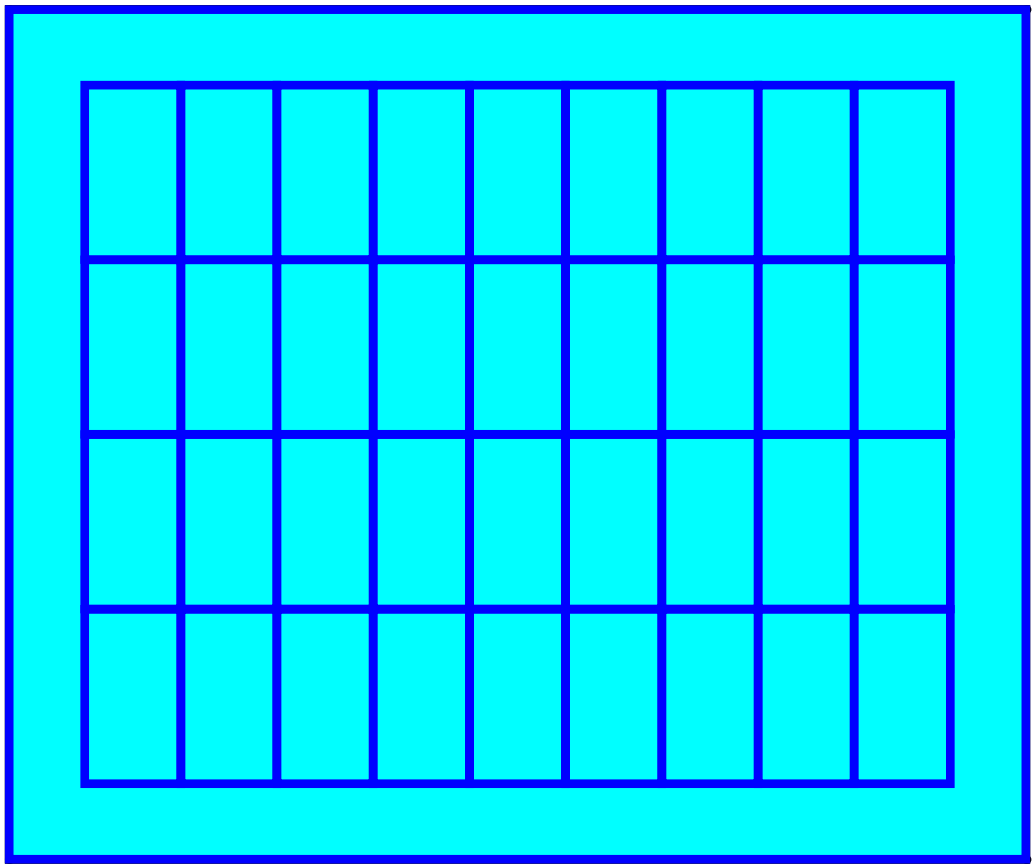
**Chamber Model = StormTrap SingleTrap 4-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf
Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf

4 Chambers/Row x 15.40' Long = 61.58' Row Length +79.9" Border x 2 = 74.90' Base Length
9 Rows x 101.7" Wide + 79.9" Side Border x 2 = 89.63' Base Width
54.0" Chamber Height = 4.50' Field Height

36 Chambers x 470.3 cf + 6,961.4 cf Border = 23,891.2 cf Chamber Storage
36 Chambers x 587.4 cf + 9,058.3 cf Border = 30,206.4 cf Displacement

Chamber Storage = 23,891.2 cf = 0.548 af
Overall Storage Efficiency = 79.1%
Overall System Size = 74.90' x 89.63' x 4.50'

36 Chambers (plus border)
1,118.8 cy Field





## Summary for Pond DS6:

Inflow Area = 1.561 ac, 83.63% Impervious, Inflow Depth = 3.32" for 2-Year event
Inflow = 5.43 cfs @ 12.08 hrs, Volume= 0.431 af
Outflow = 1.73 cfs @ 12.38 hrs, Volume= 0.431 af, Atten= 68%, Lag= 17.9 min
Primary = 1.73 cfs @ 12.38 hrs, Volume= 0.431 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 240.05' @ 12.38 hrs Surf.Area= 4,095 sf Storage= 5,621 cf

Plug-Flow detention time= 69.3 min calculated for 0.431 af (100% of inflow)
Center-of-Mass det. time= 68.2 min ( 828.6 - 760.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 238.50' | 0 cf | **38.75'W x 105.69'L x 5.50'H Field A**<br>22,525 cf Overall - 22,525 cf Embedded = 0 cf x 40.0% Voids |
| #2A | 238.50' | 18,191 cf | **StormTrap SingleTrap 5-0** x 18 Inside #1<br>Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf<br>Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf<br>18 Chambers in 3 Rows<br>25.44' x 92.38' Core + 6.66' Border = 38.75' x 105.69' System |
| | | 18,191 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 5 | 243.00' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Device 5 | 242.00' | **6.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Device 5 | 239.10' | **4.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #4 | Device 5 | 238.50' | **4.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #5 | Primary | 238.50' | **18.0" Round Culvert**<br>L= 240.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 238.50' / 233.50' S= 0.0208 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf |

**Primary OutFlow** Max=1.73 cfs @ 12.38 hrs HW=240.05' TW=0.00' (Dynamic Tailwater)
└**5=Culvert** (Passes 1.73 cfs of 6.69 cfs potential flow)
  ├**1=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)
  ├**2=Orifice/Grate** ( Controls 0.00 cfs)
  ├**3=Orifice/Grate** (Orifice Controls 0.74 cfs @ 4.25 fps)
  └**4=Orifice/Grate** (Orifice Controls 0.99 cfs @ 5.65 fps)

## Pond DS6: - Chamber Wizard Field A

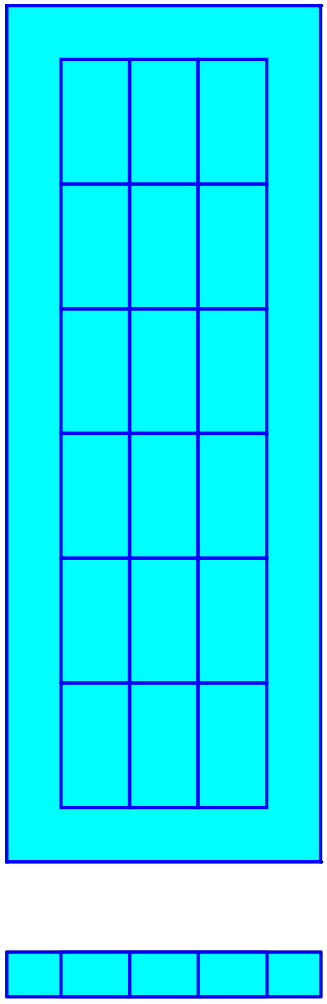
**Chamber Model = StormTrap SingleTrap 5-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

6 Chambers/Row x 15.40' Long = 92.38' Row Length +79.9" Border x 2 = 105.69' Base Length
3 Rows x 101.7" Wide + 79.9" Side Border x 2 = 38.75' Base Width
66.0" Chamber Height = 5.50' Field Height

18 Chambers x 590.2 cf + 7,568.2 cf Border = 18,191.5 cf Chamber Storage
18 Chambers x 718.0 cf + 9,600.8 cf Border = 22,524.6 cf Displacement

Chamber Storage = 18,191.5 cf = 0.418 af
Overall Storage Efficiency = 80.8%
Overall System Size = 105.69' x 38.75' x 5.50'

18 Chambers (plus border)
834.2 cy Field



## Summary for Pond IS1:

Inflow Area = 0.708 ac, 72.20% Impervious, Inflow Depth = 3.11" for 2-Year event
Inflow = 2.33 cfs @ 12.08 hrs, Volume= 0.184 af
Outflow = 2.20 cfs @ 12.11 hrs, Volume= 0.136 af, Atten= 6%, Lag= 1.7 min
Primary = 2.20 cfs @ 12.11 hrs, Volume= 0.136 af
Routed to Link DP2 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 232.89' @ 12.11 hrs Surf.Area= 1,881 sf Storage= 2,433 cf

Plug-Flow detention time= 165.6 min calculated for 0.136 af (74% of inflow)
Center-of-Mass det. time= 75.8 min ( 842.3 - 766.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 231.00' | 4,940 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 231.00 | 710 | 0 | 0 |
| 232.00 | 1,310 | 1,010 | 1,010 |
| 233.00 | 1,950 | 1,630 | 2,640 |
| 234.00 | 2,650 | 2,300 | 4,940 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 232.70' | **2.5" x 2.5" Horiz. Grate X 6.00 columns**<br>X 6 rows C= 0.600 in 24.0" x 24.0" Grate (39% open area)<br>Limited to weir flow at low heads |
| #2 | Primary | 229.20' | **18.0" Round Culvert**<br>L= 40.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 229.20' / 229.00' S= 0.0050 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf |

**Primary OutFlow** Max=2.20 cfs @ 12.11 hrs HW=232.89' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Passes 2.20 cfs of 12.88 cfs potential flow)
↑**1=Grate** (Weir Controls 2.20 cfs @ 1.43 fps)

## Summary for Pond IS2:

Inflow Area = 2.078 ac, 89.84% Impervious, Inflow Depth = 3.43" for 2-Year event
Inflow = 7.44 cfs @ 12.08 hrs, Volume= 0.593 af
Outflow = 1.38 cfs @ 12.53 hrs, Volume= 0.301 af, Atten= 82%, Lag= 26.6 min
Primary = 1.38 cfs @ 12.53 hrs, Volume= 0.301 af
Routed to Link DP2 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 235.51' @ 12.53 hrs Surf.Area= 7,134 sf Storage= 15,900 cf

Plug-Flow detention time= 324.2 min calculated for 0.301 af (51% of inflow)
Center-of-Mass det. time= 198.9 min ( 956.2 - 757.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1B | 233.00' | 0 cf | **47.23'W x 59.50'L x 5.50'H Field A**<br>15,456 cf Overall - 15,456 cf Embedded = 0 cf x 40.0% Voids |
| #2B | 233.00' | 12,474 cf | **StormTrap SingleTrap 5-0** x 12 Inside #1<br>Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf<br>Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf<br>12 Chambers in 4 Rows<br>33.92' x 46.19' Core + 6.66' Border = 47.23' x 59.50' System |
| #3C | 233.00' | 0 cf | **72.67'W x 59.50'L x 5.50'H Field B**<br>23,780 cf Overall - 23,780 cf Embedded = 0 cf x 40.0% Voids |
| #4C | 233.00' | 19,254 cf | **StormTrap SingleTrap 5-0** x 21 Inside #3<br>Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf<br>Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf<br>21 Chambers in 7 Rows<br>59.35' x 46.19' Core + 6.66' Border = 72.67' x 59.50' System |
| | | 31,728 cf | Total Available Storage |

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

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 237.00' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Device 3 | 235.00' | **8.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Primary | 233.00' | **24.0" Round Culvert**<br>L= 250.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 233.00' / 231.00' S= 0.0080 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |

**Primary OutFlow** Max=1.38 cfs @ 12.53 hrs HW=235.51' TW=0.00' (Dynamic Tailwater)
└─**3=Culvert** (Passes 1.38 cfs of 16.38 cfs potential flow)
  ├─**1=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Orifice Controls 1.38 cfs @ 2.42 fps)

## Pond IS2: - Chamber Wizard Field A

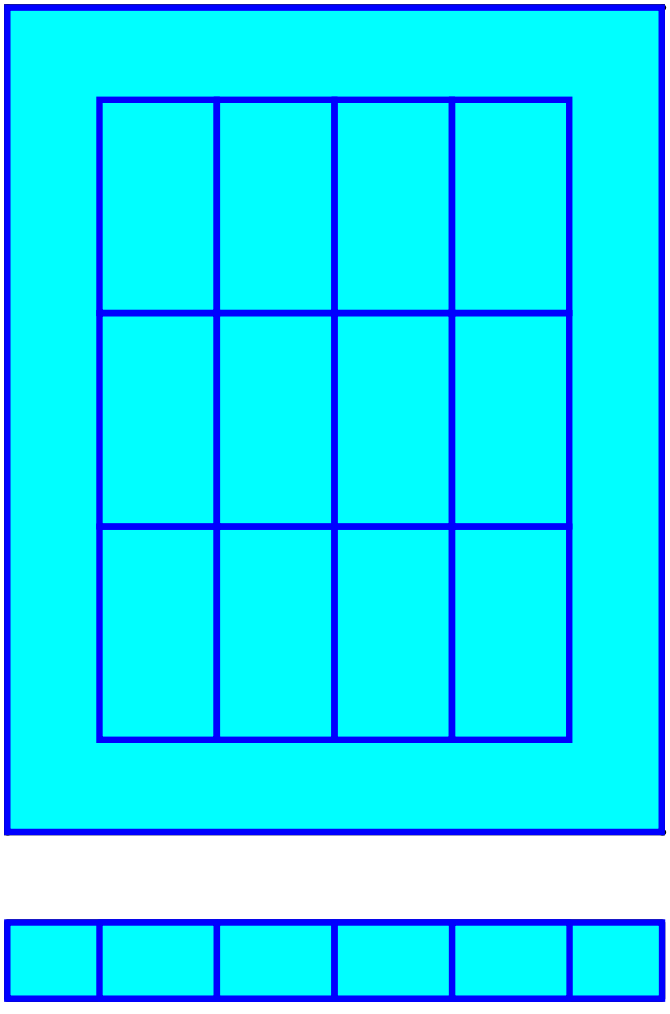
**Chamber Model = StormTrap SingleTrap 5-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

3 Chambers/Row x 15.40' Long = 46.19' Row Length +79.9" Border x 2 = 59.50' Base Length
4 Rows x 101.7" Wide + 79.9" Side Border x 2 = 47.23' Base Width
66.0" Chamber Height = 5.50' Field Height

12 Chambers x 590.2 cf + 5,391.8 cf Border = 12,474.0 cf Chamber Storage
12 Chambers x 718.0 cf + 6,839.9 cf Border = 15,455.7 cf Displacement

Chamber Storage = 12,474.0 cf = 0.286 af
Overall Storage Efficiency = 80.7%
Overall System Size = 59.50' x 47.23' x 5.50'

12 Chambers (plus border)
572.4 cy Field



## Pond IS2: - Chamber Wizard Field B

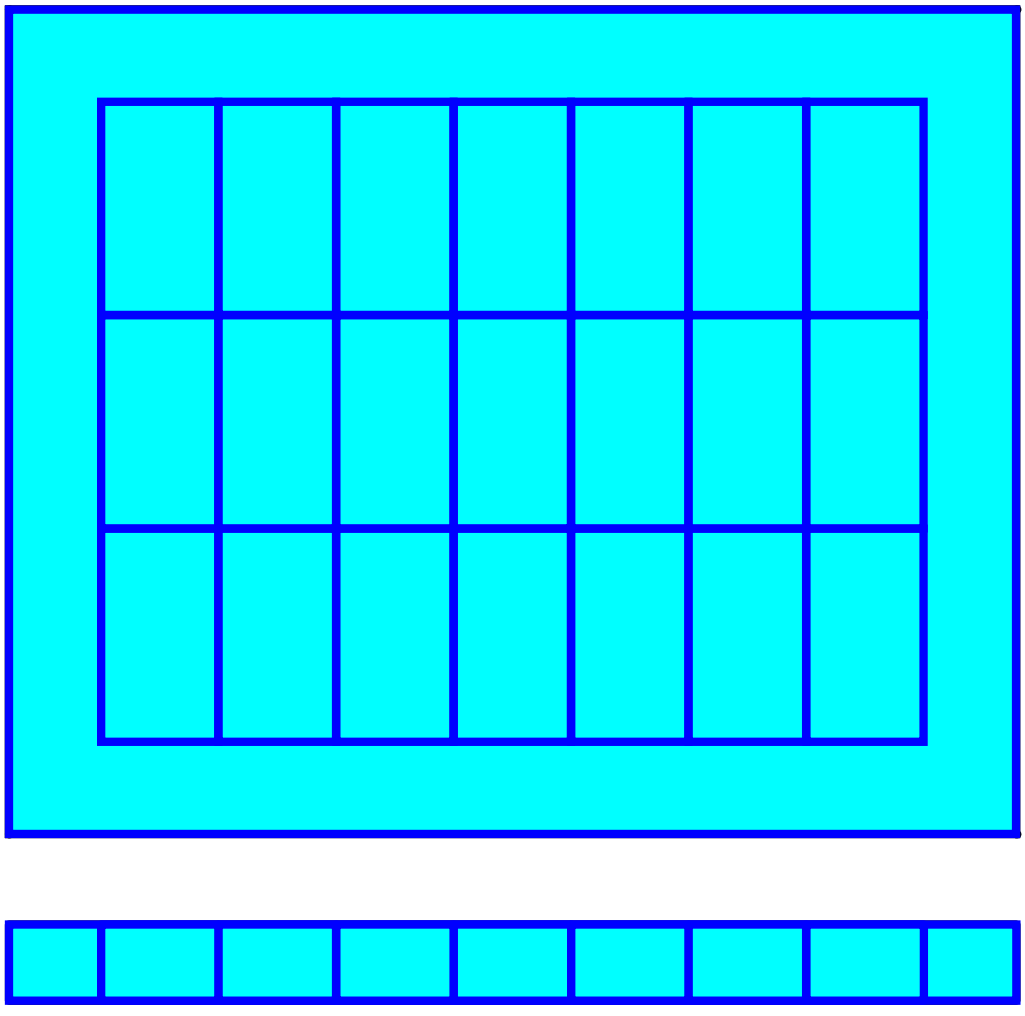
**Chamber Model = StormTrap SingleTrap 5-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

3 Chambers/Row x 15.40' Long = 46.19' Row Length +79.9" Border x 2 = 59.50' Base Length
7 Rows x 101.7" Wide + 79.9" Side Border x 2 = 72.67' Base Width
66.0" Chamber Height = 5.50' Field Height

21 Chambers x 590.2 cf + 6,860.0 cf Border = 19,253.8 cf Chamber Storage
21 Chambers x 718.0 cf + 8,702.4 cf Border = 23,780.2 cf Displacement

Chamber Storage = 19,253.8 cf = 0.442 af
Overall Storage Efficiency = 81.0%
Overall System Size = 59.50' x 72.67' x 5.50'

21 Chambers (plus border)
880.7 cy Field



## Summary for Pond IS3:

Inflow Area = 0.549 ac, 82.48% Impervious, Inflow Depth = 3.30" for 2-Year event
Inflow = 1.90 cfs @ 12.08 hrs, Volume= 0.151 af
Outflow = 1.85 cfs @ 12.10 hrs, Volume= 0.109 af, Atten= 2%, Lag= 1.1 min
Primary = 1.85 cfs @ 12.10 hrs, Volume= 0.109 af
Routed to Link DP3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 229.27' @ 12.10 hrs Surf.Area= 1,033 sf Storage= 1,987 cf

Plug-Flow detention time= 169.3 min calculated for 0.109 af (73% of inflow)
Center-of-Mass det. time= 78.0 min ( 838.9 - 760.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 226.50' | 1,022 cf | **18.50'W x 55.83'L x 4.00'H Field A**<br>4,132 cf Overall - 1,578 cf Embedded = 2,554 cf x 40.0% Voids |
| #2A | 227.00' | 1,578 cf | **Cultec R-360HD** x 42 Inside #1<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>42 Chambers in 3 Rows<br>Cap Storage= 6.5 cf x 2 x 3 rows = 38.8 cf |
| | | 2,599 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 229.00' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Primary | 227.00' | **15.0" Round Culvert**<br>L= 40.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 227.00' / 225.50' S= 0.0375 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf |

**Primary OutFlow** Max=1.85 cfs @ 12.10 hrs HW=229.27' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Passes 1.85 cfs of 6.69 cfs potential flow)
↑**1=Sharp-Crested Rectangular Weir** (Weir Controls 1.85 cfs @ 1.71 fps)

## Pond IS3: - Chamber Wizard Field A

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**
Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf
Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap
Cap Storage= 6.5 cf x 2 x 3 rows = 38.8 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

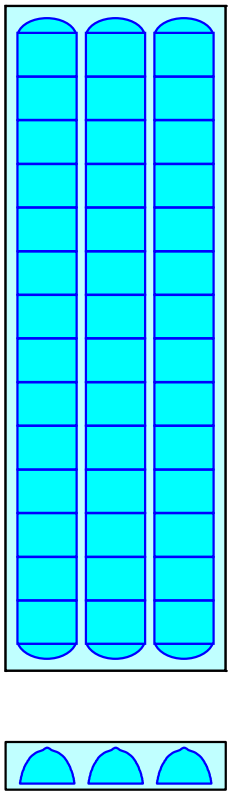
14 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 53.83' Row Length +12.0" End Stone x 2 = 55.83' Base Length
3 Rows x 60.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 18.50' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

42 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 3 Rows = 1,577.8 cf Chamber Storage

4,131.7 cf Field - 1,577.8 cf Chambers = 2,553.8 cf Stone x 40.0% Voids = 1,021.5 cf Stone Storage

Chamber Storage + Stone Storage = 2,599.4 cf = 0.060 af
Overall Storage Efficiency = 62.9%
Overall System Size = 55.83' x 18.50' x 4.00'

42 Chambers
153.0 cy Field
94.6 cy Stone



## Summary for Pond IS4:

Inflow Area = 2.540 ac, 93.09% Impervious, Inflow Depth = 2.45" for 2-Year event
Inflow = 5.93 cfs @ 12.09 hrs, Volume= 0.518 af
Outflow = 0.11 cfs @ 21.36 hrs, Volume= 0.051 af, Atten= 98%, Lag= 556.4 min
Primary = 0.11 cfs @ 21.36 hrs, Volume= 0.051 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 239.64' @ 21.36 hrs Surf.Area= 8,822 sf Storage= 20,631 cf

Plug-Flow detention time= 949.3 min calculated for 0.051 af (10% of inflow)
Center-of-Mass det. time= 589.6 min ( 1,355.4 - 765.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 237.00' | 0 cf | **55.71'W x 90.29'L x 3.50'H Field A**<br>17,605 cf Overall - 17,605 cf Embedded = 0 cf x 40.0% Voids |
| #2A | 237.00' | 13,440 cf | **StormTrap SingleTrap 3-0** x 25 Inside #1<br>Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf<br>Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf<br>25 Chambers in 5 Rows<br>42.40' x 76.98' Core + 6.66' Border = 55.71' x 90.29' System |
| #3C | 237.00' | 0 cf | **21.79'W x 44.10'L x 3.50'H Field B**<br>3,364 cf Overall - 3,364 cf Embedded = 0 cf x 40.0% Voids |
| #4C | 237.00' | 2,527 cf | **StormTrap SingleTrap 3-0** x 2 Inside #3<br>Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf<br>Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf<br>8.48' x 30.79' Core + 6.66' Border = 21.79' x 44.10' System |
| #5B | 237.00' | 0 cf | **64.19'W x 44.10'L x 4.50'H Field C**<br>12,739 cf Overall - 12,739 cf Embedded = 0 cf x 40.0% Voids |
| #6B | 237.00' | 10,016 cf | **StormTrap SingleTrap 4-0** x 12 Inside #5<br>Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf<br>Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf<br>12 Chambers in 6 Rows<br>50.88' x 30.79' Core + 6.66' Border = 64.19' x 44.10' System |
| | | 25,984 cf | Total Available Storage |

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

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 239.60' | **5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Primary | 237.50' | **24.0" Round Culvert**<br>L= 220.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 237.50' / 234.00' S= 0.0159 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |

**Primary OutFlow** Max=0.11 cfs @ 21.36 hrs HW=239.64' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Passes 0.11 cfs of 14.23 cfs potential flow)
↑—**1=Sharp-Crested Rectangular Weir** (Weir Controls 0.11 cfs @ 0.62 fps)

## Pond IS4: - Chamber Wizard Field A

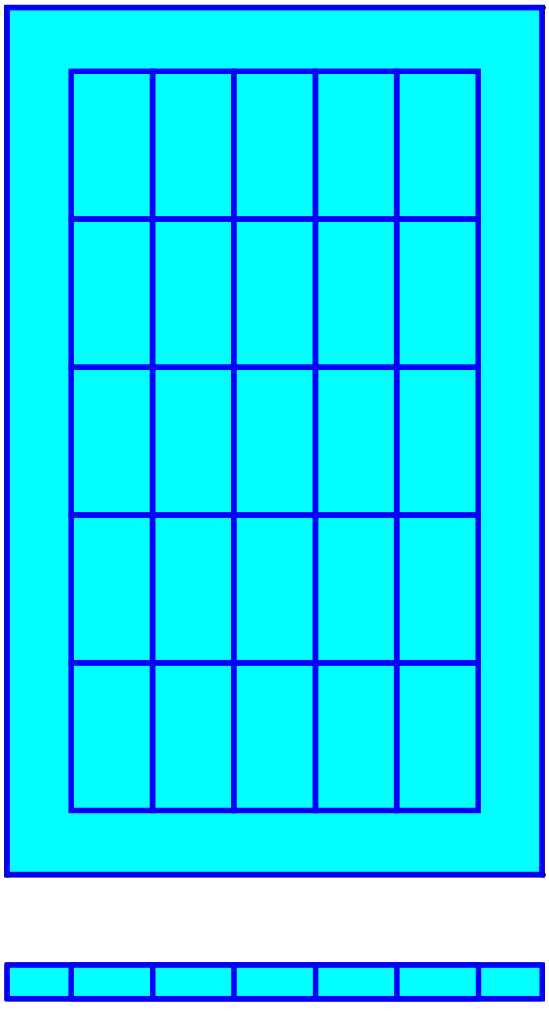
**Chamber Model = StormTrap SingleTrap 3-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf
Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf

5 Chambers/Row x 15.40' Long = 76.98' Row Length +79.9" Border x 2 = 90.29' Base Length
5 Rows x 101.7" Wide + 79.9" Side Border x 2 = 55.71' Base Width
42.0" Chamber Height = 3.50' Field Height

25 Chambers x 354.0 cf + 4,590.6 cf Border = 13,440.4 cf Chamber Storage
25 Chambers x 456.9 cf + 6,182.4 cf Border = 17,605.0 cf Displacement

Chamber Storage = 13,440.4 cf = 0.309 af
Overall Storage Efficiency = 76.3%
Overall System Size = 90.29' x 55.71' x 3.50'

25 Chambers (plus border)
652.0 cy Field



## Pond IS4: - Chamber Wizard Field B

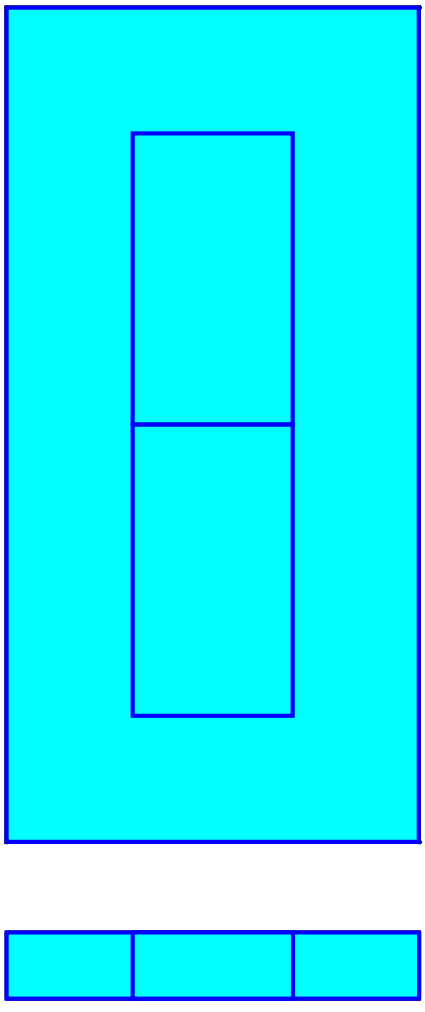
**Chamber Model = StormTrap SingleTrap 3-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf
Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf

2 Chambers/Row x 15.40' Long = 30.79' Row Length +79.9" Border x 2 = 44.10' 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

2 Chambers x 354.0 cf + 1,819.2 cf Border = 2,527.2 cf Chamber Storage
2 Chambers x 456.9 cf + 2,450.1 cf Border = 3,363.9 cf Displacement

Chamber Storage = 2,527.2 cf = 0.058 af
Overall Storage Efficiency = 75.1%
Overall System Size = 44.10' x 21.79' x 3.50'

2 Chambers (plus border)
124.6 cy Field



## Pond IS4: - Chamber Wizard Field C

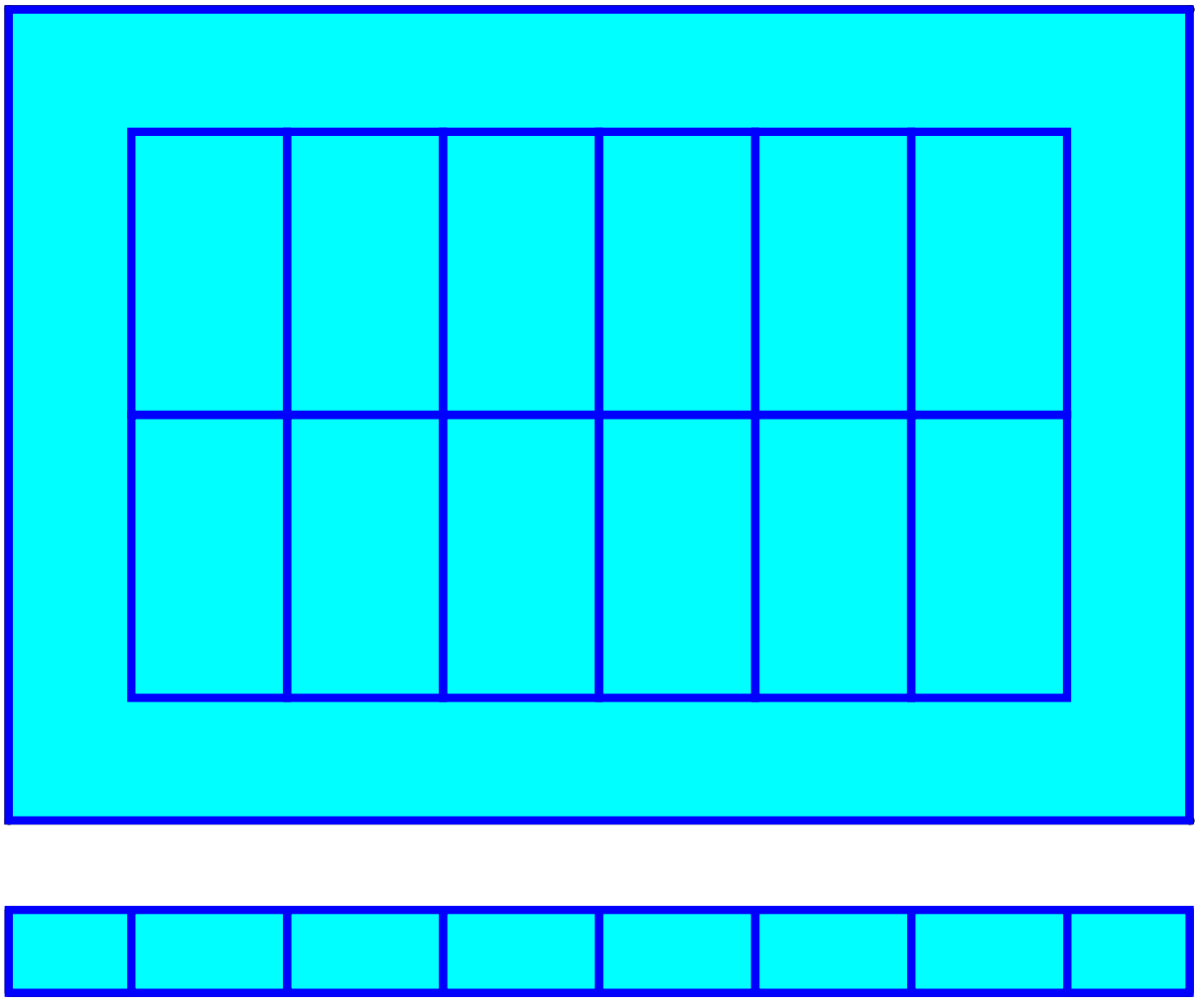
**Chamber Model = StormTrap SingleTrap 4-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf
Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf

2 Chambers/Row x 15.40' Long = 30.79' Row Length +79.9" Border x 2 = 44.10' Base Length
6 Rows x 101.7" Wide + 79.9" Side Border x 2 = 64.19' Base Width
54.0" Chamber Height = 4.50' Field Height

12 Chambers x 470.3 cf + 4,372.7 cf Border = 10,016.0 cf Chamber Storage
12 Chambers x 587.4 cf + 5,689.8 cf Border = 12,739.2 cf Displacement

Chamber Storage = 10,016.0 cf = 0.230 af
Overall Storage Efficiency = 78.6%
Overall System Size = 44.10' x 64.19' x 4.50'

12 Chambers (plus border)
471.8 cy Field



## Summary for Pond IS7:

Inflow Area = 1.264 ac, 89.98% Impervious, Inflow Depth = 3.43" for 2-Year event
Inflow = 4.53 cfs @ 12.08 hrs, Volume= 0.361 af
Outflow = 2.94 cfs @ 12.17 hrs, Volume= 0.239 af, Atten= 35%, Lag= 5.4 min
Primary = 2.94 cfs @ 12.17 hrs, Volume= 0.239 af
Routed to Link DP1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 252.27' @ 12.17 hrs Surf.Area= 4,083 sf Storage= 6,773 cf

Plug-Flow detention time= 200.5 min calculated for 0.239 af (66% of inflow)
Center-of-Mass det. time= 100.2 min ( 857.5 - 757.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 250.00' | 1,738 cf | **47.25'W x 37.50'L x 4.00'H Field A**<br>7,088 cf Overall - 2,742 cf Embedded = 4,346 cf x 40.0% Voids |
| #2A | 250.50' | 2,742 cf | **Cultec R-360HD** x 72 Inside #1<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>72 Chambers in 8 Rows<br>Cap Storage= 6.5 cf x 2 x 8 rows = 103.4 cf |
| #3B | 249.75' | 3,372 cf | **59.25'W x 39.00'L x 5.75'H Field B**<br>13,287 cf Overall - 4,856 cf Embedded = 8,431 cf x 40.0% Voids |
| #4B | 250.50' | 4,856 cf | **Cultec R-902HD v2** x 72 Inside #3<br>Effective Size= 69.1"W x 48.0"H => 17.30 sf x 3.67'L = 63.4 cf<br>Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap<br>72 Chambers in 8 Rows<br>Cap Storage= 18.0 cf x 2 x 8 rows = 288.3 cf |
| | | 12,708 cf | Total Available Storage |

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

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 251.80' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Primary | 251.00' | **12.0" Round Culvert**<br>L= 210.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 251.00' / 247.80' S= 0.0152 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf |

**Primary OutFlow** Max=2.94 cfs @ 12.17 hrs HW=252.27' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Inlet Controls 2.94 cfs @ 3.74 fps)
↑**1=Sharp-Crested Rectangular Weir** (Passes 2.94 cfs of 4.18 cfs potential flow)

## Pond IS7: - Chamber Wizard Field A

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**
Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf
Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap
Cap Storage= 6.5 cf x 2 x 8 rows = 103.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

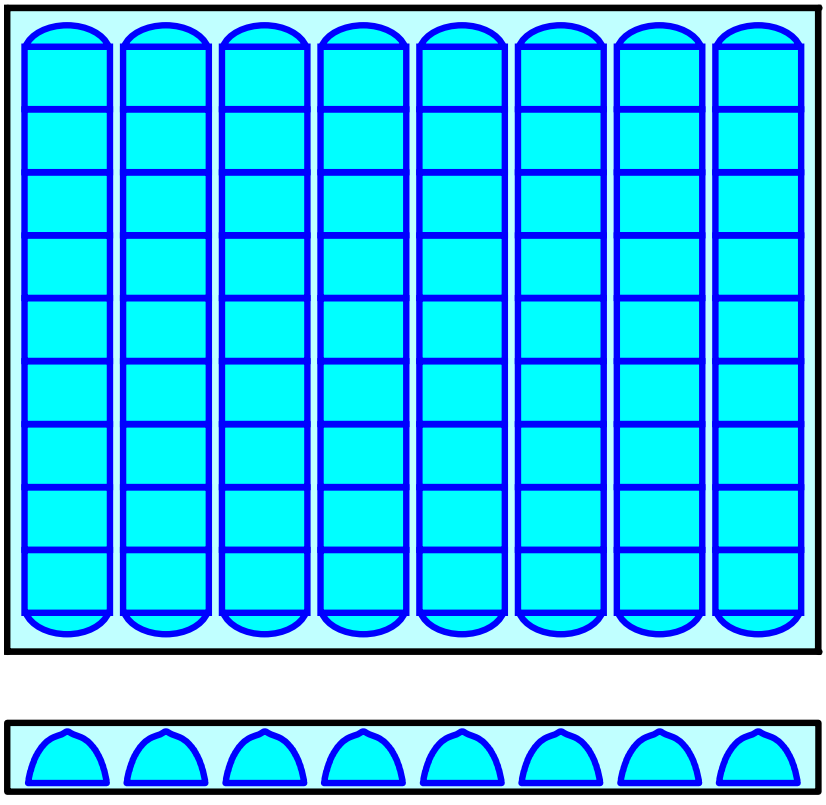
9 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 35.50' Row Length +12.0" End Stone x 2 = 37.50' Base Length
8 Rows x 60.0" Wide + 9.0" Spacing x 7 + 12.0" Side Stone x 2 = 47.25' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

72 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 8 Rows = 2,741.8 cf Chamber Storage

7,087.5 cf Field - 2,741.8 cf Chambers = 4,345.7 cf Stone x 40.0% Voids = 1,738.3 cf Stone Storage

Chamber Storage + Stone Storage = 4,480.1 cf = 0.103 af
Overall Storage Efficiency = 63.2%
Overall System Size = 37.50' x 47.25' x 4.00'

72 Chambers
262.5 cy Field
161.0 cy Stone



## Pond IS7: - Chamber Wizard Field B

**Chamber Model = Cultec R-902HD v2 (Cultec Recharger® 902HD v2)**
Effective Size= 69.1"W x 48.0"H => 17.30 sf x 3.67'L = 63.4 cf
Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap
Cap Storage= 18.0 cf x 2 x 8 rows = 288.3 cf

78.0" Wide + 9.0" Spacing = 87.0" C-C Row Spacing

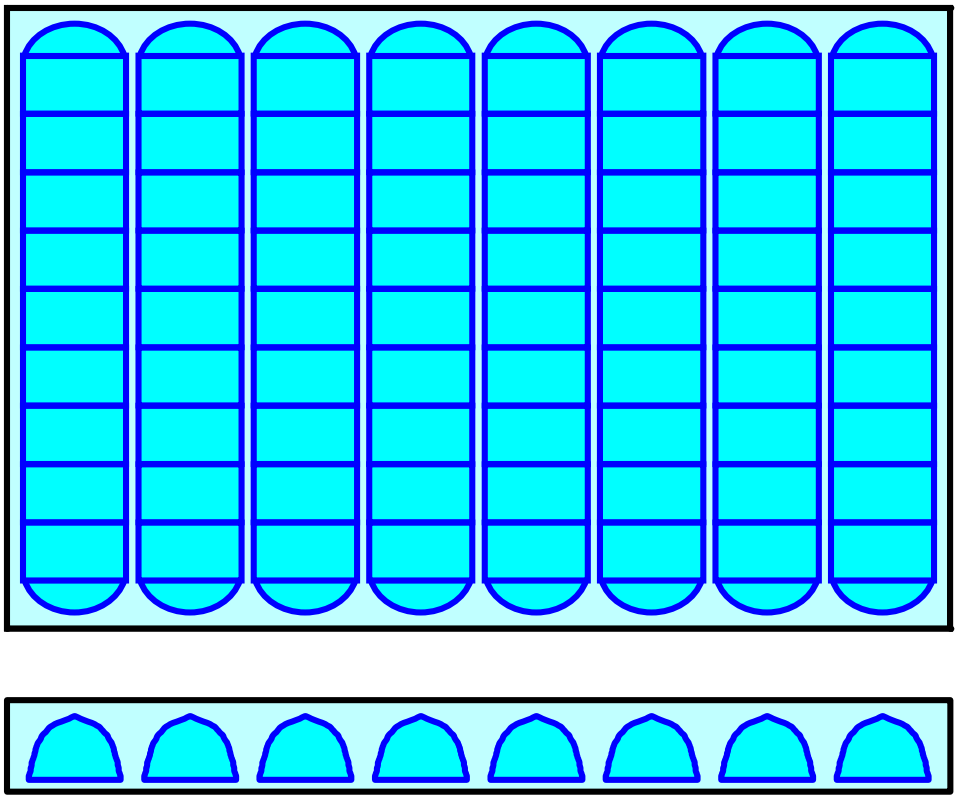
9 Chambers/Row x 3.67' Long +2.00' Cap Length x 2 = 37.00' Row Length +12.0" End Stone x 2 = 39.00' Base Length
8 Rows x 78.0" Wide + 9.0" Spacing x 7 + 12.0" Side Stone x 2 = 59.25' Base Width
9.0" Stone Base + 48.0" Chamber Height + 12.0" Stone Cover = 5.75' Field Height

72 Chambers x 63.4 cf + 18.0 cf Cap Volume x 2 x 8 Rows = 4,856.2 cf Chamber Storage

13,286.8 cf Field - 4,856.2 cf Chambers = 8,430.6 cf Stone x 40.0% Voids = 3,372.3 cf Stone Storage

Chamber Storage + Stone Storage = 8,228.4 cf = 0.189 af
Overall Storage Efficiency = 61.9%
Overall System Size = 39.00' x 59.25' x 5.75'

72 Chambers
492.1 cy Field
312.2 cy Stone



## Summary for Pond IS8:

Inflow Area = 0.809 ac, 89.10% Impervious, Inflow Depth = 3.41" for 2-Year event
Inflow = 2.89 cfs @ 12.08 hrs, Volume= 0.230 af
Outflow = 0.24 cfs @ 13.03 hrs, Volume= 0.113 af, Atten= 92%, Lag= 56.7 min
Primary = 0.24 cfs @ 13.03 hrs, Volume= 0.113 af
Routed to Link DP5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 254.49' @ 13.03 hrs Surf.Area= 3,289 sf Storage= 6,618 cf

Plug-Flow detention time= 379.7 min calculated for 0.113 af (49% of inflow)
Center-of-Mass det. time= 251.5 min ( 1,009.2 - 757.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 252.00' | 16,620 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 252.00 | 2,060 | 0 | 0 |
| 253.00 | 2,530 | 2,295 | 2,295 |
| 254.00 | 3,030 | 2,780 | 5,075 |
| 255.00 | 3,560 | 3,295 | 8,370 |
| 256.00 | 4,120 | 3,840 | 12,210 |
| 257.00 | 4,700 | 4,410 | 16,620 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 256.30' | **2.5" x 2.5" Horiz. Grate X 6.00 columns**<br>X 6 rows C= 0.600 in 24.0" x 24.0" Grate (39% open area)<br>Limited to weir flow at low heads |
| #2 | Device 3 | 254.00' | **4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |
| #3 | Primary | 252.40' | **18.0" Round Culvert**<br>L= 10.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 252.40' / 252.00' S= 0.0400 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf |

**Primary OutFlow** Max=0.24 cfs @ 13.03 hrs HW=254.49' TW=0.00' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.24 cfs of 8.69 cfs potential flow)
  ├─**1=Grate** ( Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Orifice Controls 0.24 cfs @ 2.73 fps)

## Summary for Link DP1:

Inflow Area = 1.519 ac, 80.37% Impervious, Inflow Depth = 2.30" for 2-Year event
Inflow = 3.49 cfs @ 12.12 hrs, Volume= 0.291 af
Primary = 3.49 cfs @ 12.12 hrs, Volume= 0.291 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP2:

Inflow Area = 3.412 ac, 70.15% Impervious, Inflow Depth > 1.80" for 2-Year event
Inflow = 3.20 cfs @ 12.11 hrs, Volume= 0.512 af
Primary = 3.20 cfs @ 12.11 hrs, Volume= 0.512 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP3:

Inflow Area = 1.003 ac, 45.12% Impervious, Inflow Depth = 1.92" for 2-Year event
Inflow = 2.31 cfs @ 12.11 hrs, Volume= 0.161 af
Primary = 2.31 cfs @ 12.11 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP4:

Inflow Area = 4.922 ac, 74.55% Impervious, Inflow Depth > 1.41" for 2-Year event
Inflow = 2.75 cfs @ 12.11 hrs, Volume= 0.580 af
Primary = 2.75 cfs @ 12.11 hrs, Volume= 0.580 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP5:

Inflow Area = 1.202 ac, 60.17% Impervious, Inflow Depth > 1.71" for 2-Year event
Inflow = 0.81 cfs @ 12.09 hrs, Volume= 0.171 af
Primary = 0.81 cfs @ 12.09 hrs, Volume= 0.171 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentP1.1:** Runoff Area=11,110 sf 32.76% Impervious Runoff Depth=4.42"
Tc=6.0 min CN=WQ Runoff=1.24 cfs 0.094 af

**SubcatchmentP1.2:** Runoff Area=37,050 sf 86.83% Impervious Runoff Depth=5.55"
Tc=6.0 min CN=WQ Runoff=4.87 cfs 0.393 af

**SubcatchmentP1.3:** Runoff Area=18,020 sf 96.45% Impervious Runoff Depth=5.75"
Tc=6.0 min CN=WQ Runoff=2.43 cfs 0.198 af

**SubcatchmentP2.1:** Runoff Area=27,240 sf 2.39% Impervious Runoff Depth=3.16"
Tc=6.0 min CN=WQ Runoff=2.30 cfs 0.165 af

**SubcatchmentP2.2:** Runoff Area=30,860 sf 72.20% Impervious Runoff Depth=5.24"
Tc=6.0 min CN=WQ Runoff=3.90 cfs 0.309 af

**SubcatchmentP2.3:** Runoff Area=90,530 sf 89.84% Impervious Runoff Depth=5.61"
Tc=6.0 min CN=WQ Runoff=12.01 cfs 0.972 af

**SubcatchmentP3.1:** Runoff Area=19,800 sf 0.00% Impervious Runoff Depth=3.04"
Flow Length=180' Tc=12.4 min CN=WQ Runoff=1.31 cfs 0.115 af

**SubcatchmentP3.2:** Runoff Area=23,910 sf 82.48% Impervious Runoff Depth=5.46"
Tc=6.0 min CN=WQ Runoff=3.11 cfs 0.250 af

**SubcatchmentP4.1:** Runoff Area=35,780 sf 0.00% Impervious Runoff Depth=3.17"
Tc=6.0 min CN=WQ Runoff=3.04 cfs 0.217 af

**SubcatchmentP4.2:** Runoff Area=50,120 sf 90.38% Impervious Runoff Depth=5.62"
Tc=6.0 min CN=WQ Runoff=6.66 cfs 0.539 af

**SubcatchmentP4.3:** Runoff Area=60,510 sf 95.32% Impervious Runoff Depth=5.72"
Tc=6.0 min CN=WQ Runoff=8.15 cfs 0.663 af

**SubcatchmentP4.4:** Runoff Area=67,980 sf 83.63% Impervious Runoff Depth=5.48"
Tc=6.0 min CN=WQ Runoff=8.87 cfs 0.713 af

**SubcatchmentP5.1:** Runoff Area=17,110 sf 0.58% Impervious Runoff Depth=3.65"
Tc=6.0 min CN=WQ Runoff=1.68 cfs 0.120 af

**SubcatchmentP5.2:** Runoff Area=35,240 sf 89.10% Impervious Runoff Depth=5.59"
Tc=6.0 min CN=WQ Runoff=4.67 cfs 0.377 af

**Pond DS5:** Peak Elev=239.93' Storage=11,539 cf Inflow=6.66 cfs 0.539 af
Outflow=0.90 cfs 0.320 af

**Pond DS6:** Peak Elev=241.11' Storage=9,510 cf Inflow=8.87 cfs 0.713 af
Outflow=2.46 cfs 0.712 af

**Pond IS1:** Peak Elev=232.97' Storage=2,587 cf Inflow=3.90 cfs 0.309 af
Outflow=3.72 cfs 0.262 af

**Pond IS2:** Peak Elev=236.50' Storage=22,221 cf Inflow=12.01 cfs 0.972 af
Outflow=3.63 cfs 0.679 af

**Pond IS3:** Peak Elev=229.38' Storage=2,059 cf Inflow=3.11 cfs 0.250 af
Outflow=3.05 cfs 0.208 af

**Pond IS4:** Peak Elev=239.86' Storage=22,382 cf Inflow=8.35 cfs 0.982 af
Outflow=2.14 cfs 0.515 af

**Pond IS7:** Peak Elev=252.84' Storage=8,435 cf Inflow=7.31 cfs 0.591 af
Outflow=3.86 cfs 0.470 af

**Pond IS8:** Peak Elev=255.52' Storage=10,294 cf Inflow=4.67 cfs 0.377 af
Outflow=0.49 cfs 0.260 af

**Link DP1:** Inflow=4.79 cfs 0.563 af
Primary=4.79 cfs 0.563 af

**Link DP2:** Inflow=8.82 cfs 1.105 af
Primary=8.82 cfs 1.105 af

**Link DP3:** Inflow=4.16 cfs 0.324 af
Primary=4.16 cfs 0.324 af

**Link DP4:** Inflow=5.29 cfs 1.444 af
Primary=5.29 cfs 1.444 af

**Link DP5:** Inflow=2.00 cfs 0.379 af
Primary=2.00 cfs 0.379 af

**Total Runoff Area = 12.058 ac Runoff Volume = 5.124 af Average Runoff Depth = 5.10"**
**29.84% Pervious = 3.599 ac 70.16% Impervious = 8.460 ac**

## Summary for Subcatchment P1.1:

Runoff = 1.24 cfs @ 12.09 hrs, Volume= 0.094 af, Depth= 4.42"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 7,470 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 3,640 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 11,110 | | Weighted Average |
| 7,470 | | 67.24% Pervious Area |
| 3,640 | | 32.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P1.2:

Runoff = 4.87 cfs @ 12.08 hrs, Volume= 0.393 af, Depth= 5.55"
Routed to Pond IS7 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 4,880 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 26,670 | 98 | Paved parking, HSG C |
| 5,500 | 98 | Roofs, HSG C |
| 37,050 | | Weighted Average |
| 4,880 | | 13.17% Pervious Area |
| 32,170 | | 86.83% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P1.3:

Runoff = 2.43 cfs @ 12.08 hrs, Volume= 0.198 af, Depth= 5.75"
Routed to Pond IS7 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 640 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 6,970 | 98 | Paved parking, HSG C |
| 5,010 | 98 | Roofs, HSG C |
| 5,400 | 98 | Roofs, HSG C |
| 18,020 | | Weighted Average |
| 640 | | 3.55% Pervious Area |
| 17,380 | | 96.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P2.1:

Runoff = 2.30 cfs @ 12.09 hrs, Volume= 0.165 af, Depth= 3.16"
Routed to Link DP2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 19,200 | 70 | Woods, Good, HSG C |
| 7,390 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 650 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 27,240 | | Weighted Average |
| 26,590 | | 97.61% Pervious Area |
| 650 | | 2.39% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P2.2:

Runoff = 3.90 cfs @ 12.08 hrs, Volume= 0.309 af, Depth= 5.24"
Routed to Pond IS1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 8,580 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 22,280 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 30,860 | | Weighted Average |
| 8,580 | | 27.80% Pervious Area |
| 22,280 | | 72.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P2.3:

Runoff = 12.01 cfs @ 12.08 hrs, Volume= 0.972 af, Depth= 5.61"
Routed to Pond IS2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 9,200 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 81,330 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 90,530 | | Weighted Average |
| 9,200 | | 10.16% Pervious Area |
| 81,330 | | 89.84% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P3.1:

Runoff = 1.31 cfs @ 12.17 hrs, Volume= 0.115 af, Depth= 3.04"
Routed to Link DP3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 15,510 | 70 | Woods, Good, HSG C |
| 4,290 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 19,800 | | Weighted Average |
| 19,800 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.7 | 50 | 0.0380 | 0.09 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10" |
| 2.7 | 130 | 0.0250 | 0.79 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 12.4 | 180 | Total | | | |

## Summary for Subcatchment P3.2:

Runoff = 3.11 cfs @ 12.08 hrs, Volume= 0.250 af, Depth= 5.46"
Routed to Pond IS3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 4,190 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 19,720 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 23,910 | | Weighted Average |
| 4,190 | | 17.52% Pervious Area |
| 19,720 | | 82.48% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.1:

Runoff = 3.04 cfs @ 12.09 hrs, Volume= 0.217 af, Depth= 3.17"
Routed to Link DP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 22,930 | 70 | Woods, Good, HSG C |
| 12,850 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 35,780 | | Weighted Average |
| 35,780 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.2:

Runoff = 6.66 cfs @ 12.08 hrs, Volume= 0.539 af, Depth= 5.62"
Routed to Pond DS5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 4,820 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 16,360 | 98 | Paved parking, HSG C |
| 28,940 | 98 | Roofs, HSG C |
| 50,120 | | Weighted Average |
| 4,820 | | 9.62% Pervious Area |
| 45,300 | | 90.38% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.3:

Runoff = 8.15 cfs @ 12.08 hrs, Volume= 0.663 af, Depth= 5.72"
Routed to Pond IS4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 2,830 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 12,080 | 98 | Paved parking, HSG C |
| 45,600 | 98 | Roofs, HSG C |
| 60,510 | | Weighted Average |
| 2,830 | | 4.68% Pervious Area |
| 57,680 | | 95.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.4:

Runoff = 8.87 cfs @ 12.08 hrs, Volume= 0.713 af, Depth= 5.48"
Routed to Pond DS6 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 11,130 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 56,850 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 67,980 | | Weighted Average |
| 11,130 | | 16.37% Pervious Area |
| 56,850 | | 83.63% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P5.1:

Runoff = 1.68 cfs @ 12.09 hrs, Volume= 0.120 af, Depth= 3.65"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 1,820 | 70 | Woods, Good, HSG C |
| 15,190 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 100 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 17,110 | | Weighted Average |
| 17,010 | | 99.42% Pervious Area |
| 100 | | 0.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P5.2:

Runoff = 4.67 cfs @ 12.08 hrs, Volume= 0.377 af, Depth= 5.59"
Routed to Pond IS8 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=6.06"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 3,840 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 31,400 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 35,240 | | Weighted Average |
| 3,840 | | 10.90% Pervious Area |
| 31,400 | | 89.10% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Pond DS5:

Inflow Area = 1.151 ac, 90.38% Impervious, Inflow Depth = 5.62" for 10-Year event
Inflow = 6.66 cfs @ 12.08 hrs, Volume= 0.539 af
Outflow = 0.90 cfs @ 12.68 hrs, Volume= 0.320 af, Atten= 87%, Lag= 36.0 min
Primary = 0.90 cfs @ 12.68 hrs, Volume= 0.320 af
Routed to Pond IS4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 239.93' @ 12.61 hrs Surf.Area= 6,713 sf Storage= 11,539 cf

Plug-Flow detention time= 212.1 min calculated for 0.320 af (59% of inflow)
Center-of-Mass det. time= 99.2 min ( 848.7 - 749.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 238.00' | 0 cf | **89.63'W x 74.90'L x 4.50'H Field A**<br>30,206 cf Overall - 30,206 cf Embedded = 0 cf x 40.0% Voids |
| #2A | 238.00' | 23,891 cf | **StormTrap SingleTrap 4-0** x 36 Inside #1<br>Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf<br>Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf<br>36 Chambers in 9 Rows<br>76.31' x 61.58' Core + 6.66' Border = 89.63' x 74.90' System |
| | | 23,891 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 4 | 241.40' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Device 4 | 239.60' | **6.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Device 4 | 238.00' | **6.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #4 | Primary | 238.00' | **15.0" Round Culvert**<br>L= 140.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 238.00' / 237.00' S= 0.0071 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf |

**Primary OutFlow** Max=0.90 cfs @ 12.68 hrs HW=239.93' TW=239.85' (Dynamic Tailwater)
└**4=Culvert** (Passes 0.90 cfs of 1.23 cfs potential flow)
  ├**1=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Orifice Controls 0.37 cfs @ 1.34 fps)
  └**3=Orifice/Grate** (Orifice Controls 0.53 cfs @ 1.34 fps)

## Pond DS5: - Chamber Wizard Field A

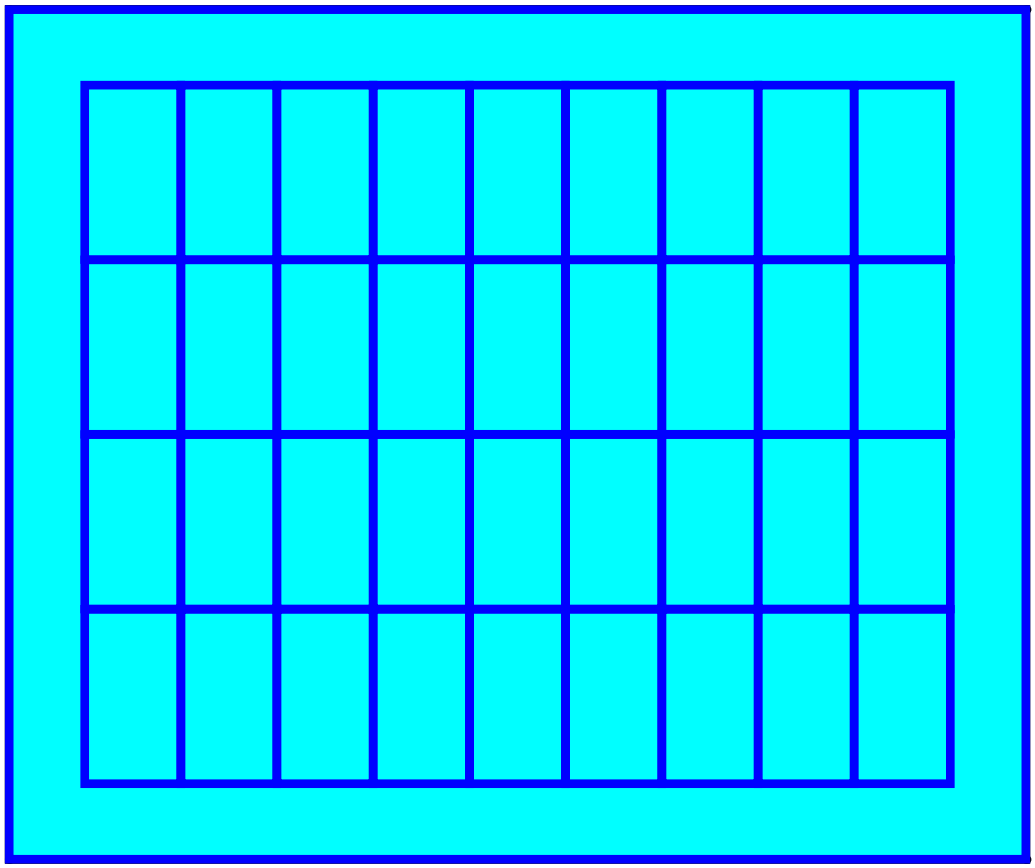
**Chamber Model = StormTrap SingleTrap 4-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf
Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf

4 Chambers/Row x 15.40' Long = 61.58' Row Length +79.9" Border x 2 = 74.90' Base Length
9 Rows x 101.7" Wide + 79.9" Side Border x 2 = 89.63' Base Width
54.0" Chamber Height = 4.50' Field Height

36 Chambers x 470.3 cf + 6,961.4 cf Border = 23,891.2 cf Chamber Storage
36 Chambers x 587.4 cf + 9,058.3 cf Border = 30,206.4 cf Displacement

Chamber Storage = 23,891.2 cf = 0.548 af
Overall Storage Efficiency = 79.1%
Overall System Size = 74.90' x 89.63' x 4.50'

36 Chambers (plus border)
1,118.8 cy Field





## Summary for Pond DS6:

Inflow Area = 1.561 ac, 83.63% Impervious, Inflow Depth = 5.48" for 10-Year event
Inflow = 8.87 cfs @ 12.08 hrs, Volume= 0.713 af
Outflow = 2.46 cfs @ 12.43 hrs, Volume= 0.712 af, Atten= 72%, Lag= 20.5 min
Primary = 2.46 cfs @ 12.43 hrs, Volume= 0.712 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 241.11' @ 12.43 hrs Surf.Area= 4,095 sf Storage= 9,510 cf

Plug-Flow detention time= 65.2 min calculated for 0.712 af (100% of inflow)
Center-of-Mass det. time= 64.8 min ( 817.7 - 752.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 238.50' | 0 cf | **38.75'W x 105.69'L x 5.50'H Field A**<br>22,525 cf Overall - 22,525 cf Embedded = 0 cf x 40.0% Voids |
| #2A | 238.50' | 18,191 cf | **StormTrap SingleTrap 5-0** x 18 Inside #1<br>Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf<br>Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf<br>18 Chambers in 3 Rows<br>25.44' x 92.38' Core + 6.66' Border = 38.75' x 105.69' System |
| | | 18,191 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 5 | 243.00' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Device 5 | 242.00' | **6.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Device 5 | 239.10' | **4.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #4 | Device 5 | 238.50' | **4.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #5 | Primary | 238.50' | **18.0" Round Culvert**<br>L= 240.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 238.50' / 233.50' S= 0.0208 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf |

**Primary OutFlow** Max=2.46 cfs @ 12.43 hrs HW=241.11' TW=0.00' (Dynamic Tailwater)
└**5=Culvert** (Passes 2.46 cfs of 10.25 cfs potential flow)
  ├**1=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)
  ├**2=Orifice/Grate** ( Controls 0.00 cfs)
  ├**3=Orifice/Grate** (Orifice Controls 1.14 cfs @ 6.54 fps)
  └**4=Orifice/Grate** (Orifice Controls 1.31 cfs @ 7.53 fps)

## Pond DS6: - Chamber Wizard Field A

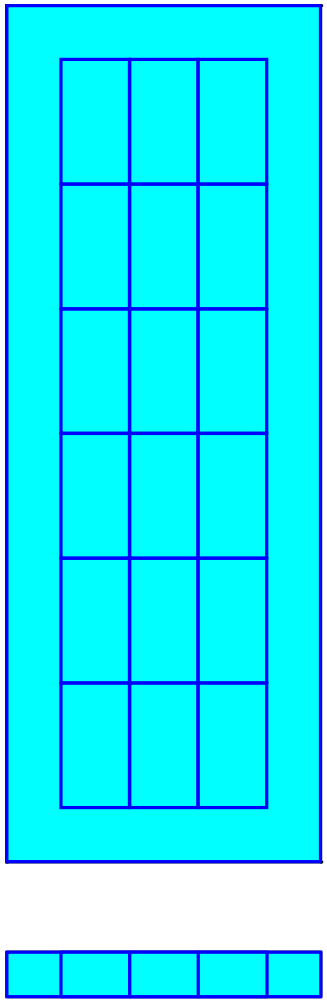
**Chamber Model = StormTrap SingleTrap 5-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

6 Chambers/Row x 15.40' Long = 92.38' Row Length +79.9" Border x 2 = 105.69' Base Length
3 Rows x 101.7" Wide + 79.9" Side Border x 2 = 38.75' Base Width
66.0" Chamber Height = 5.50' Field Height

18 Chambers x 590.2 cf + 7,568.2 cf Border = 18,191.5 cf Chamber Storage
18 Chambers x 718.0 cf + 9,600.8 cf Border = 22,524.6 cf Displacement

Chamber Storage = 18,191.5 cf = 0.418 af
Overall Storage Efficiency = 80.8%
Overall System Size = 105.69' x 38.75' x 5.50'

18 Chambers (plus border)
834.2 cy Field



## Summary for Pond IS1:

Inflow Area = 0.708 ac, 72.20% Impervious, Inflow Depth = 5.24" for 10-Year event
Inflow = 3.90 cfs @ 12.08 hrs, Volume= 0.309 af
Outflow = 3.72 cfs @ 12.11 hrs, Volume= 0.262 af, Atten= 4%, Lag= 1.5 min
Primary = 3.72 cfs @ 12.11 hrs, Volume= 0.262 af
Routed to Link DP2 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 232.97' @ 12.11 hrs Surf.Area= 1,932 sf Storage= 2,587 cf

Plug-Flow detention time= 125.1 min calculated for 0.262 af (85% of inflow)
Center-of-Mass det. time= 58.3 min ( 817.4 - 759.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 231.00' | 4,940 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 231.00 | 710 | 0 | 0 |
| 232.00 | 1,310 | 1,010 | 1,010 |
| 233.00 | 1,950 | 1,630 | 2,640 |
| 234.00 | 2,650 | 2,300 | 4,940 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 232.70' | **2.5" x 2.5" Horiz. Grate X 6.00 columns**<br>X 6 rows C= 0.600 in 24.0" x 24.0" Grate (39% open area)<br>Limited to weir flow at low heads |
| #2 | Primary | 229.20' | **18.0" Round Culvert**<br>L= 40.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 229.20' / 229.00' S= 0.0050 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf |

**Primary OutFlow** Max=3.72 cfs @ 12.11 hrs HW=232.97' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Passes 3.72 cfs of 13.05 cfs potential flow)
↑**1=Grate** (Weir Controls 3.72 cfs @ 1.71 fps)

## Summary for Pond IS2:

Inflow Area = 2.078 ac, 89.84% Impervious, Inflow Depth = 5.61" for 10-Year event
Inflow = 12.01 cfs @ 12.08 hrs, Volume= 0.972 af
Outflow = 3.63 cfs @ 12.40 hrs, Volume= 0.679 af, Atten= 70%, Lag= 18.7 min
Primary = 3.63 cfs @ 12.40 hrs, Volume= 0.679 af
Routed to Link DP2 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 236.50' @ 12.40 hrs Surf.Area= 7,134 sf Storage= 22,221 cf

Plug-Flow detention time= 235.8 min calculated for 0.679 af (70% of inflow)
Center-of-Mass det. time= 139.6 min ( 889.4 - 749.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1B | 233.00' | 0 cf | **47.23'W x 59.50'L x 5.50'H Field A**<br>15,456 cf Overall - 15,456 cf Embedded = 0 cf x 40.0% Voids |
| #2B | 233.00' | 12,474 cf | **StormTrap SingleTrap 5-0** x 12 Inside #1<br>Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf<br>Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf<br>12 Chambers in 4 Rows<br>33.92' x 46.19' Core + 6.66' Border = 47.23' x 59.50' System |
| #3C | 233.00' | 0 cf | **72.67'W x 59.50'L x 5.50'H Field B**<br>23,780 cf Overall - 23,780 cf Embedded = 0 cf x 40.0% Voids |
| #4C | 233.00' | 19,254 cf | **StormTrap SingleTrap 5-0** x 21 Inside #3<br>Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf<br>Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf<br>21 Chambers in 7 Rows<br>59.35' x 46.19' Core + 6.66' Border = 72.67' x 59.50' System |
| | | 31,728 cf | Total Available Storage |

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

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 237.00' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Device 3 | 235.00' | **8.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Primary | 233.00' | **24.0" Round Culvert**<br>L= 250.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 233.00' / 231.00' S= 0.0080 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |

**Primary OutFlow** Max=3.63 cfs @ 12.40 hrs HW=236.50' TW=0.00' (Dynamic Tailwater)
└─**3=Culvert** (Passes 3.63 cfs of 21.11 cfs potential flow)
  ├─**1=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Orifice Controls 3.63 cfs @ 5.20 fps)

## Pond IS2: - Chamber Wizard Field A

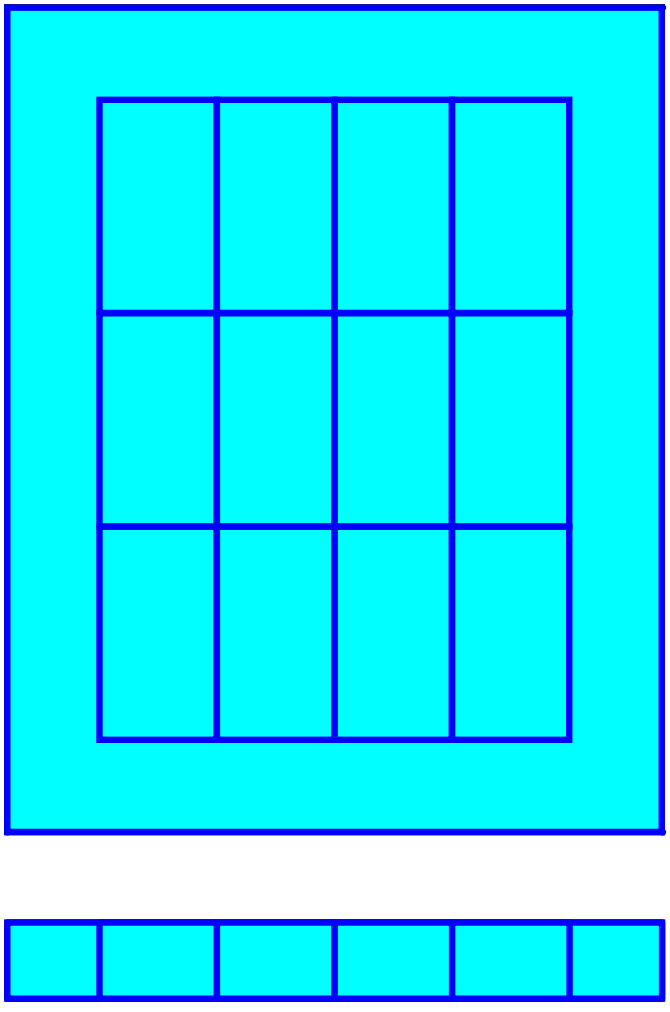
**Chamber Model = StormTrap SingleTrap 5-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

3 Chambers/Row x 15.40' Long = 46.19' Row Length +79.9" Border x 2 = 59.50' Base Length
4 Rows x 101.7" Wide + 79.9" Side Border x 2 = 47.23' Base Width
66.0" Chamber Height = 5.50' Field Height

12 Chambers x 590.2 cf + 5,391.8 cf Border = 12,474.0 cf Chamber Storage
12 Chambers x 718.0 cf + 6,839.9 cf Border = 15,455.7 cf Displacement

Chamber Storage = 12,474.0 cf = 0.286 af
Overall Storage Efficiency = 80.7%
Overall System Size = 59.50' x 47.23' x 5.50'

12 Chambers (plus border)
572.4 cy Field



## Pond IS2: - Chamber Wizard Field B

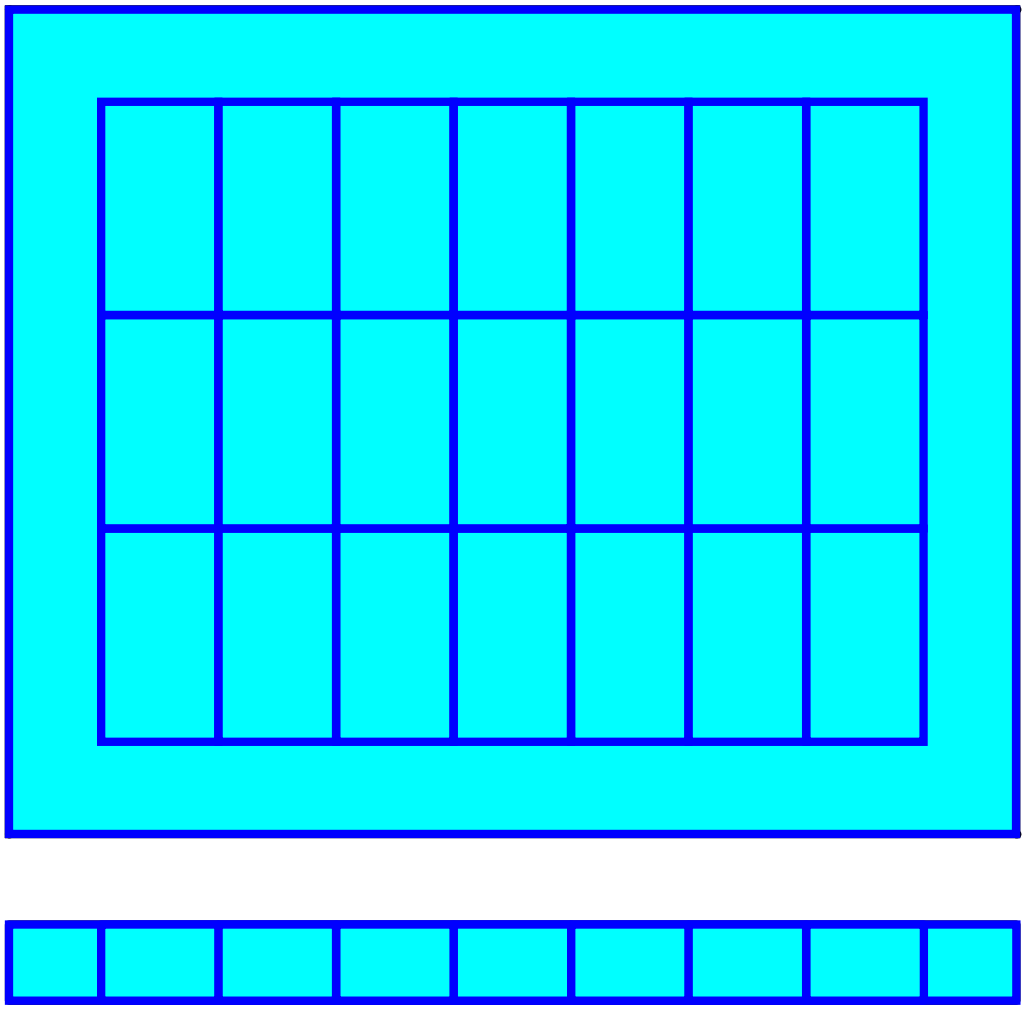
**Chamber Model = StormTrap SingleTrap 5-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

3 Chambers/Row x 15.40' Long = 46.19' Row Length +79.9" Border x 2 = 59.50' Base Length
7 Rows x 101.7" Wide + 79.9" Side Border x 2 = 72.67' Base Width
66.0" Chamber Height = 5.50' Field Height

21 Chambers x 590.2 cf + 6,860.0 cf Border = 19,253.8 cf Chamber Storage
21 Chambers x 718.0 cf + 8,702.4 cf Border = 23,780.2 cf Displacement

Chamber Storage = 19,253.8 cf = 0.442 af
Overall Storage Efficiency = 81.0%
Overall System Size = 59.50' x 72.67' x 5.50'

21 Chambers (plus border)
880.7 cy Field



## Summary for Pond IS3:

Inflow Area = 0.549 ac, 82.48% Impervious, Inflow Depth = 5.46" for 10-Year event
Inflow = 3.11 cfs @ 12.08 hrs, Volume= 0.250 af
Outflow = 3.05 cfs @ 12.10 hrs, Volume= 0.208 af, Atten= 2%, Lag= 0.9 min
Primary = 3.05 cfs @ 12.10 hrs, Volume= 0.208 af
Routed to Link DP3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 229.38' @ 12.10 hrs Surf.Area= 1,033 sf Storage= 2,059 cf

Plug-Flow detention time= 130.4 min calculated for 0.208 af (83% of inflow)
Center-of-Mass det. time= 60.8 min ( 814.3 - 753.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 226.50' | 1,022 cf | **18.50'W x 55.83'L x 4.00'H Field A**<br>4,132 cf Overall - 1,578 cf Embedded = 2,554 cf x 40.0% Voids |
| #2A | 227.00' | 1,578 cf | **Cultec R-360HD** x 42 Inside #1<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>42 Chambers in 3 Rows<br>Cap Storage= 6.5 cf x 2 x 3 rows = 38.8 cf |
| | | 2,599 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 229.00' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Primary | 227.00' | **15.0" Round Culvert**<br>L= 40.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 227.00' / 225.50' S= 0.0375 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf |

**Primary OutFlow** Max=3.05 cfs @ 12.10 hrs HW=229.38' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Passes 3.05 cfs of 6.91 cfs potential flow)
↑**1=Sharp-Crested Rectangular Weir** (Weir Controls 3.05 cfs @ 2.03 fps)

## Pond IS3: - Chamber Wizard Field A

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**
Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf
Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap
Cap Storage= 6.5 cf x 2 x 3 rows = 38.8 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

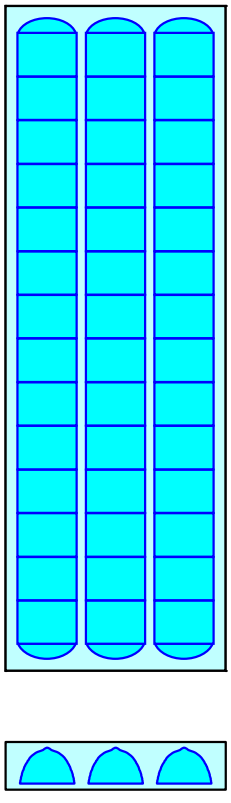
14 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 53.83' Row Length +12.0" End Stone x 2 = 55.83' Base Length
3 Rows x 60.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 18.50' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

42 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 3 Rows = 1,577.8 cf Chamber Storage

4,131.7 cf Field - 1,577.8 cf Chambers = 2,553.8 cf Stone x 40.0% Voids = 1,021.5 cf Stone Storage

Chamber Storage + Stone Storage = 2,599.4 cf = 0.060 af
Overall Storage Efficiency = 62.9%
Overall System Size = 55.83' x 18.50' x 4.00'

42 Chambers
153.0 cy Field
94.6 cy Stone



## Summary for Pond IS4:

Inflow Area = 2.540 ac, 93.09% Impervious, Inflow Depth = 4.64" for 10-Year event
Inflow = 8.35 cfs @ 12.08 hrs, Volume= 0.982 af
Outflow = 2.14 cfs @ 12.56 hrs, Volume= 0.515 af, Atten= 74%, Lag= 28.3 min
Primary = 2.14 cfs @ 12.56 hrs, Volume= 0.515 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 239.86' @ 12.56 hrs Surf.Area= 8,822 sf Storage= 22,382 cf

Plug-Flow detention time= 318.0 min calculated for 0.515 af (52% of inflow)
Center-of-Mass det. time= 169.5 min ( 949.7 - 780.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 237.00' | 0 cf | **55.71'W x 90.29'L x 3.50'H Field A**<br>17,605 cf Overall - 17,605 cf Embedded = 0 cf x 40.0% Voids |
| #2A | 237.00' | 13,440 cf | **StormTrap SingleTrap 3-0** x 25 Inside #1<br>Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf<br>Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf<br>25 Chambers in 5 Rows<br>42.40' x 76.98' Core + 6.66' Border = 55.71' x 90.29' System |
| #3C | 237.00' | 0 cf | **21.79'W x 44.10'L x 3.50'H Field B**<br>3,364 cf Overall - 3,364 cf Embedded = 0 cf x 40.0% Voids |
| #4C | 237.00' | 2,527 cf | **StormTrap SingleTrap 3-0** x 2 Inside #3<br>Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf<br>Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf<br>8.48' x 30.79' Core + 6.66' Border = 21.79' x 44.10' System |
| #5B | 237.00' | 0 cf | **64.19'W x 44.10'L x 4.50'H Field C**<br>12,739 cf Overall - 12,739 cf Embedded = 0 cf x 40.0% Voids |
| #6B | 237.00' | 10,016 cf | **StormTrap SingleTrap 4-0** x 12 Inside #5<br>Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf<br>Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf<br>12 Chambers in 6 Rows<br>50.88' x 30.79' Core + 6.66' Border = 64.19' x 44.10' System |
| | | 25,984 cf | Total Available Storage |

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

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 239.60' | **5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Primary | 237.50' | **24.0" Round Culvert**<br>L= 220.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 237.50' / 234.00' S= 0.0159 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |

**Primary OutFlow** Max=2.14 cfs @ 12.56 hrs HW=239.86' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Passes 2.14 cfs of 15.56 cfs potential flow)
↑—**1=Sharp-Crested Rectangular Weir** (Weir Controls 2.14 cfs @ 1.67 fps)

## Pond IS4: - Chamber Wizard Field A

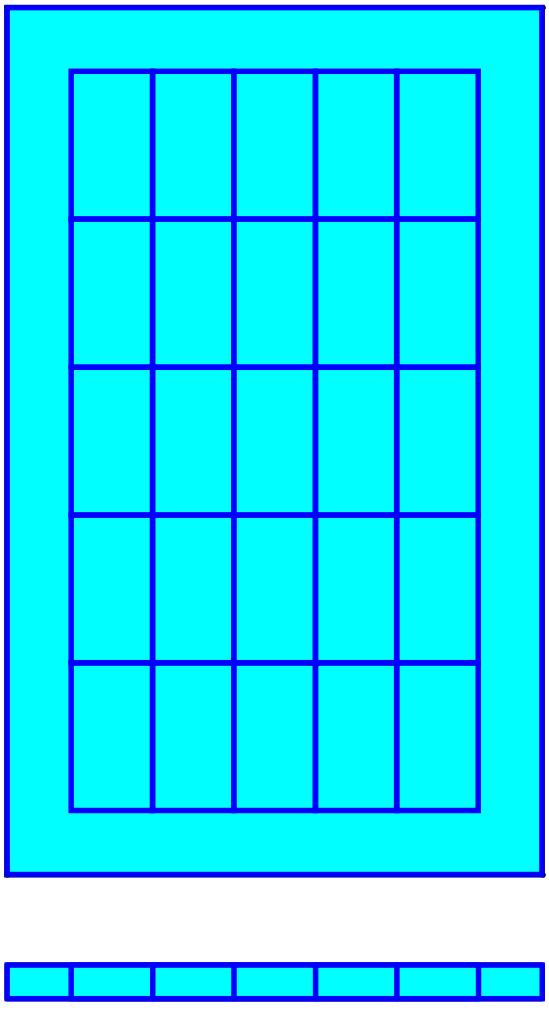
**Chamber Model = StormTrap SingleTrap 3-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf
Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf

5 Chambers/Row x 15.40' Long = 76.98' Row Length +79.9" Border x 2 = 90.29' Base Length
5 Rows x 101.7" Wide + 79.9" Side Border x 2 = 55.71' Base Width
42.0" Chamber Height = 3.50' Field Height

25 Chambers x 354.0 cf + 4,590.6 cf Border = 13,440.4 cf Chamber Storage
25 Chambers x 456.9 cf + 6,182.4 cf Border = 17,605.0 cf Displacement

Chamber Storage = 13,440.4 cf = 0.309 af
Overall Storage Efficiency = 76.3%
Overall System Size = 90.29' x 55.71' x 3.50'

25 Chambers (plus border)
652.0 cy Field



## Pond IS4: - Chamber Wizard Field B

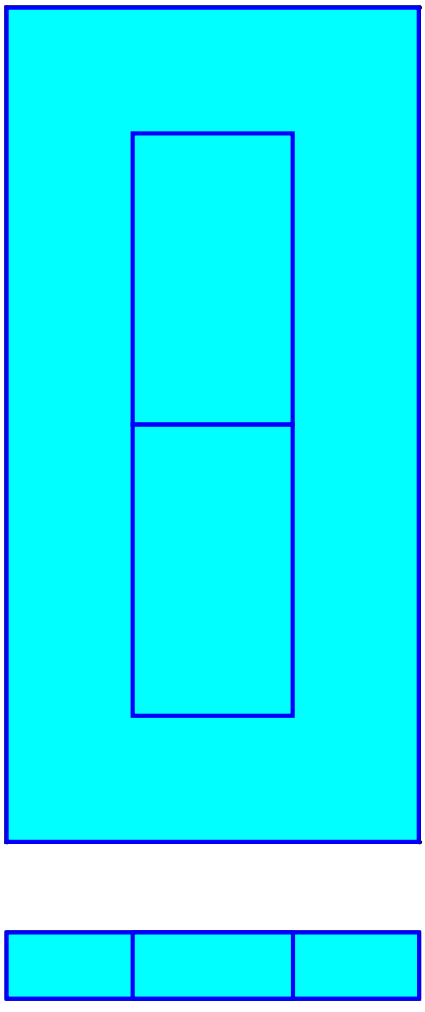
**Chamber Model = StormTrap SingleTrap 3-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf
Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf

2 Chambers/Row x 15.40' Long = 30.79' Row Length +79.9" Border x 2 = 44.10' 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

2 Chambers x 354.0 cf + 1,819.2 cf Border = 2,527.2 cf Chamber Storage
2 Chambers x 456.9 cf + 2,450.1 cf Border = 3,363.9 cf Displacement

Chamber Storage = 2,527.2 cf = 0.058 af
Overall Storage Efficiency = 75.1%
Overall System Size = 44.10' x 21.79' x 3.50'

2 Chambers (plus border)
124.6 cy Field



## Pond IS4: - Chamber Wizard Field C

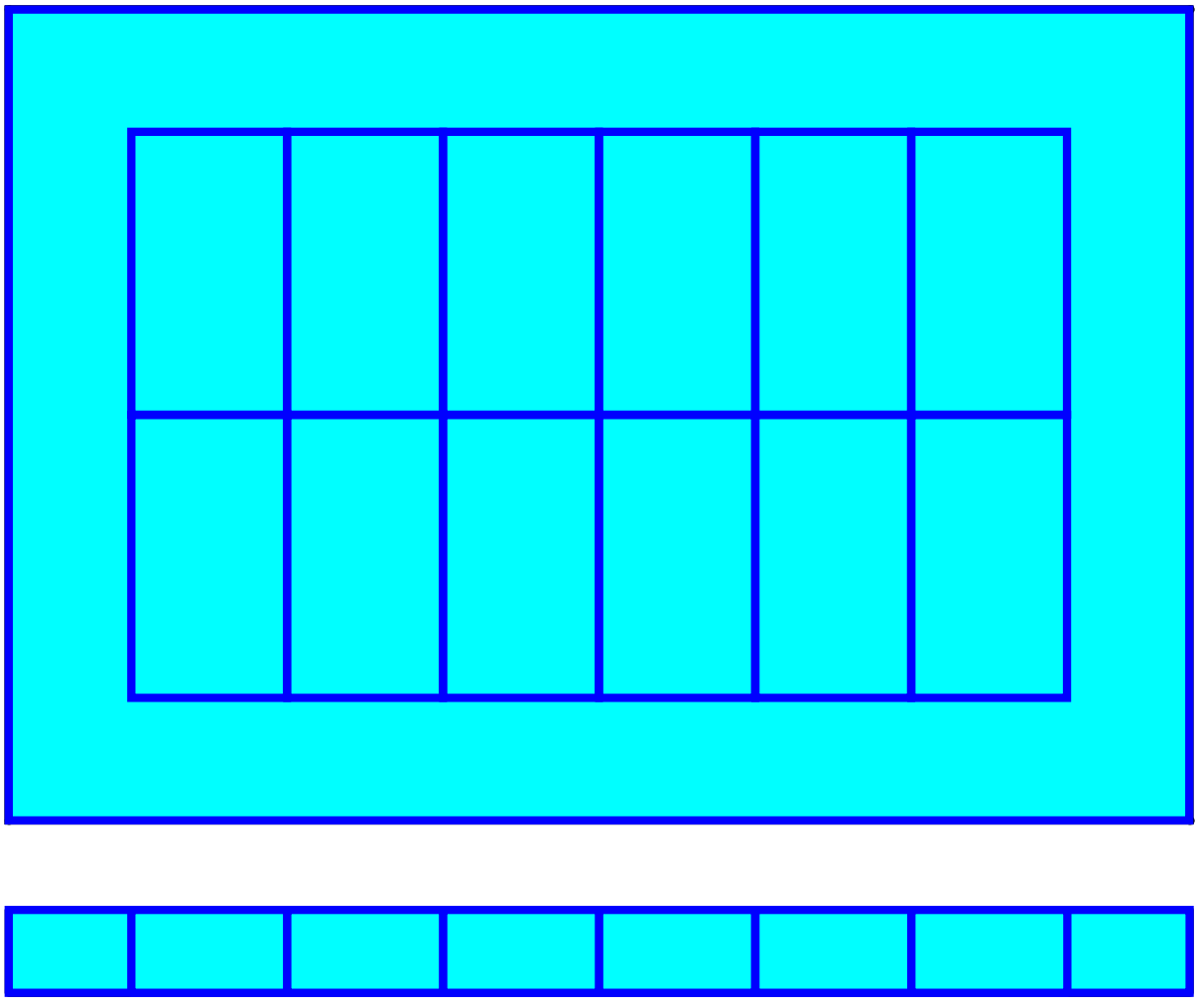
**Chamber Model = StormTrap SingleTrap 4-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf
Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf

2 Chambers/Row x 15.40' Long = 30.79' Row Length +79.9" Border x 2 = 44.10' Base Length
6 Rows x 101.7" Wide + 79.9" Side Border x 2 = 64.19' Base Width
54.0" Chamber Height = 4.50' Field Height

12 Chambers x 470.3 cf + 4,372.7 cf Border = 10,016.0 cf Chamber Storage
12 Chambers x 587.4 cf + 5,689.8 cf Border = 12,739.2 cf Displacement

Chamber Storage = 10,016.0 cf = 0.230 af
Overall Storage Efficiency = 78.6%
Overall System Size = 44.10' x 64.19' x 4.50'

12 Chambers (plus border)
471.8 cy Field



## Summary for Pond IS7:

Inflow Area = 1.264 ac, 89.98% Impervious, Inflow Depth = 5.61" for 10-Year event
Inflow = 7.31 cfs @ 12.08 hrs, Volume= 0.591 af
Outflow = 3.86 cfs @ 12.21 hrs, Volume= 0.470 af, Atten= 47%, Lag= 7.7 min
Primary = 3.86 cfs @ 12.21 hrs, Volume= 0.470 af
Routed to Link DP1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 252.84' @ 12.21 hrs Surf.Area= 4,083 sf Storage= 8,435 cf

Plug-Flow detention time= 158.8 min calculated for 0.470 af (79% of inflow)
Center-of-Mass det. time= 79.8 min ( 829.5 - 749.7 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 250.00' | 1,738 cf | **47.25'W x 37.50'L x 4.00'H Field A**<br>7,088 cf Overall - 2,742 cf Embedded = 4,346 cf x 40.0% Voids |
| #2A | 250.50' | 2,742 cf | **Cultec R-360HD** x 72 Inside #1<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>72 Chambers in 8 Rows<br>Cap Storage= 6.5 cf x 2 x 8 rows = 103.4 cf |
| #3B | 249.75' | 3,372 cf | **59.25'W x 39.00'L x 5.75'H Field B**<br>13,287 cf Overall - 4,856 cf Embedded = 8,431 cf x 40.0% Voids |
| #4B | 250.50' | 4,856 cf | **Cultec R-902HD v2** x 72 Inside #3<br>Effective Size= 69.1"W x 48.0"H => 17.30 sf x 3.67'L = 63.4 cf<br>Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap<br>72 Chambers in 8 Rows<br>Cap Storage= 18.0 cf x 2 x 8 rows = 288.3 cf |
| | | 12,708 cf | Total Available Storage |

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

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 251.80' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Primary | 251.00' | **12.0" Round Culvert**<br>L= 210.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 251.00' / 247.80' S= 0.0152 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf |

**Primary OutFlow** Max=3.86 cfs @ 12.21 hrs HW=252.84' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Inlet Controls 3.86 cfs @ 4.92 fps)
↑**1=Sharp-Crested Rectangular Weir** (Passes 3.86 cfs of 13.15 cfs potential flow)

## Pond IS7: - Chamber Wizard Field A

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**
Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf
Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap
Cap Storage= 6.5 cf x 2 x 8 rows = 103.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

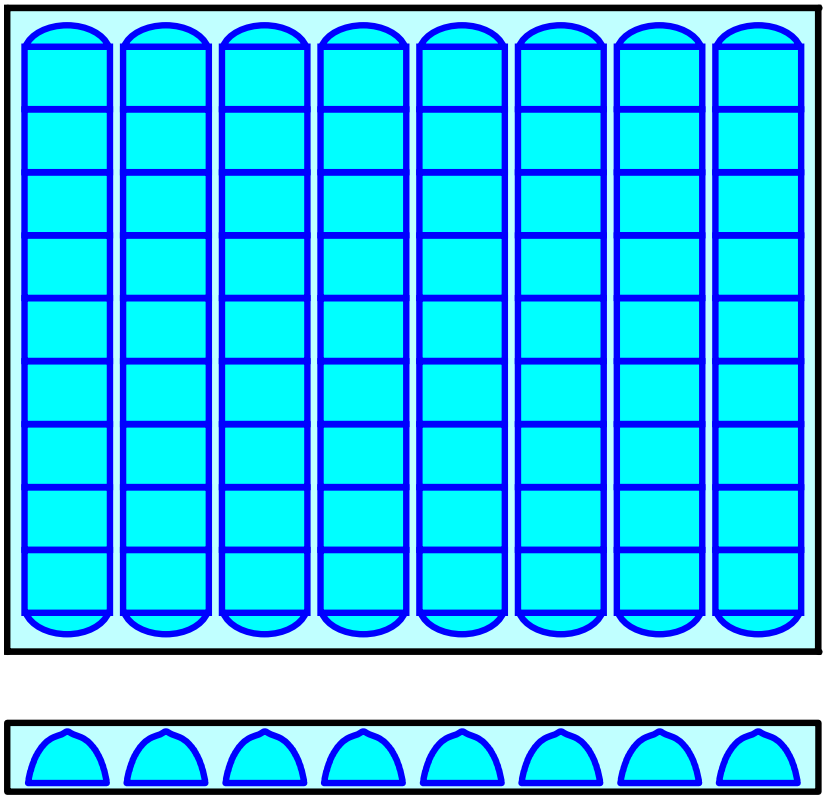
9 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 35.50' Row Length +12.0" End Stone x 2 = 37.50' Base Length
8 Rows x 60.0" Wide + 9.0" Spacing x 7 + 12.0" Side Stone x 2 = 47.25' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

72 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 8 Rows = 2,741.8 cf Chamber Storage

7,087.5 cf Field - 2,741.8 cf Chambers = 4,345.7 cf Stone x 40.0% Voids = 1,738.3 cf Stone Storage

Chamber Storage + Stone Storage = 4,480.1 cf = 0.103 af
Overall Storage Efficiency = 63.2%
Overall System Size = 37.50' x 47.25' x 4.00'

72 Chambers
262.5 cy Field
161.0 cy Stone



## Pond IS7: - Chamber Wizard Field B

**Chamber Model = Cultec R-902HD v2 (Cultec Recharger® 902HD v2)**
Effective Size= 69.1"W x 48.0"H => 17.30 sf x 3.67'L = 63.4 cf
Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap
Cap Storage= 18.0 cf x 2 x 8 rows = 288.3 cf

78.0" Wide + 9.0" Spacing = 87.0" C-C Row Spacing

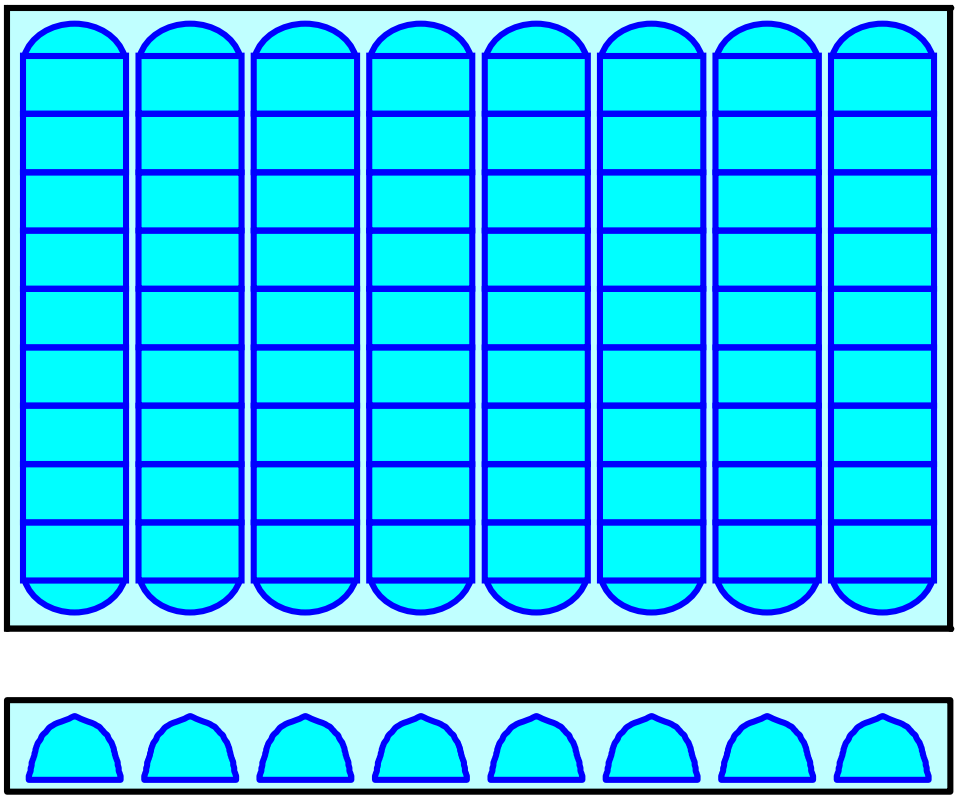
9 Chambers/Row x 3.67' Long +2.00' Cap Length x 2 = 37.00' Row Length +12.0" End Stone x 2 = 39.00' Base Length
8 Rows x 78.0" Wide + 9.0" Spacing x 7 + 12.0" Side Stone x 2 = 59.25' Base Width
9.0" Stone Base + 48.0" Chamber Height + 12.0" Stone Cover = 5.75' Field Height

72 Chambers x 63.4 cf + 18.0 cf Cap Volume x 2 x 8 Rows = 4,856.2 cf Chamber Storage

13,286.8 cf Field - 4,856.2 cf Chambers = 8,430.6 cf Stone x 40.0% Voids = 3,372.3 cf Stone Storage

Chamber Storage + Stone Storage = 8,228.4 cf = 0.189 af
Overall Storage Efficiency = 61.9%
Overall System Size = 39.00' x 59.25' x 5.75'

72 Chambers
492.1 cy Field
312.2 cy Stone



## Summary for Pond IS8:

Inflow Area = 0.809 ac, 89.10% Impervious, Inflow Depth = 5.59" for 10-Year event
Inflow = 4.67 cfs @ 12.08 hrs, Volume= 0.377 af
Outflow = 0.49 cfs @ 12.79 hrs, Volume= 0.260 af, Atten= 90%, Lag= 42.4 min
Primary = 0.49 cfs @ 12.79 hrs, Volume= 0.260 af
Routed to Link DP5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 255.52' @ 12.79 hrs Surf.Area= 3,851 sf Storage= 10,294 cf

Plug-Flow detention time= 328.7 min calculated for 0.260 af (69% of inflow)
Center-of-Mass det. time= 230.9 min ( 981.1 - 750.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 252.00' | 16,620 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 252.00 | 2,060 | 0 | 0 |
| 253.00 | 2,530 | 2,295 | 2,295 |
| 254.00 | 3,030 | 2,780 | 5,075 |
| 255.00 | 3,560 | 3,295 | 8,370 |
| 256.00 | 4,120 | 3,840 | 12,210 |
| 257.00 | 4,700 | 4,410 | 16,620 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 256.30' | **2.5" x 2.5" Horiz. Grate X 6.00 columns**<br>X 6 rows C= 0.600 in 24.0" x 24.0" Grate (39% open area)<br>Limited to weir flow at low heads |
| #2 | Device 3 | 254.00' | **4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |
| #3 | Primary | 252.40' | **18.0" Round Culvert**<br>L= 10.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 252.40' / 252.00' S= 0.0400 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf |

**Primary OutFlow** Max=0.49 cfs @ 12.79 hrs HW=255.52' TW=0.00' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.49 cfs of 11.56 cfs potential flow)
  ├─**1=Grate** ( Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Orifice Controls 0.49 cfs @ 5.60 fps)

## Summary for Link DP1:

Inflow Area = 1.519 ac, 80.37% Impervious, Inflow Depth = 4.45" for 10-Year event
Inflow = 4.79 cfs @ 12.12 hrs, Volume= 0.563 af
Primary = 4.79 cfs @ 12.12 hrs, Volume= 0.563 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP2:

Inflow Area = 3.412 ac, 70.15% Impervious, Inflow Depth = 3.89" for 10-Year event
Inflow = 8.82 cfs @ 12.11 hrs, Volume= 1.105 af
Primary = 8.82 cfs @ 12.11 hrs, Volume= 1.105 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP3:

Inflow Area = 1.003 ac, 45.12% Impervious, Inflow Depth = 3.87" for 10-Year event
Inflow = 4.16 cfs @ 12.11 hrs, Volume= 0.324 af
Primary = 4.16 cfs @ 12.11 hrs, Volume= 0.324 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP4:

Inflow Area = 4.922 ac, 74.55% Impervious, Inflow Depth = 3.52" for 10-Year event
Inflow = 5.29 cfs @ 12.47 hrs, Volume= 1.444 af
Primary = 5.29 cfs @ 12.47 hrs, Volume= 1.444 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP5:

Inflow Area = 1.202 ac, 60.17% Impervious, Inflow Depth > 3.79" for 10-Year event
Inflow = 2.00 cfs @ 12.09 hrs, Volume= 0.379 af
Primary = 2.00 cfs @ 12.09 hrs, Volume= 0.379 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentP1.1:** Runoff Area=11,110 sf 32.76% Impervious Runoff Depth=6.06"
Tc=6.0 min CN=WQ Runoff=1.70 cfs 0.129 af

**SubcatchmentP1.2:** Runoff Area=37,050 sf 86.83% Impervious Runoff Depth=7.28"
Tc=6.0 min CN=WQ Runoff=6.35 cfs 0.516 af

**SubcatchmentP1.3:** Runoff Area=18,020 sf 96.45% Impervious Runoff Depth=7.49"
Tc=6.0 min CN=WQ Runoff=3.15 cfs 0.258 af

**SubcatchmentP2.1:** Runoff Area=27,240 sf 2.39% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=WQ Runoff=3.39 cfs 0.243 af

**SubcatchmentP2.2:** Runoff Area=30,860 sf 72.20% Impervious Runoff Depth=6.95"
Tc=6.0 min CN=WQ Runoff=5.14 cfs 0.410 af

**SubcatchmentP2.3:** Runoff Area=90,530 sf 89.84% Impervious Runoff Depth=7.34"
Tc=6.0 min CN=WQ Runoff=15.62 cfs 1.272 af

**SubcatchmentP3.1:** Runoff Area=19,800 sf 0.00% Impervious Runoff Depth=4.52"
Flow Length=180' Tc=12.4 min CN=WQ Runoff=1.95 cfs 0.171 af

**SubcatchmentP3.2:** Runoff Area=23,910 sf 82.48% Impervious Runoff Depth=7.18"
Tc=6.0 min CN=WQ Runoff=4.06 cfs 0.328 af

**SubcatchmentP4.1:** Runoff Area=35,780 sf 0.00% Impervious Runoff Depth=4.67"
Tc=6.0 min CN=WQ Runoff=4.48 cfs 0.320 af

**SubcatchmentP4.2:** Runoff Area=50,120 sf 90.38% Impervious Runoff Depth=7.35"
Tc=6.0 min CN=WQ Runoff=8.66 cfs 0.705 af

**SubcatchmentP4.3:** Runoff Area=60,510 sf 95.32% Impervious Runoff Depth=7.47"
Tc=6.0 min CN=WQ Runoff=10.55 cfs 0.864 af

**SubcatchmentP4.4:** Runoff Area=67,980 sf 83.63% Impervious Runoff Depth=7.20"
Tc=6.0 min CN=WQ Runoff=11.58 cfs 0.937 af

**SubcatchmentP5.1:** Runoff Area=17,110 sf 0.58% Impervious Runoff Depth=5.23"
Tc=6.0 min CN=WQ Runoff=2.38 cfs 0.171 af

**SubcatchmentP5.2:** Runoff Area=35,240 sf 89.10% Impervious Runoff Depth=7.33"
Tc=6.0 min CN=WQ Runoff=6.07 cfs 0.494 af

**Pond DS5:** Peak Elev=240.42' Storage=14,481 cf Inflow=8.66 cfs 0.705 af
Outflow=2.31 cfs 0.486 af

**Pond DS6:** Peak Elev=242.02' Storage=12,805 cf Inflow=11.58 cfs 0.937 af
Outflow=2.94 cfs 0.936 af

**Pond IS1:** Peak Elev=233.07' Storage=2,773 cf Inflow=5.14 cfs 0.410 af
Outflow=4.56 cfs 0.362 af

**Pond IS2:** Peak Elev=237.19' Storage=26,579 cf Inflow=15.62 cfs 1.272 af
Outflow=5.64 cfs 0.979 af

**Pond IS3:** Peak Elev=229.46' Storage=2,108 cf Inflow=4.06 cfs 0.328 af
Outflow=4.01 cfs 0.287 af

**Pond IS4:** Peak Elev=240.15' Storage=23,847 cf Inflow=10.92 cfs 1.350 af
Outflow=6.47 cfs 0.883 af

**Pond IS7:** Peak Elev=253.39' Storage=9,887 cf Inflow=9.50 cfs 0.774 af
Outflow=4.59 cfs 0.652 af

**Pond IS8:** Peak Elev=256.26' Storage=13,295 cf Inflow=6.07 cfs 0.494 af
Outflow=0.61 cfs 0.377 af

**Link DP1:** Inflow=5.79 cfs 0.781 af
Primary=5.79 cfs 0.781 af

**Link DP2:** Inflow=11.72 cfs 1.584 af
Primary=11.72 cfs 1.584 af

**Link DP3:** Inflow=5.67 cfs 0.458 af
Primary=5.67 cfs 0.458 af

**Link DP4:** Inflow=11.69 cfs 2.139 af
Primary=11.69 cfs 2.139 af

**Link DP5:** Inflow=2.84 cfs 0.548 af
Primary=2.84 cfs 0.548 af

**Total Runoff Area = 12.058 ac Runoff Volume = 6.818 af Average Runoff Depth = 6.79"**
**29.84% Pervious = 3.599 ac 70.16% Impervious = 8.460 ac**

## Summary for Subcatchment P1.1:

Runoff = 1.70 cfs @ 12.09 hrs, Volume= 0.129 af, Depth= 6.06"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 7,470 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 3,640 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 11,110 | | Weighted Average |
| 7,470 | | 67.24% Pervious Area |
| 3,640 | | 32.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P1.2:

Runoff = 6.35 cfs @ 12.08 hrs, Volume= 0.516 af, Depth= 7.28"
Routed to Pond IS7 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 4,880 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 26,670 | 98 | Paved parking, HSG C |
| 5,500 | 98 | Roofs, HSG C |
| 37,050 | | Weighted Average |
| 4,880 | | 13.17% Pervious Area |
| 32,170 | | 86.83% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P1.3:

Runoff = 3.15 cfs @ 12.08 hrs, Volume= 0.258 af, Depth= 7.49"
Routed to Pond IS7 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 640 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 6,970 | 98 | Paved parking, HSG C |
| 5,010 | 98 | Roofs, HSG C |
| 5,400 | 98 | Roofs, HSG C |
| 18,020 | | Weighted Average |
| 640 | | 3.55% Pervious Area |
| 17,380 | | 96.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P2.1:

Runoff = 3.39 cfs @ 12.09 hrs, Volume= 0.243 af, Depth= 4.66"
Routed to Link DP2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 19,200 | 70 | Woods, Good, HSG C |
| 7,390 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 650 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 27,240 | | Weighted Average |
| 26,590 | | 97.61% Pervious Area |
| 650 | | 2.39% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P2.2:

Runoff = 5.14 cfs @ 12.08 hrs, Volume= 0.410 af, Depth= 6.95"
Routed to Pond IS1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 8,580 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 22,280 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 30,860 | | Weighted Average |
| 8,580 | | 27.80% Pervious Area |
| 22,280 | | 72.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P2.3:

Runoff = 15.62 cfs @ 12.08 hrs, Volume= 1.272 af, Depth= 7.34"
Routed to Pond IS2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 9,200 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 81,330 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 90,530 | | Weighted Average |
| 9,200 | | 10.16% Pervious Area |
| 81,330 | | 89.84% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P3.1:

Runoff = 1.95 cfs @ 12.17 hrs, Volume= 0.171 af, Depth= 4.52"
Routed to Link DP3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 15,510 | 70 | Woods, Good, HSG C |
| 4,290 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 19,800 | | Weighted Average |
| 19,800 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.7 | 50 | 0.0380 | 0.09 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10" |
| 2.7 | 130 | 0.0250 | 0.79 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 12.4 | 180 | Total | | | |

## Summary for Subcatchment P3.2:

Runoff = 4.06 cfs @ 12.08 hrs, Volume= 0.328 af, Depth= 7.18"
Routed to Pond IS3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 4,190 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 19,720 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 23,910 | | Weighted Average |
| 4,190 | | 17.52% Pervious Area |
| 19,720 | | 82.48% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.1:

Runoff = 4.48 cfs @ 12.09 hrs, Volume= 0.320 af, Depth= 4.67"
Routed to Link DP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 22,930 | 70 | Woods, Good, HSG C |
| 12,850 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 35,780 | | Weighted Average |
| 35,780 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.2:

Runoff = 8.66 cfs @ 12.08 hrs, Volume= 0.705 af, Depth= 7.35"
Routed to Pond DS5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 4,820 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 16,360 | 98 | Paved parking, HSG C |
| 28,940 | 98 | Roofs, HSG C |
| 50,120 | | Weighted Average |
| 4,820 | | 9.62% Pervious Area |
| 45,300 | | 90.38% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.3:

Runoff = 10.55 cfs @ 12.08 hrs, Volume= 0.864 af, Depth= 7.47"
Routed to Pond IS4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 2,830 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 12,080 | 98 | Paved parking, HSG C |
| 45,600 | 98 | Roofs, HSG C |
| 60,510 | | Weighted Average |
| 2,830 | | 4.68% Pervious Area |
| 57,680 | | 95.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.4:

Runoff = 11.58 cfs @ 12.08 hrs, Volume= 0.937 af, Depth= 7.20"
Routed to Pond DS6 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 11,130 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 56,850 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 67,980 | | Weighted Average |
| 11,130 | | 16.37% Pervious Area |
| 56,850 | | 83.63% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P5.1:

Runoff = 2.38 cfs @ 12.09 hrs, Volume= 0.171 af, Depth= 5.23"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 1,820 | 70 | Woods, Good, HSG C |
| 15,190 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 100 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 17,110 | | Weighted Average |
| 17,010 | | 99.42% Pervious Area |
| 100 | | 0.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P5.2:

Runoff = 6.07 cfs @ 12.08 hrs, Volume= 0.494 af, Depth= 7.33"
Routed to Pond IS8 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=7.81"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 3,840 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 31,400 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 35,240 | | Weighted Average |
| 3,840 | | 10.90% Pervious Area |
| 31,400 | | 89.10% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Pond DS5:

Inflow Area = 1.151 ac, 90.38% Impervious, Inflow Depth = 7.35" for 25-Year event
Inflow = 8.66 cfs @ 12.08 hrs, Volume= 0.705 af
Outflow = 2.31 cfs @ 12.55 hrs, Volume= 0.486 af, Atten= 73%, Lag= 28.1 min
Primary = 2.31 cfs @ 12.55 hrs, Volume= 0.486 af
Routed to Pond IS4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 240.42' @ 12.44 hrs Surf.Area= 6,713 sf Storage= 14,481 cf

Plug-Flow detention time= 185.8 min calculated for 0.486 af (69% of inflow)
Center-of-Mass det. time= 87.7 min ( 833.7 - 746.0 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 238.00' | 0 cf | **89.63'W x 74.90'L x 4.50'H Field A**<br>30,206 cf Overall - 30,206 cf Embedded = 0 cf x 40.0% Voids |
| #2A | 238.00' | 23,891 cf | **StormTrap SingleTrap 4-0** x 36 Inside #1<br>Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf<br>Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf<br>36 Chambers in 9 Rows<br>76.31' x 61.58' Core + 6.66' Border = 89.63' x 74.90' System |
| | | 23,891 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 4 | 241.40' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Device 4 | 239.60' | **6.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Device 4 | 238.00' | **6.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #4 | Primary | 238.00' | **15.0" Round Culvert**<br>L= 140.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 238.00' / 237.00' S= 0.0071 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf |

**Primary OutFlow** Max=2.31 cfs @ 12.55 hrs HW=240.39' TW=240.02' (Dynamic Tailwater)
└**4=Culvert** (Passes 2.31 cfs of 2.70 cfs potential flow)
  ├**1=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Orifice Controls 1.15 cfs @ 2.94 fps)
  └**3=Orifice/Grate** (Orifice Controls 1.15 cfs @ 2.94 fps)

## Pond DS5: - Chamber Wizard Field A

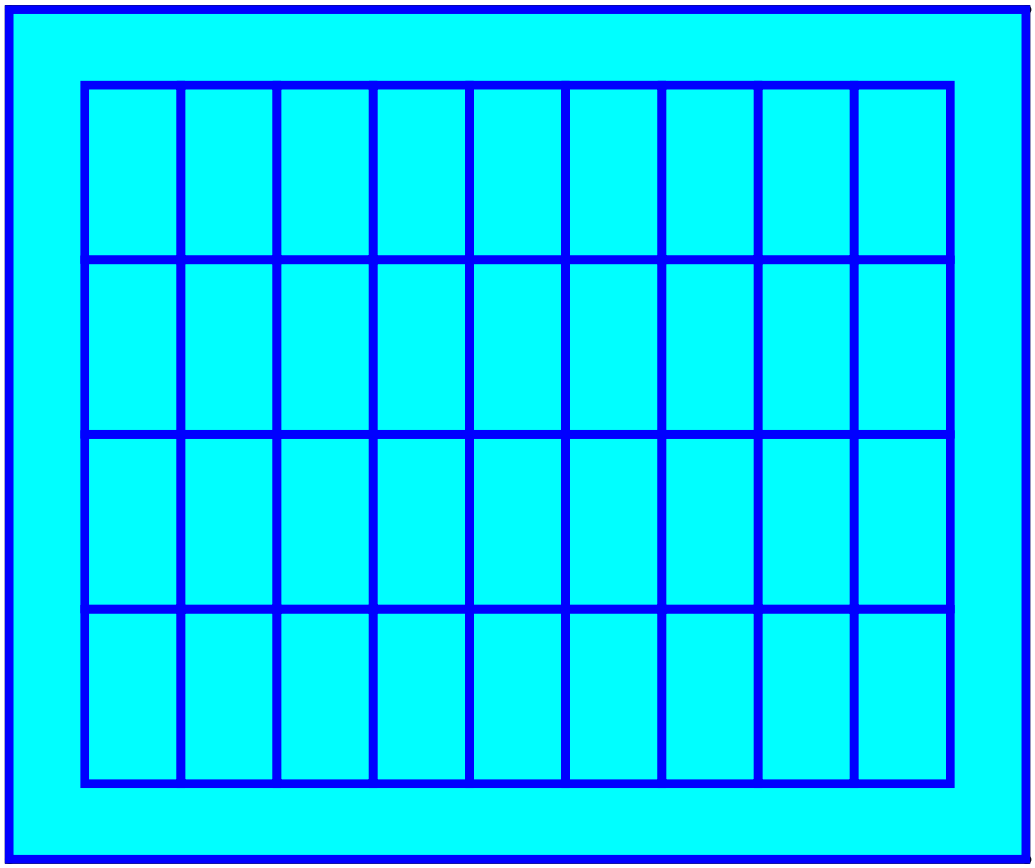
**Chamber Model = StormTrap SingleTrap 4-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf
Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf

4 Chambers/Row x 15.40' Long = 61.58' Row Length +79.9" Border x 2 = 74.90' Base Length
9 Rows x 101.7" Wide + 79.9" Side Border x 2 = 89.63' Base Width
54.0" Chamber Height = 4.50' Field Height

36 Chambers x 470.3 cf + 6,961.4 cf Border = 23,891.2 cf Chamber Storage
36 Chambers x 587.4 cf + 9,058.3 cf Border = 30,206.4 cf Displacement

Chamber Storage = 23,891.2 cf = 0.548 af
Overall Storage Efficiency = 79.1%
Overall System Size = 74.90' x 89.63' x 4.50'

36 Chambers (plus border)
1,118.8 cy Field





## Summary for Pond DS6:

Inflow Area = 1.561 ac, 83.63% Impervious, Inflow Depth = 7.20" for 25-Year event
Inflow = 11.58 cfs @ 12.08 hrs, Volume= 0.937 af
Outflow = 2.94 cfs @ 12.45 hrs, Volume= 0.936 af, Atten= 75%, Lag= 22.0 min
Primary = 2.94 cfs @ 12.45 hrs, Volume= 0.936 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 242.02' @ 12.45 hrs Surf.Area= 4,095 sf Storage= 12,805 cf

Plug-Flow detention time= 65.8 min calculated for 0.936 af (100% of inflow)
Center-of-Mass det. time= 65.2 min ( 814.6 - 749.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 238.50' | 0 cf | **38.75'W x 105.69'L x 5.50'H Field A**<br>22,525 cf Overall - 22,525 cf Embedded = 0 cf x 40.0% Voids |
| #2A | 238.50' | 18,191 cf | **StormTrap SingleTrap 5-0** x 18 Inside #1<br>Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf<br>Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf<br>18 Chambers in 3 Rows<br>25.44' x 92.38' Core + 6.66' Border = 38.75' x 105.69' System |
| | | 18,191 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 5 | 243.00' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Device 5 | 242.00' | **6.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Device 5 | 239.10' | **4.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #4 | Device 5 | 238.50' | **4.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #5 | Primary | 238.50' | **18.0" Round Culvert**<br>L= 240.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 238.50' / 233.50' S= 0.0208 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf |

**Primary OutFlow** Max=2.94 cfs @ 12.45 hrs HW=242.02' TW=0.00' (Dynamic Tailwater)
└─**5=Culvert** (Passes 2.94 cfs of 12.49 cfs potential flow)
  ├─**1=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)
  ├─**2=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.48 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.39 cfs @ 7.99 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.54 cfs @ 8.82 fps)

## Pond DS6: - Chamber Wizard Field A

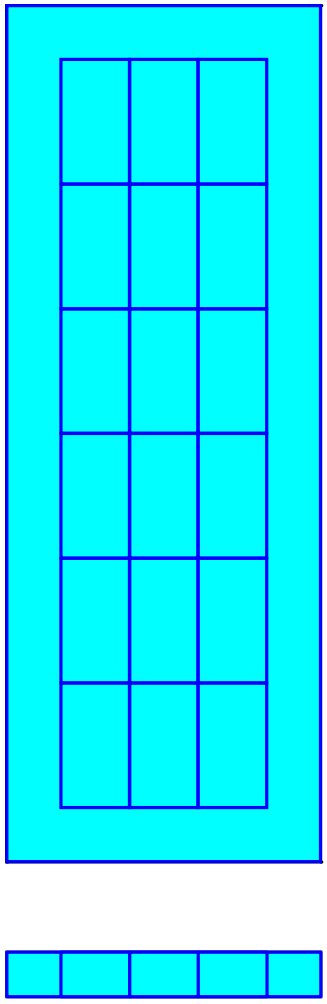
**Chamber Model = StormTrap SingleTrap 5-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

6 Chambers/Row x 15.40' Long = 92.38' Row Length +79.9" Border x 2 = 105.69' Base Length
3 Rows x 101.7" Wide + 79.9" Side Border x 2 = 38.75' Base Width
66.0" Chamber Height = 5.50' Field Height

18 Chambers x 590.2 cf + 7,568.2 cf Border = 18,191.5 cf Chamber Storage
18 Chambers x 718.0 cf + 9,600.8 cf Border = 22,524.6 cf Displacement

Chamber Storage = 18,191.5 cf = 0.418 af
Overall Storage Efficiency = 80.8%
Overall System Size = 105.69' x 38.75' x 5.50'

18 Chambers (plus border)
834.2 cy Field



## Summary for Pond IS1:

Inflow Area = 0.708 ac, 72.20% Impervious, Inflow Depth = 6.95" for 25-Year event
Inflow = 5.14 cfs @ 12.08 hrs, Volume= 0.410 af
Outflow = 4.56 cfs @ 12.13 hrs, Volume= 0.362 af, Atten= 11%, Lag= 2.5 min
Primary = 4.56 cfs @ 12.13 hrs, Volume= 0.362 af
Routed to Link DP2 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 233.07' @ 12.13 hrs Surf.Area= 1,997 sf Storage= 2,773 cf

Plug-Flow detention time= 106.0 min calculated for 0.362 af (88% of inflow)
Center-of-Mass det. time= 50.3 min ( 805.6 - 755.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 231.00' | 4,940 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 231.00 | 710 | 0 | 0 |
| 232.00 | 1,310 | 1,010 | 1,010 |
| 233.00 | 1,950 | 1,630 | 2,640 |
| 234.00 | 2,650 | 2,300 | 4,940 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 232.70' | **2.5" x 2.5" Horiz. Grate X 6.00 columns**<br>X 6 rows C= 0.600 in 24.0" x 24.0" Grate (39% open area)<br>Limited to weir flow at low heads |
| #2 | Primary | 229.20' | **18.0" Round Culvert**<br>L= 40.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 229.20' / 229.00' S= 0.0050 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf |

**Primary OutFlow** Max=4.56 cfs @ 12.13 hrs HW=233.07' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Passes 4.56 cfs of 13.25 cfs potential flow)
↑**1=Grate** (Orifice Controls 4.56 cfs @ 2.92 fps)

## Summary for Pond IS2:

Inflow Area = 2.078 ac, 89.84% Impervious, Inflow Depth = 7.34" for 25-Year event
Inflow = 15.62 cfs @ 12.08 hrs, Volume= 1.272 af
Outflow = 5.64 cfs @ 12.33 hrs, Volume= 0.979 af, Atten= 64%, Lag= 15.0 min
Primary = 5.64 cfs @ 12.33 hrs, Volume= 0.979 af
Routed to Link DP2 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 237.19' @ 12.33 hrs Surf.Area= 7,134 sf Storage= 26,579 cf

Plug-Flow detention time= 209.7 min calculated for 0.979 af (77% of inflow)
Center-of-Mass det. time= 125.5 min ( 871.8 - 746.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1B | 233.00' | 0 cf | **47.23'W x 59.50'L x 5.50'H Field A**<br>15,456 cf Overall - 15,456 cf Embedded = 0 cf x 40.0% Voids |
| #2B | 233.00' | 12,474 cf | **StormTrap SingleTrap 5-0** x 12 Inside #1<br>Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf<br>Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf<br>12 Chambers in 4 Rows<br>33.92' x 46.19' Core + 6.66' Border = 47.23' x 59.50' System |
| #3C | 233.00' | 0 cf | **72.67'W x 59.50'L x 5.50'H Field B**<br>23,780 cf Overall - 23,780 cf Embedded = 0 cf x 40.0% Voids |
| #4C | 233.00' | 19,254 cf | **StormTrap SingleTrap 5-0** x 21 Inside #3<br>Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf<br>Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf<br>21 Chambers in 7 Rows<br>59.35' x 46.19' Core + 6.66' Border = 72.67' x 59.50' System |
| | | 31,728 cf | Total Available Storage |

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

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 237.00' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Device 3 | 235.00' | **8.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Primary | 233.00' | **24.0" Round Culvert**<br>L= 250.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 233.00' / 231.00' S= 0.0080 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |

**Primary OutFlow** Max=5.64 cfs @ 12.33 hrs HW=237.19' TW=0.00' (Dynamic Tailwater)
└─**3=Culvert** (Passes 5.64 cfs of 23.51 cfs potential flow)
  ├─**1=Sharp-Crested Rectangular Weir** (Weir Controls 1.06 cfs @ 1.42 fps)
  └─**2=Orifice/Grate** (Orifice Controls 4.58 cfs @ 6.56 fps)

## Pond IS2: - Chamber Wizard Field A

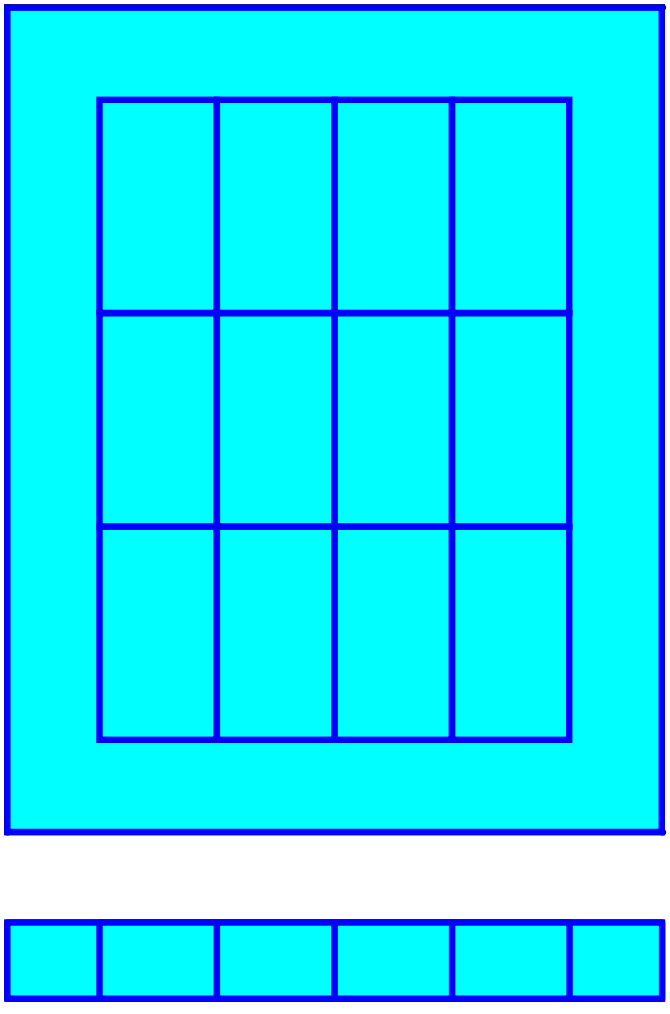
**Chamber Model = StormTrap SingleTrap 5-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

3 Chambers/Row x 15.40' Long = 46.19' Row Length +79.9" Border x 2 = 59.50' Base Length
4 Rows x 101.7" Wide + 79.9" Side Border x 2 = 47.23' Base Width
66.0" Chamber Height = 5.50' Field Height

12 Chambers x 590.2 cf + 5,391.8 cf Border = 12,474.0 cf Chamber Storage
12 Chambers x 718.0 cf + 6,839.9 cf Border = 15,455.7 cf Displacement

Chamber Storage = 12,474.0 cf = 0.286 af
Overall Storage Efficiency = 80.7%
Overall System Size = 59.50' x 47.23' x 5.50'

12 Chambers (plus border)
572.4 cy Field



## Pond IS2: - Chamber Wizard Field B

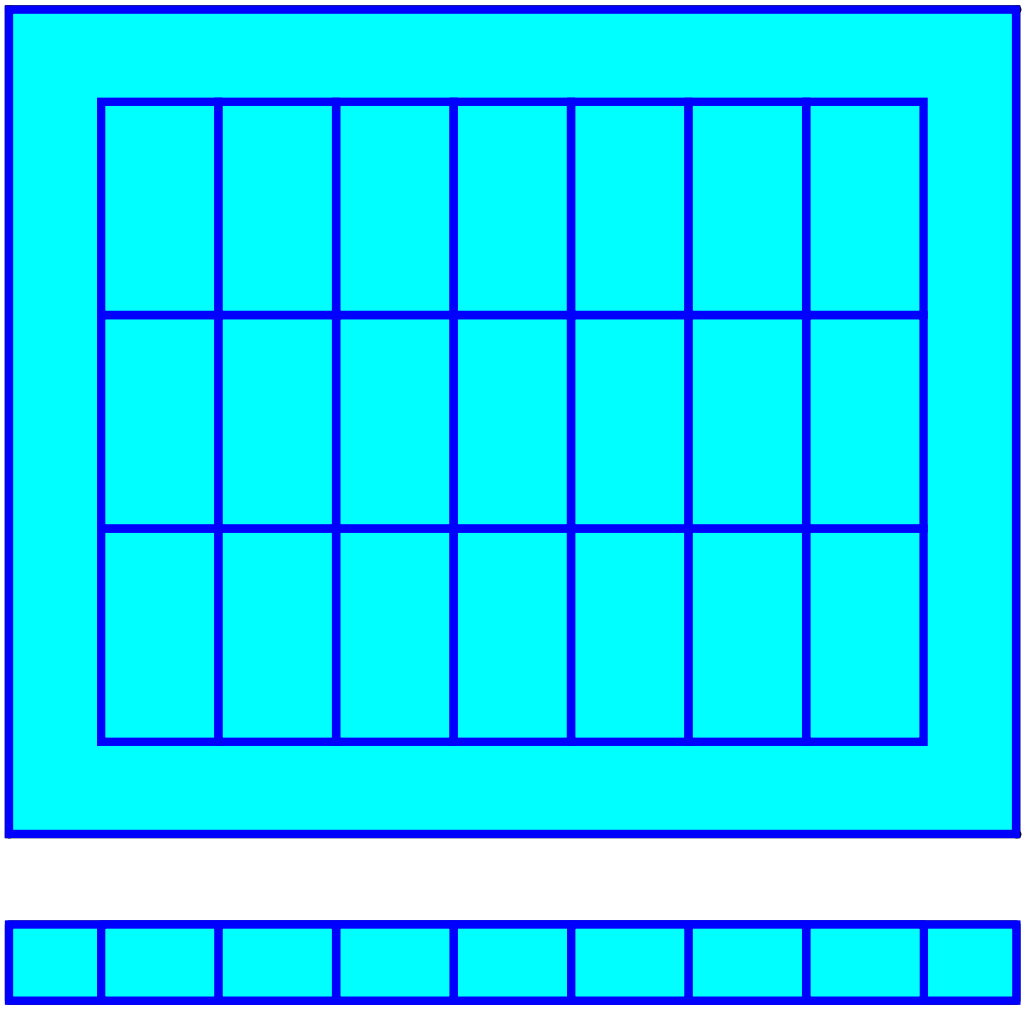
**Chamber Model = StormTrap SingleTrap 5-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

3 Chambers/Row x 15.40' Long = 46.19' Row Length +79.9" Border x 2 = 59.50' Base Length
7 Rows x 101.7" Wide + 79.9" Side Border x 2 = 72.67' Base Width
66.0" Chamber Height = 5.50' Field Height

21 Chambers x 590.2 cf + 6,860.0 cf Border = 19,253.8 cf Chamber Storage
21 Chambers x 718.0 cf + 8,702.4 cf Border = 23,780.2 cf Displacement

Chamber Storage = 19,253.8 cf = 0.442 af
Overall Storage Efficiency = 81.0%
Overall System Size = 59.50' x 72.67' x 5.50'

21 Chambers (plus border)
880.7 cy Field



## Summary for Pond IS3:

Inflow Area = 0.549 ac, 82.48% Impervious, Inflow Depth = 7.18" for 25-Year event
Inflow = 4.06 cfs @ 12.08 hrs, Volume= 0.328 af
Outflow = 4.01 cfs @ 12.10 hrs, Volume= 0.287 af, Atten= 1%, Lag= 0.8 min
Primary = 4.01 cfs @ 12.10 hrs, Volume= 0.287 af
Routed to Link DP3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 229.46' @ 12.10 hrs Surf.Area= 1,033 sf Storage= 2,108 cf

Plug-Flow detention time= 111.2 min calculated for 0.287 af (87% of inflow)
Center-of-Mass det. time= 52.6 min ( 802.5 - 749.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 226.50' | 1,022 cf | **18.50'W x 55.83'L x 4.00'H Field A**<br>4,132 cf Overall - 1,578 cf Embedded = 2,554 cf x 40.0% Voids |
| #2A | 227.00' | 1,578 cf | **Cultec R-360HD** x 42 Inside #1<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>42 Chambers in 3 Rows<br>Cap Storage= 6.5 cf x 2 x 3 rows = 38.8 cf |
| | | 2,599 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 229.00' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Primary | 227.00' | **15.0" Round Culvert**<br>L= 40.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 227.00' / 225.50' S= 0.0375 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf |

**Primary OutFlow** Max=4.00 cfs @ 12.10 hrs HW=229.46' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Passes 4.00 cfs of 7.06 cfs potential flow)
↑**1=Sharp-Crested Rectangular Weir** (Weir Controls 4.00 cfs @ 2.22 fps)

## Pond IS3: - Chamber Wizard Field A

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**
Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf
Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap
Cap Storage= 6.5 cf x 2 x 3 rows = 38.8 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

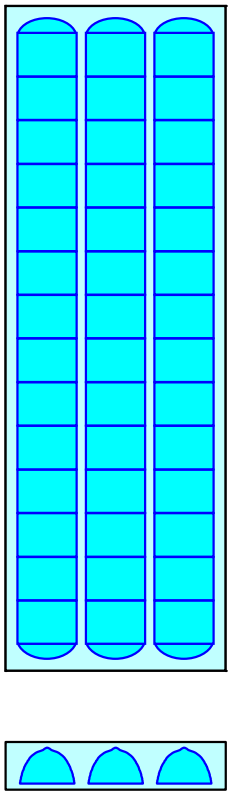
14 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 53.83' Row Length +12.0" End Stone x 2 = 55.83' Base Length
3 Rows x 60.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 18.50' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

42 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 3 Rows = 1,577.8 cf Chamber Storage

4,131.7 cf Field - 1,577.8 cf Chambers = 2,553.8 cf Stone x 40.0% Voids = 1,021.5 cf Stone Storage

Chamber Storage + Stone Storage = 2,599.4 cf = 0.060 af
Overall Storage Efficiency = 62.9%
Overall System Size = 55.83' x 18.50' x 4.00'

42 Chambers
153.0 cy Field
94.6 cy Stone



## Summary for Pond IS4:

Inflow Area = 2.540 ac, 93.09% Impervious, Inflow Depth = 6.38" for 25-Year event
Inflow = 10.92 cfs @ 12.09 hrs, Volume= 1.350 af
Outflow = 6.47 cfs @ 12.23 hrs, Volume= 0.883 af, Atten= 41%, Lag= 8.5 min
Primary = 6.47 cfs @ 12.23 hrs, Volume= 0.883 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 240.15' @ 12.23 hrs Surf.Area= 8,822 sf Storage= 23,847 cf

Plug-Flow detention time= 239.5 min calculated for 0.883 af (65% of inflow)
Center-of-Mass det. time= 122.5 min ( 898.5 - 776.1 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 237.00' | 0 cf | **55.71'W x 90.29'L x 3.50'H Field A**<br>17,605 cf Overall - 17,605 cf Embedded = 0 cf x 40.0% Voids |
| #2A | 237.00' | 13,440 cf | **StormTrap SingleTrap 3-0** x 25 Inside #1<br>Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf<br>Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf<br>25 Chambers in 5 Rows<br>42.40' x 76.98' Core + 6.66' Border = 55.71' x 90.29' System |
| #3C | 237.00' | 0 cf | **21.79'W x 44.10'L x 3.50'H Field B**<br>3,364 cf Overall - 3,364 cf Embedded = 0 cf x 40.0% Voids |
| #4C | 237.00' | 2,527 cf | **StormTrap SingleTrap 3-0** x 2 Inside #3<br>Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf<br>Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf<br>8.48' x 30.79' Core + 6.66' Border = 21.79' x 44.10' System |
| #5B | 237.00' | 0 cf | **64.19'W x 44.10'L x 4.50'H Field C**<br>12,739 cf Overall - 12,739 cf Embedded = 0 cf x 40.0% Voids |
| #6B | 237.00' | 10,016 cf | **StormTrap SingleTrap 4-0** x 12 Inside #5<br>Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf<br>Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf<br>12 Chambers in 6 Rows<br>50.88' x 30.79' Core + 6.66' Border = 64.19' x 44.10' System |
| | | 25,984 cf | Total Available Storage |

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

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 239.60' | **5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Primary | 237.50' | **24.0" Round Culvert**<br>L= 220.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 237.50' / 234.00' S= 0.0159 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |

**Primary OutFlow** Max=6.47 cfs @ 12.23 hrs HW=240.15' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Passes 6.47 cfs of 17.13 cfs potential flow)
↑—**1=Sharp-Crested Rectangular Weir** (Weir Controls 6.47 cfs @ 2.42 fps)

## Pond IS4: - Chamber Wizard Field A

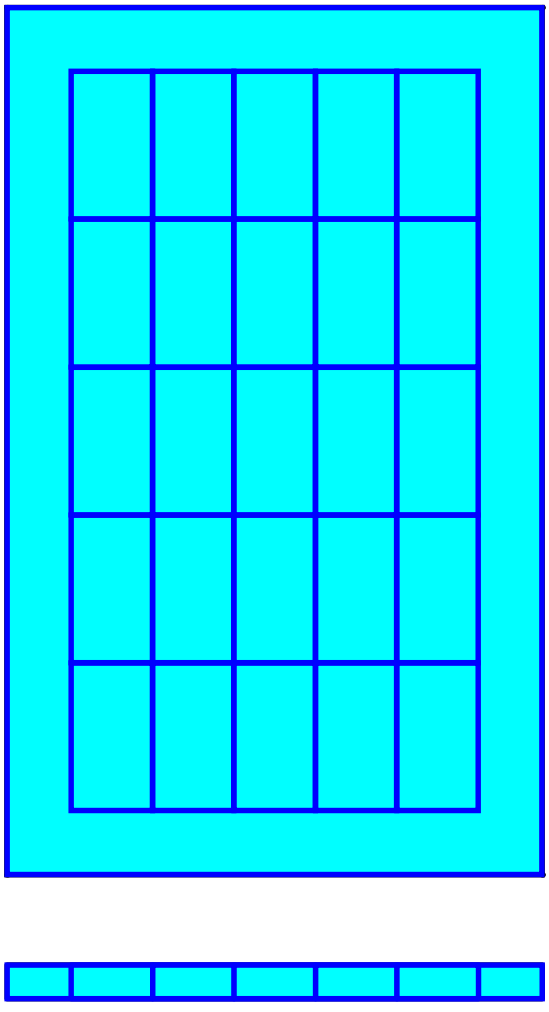
**Chamber Model = StormTrap SingleTrap 3-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf
Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf

5 Chambers/Row x 15.40' Long = 76.98' Row Length +79.9" Border x 2 = 90.29' Base Length
5 Rows x 101.7" Wide + 79.9" Side Border x 2 = 55.71' Base Width
42.0" Chamber Height = 3.50' Field Height

25 Chambers x 354.0 cf + 4,590.6 cf Border = 13,440.4 cf Chamber Storage
25 Chambers x 456.9 cf + 6,182.4 cf Border = 17,605.0 cf Displacement

Chamber Storage = 13,440.4 cf = 0.309 af
Overall Storage Efficiency = 76.3%
Overall System Size = 90.29' x 55.71' x 3.50'

25 Chambers (plus border)
652.0 cy Field



## Pond IS4: - Chamber Wizard Field B

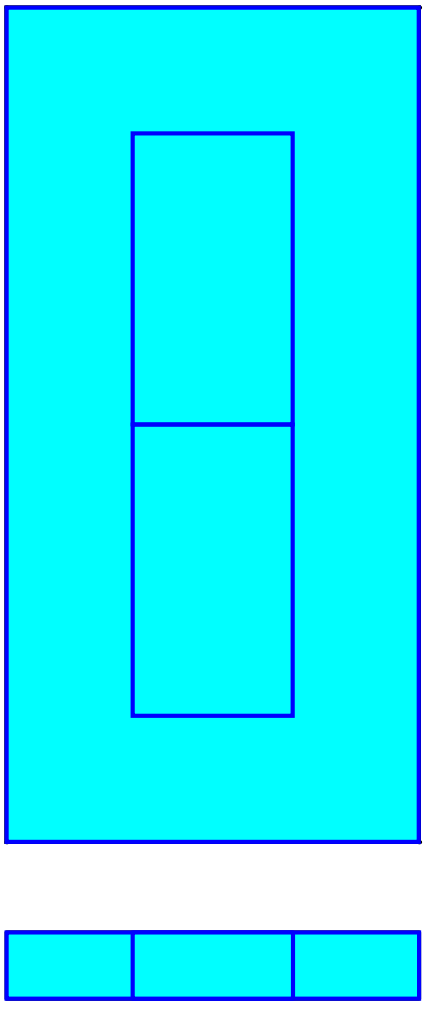
**Chamber Model = StormTrap SingleTrap 3-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf
Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf

2 Chambers/Row x 15.40' Long = 30.79' Row Length +79.9" Border x 2 = 44.10' 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

2 Chambers x 354.0 cf + 1,819.2 cf Border = 2,527.2 cf Chamber Storage
2 Chambers x 456.9 cf + 2,450.1 cf Border = 3,363.9 cf Displacement

Chamber Storage = 2,527.2 cf = 0.058 af
Overall Storage Efficiency = 75.1%
Overall System Size = 44.10' x 21.79' x 3.50'

2 Chambers (plus border)
124.6 cy Field



## Pond IS4: - Chamber Wizard Field C

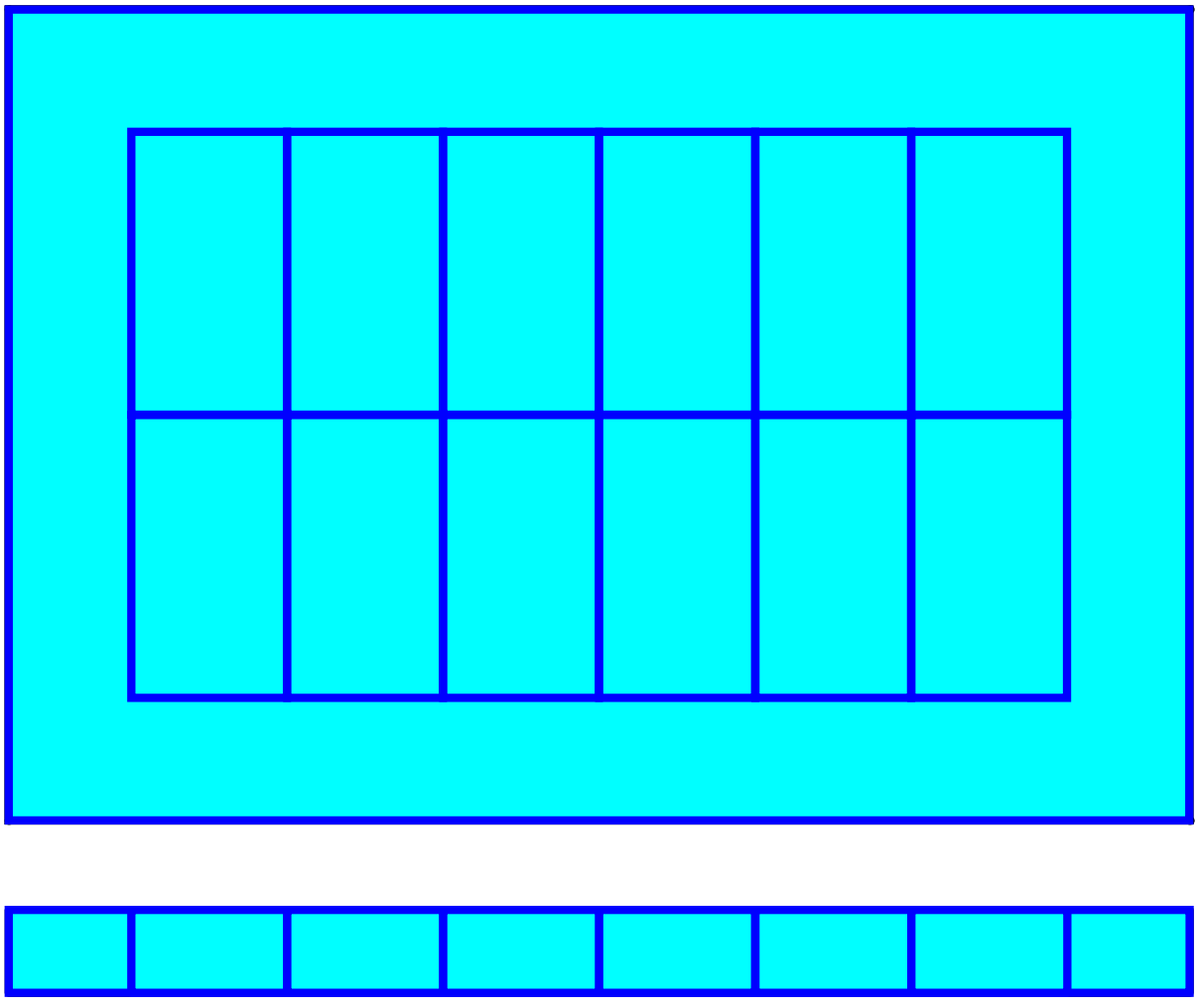
**Chamber Model = StormTrap SingleTrap 4-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf
Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf

2 Chambers/Row x 15.40' Long = 30.79' Row Length +79.9" Border x 2 = 44.10' Base Length
6 Rows x 101.7" Wide + 79.9" Side Border x 2 = 64.19' Base Width
54.0" Chamber Height = 4.50' Field Height

12 Chambers x 470.3 cf + 4,372.7 cf Border = 10,016.0 cf Chamber Storage
12 Chambers x 587.4 cf + 5,689.8 cf Border = 12,739.2 cf Displacement

Chamber Storage = 10,016.0 cf = 0.230 af
Overall Storage Efficiency = 78.6%
Overall System Size = 44.10' x 64.19' x 4.50'

12 Chambers (plus border)
471.8 cy Field



## Summary for Pond IS7:

Inflow Area = 1.264 ac, 89.98% Impervious, Inflow Depth = 7.35" for 25-Year event
Inflow = 9.50 cfs @ 12.08 hrs, Volume= 0.774 af
Outflow = 4.59 cfs @ 12.23 hrs, Volume= 0.652 af, Atten= 52%, Lag= 9.0 min
Primary = 4.59 cfs @ 12.23 hrs, Volume= 0.652 af
Routed to Link DP1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 253.39' @ 12.23 hrs Surf.Area= 4,083 sf Storage= 9,887 cf

Plug-Flow detention time= 139.1 min calculated for 0.652 af (84% of inflow)
Center-of-Mass det. time= 71.6 min ( 817.8 - 746.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 250.00' | 1,738 cf | **47.25'W x 37.50'L x 4.00'H Field A**<br>7,088 cf Overall - 2,742 cf Embedded = 4,346 cf x 40.0% Voids |
| #2A | 250.50' | 2,742 cf | **Cultec R-360HD** x 72 Inside #1<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>72 Chambers in 8 Rows<br>Cap Storage= 6.5 cf x 2 x 8 rows = 103.4 cf |
| #3B | 249.75' | 3,372 cf | **59.25'W x 39.00'L x 5.75'H Field B**<br>13,287 cf Overall - 4,856 cf Embedded = 8,431 cf x 40.0% Voids |
| #4B | 250.50' | 4,856 cf | **Cultec R-902HD v2** x 72 Inside #3<br>Effective Size= 69.1"W x 48.0"H => 17.30 sf x 3.67'L = 63.4 cf<br>Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap<br>72 Chambers in 8 Rows<br>Cap Storage= 18.0 cf x 2 x 8 rows = 288.3 cf |
| | | 12,708 cf | Total Available Storage |

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

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 251.80' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Primary | 251.00' | **12.0" Round Culvert**<br>L= 210.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 251.00' / 247.80' S= 0.0152 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf |

**Primary OutFlow** Max=4.59 cfs @ 12.23 hrs HW=253.39' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Inlet Controls 4.59 cfs @ 5.85 fps)
↑**1=Sharp-Crested Rectangular Weir** (Passes 4.59 cfs of 24.21 cfs potential flow)

## Pond IS7: - Chamber Wizard Field A

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**
Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf
Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap
Cap Storage= 6.5 cf x 2 x 8 rows = 103.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

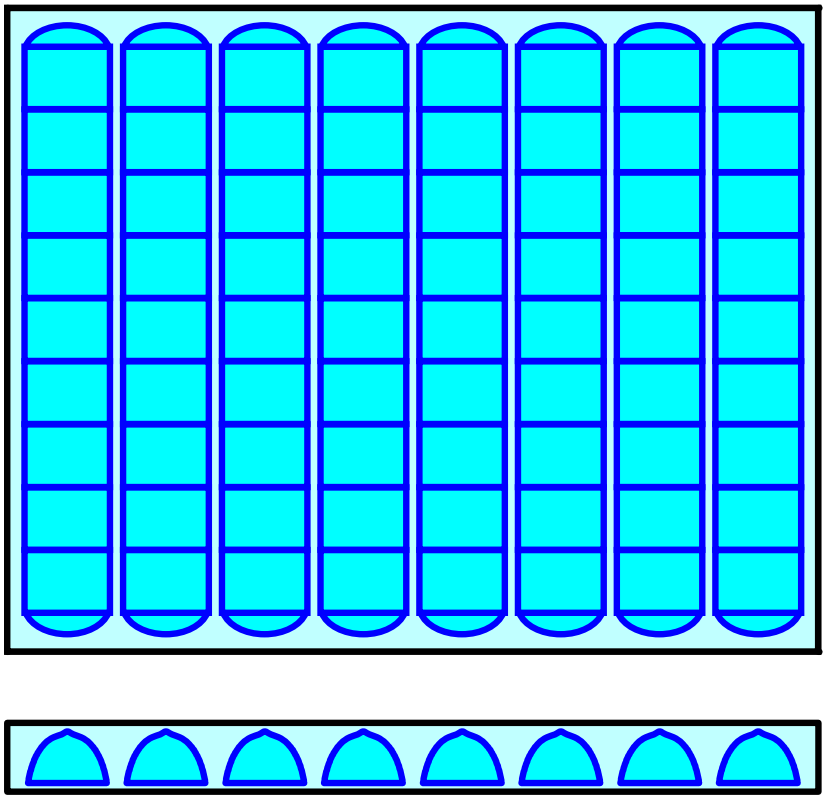
9 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 35.50' Row Length +12.0" End Stone x 2 = 37.50' Base Length
8 Rows x 60.0" Wide + 9.0" Spacing x 7 + 12.0" Side Stone x 2 = 47.25' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

72 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 8 Rows = 2,741.8 cf Chamber Storage

7,087.5 cf Field - 2,741.8 cf Chambers = 4,345.7 cf Stone x 40.0% Voids = 1,738.3 cf Stone Storage

Chamber Storage + Stone Storage = 4,480.1 cf = 0.103 af
Overall Storage Efficiency = 63.2%
Overall System Size = 37.50' x 47.25' x 4.00'

72 Chambers
262.5 cy Field
161.0 cy Stone



## Pond IS7: - Chamber Wizard Field B

**Chamber Model = Cultec R-902HD v2 (Cultec Recharger® 902HD v2)**
Effective Size= 69.1"W x 48.0"H => 17.30 sf x 3.67'L = 63.4 cf
Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap
Cap Storage= 18.0 cf x 2 x 8 rows = 288.3 cf

78.0" Wide + 9.0" Spacing = 87.0" C-C Row Spacing

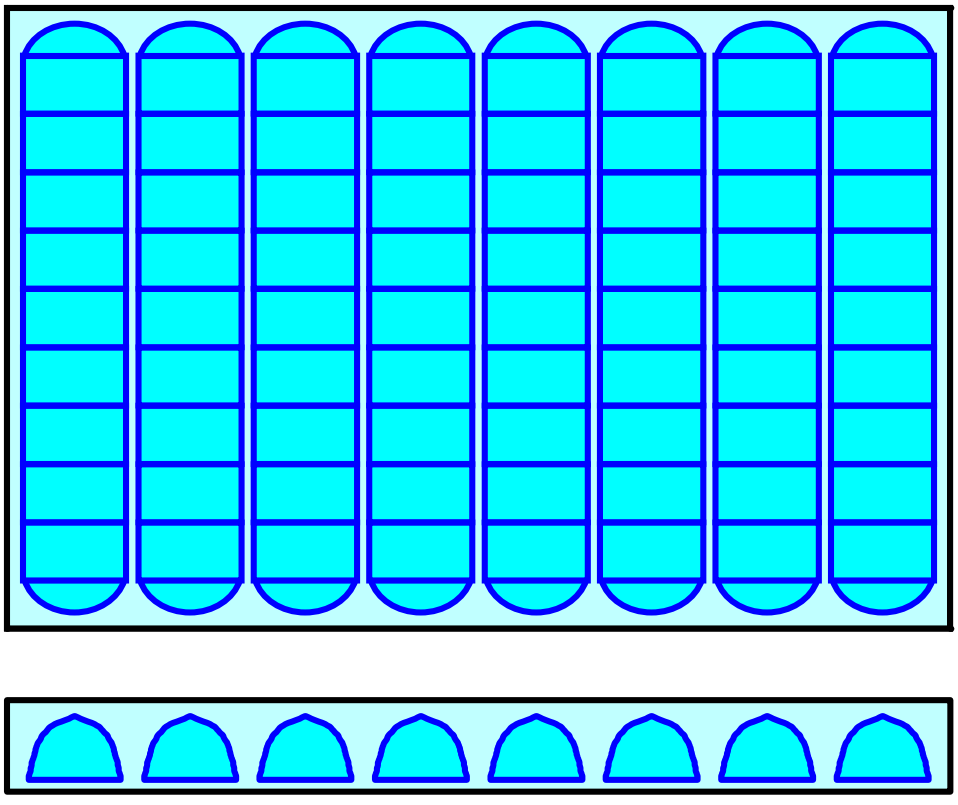
9 Chambers/Row x 3.67' Long +2.00' Cap Length x 2 = 37.00' Row Length +12.0" End Stone x 2 = 39.00' Base Length
8 Rows x 78.0" Wide + 9.0" Spacing x 7 + 12.0" Side Stone x 2 = 59.25' Base Width
9.0" Stone Base + 48.0" Chamber Height + 12.0" Stone Cover = 5.75' Field Height

72 Chambers x 63.4 cf + 18.0 cf Cap Volume x 2 x 8 Rows = 4,856.2 cf Chamber Storage

13,286.8 cf Field - 4,856.2 cf Chambers = 8,430.6 cf Stone x 40.0% Voids = 3,372.3 cf Stone Storage

Chamber Storage + Stone Storage = 8,228.4 cf = 0.189 af
Overall Storage Efficiency = 61.9%
Overall System Size = 39.00' x 59.25' x 5.75'

72 Chambers
492.1 cy Field
312.2 cy Stone



## Summary for Pond IS8:

Inflow Area = 0.809 ac, 89.10% Impervious, Inflow Depth = 7.33" for 25-Year event
Inflow = 6.07 cfs @ 12.08 hrs, Volume= 0.494 af
Outflow = 0.61 cfs @ 12.83 hrs, Volume= 0.377 af, Atten= 90%, Lag= 45.1 min
Primary = 0.61 cfs @ 12.83 hrs, Volume= 0.377 af
Routed to Link DP5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 256.26' @ 12.83 hrs Surf.Area= 4,270 sf Storage= 13,295 cf

Plug-Flow detention time= 332.4 min calculated for 0.377 af (76% of inflow)
Center-of-Mass det. time= 246.7 min ( 993.4 - 746.6 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 252.00' | 16,620 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 252.00 | 2,060 | 0 | 0 |
| 253.00 | 2,530 | 2,295 | 2,295 |
| 254.00 | 3,030 | 2,780 | 5,075 |
| 255.00 | 3,560 | 3,295 | 8,370 |
| 256.00 | 4,120 | 3,840 | 12,210 |
| 257.00 | 4,700 | 4,410 | 16,620 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 256.30' | **2.5" x 2.5" Horiz. Grate X 6.00 columns**<br>X 6 rows C= 0.600 in 24.0" x 24.0" Grate (39% open area)<br>Limited to weir flow at low heads |
| #2 | Device 3 | 254.00' | **4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |
| #3 | Primary | 252.40' | **18.0" Round Culvert**<br>L= 10.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 252.40' / 252.00' S= 0.0400 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf |

**Primary OutFlow** Max=0.61 cfs @ 12.83 hrs HW=256.26' TW=0.00' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.61 cfs of 13.24 cfs potential flow)
  ├─**1=Grate** ( Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Orifice Controls 0.61 cfs @ 6.96 fps)

## Summary for Link DP1:

Inflow Area = 1.519 ac, 80.37% Impervious, Inflow Depth = 6.17" for 25-Year event
Inflow = 5.79 cfs @ 12.12 hrs, Volume= 0.781 af
Primary = 5.79 cfs @ 12.12 hrs, Volume= 0.781 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP2:

Inflow Area = 3.412 ac, 70.15% Impervious, Inflow Depth = 5.57" for 25-Year event
Inflow = 11.72 cfs @ 12.11 hrs, Volume= 1.584 af
Primary = 11.72 cfs @ 12.11 hrs, Volume= 1.584 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP3:

Inflow Area = 1.003 ac, 45.12% Impervious, Inflow Depth = 5.48" for 25-Year event
Inflow = 5.67 cfs @ 12.11 hrs, Volume= 0.458 af
Primary = 5.67 cfs @ 12.11 hrs, Volume= 0.458 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP4:

Inflow Area = 4.922 ac, 74.55% Impervious, Inflow Depth = 5.21" for 25-Year event
Inflow = 11.69 cfs @ 12.21 hrs, Volume= 2.139 af
Primary = 11.69 cfs @ 12.21 hrs, Volume= 2.139 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP5:

Inflow Area = 1.202 ac, 60.17% Impervious, Inflow Depth > 5.47" for 25-Year event
Inflow = 2.84 cfs @ 12.09 hrs, Volume= 0.548 af
Primary = 2.84 cfs @ 12.09 hrs, Volume= 0.548 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentP1.1:** Runoff Area=11,110 sf 32.76% Impervious Runoff Depth=8.86"
Tc=6.0 min CN=WQ Runoff=2.46 cfs 0.188 af

**SubcatchmentP1.2:** Runoff Area=37,050 sf 86.83% Impervious Runoff Depth=10.15"
Tc=6.0 min CN=WQ Runoff=8.80 cfs 0.720 af

**SubcatchmentP1.3:** Runoff Area=18,020 sf 96.45% Impervious Runoff Depth=10.38"
Tc=6.0 min CN=WQ Runoff=4.33 cfs 0.358 af

**SubcatchmentP2.1:** Runoff Area=27,240 sf 2.39% Impervious Runoff Depth=7.28"
Tc=6.0 min CN=WQ Runoff=5.25 cfs 0.379 af

**SubcatchmentP2.2:** Runoff Area=30,860 sf 72.20% Impervious Runoff Depth=9.80"
Tc=6.0 min CN=WQ Runoff=7.19 cfs 0.579 af

**SubcatchmentP2.3:** Runoff Area=90,530 sf 89.84% Impervious Runoff Depth=10.23"
Tc=6.0 min CN=WQ Runoff=21.59 cfs 1.771 af

**SubcatchmentP3.1:** Runoff Area=19,800 sf 0.00% Impervious Runoff Depth=7.13"
Flow Length=180' Tc=12.4 min CN=WQ Runoff=3.06 cfs 0.270 af

**SubcatchmentP3.2:** Runoff Area=23,910 sf 82.48% Impervious Runoff Depth=10.05"
Tc=6.0 min CN=WQ Runoff=5.65 cfs 0.460 af

**SubcatchmentP4.1:** Runoff Area=35,780 sf 0.00% Impervious Runoff Depth=7.30"
Tc=6.0 min CN=WQ Runoff=6.93 cfs 0.500 af

**SubcatchmentP4.2:** Runoff Area=50,120 sf 90.38% Impervious Runoff Depth=10.24"
Tc=6.0 min CN=WQ Runoff=11.96 cfs 0.982 af

**SubcatchmentP4.3:** Runoff Area=60,510 sf 95.32% Impervious Runoff Depth=10.36"
Tc=6.0 min CN=WQ Runoff=14.54 cfs 1.199 af

**SubcatchmentP4.4:** Runoff Area=67,980 sf 83.63% Impervious Runoff Depth=10.08"
Tc=6.0 min CN=WQ Runoff=16.09 cfs 1.310 af

**SubcatchmentP5.1:** Runoff Area=17,110 sf 0.58% Impervious Runoff Depth=7.96"
Tc=6.0 min CN=WQ Runoff=3.56 cfs 0.260 af

**SubcatchmentP5.2:** Runoff Area=35,240 sf 89.10% Impervious Runoff Depth=10.21"
Tc=6.0 min CN=WQ Runoff=8.40 cfs 0.688 af

**Pond DS5:** Peak Elev=241.30' Storage=19,688 cf Inflow=11.96 cfs 0.982 af
Outflow=3.87 cfs 0.762 af

**Pond DS6:** Peak Elev=243.10' Storage=16,748 cf Inflow=16.09 cfs 1.310 af
Outflow=5.59 cfs 1.310 af

**Pond IS1:** Peak Elev=233.30' Storage=3,264 cf Inflow=7.19 cfs 0.579 af
Outflow=5.85 cfs 0.531 af

**Pond IS2:** Peak Elev=237.69' Storage=29,756 cf Inflow=21.59 cfs 1.771 af
Outflow=12.39 cfs 1.478 af

**Pond IS3:** Peak Elev=229.58' Storage=2,180 cf Inflow=5.65 cfs 0.460 af
Outflow=5.59 cfs 0.418 af

**Pond IS4:** Peak Elev=240.57' Storage=24,917 cf Inflow=15.97 cfs 1.961 af
Outflow=15.11 cfs 1.494 af

**Pond IS7:** Peak Elev=255.45' Storage=12,659 cf Inflow=13.14 cfs 1.078 af
Outflow=5.64 cfs 0.956 af

**Pond IS8:** Peak Elev=256.56' Storage=14,610 cf Inflow=8.40 cfs 0.688 af
Outflow=4.12 cfs 0.571 af

**Link DP1:** Inflow=7.30 cfs 1.144 af
Primary=7.30 cfs 1.144 af

**Link DP2:** Inflow=21.53 cfs 2.388 af
Primary=21.53 cfs 2.388 af

**Link DP3:** Inflow=8.20 cfs 0.688 af
Primary=8.20 cfs 0.688 af

**Link DP4:** Inflow=24.96 cfs 3.303 af
Primary=24.96 cfs 3.303 af

**Link DP5:** Inflow=6.02 cfs 0.831 af
Primary=6.02 cfs 0.831 af

**Total Runoff Area = 12.058 ac Runoff Volume = 9.664 af Average Runoff Depth = 9.62"**
**29.84% Pervious = 3.599 ac 70.16% Impervious = 8.460 ac**

## Summary for Subcatchment P1.1:

Runoff = 2.46 cfs @ 12.08 hrs, Volume= 0.188 af, Depth= 8.86"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 7,470 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 3,640 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 11,110 | | Weighted Average |
| 7,470 | | 67.24% Pervious Area |
| 3,640 | | 32.76% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P1.2:

Runoff = 8.80 cfs @ 12.08 hrs, Volume= 0.720 af, Depth=10.15"
Routed to Pond IS7 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 4,880 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 26,670 | 98 | Paved parking, HSG C |
| 5,500 | 98 | Roofs, HSG C |
| 37,050 | | Weighted Average |
| 4,880 | | 13.17% Pervious Area |
| 32,170 | | 86.83% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P1.3:

Runoff = 4.33 cfs @ 12.08 hrs, Volume= 0.358 af, Depth=10.38"
Routed to Pond IS7 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 640 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 6,970 | 98 | Paved parking, HSG C |
| 5,010 | 98 | Roofs, HSG C |
| 5,400 | 98 | Roofs, HSG C |
| 18,020 | | Weighted Average |
| 640 | | 3.55% Pervious Area |
| 17,380 | | 96.45% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P2.1:

Runoff = 5.25 cfs @ 12.09 hrs, Volume= 0.379 af, Depth= 7.28"
Routed to Link DP2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 19,200 | 70 | Woods, Good, HSG C |
| 7,390 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 650 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 27,240 | | Weighted Average |
| 26,590 | | 97.61% Pervious Area |
| 650 | | 2.39% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P2.2:

Runoff = 7.19 cfs @ 12.08 hrs, Volume= 0.579 af, Depth= 9.80"
Routed to Pond IS1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 8,580 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 22,280 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 30,860 | | Weighted Average |
| 8,580 | | 27.80% Pervious Area |
| 22,280 | | 72.20% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P2.3:

Runoff = 21.59 cfs @ 12.08 hrs, Volume= 1.771 af, Depth=10.23"
Routed to Pond IS2 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 9,200 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 81,330 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 90,530 | | Weighted Average |
| 9,200 | | 10.16% Pervious Area |
| 81,330 | | 89.84% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P3.1:

Runoff = 3.06 cfs @ 12.17 hrs, Volume= 0.270 af, Depth= 7.13"
Routed to Link DP3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 15,510 | 70 | Woods, Good, HSG C |
| 4,290 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 19,800 | | Weighted Average |
| 19,800 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 9.7 | 50 | 0.0380 | 0.09 | | **Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10" |
| 2.7 | 130 | 0.0250 | 0.79 | | **Shallow Concentrated Flow,** Woodland Kv= 5.0 fps |
| 12.4 | 180 | Total | | | |

## Summary for Subcatchment P3.2:

Runoff = 5.65 cfs @ 12.08 hrs, Volume= 0.460 af, Depth=10.05"
Routed to Pond IS3 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 4,190 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 19,720 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 23,910 | | Weighted Average |
| 4,190 | | 17.52% Pervious Area |
| 19,720 | | 82.48% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.1:

Runoff = 6.93 cfs @ 12.09 hrs, Volume= 0.500 af, Depth= 7.30"
Routed to Link DP4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 22,930 | 70 | Woods, Good, HSG C |
| 12,850 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 0 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 35,780 | | Weighted Average |
| 35,780 | | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.2:

Runoff = 11.96 cfs @ 12.08 hrs, Volume= 0.982 af, Depth=10.24"
Routed to Pond DS5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 4,820 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 16,360 | 98 | Paved parking, HSG C |
| 28,940 | 98 | Roofs, HSG C |
| 50,120 | | Weighted Average |
| 4,820 | | 9.62% Pervious Area |
| 45,300 | | 90.38% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.3:

Runoff = 14.54 cfs @ 12.08 hrs, Volume= 1.199 af, Depth=10.36"
Routed to Pond IS4 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 2,830 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 12,080 | 98 | Paved parking, HSG C |
| 45,600 | 98 | Roofs, HSG C |
| 60,510 | | Weighted Average |
| 2,830 | | 4.68% Pervious Area |
| 57,680 | | 95.32% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P4.4:

Runoff = 16.09 cfs @ 12.08 hrs, Volume= 1.310 af, Depth=10.08"
Routed to Pond DS6 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 11,130 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 56,850 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 67,980 | | Weighted Average |
| 11,130 | | 16.37% Pervious Area |
| 56,850 | | 83.63% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P5.1:

Runoff = 3.56 cfs @ 12.09 hrs, Volume= 0.260 af, Depth= 7.96"
Routed to Link DP5 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 1,820 | 70 | Woods, Good, HSG C |
| 15,190 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 100 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 17,110 | | Weighted Average |
| 17,010 | | 99.42% Pervious Area |
| 100 | | 0.58% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Subcatchment P5.2:

Runoff = 8.40 cfs @ 12.08 hrs, Volume= 0.688 af, Depth=10.21"
Routed to Pond IS8 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=10.71"

| Area (sf) | CN | Description |
|---|---|---|
| 0 | 70 | Woods, Good, HSG C |
| 3,840 | 79 | 50-75% Grass cover, Fair, HSG C |
| 0 | 89 | Gravel roads, HSG C |
| 31,400 | 98 | Paved parking, HSG C |
| 0 | 98 | Roofs, HSG C |
| 35,240 | | Weighted Average |
| 3,840 | | 10.90% Pervious Area |
| 31,400 | | 89.10% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|---|---|---|---|---|---|
| 6.0 | | | | | **Direct Entry, Min. Tc** |

## Summary for Pond DS5:

Inflow Area = 1.151 ac, 90.38% Impervious, Inflow Depth = 10.24" for 100-Year event
Inflow = 11.96 cfs @ 12.08 hrs, Volume= 0.982 af
Outflow = 3.87 cfs @ 12.47 hrs, Volume= 0.762 af, Atten= 68%, Lag= 23.4 min
Primary = 3.87 cfs @ 12.47 hrs, Volume= 0.762 af
Routed to Pond IS4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 241.30' @ 12.38 hrs Surf.Area= 6,713 sf Storage= 19,688 cf

Plug-Flow detention time= 167.2 min calculated for 0.762 af (78% of inflow)
Center-of-Mass det. time= 84.1 min ( 826.3 - 742.2 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 238.00' | 0 cf | **89.63'W x 74.90'L x 4.50'H Field A**<br>30,206 cf Overall - 30,206 cf Embedded = 0 cf x 40.0% Voids |
| #2A | 238.00' | 23,891 cf | **StormTrap SingleTrap 4-0** x 36 Inside #1<br>Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf<br>Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf<br>36 Chambers in 9 Rows<br>76.31' x 61.58' Core + 6.66' Border = 89.63' x 74.90' System |
| | | 23,891 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 4 | 241.40' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Device 4 | 239.60' | **6.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Device 4 | 238.00' | **6.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #4 | Primary | 238.00' | **15.0" Round Culvert**<br>L= 140.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 238.00' / 237.00' S= 0.0071 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf |

**Primary OutFlow** Max=3.87 cfs @ 12.47 hrs HW=241.26' TW=240.21' (Dynamic Tailwater)
└**4=Culvert** (Passes 3.87 cfs of 4.53 cfs potential flow)
  ├**1=Sharp-Crested Rectangular Weir** ( Controls 0.00 cfs)
  ├**2=Orifice/Grate** (Orifice Controls 1.94 cfs @ 4.93 fps)
  └**3=Orifice/Grate** (Orifice Controls 1.94 cfs @ 4.93 fps)

## Pond DS5: - Chamber Wizard Field A

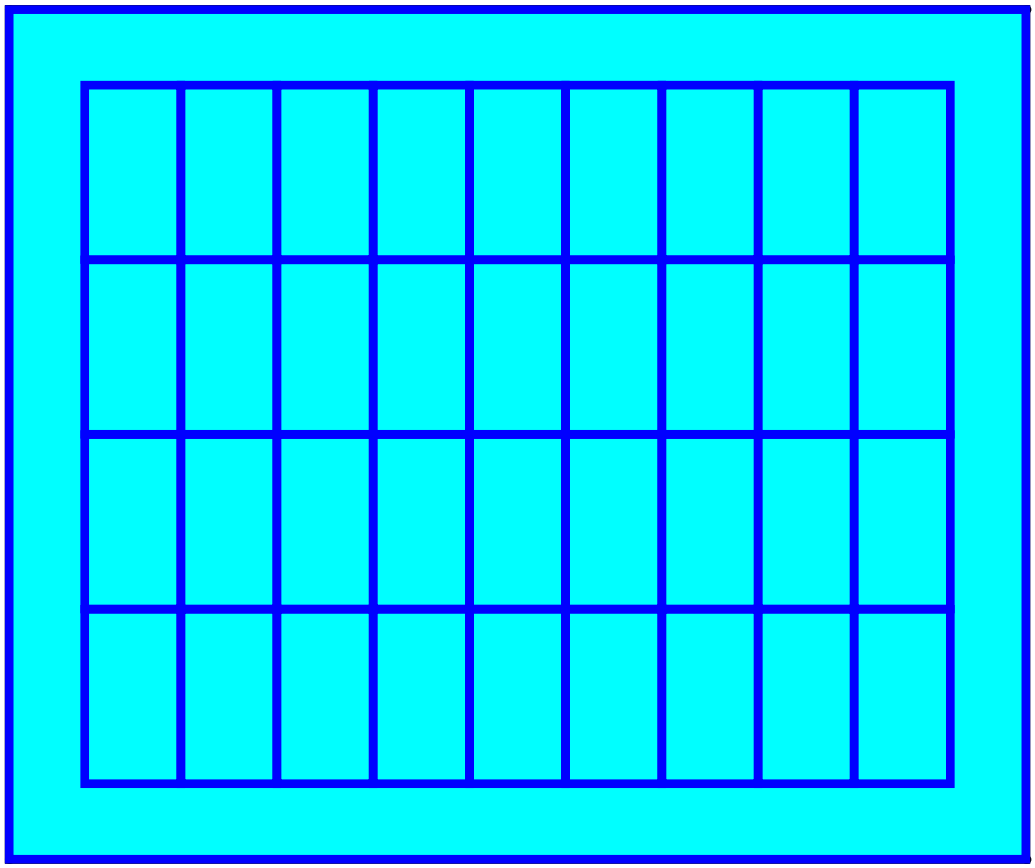
**Chamber Model = StormTrap SingleTrap 4-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf
Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf

4 Chambers/Row x 15.40' Long = 61.58' Row Length +79.9" Border x 2 = 74.90' Base Length
9 Rows x 101.7" Wide + 79.9" Side Border x 2 = 89.63' Base Width
54.0" Chamber Height = 4.50' Field Height

36 Chambers x 470.3 cf + 6,961.4 cf Border = 23,891.2 cf Chamber Storage
36 Chambers x 587.4 cf + 9,058.3 cf Border = 30,206.4 cf Displacement

Chamber Storage = 23,891.2 cf = 0.548 af
Overall Storage Efficiency = 79.1%
Overall System Size = 74.90' x 89.63' x 4.50'

36 Chambers (plus border)
1,118.8 cy Field





## Summary for Pond DS6:

Inflow Area = 1.561 ac, 83.63% Impervious, Inflow Depth = 10.08" for 100-Year event
Inflow = 16.09 cfs @ 12.08 hrs, Volume= 1.310 af
Outflow = 5.59 cfs @ 12.35 hrs, Volume= 1.310 af, Atten= 65%, Lag= 15.8 min
Primary = 5.59 cfs @ 12.35 hrs, Volume= 1.310 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 243.10' @ 12.35 hrs Surf.Area= 4,095 sf Storage= 16,748 cf

Plug-Flow detention time= 61.7 min calculated for 1.309 af (100% of inflow)
Center-of-Mass det. time= 61.5 min ( 806.9 - 745.3 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 238.50' | 0 cf | **38.75'W x 105.69'L x 5.50'H Field A**<br>22,525 cf Overall - 22,525 cf Embedded = 0 cf x 40.0% Voids |
| #2A | 238.50' | 18,191 cf | **StormTrap SingleTrap 5-0** x 18 Inside #1<br>Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf<br>Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf<br>18 Chambers in 3 Rows<br>25.44' x 92.38' Core + 6.66' Border = 38.75' x 105.69' System |
| | | 18,191 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 5 | 243.00' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Device 5 | 242.00' | **6.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Device 5 | 239.10' | **4.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #4 | Device 5 | 238.50' | **4.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #5 | Primary | 238.50' | **18.0" Round Culvert**<br>L= 240.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 238.50' / 233.50' S= 0.0208 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf |

**Primary OutFlow** Max=5.59 cfs @ 12.35 hrs HW=243.10' TW=0.00' (Dynamic Tailwater)
└**5=Culvert** (Passes 5.59 cfs of 14.74 cfs potential flow)
  ├**1=Sharp-Crested Rectangular Weir** (Weir Controls 0.43 cfs @ 1.05 fps)
  ├**2=Orifice/Grate** (Orifice Controls 1.75 cfs @ 4.45 fps)
  ├**3=Orifice/Grate** (Orifice Controls 1.65 cfs @ 9.43 fps)
  └**4=Orifice/Grate** (Orifice Controls 1.77 cfs @ 10.14 fps)

## Pond DS6: - Chamber Wizard Field A

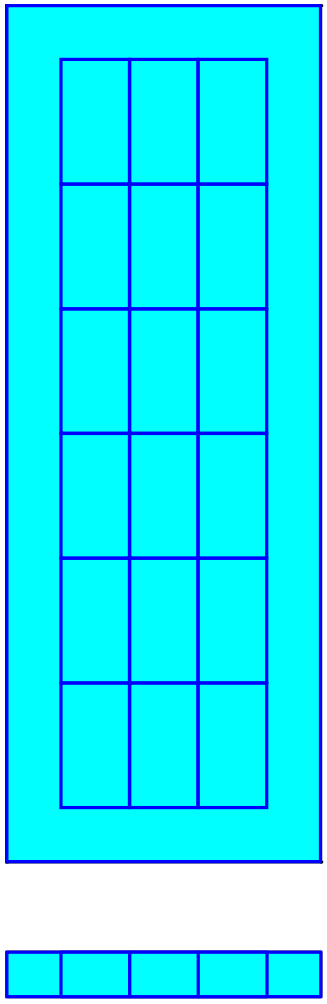
**Chamber Model = StormTrap SingleTrap 5-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

6 Chambers/Row x 15.40' Long = 92.38' Row Length +79.9" Border x 2 = 105.69' Base Length
3 Rows x 101.7" Wide + 79.9" Side Border x 2 = 38.75' Base Width
66.0" Chamber Height = 5.50' Field Height

18 Chambers x 590.2 cf + 7,568.2 cf Border = 18,191.5 cf Chamber Storage
18 Chambers x 718.0 cf + 9,600.8 cf Border = 22,524.6 cf Displacement

Chamber Storage = 18,191.5 cf = 0.418 af
Overall Storage Efficiency = 80.8%
Overall System Size = 105.69' x 38.75' x 5.50'

18 Chambers (plus border)
834.2 cy Field



## Summary for Pond IS1:

Inflow Area = 0.708 ac, 72.20% Impervious, Inflow Depth = 9.80" for 100-Year event
Inflow = 7.19 cfs @ 12.08 hrs, Volume= 0.579 af
Outflow = 5.85 cfs @ 12.14 hrs, Volume= 0.531 af, Atten= 19%, Lag= 3.4 min
Primary = 5.85 cfs @ 12.14 hrs, Volume= 0.531 af
Routed to Link DP2 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 233.30' @ 12.14 hrs Surf.Area= 2,163 sf Storage= 3,264 cf

Plug-Flow detention time= 85.3 min calculated for 0.531 af (92% of inflow)
Center-of-Mass det. time= 41.6 min ( 792.5 - 750.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 231.00' | 4,940 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 231.00 | 710 | 0 | 0 |
| 232.00 | 1,310 | 1,010 | 1,010 |
| 233.00 | 1,950 | 1,630 | 2,640 |
| 234.00 | 2,650 | 2,300 | 4,940 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 232.70' | **2.5" x 2.5" Horiz. Grate X 6.00 columns**<br>X 6 rows C= 0.600 in 24.0" x 24.0" Grate (39% open area)<br>Limited to weir flow at low heads |
| #2 | Primary | 229.20' | **18.0" Round Culvert**<br>L= 40.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 229.20' / 229.00' S= 0.0050 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf |

**Primary OutFlow** Max=5.84 cfs @ 12.14 hrs HW=233.30' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Passes 5.84 cfs of 13.75 cfs potential flow)
↑**1=Grate** (Orifice Controls 5.84 cfs @ 3.74 fps)

## Summary for Pond IS2:

Inflow Area = 2.078 ac, 89.84% Impervious, Inflow Depth = 10.23" for 100-Year event
Inflow = 21.59 cfs @ 12.08 hrs, Volume= 1.771 af
Outflow = 12.39 cfs @ 12.19 hrs, Volume= 1.478 af, Atten= 43%, Lag= 6.7 min
Primary = 12.39 cfs @ 12.19 hrs, Volume= 1.478 af
Routed to Link DP2 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 237.69' @ 12.19 hrs Surf.Area= 7,134 sf Storage= 29,756 cf

Plug-Flow detention time= 176.4 min calculated for 1.478 af (83% of inflow)
Center-of-Mass det. time= 106.5 min ( 848.9 - 742.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1B | 233.00' | 0 cf | **47.23'W x 59.50'L x 5.50'H Field A**<br>15,456 cf Overall - 15,456 cf Embedded = 0 cf x 40.0% Voids |
| #2B | 233.00' | 12,474 cf | **StormTrap SingleTrap 5-0** x 12 Inside #1<br>Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf<br>Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf<br>12 Chambers in 4 Rows<br>33.92' x 46.19' Core + 6.66' Border = 47.23' x 59.50' System |
| #3C | 233.00' | 0 cf | **72.67'W x 59.50'L x 5.50'H Field B**<br>23,780 cf Overall - 23,780 cf Embedded = 0 cf x 40.0% Voids |
| #4C | 233.00' | 19,254 cf | **StormTrap SingleTrap 5-0** x 21 Inside #3<br>Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf<br>Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf<br>21 Chambers in 7 Rows<br>59.35' x 46.19' Core + 6.66' Border = 72.67' x 59.50' System |
| | | 31,728 cf | Total Available Storage |

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

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 237.00' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Device 3 | 235.00' | **8.0" Vert. Orifice/Grate X 2.00** C= 0.600<br>Limited to weir flow at low heads |
| #3 | Primary | 233.00' | **24.0" Round Culvert**<br>L= 250.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 233.00' / 231.00' S= 0.0080 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |

**Primary OutFlow** Max=12.38 cfs @ 12.19 hrs HW=237.69' TW=0.00' (Dynamic Tailwater)
└**3=Culvert** (Passes 12.38 cfs of 24.88 cfs potential flow)
  ├**1=Sharp-Crested Rectangular Weir** (Weir Controls 7.22 cfs @ 2.71 fps)
  └**2=Orifice/Grate** (Orifice Controls 5.16 cfs @ 7.39 fps)

## Pond IS2: - Chamber Wizard Field A

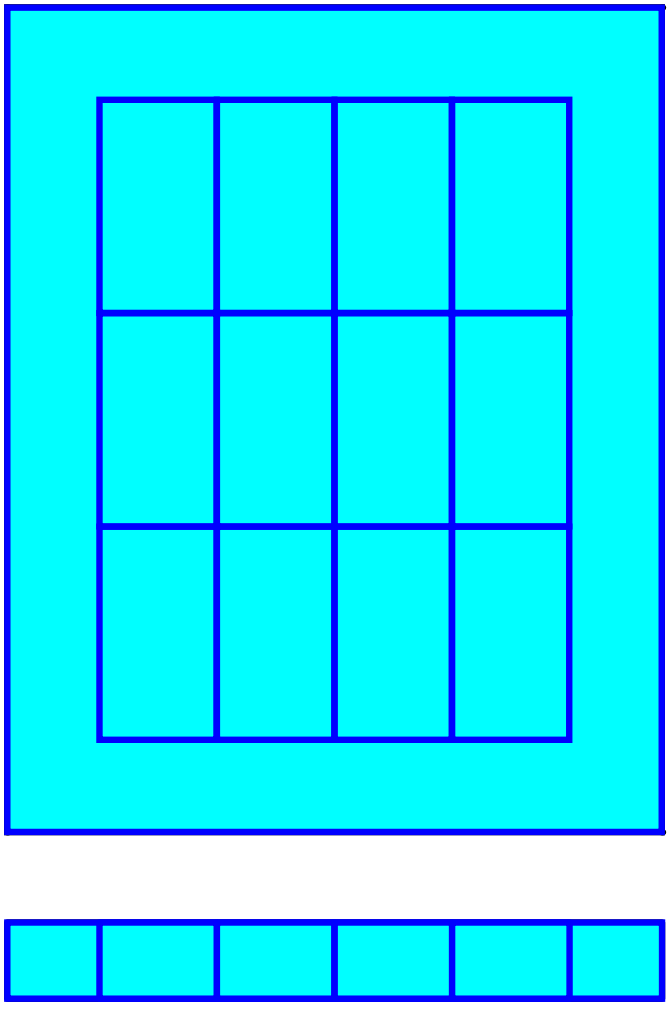
**Chamber Model = StormTrap SingleTrap 5-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

3 Chambers/Row x 15.40' Long = 46.19' Row Length +79.9" Border x 2 = 59.50' Base Length
4 Rows x 101.7" Wide + 79.9" Side Border x 2 = 47.23' Base Width
66.0" Chamber Height = 5.50' Field Height

12 Chambers x 590.2 cf + 5,391.8 cf Border = 12,474.0 cf Chamber Storage
12 Chambers x 718.0 cf + 6,839.9 cf Border = 15,455.7 cf Displacement

Chamber Storage = 12,474.0 cf = 0.286 af
Overall Storage Efficiency = 80.7%
Overall System Size = 59.50' x 47.23' x 5.50'

12 Chambers (plus border)
572.4 cy Field



## Pond IS2: - Chamber Wizard Field B

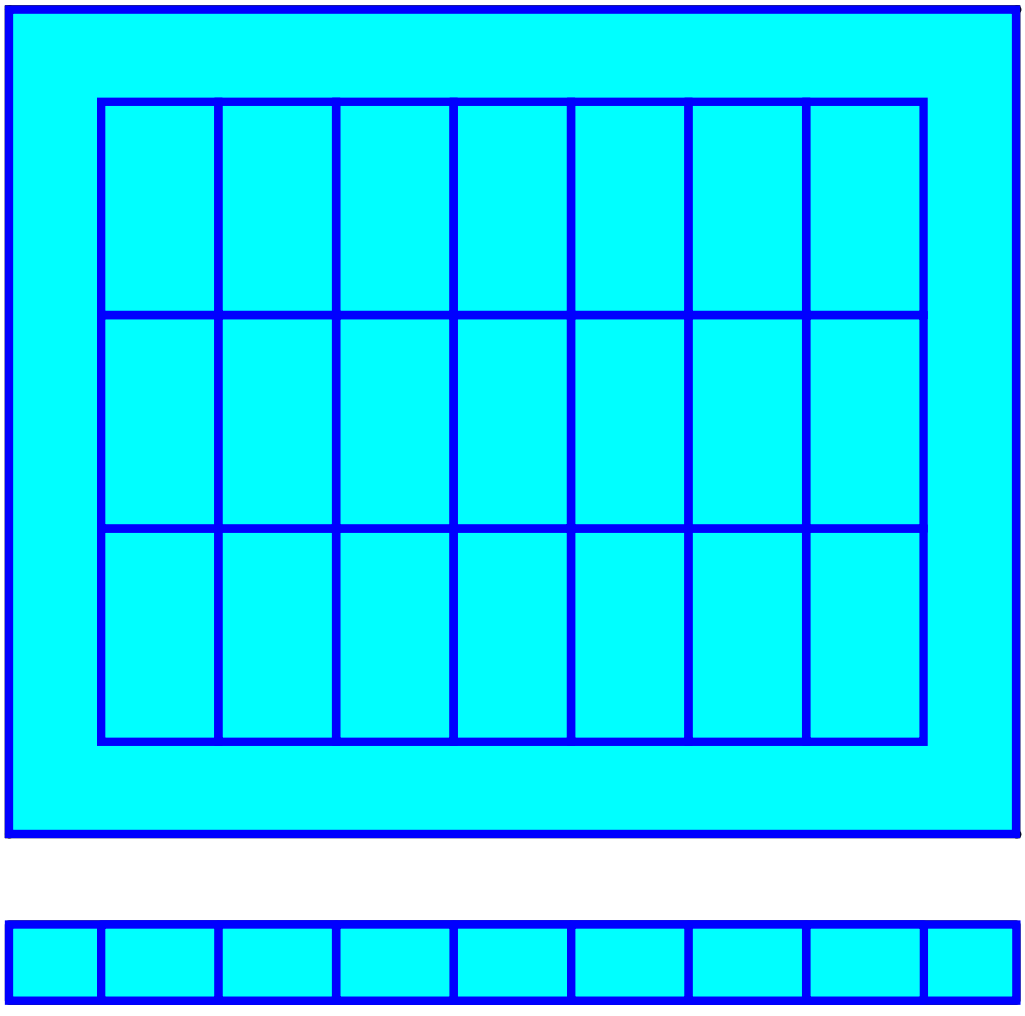
**Chamber Model = StormTrap SingleTrap 5-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 60.0"H => 38.33 sf x 15.40'L = 590.2 cf
Outside= 101.7"W x 66.0"H => 46.64 sf x 15.40'L = 718.0 cf

3 Chambers/Row x 15.40' Long = 46.19' Row Length +79.9" Border x 2 = 59.50' Base Length
7 Rows x 101.7" Wide + 79.9" Side Border x 2 = 72.67' Base Width
66.0" Chamber Height = 5.50' Field Height

21 Chambers x 590.2 cf + 6,860.0 cf Border = 19,253.8 cf Chamber Storage
21 Chambers x 718.0 cf + 8,702.4 cf Border = 23,780.2 cf Displacement

Chamber Storage = 19,253.8 cf = 0.442 af
Overall Storage Efficiency = 81.0%
Overall System Size = 59.50' x 72.67' x 5.50'

21 Chambers (plus border)
880.7 cy Field



## Summary for Pond IS3:

Inflow Area = 0.549 ac, 82.48% Impervious, Inflow Depth = 10.05" for 100-Year event
Inflow = 5.65 cfs @ 12.08 hrs, Volume= 0.460 af
Outflow = 5.59 cfs @ 12.10 hrs, Volume= 0.418 af, Atten= 1%, Lag= 0.7 min
Primary = 5.59 cfs @ 12.10 hrs, Volume= 0.418 af
Routed to Link DP3 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 229.58' @ 12.10 hrs Surf.Area= 1,033 sf Storage= 2,180 cf

Plug-Flow detention time= 90.1 min calculated for 0.418 af (91% of inflow)
Center-of-Mass det. time= 43.4 min ( 789.3 - 745.9 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 226.50' | 1,022 cf | **18.50'W x 55.83'L x 4.00'H Field A**<br>4,132 cf Overall - 1,578 cf Embedded = 2,554 cf x 40.0% Voids |
| #2A | 227.00' | 1,578 cf | **Cultec R-360HD** x 42 Inside #1<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>42 Chambers in 3 Rows<br>Cap Storage= 6.5 cf x 2 x 3 rows = 38.8 cf |
| | | 2,599 cf | Total Available Storage |

Storage Group A created with Chamber Wizard

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 229.00' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Primary | 227.00' | **15.0" Round Culvert**<br>L= 40.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 227.00' / 225.50' S= 0.0375 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf |

**Primary OutFlow** Max=5.58 cfs @ 12.10 hrs HW=229.58' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Passes 5.58 cfs of 7.29 cfs potential flow)
↑**1=Sharp-Crested Rectangular Weir** (Weir Controls 5.58 cfs @ 2.49 fps)

## Pond IS3: - Chamber Wizard Field A

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**
Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf
Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap
Cap Storage= 6.5 cf x 2 x 3 rows = 38.8 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

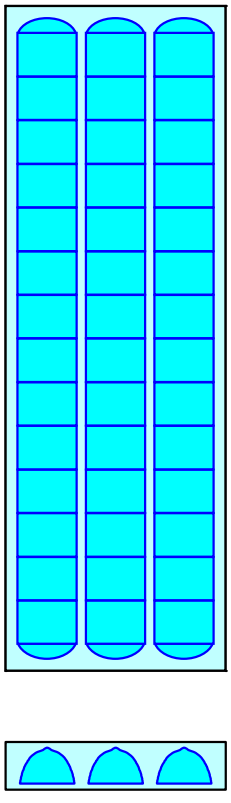
14 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 53.83' Row Length +12.0" End Stone x 2 = 55.83' Base Length
3 Rows x 60.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 18.50' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

42 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 3 Rows = 1,577.8 cf Chamber Storage

4,131.7 cf Field - 1,577.8 cf Chambers = 2,553.8 cf Stone x 40.0% Voids = 1,021.5 cf Stone Storage

Chamber Storage + Stone Storage = 2,599.4 cf = 0.060 af
Overall Storage Efficiency = 62.9%
Overall System Size = 55.83' x 18.50' x 4.00'

42 Chambers
153.0 cy Field
94.6 cy Stone



## Summary for Pond IS4:

Inflow Area = 2.540 ac, 93.09% Impervious, Inflow Depth = 9.27" for 100-Year event
Inflow = 15.97 cfs @ 12.09 hrs, Volume= 1.961 af
Outflow = 15.11 cfs @ 12.12 hrs, Volume= 1.494 af, Atten= 5%, Lag= 1.9 min
Primary = 15.11 cfs @ 12.12 hrs, Volume= 1.494 af
Routed to Link DP4 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 240.57' @ 12.12 hrs Surf.Area= 8,822 sf Storage= 24,917 cf

Plug-Flow detention time= 184.3 min calculated for 1.494 af (76% of inflow)
Center-of-Mass det. time= 93.5 min ( 867.1 - 773.5 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 237.00' | 0 cf | **55.71'W x 90.29'L x 3.50'H Field A**<br>17,605 cf Overall - 17,605 cf Embedded = 0 cf x 40.0% Voids |
| #2A | 237.00' | 13,440 cf | **StormTrap SingleTrap 3-0** x 25 Inside #1<br>Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf<br>Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf<br>25 Chambers in 5 Rows<br>42.40' x 76.98' Core + 6.66' Border = 55.71' x 90.29' System |
| #3C | 237.00' | 0 cf | **21.79'W x 44.10'L x 3.50'H Field B**<br>3,364 cf Overall - 3,364 cf Embedded = 0 cf x 40.0% Voids |
| #4C | 237.00' | 2,527 cf | **StormTrap SingleTrap 3-0** x 2 Inside #3<br>Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf<br>Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf<br>8.48' x 30.79' Core + 6.66' Border = 21.79' x 44.10' System |
| #5B | 237.00' | 0 cf | **64.19'W x 44.10'L x 4.50'H Field C**<br>12,739 cf Overall - 12,739 cf Embedded = 0 cf x 40.0% Voids |
| #6B | 237.00' | 10,016 cf | **StormTrap SingleTrap 4-0** x 12 Inside #5<br>Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf<br>Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf<br>12 Chambers in 6 Rows<br>50.88' x 30.79' Core + 6.66' Border = 64.19' x 44.10' System |
| | | 25,984 cf | Total Available Storage |

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

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 239.60' | **5.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Primary | 237.50' | **24.0" Round Culvert**<br>L= 220.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 237.50' / 234.00' S= 0.0159 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf |

**Primary OutFlow** Max=15.09 cfs @ 12.12 hrs HW=240.57' TW=0.00' (Dynamic Tailwater)
↑—**2=Culvert** (Passes 15.09 cfs of 19.22 cfs potential flow)
↑—**1=Sharp-Crested Rectangular Weir** (Weir Controls 15.09 cfs @ 3.23 fps)

## Pond IS4: - Chamber Wizard Field A

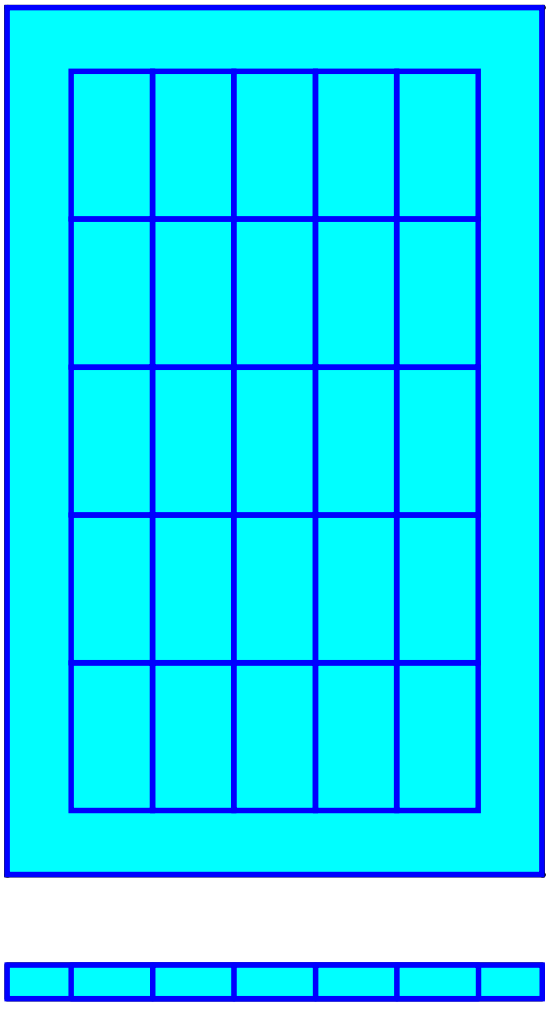
**Chamber Model = StormTrap SingleTrap 3-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf
Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf

5 Chambers/Row x 15.40' Long = 76.98' Row Length +79.9" Border x 2 = 90.29' Base Length
5 Rows x 101.7" Wide + 79.9" Side Border x 2 = 55.71' Base Width
42.0" Chamber Height = 3.50' Field Height

25 Chambers x 354.0 cf + 4,590.6 cf Border = 13,440.4 cf Chamber Storage
25 Chambers x 456.9 cf + 6,182.4 cf Border = 17,605.0 cf Displacement

Chamber Storage = 13,440.4 cf = 0.309 af
Overall Storage Efficiency = 76.3%
Overall System Size = 90.29' x 55.71' x 3.50'

25 Chambers (plus border)
652.0 cy Field



## Pond IS4: - Chamber Wizard Field B

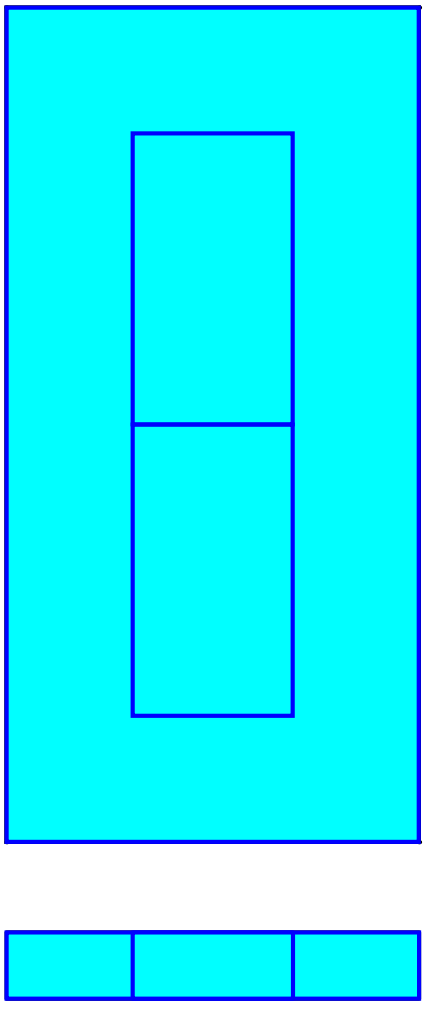
**Chamber Model = StormTrap SingleTrap 3-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 36.0"H => 22.99 sf x 15.40'L = 354.0 cf
Outside= 101.7"W x 42.0"H => 29.68 sf x 15.40'L = 456.9 cf

2 Chambers/Row x 15.40' Long = 30.79' Row Length +79.9" Border x 2 = 44.10' 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

2 Chambers x 354.0 cf + 1,819.2 cf Border = 2,527.2 cf Chamber Storage
2 Chambers x 456.9 cf + 2,450.1 cf Border = 3,363.9 cf Displacement

Chamber Storage = 2,527.2 cf = 0.058 af
Overall Storage Efficiency = 75.1%
Overall System Size = 44.10' x 21.79' x 3.50'

2 Chambers (plus border)
124.6 cy Field



## Pond IS4: - Chamber Wizard Field C

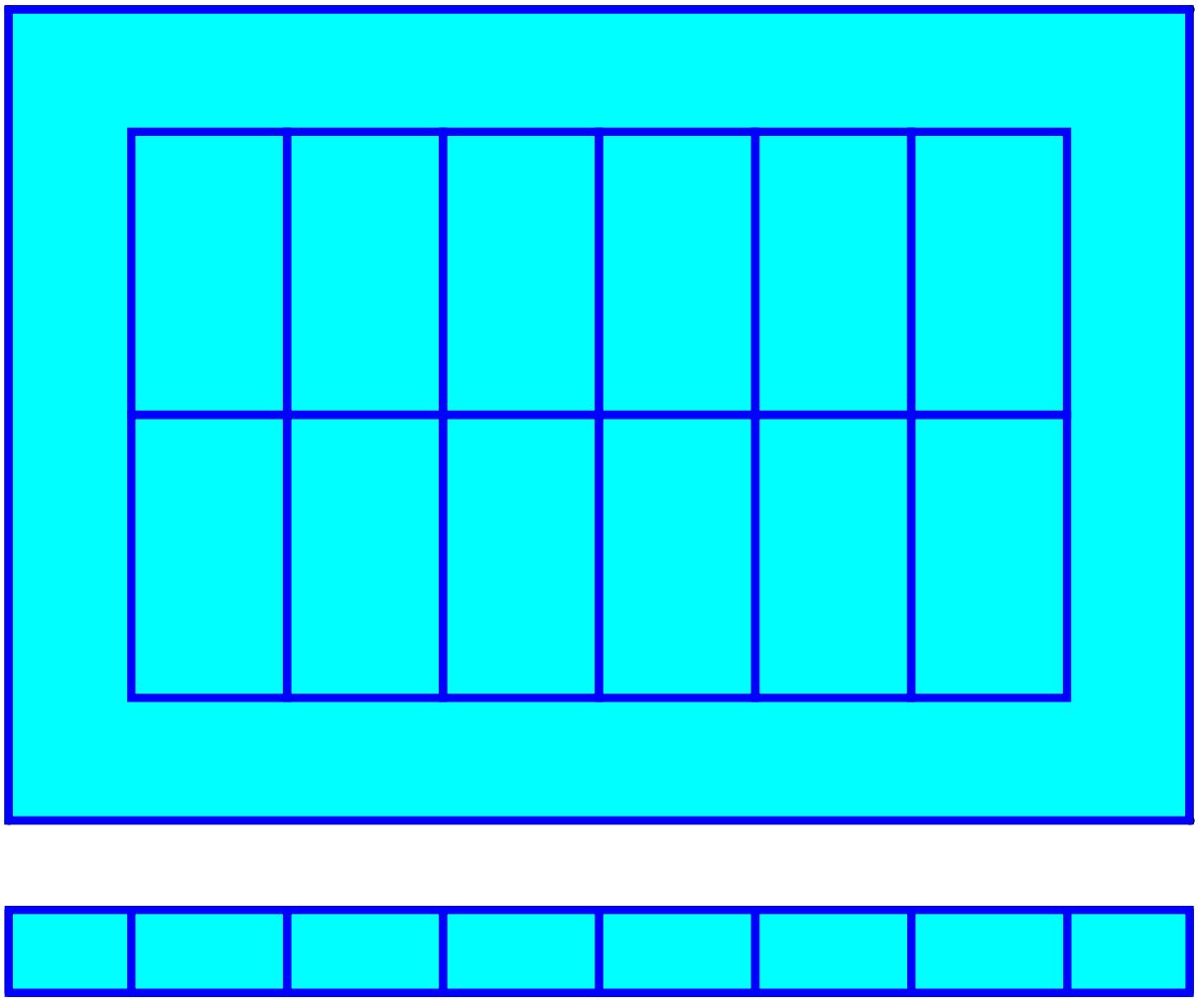
**Chamber Model = StormTrap SingleTrap 4-0 (StormTrap SingleTrap® Type II+IV)**
Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf
Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf

2 Chambers/Row x 15.40' Long = 30.79' Row Length +79.9" Border x 2 = 44.10' Base Length
6 Rows x 101.7" Wide + 79.9" Side Border x 2 = 64.19' Base Width
54.0" Chamber Height = 4.50' Field Height

12 Chambers x 470.3 cf + 4,372.7 cf Border = 10,016.0 cf Chamber Storage
12 Chambers x 587.4 cf + 5,689.8 cf Border = 12,739.2 cf Displacement

Chamber Storage = 10,016.0 cf = 0.230 af
Overall Storage Efficiency = 78.6%
Overall System Size = 44.10' x 64.19' x 4.50'

12 Chambers (plus border)
471.8 cy Field



## Summary for Pond IS7:

Inflow Area = 1.264 ac, 89.98% Impervious, Inflow Depth = 10.23" for 100-Year event
Inflow = 13.14 cfs @ 12.08 hrs, Volume= 1.078 af
Outflow = 5.64 cfs @ 12.27 hrs, Volume= 0.956 af, Atten= 57%, Lag= 11.2 min
Primary = 5.64 cfs @ 12.27 hrs, Volume= 0.956 af
Routed to Link DP1 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 255.45' @ 12.27 hrs Surf.Area= 4,083 sf Storage= 12,659 cf

Plug-Flow detention time= 117.6 min calculated for 0.956 af (89% of inflow)
Center-of-Mass det. time= 62.9 min ( 805.3 - 742.4 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1A | 250.00' | 1,738 cf | **47.25'W x 37.50'L x 4.00'H Field A**<br>7,088 cf Overall - 2,742 cf Embedded = 4,346 cf x 40.0% Voids |
| #2A | 250.50' | 2,742 cf | **Cultec R-360HD** x 72 Inside #1<br>Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf<br>Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap<br>72 Chambers in 8 Rows<br>Cap Storage= 6.5 cf x 2 x 8 rows = 103.4 cf |
| #3B | 249.75' | 3,372 cf | **59.25'W x 39.00'L x 5.75'H Field B**<br>13,287 cf Overall - 4,856 cf Embedded = 8,431 cf x 40.0% Voids |
| #4B | 250.50' | 4,856 cf | **Cultec R-902HD v2** x 72 Inside #3<br>Effective Size= 69.1"W x 48.0"H => 17.30 sf x 3.67'L = 63.4 cf<br>Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap<br>72 Chambers in 8 Rows<br>Cap Storage= 18.0 cf x 2 x 8 rows = 288.3 cf |
| | | 12,708 cf | Total Available Storage |

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

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 2 | 251.80' | **4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) |
| #2 | Primary | 251.00' | **12.0" Round Culvert**<br>L= 210.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 251.00' / 247.80' S= 0.0152 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf |

**Primary OutFlow** Max=5.64 cfs @ 12.27 hrs HW=255.45' TW=0.00' (Dynamic Tailwater)
↑**2=Culvert** (Barrel Controls 5.64 cfs @ 7.18 fps)
↑**1=Sharp-Crested Rectangular Weir** (Passes 5.64 cfs of 74.47 cfs potential flow)

## Pond IS7: - Chamber Wizard Field A

**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**
Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf
Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap
Cap Storage= 6.5 cf x 2 x 8 rows = 103.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

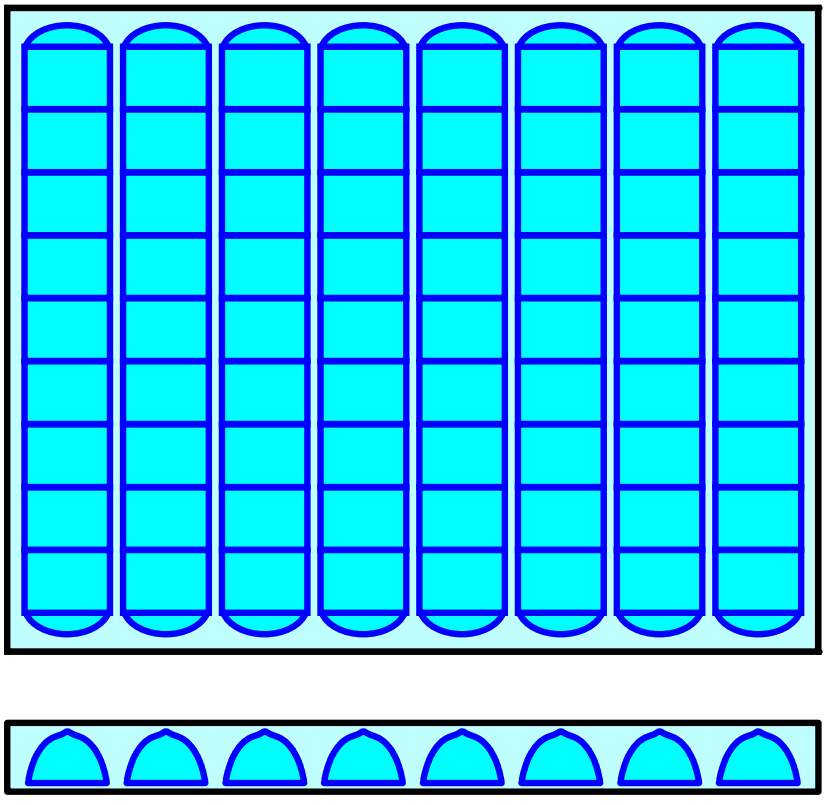
9 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 35.50' Row Length +12.0" End Stone x 2 = 37.50' Base Length
8 Rows x 60.0" Wide + 9.0" Spacing x 7 + 12.0" Side Stone x 2 = 47.25' Base Width
6.0" Stone Base + 36.0" Chamber Height + 6.0" Stone Cover = 4.00' Field Height

72 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 8 Rows = 2,741.8 cf Chamber Storage

7,087.5 cf Field - 2,741.8 cf Chambers = 4,345.7 cf Stone x 40.0% Voids = 1,738.3 cf Stone Storage

Chamber Storage + Stone Storage = 4,480.1 cf = 0.103 af
Overall Storage Efficiency = 63.2%
Overall System Size = 37.50' x 47.25' x 4.00'

72 Chambers
262.5 cy Field
161.0 cy Stone



## Pond IS7: - Chamber Wizard Field B

**Chamber Model = Cultec R-902HD v2 (Cultec Recharger® 902HD v2)**
Effective Size= 69.1"W x 48.0"H => 17.30 sf x 3.67'L = 63.4 cf
Overall Size= 78.0"W x 48.0"H x 4.10'L with 0.44' Overlap
Cap Storage= 18.0 cf x 2 x 8 rows = 288.3 cf

78.0" Wide + 9.0" Spacing = 87.0" C-C Row Spacing

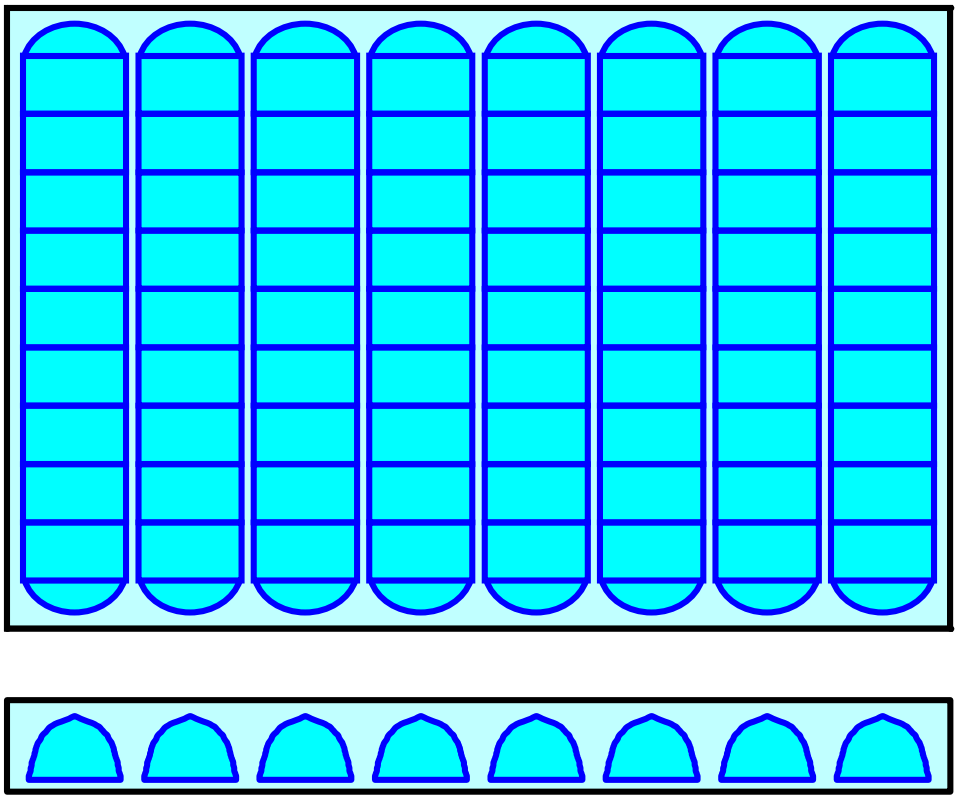
9 Chambers/Row x 3.67' Long +2.00' Cap Length x 2 = 37.00' Row Length +12.0" End Stone x 2 = 39.00' Base Length
8 Rows x 78.0" Wide + 9.0" Spacing x 7 + 12.0" Side Stone x 2 = 59.25' Base Width
9.0" Stone Base + 48.0" Chamber Height + 12.0" Stone Cover = 5.75' Field Height

72 Chambers x 63.4 cf + 18.0 cf Cap Volume x 2 x 8 Rows = 4,856.2 cf Chamber Storage

13,286.8 cf Field - 4,856.2 cf Chambers = 8,430.6 cf Stone x 40.0% Voids = 3,372.3 cf Stone Storage

Chamber Storage + Stone Storage = 8,228.4 cf = 0.189 af
Overall Storage Efficiency = 61.9%
Overall System Size = 39.00' x 59.25' x 5.75'

72 Chambers
492.1 cy Field
312.2 cy Stone



## Summary for Pond IS8:

Inflow Area = 0.809 ac, 89.10% Impervious, Inflow Depth = 10.21" for 100-Year event
Inflow = 8.40 cfs @ 12.08 hrs, Volume= 0.688 af
Outflow = 4.12 cfs @ 12.23 hrs, Volume= 0.571 af, Atten= 51%, Lag= 8.7 min
Primary = 4.12 cfs @ 12.23 hrs, Volume= 0.571 af
Routed to Link DP5 :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 256.56' @ 12.23 hrs Surf.Area= 4,445 sf Storage= 14,610 cf

Plug-Flow detention time= 278.0 min calculated for 0.571 af (83% of inflow)
Center-of-Mass det. time= 206.7 min ( 949.5 - 742.8 )

| Volume | Invert | Avail.Storage | Storage Description |
|---|---|---|---|
| #1 | 252.00' | 16,620 cf | **Custom Stage Data (Prismatic)** Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---|---|---|---|
| 252.00 | 2,060 | 0 | 0 |
| 253.00 | 2,530 | 2,295 | 2,295 |
| 254.00 | 3,030 | 2,780 | 5,075 |
| 255.00 | 3,560 | 3,295 | 8,370 |
| 256.00 | 4,120 | 3,840 | 12,210 |
| 257.00 | 4,700 | 4,410 | 16,620 |

| Device | Routing | Invert | Outlet Devices |
|---|---|---|---|
| #1 | Device 3 | 256.30' | **2.5" x 2.5" Horiz. Grate X 6.00 columns**<br>X 6 rows C= 0.600 in 24.0" x 24.0" Grate (39% open area)<br>Limited to weir flow at low heads |
| #2 | Device 3 | 254.00' | **4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads |
| #3 | Primary | 252.40' | **18.0" Round Culvert**<br>L= 10.0' CPP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 252.40' / 252.00' S= 0.0400 '/' Cc= 0.900<br>n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf |

**Primary OutFlow** Max=4.12 cfs @ 12.23 hrs HW=256.56' TW=0.00' (Dynamic Tailwater)
└─**3=Culvert** (Passes 4.12 cfs of 13.86 cfs potential flow)
  ├─**1=Grate** (Weir Controls 3.47 cfs @ 1.67 fps)
  └─**2=Orifice/Grate** (Orifice Controls 0.65 cfs @ 7.45 fps)

## Summary for Link DP1:

Inflow Area = 1.519 ac, 80.37% Impervious, Inflow Depth = 9.04" for 100-Year event
Inflow = 7.30 cfs @ 12.10 hrs, Volume= 1.144 af
Primary = 7.30 cfs @ 12.10 hrs, Volume= 1.144 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP2:

Inflow Area = 3.412 ac, 70.15% Impervious, Inflow Depth = 8.40" for 100-Year event
Inflow = 21.53 cfs @ 12.16 hrs, Volume= 2.388 af
Primary = 21.53 cfs @ 12.16 hrs, Volume= 2.388 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP3:

Inflow Area = 1.003 ac, 45.12% Impervious, Inflow Depth = 8.23" for 100-Year event
Inflow = 8.20 cfs @ 12.11 hrs, Volume= 0.688 af
Primary = 8.20 cfs @ 12.11 hrs, Volume= 0.688 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP4:

Inflow Area = 4.922 ac, 74.55% Impervious, Inflow Depth = 8.05" for 100-Year event
Inflow = 24.96 cfs @ 12.12 hrs, Volume= 3.303 af
Primary = 24.96 cfs @ 12.12 hrs, Volume= 3.303 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## Summary for Link DP5:

Inflow Area = 1.202 ac, 60.17% Impervious, Inflow Depth = 8.30" for 100-Year event
Inflow = 6.02 cfs @ 12.20 hrs, Volume= 0.831 af
Primary = 6.02 cfs @ 12.20 hrs, Volume= 0.831 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

## APPENDIX F: STORMWATER CALCULATIONS

- *NOAA+ RAINFALL DATA*
- *MA STANDARD #3 – RECHARGE AND DRAWDOWN TIME*
- *MA STANDARD #4 – WATER QUALITY AND TSS REMOVAL*
- *FOREBAY SIZING*
- *TOTAL PHOSPHOROUS REMOVAL CALCULATIONS*
- *TECHNOLOGY VERIFICATION SHEETS*

**NOAA Atlas 14, Volume 10, Version 3**
**Location name: Medway, Massachusetts, USA***
**Latitude: 42.1494°, Longitude: -71.4162°**
**Elevation: 250 ft****
* source: ESRI Maps
** source: USGS

**POINT PRECIPITATION FREQUENCY ESTIMATES**

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

## PF tabular

**PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]**

| Duration | Average recurrence interval (years) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 5 | 10 | 25 | 50 | 100 | 200 | 500 | 1000 |
| 5-min | 0.328 (0.251-0.427) | 0.396 (0.303-0.517) | 0.508 (0.387-0.663) | 0.600 (0.455-0.789) | 0.728 (0.536-1.00) | 0.824 (0.596-1.16) | 0.925 (0.651-1.34) | 1.04 (0.695-1.54) | 1.19 (0.773-1.84) | 1.32 (0.836-2.08) |
| 10-min | 0.465 (0.356-0.605) | 0.561 (0.429-0.732) | 0.719 (0.548-0.940) | 0.851 (0.645-1.12) | 1.03 (0.760-1.42) | 1.17 (0.844-1.64) | 1.31 (0.922-1.90) | 1.47 (0.983-2.18) | 1.69 (1.09-2.60) | 1.87 (1.18-2.94) |
| 15-min | 0.547 (0.419-0.712) | 0.661 (0.505-0.861) | 0.847 (0.646-1.11) | 1.00 (0.759-1.32) | 1.21 (0.894-1.67) | 1.37 (0.994-1.93) | 1.54 (1.08-2.24) | 1.73 (1.16-2.57) | 1.99 (1.29-3.06) | 2.20 (1.39-3.46) |
| 30-min | 0.748 (0.573-0.974) | 0.905 (0.692-1.18) | 1.16 (0.886-1.52) | 1.37 (1.04-1.81) | 1.66 (1.23-2.28) | 1.88 (1.36-2.64) | 2.11 (1.49-3.07) | 2.37 (1.59-3.52) | 2.73 (1.76-4.20) | 3.02 (1.91-4.74) |
| 60-min | 0.950 (0.727-1.24) | 1.15 (0.879-1.50) | 1.47 (1.12-1.93) | 1.74 (1.32-2.29) | 2.12 (1.56-2.90) | 2.40 (1.73-3.36) | 2.69 (1.89-3.90) | 3.01 (2.02-4.48) | 3.47 (2.24-5.34) | 3.84 (2.43-6.02) |
| 2-hr | 1.22 (0.939-1.58) | 1.48 (1.14-1.92) | 1.91 (1.46-2.48) | 2.26 (1.72-2.96) | 2.75 (2.04-3.77) | 3.11 (2.27-4.36) | 3.50 (2.50-5.11) | 3.96 (2.66-5.87) | 4.66 (3.02-7.14) | 5.25 (3.33-8.20) |
| 3-hr | 1.41 (1.09-1.82) | 1.72 (1.32-2.22) | 2.22 (1.70-2.87) | 2.63 (2.01-3.42) | 3.20 (2.38-4.37) | 3.62 (2.65-5.06) | 4.07 (2.92-5.95) | 4.63 (3.12-6.83) | 5.49 (3.56-8.37) | 6.23 (3.96-9.68) |
| 6-hr | 1.81 (1.40-2.32) | 2 (1.7 | 2.84 (2.19-3.66) | 3 (2.5 | 4 (3.0 | 4.64 (3.42-6.47) | (3.1 | 5.97 (03-8.75) | 7.11 (4.63-10.8) | 8.10 (5.16-12.5) |
| 12-hr | 2.29 (1.78-2.91) | 2.79 (2.17-3.55) | 3.60 (2.80-4.61) | 4.28 (3.30-5.50) | 5.21 (3.92-7.04) | 5.90 (4.36-8.16) | 6.64 (4.81-9.60) | 7.57 (5.13-11.0) | 9.00 (5.88-13.6) | 10.2 (6.55-15.7) |
| 24-hr | 2.74 (2.14-3.46) | 3.37 (2.64-4.27) | 4.41 (3.44-5.60) | 5.27 (4.08-6.73) | 6.45 (4.88-8.68) | 7.32 (5.44-10.1) | 8.28 (6.03-11.9) | 9.47 (6.44-13.7) | 11.3 (7.43-17.0) | 13.0 (8.32-19.8) |
| 2-day | 3.11 (2.44-3.90) | 3.89 (3.06-4.90) | 5.18 (4.05-6.53) | 6.24 (4.86-7.92) | 7.70 (5.86-10.3) | 8.78 (6.57-12.1) | 9.96 (7.32-14.4) | 11.5 (7.84-16.6) | 14.0 (9.17-20.8) | 16.1 (10.4-24.5) |
| 3-day | 3.39 (2.68-4.25) | 4.24 (3.34-5.31) | 5.62 (4.42-7.07) | 6.77 (5.29-8.56) | 8.35 (6.36-11.1) | 9.50 (7.13-13.0) | 10.8 (7.94-15.5) | 12.4 (8.50-17.8) | 15.1 (9.95-22.4) | 17.5 (11.3-26.4) |
| 4-day | 3.66 (2.90-4.57) | 4.54 (3.58-5.67) | 5.97 (4.70-7.49) | 7.16 (5.60-9.03) | 8.80 (6.72-11.7) | 9.99 (7.51-13.6) | 11.3 (8.35-16.2) | 13.0 (8.92-18.6) | 15.8 (10.4-23.3) | 18.2 (11.7-27.4) |
| 7-day | 4.41 (3.50-5.48) | 5.33 (4.23-6.63) | 6.85 (5.41-8.54) | 8.10 (6.37-10.2) | 9.83 (7.53-13.0) | 11.1 (8.35-15.0) | 12.5 (9.20-17.7) | 14.2 (9.79-20.3) | 17.0 (11.2-25.0) | 19.4 (12.5-29.1) |
| 10-day | 5.12 (4.07-6.34) | 6.08 (4.83-7.53) | 7.64 (6.05-9.50) | 8.93 (7.04-11.2) | 10.7 (8.21-14.1) | 12.0 (9.06-16.2) | 13.5 (9.89-18.9) | 15.2 (10.5-21.6) | 17.9 (11.9-26.2) | 20.2 (13.1-30.2) |
| 20-day | 7.23 (5.78-8.89) | 8.25 (6.59-10.2) | 9.92 (7.90-12.3) | 11.3 (8.95-14.0) | 13.2 (10.1-17.1) | 14.7 (11.0-19.4) | 16.2 (11.8-22.1) | 17.8 (12.4-25.1) | 20.2 (13.5-29.4) | 22.2 (14.4-33.0) |
| 30-day | 8.97 (7.20-11.0) | 10.0 (8.04-12.3) | 11.8 (9.41-14.5) | 13.2 (10.5-16.4) | 15.2 (11.7-19.6) | 16.8 (12.6-21.9) | 18.3 (13.3-24.8) | 19.9 (13.8-27.8) | 22.1 (14.8-32.0) | 23.8 (15.5-35.2) |
| 45-day | 11.1 (8.96-13.6) | 12.3 (9.85-15.0) | 14.1 (11.3-17.3) | 15.6 (12.4-19.2) | 17.7 (13.6-22.5) | 19.3 (14.5-25.1) | 20.9 (15.1-27.9) | 22.4 (15.6-31.2) | 24.3 (16.3-35.1) | 25.7 (16.8-37.9) |
| 60-day | 13.0 (10.4-15.8) | 14.1 (11.4-17.2) | 16.0 (12.8-19.5) | 17.6 (14.0-21.6) | 19.7 (15.2-25.0) | 21.4 (16.1-27.7) | 23.0 (16.6-30.6) | 24.5 (17.1-33.9) | 26.2 (17.6-37.6) | 27.3 (17.9-40.2) |

3.84 6.06 7.81 10.71

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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## PF graphical

**Heritage on Main**
**107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St**
**Medway, MA**
**Bohler Job Number: W211301**
**September 28, 2026**

## MA DEP Standard 3: Recharge Volume Calculations

| | |
|---|---|
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| **Required Recharge Volume - Municipal Standards (1.0 in.)** | |
|---|---|
| Proposed Site Impervious Area (ac) | 8.460 |
| **Recharge Volume Required (cf)** | **30,708** |
| | |

| | |
|---|---|
| **Total Recharge Volume Required (cf)** | **30,708** |

| **Recharge Volume Adjustment Factor** | |
|---|---|
| Impervious Area Directed to Infiltration BMP (ac) | **7.071** |
| %Impervious Directed to Infiltration BMP | 84% |
| Adjustment Factor | 1.20 |
| **Adjusted Total Recharge Volume Required (cf)** | **36,739** |

| **Provided Recharge Volume*** | |
|---|---|
| IS-1 | 2,084 |
| IS-2 | 12,691 |
| IS-3 | 1,797 |
| IS-4 | 19,566 |
| IS-7 | 5,303 |
| IS-8 | 5,075 |
| | |
| | |
| | |
| | |
| | |
| **Total Recharge Volume Provided (cf)** | **46,516** |

**Provided greater than or Equal to Required**

*Volume provided below lowest outlet in cubic feet (cf)

Prepared By:
BOHLER
352 Turnpike Road
Southborough, MA 01772
(508) 480-9900

**Heritage on Main**
**107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St**
**Medway, MA**
**Bohler Job Number: W211301**
**September 28, 2026**

## MA DEP Standard 3: Drawdown Time Calculations

| **Drawdown Time - IS-1** | |
|---|---|
| Volume below outlet pipe (Rv) (cf) | 2,084 |
| Soil Type | Loamy Sand - B |
| Infiltration rate (K)* | 1.02 |
| Bottom Area (sf) | 710 |
| **Drawdown time (Hours)*** | **34.5** |
| | |
| **Drawdown Time - IS-2** | |
| Volume below outlet pipe (Rv) (cf) | 12,691 |
| Soil Type | Loamy Sand - B |
| Infiltration rate (K)* | 1.02 |
| Bottom Area (sf) | 6,613 |
| **Drawdown time (Hours)**** | **22.6** |
| | |
| **Drawdown Time - IS-3** | |
| Volume below outlet pipe (Rv) (cf) | 1,797 |
| Soil Type | Loamy Sand - B |
| Infiltration rate (K)* | 1.02 |
| Bottom Area (sf) | 1,033 |
| **Drawdown time (Hours)**** | **20.5** |
| | |
| **Drawdown Time - IS-4** | |
| Volume below outlet pipe (Rv) (cf) | 19,566 |
| Soil Type | Loamy Sand - B |
| Infiltration rate (K)* | 1.02 |
| Bottom Area (sf) | 8,822 |
| **Drawdown time (Hours)**** | **26.1** |
| | |
| **Drawdown Time - IS-7** | |
| Volume below outlet pipe (Rv) (cf) | 5,303 |
| Soil Type | Loamy Sand - B |
| Infiltration rate (K)* | 1.02 |
| Bottom Area (sf) | 4,410 |
| **Drawdown time (Hours)**** | **14.1** |

| **Drawdown Time - IS-8** | |
|---|---|
| Volume below outlet pipe (Rv) (cf) | 5,075 |
| Soil Type | Loamy Sand - B |
| Infiltration rate (K)* | 1.02 |
| Bottom Area (sf) | 2,060 |
| **Drawdown time (Hours)**** | **29.0** |

*Infiltration Rates taken from Rawls Table
**Drawdown time = Rv / (K) x (bottom area)

Prepared By:
BOHLER
352 Turnpike Road
Southborough, MA 01772
(508) 480-9900

**Heritage on Main**
**107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St**
**Medway, MA**
**Bohler Job Number: W211301**
**September 28, 2026**

## MA DEP Standard 4: Water Quality Volume Calculations

| **Water Quality Volume Required** | |
|---|---|
| Water Quality Volume runoff (in.)* | 1.0 |
| Total Post Development Impervious Area (sf) | 368,500 |
| **Required Water Quality Volume (cf)** | **30,708** |
| *Water Quality volume runoff is equal to 1.0 inches of runoff times the total impervious area of the post development project site. | |

| **Water Quality Volume Provided*** | |
|---|---|
| IS-1 | 2,084 |
| IS-2 | 12,691 |
| IS-3 | 1,797 |
| IS-4 | 19,566 |
| IS-7 | 5,303 |
| IS-8 | 5,075 |
| | |
| | |
| | |
| | |
| | |
| **Total Provided Water Quality Volume (cf)** | **46,516** |

**Required Recharge Provided**

*Volume provided below lowest outlet pipe in cubic feet (cf)

Prepared By:
BOHLER
352 Turnpike Road
Southborough, MA 01772
(508) 480-9900

## Stage-Area-Storage for Pond IS1:

| Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) |
|---|---|---|
| 231.00 | 710 | 0 |
| 231.05 | 740 | 36 |
| 231.10 | 770 | 74 |
| 231.15 | 800 | 113 |
| 231.20 | 830 | 154 |
| 231.25 | 860 | 196 |
| 231.30 | 890 | 240 |
| 231.35 | 920 | 285 |
| 231.40 | 950 | 332 |
| 231.45 | 980 | 380 |
| 231.50 | 1,010 | 430 |
| 231.55 | 1,040 | 481 |
| 231.60 | 1,070 | 534 |
| 231.65 | 1,100 | 588 |
| 231.70 | 1,130 | 644 |
| 231.75 | 1,160 | 701 |
| 231.80 | 1,190 | 760 |
| 231.85 | 1,220 | 820 |
| 231.90 | 1,250 | 882 |
| 231.95 | 1,280 | 945 |
| 232.00 | 1,310 | 1,010 |
| 232.05 | 1,342 | 1,076 |
| 232.10 | 1,374 | 1,144 |
| 232.15 | 1,406 | 1,214 |
| 232.20 | 1,438 | 1,285 |
| 232.25 | 1,470 | 1,358 |
| 232.30 | 1,502 | 1,432 |
| 232.35 | 1,534 | 1,508 |
| 232.40 | 1,566 | 1,585 |
| 232.45 | 1,598 | 1,664 |
| 232.50 | 1,630 | 1,745 |
| 232.55 | 1,662 | 1,827 |
| 232.60 | 1,694 | 1,911 |
| 232.65 | 1,726 | 1,997 |
| 232.70 | 1,758 | 2,084 |
| 232.75 | 1,790 | 2,173 |
| 232.80 | 1,822 | 2,263 |
| 232.85 | 1,854 | 2,355 |
| 232.90 | 1,886 | 2,448 |
| 232.95 | 1,918 | 2,543 |
| 233.00 | 1,950 | 2,640 |
| 233.05 | 1,985 | 2,738 |
| 233.10 | 2,020 | 2,838 |
| 233.15 | 2,055 | 2,940 |
| 233.20 | 2,090 | 3,044 |
| 233.25 | 2,125 | 3,149 |
| 233.30 | 2,160 | 3,257 |
| 233.35 | 2,195 | 3,365 |
| 233.40 | 2,230 | 3,476 |
| 233.45 | 2,265 | 3,588 |
| 233.50 | 2,300 | 3,703 |
| 233.55 | 2,335 | 3,818 |
| 233.60 | 2,370 | 3,936 |
| 233.65 | 2,405 | 4,055 |
| 233.70 | 2,440 | 4,176 |
| 233.75 | 2,475 | 4,299 |
| 233.80 | 2,510 | 4,424 |
| 233.85 | 2,545 | 4,550 |
| 233.90 | 2,580 | 4,679 |
| 233.95 | 2,615 | 4,808 |
| 234.00 | **2,650** | **4,940** |

## Stage-Area-Storage for Pond IS2:

| Elevation (feet) | Storage (cubic-feet) | Elevation (feet) | Storage (cubic-feet) | Elevation (feet) | Storage (cubic-feet) |
|---|---|---|---|---|---|
| 233.00 | 0 | 235.60 | 16,498 | 238.20 | 31,728 |
| 233.05 | 317 | 235.65 | 16,816 | 238.25 | 31,728 |
| 233.10 | 635 | 235.70 | 17,133 | 238.30 | 31,728 |
| 233.15 | 952 | 235.75 | 17,450 | 238.35 | 31,728 |
| 233.20 | 1,269 | 235.80 | 17,768 | 238.40 | 31,728 |
| 233.25 | 1,586 | 235.85 | 18,085 | 238.45 | 31,728 |
| 233.30 | 1,904 | 235.90 | 18,402 | 238.50 | 31,728 |
| 233.35 | 2,221 | 235.95 | 18,719 | | |
| 233.40 | 2,538 | 236.00 | 19,037 | | |
| 233.45 | 2,855 | 236.05 | 19,354 | | |
| 233.50 | 3,173 | 236.10 | 19,671 | | |
| 233.55 | 3,490 | 236.15 | 19,988 | | |
| 233.60 | 3,807 | 236.20 | 20,306 | | |
| 233.65 | 4,125 | 236.25 | 20,623 | | |
| 233.70 | 4,442 | 236.30 | 20,940 | | |
| 233.75 | 4,759 | 236.35 | 21,258 | | |
| 233.80 | 5,076 | 236.40 | 21,575 | | |
| 233.85 | 5,394 | 236.45 | 21,892 | | |
| 233.90 | 5,711 | 236.50 | 22,209 | | |
| 233.95 | 6,028 | 236.55 | 22,527 | | |
| 234.00 | 6,346 | 236.60 | 22,844 | | |
| 234.05 | 6,663 | 236.65 | 23,161 | | |
| 234.10 | 6,980 | 236.70 | 23,479 | | |
| 234.15 | 7,297 | 236.75 | 23,796 | | |
| 234.20 | 7,615 | 236.80 | 24,113 | | |
| 234.25 | 7,932 | 236.85 | 24,430 | | |
| 234.30 | 8,249 | 236.90 | 24,748 | | |
| 234.35 | 8,566 | 236.95 | 25,065 | | |
| 234.40 | 8,884 | 237.00 | 25,382 | | |
| 234.45 | 9,201 | 237.05 | 25,699 | | |
| 234.50 | 9,518 | 237.10 | 26,017 | | |
| 234.55 | 9,836 | 237.15 | 26,334 | | |
| 234.60 | 10,153 | 237.20 | 26,651 | | |
| 234.65 | 10,470 | 237.25 | 26,969 | | |
| 234.70 | 10,787 | 237.30 | 27,286 | | |
| 234.75 | 11,105 | 237.35 | 27,603 | | |
| 234.80 | 11,422 | 237.40 | 27,920 | | |
| 234.85 | 11,739 | 237.45 | 28,238 | | |
| 234.90 | 12,057 | 237.50 | 28,555 | | |
| 234.95 | 12,374 | 237.55 | 28,872 | | |
| 235.00 | 12,691 | 237.60 | 29,190 | | |
| 235.05 | 13,008 | 237.65 | 29,507 | | |
| 235.10 | 13,326 | 237.70 | 29,824 | | |
| 235.15 | 13,643 | 237.75 | 30,141 | | |
| 235.20 | 13,960 | 237.80 | 30,459 | | |
| 235.25 | 14,277 | 237.85 | 30,776 | | |
| 235.30 | 14,595 | 237.90 | 31,093 | | |
| 235.35 | 14,912 | 237.95 | 31,410 | | |
| 235.40 | 15,229 | 238.00 | **31,728** | | |
| 235.45 | 15,547 | 238.05 | 31,728 | | |
| 235.50 | 15,864 | 238.10 | 31,728 | | |
| 235.55 | 16,181 | 238.15 | 31,728 | | |

## Stage-Area-Storage for Pond IS3:

| Elevation (feet) | Storage (cubic-feet) |
|---|---|
| 226.50 | 0 |
| 226.55 | 21 |
| 226.60 | 41 |
| 226.65 | 62 |
| 226.70 | 83 |
| 226.75 | 103 |
| 226.80 | 124 |
| 226.85 | 145 |
| 226.90 | 165 |
| 226.95 | 186 |
| 227.00 | 207 |
| 227.05 | 249 |
| 227.10 | 291 |
| 227.15 | 333 |
| 227.20 | 375 |
| 227.25 | 417 |
| 227.30 | 459 |
| 227.35 | 501 |
| 227.40 | 543 |
| 227.45 | 585 |
| 227.50 | 626 |
| 227.55 | 668 |
| 227.60 | 709 |
| 227.65 | 750 |
| 227.70 | 791 |
| 227.75 | 832 |
| 227.80 | 873 |
| 227.85 | 914 |
| 227.90 | 954 |
| 227.95 | 995 |
| 228.00 | 1,035 |
| 228.05 | 1,075 |
| 228.10 | 1,115 |
| 228.15 | 1,155 |
| 228.20 | 1,194 |
| 228.25 | 1,233 |
| 228.30 | 1,273 |
| 228.35 | 1,312 |
| 228.40 | 1,350 |
| 228.45 | 1,389 |
| 228.50 | 1,427 |
| 228.55 | 1,466 |
| 228.60 | 1,504 |
| 228.65 | 1,541 |
| 228.70 | 1,579 |
| 228.75 | 1,616 |
| 228.80 | 1,653 |
| 228.85 | 1,689 |
| 228.90 | 1,726 |
| 228.95 | 1,762 |
| 229.00 | 1,797 |
| 229.05 | 1,833 |
| 229.10 | 1,868 |
| 229.15 | 1,902 |
| 229.20 | 1,937 |
| 229.25 | 1,970 |
| 229.30 | 2,004 |
| 229.35 | 2,037 |
| 229.40 | 2,069 |
| 229.45 | 2,101 |
| 229.50 | 2,132 |
| 229.55 | 2,163 |
| 229.60 | 2,192 |
| 229.65 | 2,221 |
| 229.70 | 2,249 |
| 229.75 | 2,276 |
| 229.80 | 2,301 |
| 229.85 | 2,325 |
| 229.90 | 2,349 |
| 229.95 | 2,371 |
| 230.00 | 2,393 |
| 230.05 | 2,413 |
| 230.10 | 2,434 |
| 230.15 | 2,455 |
| 230.20 | 2,475 |
| 230.25 | 2,496 |
| 230.30 | 2,517 |
| 230.35 | 2,537 |
| 230.40 | 2,558 |
| 230.45 | 2,579 |
| 230.50 | **2,599** |

## Stage-Area-Storage for Pond IS4:

| Elevation (feet) | Storage (cubic-feet) |
|---|---|
| 237.00 | 0 |
| 237.05 | 391 |
| 237.10 | 783 |
| 237.15 | 1,174 |
| 237.20 | 1,565 |
| 237.25 | 1,957 |
| 237.30 | 2,348 |
| 237.35 | 2,739 |
| 237.40 | 3,131 |
| 237.45 | 3,522 |
| 237.50 | 3,913 |
| 237.55 | 4,305 |
| 237.60 | 4,696 |
| 237.65 | 5,087 |
| 237.70 | 5,479 |
| 237.75 | 5,870 |
| 237.80 | 6,261 |
| 237.85 | 6,653 |
| 237.90 | 7,044 |
| 237.95 | 7,435 |
| 238.00 | 7,827 |
| 238.05 | 8,218 |
| 238.10 | 8,609 |
| 238.15 | 9,001 |
| 238.20 | 9,392 |
| 238.25 | 9,783 |
| 238.30 | 10,175 |
| 238.35 | 10,566 |
| 238.40 | 10,957 |
| 238.45 | 11,348 |
| 238.50 | 11,740 |
| 238.55 | 12,131 |
| 238.60 | 12,522 |
| 238.65 | 12,914 |
| 238.70 | 13,305 |
| 238.75 | 13,696 |
| 238.80 | 14,088 |
| 238.85 | 14,479 |
| 238.90 | 14,870 |
| 238.95 | 15,262 |
| 239.00 | 15,653 |
| 239.05 | 16,044 |
| 239.10 | 16,436 |
| 239.15 | 16,827 |
| 239.20 | 17,218 |
| 239.25 | 17,610 |
| 239.30 | 18,001 |
| 239.35 | 18,392 |
| 239.40 | 18,784 |
| 239.45 | 19,175 |
| 239.50 | 19,566 |
| 239.55 | 19,958 |
| 239.60 | 20,349 |
| 239.65 | 20,740 |
| 239.70 | 21,132 |
| 239.75 | 21,523 |
| 239.80 | 21,914 |
| 239.85 | 22,306 |
| 239.90 | 22,697 |
| 239.95 | 23,088 |
| 240.00 | 23,480 |
| 240.05 | 23,605 |
| 240.10 | 23,730 |
| 240.15 | 23,855 |
| 240.20 | 23,980 |
| 240.25 | 24,106 |
| 240.30 | 24,231 |
| 240.35 | 24,356 |
| 240.40 | 24,481 |
| 240.45 | 24,606 |
| 240.50 | 24,732 |
| 240.55 | 24,857 |
| 240.60 | 24,982 |
| 240.65 | 25,107 |
| 240.70 | 25,232 |
| 240.75 | 25,358 |
| 240.80 | 25,483 |
| 240.85 | 25,608 |
| 240.90 | 25,733 |
| 240.95 | 25,858 |
| 241.00 | **25,984** |
| 241.05 | **25,984** |
| 241.10 | 25,984 |
| 241.15 | 25,984 |
| 241.20 | 25,984 |
| 241.25 | 25,984 |
| 241.30 | 25,984 |
| 241.35 | 25,984 |
| 241.40 | 25,984 |
| 241.45 | 25,984 |
| 241.50 | 25,984 |

## Stage-Area-Storage for Pond IS7: (continued)

| Elevation (feet) | Storage (cubic-feet) | Elevation (feet) | Storage (cubic-feet) | Elevation (feet) | Storage (cubic-feet) |
|---|---|---|---|---|---|
| 251.31 | 3,730 | 251.83 | 5,397 | 252.35 | 7,000 |
| 251.32 | 3,763 | 251.84 | 5,429 | 252.36 | 7,030 |
| 251.33 | 3,795 | 251.85 | 5,460 | 252.37 | 7,060 |
| 251.34 | 3,828 | 251.86 | 5,492 | 252.38 | 7,090 |
| 251.35 | 3,860 | 251.87 | 5,523 | 252.39 | 7,120 |
| 251.36 | 3,893 | 251.88 | 5,554 | 252.40 | 7,150 |
| 251.37 | 3,925 | 251.89 | 5,586 | 252.41 | 7,180 |
| 251.38 | 3,958 | 251.90 | 5,617 | 252.42 | 7,210 |
| 251.39 | 3,990 | 251.91 | 5,648 | 252.43 | 7,240 |
| 251.40 | 4,022 | 251.92 | 5,680 | 252.44 | 7,270 |
| 251.41 | 4,055 | 251.93 | 5,711 | 252.45 | 7,300 |
| 251.42 | 4,087 | 251.94 | 5,742 | 252.46 | 7,330 |
| 251.43 | 4,119 | 251.95 | 5,773 | 252.47 | 7,359 |
| 251.44 | 4,151 | 251.96 | 5,804 | 252.48 | 7,389 |
| 251.45 | 4,184 | 251.97 | 5,836 | 252.49 | 7,419 |
| 251.46 | 4,216 | 251.98 | 5,867 | 252.50 | 7,449 |
| 251.47 | 4,248 | 251.99 | 5,898 | 252.51 | 7,478 |
| 251.48 | 4,280 | 252.00 | 5,929 | 252.52 | 7,508 |
| 251.49 | 4,313 | 252.01 | 5,960 | 252.53 | 7,538 |
| 251.50 | 4,345 | 252.02 | 5,991 | 252.54 | 7,567 |
| 251.51 | 4,377 | 252.03 | 6,022 | 252.55 | 7,597 |
| 251.52 | 4,409 | 252.04 | 6,053 | 252.56 | 7,626 |
| 251.53 | 4,441 | 252.05 | 6,084 | 252.57 | 7,656 |
| 251.54 | 4,474 | 252.06 | 6,115 | 252.58 | 7,685 |
| 251.55 | 4,506 | 252.07 | 6,145 | 252.59 | 7,714 |
| 251.56 | 4,538 | 252.08 | 6,176 | 252.60 | 7,744 |
| 251.57 | 4,570 | 252.09 | 6,207 | 252.61 | 7,773 |
| 251.58 | 4,602 | 252.10 | 6,238 | 252.62 | 7,802 |
| 251.59 | 4,634 | 252.11 | 6,269 | 252.63 | 7,831 |
| 251.60 | 4,666 | 252.12 | 6,299 | 252.64 | 7,861 |
| 251.61 | 4,698 | 252.13 | 6,330 | 252.65 | 7,890 |
| 251.62 | 4,730 | 252.14 | 6,361 | 252.66 | 7,919 |
| 251.63 | 4,762 | 252.15 | 6,392 | 252.67 | 7,948 |
| 251.64 | 4,794 | 252.16 | 6,422 | 252.68 | 7,977 |
| 251.65 | 4,826 | 252.17 | 6,453 | 252.69 | 8,006 |
| 251.66 | 4,858 | 252.18 | 6,484 | 252.70 | 8,035 |
| 251.67 | 4,890 | 252.19 | 6,514 | 252.71 | 8,064 |
| 251.68 | 4,922 | 252.20 | 6,545 | 252.72 | 8,093 |
| 251.69 | 4,954 | 252.21 | 6,575 | 252.73 | 8,121 |
| 251.70 | 4,986 | 252.22 | 6,606 | 252.74 | 8,150 |
| 251.71 | 5,018 | 252.23 | 6,636 | 252.75 | 8,179 |
| 251.72 | 5,049 | 252.24 | 6,667 | 252.76 | 8,208 |
| 251.73 | 5,081 | 252.25 | 6,697 | 252.77 | 8,236 |
| 251.74 | 5,113 | 252.26 | 6,728 | 252.78 | 8,265 |
| 251.75 | 5,145 | 252.27 | 6,758 | 252.79 | 8,293 |
| 251.76 | 5,176 | 252.28 | 6,788 | 252.80 | 8,322 |
| 251.77 | 5,208 | 252.29 | 6,819 | 252.81 | 8,350 |
| 251.78 | 5,240 | 252.30 | 6,849 | 252.82 | 8,379 |
| 251.79 | 5,271 | 252.31 | 6,879 | 252.83 | 8,407 |
| 251.80 | 5,303 | 252.32 | 6,909 | 252.84 | 8,435 |
| 251.81 | 5,334 | 252.33 | 6,939 | 252.85 | 8,464 |
| 251.82 | 5,366 | 252.34 | 6,970 | 252.86 | 8,492 |

## Stage-Area-Storage for Pond IS8:

| Elevation (feet) | Surface (sq-ft) | Storage (cubic-feet) |
|---|---|---|
| 252.00 | 2,060 | 0 |
| 252.05 | 2,084 | 104 |
| 252.10 | 2,107 | 208 |
| 252.15 | 2,131 | 314 |
| 252.20 | 2,154 | 421 |
| 252.25 | 2,178 | 530 |
| 252.30 | 2,201 | 639 |
| 252.35 | 2,224 | 750 |
| 252.40 | 2,248 | 862 |
| 252.45 | 2,271 | 975 |
| 252.50 | 2,295 | 1,089 |
| 252.55 | 2,319 | 1,204 |
| 252.60 | 2,342 | 1,321 |
| 252.65 | 2,366 | 1,438 |
| 252.70 | 2,389 | 1,557 |
| 252.75 | 2,413 | 1,677 |
| 252.80 | 2,436 | 1,798 |
| 252.85 | 2,459 | 1,921 |
| 252.90 | 2,483 | 2,044 |
| 252.95 | 2,506 | 2,169 |
| 253.00 | 2,530 | 2,295 |
| 253.05 | 2,555 | 2,422 |
| 253.10 | 2,580 | 2,550 |
| 253.15 | 2,605 | 2,680 |
| 253.20 | 2,630 | 2,811 |
| 253.25 | 2,655 | 2,943 |
| 253.30 | 2,680 | 3,077 |
| 253.35 | 2,705 | 3,211 |
| 253.40 | 2,730 | 3,347 |
| 253.45 | 2,755 | 3,484 |
| 253.50 | 2,780 | 3,623 |
| 253.55 | 2,805 | 3,762 |
| 253.60 | 2,830 | 3,903 |
| 253.65 | 2,855 | 4,045 |
| 253.70 | 2,880 | 4,188 |
| 253.75 | 2,905 | 4,333 |
| 253.80 | 2,930 | 4,479 |
| 253.85 | 2,955 | 4,626 |
| 253.90 | 2,980 | 4,775 |
| 253.95 | 3,005 | 4,924 |
| 254.00 | 3,030 | 5,075 |
| 254.05 | 3,057 | 5,227 |
| 254.10 | 3,083 | 5,381 |
| 254.15 | 3,110 | 5,535 |
| 254.20 | 3,136 | 5,692 |
| 254.25 | 3,163 | 5,849 |
| 254.30 | 3,189 | 6,008 |
| 254.35 | 3,215 | 6,168 |
| 254.40 | 3,242 | 6,329 |
| 254.45 | 3,268 | 6,492 |
| 254.50 | 3,295 | 6,656 |
| 254.55 | 3,322 | 6,822 |
| 254.60 | 3,348 | 6,988 |
| 254.65 | 3,375 | 7,156 |
| 254.70 | 3,401 | 7,326 |
| 254.75 | 3,428 | 7,497 |
| 254.80 | 3,454 | 7,669 |
| 254.85 | 3,480 | 7,842 |
| 254.90 | 3,507 | 8,017 |
| 254.95 | 3,533 | 8,193 |
| 255.00 | 3,560 | 8,370 |
| 255.05 | 3,588 | 8,549 |
| 255.10 | 3,616 | 8,729 |
| 255.15 | 3,644 | 8,910 |
| 255.20 | 3,672 | 9,093 |
| 255.25 | 3,700 | 9,278 |
| 255.30 | 3,728 | 9,463 |
| 255.35 | 3,756 | 9,650 |
| 255.40 | 3,784 | 9,839 |
| 255.45 | 3,812 | 10,029 |
| 255.50 | 3,840 | 10,220 |
| 255.55 | 3,868 | 10,413 |
| 255.60 | 3,896 | 10,607 |
| 255.65 | 3,924 | 10,802 |
| 255.70 | 3,952 | 10,999 |
| 255.75 | 3,980 | 11,198 |
| 255.80 | 4,008 | 11,397 |
| 255.85 | 4,036 | 11,598 |
| 255.90 | 4,064 | 11,801 |
| 255.95 | 4,092 | 12,005 |
| 256.00 | 4,120 | 12,210 |
| 256.05 | 4,149 | 12,417 |
| 256.10 | 4,178 | 12,625 |
| 256.15 | 4,207 | 12,835 |
| 256.20 | 4,236 | 13,046 |
| 256.25 | 4,265 | 13,258 |
| 256.30 | 4,294 | 13,472 |
| 256.35 | 4,323 | 13,688 |
| 256.40 | 4,352 | 13,904 |
| 256.45 | 4,381 | 14,123 |
| 256.50 | 4,410 | 14,343 |
| 256.55 | 4,439 | 14,564 |
| 256.60 | 4,468 | 14,786 |
| 256.65 | 4,497 | 15,011 |
| 256.70 | 4,526 | 15,236 |
| 256.75 | 4,555 | 15,463 |
| 256.80 | 4,584 | 15,692 |
| 256.85 | 4,613 | 15,922 |
| 256.90 | 4,642 | 16,153 |
| 256.95 | 4,671 | 16,386 |
| 257.00 | **4,700** | **16,620** |

**Heritage on Main**
**107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St**
**Medway, MA**
**Bohler Job Number: W211301**
**September 28, 2026**

## MA DEP Standard 4: TSS Removal Calculation Worksheet

BMP Treatment Train: #1 - Deep Sump Catch Basin -> Hydrodynamic Separator -> Subsurface Infiltration Chambers w/ isolator rows

| A<br>BMP | B<br>TSS Removal Rate | C<br>Starting TSS Load* | D<br>Amount Removed (B*C) | E<br>Remaining Load (C-D) |
|---|---|---|---|---|
| **Deep Sump Catch Basin** | **0.25** | **1.00** | **0.25** | **0.75** |
| **Hydrodynamic Separator** | **0.80** | **0.75** | **0.60** | **0.15** |
| **Subsurface Infiltration Chambers w/ isolator rows** | **1.00** | **0.15** | **0.15** | **0.00** |
| | | | | |
| | | **Total TSS Removal =** | **100%** | |

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

Prepared By:
BOHLER
352 Turnpike Road
Southborough, MA 01772
(508) 480-9900

**Heritage on Main**
**107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St**
**Medway, MA**
**Bohler Job Number: W211301**
**September 28, 2026**

## MA DEP Standard 4: TSS Removal Calculation Worksheet

BMP Treatment Train: #2 - Hydrodynamic Separator (Inlet) -> Infiltration Basin / Chambers

| A<br>BMP | B<br>TSS Removal Rate | C<br>Starting TSS Load* | D<br>Amount Removed (B*C) | E<br>Remaining Load (C-D) |
|---|---|---|---|---|
| **Hydrodynamic Separator (Inlet)** | **0.80** | **1.00** | **0.80** | **0.20** |
| **Subsurface Infiltration Chambers w/ isolator rows** | **1.00** | **0.20** | **0.20** | **0.00** |
| | | | | |
| | | | | |
| | | **Total TSS Removal =** | **100%** | |

*Equals remaining load from previous BMP (E) which enters BMP
**Hydrodynamic Separator to act as adequate pre-treatment for the Infiltration System

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**Medway, MA**
**Bohler Job Number: W211301**
**September 28, 2026**

## MA DEP Standard 4: TSS Removal Calculation Worksheet

BMP Treatment Train: #3 - Deep Sump Catch Basin -> Hydrodynamic Separator -> Detention System

| A<br>BMP | B<br>TSS Removal Rate | C<br>Starting TSS Load* | D<br>Amount Removed (B*C) | E<br>Remaining Load (C-D) |
|---|---|---|---|---|
| **Deep Sump Catch Basin** | **0.25** | **1.00** | **0.25** | **0.75** |
| **Hydrodynamic Separator** | **0.80** | **0.75** | **0.60** | **0.15** |
| **Detention Sytstem** | **0.00** | **0.15** | **0.00** | **0.15** |
| | | | | |
| | | **Total TSS Removal =** | **85%** | |

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

Prepared By:
BOHLER
352 Turnpike Road
Southborough, MA 01772
(508) 480-9900

**Heritage on Main**
**107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St**
**Medway, MA**
**Bohler Job Number: W211301**
**September 28, 2026**

## MA DEP Standard 4: Weighted TSS Removal Rate

| Design Point - Treatment Train Description(s) | TSS Removal (%) | Impervious Area* (ac) | Total Area |
|---|---|---|---|
| Treatment Train #1 | 100% | 9.179 | 9.179 |
| Treatment Train #2 | 100% | 1.491 | 1.491 |
| Treatment Train #3 | 85% | 1.305 | 1.305 |
| Untreated (runoff from impervious not captured by system) | 0% | 0.084 | 0.084 |
| **Weighted TSS Removal Rate** | **98%** | | |

*Excludes roof runoff

Prepared By:
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352 Turnpike Road
Southborough, MA 01772
(508) 480-9900

**Heritage on Main**
**107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St**
**Medway, MA**
**Bohler Job Number: W211301**
**September 28, 2026**

## Rip Rap Sizing Calculations

**Design Period Storm:** 25 Year

### Rip Rap Apron Sizing Calculations

| Location | Pipe Size (in.) | Pipe Size (ft.) | Q (cfs) | TW (ft.) | V (fps) | W1 (ft.) | La (ft.) | W2 (ft.) | W3 (ft.) | Apron Type | Rip Rap Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A-10 | 18 | 1.5 | 4.69 | 0.00 | 3.13 | 4.50 | 6.2 | 9 | NA | A | Modified |
| B-10 | 18 | 1.5 | 5.35 | 0.00 | 3.57 | 4.50 | 5.4 | 8 | NA | A | Modified |
| O-10 | 18 | 1.5 | 6.00 | 0.00 | 4.00 | 4.50 | 6.6 | 9 | NA | A | Modified |
| G-10 | 15 | 1.3 | 3.70 | 0.00 | 2.96 | 3.75 | 7.6 | 9 | NA | A | Modified |
| P-10 | 30 | 2.5 | 9.78 | 0.00 | 3.91 | 7.50 | 12 | 16 | NA | A | Modified |
| M-10 | 18 | 1.5 | 0.61 | 0.00 | 0.41 | 4.50 | 2.9 | 7 | NA | A | Modified |
| K-10 | 18 | 1.5 | 6.07 | 0.00 | 4.05 | 4.50 | 10.2 | 12 | NA | A | Modified |
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Based ConnDOT Drainage Manual - Type A, B, and C Riprap Aprons

Outlet Velocity (fps)
0-8 - Modified
8-10 - Intermediate
10-14 - Standard

### Scour Hole Sizing Calculations

| Location | Pipe Size/ Span (in) | Pipe Size/ Span (ft) | Q (cfs) | TW (ft.) | Scour Hole Type | $D_{50}$ (ft) | F (ft) | C (ft) | B (ft) | Rip Rap Type |
|---|---|---|---|---|---|---|---|---|---|---|
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Based on ConnDOT Drainage Manual - Type 1 and 2 Scour Holes

$D_{50}$ < 0.42 ft - Modified
0.42 ft < $D_{50}$ < 0.67 ft - Intermediate
0.67 ft < $D_{50}$ < 1.25 ft - Standard
1.25 ft < $D_{50}$ - Special Design

Riprap Type $D_{50}$ (inches)
Modified - 5
Intermediate - 8
Standard - 15

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**Proposed Mixed-Use Development**
**Heritage on Main**
**Medway, MA**
**Bohler Job Number: W211301**
**September 28, 2026**

**Weighted Total Phosphorus Removal Rate**

***Phosphorus Loading Calculation - Proposed Conditions***

| Subcatchment | Impervious Area (sf) | Land Use Category | Pervious Area (sf) | Land Use Category | Phosphorus Load (lbs/year) |
|---|---|---|---|---|---|
| P1.1 | 3,640 | Multi-Family Residential | 7,470 | Developed Land - HSG C | 0.23 |
| P1.2 | 32,170 | Commercial | 4,880 | Developed Land - HSG C | 1.34 |
| P1.3 | 17,380 | Commercial | 640 | Developed Land - HSG C | 0.71 |
| P2.1 | 650 | Multi-Family Residential | 26,590 | Developed Land - HSG C | 0.16 |
| P2.2 | 22,280 | Multi-Family Residential | 8,580 | Developed Land - HSG C | 1.23 |
| P2.3 | 81,330 | Multi-Family Residential | 9,200 | Developed Land - HSG C | 4.38 |
| P3.1 | 0 | Multi-Family Residential | 19,800 | Developed Land - HSG C | 0.10 |
| P3.2 | 19,720 | Multi-Family Residential | 4,190 | Developed Land - HSG C | 1.07 |
| P4.1 | 0 | Multi-Family Residential | 35,780 | Developed Land - HSG C | 0.17 |
| P4.2 | 45,300 | Multi-Family Residential | 4,820 | Developed Land - HSG C | 2.44 |
| P4.3 | 57,680 | Multi-Family Residential | 2,830 | Developed Land - HSG C | 3.09 |
| P4.4 | 56,850 | Multi-Family Residential | 11,130 | Developed Land - HSG C | 3.08 |
| P5.1 | 100 | Commercial | 17,010 | Developed Land - HSG C | 0.09 |
| P5.2 | 31,400 | Commercial | 3,840 | Developed Land - HSG C | 1.30 |
| **Total** | **368,500** | | **156,760** | | **19.38** |

***Table 1: Phosphorus Loading Export by Land Use***

| Land Use | Phosphorus Load Export (lbs/acre/year) |
|---|---|
| Commercial | 1.78 |
| Industrial | 1.78 |
| Multi-Family Residential | 2.32 |
| High-Density Residential | 2.32 |
| Medium-Density Residential | 1.96 |
| Low-Density Residential | 1.52 |
| Highway | 1.34 |
| Forest - Impervious | 1.52 |
| Forest - Pervious | 0.13 |
| Open Land | 1.52 |
| Agriculture - Impervious | 1.52 |
| Agriculture - Pervious | 0.45 |
| Developed Land - HSG A | 0.03 |
| Developed Land - HSG B | 0.12 |
| Developed Land - HSG C | 0.21 |
| Developed Land - HSG C/D | 0.29 |
| Developed Land - HSG D | 0.37 |

Prepared By:
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**Proposed Mixed-Use Development**
**Heritage on Main**
**Medway, MA**
**Bohler Job Number: W211301**
**September 28, 2026**

**Weighted Total Phosphorus Removal Rate**

**Structural BMPs/Proprietary Devices**

| Subcatchment | Phosphorus Loading (lbs/year) | Treatment Train | TP Removal (%) | TP Removal (lbs/year) |
|---|---|---|---|---|
| P1.1 | 0.23 | N/A | 0% | 0.00 |
| P1.2 | 1.34 | Treatment Train #1 | 97% | 1.30 |
| P1.3 | 0.71 | Treatment Train #1 | 97% | 0.69 |
| P2.1 | 0.16 | N/A | 0% | 0.00 |
| P2.2 | 1.23 | Treatment Train #1 | 97% | 1.19 |
| P2.3 | 4.38 | Treatment Train #1 | 97% | 4.24 |
| P3.1 | 0.10 | N/A | 0% | 0.00 |
| P3.2 | 1.07 | Treatment Train #1 | 97% | 1.04 |
| P4.1 | 0.17 | N/A | 0% | 0.00 |
| P4.2 | 2.44 | Treatment Train #1 | 97% | 2.36 |
| P4.3 | 3.09 | Treatment Train #1 | 97% | 2.99 |
| P4.4 | 3.08 | Treatment Train #2 | 20% | 0.62 |
| P5.1 | 0.09 | N/A | 0% | 0.00 |
| P5.2 | 1.30 | Treatment Train #1 | 97% | 1.26 |
| **Total** | **19.38** | **-** | **-** | **15.67** |

| **Weighted Total Phosphorus Removal Rate** | **81%** |
|---|---|

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# Total Phosphorus Removal Calculation Worksheet

Subcatchments: (see other sheets)

**Treatment Train #1**

| A<br>BMP[1] | B<br>TP Removal Rate[1] | C<br>Starting TP Load* | D<br>Amount Removed (B*C) | E<br>Remaining Load (C-D) |
|---|---|---|---|---|
| **Hydrodynamic Separator** | **0.20** | **1.00** | **0.20** | **0.80** |
| **Subsurface Infiltration System** | **0.96** | **0.80** | **0.77** | **0.03** |
| | | | | |
| | | | | |

**Total Phosphorus Removal =** **97%**

Project: **Heritage on Main**
Prepared By: **Bohler**
Date: **9/28/2026**

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

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Subcatchments: (see other sheets)

**Treatment Train #2**

**Total Phosphorus Removal Calculation Worksheet**

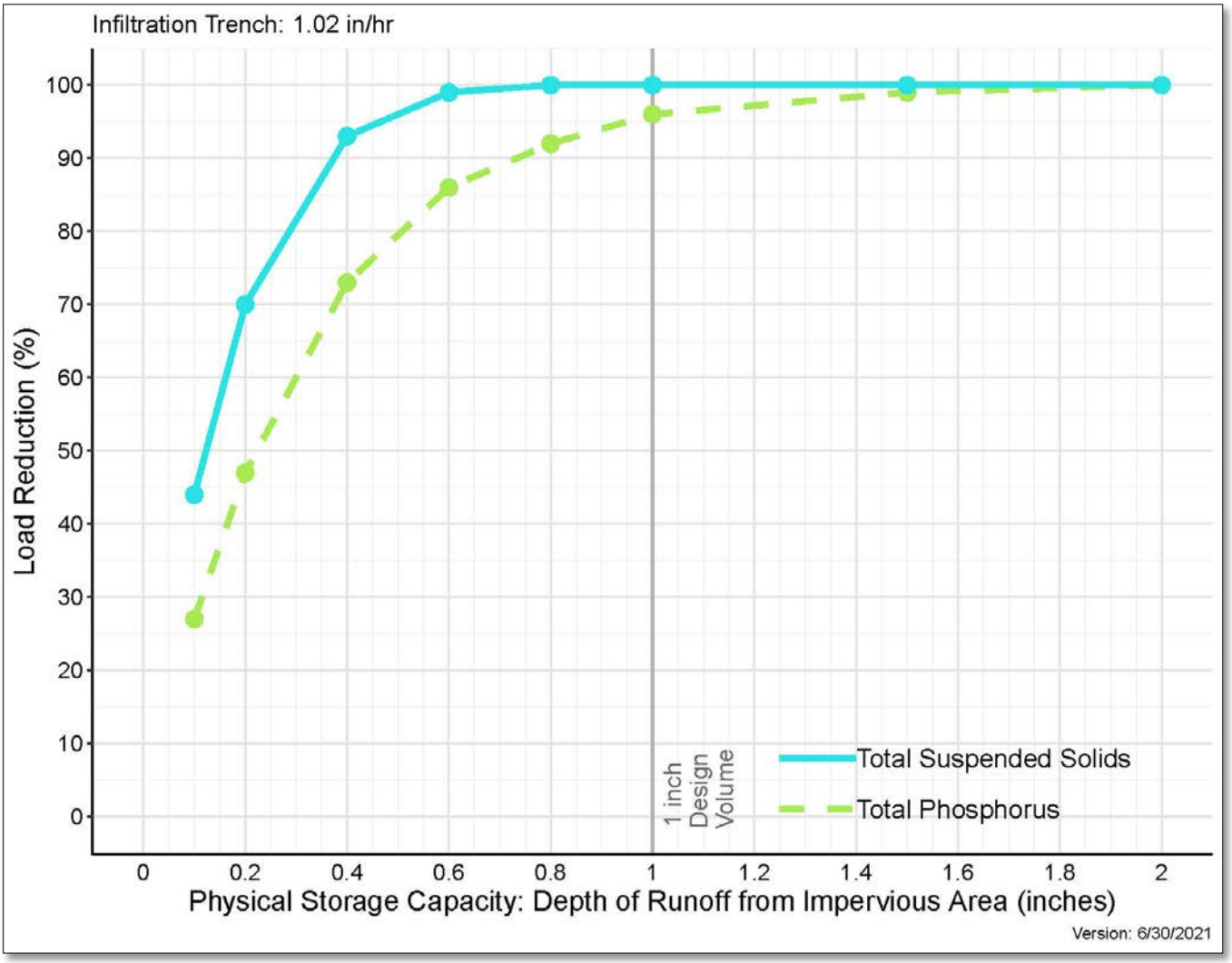
| A<br>BMP[1] | B<br>TP Removal Rate[1] | C<br>Starting TP Load* | D<br>Amount Removed (B*C) | E<br>Remaining Load (C-D) |
|---|---|---|---|---|
| **Hydrodynamic Separator** | **0.20** | **1.00** | **0.20** | **0.80** |
| | | | | |
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**Total Phosphorus Removal =** **20%**

Project: **Heritage on Main**
Prepared By: **Bohler**
Date: **9/28/2026**

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

Prepared By:
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| Infiltration Trench (1.02 in/hr) BMP Performance Table: Long-Term Load Reduction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Storage Capacity: Depth of Runoff Treated from Impervious Area (inches) | 0.1 | 0.2 | 0.4 | 0.6 | 0.8 | 1 | 1.5 | 2 |
| Cumulative Phosphorus Load Reduction | 27.0% | 47.0% | 73.0% | 86.0% | 92.0% | 96.0% | 99.0% | 100.0% |
| Cumulative TSS Load Reduction | 44.0% | 70.0% | 93.0% | 99.0% | 100.0% | 100.0% | 100.0% | 100.0% |

*Commonwealth of Virginia*

*VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY*

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Travis A. Voyles
Acting Secretary of Natural and Historic Resources

Michael S. Rolband, PE, PWD, PWS Emeritus
Director
(804) 698-4020

April 20, 2022

Mr. Jacob Dorman
Contech Engineered Solutions LLC
7037 Ridge Road, Suite 350
Hanover, MD 21076

Transmitted electronically jdorman@conteches.com

Re: Assignment of Percent Removal Efficiencies for Total Phosphorus
**Continuous Deflective Separator (CDS) Stormwater Treatment Device**

Dear Mr. Dorman:

The Department of Environmental Quality (Department or DEQ) received the Proprietary Best Management Practice (BMP) Registration Statement and supporting documentation for the **Continuous Deflective Separator (CDS) Stormwater Treatment Device** on December 29, 2021. The Department has reviewed the application and supporting documentation in accordance with § 62.1-44.15:28 of the Code of Virginia, 9VAC25-870-65 D of the Virginia Stormwater Management Program (VSMP) Regulation, and DEQ Guidance Memo No. 21-2006.

Section 65 D 2 of the VSMP Regulation states, "Any proprietary BMP approved for use after July 1, 2020, must meet the requirements of § 62.1-44.15:28 A 9 of the Code of Virginia." The Department received the current general use level designation (GULD) certificate from Washington State's Technology Assessment Protocol – Ecology (TAPE) program or the current certification from the New Jersey Department of Environmental Protection (NJDEP) for the **Continuous Deflective Separator (CDS) Stormwater Treatment Device**.

The **Continuous Deflective Separator (CDS) Stormwater Treatment Device** is approved for use in Virginia to meet the VSMP water quality design criteria requirements and has been assigned a total phosphorus pollutant removal efficiency of **20%**. This information will be posted on the Virginia Stormwater BMP Clearinghouse website. This device and the assigned removal efficiency can be manually added into the Virginia Runoff Reduction Method spreadsheet to demonstrate compliance with VSMP water quality design criteria requirements.

If you have any questions regarding this letter, please contact Robert E. Cooper, P.E. at (804) 965-4875 or e-mail at Robert.Cooper@deq.virginia.gov.

Sincerely

Erin Ervin Belt

Erin Ervin Belt
Office of Stormwater Management

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# Parameter Brief

## Removal of Suspended Solids using the CDS® System – Laboratory Evaluations

The CDS® system is a hydrodynamic separator which uses patented continuous deflective separation (CDS) technology to separate and capture trash, debris, sediment and oil and grease from stormwater runoff. Indirect screening allows for 100% removal of floatables and neutrally buoyant material without blinding the screen. Flow and screening controls separate captured solids and minimize resuspension of previously captured pollutants.

The CDS system can effectively capture 100% of particulate material, including trash and debris, greater than screen aperture size (2400 or 4700 microns). In addition, the CDS can remove medium and coarse sediments. A full-scale laboratory evaluation of the CDS system using test materials with various particle size distributions is summarized here.

### Laboratory Study – Full-Scale Evaluation at University of Florida

A full-scale CDS unit (Model CDS2020-5B) was tested at the facility of University of Florida, Gainesville, FL. This full-scale CDS unit was evaluated under controlled laboratory conditions of pumped influent and the controlled addition of sediment.

Two different gradations of silica sand material (UF Sediment & OK-110) were used in the CDS performance evaluation. The particle size distributions (PSD) of the test materials were analyzed using standard method "Gradation ASTM D-422 with Hydrometer" by a certified laboratory. UF Sediment is a mixture of three different U.S. Silica Sand products referred as: "Sil-Co-Sil 106", "#1 DRY" and "20/40 Oil Frac". Particle size distribution analysis shows that the UF Sediment has a very fine gradation ($d_{50}$ = 20 to 30 µm) covering a wide size range (uniform coefficient $C_u$ averaged at 10.6). In comparison with the hypothetical TSS gradation specified in the NJDEP (New Jersey Department of Environmental Protection) and NJCAT (New Jersey Corporation for Advanced Technology) protocol for lab testing, the UF Sediment covers a similar range of particle size but with a finer $d_{50}$ ($d_{50}$ for NJDEP is approximately 50 µm) (NJDEP, 2003). The OK-110 silica sand is a commercial product of U.S. Silica Sand. The particle size distribution analysis of this material, also included in Figure 1, shows that 99.9% of the OK-110 sand is finer than 250 microns, with a mean particle size ($d_{50}$) of 106 microns. The PSDs for the test material are shown in Figure 1.

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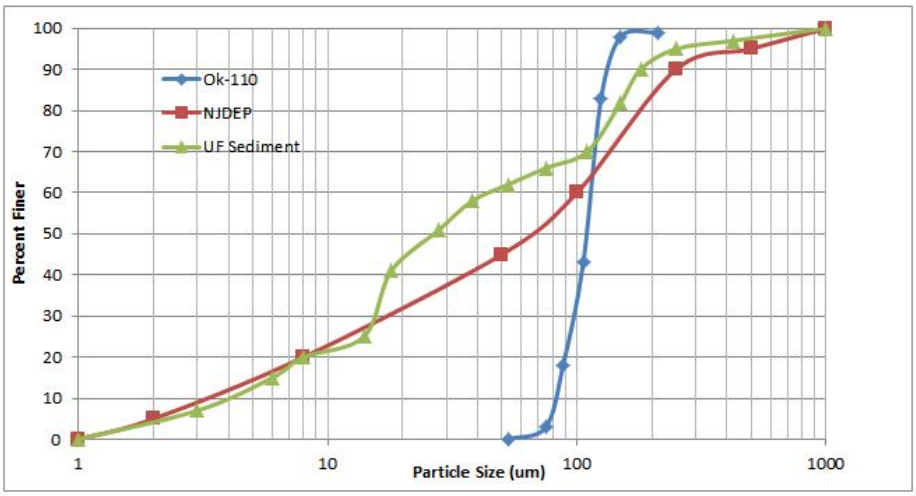



**Figure 1.** Particle size distributions for the test materials, as compared to the NJCAT/NJDEP theoretical distribution.

Tests were conducted to quantify the CDS unit (1.1 cfs design capacity) performance at various flow rates, ranging from 1% up to 125% of the design capacity of the unit, using the 2400 micron screen. All tests were conducted with controlled influent concentrations approximately 200 mg/L. Effluent samples were taken at equal time intervals across the entire duration of each test run. These samples were then processed with a Dekaport Cone sample splitter to obtain representative sub-samples for Suspended Sediment Concentration (SSC – ASTM Standard Method D3977-97) and particle size distribution analysis.

**Results and Modeling**

Based on the testing data from the University of Florida, a performance model was developed for the CDS system. A regression analysis was used to develop a fitting curve for the scattered data points at various design flow rates. This model, which demonstrated good agreement with the laboratory data, can then be used to predict CDS system performance with respect to SSC removal for any particle size gradation assuming sandy-silt type of inorganic components of SSC. Figure 2 shows CDS predictive performance for two typical particle size gradations (NJCAT gradation and OK-110 sand).

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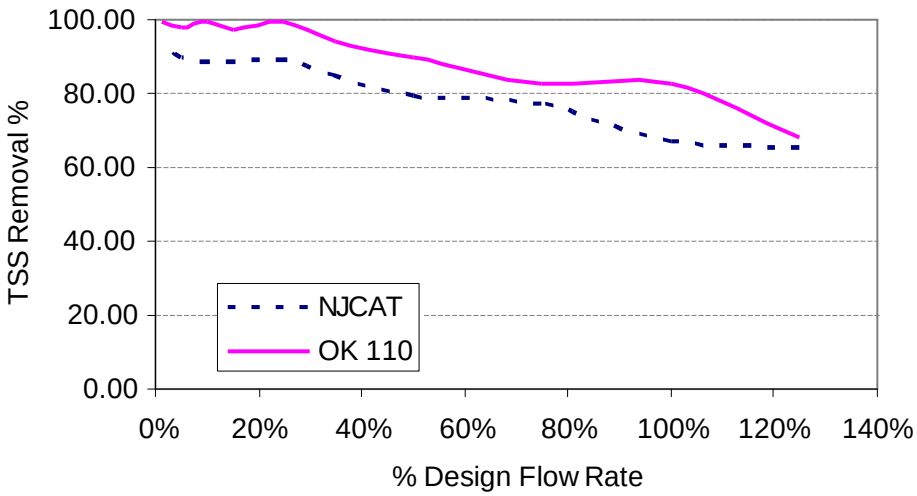



**Figure 2.** CDS stormwater treatment predictive performance for various particle gradations as a function of operating rate.

Many regulatory jurisdictions set a performance standard for hydrodynamic devices by stating that the devices shall be capable of achieving an 80% removal efficiency for particles having a mean particle size ($d_{50}$) of 125 microns (WADOE, 2008). The model can be used to calculate the expected performance of such a PSD (shown in Figure 3). Supported by the laboratory data, the model indicates (Figure 4) that the CDS system with 2400 micron screen achieves approximately 80% removal at 100% of design flow rate, for this particle size distribution ($d_{50}$ = 125 µm).

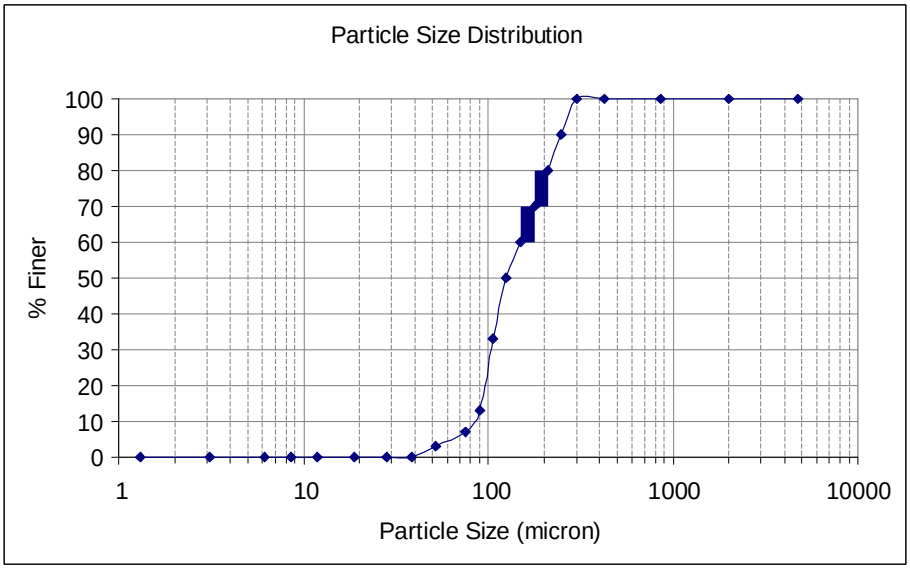



**Figure 3.** PSD with $d_{50}$ = 125 microns, used to model performance for Ecology submittal.

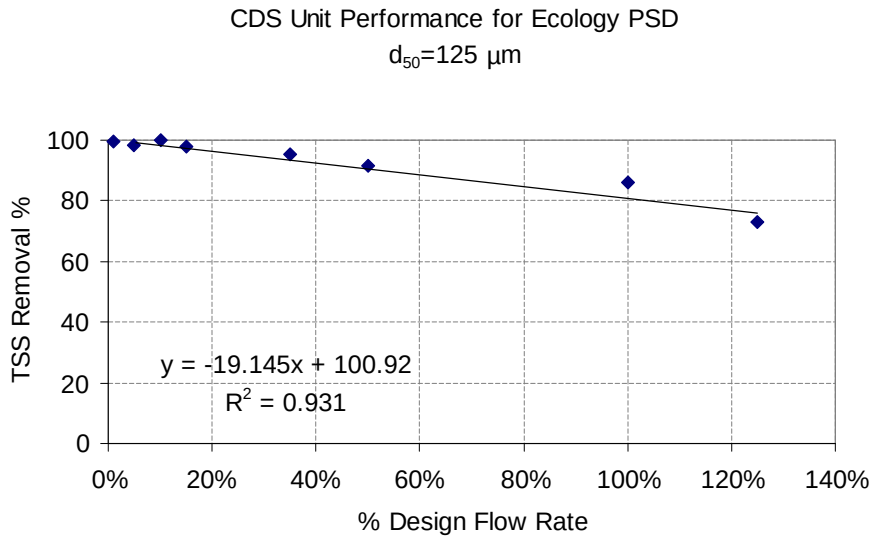



**Figure 4.** Modeled performance for CDS unit with 2400 microns screen, using Ecology PSD.

**References:**

New Jersey Department of Environmental Protection (NJDEP). (2003). Total Suspended Solids Laboratory Testing Procedures (December 23, 2003).

Washington State Department of Ecology (WADOE). (2008). Guidance for Evaluating Emerging Stormwater Treatment Technologies: Technology Assessment Protocol—Ecology (TAPE) (Publication Number 02-10-037). Olympia, Washington: Author. Available Online: www.ecy.wa.gov/biblio/0210037.html

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## APPENDIX G: OPERATION AND MAINTENANCE

- *STORMWATER OPERATION AND MAINTENANCE PLAN*
- *INSPECTION REPORT*
- *INSPECTION AND MAINTENANCE LOG FORM*
- *LONG-TERM POLLUTION PREVENTION PLAN*
- *ILLICIT DISCHARGE STATEMENT*
- *SPILL PREVENTION*
- *PROPOSED OPERATION AND MAINTENANCE MAP*
- *MANUFACTURER'S INSPECTION AND MAINTENANCE MANUALS*

# STORMWATER OPERATION AND MAINTENANCE PLAN

***Heritage on Main***
***107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St***
***Medway, MA***

**RESPONSIBLE PARTY DURING CONSTRUCTION:**

***RTE. 85 REALTY CORP.***
***107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St***
***Medway, MA***

**RESPONSIBLE PARTY POST CONSTRUCTION:**

***RTE. 85 REALTY CORP.***
***107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St***
***Medway, MA***

## Construction Phase

During the construction phase, all erosion control devices and measures shall be maintained in accordance with the final record plans, local/state approvals and conditions, the EPA Construction General Permit and the Stormwater Pollution Prevention Plan (SWPPP). Additionally, the maintenance of all erosion / siltation control measures during construction shall be the responsibility of the general contractor. Contact information of the OWNER and CONTRACTOR shall be listed in the SWPPP for this site. The SWPPP also includes information regarding construction period allowable and illicit discharges, housekeeping and emergency response procedures. Upon proper notice to the property owner, the Town/City or its authorized designer shall be allowed to enter the property at a reasonable time and in a reasonable manner for the purposes of inspection.

The contractor shall comply with “Article 26 Stormwater Management and Land Disturbance” of the municipal bylaw. Additionally, per Section 26.5.7 of the bylaw, the contractor shall provide an on-site rain gauge and submit reports bi-weekly to the Permitting Authority and after any storm event resulting in 0.25 inches of precipitation or more within twenty-four hours.

### Changes to Long-Term Operation and Maintenance Plan (per Section 26.5.9.4 of the municipal bylaws)

The owner(s) of the stormwater management system must notify the Department of Public Works of changes in ownership or assignment of financial responsibility.

The maintenance schedule in the Maintenance Agreement may be amended to achieve the purposes of this Bylaw by mutual agreement of the Department of Public Works and the Responsible Parties. Proposed amendments must be in writing and signed by all Responsible Parties. Responsible Parties shall include owner(s), persons with financial responsibility, and persons with operational responsibility. Proposed amendments must be described in detail along with reasons why the Town should consider them. Amendments will not be considered until at least three years after Project Completion as defined in Section 26.5.14 of the municipal bylaws.

## Post Development Controls

Once construction is completed, the post development stormwater controls are to be operated and maintained in compliance with the following permanent procedures (note that the continued implementation of these procedures shall be the responsibility of the Owner or its assignee):

1. Parking lots: Sweep at least four (4) times per year and on a more frequent basis depending on sanding operations. Swept areas shall include all parking, drive aisles, and access aisles All resulting sweepings shall be collected and properly disposed of offsite in accordance with MADEP and other applicable requirements.

   Approximate Maintenance Budget: $1,000/year

2. Roadways: Sweep at least four (4) times per year and on a more frequent basis depending on sanding operations. All resulting sweepings shall be collected and properly disposed of off site in accordance with MADEP and other applicable requirements.

   Approximate Maintenance Budget: $1,000/year

3. Catch basins, yard drains, trench drains, manholes and piping: Inspect four (4) times per year and at the end of foliage and snow-removal seasons. These features shall be cleaned four (4) 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 underground system. Additionally, catch basins shall be cleaned whenever the depth of deposits is greater than or equal to 50% of the sump capacity. Accumulated sediment and hydrocarbons present must be removed and properly disposed of off-site in accordance with MADEP and other applicable requirements.

   Approximate Maintenance Budget: $500/year per structure.

4. Riprap apron / Scour Hole: Riprap and scour holes should be checked at least annually and after every major storm event (generally equal or greater to 3.0 inches in 24 hours) for displaced stones, slumping, and erosion at edges, especially downstream or downslope. If the riprap is damaged, it should be repaired before further damage can take place. Note and repair any erosion, stone displacement or low spots in the areas. Woody vegetation should be removed from the riprap annually.

   Approximate Maintenance Budget: $250/year per location.

5. Water Quality Unit (Proprietary Separator): Follow manufacturer's recommendations (attached).

   Approximate Maintenance Budget: $1,000/year per structure.

6. Infiltration Basin: Preventative maintenance after every major storm event during the first three (3) months of operation and at least twice per year thereafter. Inspect structure and pretreatment BMP to ensure proper operation after every major storm event (generally equal or greater to 3.0 inches in 24 hours) for the first three months. Mow the buffer area, side slopes and basin bottom if grassed floor, rake if stone or sand bottom, remove trash and debris, remove grass clippings and accumulated organic matter. Any sediment

removed shall be disposed of in accordance with MADEP and other applicable requirements.

Approximate Maintenance Budget: $2,000/year per basin

7. Underground Infiltration & Detention Basins: Preventative maintenance after every major storm event during the first three (3) months of operation and at least twice per year thereafter. Inspect structure and pretreatment BMP to ensure proper operation after every major storm event (generally equal or greater to 3.0 inches in 24 hours) for the first three months. The outlet of the basin, if any, shall be inspected for erosion and sedimentation, and rip-rap shall be promptly repaired in the case of erosion. Sediment collecting in the bottom of the basin shall be inspected twice annually, and removal shall commence any time the sediment reaches a depth of six inches anywhere in the basin. Any sediment removed shall be disposed of in accordance with MADEP and other applicable requirements.

   Approximate Maintenance Budget: Cleaning - $1,000/year, Inspection - $200/year

All components of the stormwater system will be accessible by the owner or their assignee.

***STORMWATER MANAGEMENT SYSTEM***

***POST-CONSTRUCTION INSPECTION REPORT***

**LOCATION:**

***Heritage on Main***
***107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St***
***Medway, MA***

**RESPONSIBLE PARTY:**

***RTE. 85 REALTY CORP.***
***107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St***
***Medway, MA***

| NAME OF INSPECTOR: | INSPECTION DATE: |
|---|---|
| Note Condition of the Following (sediment depth, debris, standing water, damage, etc.): | |
| Catch Basins: | |
| Discharge Points/ Flared End Sections / Rip Rap: | |
| Infiltration Basin: | |
| Underground Infiltration & Detention Basin(s): | |
| Water Quality Units: | |

| |
|---|
| Other: |
| Note Recommended Actions to be taken on the Following (sediment and/or debris removal, repairs, etc.): |
| Catch Basins: |
| Discharge Points/ Flared End Sections / Rip Rap: |
| Infiltration Basin: |
| Underground Infiltration & Detention Basin(s): |
| Water Quality Units: |
| Other: |

| Comments: |
| --- |
| |

***STORMWATER INSPECTION AND MAINTENANCE LOG FORM***

***Heritage on Main***
***107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St, Medway, MA***

| Stormwater Management Practice | Responsible Party | Date | Maintenance Activity Performed |
|---|---|---|---|
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# LONG-TERM POLLUTION PREVENTION PLAN

***Heritage on Main***
***107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St***
***Medway, MA***

**RESPONSIBLE PARTY DURING CONSTRUCTION:**

***RTE. 85 REALTY CORP.***
***107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St***
***Medway, MA***

**RESPONSIBLE PARTY POST CONSTRUCTION:**

***RTE. 85 REALTY CORP.***
***107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St***
***Medway, MA***

For this site, the Long-Term Pollution Prevention Plan will consist of the following:

- The property owner shall be responsible for "good housekeeping" including proper periodic maintenance of building and pavement areas, curbing, landscaping, etc.
- Proper storage and removal of solid waste (dumpsters).
- Sweeping of parking lots, drive aisles and access aisles a minimum of twice per year with a commercial cleaning unit. Any sediment removed shall be disposed of in accordance with applicable local and state requirements.
- Sweeping of roadways a minimum of four times per year with a commercial cleaning unit. Any sediment removed shall be disposed of in accordance with applicable local and state requirements.
- Regular inspections and maintenance of Stormwater Management System as noted in the "O&M Plan".
- Snow removal shall be the responsibility of the property owner. Snow shall not be plowed, dumped and/or placed in wetlands and its buffers, forebays, infiltration basins or similar stormwater management areas. Salting and/or sanding of pavement / walkway areas during winter conditions shall only be done in accordance with all state/local requirements and approvals.

- Trash and other debris shall be removed from all areas of the site at least twice yearly.

- Reseed any bare areas as soon as they occur. Erosion control measures shall be installed in these areas to prevent deposits of sediment from entering the drainage system.

- Grass shall be maintained at a minimum blade height of two to three inches and only 1/3 of the plant height shall be removed at a time. Clippings shall not be disposed of within stormwater management areas or adjacent resource areas.

- Plants shall be pruned as necessary.

- Pet waste shall be disposed of in accordance with local regulations. Pet waste shall not be disposed of in a storm drain or catch basin.

- Snow piles shall be located adjacent to or on pervious surfaces in upland areas. This will allow snow melt water to filter into the soil, leaving behind sand and debris which can be removed in the springtime.

- In no case shall snow be disposed of or stored in resource areas (wetlands, **wetland buffers**, floodplain, streams, or other water bodies).

- In no case shall snow be disposed of or stored in the detention basins, infiltration basins or bioretention areas.

- If necessary, stockpiled snow will be removed from the Site and disposed of at an off-site location in accordance with all local, state and federal regulations.

- The amount of sand and deicing chemicals shall be kept at the minimum amount required to provide safe pedestrian and vehicle travel.

- Deicing chemicals are recommended as a pretreatment to storm events to minimize the amount of applied sand.

- Sand and deicing chemicals should be stockpiled under covered storage facilities that prevent precipitation and adjacent runoff from coming in contact with the deicing materials. Stockpile areas shall be located outside resource areas.

- The primary agents used for deicing at parking lots, sidewalks and the access roads shall consist of salt alternatives such as calcium carbonate ($CaCO_3$) or potassium chloride (KCl) or sodium chloride.

- Deliveries shall be monitored by owner or owner’s representative to ensure proper delivery and in the event that a spillage occurs it shall be contained and cleaned up immediately in accordance with the spill prevention program for the project.

- Recycle materials whenever possible. Provide separate containers for recycle materials. Recycling products will be removed by a certified waste hauler.

- Public safety features such as guiderails and fencing (for pedestrian fall protection) shall be visually inspected for damage and replaced as needed.

## OPERATON AND MAINTENANCE TRAINING PROGRAM

The Owner will coordinate an annual in-house training session to discuss the Operations and Maintenance Plan, the Long-Term Pollution Prevention Plan, and the Spill Prevention Plan and response procedures. Annual training will include the following:

Discuss the Operations and Maintenance Plan

- Explain the general operations of the stormwater management system and its BMPs
- Identify potential sources of stormwater pollution and measures / methods of reducing or eliminating that pollution
- Emphasize good housekeeping measures

Discuss the Spill Prevention and Response Procedures

- Explain the process in the event of a spill
- Identify potential sources of spills and procedures for cleanup and /or reporting and notification
- Complete a yearly inventory or Materials Safety Data sheets of all tenants and confirm that no potentially harmful chemicals are in use.

# ILLICIT DISCHARGE STATEMENT

Certain types of non-stormwater discharges are allowed under the U.S. Environmental Protection Agency Construction General Permit. These types of discharges will be allowed under the conditions that no pollutants will be allowed to come in contact with the water prior to or after its discharge. The control measures which have been outlined previously in this LTPPP will be strictly followed to ensure that no contamination of these non-storm water discharges takes place. Any existing illicit discharges, if discovered during the course of the work, will be reported to MassDEP and the local DPW, as applicable, to be addressed in accordance with their respective policies. No illicit discharges will be allowed in conjunction with the proposed improvements.

Duly Acknowledged:

_____

Name & Title Date

# SPILL PREVENTION AND RESPONSE PROCEDURES (POST CONSTRUCTION)

In order to prevent or minimize the potential for a spill of Hazardous Substances or Oil or come into contact with stormwater, the following steps will be implemented:

1. All Hazardous Substances or Oil (such as pesticides, petroleum products, fertilizers, detergents, acids, paints, paint solvents, cleaning solvents, etc.) will be stored in a secure location, with their lids on, preferably under cover, when not in use.

2. The minimum practical quantity of all such materials will be kept on site.

3. A spill control and containment kit (containing, for example, absorbent materials, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided on site.

4. Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be trained regarding these procedures and the location of the information and cleanup supplies.

5. It is the OWNER's responsibility to ensure that all Hazardous Waste on site is disposed of properly by a licensed hazardous material disposal company. The OWNER is responsible for not exceeding Hazardous Waste storage requirements mandated by the EPA or state and local authorities.

In the event of a spill of Hazardous Substances or Oil, the following procedures should be followed:

1. All measures should be taken to contain and abate the spill and to prevent the discharge of the Hazardous Substance or Oil to stormwater or off-site. (The spill area should be kept well ventilated and personnel should wear appropriate protective clothing to prevent injury from contact with the Hazardous Substances.)

2. For spills of less than five (5) gallons of material, proceed with source control and containment, clean-up with absorbent materials or other applicable means unless an imminent hazard or other circumstances dictate that the spill should be treated by a professional emergency response contractor.

3. For spills greater than five (5) gallons of material immediately contact the MADEP at the toll-free 24-hour statewide emergency number: **1-888-304-1133**, the local fire department (**9-1-1**) and an approved emergency response contractor. Provide information on the type of material spilled, the location of the spill, the quantity spilled, and the time of the spill to the emergency response contractor or coordinator, and proceed with prevention, containment and/or clean-up if so desired. (Use the form provided, or similar).

4. If there is a Reportable Quantity (RQ) release, then the National Response Center should be notified immediately at (800) 424-8802; within 14 days a report should be submitted to the EPA regional office describing the release, the date and circumstances of the release and the steps taken to prevent another release. This Pollution Prevention Plan should be updated to reflect any such steps or actions taken and measures to prevent the same from reoccurring.

**SPILL PREVENTION CONTROL AND COUNTERMEASURE FORM**

***Heritage on Main***
***107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St***
***Medway, MA***

Where a release containing a hazardous substance occurs, the following steps shall be taken by the facility manager and/or supervisor:

1. Immediately notify The Town Fire Department (at **9-1-1**)

2. All measures must be taken to contain and abate the spill and to prevent the discharge of the pollutant(s) to off-site locations, receiving waters, wetlands and/or resource areas.

3. Notify the Town Health Department at (508) 533-3206 and the Town Conservation Commission at (508) 321-4890.

4. Provide documentation from licensed contractor showing disposal and cleanup procedures were completed as well as details on chemicals that were spilled to the Town Health Department and Conservation Commission.

Date of spill:_____ Time:_____ Reported By:_____

Weather Conditions:_____

| **Material Spilled** | **Location of Spill** | **Approximate Quantity of Spill (in gallons)** | **Agency(s) Notified** | **Date of Notification** |
|---|---|---|---|---|
| | | | | |
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| | | | | |

Cause of Spill: _____

_____

Measures Taken to Clean up Spill: _____

_____

Type of equipment: _____ Make: _____ Size: _____

License or S/N: _____

Location and Method of Disposal _____

_____

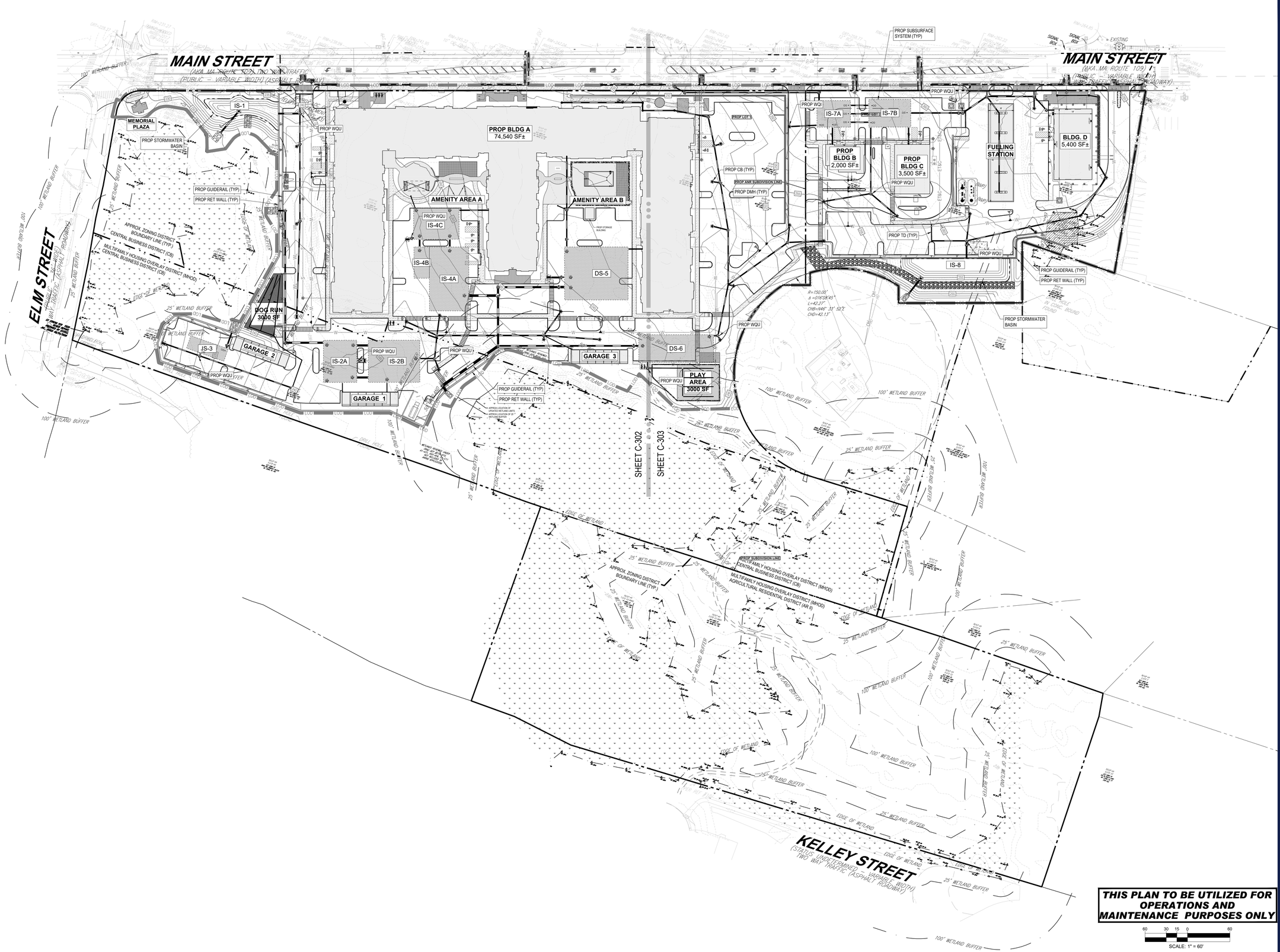
Procedures, method, and precautions instituted to prevent a similar occurrence from recurring: _____

_____

_____

Additional Contact Numbers:

- DEPARTMENT OF ENVIRONMENTAL PROTECTION (DEP) EMERGENCY PHONE: 1-888-304-1133
- NATIONAL RESPONSE CENTER PHONE: (800) 424-8802
- U.S. ENVIRONMENTAL PROTECTION AGENCY PHONE: (888) 372-7341




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**REVISIONS**

| REV | DATE | COMMENT | DRAWN BY / CHECKED BY |
|---|---|---|---|
| 1 | 09/29/2026 | MUNICIPAL REVIEW COMMENTS | AP, SW / TH, MM |

811 Know what's **below.** **Call** before you dig.

**ALWAYS CALL 811**

**It's fast. It's free. It's the law.**

**PERMIT SET**

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| | |
|---|---|
| **PROJECT NO.:** | AA240482.00-0A |
| **DRAWN BY:** | AP, JK, SW |
| **CHECKED BY:** | TH, MM |
| **DATE:** | 02/02/2026 |
| **CAD I.D.:** | P-GNRE-O&M- |

**PROJECT:**

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**FOR**

**RTE. 85 REALTY CORP**
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**SHEET TITLE:**

***OPERATIONS AND MAINTENANCE PLAN***

**SHEET NUMBER:**

**EX-OM**

**REVISION 1 - 09/25/2026**

P:\MA\2024\MAA240482.00\CAD\DRAWINGS\EXHIBITS\O&M\P-GNRE-O&M-MAA240482.00-0A----LAYOUT: EX-OM O&M
AP

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# 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.

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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 |
|---|---|---|---|---|---|
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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.

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## Save Valuable Land and Protect Water Resources



# Isolator® Row O&M Manual

StormTech® Chamber System for Stormwater Management

# 1.0 The Isolator® Row

## 1.1 INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a patented technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.



*Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.*

## 1.2 THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-4500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC-310-3 and SC-740 models) allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

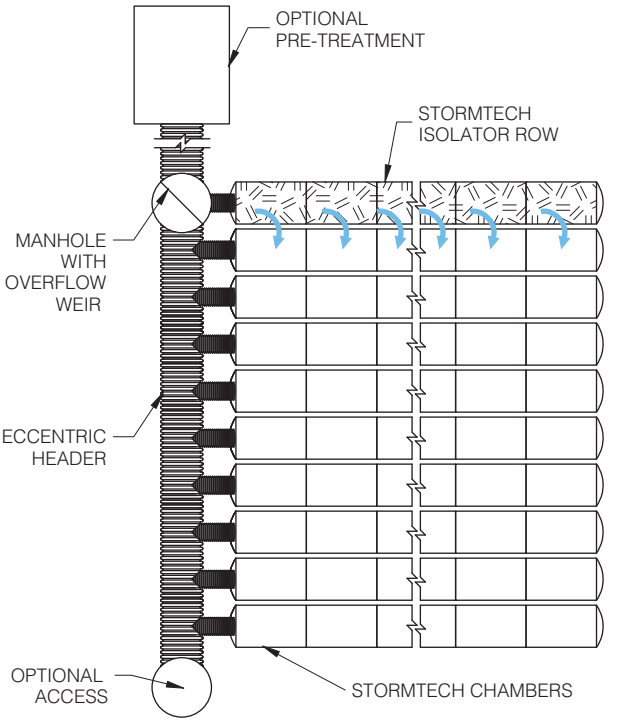
Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of the underlying stone and remain intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber. The non-woven fabric is not required over the DC-780, MC-3500 or MC-4500 models as these chambers do not have perforated side walls.

The Isolator Row is typically designed to capture the "first flush" and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but typically includes a high flow weir such that storm water flowrates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other chambers.

The Isolator Row may also be part of a treatment train. By treating storm water prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

*Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.*

**StormTech Isolator Row with Overflow Spillway**
(not to scale)



# 2.0 Isolator Row Inspection/Maintenance

## 2.1 INSPECTION

The frequency of Inspection and Maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

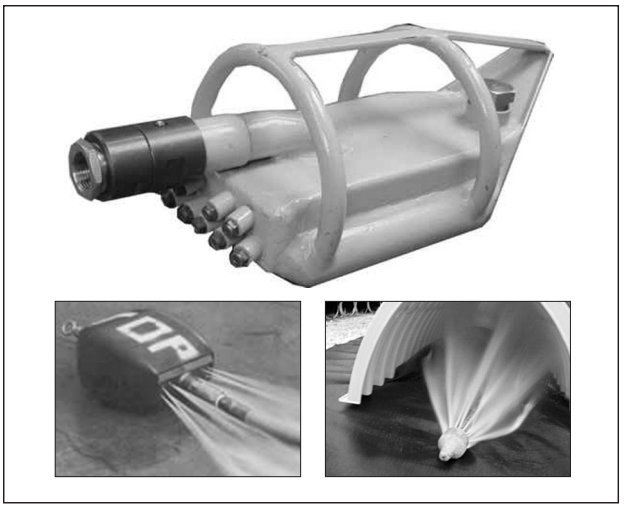
At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

## 2.2 MAINTENANCE

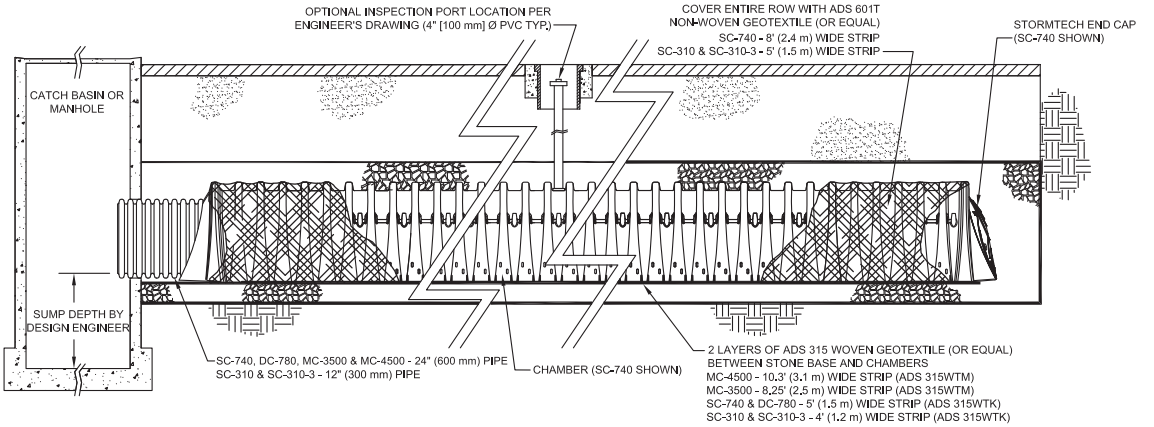
The Isolator Row was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.



*Examples of culvert cleaning nozzles appropriate for Isolator Row maintenance. (These are not StormTech products.)*

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**

**StormTech Isolator Row** (not to scale)




**NOTE:** NON-WOVEN FABRIC IS ONLY REQUIRED OVER THE INLET PIPE CONNECTION INTO THE END CAP FOR DC-780, MC-3500 AND MC-4500 CHAMBER MODELS AND IS NOT REQUIRED OVER THE ENTIRE ISOLATOR ROW.

# 3.0 Isolator Row Step By Step Maintenance Procedures

**Step 1)** Inspect Isolator Row for sediment

A) Inspection ports (if present)

i. Remove lid from floor box frame

ii. Remove cap from inspection riser

iii. Using a flashlight and stadia rod, measure depth of sediment and record results on maintenance log.

iv. If sediment is at, or above, 3 inch depth proceed to Step 2. If not proceed to step 3.

B) All Isolator Rows

i. Remove cover from manhole at upstream end of Isolator Row

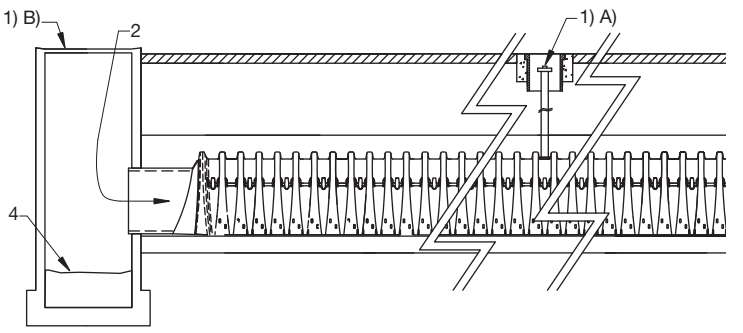
ii. Using a flashlight, inspect down Isolator Row through outlet pipe

1. Mirrors on poles or cameras may be used to avoid a confined space entry

2. Follow OSHA regulations for confined space entry if entering manhole

iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches) proceed to Step 2. If not proceed to Step 3.

**StormTech Isolator Row** (not to scale)




**Step 2)** Clean out Isolator Row using the JetVac process

A) A fixed culvert cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable

B) Apply multiple passes of JetVac until backflush water is clean

C) Vacuum manhole sump as required

**Step 3)** Replace all caps, lids and covers, record observations and actions

**Step 4)** Inspect & clean catch basins and manholes upstream of the StormTech system

**Sample Maintenance Log**

| Date | Stadia Rod Readings | | Sediment Depth (1) - (2) | Observations/Actions | Inspector |
|---|---|---|---|---|---|
| | Fixed point to chamber bottom (1) | Fixed point to top of sediment (2) | | | |
| 3/15/01 | 6.3 ft. | none | | New installation. Fixed point is CI frame at grade | djm |
| 9/24/01 | | 6.2 | 0.1 ft. | Some grit felt | sm |
| 6/20/03 | | 5.8 | 0.5 ft. | Mucky feel, debris visible in manhole and in Isolator row, maintenance due | rv |
| 7/7/03 | 6.3 ft. | | 0 | System jetted and vacuumed | djm |

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## HIGH-QUALITY TPV POURED-IN-PLACE

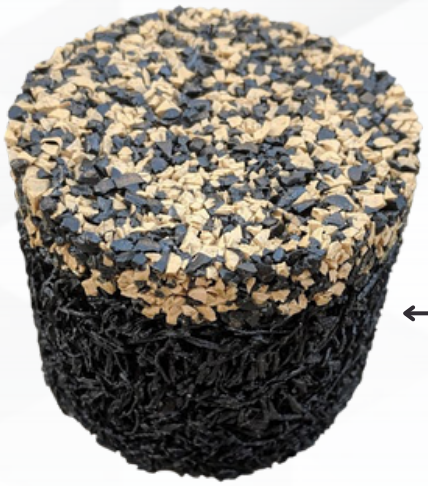
EnduraFlex is a superior poured-in-place rubber surface. It consists of two layers: a cushioned base and a surface layer of TPV granules (each granule being 1-4 mm). TPV is a vulcanized product, making it better equipped to withstand daily wear and tear and color fading from consistent UV exposure.

## Advantages:

- Can be modified to meet varying critical fall heights
- Offered in a wide array of colors
- IPEMA Certified
- Wheelchair Accessible
- Durable
- Can be installed indoors or outdoors
- Suitable for all-age playgrounds








EnduraFlex is offered in a wide array of colors. Colors may be mixed or designed side-by-side. More intricate design work, involving numerous colors and patterns, is also available.

flex GROUND®
INNOVATIVE • QUALITY • SURFACING

888-571-1080
www.flexground.com

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# RUBBER SURFACE REPAIR & MAINTENANCE

## REFRESH




**FlexCoat™** FlexCoat is a urethane top dressing which may be applied to any rubber safety surface. Our FlexCoat urethane coating rebinds the rubber granules, improving the product's useful life. FlexCoat also rejuvenates and refreshes surface colors. FlexCoat is recommended as a preventative maintenance application. To ensure longevity, it is recommended that a FlexCoat be applied every two years. It is recommended to pressure wash and power blow surface as needed before FlexCoat is applied.

## REPAIR



**FlexGrout™** This newly engineered grouting compound repairs and strengthens rubberized surfacing systems, and has been tested to withstand even the most extreme conditions. Tired of repairs to loose and granulated rubber in high-wear areas such as underneath swings or at slide exits? Installing a new pad and just want to make sure you don't have to deal with that inevitable hassle? FlexGrout is the perfect option for use in high-wear areas.



**FlexFix™** Finding holes in your previously applied rubber surface? FlexGround can quickly and easily repair minor and major damage. Small repairs can be made in various designs and colors (triangles, circles, happy faces etc) in order to create the appearance that the repaired area was part of the original design.

## RETOP



**FlexTop™** FlexTop is the solution for widespread and severely damaged rubber. It consists of reapplying the EPDM or TPV top surface (and cushioning where needed). FlexTop can be applied as 1.5" over existing wear layer, or can be accomplished by removing the existing color layer, freshening the cushion and then installing a new 1/2" color wear layer. Either method works to conceal any age and maintain or improve critical fall.

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CERTIFICATE OF COMPLIANCE

EPA 1633

Firefly Sports Testing
78 Londonderry Tpk, Unit D5
Hooksett, NH 03106

# CERTIFICATE OF COMPLIANCE

Certificate Number: 2025-100873-01A

| | |
|---|---|
| Applicant | Flexground c/o SprintPlay<br>2140 E. Cedar Street<br>Tempe, AZ 85281 |
| Manufacturer | Flexground c/o SprintPlay<br>2140 E. Cedar Street<br>Tempe, AZ 85281 |
| Product | Poured-In-Place Rubber |
| Model Number | TPV PIP top -Part# TPV-50.50 |
| Test Standard | EPA 1633: Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS |
| Test Report Number | 100873-01 |
| Test Date(s) | 8/18/2025 – 8/19/2025 |
| Validation Agency | Firefly Sports Testing<br>78 Londonderry Tpk, Unit D5<br>Hooksett, NH 03106 |
| Validation Date | 8/21/2025 |
| Expiration Date | 8/21/2026 |

Firefly Sports Testing certifies that the sample(s) identified in this certificate have been tested in accordance with the method(s) and specification(s) listed herein. The submitted sample(s) were evaluated under the conditions stated in the associated test report. Testing conducted in accordance with EPA Method 1633 detected no PFAS compounds above the method's reporting limits. This certificate applies only to the specific sample(s) tested and the conditions at the time of testing.

Approved By

Jeff Gentile
*Co-Founder & CFO*

This certificate is based on the results and conditions documented in the associated test report issued by Firefly Sports Testing. Use of the Firefly Certification Mark is permitted only for the specific configuration tested and is subject to Firefly's Certification Mark Usage Policy. Where subcontracted testing was performed, the method and laboratory details are documented in the associated test report. Conditions for the validity and use of this certificate may be subject to additional requirements. For further details, please contact Firefly Sports Testing.

# POURED IN PLACE
# EnduraFlex, UltraFlex, Standard EPDM
## MAINTENANCE MANUAL

**Keep Loose Debris Off**

- Loose debris such as sand, dirt, and small stones on top of poured in place surfaces can produce slip hazards. It is recommended that a regular periodic removal of this loose debris be done. It is best to vacuum porous surfaces to clear the permeable openings as to remove top litter. Blowing can also be an effective means of achieving this. Dry sweeping or scrubbing will remove the loose litter but can force more fine particles into porous openings of some surfaces. This should be done at least every two-three weeks but may be necessary more often if local conditions warrant.
- Pressure washer less than 3000 psi. No turbo tip or bulls eye tip can be used on pressure washer.
- Cleaning can be done with just a hose, or the pressure washer and Simple Green can be used or TSP for getting stains out like dirt, or soda spills.
- No shoes with Cleats metal or plastic.
- No roller blades, scooters, skates, skateboards or bikes should be used as they can damage surface over time and will mark up the lighter colors and white lines.
- All furniture on courts should have Rubber wheels or the legs of chairs should have flats surfaces or Rubber protection caps.
- A clear maintenance sealer every two years is recommended. This will help keep the surface in good condition, reduces granulating and cracking, and can extend the life of the surfacing.

**Correct cleaner for deposits**

It helps to use the right cleaner to remove problem deposits or spills on unitary surfacing. Here is what is recommended for the following problems on unitary surfacing:

- Bird droppings or other excrement:
    - Do not attempt to loosen any dry excrement that is stuck to the surfacing; this could cause disease-causing fungus in the deposition to become air-borne. Wear disposable gloves. Remove any loose excrement. Scrub deposits with dampened Simple Green, Bon Ami™, Borax™ or STPP and then wash with a Borax™ or STPP solution. Soak up residue with disposable rags. Disinfect by spraying on hydrogen peroxide and let stand for at least two minutes, then spraying again with vinegar and let stand for at least two minutes. (Do not mix these together; spray separately for best results.) Soak up residue with disposable rags. Double rinse with clean water.
- Blood:
    - Wear disposable gloves. Remove and disinfect by spraying on hydrogen peroxide and let stand for at least two minutes, then spraying again with vinegar and let stand for an additional two minutes. Soak up residue with disposable rags. Double rinse with clean water.

- Chewing Gum:
    - Apply dry ice (regular ice isn't as effective) to freeze the gum and chip it from the surface and remove it.
- Gasoline:
    - Wash with a detergent and water. Soak up with disposable rags. Double rinse with clean water.
- Grass Stains:
    - Apply orange oil cleaner. Work in and soak up with disposable rags. Double rinse with clean water
- Moss/Algae/Mildew/Mold:
    - Saturate with hydrogen peroxide and let stand for at least five minutes. Repeat using vinegar. Soak up with disposable rags. Double rinse with clean water
- Scuff Marks:
    - Scrub with dampened Bon Ami™, Borax™, or STPP. Double rinse with clean water
- Soda or Juice:
    - Saturate with Formula 407™. Work in and soak up with disposable rags. Then wash with a liquid detergent, Borax™ or STPP solution. Double rinse with clean water
- Tar/Crayon/Lipstick/Tree Sap/Motor Oil/Grease:
    - Apply one or more of the following: orange oil cleaner, Goop™, or Formula 407™. Work in and soak up with disposable rags. Then scrub with dampened Bon Ami™, Borax™ or STPP. Double rinse with clean water
- Urine/Vomit/Nasal Discharge:
    - Wear disposable gloves. Wash with a Borax™ or STPP solution. Soak up residue with disposable rags. Disinfect by spraying on hydrogen peroxide and let stand for at least two minutes, then spraying again with vinegar and let stand for an additional two minutes. (Do not mix these together; spray separately for best results.) Soak up residue with disposable rags. Double rinse with clean water.

**Avoid harmful solvents and cleaning products:**

The following are effective cleaning agents but they are NOT recommended on most unitary safety surfaces. They may be detrimental to the surfacing because, over time, they could break down the polyurethane binding component and may lead to de-plasticization of the rubber. Most are not environmentally friendly. Some also change the appearance of the cleaned area compared to the rest of the surface or make the surface very slippery. Use of these solvents may void warranty:

| | | | |
|---|---|---|---|
| *Acetate* | *Ammonia* | *WD40* | *Mineral spirits* |
| *Chlorine bleach* | *Glycerin* | *Lighter fluid* | |
| *Petroleum distillates* | *Benzene* | *Turpentine* | |
| *Petroleum Jelly* | *Naphtha* | *Carbon tetrachloride* | |

# SUPERIOR PET SURFACING | ForeverLawn



## K9Grass

**The synthetic grass designed specifically for dogs!**

MADE IN THE USA

**K9Grass®** is the synthetic grass designed specifically for dogs! A premium product line that has been time-tested and proven by thousands of commercial pet facilities and homeowners, K9Grass is the leader in pet surfacing. Cleanliness and safety is maximized thanks to our edge-to-edge drainage, and you can't beat the beauty and safety that an expert K9Grass installation provides. Your dogs will love it too! Say goodbye to cold concrete, gravel, mulch, muddy yards, and dirty paws—K9Grass is the solution you have been looking for.



### K9Grass Classic +

Durable, drainable, cleanable, and antimicrobial.



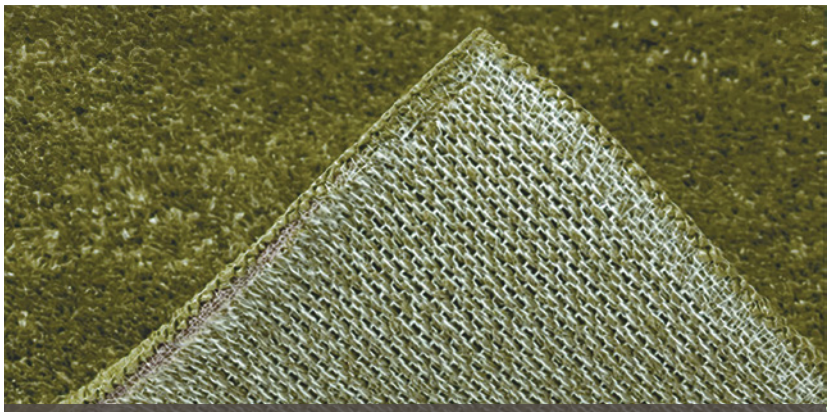
### K9Grass Elite

Performs like K9Grass Classic + with extreme durability and superior realism.



### K9Grass Endura

Our softest nylon meets unmatched realism and drainage.



Unique Flow-Through Backing™ provides edge-to-edge drainage.

## No More Mud!

**Kennels, boarding facilities, and dog parks.**

Pet facilities benefit from the long-term savings, added cleanliness, and increased revenue they see after installing our pet-friendly grass. Clean, safe, beautiful, and easy to maintain—we offer everything you want and need from a surfacing product. Contact your local ForeverLawn expert for more information on K9Grass.



### More on K9Grass Sport

Designed for athletic peak performance and superior traction, K9Grass Sport is the perfect surface for athletic training areas and agility courses. K9Grass Sport provides stability and cushion to limit risk of injuries while offering you the ability to adjust performance to your liking. K9Grass is specifically designed to set the bar high on performance.

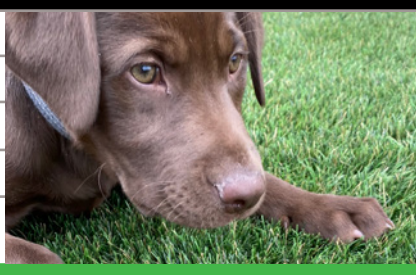
# PRODUCT SPECIFICATIONS

For the ultimate in pet surfacing, trust ForeverLawn®. Choose from a variety of products including K9Grass Elite, K9Grass Classic +, and K9Grass Endura, which feature our unique knitted Flow-Through Backing™ providing edge-to-edge drainage. Looking for artificial grass specifically for an agility course or sporting application? K9Grass Sport provides the ultimate surface for performance and safety.

| COMPONENTS | K9Grass Elite | K9Grass Classic + | K9Grass Endura | K9Grass Sport |
|---|---|---|---|---|
| **YARN TYPE** | • Primary: Nylon monofilament<br>• Secondary: Heat set textured nylon monofilament | • Primary: Polyethylene monofilament<br>• Secondary: Heat set textured nylon monofilament | • Primary: Nylon monofilament<br>• Secondary: Curled nylon monofilament | • Primary: Polyethylene slit film<br>• Secondary: Heat set textured nylon monofilament |
| **YARN COLOR** | • Primary: Verde, Lime, Tan<br>• Secondary: Turf Green | • Primary: Summer Green<br>• Secondary: Turf Green | • Primary: Field/Apple Green<br>• Secondary: Green/Tan | • Primary: Olive green<br>• Secondary: Turf green/Tan blend |
| **YARN COUNT** | • Primary: 4550/7<br>• Secondary: 4200/8 | • Primary: 5000/4<br>• Secondary: 4200/8 | • Primary: 5000/8<br>• Secondary: 4730/8 | • Primary: 5,040/1<br>• Secondary: 4,200/8 |
| **CONSTRUCTION** | • Knitted | • Knitted | • Knitted | • Dual yarn, same row |
| **BLADE HEIGHT** | • 7/8"* | • 7/8"* | • 7/8"* | • 1-1/2"* |
| **FACE WEIGHT** | • 60 oz.* | • 65 oz.* | • 75 oz.* | • 48 oz.* |
| **TOTAL PRODUCT WEIGHT** | • 65 oz.* | • 70 oz.* | • 80 oz.* | • 103 oz.* |
| **BACKING** | • Flow-Through Backing™ | • Flow-Through Backing™ | • Flow-Through Backing™ | • Three-layer premium backing made with BioCel polyurethane and 100% recycled geotextile nonwoven fabric on a dual layer primary. |
| **ANTIMICROBIAL** | • AlphaSan® | • AlphaSan® | • Yes | • AlphaSan® |
| **ANTISTATIC** | • No | • No | • No | • Yes |
| **DESIGNED FOR PET WASTE** | • Yes | • Yes | • Yes | • No |
| **SEAMING** | • Turf adhesive | • Turf adhesive | • Turf adhesive | • Micromechanical bonding |
| **INFILL** | • NONE | • NONE | • NONE | • Adjustable |
| **WARRANTY** | • 15-year | • 15-year | • 15-year | • 15-year |

## A CLEANER, SAFER, BETTER SMELLING ENVIRONMENT FOR PETS.

| | |
|---|---|
| **Durable** | Dense interlocking construction of high-grade materials. |
| **Drainable** | Unique knitted Flow-Through Backing**. |
| **Cleanable** | Short, dense blade construction requiring no infill greatly enhances cleanability. |
| **Safe** | Integral AlphaSan® antimicrobial protection built-in. |



*Product heights shown may have a variance of 1/8" and product weights shown may have a variance of 5%. **Applies to K9Grass Elite, Classic +, and Endura

## ForeverLawn PFAS Safety Statement

Since our inception, ForeverLawn has prioritized both quality and integrity of product, understanding that to properly serve our customers and communities we must provide a solution that enhances and fosters safety, accessibility, and longevity. Guided by this conviction, we have selected both materials and partners with the utmost caution to ensure we produce the best and safest synthetic grass solutions.

As a result of this, we say with absolute certainty that the entire ForeverLawn family of products are not constructed with any per- and/or polyfluoroalkyl substances (PFAS) and have reverified with our suppliers that all components used are PFAS-free. It should be noted that while our materials and products are not manufactured with PFAS, certain processes and environmental conditions can cause trace amounts of PFAS to appear on specific products. However, these residual quantities are negligible when compared to other common household items and do not pose any known safety concerns.

It is commonly known that many products we engage with every day contain some PFAS. For example, a toothbrush might have up to 800 parts per million of PFAS. Makeup, medicines, and other personal care products may contain several thousand parts per million. In contrast, independent testing of our product components have verified that our products contain less than 100 parts per million - far less than these everyday products.

As such, we oppose statements claiming that "all artificial turf is made with toxic PFAS compounds,"[1] and instead stand by the proven safety of our products which help preserve the well-being of our customers and their environments.

Synthetic turf has time and time again been shown to safeguard and enhance community life. Synthetic turf protects water sources by eliminating chemical runoff from pesticides and fertilizers.[2] Athletes using synthetic turf field facilities have comparable or even lower carcinogenic exposure levels when compared to groups of their peers.[3] Furthermore, synthetic turf increases usability of spaces by up to 300% when compared to even the most intensely maintained natural grass spaces.[4]

ForeverLawn also proudly offers a variety of proprietary and proven safety features within our products and systems, including antistatic and antimicrobial product qualities, superior G-MAX ratings, up to 15-foot critical fall height ratings, and surfaces exceeding ADA accessibility specifications.

ForeverLawn is fully committed to improving our communities' safety, from the production to the applications of our products. We are continuously seeking ways to enhance and improve these offerings, even as we lead the industry in safety, accessibility, and longevity. We look forward to continually serving our customers with the best products and practices available.



Brian Karmie
Co-Founder of ForeverLawn



Tom Fulk
Supply Chain & Production Specialist

1 Perkins, Tom. "Boston Bans Artificial Turf in Parks Due to Toxic 'Forever Chemicals'." The Guardian, Guardian News and Media, 30 Sept. 2022, https://www.theguardian.com/environment/2022/sep/30/boston-bans-artificial-turf-toxic-forever-chemicals-pfas.
2 "Issue Briefs & Position Statements for STC Members." Synthetic Turf Council, https://www.syntheticturfcouncil.org/general/ custom.asp?page=Position_Statements.
3 Peterson, Michael K., et al. "Comprehensive Multipathway Risk Assessment of Chemicals Associated with Recycled ('Crumb') Rubber in Synthetic Turf Fields." Environmental Research, vol. 160, 1 Mar. 2018, pp. 256–268., https://doi.org/10.1016/j.envres.2017.09.019.
4 "Issue Briefs & Position Statements for STC Members." Synthetic Turf Council, https://www.syntheticturfcouncil.org/general/custom.asp?page=Position_Statements.

K9Grass® by ForeverLawn®

# Maintenance Guidelines







## Welcome

Congratulations on your investment in K9Grass® by ForeverLawn®. We are excited to have you as a part of the ForeverLawn K9Grass family. As you know, K9Grass is the artificial grass made specifically for dogs, and is the premier surfacing product for dogs everywhere.

We want to make sure that your experience with K9Grass is as enjoyable and successful as possible. Defining and following specific maintenance guidelines for your unique situation is important. To help you get there, this document provides general maintenance guidelines with common thresholds. Please contact your ForeverLawn dealer to find out how best to tailor them for you.

**Success** with artificial grass in pet applications comes down to **three simple steps:**

1. Choose the best product (which you have already found in K9Grass by ForeverLawn).
2. Ensure that the product is correctly installed. This is best achieved by our professional installation team.
3. Properly care for your K9Grass. Refer to the general guidelines provided below, and tailor them to fit your specific needs as determined by you and your ForeverLawn dealer.

## Proper K9Grass Maintenance

**Remove large debris regularly and solid waste immediately.**

Debris such as leaves and sticks should be removed regularly. Leaf rakes and blowers are great tools to accomplish this.

Solid pet waste is easy to locate and should be removed frequently (immediately if possible—the sooner the better). The more dogs there are, the more important this is. If the solid waste is messy, pick up all that you can, rinse with a hose, and treat with a bacterial enzyme. DO NOT RINSE SOLID WASTE INTO THE GRASS.

**Use a bacterial enzyme cleaner (odor eliminator with live bacteria).**

It is advisable to have a spray bottle filled with premixed bacterial enzyme to treat the spot where the waste was removed. We recommend Got Pee Odor Eliminator, which can be purchased through your ForeverLawn dealer. The product is a concentrate so it can be easily diluted for use in hand-held spray bottle.

Broad spraying of a bacterial enzyme should be done regularly. A hose attachment is available for purchase from your ForeverLawn dealer and is recommended. Early evening is a good time to treat outdoor areas. Indoor K9Grass typically requires an application of once per day at a minimum. The purpose of these treatments is to break down residual waste (urine and feces) which, if not addressed, can be the source of odor or unclean conditions. The longer the bacterial enzyme is left on the grass, the better it works.

Got Pee Odor Eliminator, specially designed containing live bacteria, is safe for use with dogs. If another brand is used, we recommend that you consult with the manufacturer to confirm that it is safe to use with dogs. The product activates and continues to work as long as there is moisture and pet waste present. In lieu of a hose applicator, rinse well with a hose and mist grass with a premixed spray (6 - 8 ounces per gallon applied with a pump sprayer).

Frequency of treatment will be dependent on the size of the area, number of dogs, climate, use, and design of installation.Consult your ForeverLawn dealer for specific guidelines. General guidelines are to apply bacterial enzymes on a regular interval preemptively heading off odors (you will need to find the frequency that works for you). Reactively, it can be applied any time there is an odor. A good place to begin for common outdoor use is to start weekly then increase or decrease based on results.

K9Grass® by ForeverLawn®

# Maintenance Guidelines





**Remove small debris with vacuums and extraction equipment.**

It is important to remove hair and smaller debris to keep the K9Grass performing at its best. This can be accomplished by running a vacuum when the grass is dry (with a rotating brush and strong suction) to groom, agitate, and remove debris. For installations under 1,500 square feet, a household vacuum can be used. Larger areas may require a commercial vacuum or a power broom (consult your ForeverLawn dealer). Frequency is dependent on size, number of dogs, and how the area is used. Removing this debris keeps the grass looking good and prevents urine, hair, and waste from slowing drainage and holding unwanted waste.

**Outdoor area:** A common place to start for an area of typical size and use is to vacuum hair and small debris once a month. Remember, this is a starting point and will likely need to be adjusted by monitoring the amount of debris and hair coming out. High-use outdoor areas may require weekly vacuuming. A shop vac can be used around the perimeter (fence and walls).

**Indoor area:** A common place to start for an indoor area of typical size and use is to begin by extracting and vacuuming every other day. A commercial-grade carpet extractor may be preferred for indoor use as it can be run when the grass is wet, pulling out hair and debris while also removing residual water. This is a starting point and will likely need to be adjusted by monitoring the amount of debris and hair coming out. It is very common for daily vacuuming and extraction to be required for indoor areas. A shop vac can be used around the perimeter (fence and walls).

**Additional Notes**

- Rinsing the grass between cleanings is advisable if you do not have regular rain.
- If you have a sick dog, clean and sanitize the area by removing the bulk matter, apply Got Pee Odor Eliminator bacterial product to that area. Allow the bacterial action to consume and liquify blood, urine, feces, and vomit. Then rinse or extract the area clean with water to flush away contaminants. Got Pee Odor Eliminator cleans and deodorizes K9Grass with every application.
- If you have a flushing system, it is designed to dilute urine and move it to the drain. Consult your ForeverLawn dealer regarding frequency and duration.

## Maintenance Products Available from your ForeverLawn Dealer

Got Pee Odor Eliminator is a highly concentrated product (mixes 20:1) that comes in a variety of sizes (quart, gallon, 5 gallon, 33 & 55 gallon drums). Contact your ForeverLawn dealer to request a sample or place an order. If your ForeverLawn Dealer is unable to fulfill your order, you may also order products from the ForeverLawn home office by calling 866.992.7876.

We are happy to have you as part of the ForeverLawn family! Please do not hesitate to call your ForeverLawn K9Grass dealer with maintenance questions or concerns. We are glad to assist you.

got pee?
ODOR ELIMINATOR




M0085 Rev. 04/18

HOME OFFICE
**8007 Beeson St., Louisville, OH 44641**

PHONE
**866.992.7876**

WEB
**k9grass.com**

MADE IN THE USA

# APPENDIX H: DRAFT STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

# *STORM WATER POLLUTION PREVENTION PLAN*

## *for*

## *CONSTRUCTION ACTIVITIES*

## *at*

Heritage on Main
107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St
Town of Medway, Norfolk County, Massachusetts 02053
Insert Project/Site Telephone Number

**SWPPP Prepared For:**

RTE. 85 Realty Corp.
Tariq H. Fayyad, M.S.
32 Hastings St, P.O. Box 444
Mendon, MA, 01756
(508) 422-1050
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**Prepared by:**

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**20 Winthrop Square, 4th Floor**
**Boston, MA 02110**
**Phone: (617) 849-8040**
**www.bohlerengineering.com**

**SWPPP Preparation Date:**

August, 2026

**Estimated Project Dates:**

**Project Start Date:** TBD
**Project Completion Date:** TBD

Prepared by:

BOHLER

W211301

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## ***PROJECT SUMMARY***

The site consists of approximately 22.9 acres of land located on the southerly side of Main Street, the easterly side of Elm Street, and the northerly side of Vine Street the Town of Medway, Massachusetts. The site contains existing buildings and paved and forested areas. There are no known modern best management practices for water quality treatment in place to treat existing stormwater collected from the site.

The project currently proposes redeveloping the existing site with a 74,540-sf± residential building, one (1) 2,000-sf± restaurant with drive-through facilities, one (1) 3,500-sf± bank with drive-through facilities, and one (1) fueling station with an associated 5,400-sf± convenience store, along with paved parking areas, landscaping, and associated stormwater management system(s) and utilities.

The Project will provide erosion and sedimentation controls during the demolition and construction periods, as well as long term stabilization of the Site. The Project will also include proposed stormwater management controls designed in accordance with requirements set by the Town of Medway and the MassDEP Stormwater Handbook. The stormwater management controls are designed to collect and treat the stormwater runoff generated as a result of the Project through a combination of Best Management Practices prior to discharge to the existing Town drainage infrastructure.

## SECTION 1: CONTACT INFORMATION/RESPONSIBLE PARTIES

### 1.1 Summary of Requirements

Because the project will disturb more than one (1) acre during construction, coverage under EPA's National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharge from Construction Activities is necessary. In order for the project to obtain coverage under this NPDES General Permit, a Storm Water Pollution Prevention Plan (SWPPP) must be developed that contains the following requirements:

1. Certification for the Owner must be included in the SWPPP. Both the Owner and all Operators must submit separate eNOIs and apply for individual coverage under the CGP. The Owner is defined as the permittee with operational control over construction plans and specifications. The Operator is defined as the permittee with day-to-day operational control over activities necessary to ensure compliance with the SWPPP. Certifications are provided in Section 9.0 of this SWPPP.

2. An electronic Notice of Intent (eNOI) must be filed with the Federal Environmental Protection Agency (EPA) prior to the initiation of construction activity covered by the General Permit. Construction activities may begin fourteen (14) days after receipt of a complete eNOI is posted on EPA's NPDES web site. A paper copy of the Notice of Intent is provided for reference in Appendix A. The eNOI shall be completed and submitted by logging into the following website: https://cdx.epa.gov/cdx and following the steps to fill out an eNOI for the 2022 General Permit for Stormwater Discharges from Construction Activities (CGP). The eNOI will need to be certified by an appropriate member of the Operator's company. The certifying authority will need to set up and account with the EPA's NeT-CGP reporting system by registering as a certifier at this website address: https://cdx.epa.gov/cdx

3. The Owner must also demonstrate as to whether or not the project's receiving waters has an established or approved Total Maximum Daily Load (TMDL). These issues are discussed in Section 2.0.

4. The Owner must demonstrate compliance with the Endangered Species Act (ESA) and the Historic Preservation Act (HPA). The Owner must determine whether any listed endangered or threatened species or designated critical habitat exists in the Project area. The Owner must also determine whether areas of historical significance occur in the vicinity of the site. These issues are outlined in Section 3.0 and Appendices J and K which contain correspondence with the Massachusetts Historical Commission and U.S. Fish and Wildlife Endangered Species Division.

5. Storm water pollution prevention controls for construction activities must be implemented and must conform to the Massachusetts Department of Environmental Protection and Federal Environmental Protection Agencies Standards. The storm water pollution prevention controls proposed for this project are presented in Section 4.0.

6. The SWPPP must identify any authorized non-storm water discharges that are combined with storm water discharges and implement a system of controls to provide appropriate pollution prevention measures to these components of the discharge. Non-storm water discharges and appropriate controls are discussed in Section 5.0.

7. An inspection and maintenance plan must be developed and implemented. This inspection and maintenance plan is presented in Section 6.0. Construction activity records must be completed and maintained. Construction activity records shall be completed and maintained in Appendix C and Site Inspection Reports shall be completed and maintained in Appendix D.

8. A written description of the release of a Reportable Quantity (RQ), an estimate of the amount of the release, the date of the release, the circumstances leading up to the release, and the steps that will be taken in response to the release must be submitted to the EPA. Copies of the written description shall be retained in Appendix E.

9. The SWPPP must be updated to accurately reflect site changes, control measure changes or in response to a hazardous or reportable quantity (RQ) release as defined in the Emergency Response Plan for the Project. Copies of SWPPP amendments shall be retained in Appendix F.

10. After final stabilization of the construction site, a Notice of Termination (NOT) shall be submitted to the EPA. The NOT shall be retained in accordance with CGP requirements.

11. The SWPPP and all construction records must be retained for a period of at least three (3) years following final stabilization and the filing of a NOT. A copy of the SWPPP and all pertinent records shall be maintained at the construction site during the duration of construction activity.

Additional requirements under the General Permit that are not included as part of this SWPPP include the following:

1. A sign or other notice of the permit coverage must be posted 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 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:

    1.10 The NPDES ID (i.e., permit tracking number assigned to your NOI).

    1.11 A contact name and phone number for obtaining additional construction site information.

    1.12 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*].

    1.13 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. The Owner and Operator must allow access to the construction site by the EPA and Massachusetts Department of Environmental Protection (MassDEP).

## 1.2 Operator(s) / Subcontractor(s)

All Operators associated with this construction project to be covered under the NPDES General Permit must adhere to the requirements of this Stormwater Pollution Prevention Plan (SWPPP).

This SWPPP was required to be developed prior to submitting the electronic Notice of Intent (eNOI).

All known Operators associated with a construction project to be covered under this permit have been identified and are noted within this section of this SWPPP. This SWPPP has been developed on behalf of Owner/Developer but may be used as a group SWPPP as it is intended to address both the owner's and the General Contractor's scope of work and obligations under the General Permit. Should the General Contractor choose to utilize this SWPPP to obtain coverage under the General Permit, they must complete and submit the appropriate documents, certifications and NOI included within the SWPPP.

Note: For the purposes of this SWPPP, an "Operator" is any party associated with a construction project that meets either of the following two criteria:

1. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or

2. 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).

Subcontractors generally are not considered operators for the purposes of this permit but are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that they perform on-site. It is recommended that the Operators require their subcontractors sign a Subcontractor Agreement such as the type included in Appendix G of this SWPPP.

All Operators must file an eNOI to obtain coverage under the General Permit.

Note: Where there are multiple operators associated with the same project, all operators are required to obtain permit coverage.

The Operator(s) who will be engaged in construction activities at the site have been identified as the following:

Owner/Developer
Name: RTE. 85 REALTY CORP.
Contact Name: Tariq H. Fayyad, M.S.
Street: 32 Hastings St, P.O. Box 444
City, State, Zip Code: Mendon, MA 01756
Telephone: (508) 422-1050
Fax:
Email: Ty@ImperialCars.com

Contractor Name: TBD
Contact Name:
Street:
City, State, Zip Code:
Telephone:
Fax:
Email:

If more than one contractor is present:

Contractor Name:
Contact Name:
Street:
City, State, Zip Code:
Telephone:
Fax:
Email:

### 1.3 Stormwater Team

Each Operator, or group of multiple operators that will be involved with this project, must assemble a "Stormwater Team," which will be responsible for overseeing the development of the SWPPP, any later modifications to it, and for carrying out activities necessary to comply with the General Permit. This SWPPP identifies the following individuals as the Stormwater Team:

| | |
|---|---|
| Role or Responsibility: | Civil Engineer – Bohler Engineering |
| Name: | TBD |
| Position: | |
| Telephone: | |
| Email: | |
| ☐ Yes<br>Date: | I have read the CGP and Understand the Applicable requirements |
| ☐ Yes | I have completed training required by the General Permit part 6.2 |
| Role or Responsibility: | Operator / Contractor |
| Name: | |
| Position: | |
| Telephone: | |
| Email: | |
| ☐ Yes<br>Date: | I have read the CGP and Understand the Applicable requirements |
| ☐ Yes | I have completed training required by the General Permit part 6.2 |
| Role or Responsibility: | Personnel responsible for maintenance / corrective action |
| Name: | |
| Position: | |
| Telephone: | |

Email:

☐ Yes
Date:

I have read the CGP and Understand the Applicable requirements

☐ Yes

I have completed training required by the General Permit part 6.2

Role or Responsibility: Personnel responsible for inspections
Name:
Position:
Telephone:
Email:

☐ Yes
Date:

I have read the CGP and Understand the Applicable requirements

☐ Yes

I have completed training required by the General Permit part 6.2

Role or Responsibility: Personnel responsible for application and storage of treatment chemicals (if applicable)

Name:
Position:
Telephone:
Email:

☐ Yes
Date:

I have read the CGP and Understand the Applicable requirements

☐ Yes

I have completed training required by the General Permit part 6.2

If more than one contractor is present:

Role or Responsibility:
Name:
Position:
Telephone:
Email:

☐ Yes
Date:

I have read the CGP and Understand the Applicable requirements

☐ Yes

I have completed training required by the General Permit part 6.2

**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 |
|---|---|---|---|
| TBD | 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<br><br>☐ Proper installation and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites<br><br>☐ Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of Part 4 |
| Insert Name of Responsible Person<br>Insert Position<br>Insert Telephone Number<br>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<br><br>☐ Proper installation and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites<br><br>☐ Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of Part 4 |
| Insert Name of Responsible Person<br>Insert Position<br>Insert Telephone Number<br>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<br><br>☐ Proper installation and maintenance of erosion and sediment controls and pollution prevention practices used at construction sites<br><br>☐ Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of Part 4 |

Each member of the stormwater team must maintain ready access to an electronic or paper copy of applicable portions of this permit, the most updated copy of the SWPPP, and other relevant documents or information that must be kept with the SWPPP.

### 1.4 Required SWPPP Modifications

The Operator(s) must modify the SWPPP, including the site map(s), in response to any of the following conditions:

- Whenever new operator(s) become active in construction activities on your site, or changes are made to the construction plans, stormwater control measures, pollution prevention measures, or other activities at the site that are no longer accurately reflected in your SWPPP. This includes changes made in response to corrective actions. The SWPPP does not need to be modified if the estimated construction sequence dates change during the course of construction;

- To reflect areas on the site map where operational control has been transferred (and the date of transfer) since initiating permit coverage;

- If inspections or investigations by site staff, or by local, state, tribal, or federal officials determine that SWPPP modifications are necessary for compliance with this permit;

- Where EPA determines it is necessary to impose additional requirements on your discharge, the following must be included in your SWPPP:
  - A copy of any correspondence describing such requirements and;
  - A description of the stormwater control measures that will be used to meet such requirements.

- To reflect any revisions to applicable federal, state, tribal, or local requirement that affect the stormwater control measures implemented at the site; and

- 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.

The Operator must complete required revisions to the SWPPP within seven (7) calendar days following the occurrence of any of the conditions listed above.

All modifications shall be recorded in Appendix F and shall include dates, description of the modification, and the name of the person authorizing the change. All affected operators shall be notified of said change.

### 1.5 Requirement to Post a Notice of Permit Coverage

A sign or other notice of permit coverage must be posted at a safe, publicly accessible location in close proximity to the construction site. 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 ID (i.e. 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 Office at https//www.epa.gov/npdes/contact-us-stormwater#regional

- 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 ."

## SECTION 2: SITE EVALUATION, ASSESSMENT, AND PLANNING

### 2.1 Project/Site Information

| | |
|---|---|
| Project Site Name: | Heritage on Main |
| Project Address: | 107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St |
| Project State and Zip Code: | Massachusetts 02053 |
| Project County: | Norfolk County |

### 2.2 Project Latitude/Longitude

Latitude: 42º 08' 57.7" N (degrees, minutes, seconds)
Longitude: 71º 25' 03.4" W (degrees, minutes, seconds)

Method for determining latitude/longitude:
☐ USGS Topographic Map (specify scale): _____
☐ EPA Web Site
☒ GPS
☐ Other: _____

Horizontal Reference Datum:
☐ NAD27 ☒ NAD 83 or WGS 84 ☐ Unknown

### 2.3 Additional Project Information

Is the project/site located in Indian country land, or located on property of a religious or cultural significance to an Indian tribe?
☐ Yes ☒ No

If Yes, provide the name of Indian country land or Indian tribe associated with property:

_____

Are the earth-disturbing activities in response to a public emergency?
☐ Yes ☒ No

If Yes, provide the cause of the public emergency:

_____

Are you applying for permit coverage as a “federal operator” as defined in Appendix A of the 2022 Construction General Permit?

☐ Yes ☒ No

## 2.4 Discharge Information

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)?

☒ Yes ☐ No

Are there any surface waters that are located within fifty (50) feet of your construction disturbance?

☒ Yes ☐ No

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)? |
|---|---|---|---|---|---|---|---|---|
| MA72-34 | Chicken Brook Park Pond | ☒ Yes ☐ No | Escherichia Coli (E. Coli) | ☒ Yes ☐ No | Massachusetts Statewide TMDL for Pathogen-Impaired Waterbodies (R1_MA_2024_04) | Enterococcus Escherichia Coli (E. Coli) Fecal Coliform | ☐ Yes ☒ No | N/A |

Describe the method(s) you used to determine whether or not your project/site discharges to an impaired water:
EPA Stormwater – How's My Waterway?

## 2.5 Nature of the Construction Activity

Construction activities will involve site preparation necessary for construction of the foundations for the major on-site structures, building of the access road, installation of the necessary underground utilities, and construction of the storm water management features. These activities primarily include: clearing and stripping of vegetation, excavating, hauling within site and stockpiling of top and subsoils, and trenching and rough grading. Once the excavations are completed, forms will be constructed for footings, piers, piles and/or foundations. The structure will then be constructed on the completed building foundations.

Soil erosion and sediment control measures will be installed prior to the commencement of any significant soil disturbing activities and will remain in place until final site stabilization is complete. These are discussed in the following section. Topsoil which must be excavated for site development will be separated from the remaining soil and stockpiled on-site (if practicable) for use during site landscaping. The stockpiled topsoil will be surrounded by silt fence and seeded to prevent the mobilization of sediment.

## 2.6 Size and Type of Construction Project

Size of Property: 22.93

Total Area of Construction Disturbance (in acres): 13.47

Max. Area to be Disturbed at Any One Time (in acres): 13.47
Including on-site and offsite construction activities

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

## 2.7 Construction Support Activities

Construction support activities located beyond the construction project area are not to be covered under this SWPPP and the Construction General Permit.

## 2.8 Sequence and Estimated Dates of Construction Activities

The following is a description of the intended sequence of construction activities, including an approximate schedule of the estimated start dates and the duration of the activity, for the following activities:

*Project Schedule: Sequence of Major Activities*

Construction is scheduled to begin ***[DATE]*** and extend for approximately ***[NUMBER OF DAYS]*** calendar days. Construction activities shall be documented and retained.

Construction activities include the following:

- *Construction activities may begin **14** days after receipt of complete NOI posted on EPA's NPDES web site.*
- *Construct temporary construction exit points at locations shown in the plans, for construction traffic**.***
- *Install silt fences around locations of all existing drainage structures as shown on the Erosion Control Plan.*
- *Install additional erosion control measures as outlined on the Erosion Control Plan.*
- *Perform clearing, grubbing, and topsoil removal as required.*
- *Begin site-grading operations. Approximately **13.5** acres of disturbance.*
- *Install all storm sewer pipes and underground utility lines as shown on the plans with appropriate erosion control measures to eliminate siltation from entering pipe systems.*
- *Begin building construction.*
- *When applicable, install base material as required for pavement.*
- *Construct all curb and gutter, gutter inlets, area inlets, and storm sewer manholes, as shown on the plans.*
- *Remove inlet protection around inlets and manholes no more than 48 hours prior to placing stabilized base course, if applicable. Note that erosion control around inlets cannot be removed until paving operations are complete.*
- *Remove temporary construction exits only prior to pavement construction in these areas (these areas are to be paved last).*
- *Carry out final grading and seeding and planting as shown on Landscape Plan.*
  *Remove silt fencing only after all paving is complete and exposed surfaces are stabilized.*
  *Install final pavement as shown on the plans.*
- *Filing of NOT. **[***
- *Records retention for **3 years** after filing NOT.*

## 2.9 Business Days and Hours for the Project

The contractor is to confirm allowable work hours with the municipality's Building Department.

## 2.10 Potential Pollutant-Generating Activities

The following activities are anticipated during construction and could have the potential to generate pollutants. All such activities are to be conducted in accordance with all applicable General Permit requirements and in accordance with industry-standard best management practices. An inventory of possible pollutants associated with each activity is listed below next to the activity.

- Earthwork activities- sediment, earthwork equipment oil and fuel
- Paving operations- asphalt, asphalt sealer, oil, paving equipment fuel
- Concrete- concrete washout, concrete truck oil and fuel
- Exterior building painting- solvents, paint thinners, painting wash water
- Landscaping- outdoor fertilizer storage and application of fertilizer
- Solid waste storage and disposal- construction waste including any of the items above and materials such as caulk, sealant, PVC glue, etc.

## 2.11 Deadline to Initiate Stabilization

The operator must initiate soil stabilization measures immediately whenever earth-disturbing activities have permanently or temporarily ceased on any portion of the site. Earth-disturbing activities have permanently ceased when clearing and excavation within any area of the construction site that will not include permanent structures has been completed.

In circumstances where unplanned or unanticipated delays in construction due to circumstances beyond the Operators control (e.g., sudden work stoppage due to unanticipated problems associated with construction labor, funding, or other issues related to the ability to work on the site; weather conditions rendering the site unsuitable for the continuation of construction work) and you do not know at first how long the work stoppage will continue, the requirement to immediately initiate stabilization is triggered as soon as you know with reasonable certainty that work will be stopped for 14 or more additional calendar days. At that point, you must comply with the deadlines to initiate and complete stabilization.

For the purposes of this SWPPP, EPA will consider any of the following types of activities to constitute the initiation of stabilization:

1. Prepping the soil for vegetative or non-vegetative stabilization;
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 area to be stabilized, but not on the entire area; and
5. Finalizing arrangements to have stabilization product fully installed in compliance with the applicable deadline for completing stabilization.

### *2.11.1 Deadline to Complete Stabilization Activities*

When a total of five (5) acres or less has been disturbed, and earth-disturbing activities have temporarily ceased when clearing, grading, and excavation within any area of the site that will not include permanent structures will not resume (i.e., the land will be idle) for a period of fourteen (14) or more calendar days, but such activities will resume in the future, stabilization measures shall be initiated. Stabilization measures shall be completed as soon as practicable, but no later than fourteen (14) calendar days after stabilization has been initiated. The fourteen (14) calendar day timeframe begins counting as soon as the Operator knows that construction work on a portion of the site will be temporarily ceased.

If more than five (5) acres of land has been disturbed, stabilization measures must be initiated immediately in areas of exposed soil where construction activities have permanently ceased or will be temporarily inactive for fourteen (14) more calendar days. Stabilization measures shall be completed as soon as practicable, but no later than seven (7) calendar days after stabilization has been initiated.

In areas discharging to a sediment or nutrient impaired water, or to a water identified as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes, stabilization must be completed as soon as practicable, but no later than seven (7) calendar days after stabilization has been initiated. For example, this would apply to sites discharging to waters with TSS, or phosphorus, or other similar impairments. This project meets this requirement.

As soon as practicable but no later than seven (7) or fourteen (14) calendar days depending on the above conditions, after the initiation of soil stabilization measures consistent with this SWPPP, the Operator is required to have completed:

a. For vegetative stabilization, all activities necessary to initially seed or plant the area to be stabilized; and/or
b. For non-vegetative stabilization, the installation or application of all such non-vegetative measures.

Final site stabilization is achieved when uniform perennial vegetative cover provides permanent stabilization for at least 70 percent of the disturbed soil surface, exclusive of areas that have been paved.

### *2.11.2 Exceptions to the Deadlines*

Deadlines for projects that are affected by arid or drought stricken areas, snow cover, or circumstances beyond the control of the Operator (as defined in Part 2 of the General Permit) that delay the initiation and/or completion of vegetative stabilization as required in this SWPPP, and are using vegetative cover for temporary or permanent stabilization, may comply with the following stabilization deadlines instead:

i. Immediately initiate, and within fourteen (14) calendar days complete, the installation of temporary non-vegetative stabilization measures to prevent erosion;

ii. 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

iii. Document the circumstances that prevent you from meeting the deadlines required in Section 2.11.1 above and the schedule you will follow for initiating and completing stabilization.

## 2.12 Allowable Non-Stormwater Discharges

The following is a list of allowable non-stormwater discharge present at the site:

| **Type of Allowable Non-Stormwater Discharge** | **Likely to be Present at Your Site?** |
|---|---|
| Discharges from emergency fire-fighting activities | ☐ YES ☒ NO |
| Fire hydrant flushings | ☒ YES ☐ NO |
| Landscape irrigation | ☒ YES ☐ NO |

| | |
|---|---|
| Waters used to wash vehicles and equipment | ☐ YES ☒ NO |
| Water used to control dust | ☒ YES ☐ NO |
| Potable water including uncontaminated water line flushings | ☒ YES ☐ NO |
| Routine external building wash down | ☐ 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 |

- Discharges from firefighting activities: Emergency firefighting activities are not anticipated.

- Fire hydrant flushing: It is anticipated that fire hydrant flushing will occur at the proposed hydrant locations during construction to allow for quality control during installation.

- Landscape irrigation: Irrigation of the proposed landscaping may be needed to promote establishment of vegetation.

- Water used to wash vehicles where detergents are not used: The washing of construction vehicles and equipment are not proposed onsite.

- Water used to control dust control: Dust control may be implemented onsite during construction and is anticipated to be located within ongoing non-stabilized work areas to prevent dry arid conditions.

- Potable water including uncontaminated water line flushing: During construction, it is anticipated that water line flushing will occur to assure quality control during installation.

- Routine external building wash down that does not use detergents: Building washdown during construction is not expected.

- Pavement wash waters: Washdown of pavement is not expected.

- Uncontaminated air conditioning or compressor condensate: The proposed building will contain air conditioning, however it is unknown at this time as to whether the condensate will discharge to the surface or be conveyed thought the building plumbing.

- Uncontaminated ground water or spring water: Groundwater and spring waters are not expected to be encountered.

- Foundation or footing drains where flows are not contaminated with process materials such as solvents; Footing drains are not proposed for this project.

- Uncontaminated excavation dewatering: Dewatering activities are not proposed at this time.

### *2.12.1 Prohibited Non-Stormwater Discharges*

The following discharges are specifically prohibited outright by the EPA's General Permit:

1. Wastewater from washout of concrete, unless managed by an appropriate control as described in section 2.3.4 of the General Permit.
2. Wastewater from washout and/or cleanout of stucco, paint, form release oils, curing compounds, and other construction materials.
3. Fuels, oils, or other pollutants used in vehicle and equipment operation maintenance.
4. Soaps, solvents, or detergents used in vehicle and equipment washing or external building washdown; and
5. Toxic or hazardous substances from a spill or other release.

To prevent the above-listed prohibited non-stormwater discharges, operators must comply with the applicable pollution prevention requirements in the General Permit or ensure the discharge is authorized by another NPDES permit consistent with requirements of the General Permit for commingled discharges.

### *2.12.2 Control Measures for Non-Storm Water Flows*

Dust control water sprays and irrigation sprinklers shall be undertaken to minimize any volume of non-stormwater runoff.

Pumped groundwater draw down water, fireline and potable waterline flushings shall be conducted directly into the storm water conveyance system. Flows are only to be directed into the drainage swales if adequate vegetative cover has been established and/or other provisions are taken to prevent erosion of the conveyance structures. Care shall be taken to prevent high flow hose discharges from eroding the detention pond bottom by either using splashboards or directing the flow into an existing pool of water. Groundwater or storm water pumped from excavations that contain silt or sediment shall be directed to a silt-fenced or straw bale diked area for settling prior to discharge to the detention basins.

Wash-up waters shall be directed to the detention basins. No wash waters containing chemicals shall be discharged on-site.

## 2.13 Site Maps

As part of this SWPPP a comprehensive design site plan package was developed entitled Heritage on Main Mixed Use Development dated 02/02/2026 see Appendix L. These plans are considered to be part of this SWPPP and shall be retained and made accessible in accordance with the SWPPP.

## SECTION 3: DOCUMENTATION OF COMPLIANCE WITH OTHER FEDERAL REQUIREMENTS

### 3.1 Endangered Species Protection

Under what criterion listed in Appendix D of the General Permit are you eligible for coverage?
☐ A ☐ B ☒ C ☐ D ☐ E ☐ F

#### *3.1.1 Supporting Documentation*

Provide a brief summary of the basis used by the other operator for selecting criterion A, B, C, D, E, or F:

Criterion A: No ESA-listed species and/or designated critical habitat present in action area. Using the process outlined in Appendix D of the General Permit, you certify that ESA-listed species and designated critical habitat(s) under the jurisdiction of the USFWS or NMFS are not likely to occur in your site's "action area" as defined in Appendix A of the General Permit. Please Note: NMFS' jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers.

☐ Check to confirm you have provided documentation in your SWPPP as required by CGP Appendix D (Note: reliance on State resources is not acceptable; see CGP Appendix D).

Refer to ESA worksheet and additional documentation in Appendix K

Criterion B: Eligibility requirements met by another operator under the 2022 CGP. The construction site's discharges and discharge-related activities were already addressed in another operator's valid certification of eligibility for your "action area" under eligibility Criterion A, C, D, E, or F of the 2022 CGP and you have confirmed that no additional ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS not considered in the that certification may be present or located in the "action area." To certify your eligibility under this criterion, there must be no lapse of NPDES permit coverage in the other CGP operator's certification. By certifying eligibility under this criterion, you agree to comply with any conditions upon which the other CGP operator's certification was based. You must include in your NOI the NPDES ID from the other 2022 CGP operator's notification of authorization under this permit and list any measures that you must comply with. If your certification is based on another 2022 CGP operator's certification under criterion C, you must provide EPA with the relevant supporting information required of existing dischargers in Criterion C.

☐ Check to confirm you have provided documentation in your SWPPP as required by CGP Appendix D

Refer to ESA worksheet and additional documentation in Appendix K

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.

Refer to ESA worksheet and additional documentation in Appendix K

Criterion D: Coordination between you and the USFWS and/or NMFS has concluded. The coordination must have addressed the effects of your site's discharges and discharge-related activities on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS, and resulted in a written confirmation from USFWS and/or NMFS that the effects of your site's discharges and discharge-related activities are not likely to result in any short- or long-term adverse effects. By certifying eligibility under this criterion, you agree to comply with any conditions you must meet for your site's discharges and discharge-related activities to not likely result in any short- or long-term adverse effects. You must include copies of the correspondence with the participating agencies in your SWPPP and this NOI.

☐ Check to confirm you have provided documentation in your SWPPP as required by CGP Appendix D.

Refer to ESA worksheet and additional documentation in Appendix K

Criterion E: ESA section 7 has concluded. A consultation between a Federal agency and USFWS and/or the NMFS under section 7 of the ESA has concluded. Consultations can be either formal or informal, and would have occurred only as a result of a separate Federal action (e.g., during application for an individual wastewater discharge permit or the issuance of a wetlands dredge and fill permit), and the consultation must have addressed the effects of your construction activity's discharges and discharge-related activities on all ESA-listed threatened or endangered species and all designated critical habitat under the jurisdiction of each Service, as appropriate, in your action area. The result of this consultation must be either:

- A biological opinion currently in effect that determined that the action in question (taking into account the effects of your facility's discharges and discharge-related activities) is likely to adversely affect, but is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The biological opinion must have included the effects of your facility's discharges and discharge-related activities on all the listed species and designated critical habitat in your action area under the jurisdiction of each Service, as appropriate. To be eligible under (i), any reasonable and prudent measures specified in the incidental take statement must be implemented
- Written concurrence (e.g., letter of concurrence) from the applicable Service(s) (i.e. USFWS and/or NMFS) with a determination that your facility's discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat. The concurrence letter must have included the effects of your facility's discharges and discharge-related activities on all the ESA-listed species and/or designated critical habitat on your species list(s) acquired from USFWS and/or NMFS.

The consultation does not warrant reinitiation under 50 CFR §402.16; or, if reinitiation of consultation is required (e.g., due to a new species listing, critical habitat designation, or new information), the Federal action agency has reinitiated the consultation and the result of the consultation is consistent with the statements above. (Note: you must include any reinitiation documentation from the Services or consulting Federal agency with your NOI.)

☐ Check to confirm you have provided documentation in your SWPPP as required by CGP Appendix D.

Refer to ESA worksheet and additional documentation in Appendix K

Criterion F: Issuance of section 10 permit. Potential take is authorized through the issuance of a permit under section 10 of the ESA by the USFWS and/or NMFS, and this authorization addresses the effects of the site's discharges and discharge-related activities on ESA-listed species and designated critical habitat. You must include copies of the correspondence between yourself and the participating agencies in your SWPPP and your NOI.

☐ Check to confirm you have provided documentation in your SWPPP as required by CGP Appendix D.

Refer to ESA worksheet and additional documentation in Appendix K

## 3.2 Historic Preservation

The following steps outline the Screening Process in Appendix E of the General Permit:

**Step 1**

Do you plan on installing any of the following stormwater controls at your site? Check all that apply below and proceed to 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:

**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 SWPPP.
If no, proceed to Step 3.

**Step 3**

If you answered no in Step 2, have you determined that your installation of subsurface earth-disturbing stormwater controls will have no effect on historic properties?

☐ YES ☐ NO

If yes, provide documentation of the basis for your determination.

If no, proceed to Step 4 and Step 5.

**Step 4 and Step 5**

If you answered no in Step 3, did the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Office (THPO), or other tribal representative (whichever applies) respond to you within fifteen (15) calendar days to indicate their views as to the likelihood that historic properties are potentially present on your site and may be impacted by the installation of stormwater controls that require subsurface earth disturbance?

☐ YES ☐ NO

If no, no further documentation is required for Section 3.2 of the SWPPP.

If yes, describe the nature of their response:

☐ Written indication that adverse effects to historic properties from the installation of stormwater controls can be mitigated by agreed upon actions.

☐ Written indication that adverse effects to historic properties from the installation of stormwater controls can be mitigated by agreed upon actions.

☐ No agreement has been reached regarding measures to mitigate effects to historic properties from the installation of stormwater controls.

## 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)

## SECTION 4: EROSION AND SEDIMENT CONTROLS

### 4.1 Natural Buffers or Equivalent Sediment Controls

Are there any surface waters within fifty (50) feet of your project's earth disturbances?
☐ YES ☒ NO

If no, no further documentation is required for Section 4.1 of the SWPPP.

#### *4.1.1 Buffer Compliance Alternatives*

If yes was noted above, check the compliance alternative that you have chosen:

☐ I will provide and maintain a 50-foot undisturbed natural buffer.

☐ I will provide and maintain an undisturbed natural buffer that is less than fifty (50) feet and is supplemented by additional erosion and sediment controls, which in combination achieves the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

☐ 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.

☐ I qualify for one of the exceptions in Part 2.2.1.b of the General Permit (If you have checked this box, provide information on the applicable buffer exception that applies, below.)

#### *4.1.2. Buffer Exceptions*

Which of the following exceptions to the buffer requirements applies to your site?

☐ There is no discharge of stormwater to the surface water that is located fifty (50) feet from my construction disturbances.

☐ No natural buffer exists due to pre-existing development disturbances that occurred prior to the initiation of planning for this project.

☐ For a "linear project" (defined in Appendix A of the General Permit), site constraints (e.g., limited right-of-way) make it infeasible for me to meet any of the CGP Part 2.2.1.a compliance alternatives, provided that, to the extent feasible, you limit disturbances within 50 feet of the receiving water

☐ The project qualifies as "small residential lot" construction (defined in Appendix A of the General Permit).

For Alternative 1 (see Appendix F, Part F.3 of the General Permit):

For Alternative 2 (see Appendix F, Part F.3 of the General Permit)

☐ Buffer disturbances are authorized under a CWA Section 404 permit.

☐ Buffer disturbances will occur for the construction of a water-dependent structure or water access area (e.g., pier, boat ramp, and trail).

## 4.2 Perimeter Controls

Compliance with the regulation to provide a fifty (50) foot equivalent vegetated buffer is met by providing a combination of perimeter erosion controls that will provide the appropriate protection against sediment runoff. Perimeter controls that will be implemented for this project include silt fencing and filter socks.

### *4.2.1 Silt Fence*

Silt fence is a synthetic permeable mesh fabric typically incorporating wooden support stakes at intervals sufficient to support the fence and water and sediment retained by the fence. Silt fence is also available with a wire mesh backing. The fence is designed to retain sediment-laden water to allow settlement of suspended soils before filtering through the mesh fabric for discharge downstream. Silt fence shall be located to capture overland, low-velocity sheet flows as follows:

| **Silt Fence Section** | **Section Length** (feet) | **Drainage Area** (acres) | **Avg. Land Slope** (percent) |
|---|---|---|---|
| | **2,923** | **13.47** | **2.4** |
| | | | |

Install silt fence at a fairly level grade (along 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, to provide sufficient upstream storage volume for the anticipated runoff. A construction detail has been provided on the erosion and sediment control plans. All sediment accumulated shall be removed before it reaches one-half of the above ground height of the perimeter control. After a storm event extend controls and/or repair areas where runoff may be circumventing or undercutting the control. See section 2.8 for installation sequencing.

### *4.2.2. Mulch Sock*

Mulch sock is similar to silt fence except they consist of a filter sock that is filled with blown compost material. They are typically secured to the ground by wooden stakes. The mulch socks are designed to retain sediment-laden water to allow settlement of suspended soils before filtering through the compost for discharge downstream. Mulch socks shall be located to capture overland, low-velocity sheet flows.

- Mulch sock shall be placed in a single row, lengthwise on the contour, with ends of adjacent socks tightly abutting one another.
- Stakes shall be driven through the sock to a minimum depth of 2 feet below finish grade. The stakes shall be spaced 4 feet apart.
- The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a sock and the length of the proposed barrier to a minimum depth of 3 inches.

After the socks are staked, the excavated soil shall be backfilled against the barrier. Backfill soil shall conform to the ground level on the downhill side and shall be build up to 4 inches against the uphill side of the barrier. Ideally, socks should be placed 10 feet away from the toe of slope.

## 4.3 Sediment Track-Out

The construction site roads shall be maintained in good construction condition to minimize off-site vehicle tracking of sediments. A construction entrance tire mud cleaning structure and laydown area shall be constructed of crushed stone to remove mud from the tires of construction vehicles. The rock shall be replaced as necessary to assure its effectiveness. Additionally, dump trucks hauling material to or from the construction site shall be covered in accordance with state and local regulations. The paved streets adjacent to the site will be inspected daily and swept as necessary**.**

### *4.3.1 Specific Track-Out Controls*

All access points from the public street into the construction site shall include a construction exit composed of coarse stone to the dimensions shown on the Construction Drawings. The rough texture of the stone helps to remove clumps of soil adhering to construction vehicle tires through the action of vibration and jarring over the rough surface and the friction of the stone matrix against soils attached to the vehicle's tires. A construction detail has been provided on the erosion and sediment control plans.

If the majority of mud or dirt is not removed from existing traffic, hose bibbs shall be provided at construction traffic exit points and vehicle tires shall be washed before exiting on public roads. Silt from this washing operation shall be intercepted and trapped before wash water is allowed to be discharged offsite.

The schedule for the Installation of this BMP is outlined in section 2.8 of this SWPPP

### *4.3.2 Maintenance Requirements*

Where sediment has been tracked-out from your site onto the surface of off-site streets, other paved areas, and sidewalks, the Operator must remove the deposited sediment by the end of the same work day in which the track-out occurs or by the end of the next work day if track-out occurs on a non-work day. The Operator must remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. The Operator is prohibited from hosing or sweeping tracked-out sediment into any stormwater conveyance (unless it is connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, or surface water."

## 4.4 Stockpiled Sediment or Soil

The Operator must locate stockpile areas per the erosion control plans and outside any established natural buffers. Temporary perimeter sediment barriers are to be installed around the limits of the stockpile area. Stockpiles of earthen materials shall be stored away from any constructed or natural site drainage features, storm drain inlets, and areas where stormwater flow is concentrated in a manner that prevents erosion and the transport of sediments. Silt fences shall be employed when required, as described in this plan. A construction detail has been provided on the erosion and sediment control plans.

## 4.5 Minimize Dust

Fine water sprays shall be used to control dust onsite shall by spraying on dry areas of the site. The use of oils and other petroleum based or toxic liquids for dust suppression is prohibited. Chemical dust suppressants shall not be used. Wind screening may also be implemented if deemed beneficial by the Operator or where dust conveyance may concentrate and discharge offsite.

Dust control shall be implemented on a routine basis as deemed necessary by site conditions and the Operator. Water shall be applied at a rate necessary to control the dust and as not to develop saturated, muddy or puddle conditions onsite.

## 4.6 Minimize the Disturbance of Steep Slopes

Earthwork procedures shall be timed, and shall progress, in a manner that will minimize the exposure of disturbed surfaces to storm water runoff. Excavation and filling sequences shall typically proceed down slope while maintaining an earth dike at the toe of the slope. Tree felling, stumping, grubbing, stripping and other construction activities shall be performed so as to minimize disturbances and to not concentrate runoff (i.e., up or down slope, not cross slope) into flows capable of soil erosion. Stabilization procedures shall be undertaken in accordance with this plan and the requirements of the General Permit. Grubbing during wet seasons should be avoided.

Minimized disturbance to steeps slopes will be achieved by phasing disturbances in areas where appropriate, installation of retaining walls (where proposed) to limit ground disturbances and using stabilization practices designed to be used on steep grades such as implementing erosion control matting (geotextiles) and temporary mulching.

Geotextiles are porous fabrics known in the construction industry as filter fabrics, road rugs, synthetic fabrics, construction fabrics, or simply fabrics. Geotextiles can be manufactured from synthetic or natural materials. Geotextiles are used for filtration, reinforcement, material separation, mattings, and drainage applications and erosion control. For sediment and erosion control applications, they are most commonly used as mattings to stabilize flow in channels and swales on recently planted slopes and as separators to prevent the migration of sediments into other layers such as soil from beneath rip rap. Installation and maintenance shall be per the manufacturer's recommendations and requirements.

Mulching refers to the placement of material, including but not limited to grass, wood chips, straw, and gravel, on the soil surface to cover and hold in place disturbed soils. This practice is often complementary to seeding and planting practices and provides temporary stabilization until permanent vegetation becomes established.

Install mulch in a 3 to 5-inch layer over exposed surfaces and monitor regularly and inspect for rills. Fill rill with new mulch. Continue to replenish mulch on a regular basis or until such time as the slope has become permanently stabilized.

## 4.7 Topsoil

Topsoil which must be excavated for site development shall be separated from the remaining soil and stockpiled on-site (if practicable) for use during site landscaping. The stockpiled topsoil will be surrounded by silt fence and seeded or covered to prevent the mobilization of sediment. A construction detail is included on the erosion and sediment control plans.

## 4.8 Soil Compaction

In areas of the site where final vegetative stabilization will occur or where infiltration practices will be installed, the Operator must restrict/limit vehicle/equipment use within those locations to only the activities necessary for site development in order to avoid soil compaction. The Operator shall utilize areas of proposed compacted/impervious surfaces to the greatest extent practical for vehicle/equipment maneuvering. In the locations of proposed infiltration basins, a rough grade shall be established to one foot above proposed finished grade until the site is stabilized and at such time, final excavation may occur to proposed finished grades.

The Operator must implement soil conditioning techniques prior to seeding or planting areas of exposed soils that have been compacted. Any technique used shall be for the support of vegetative growth and installation.

## 4.9 Storm Drain Inlets Protection

Curb and grated inlets are protected from the intrusion of silt and sediment through a variety of measures as shown on the Construction Drawings. The primary mechanism is to place controls in the path of flow sufficient to slow sediment-laden water and to allow settlement of suspended soils before discharging into the storm sewer. Controls typically provide a secondary benefit by means of filtration. Grated inlets typically include a sturdy frame wrapped in silt fence or crushed stone-lined perimeter to slow the flow of water. Curb inlets typically include crushed stone barriers held in place with silt fence material or geotextile fabric. A construction detail is provided on the erosion and sediment control plans.

The Operator must clean, or remove and replace, the 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, you must remove the deposited sediment by the end of the same work day in which it is found or by the end of the following work day if removal by the same work day is not feasible.

## 4.10 Constructed Stormwater Conveyance Channels

Stormwater conveyance channels are proposed to avoid unstabilized areas on the site and to reduce erosion. This will be accomplished through the installation of diversion dikes/swales as discussed in section 4.2.2. Additionally, check dams will be installed within these diversion dikes/swales to minimize erosion of the channels and their embankments, outlets, adjacent streambanks, slopes, and downstream waters during discharge conditions by dissipation of the stormwater runoff to a non-erosive flow velocity. The locations and construction details are provided in the erosion and sediment control plans.

## 4.11 Sediment Basins

Temporary sediment basins are depressions constructed downslope of construction activity and located such that storm water runoff from upland areas of less than 100 acres are diverted through the basin. Sediment basins shall be constructed as directed by the Storm Water Pollution Prevention Plan and shall be constructed as part of the initial best management practices whenever practical. The Operator shall provide a temporary settling basin storage volume of 3,600 cubic feet per one acre drained. Proposed locations are shown on the sediment and

erosion control plans. The Operator is responsible for adjusting location, size and stormwater diversion to the proposed temporary settling basins based upon project phasing and earth disturbance operations. An overflow pipe is incorporated at the outlet to discharge flow from the basin. Sediment basins shall be phased with the earthwork activity where practical. The basin shall be kept in effective operating condition and removed of accumulated sediment to maintain at least ½ of the design capacity of the sediment basin at all times.

### 4.12 Chemical Treatment

The use of chemical treatments is not proposed at this time, however, they are not forbidden. Should the Operator choose to use polymers, flocculants, or other treatment chemicals at the site, the operator must update the SWPPP to include the following

a. A listing of all soil types that are expected to be exposed during construction and that will be discharged to locations where chemicals will be applied. 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 you have been authorized by your applicable EPA Regional Office to use cationic treatment chemicals, include the specific controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards including any additional measures as conditioned by EPA's authorization;

d. The dosage of all treatment chemicals you will use at the site or the methodology you will use to determine dosage;

e. Information from any applicable Material Safety Data Sheets (MSDS);

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 the general permit;

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.

### 4.13 Dewatering Practices

The Operator is prohibited from discharging ground water or accumulated stormwater without complying with the following requirements to minimize the discharge of pollutants from dewatering operations. Uncontaminated, non-turbid dewatering water can be discharged without being routed to a control.

The following discharge requirements for dewatering activities must be maintained:

- Route dewatering water through a sediment control (e.g. sediment trap or basin, pumped water filter bag) designed to prevent discharges with visual turbidity.
- Do not discharge visible floating solids or foam;
- The discharge must not cause the formation of a visible sheen on the water surface, or visible oil 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 contain these materials;
- 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 receiving waters be considered part of the treatment area;
- To prevent dewatering-related erosion and sediment discharges the Operator shall (1) use stable, erosion-resistant surfaces (e.g., well-vegetated grassy areas, clean filter stone, geotextile underlayment) to discharge from dewatering controls (2) dewatering controls, such as pumped water filter bags, shall not be placed on steep slopes (as defined in Appendix A of the General Permit); and (3) at all points where dewatering water is discharged, comply with the velocity dissipation requirements of Part 2.2.11 of the General Permit;
- With backwash water, either haul it away for disposal or return it to the beginning of the treatment process;
- Replace and clean the filter media used in dewatering devices when the pressure differential equals or exceeds the manufacturer's specifications; and
- Comply with dewatering specific inspection requirements outlined in the General Permit and herein including inspection of dewatering operations once per day on any day there is a dewatering discharge.

If groundwater is encountered during the construction sequencing as described in Section 2.8 of this SWPPP, lowering of the water table will be required through localized perimeter point well dewatering. The Operator is responsible for all means and methods for any and all dewatering practices.

### 4.14 Site Stabilization

Site Stabilization Practices:

☒ *Vegetative* ☒ *Non-Vegetative*
☒ *Temporary* ☒ *Permanent*

A fundamental principal for preventing erosion and controlling sedimentation is to minimize the extent of land disturbance. For areas where disturbances cannot be avoided, rapid stabilization of the surface is the most effective method of controlling erosion. Areas that are disturbed during construction activity must be stabilized as soon as practicable. A land surface that is stabilized resists the erosive action of storm water runoff.

For the purposes of this SWPPP, “exposed portions of your site” means areas of exposed soil that are required to be stabilized. Note that EPA does not expect that temporary or permanent stabilization measures to be applied to areas that are intended to be left unvegetated or unstabilized following construction (e.g., dirt access roads, utility pole pads, areas being used for storage of vehicles, equipment, or materials).

The General Permit also requires that records be retained as part of the SWPPP. The records should include the dates of major grading activities, cessation and initiation of construction activities, and initiation of stabilization measures. A draft record and future completed records shall be maintained. It is recommended that the Operators utilize Grading/Stabilization Activities log in Appendix C of the SWPPP to document compliance with the stabilization requirements in of the CGP.

### *4.15.1 Measures of the Stabilization*

The Operator must initiate soil stabilization measures immediately whenever earth-disturbing activities have permanently or temporarily ceased on any portion of the site.

Below are descriptions of stabilization measures that will be used during project construction. To be considered adequately stabilized, you must meet the criteria below depending on the type of cover you are using, either vegetative or non-vegetative. See section 2.11.1 for applicable stabilization deadlines.

- ***Temporary Seeding –*** Within seven (7) or fourteen (14) days after construction activity ceases on any particular area, all disturbed ground where there will not be construction for longer than fourteen (14) days must be seeded with fast-germinating temporary seed and protected with mulch.

- ***Permanent Seeding –*** All areas at final grade must be seeded within fourteen (14) days after completion of the major construction activity. Except for small level spots, seeded areas should generally be protected with mulch.

- ***Permanent Plantings -*** At the completion of the Project, the contractor shall install and adequately establish all plantings as required.

- ***Mulching -*** Mulching refers to the placement of material, including but not limited to grass, wood chips, straw, and gravel, on the soil surface to cover and hold in place disturbed soils. This practice is often complementary to seeding practices.

- ***Geotextiles -*** Geotextiles are porous fabrics known in the construction industry as filter fabrics, road rugs, synthetic fabrics, construction fabrics, or simply fabrics. Geotextiles can be manufactured from synthetic or natural materials. Geotextiles are used for filtration, reinforcement, material separation, mattings, and drainage applications and erosion control. For sediment and erosion control applications, they are most commonly used as mattings to stabilize flow in channels and swales and on recently planted slopes, and as separators to prevent the migration of sediments into other layers such as soil from beneath rip rap.

- ***Protection of Trees and Mature Vegetation -*** Natural vegetation shall be preserved whenever possible, but especially on steep slopes, near perennial and intermittent watercourses or swales, and on sites in wooded areas. Preserving natural and mature

vegetation can save money, beautifies areas, provides buffer and habitat and reduces soil erosion. Erosion and Sediment Control Barriers shall be used to prevent equipment from damaging areas designated for preservation. Special care should be taken with mature trees. Barriers should be offset from trees to protect roots.

## SECTION 5: POLLUTION PREVENTION STANDARDS

### 5.1 Potential Sources of Pollution

The following is a list of Pollutant Generating Activities that are anticipated onsite. The Operator is required to comply with the requirements outlined in the Pollution Prevention Standards Section of this SWPPP if any of the following activities at the site or at any construction support activity area is proposed.

- Fueling and maintenance of equipment or vehicles.
- Washing of equipment and vehicles.
- Storage, handling, and disposal of construction materials, products, and wastes.
- Washing of applicators and containers used for paint, concrete, or other materials.
- Sediment collection/discharge; and
- Fertilization

The location of these proposed activities are shown on the erosion and sediment control plans. If not shown, the Operator is required to document and update the SWPPP to show all locations of pollution generating activities.

#### *5.1.1 General Maintenance Requirements*

The Operator must ensure that all pollution prevention controls that are installed remain in effective operating condition and are protected from activities that would reduce their effectiveness. The Operator must inspect all pollutant-generating activities and pollution prevention controls in accordance with the inspection frequency requirements to avoid situations that may result in leaks, spills, and other releases of pollutants in stormwater discharges to receiving waters, and must document the findings. If it is found that controls need to be replaced, repaired, or maintained, the Operator must make the necessary repairs or modifications in accordance with the following:

Initiate work to fix the problem immediately after discovering the problem, and complete such work by the close of the next work day, if the problem does not require significant repair or replacement, or if the problem can be corrected through routine maintenance (i.e. minor repairs or upkeep not including or installation of new controls). If it is infeasible to complete routine maintenance by the close of the next business day the reasons why shall be documented in the inspection report and such work shall be completed no later than seven (7) calendar days form the time of discovery.

For repetitive routine maintenance (i.e. three (3) or more times) that require the same fix to the same controls at the same location you must either complete work to fix any subsequent repeat occurrences as noted in corrective action procedures or document in the inspection report why the specific reoccurrence should still be addressed as routine maintenance.

When installation of a new pollution prevention control or a significant repair is needed, the Operator must 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, the Operator must document their records as to why it is infeasible to complete the installation or repair within the seven (7) calendar day timeframe and document the schedule for installing the stormwater control(s) and making it operational as soon as practicable after the seven (7) calendar day timeframe.

Where these actions result in changes to any of the pollution prevention controls or procedures documented in this SWPPP, the Operator must modify the SWPPP accordingly within seven (7) calendar days of completing this work.

## 5.2 Spill Prevention and Response

Prior to the commencement of any construction activity, the operator shall develop procedures for expeditiously stopping, containing, and cleaning up spills, leaks, and other releases. Identify the name or title of the employee(s) responsible for detection and response of spills or leaks.

### *5.2.1 Emergency Spill Notification*

The Operator is prohibited from discharging toxic or hazardous substances from a spill or other releases. 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, the Operator 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 the operator has knowledge of the discharge. The Operator 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

### *5.2.2 Reporting*

In the event of a discharge of oil or another hazardous material, rapid notification of responsible facility personnel, oil spill and/or hazardous material removal organizations and federal, state, and local regulatory agencies can be essential to protecting the environment in the immediate vicinity.

As required by the conditions of the General Permit, all spills shall be recorded and documented within the SWPPP. Detailed reports including the date and time of the incident, location, volume and contents of the spill, weather conditions, response procedures, parties notified, recommended revisions to the proposed storm water pollution prevention controls, operating procedures, and/or equipment needed to prevent recurrence shall be maintained. Reports on reportable quantity spills are to be maintained in Appendix E of this SWPPP.

Because construction activities may handle many hazardous substances over the course of construction, spills of these substances in amounts that equal or exceed RQ levels are a possibility. The Emergency Response Plan lists the RQ levels of the substances expected to be on the construction site. Any discharge of a substance above an RQ shall be reported to the Construction Manager.

## 5.3 Fueling and Maintenance of Equipment or Vehicles

If the Operator conducts fueling and/or maintenance of equipment or vehicles at the site, the Operator must provide an effective means of eliminating the discharge of spilled or leaked chemicals, including fuel, from the area where these activities will take place. To comply with the prohibited discharges, the Operator must:

- If applicable, comply with the Spill Prevention Control and Countermeasures (SPCC) requirements in 40 CFR 112 and Section 311 of the Clean Waters Act CWA;
- Ensure adequate supplies are available at all times to handle spills, leaks, and disposal of used liquids;
- Use drip pans and absorbents under or around leaky vehicles;
- Dispose of or recycle oil and oily wastes in accordance with other federal, state, tribal, or local requirements;
- Clean up spills or contaminated surfaces immediately, using dry clean up measures where possible, and eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge; and
- Do not clean surfaces by hosing the area down.

## 5.4 Washing of Equipment and Vehicles

The Operator must provide effective means of minimizing the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other types of washing. The Operator must, for storage of soaps, detergents, or solvents, provide either (1) cover (*e.g., plastic sheeting or temporary roofs*) to prevent these detergents from coming into contact with rainwater, or (2) a similarly effective means designed to prevent the discharge of pollutants from these areas.

The Operator shall conduct all equipment and vehicle washing activities away from surface waters and stormwater inlets or conveyances and direct 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.

## 5.5 Storage, Handling, and Disposal of Construction Products, Materials, and Wastes

### *5.5.1 Building Products*

The Operator must minimize the exposure to stormwater of any of the products, materials, or wastes specified below that are present at the site by complying with the following requirements.

*Note: These requirements do not apply to those products, materials, or wastes that are not a source of stormwater contamination or that are designed to be exposed to stormwater.*

The Operator must:

For building products*:* In storage areas, provide either (1) cover (*e.g., plastic sheeting, storage trailers or temporary roofs*) to prevent these products from coming into contact with rainwater, or (2) a similarly effective means designed to prevent the discharge of pollutants from these areas.

Solid Waste Storage and Disposal: All waste materials will be collected and stored in a securely lidded metal dumpster rented from a local waste management company which must be a solid waste management company licensed to do business by the state and the city. The dumpster will comply with all local and state solid waste management regulations.

### *5.5.2 Pesticides, Herbicides, Insecticides, Fertilizers, and Landscape Materials*

In storage areas, the Operator must provide either (1) cover (e.g., *plastic sheeting or temporary roofs*) to prevent these chemicals from coming into contact with rainwater, or (2) a similarly effective means designed to prevent 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.

### *5.5.3 Diesel Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Other Chemicals*

For all chemicals the Operator must (1) store chemicals in water-tight containers, and must be kept closed, sealed, and secured when not being used; (2) If stored outside the Operator shall use a spill containment pallet or similar device to capture small leaks and spills; and (3) have a spill kit available that is in good working condition and ensure personnel are available to respond immediately in the event of a leak or spill.

In addition, for chemical containers with a storage capacity of 55 gallons or more the Operator must also (1) store containers a minimum of fifty (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 fifty (50) feet away from receiving waters or the other features identified, you must document in the SWPPP the specific reasons why the 50-foot setback is infeasible, and how you will store containers as far away as the site permits; (2) Provide either a cover (e.g., temporary roofs) to minimize the exposure of these containers to precipitation and to stormwater, or secondary containment (e.g., curbing, spill berms, dikes, spill containment pallets, double-wall, above-ground storage tank), and (3) have additional secondary containment measures are listed at 40 CFR § 112.7(c)(1).

The Operator shall clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. Do not clean surfaces or spills by hosing the area down. Eliminate the source of the spill to prevent a discharge or a continuation of an ongoing discharge.

### *5.5.4 Hazardous or Toxic Waste*

The Operator must:

- Separate hazardous or toxic waste from construction and domestic waste;
- Store waste in sealed containers, which are constructed of suitable materials to prevent leakage and corrosion, and which are labeled in accordance with applicable Resource Conservation and Recovery Act (RCRA) requirements and all other applicable federal, state, tribal, or local requirements;
- Store all containers that will be stored outside within appropriately sized secondary containment *(e.g., spill berms, decks, 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 covered area or 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;

and

- Clean up spills immediately, using dry clean-up methods where possible, and dispose of used materials properly. Do not clean surfaces or spills by hosing the area down. Eliminate the source of the spill to prevent a discharge or a furtherance of an ongoing discharge.

All hazardous waste materials will be disposed of in the manner specified by local, state and/or federal regulations and by the manufacturer of such products. Site personnel will be instructed in these practices by the job site superintendent, who will also be responsible for seeing that these practices are followed. Material Safety Data Sheets (MSDS's) for each substance with hazardous properties that is used on the job site shall be obtained and used for the proper management of potential wastes that may result from these products. An MSDS will be posted in the immediate area where such product is stored and/or used and another copy of the each MSDS shall be maintained in the SWPPP file at the job site construction trailer office. Each employee who must handle a substance with hazardous properties will be instructed on the use of MSDS sheets and the specific information in the applicable MSDS for the product he/she is using, particularly regarding spill control techniques.

The Operator shall train all personnel in the proper cleanup and handling of spilled materials. No spilled hazardous materials or hazardous wastes will be allowed to come in contact with storm water discharge. If such contact occurs, the storm water discharge will be contained onsite until appropriate measures in compliance with state and federal regulations are taken to dispose of such contaminated storm water. It shall be responsibility of the job site superintendent to properly train all personnel.

### *5.5.5 Construction and Domestic Waste*

Provide waste containers *(e.g. dumpster, or trash receptacle)* of sufficient size and number to contain construction and domestic wastes. In addition, you must: (1) On work days, clean up and dispose of waste in designated waste containers; (2) Keep waste container lids closed when not in use, at the end of business days and during storm events; and (3) Clean up immediately if containers overflow and if there is litter elsewhere on the site from escaped trash.

Waste containers are not required for the waste remnant or unused portions of construction materials provided that (1) these wastes are stored separately from other construction or domestic wastes; and (2) these wastes are stored in designated areas of the site, described in the SWPPP and identified on the site plan. If the wastes are mixed, they must be stored in waste containers.

<u>Solid Waste Storage and Disposal</u>
All waste materials will be collected and stored in a securely covered metal dumpster rented from a local waste management company which must be a solid waste management company licensed to do business by the state and the city. The dumpster will comply with all local and state solid waste management regulations.

### *5.5.6 Sanitary Waste*

Position portable toilets so that 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. All sanitary waste will be collected from the portable units by a licensed sanitary waste management contractor, as needed or more frequently as required by local regulations.

## 5.6 Washing of Applicators and Containers used for Paint, Concrete or Other Materials

The operator must provide an effective means of eliminating the discharge of water from the washout and cleanout of stucco, paint, concrete, form release oils, curing compounds, and other construction materials. To comply with this requirement, Operator must:

- Direct all wash water into a leak-proof container or leak-proof pit. The container or pit must be designed so that no overflows can occur due to inadequate sizing or precipitation;
- Do not dump liquid wastes or allow them to enter into constructed or natural site drainage features, storm sewers, 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 this SWPPP;
- Locate any washout or cleanout activities as far away as possible from receiving waters, constructed or natural site drainage features, and stormwater inlets or conveyances, and, to the extent practicable, designate areas to be used for these activities and conduct such activities only in these areas.

## 5.7 Fertilizers

The operator is required to minimize discharges of fertilizers containing nitrogen or phosphorus. To meet this requirement, you must comply with the following requirements:

- Apply at a rate and in amounts consistent with manufacturer's specifications;
- 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.

## 5.8 Other Pollution Prevention Practices

### *5.8.1. Contaminated Soils*

Any contaminated soils (resulting from spills of materials with hazardous properties) which may result from construction activities will be contained and cleaned up immediately in accordance with the procedures given in accordance with applicable state and federal regulations. The job site superintendent will be responsible for seeing that these procedures are followed.

### *5.8.2. Snow Removal Plan*

Snow removal practices will consist of several management techniques to minimize major runoff and pollutant loading impacts. First, de-icing compounds such as calcium chloride or calcium magnesium acetate should be used. If stored, the de-icing compounds should be stored on enclosed impervious pads. Low-salt areas will be designated on the portions of the road adjacent to streams and wetlands. All snow removed should be placed in pervious areas where it can slowly infiltrate. In addition, street cleaning will occur biannually

## SECTION 6: INSPECTION AND CORRECTIVE ACTION

### 6.1 Inspection Personnel and Procedures

Personnel Responsible for Inspections

Role or Responsibility: TBD
Name:
Position:
Telephone:
Email:

Role or Responsibility:
Name:
Position:
Telephone:
Email:

The Operator shall obtain copies of any and all local and state regulations, which are applicable to storm water management and pollution minimization at this job site and will comply fully with such regulations. The contractor will submit written evidence of such compliance if requested by the Owner or any agent of a regulatory body. The Contractor will comply with all conditions of the NPDES General Permit for Construction Activities, including the conditions related to maintaining the SWPPP and evidence of compliance with the SWPPP at the job site and allowing regulatory personnel access to the job site and to records in order to determine compliance.

The person(s) inspecting the site shall be the Operator or a member of their staff or a third party hired to conduct such inspections. The person who conducts inspections shall be a “qualified person.”

For projects filed prior to February 17, 2023 a “qualified person” is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the skills to assess conditions at the construction site that could impact stormwater quality, and the skills to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.

For projects filed on or after February 17, 2023, to be considered a “qualified person” said individual must have completed the training outlined in Section 7.2. Documentation outlining completion of trainings shall be included in the Appendix G of the SWPPP.

### *6.1.1 Inspection Schedule*

All control measures will be inspected in accordance with one of the following schedules:

- At least once every seven (7) calendar days; or
- At least once every fourteen (14) calendar days and within 24 hours of the occurrence of a storm event that produces 0.25[1] inches or more of rain within a 24-hour period and/or a discharge caused by snowmelt from a storm event that produces 3.25 inches or more of snow within a 24-hour period.

For any portion of the site that discharges to a sediment or nutrient-impaired water or to a water that is identified as Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes, inspections must be conducted 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 discharge caused by snowmelt from a storm event that produces 3.25 inches or more of snow within a 24-hour period.

For sites discharging dewatering water, an inspection must be performed in accordance with Section 4.13 during the discharge once per day on which the discharge occurs.

For frozen conditions where construction activities are still being conducted the inspections can be reduced to one (1) per month. The SWPPP shall be updated to include the beginning and end date of the frozen conditions.

For frozen conditions[2] where construction activities are suspended the inspections can be temporarily suspended. The SWPPP shall be updated to include the beginning and end date of the frozen conditions.

### *6.1.2 Inspection Areas*

The following areas require inspection:

- All areas that have been cleared, graded, or excavated and that have not yet completed stabilization;
- All stormwater controls (including pollution prevention measures) installed at the site;
- Material, waste, borrow, or equipment storage and maintenance areas that are covered by this SWPPP;
- All areas where stormwater typically flows within the site, including constructed or natural site drainage features designed to divert, convey, and/or treat stormwater.

[1] (a) 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), an inspection shall be conducted within 24 hours of when 0.25 inches of rain or more has fallen. (b) 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, an inspection shall be conducted 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).

[2] For at least three (3) months based on historic seasonal averages.

- 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;
- All points of discharge from the site; and
- All locations where stabilization measures have been implemented.

The Operator is not required to inspect areas that, at the time of the inspection, are considered unsafe to your inspection personnel.

### *6.1.3 Inspection Requirements*

The following are requirement for inspections:

- Check whether all erosion and sediment controls and pollution prevention controls are installed, appear to be operational, and are working as intended to minimize pollutant discharges;
- Determine if any controls need to be replaced, repaired, or maintained;
- Check for the presence of conditions that could lead to spills, leaks, or other accumulations of pollutants on the site;
- Identify any locations where new or modified stormwater controls are necessary to meet the requirements of the SWPPP;
- At points of discharge and, if applicable, the banks of any surface waters flowing within your property boundaries or immediately adjacent to your property, check for signs of visible erosion and sedimentation *(i.e., sediment deposits)* that have occurred and are attributable to site discharge;
- 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), and
- Identify any and all incidents of noncompliance observed. If a discharge is occurring during your inspection, the Operator is required to:
  a. Identify all points of the property from which there is a discharge;
  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 obvious indicators of stormwater pollutants; and
  c. Document whether your stormwater controls are operating effectively and describe any such controls that are clearly not operating as intended or are in need of maintenance.
- Based on the results of your inspection, initiate corrective action plan.

The following maintenance procedures are to be performed as noted.

- Litter, construction debris, and chemicals shall be prevented from exposure to storm water and from becoming a pollutant source. A daily walkover of the Project site to identify exposure of potential pollutants to storm water shall be performed.

- All measures will be maintained in good working order; if repairs are found to be necessary, they will be initiated within 24 hours of report.

- Built-up sediment shall be removed from silt fences when it has reached 1/3 of the aboveground height of the silt fence.

- Sediment shall be removed where accumulations reach one-half the aboveground height of any straw bale barriers.

- Silt fences will be inspected for depth of sediment, tears or sags in the fabric, and to see if the fabric is securely attached to the posts. Posts will also be inspected to ensure that they are firmly set in the ground.

- Temporary and permanent seeding shall be inspected weekly during its period of establishment for bare spots and areas of insufficient germination or growth. Remedial action shall be taken to establish a stabilized surface in these areas once identified.

- Straw bale dikes shall be replaced when the strings have broken. Two stakes shall be maintained in ground.

- Deteriorated silt fences shall be replaced as soon as the condition is discovered.

- Conveyance structures shall be maintained so as to operate in the design condition. Foreign debris, including leaves and lawn cuttings shall not be allowed to accumulate in diversion swales, water quality swales, sediment forebays, or detention basins.

- Fertilizer applications shall be applied strictly in accordance with manufacturer's instructions.

- Storm water detention basins and sediment forebays shall be maintained in working order and free of foreign debris throughout the construction period. Any sediment basins will be inspected for depth of sediment and built up sediment will be removed when it reaches 50 percent of the design capacity or at the end of the job.

- Accumulations of sediment that escape to off-site areas must be removed at intervals to minimize offsite impacts. Sediment accumulations in public streets shall be removed as soon as possible and before any anticipated rain event. Vehicle tire mud cleaning devices shall be maintained to ensure their proper operation.

- Spare erosion and sediment control barrier material shall be stocked on site.

A site inspection report will be made after each inspection. A copy of the report form to be completed by the inspector is included in Appendix D.

### *6.1.4 Inspection Reports*

The Operator must complete inspection reports within 24 hours of completing any site inspection. A sample inspection report is included in the SWPPP for use and consideration (see Appendix D). Each inspection report 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 made in accordance with the requirements for inspections as noted above, including any problems found during the observation that make it necessary to perform routine maintenance or corrective action. Include also any documentation as to why the corrective action procedures are unnecessary to fix a problem that repeatedly occurs.
d. If you are inspecting your site at the frequency above and the inspection is due to rainfall measuring 0.25 inches or more within a 24-hour period then the applicable rain gauge or weather station readings that triggered the inspection must be included. Similarly, if an inspection is conducted due to snowmelt discharge form an event that produced 3.25 inches or more of snow within a 24-hour period then the applicable measurements taken of snowfall at the site or weather station information relied upon.; and
e. If you have determined that it is unsafe to inspect a portion of the site, describe the reason you found it to be unsafe and specify the locations that this condition applied to.

Each inspection report must be signed in accordance with Appendix G, Part G.11 of the General Permit.

The Operator is required to keep a current, 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 onsite inspection or upon request by EPA. For purposes of this permit, your inspection reports may be kept electronically 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. 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.

All inspection reports completed for this part must be retained for at least three (3) years from the date that your permit coverage expires or is terminated.

### *6.1.5 Dewatering Inspections and Reports*

For dewatering inspections conducted 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;
d) Estimates of the rate (in gallons per day) of discharge on the day of inspection;

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

   a. a sediment plume, suspended solids, unusual color, presence of odor, decreased clarity, or presence of foam; and, /or

   b. 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) 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

The Operator must also comply with the requirements of the General Permit for signing the reports, keeping them available on site, and retaining copies.

### *6.1.6 Inspection By EPA*

You must allow EPA, or an authorized representative of the EPA, to conduct the following activities at reasonable times:

- Enter onto areas of your site, including any construction support activity areas covered by this permit (see Part 1.3.c), and onto locations where records are kept under the conditions of this permit;
- Access and copy any records that must be kept under the conditions of this permit;
- Inspect your construction site, including any construction support activity areas covered by this permit and any stormwater controls installed and maintained at the site; and
- Sample or monitor for the purpose of ensuring compliance.

## 6.2 Corrective Action

Personnel Responsible for Corrective Actions:

Company Name: TBD
Contact Name:
Street:
City, State, Zip Code:
Telephone:
Fax:
Email:

Any deficiencies[3][4] discovered during an inspection must be addressed in accordance with the following:

[3] Stormwater controls needing significant repair and or new replacement control is needed, or it has been found that it is necessary to repeatedly (i.e. three (3) or more times) conduct the same routine maintenance fix to the same control at the same location. Discharges not meeting applicable water quality standards.

- 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
- 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
- When the problem requires a new or replacement control or significant repair , install the new or modified erosion controls to 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 seven (7) calendar day timeframe and document your schedule for installing the stormwater.

If responding to either of the triggering conditions related to site dewatering activities, the Operator 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; and
- 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 changes deemed necessary have been made, discharging from dewatering activities may resume.

Where corrective actions result in changes to any of the stormwater controls or procedures documented in your SWPPP, the Operator must modify the SWPPP and site map accordingly within seven (7) calendar days of completing corrective action work.

### *6.2.1. Corrective Action Log*

For each corrective action taken, the Operator must complete a corrective action log. Note that these logs must be maintained in your records but do not need to be provided to EPA except upon request. The Corrective Action Log shall be prepared in accordance with the following:

- Within 24 hours of identifying the correction action condition, document the specific condition and the date and time it was identified;
- Within 24 hours of completing the corrective action condition, document the specific condition and the date and time it was identified;
- Each entry into the corrective action log, consisting of the information required by the General Permit must be signed by the Operator's signatory in accordance with Appendix G, Part G.11.2 of the General Permit

[4] During discharge from site dewatering activities (a) The weekly average of your turbidity monitoring results exceeds the 50 NTU benchmark. (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. of the General Permit.

- A copy of the corrective action log must be kept at the site or an easily accessible location so that it can be made immediately available at the time of an on-site inspection or upon request by the EPA;

- The corrective action log must be retained for at least three (3) years from the date that your permit coverage expires or is terminated.

### 6.3 Delegation of Authority

Duly Authorized Representative(s) or Position(s):

| | |
|---|---|
| Company Name: | RTE. 85 REALTY CORP. |
| Contact Name: | Tariq H. Fayyad, M.S. |
| Street: | 32 Hastings St, P.O. Box 444 |
| City, State, Zip Code: | Mendon, MA 01756 |
| Telephone: | (508) 422-1050 |
| Email: | Ty@ImperialCars.com |

## SECTION 7: TRAINING

7.1 Training for Stormwater Team Members

Prior to commencement of construction activities all persons assigned to the stormwater team shall understand the requirements of the General 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.

The Operator is responsible for ensuring that all activities on the site comply with the requirements of this SWPPP. The Operator is not required to provide or document formal training for subcontractors or other outside service providers but must ensure that such personnel understands any requirements of the SWPPP that may be affected by the work they are subcontracted to perform.

It is recommended to utilize the sample training log for recording keeping contained in Appendix G.

7.2 Training for Persons Conducting Inspections

For projects that receive coverage under the General Permit on or after February 17, 2023, to be considered a "qualified person" for conducting inspections (including dewatering inspections), the person 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:

   I. Principles and practices of erosion and sediment control and pollution prevention practices at construction sites;

   II. Principles and practices of erosion and sediment control and pollution prevention practices at construction sites;

   III. Performance of inspections, including the proper completion of required reports and documentation, consistent with the requirements of the General Permit.

If personnel team elect to complete a non-EPA inspector training program, the Operator must also confirm that the non-EPA inspector training program satisfies the minimum elements for such programs as outlined in the General Permit.

The SWPPP shall include documentation showing that persons responsible for conducting inspections have received the required training (e.g. copy of certificate from EPA inspection course).

For projects that receive coverage under this the General Permit prior to February 17, 2023[5], any personnel conducting site inspections on 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.

## SECTION 8: TERMINATION OF COVERAGE

Until coverage is terminated, all conditions of the general permit must be complied with. Coverage must be terminated within thirty (30) days of one or more of the following conditions:

- Construction activities and if applicable, construction support activities have been completed and all of the following requirements are met:

   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 2.2.14b of the General Permit.

      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

[5] If coverage is obtained 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 for inspections conducted on the project site

your 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 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 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 of the General Permit); 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

- 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

- Coverage under an individual or alternative general NPDES permit has been obtained.

The Notice of Termination (NOT) must be submitted electronically using the EPA's NPDES eReporting Tool (NeT). To access NeT, go to https://cdx.epa.gov/cdx

## SECTION 9: CERTIFICATION AND NOTIFICATION

"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."

Owner: _____

Printed Name: _____ Title: _____

Signature: _____ Date: _____

# SWPPP APPENDICES

Appendix A – NOI Form and EPA Authorization

Appendix B – Site Location Map

Appendix C – Grading and Stabilization Activities Log

Appendix D – Site Inspection Form, Dewatering Inspection Form and Corrective Action Log

Appendix E – Reportable Quantity (RQ) Spill Form

Appendix F – SWPPP Amendment Log

Appendix G – Training Log

Appendix H – Delegation of Authority Form

Appendix I – Endangered Species Documentation

Appendix J – Historic Preservation Documentation

Appendix K – Copy of 2022 US EPA Construction General Permit

Appendix L – Site Maps (Bound Separately)

## Appendix A

**ENOI Form and EPA Authorization Email**
**(to be inserted once electronic versions are available)**

## Appendix B

**Site Location Map**

USGS
science for a changing world

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map
US Topo

# HOLLISTON QUADRANGLE
MASSACHUSETTS
7.5-MINUTE SERIES

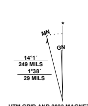



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid:Universal Transverse Mercator, Zone 19T

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery........................NAIP, August 2018 - October 2018
Roads........................U.S. Census Bureau, 2018
Names........................GNIS, 1974 - 2023
Hydrography........................National Hydrography Dataset, 2004 - 2022
Contours........................National Elevation Dataset, 2023
Boundaries.............Multiple sources; see metadata file 2021 - 2022

Wetlands................FWS National Wetlands Inventory 1992 - 2013




UTM GRID AND 2023 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

| U.S. National Grid | |
|---|---|
| 100,000 - m Square ID | |
| BG | CG |
| Grid Zone Designation 19T | |

SCALE 1:24 000

KILOMETERS: 1 0.5 0 1 2
METERS: 1000 500 0 1000 2000
MILES: 1 0.5 0 1
FEET: 1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard.




QUADRANGLE LOCATION

| | | |
|---|---|---|
| 1 | 2 | 3 |
| 4 | | 5 |
| 6 | 7 | 8 |

ADJOINING QUADRANGLES

1 Marlborough
2 Framingham
3 Natick
4 Milford
5 Medfield
6 Blackstone
7 Franklin
8 Wrentham

ROAD CLASSIFICATION

| | |
|---|---|
| Expressway | Local Connector |
| Secondary Hwy | Local Road |
| Ramp | 4WD |
| Interstate Route | US Route |
| State Route | |

HOLLISTON, MA
2024

NSN. 7643016369550
NGA REF NO. USGSX24K20752

## Appendix C

## Grading and Stabilization Activities Log

## ***GRADING AND STABILIZATION ACTIVITIES***

**NOTE:** The contractor is responsible for maintaining an accurate and complete log of construction activities, including, but not limited to, commencement of stabilization, major grading activities, timeframes when construction ceases on a portion of site (temporary or permanent) until the Notice of Termination (NOT) is filed.

### ***MAJOR STABILIZATION AND GRADING ACTIVITIES***

| Construction Activity | Contractor Name | Start Date | End Date | Location |
|---|---|---|---|---|
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**Appendix D**

**Routine Maintenance and Corrective Action Determination Guidelines**

**Site Inspection Form**

**Corrective Action Log**

**Dewatering Inspection Form**

**EPA Inspection and Monitoring Guide for Construction Dewatering**

# EPA Construction General Permit Routine Maintenance/Corrective Action Determination Guidelines

## Introduction

EPA's Construction General Permit (CGP) requires construction operators to note conditions identified on the construction site that may require either "routine maintenance" or "corrective action" and fix the problems in accordance with the appropriate requirement. Inspectors or others may document these conditions during inspections and at other times during construction. Routine maintenance and corrective actions have separate triggers under the CGP, as well as differing timelines for completion and requirements for documentation.

Determining whether a specific condition requires routine maintenance or corrective action may be straightforward in some circumstances, however, in other circumstances, such as deciding whether a required repair is significant or minor, it will come down to the judgment of the construction operator. The questions presented in this document are intended to guide operators in both types of circumstances.[1]

## CGP Requirements for Routine Maintenance and Corrective Actions

Routine maintenance, as described in CGP Part 2.1.4.b, is defined as "minor repairs or other upkeep performed to ensure the site's stormwater controls remain in effective operating condition, not including major repairs or the need to install a new or replacement control." CGP Part 2.1.4.b also requires routine maintenance to be initiated by the operator immediately and completed by the close of the next business day, unless the operator documents that this deadline is infeasible, in which case the work must be completed within seven (7) calendar days.

Corrective actions are triggered by one of several conditions described in CGP Part 5.1. These conditions involve problems that are typically more significant than the routine maintenance triggers. If the corrective action requires a new or replacement control or significant repair, CGP Part 5.2 requires the operator to complete the fix within 7 days, unless the operator documents that this deadline would be infeasible, in which case the work must be completed and the control made operational as soon as feasible after the 7-day timeframe. If the corrective action does not require a new or replacement control or significant repair, the operator must complete the fix by the close of the next business day.

These guidelines are limited to focusing on whether routine maintenance is required or whether one of the following conditions requiring corrective action is present:

- A stormwater control needs a significant repair (CGP Part 5.1.1);
- A new or replacement stormwater control is needed (CGP Part 5.1.1);
- The operator finds 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 the operator documents in the inspection report that the specific reoccurrence of the same problem should still be addressed as a routine maintenance fix) (CGP Part 5.1.1); or
- A stormwater control necessary to comply with the permit was never installed or was installed incorrectly (CGP Part 5.1.2).

These guidelines do not address the other corrective action triggers listed in CGP Parts 5.1.3, 5.1.4, and 5.1.5.

[1] This document does not impose any new legally binding requirements on EPA, States, Tribes, territories, or the regulated community, and does not confer legal rights or impose legal obligations upon any member of the public. In the event of a conflict between this document and any statute, regulation, or permit, this document would not be controlling. Interested parties are free to raise questions and objections about the substance of this document, and about its applicability to a particular situation. EPA retains the discretion to adopt approaches on a case-by-case basis that differ from those described in this guide, where appropriate.

All findings of routine maintenance or corrective actions must be documented in the inspection report. Corrective actions must also be documented in a corrective action log.

## Routine Maintenance or Corrective Action?

Use these questions to determine if a problem with a specific control requires corrective action or routine maintenance.

**Question 1: Is this a control that is required under the CGP and:**

- **was never installed; or**
- **was incorrectly installed?**

**If yes to either**, then corrective action is required. The triggering condition(s) and the actions taken to address it must be documented in a corrective action log entry in accordance with CGP Part 5.4.

**If no**, move to Question 2.

**Examples:**

- The control was never installed:
  - Inlet controls are included in the SWPPP but are not installed.
  - A spill kit is not available for a fuel storage area.
  - A sand pile has no evidence of cover or secondary containment.
- The installed control significantly departs from the design described in the SWPPP or applicable local design specifications, making the installed control ineffective:
  - The fence posts of a silt fence are installed on the wrong side (i.e., facing upgradient).
  - A stabilized construction entrance is shorter than the required length.
  - A sediment tank is missing a required filter.

**Question 2: Does the control need to be replaced in its entirety?**
Answer yes if either the control must be replaced with a different type of control because the existing control proved to be ineffective, or the control can be replaced with the same type of control because the original control failed but is still an appropriate control.

**If yes**, then corrective action is required. The triggering condition(s) and the actions taken to address it must be documented in a corrective action log entry in accordance with CGP Part 5.4.

**If no**, and the control can be repaired instead of being replaced, move to Question 3.

**Examples:**

- The original control has failed or is proving to be ineffective, and needs to be replaced with a different type of control:
  - Stabilization with blown straw and seeding on a disturbed slope has completely failed as evidenced by rill erosion and significant soil loss, because the slope is too steep for vegetation to establish without additional controls to keep the seeding in place.
  - A filter sock check dam needs to be replaced with a riprap check dam because it is not adequately slowing the flow of stormwater in a channel that discharges from the site, and there is evidence of scour and erosion at the outfall.

**Examples (continued):**

- The original control failed but is still an appropriate control:
  - An entire section of silt fence installed on the site perimeter has collapsed and been damaged beyond repair by construction equipment.
  - Gravel installed as inlet protection is clogged with sediment and is no longer filtering stormwater.
  - A new concrete washout pit needs to be installed because the existing washout pit is full and close to overflowing.

**<u>Question 3:</u> If repairs are required, but the control does not need to be replaced in its entirety, does the control require significant repairs?**

A "significant repair" is required if any of the following is true: the control must be temporarily taken offline, and/or major replacement parts, specialized equipment, materials, or personnel that are not regularly available to the operator are required. CGP Part 5.1.1.

Indicators of a non-significant or "minor repair" include that the equipment, materials, parts, and/or personnel necessary for the repair are regularly available to the operator, and the repair may be completed without taking the control offline.

**If yes**, then corrective action is required. The triggering conditions and the actions taken to address it must be documented in a corrective action log entry in accordance with CGP Part 5.4.

**If no,** treat this work as a minor repair, and move on to Question 4.

**Examples of controls in need of significant repairs:**

- A portion of the embankment of a sediment basin has washed out, and the basin needs to be temporarily taken offline and dewatered to repair the embankment.
- A major replacement part is needed for a dewatering system.
- An entire diversion berm is significantly eroded and needs to be regraded.
- Inlet protection controls have failed, and sediment needs to be cleaned out of a storm sewer system.

**Examples of controls in need of minor repairs:**

- Erosion control matting does not completely cover an area of exposed soil but can be easily moved or stretched over to cover the exposed area.
- There is accumulated or tracked out sediment on the surface of a road that can be swept up.
- A filter sock does not completely cover a curb cut opening or storm sewer inlet but can be easily shifted to the proper position.
- Chemical containers are not under cover but there is space available in a covered area on site.
- A portion of the filter fabric has detached from the metal fencing of a super silt fence and can be easily re-attached.

**<u>Question 4:</u> Has the same minor repair been made to the same control at the same location three or more times?**

**If yes**, then corrective action is required, and the triggering conditions and the actions taken to address it must be documented in a corrective action log entry in accordance with CGP Part 5.4, unless the operator documents in the inspection report why the specific reoccurrence of the same problem should still be addressed as routine maintenance in accordance with CGP Part 2.1.4.c.ii.

**If no**, then routine maintenance is required in accordance with CGP Part 2.1.4.b.

**Project Name:** _____
**NPDES ID Number:** _____

## Section A – General Information

| **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

**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.

Project Name: _____
NPDES ID Number: _____

| 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<br>If "Yes," date initiated: | ☐ Yes ☐ No<br>If "Yes," date criteria met: | ☐ Yes ☐ No | |
| **2.** | | ☐ Yes ☐ No<br>If "Yes," date initiated: | ☐ Yes ☐ No<br>If "Yes," date criteria met: | ☐ Yes ☐ No | |
| **3.** | | ☐ Yes ☐ No<br>If "Yes," date initiated: | ☐ Yes ☐ No<br>If "Yes," date criteria met: | ☐ Yes ☐ No | |
| **4.** | | ☐ Yes ☐ No<br>If "Yes," date initiated: | ☐ Yes ☐ No<br>If "Yes," date criteria met: | ☐ Yes ☐ No | |
| **5.** | | ☐ Yes ☐ No<br>If "Yes," date initiated: | ☐ Yes ☐ No<br>If "Yes," date criteria met: | ☐ Yes ☐ No | |

| **Section E – Description of Discharges (CGP Part 4.6.2)**<br>(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<br><br>**If "Yes," for each point of discharge, document the following:**<br>• The visual quality of the discharge.<br>• The characteristics of the discharge, including color; odor; floating, settled, or suspended solids; foam; oil sheen; and other indicators of stormwater pollutants.<br>• 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:** |

## General Tips for Using This Template

This Site Inspection Report Template is provided to assist you in preparing site inspection reports for EPA's 2022 Construction General Permit (CGP). If you are covered under the 2022 CGP, you can use this template to create a site inspection report form that is customized to the specific circumstances of your site and that complies with the minimum reporting requirements of Part 4.7 of the permit. Note that the use of this form is optional; you may use your own site inspection report form provided it includes the minimum information required in Part 4.7 of the CGP.

This template does not address the CGP's inspection reporting requirements related to dewatering activities. A separate inspection template has been developed specifically for dewatering activities and is available at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates.

Keep in mind that this document is a template and not an "off-the-shelf" inspection report that is ready to use without some modification. You must first customize this form to include the specifics of your project in order for it to be useable for your inspection reports. Once you have entered all of your site-specific information into the blank fields, you may use this form to complete inspection reports.

The following tips for using this template will help you ensure that the minimum permit requirements are met:

- **Review the inspection requirements.** Before you start developing your inspection report form, read the CGP's Part 4 inspection requirements. This will ensure that you have a working understanding of the permit's underlying inspection requirements.
- **Complete all required blank fields.** Fill out all blank fields. Only by filling out all fields will the template be compliant with the requirements of the permit. (Note: Where you do not need the number of rows provided in the template form for your inspection, you may delete these or cross them off as you see fit. Or, if you need more space to document your findings, you may insert additional rows in the electronic version of this form or use the bottom of the page in the field version of this form.)
- **Use your site map to document inspection findings.** In several places in the template, you are directed to specify the location of certain features of your site, including where stormwater controls are installed and where you will be stabilizing exposed soil. You are also asked to fill in location information for unsafe conditions and the locations of any discharges occurring during your inspections. Where you are asked for location information, EPA encourages you to reference the point on your SWPPP site map that corresponds to the requested location on the inspection form. Using the site map as a tool in this way will help you conduct efficient inspections, will assist you in evaluating problems found, and will ensure proper documentation.
- **Complete the inspection report within 24 hours of completing a site inspection.** You must complete an inspection report in accordance with Part 4.7.1 of the CGP.
- **Include the inspection form with your SWPPP.** Once your form is complete, make sure to include a copy of the inspection form in your SWPPP in accordance with Part 7.2.7.e of the CGP.
- **Retain copies of all inspection reports with your records.** You must also retain in your records copies of all inspection reports in accordance with the requirements in Part 4.7.3 of the CGP. These reports must be retained for at least 3 years from the date your permit coverage expires or is terminated in accordance with the requirements in Part 4.7.4 of the CGP.

## Instructions for Section A

**Inspector Name**

Enter the name of the person that conducted the inspection. Include the person's contact information (title, affiliated company name, address, email, and phone number).

**Inspection Date and Time**

Enter the date you performed the inspection and the time you started and ended the inspection.

**Weather Conditions During Inspection**

Enter the weather conditions occurring during the inspection, e.g., sunny, overcast, light rain, heavy rain, snowing, icy, windy.

**Current Phase of Construction**
If this project is being completed in more than one phase, indicate which phase it is currently in.

**Inspection Location**
If your project has multiple locations where you conduct separate inspections, specify the location where this inspection is being conducted. If only one inspection is conducted for your entire project, enter "Entire Site." If necessary, complete additional inspection report forms for each separate inspection location.

**Unsafe Conditions for Inspection** (CGP Part 4.5.7)
Inspections are not required where a portion of the site or the entire site is subject to unsafe conditions. These conditions should not regularly occur and should not be consistently present on a site. Generally, unsafe conditions are those that render the site (or a portion of it) inaccessible or that would pose a significant probability of injury to applicable personnel. Examples could include severe storm or flood conditions, high winds, and downed electrical wires.

If your site, or a portion of it, is affected by unsafe conditions during the time of your inspection, provide a description of the conditions that prevented you from conducting the inspection and what parts of the site were affected. If the entire site was considered unsafe, specify the location as "Entire Site."

**Inspection Frequency**
Check all the inspection frequencies that apply to your project. Note that you may be subject to different inspection frequencies in different areas of your site.

**Inspection Triggered by a Storm Event**
If you were required to conduct this inspection because of a storm event that produced 0.25 inches or more of rain within a 24-hour period, indicate whether you relied on an on-site rain gauge or a nearby weather station (and where the weather station is located). Also, specify the total amount of rainfall for this specific storm event.

If you were required to conduct this inspection because of a snowmelt discharge from a storm event that produced 3.25 inches or more of snow within a 24-hour period, then indicate whether you relied on an on-site measurement or a nearby weather station (and where the weather station is located). Also, specify the total amount of snowfall for this specific storm event.

## Instructions for Section B

**Type and Location of Erosion and Sediment (E&S) Controls**
Provide a list of all erosion and sediment (E&S) controls that your SWPPP indicates will be installed and implemented at your site. This list must include at a minimum all E&S controls required by CGP Part 2.2. Include also any natural buffers established under CGP Part 2.2.1. Buffer requirements apply if your project's earth-disturbing activities will occur within 50 feet of a discharge to receiving water. You may group your E&S controls on your form if you have several of the same type of controls (e.g., you may group "Inlet Protection Measures," "Perimeter Controls," and "Stockpile Controls" together on one line), but if there are any problems with a specific control, you must separately identify the location of the control, whether routine maintenance or corrective action is necessary, and in the notes section you must describe the specifics about the problem you observed.

**Conditions Requiring Routine Maintenance?**
Answer "Yes" if the E&S control requires routine maintenance as defined in footnote 1 of this template. Note that in many cases, "Yes" answers are expected and indicate a project with an active operation and maintenance program. You should also answer "Yes" if work to fix the problem is still ongoing from the previous inspection, though necessary work must be initiated immediately and completed by the end of the next business day or within seven calendar days if documented in accordance with CGP Part 2.1.4.b.

**If "Yes," How Many Times (Including this Occurrence) Has this Condition Been Identified?**
Indicate how many times the routine maintenance has been required for the same control at the same location.

**Conditions Requiring Corrective Action?**
Answer "Yes" if you found any of the conditions listed in footnote 2 in this template to be present during your inspection (CGP Part 5.1). If you answer "Yes," you must take corrective action and complete a corrective action log, found at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates. You should also answer "Yes" if work to fix the problem from a previous inspection is still ongoing, though the operator must comply with the corrective action deadlines in CGP Part 5.2.

**Date on Which Condition First Observed (If Applicable)?**
Provide the date on which the condition that triggered the need for routine maintenance or corrective action was first identified. If the condition was just discovered during this inspection, enter the inspection date. If the condition is a carryover from a previous inspection, enter the original date of the condition's discovery.

**Description of Conditions Observed**
For each E&S control and the area immediately surrounding it, describe whether the control is properly installed and whether it appears to be working to minimize sediment discharge. Indicate also whether a new or modified control is necessary to comply with the permit. Describe any problem condition(s) you observed such as the following:

1. Failure to install or to properly install a required E&S control
2. Damage or destruction to an E&S control caused by vehicles, equipment, or personnel, a storm event, or other event
3. Mud or sediment deposits found downslope from E&S controls, including in receiving waters, or on nearby streets, curbs, or open conveyance channels
4. Sediment tracked out onto paved areas by vehicles leaving construction site
5. Noticeable erosion or sedimentation at discharge outlets or at adjacent streambanks or channels
6. Erosion of the site's sloped areas (e.g., formation of rills or gullies)
7. E&S control is no longer working due to lack of maintenance
8. Other incidents of noncompliance

Describe also why you think the problem condition(s) occurred as well as actions (e.g., routine maintenance or corrective action) you will take or have taken to fix the problem.

For buffer areas, make note of whether they are marked off as required, whether there are signs of construction disturbance within the buffer, which is prohibited under the CGP, and whether there are visible signs of erosion resulting from discharges through the area.

If routine maintenance or corrective action is required, briefly note the reason. If routine maintenance or corrective action has been completed, make a note of the date it was completed and what was done. *If corrective action is required, note that you will need to complete a separate corrective action log describing the condition and your work to fix the problem*.

**Routine Maintenance Need Has Been Found to be Necessary Three (3) or More Times for the Same Control at the Same Location (Including this Occurrence)**
If routine maintenance has been required three (3) or more times for the same control at the same location, the permit requires (CGP Part 2.1.4.c) you to fix the problem using the corrective action procedures in CGP Part 5 or to document why you believe the reoccurring problem can be addressed as a routine maintenance fix. If you believe the problem can continue to be fixed as routine maintenance, describe why you believe the specific condition should still be addressed as routine maintenance.

## Instructions for Section C

**Type and Location of Pollution Prevention (P2) Practices and Controls**
Provide a list of all pollution prevention (P2) practices and controls that are implemented at your site. This list must include all P2 practices and controls required by CGP Part 2.3 and those that are described in your SWPPP.

**Conditions Requiring Routine Maintenance?**
Answer "Yes" if the P2 practice or control requires routine maintenance as defined in footnote 1of this template. Note that in many cases, "Yes" answers are expected and indicate a project with an active operation and maintenance program. You should also answer "Yes" if work to fix the problem is still ongoing

from the previous inspection, though necessary work must be initiated immediately and completed by the end of the next business day or within seven calendar days if documented in accordance with CGP Part 2.1.4.b.

**If "Yes," How Many Times (Including this Occurrence) Has this Condition Been Identified?**
Indicate how many times the routine maintenance has been required for the same practice or control at the same location.

**Conditions Requiring Corrective Action?**
Answer "Yes" if you found any of the conditions listed in footnote 2 in this template to be present during your inspection (CGP Part 5.1). If you answer "Yes," you must take corrective action and complete a corrective action log, found at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates. You should also answer "Yes" if work to fix the problem from a previous inspection is still ongoing, though the operator must comply with the corrective action deadlines in CGP Part 5.2.

**Date on Which Condition First Observed (If Applicable)?**
Provide the date on which the condition that triggered the need for maintenance or corrective action was first identified. If the condition was just discovered during this inspection, enter the inspection date. If the condition is a carryover from a previous inspection, enter the original date of the condition's discovery.

**Description of Conditions Observed**
For each P2 control and the area immediately surrounding it, describe whether the control is properly installed, and whether it appears to be working to minimize or eliminate pollutant discharges. Indicate also whether a new or modified control is necessary to comply with the permit. Describe any problem condition(s) you observed such as the following:

1. Failure to install or to properly install a required P2 control
2. Damage or destruction to a P2 control caused by vehicles, equipment, or personnel, or a storm event
3. Evidence of a spill, leak, or other type of pollutant discharge, or failure to have properly cleaned up a previous spill, leak, or other type of pollutant discharge
4. Spill response supplies are absent, insufficient, or not where they are supposed to be located
5. Improper storage, handling, or disposal of chemicals, building materials or products, fuels, or wastes
6. P2 control is no longer working due to lack of maintenance
7. Other incidents of noncompliance

Describe also why you think the problem condition(s) occurred as well as actions (e.g., routine maintenance or corrective action) you will take or have taken to fix the problem.

If routine maintenance or corrective action is required, briefly note the reason. If routine maintenance or corrective action has been completed, make a note of the date it was completed and what was done. *If corrective action is required, note that you will need to complete a separate corrective action log describing the condition and your work to fix the problem*.

**Routine Maintenance Need Was Found to be Necessary Three (3) or More Times for the Same Control at the Same Location (Including this Occurrence)**
If routine maintenance has been required three (3) or more times for the same control at the same location, the permit requires (CGP Part 2.1.4.c) you to fix the problem using the corrective action procedures in CGP Part 5 or to document why you believe the reoccurring problem can be addressed as a routine maintenance fix. If you believe the problem can continue to be fixed as routine maintenance, describe why you believe the specific condition should still be addressed as routine maintenance.

## Instructions for Section D

**Specific Location That Has Been or Will Be Stabilized**
List all areas where soil stabilization is required to begin because construction work in that area has permanently stopped or temporarily stopped (i.e., work will stop for 14 or more days), and all areas where stabilization has been implemented (CGP Part 2.2.14).

**Stabilization Method and Applicable Deadline**
For each area, specify the method of stabilization (e.g., hydroseed, sod, planted vegetation, erosion control blanket, mulch, rock).

Specify also which of the following stabilization deadlines apply to this location:

1. 5 acres or less of land disturbance occurring at any one time at site: Complete no later than 14 calendar days after stabilization initiated.
2. More than 5 acres of land disturbance occurring at any one time at site: Complete no later than 7 calendar days after stabilization initiated.
3. Arid, semi-arid, and drought-stricken areas: See CGP Part 2.2.14.b.i.
4. Unforeseen circumstances: See CGP Part 2.2.14.b.ii.
5. Discharges to a sediment- or nutrient-impaired water or to a water identified as Tier 2, 2.5, or 3 for antidegradation purposes: Complete no later than 7 days after stabilization initiated.

**Stabilization Initiated?**
For each area, indicate whether stabilization has been initiated. If "Yes," then enter the date stabilization was initiated.

**Final Stabilization Criteria Met?**
For each area, indicate whether the final stabilization criteria in CGP Part 2.2.14.c have been met. If "Yes," then enter the date final stabilization criteria were met.

**Final Stabilization Photos Taken?**
Answer "Yes" if you have taken photos before and after meeting the stabilization criteria as required in CGP Part 8.2.1.a.

**Notes**
For each area where stabilization has been initiated, describe the progress that has been made and what additional actions are necessary to complete stabilization. Note the effectiveness of stabilization in preventing erosion. If stabilization has been initiated but not completed, make a note of the date it is to be completed. If stabilization has been completed, make a note of the date it was completed. If stabilization has not yet been initiated, make a note of the date it is to be initiated and the date it is to be completed.

## Instructions for Section E

You are only required to complete this section if a discharge is occurring at the time of the inspection (CGP Part 4.6.2).

**Was a discharge (not including dewatering) occurring from any part of your site at the time of the inspection?**
During your inspection, examine all points of discharge from your site, and determine whether a discharge is occurring. If a dewatering discharge was occurring, you must conduct a dewatering inspection pursuant to CGP Part 4.3.2. If there is a discharge, answer "Yes" and complete the questions below regarding the specific discharge. If there is not a discharge, answer "No" and skip to the next page.

**Discharge Location** (Repeat as necessary if there are multiple points of discharge.)
Specify the location on your site where the discharge is occurring. The location may be an outlet from a stormwater control or constructed stormwater channel, a discharge into a storm sewer inlet, or a specific point on the site. Be as specific as possible; it is recommended that you refer to a precise point on your site map.

**Observations**
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; oily sheen; and other indicators of stormwater pollutants. Also, document 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.

## Instructions for Section F

Each inspection report must be signed and certified to be considered complete (CGP Part 4.7.2).

**Operator or "Duly Authorized Representative" – MANDATORY** (CGP Appendix G Part G.11.2 and CGP Appendix H Section X)

At a minimum, the site inspection report must be signed by either (1) the person who signed the NOI, or (2) a duly authorized representative of that person. The following requirements apply:

If the signatory will be the person who signed the NOI for permit coverage, as a reminder, that person must be one of the following types of individuals:

- *For a corporation*: By a responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- *For a partnership or sole proprietorship*: By a general partner or the proprietor, respectively.
- *For a municipality, State, Federal, or other public agency*: By either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a Federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

If the signatory will be a duly authorized representative, the following requirements must be met:

- The authorization is made in writing by the person who signed the NOI (see above);
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

Sign, date and print your name and affiliation.

**Contractor or Subcontractor - OPTIONAL**

Where you rely on a contractor or subcontractor to complete the site inspection report, you should consider requiring the individual(s) to sign and certify each report. Note that this does not relieve you, the permitted operator, of the requirement to sign and certify the site inspection report as well. If applicable, sign, date, and print your name and affiliation.

## Note

While EPA has made every effort to ensure the accuracy of all instructions contained in this template, it is the permit, not this template, that determines the actual obligations of regulated construction stormwater discharges. In the event of a conflict between this template and any corresponding provision of the CGP, you must abide by the requirements in the permit. EPA welcomes comments on this Site Inspection Report Template at any time and will consider those comments in any future revision. You may contact EPA for CGP-related inquiries at cgp@epa.gov

# 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)**<br>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).)*<br>☐ 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)**<br>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:<br>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:**

- ☐ 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:** |

## General Instructions

This Corrective Action Log Template is provided to assist you creating a corrective action log that complies with the minimum reporting requirements of Part 5.4 of the EPA's Construction General Permit (CGP). For each triggering condition on your site, you will need to fill out a separate corrective action log.

The entire form must be completed to be compliant with the requirements of the permit. (Note: In Section C, if you do not need the number of rows provided in the corrective action log, you may delete these or cross them off. Alternatively, if you need more space to describe any modifications, you may insert additional rows in the electronic version of this form or use the bottom of the page in the field version of this form.)

If you are covered under a State CGP, this template may be helpful in developing a log that can be used for that permit; however, you will likely need to modify this form to meet the specific requirements of any State-issued permit. If your permitting authority requires you to use a specific corrective action log, you should not use this template.

## Instructions for Section A

**Individual completing this form** Enter the name of the person completing this log. Include the person's contact information (title, affiliated company name, address, email, and phone number).

## Instructions for Section B

You must complete Section B within 24 hours of discovering the condition that triggered corrective action. (CGP Part 5.4)

**When was the problem first discovered?**

Specify the date and time when the triggering condition was first discovered.

**What site conditions triggered this corrective action?** (CGP Parts 5.1 and 5.3)

Check the box corresponding to the numbered triggering condition below that applies to your site.

1. A stormwater control needs a significant repair or a new or replacement control is needed, or, in accordance with Part Error! Reference source not found., 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 Part Error! Reference source not found. that the specific reoccurrence of this same problem should still be addressed as a routine maintenance fix under Part Error! Reference source not found.);
2. A stormwater control necessary to comply with the requirements of this permit was never installed, or was installed incorrectly;
3. Your discharges are not meeting applicable water quality standards;
4. A prohibited discharge has occurred (see Part 1.3);
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 **Error! Reference source not found.**); or
   b. You observe or you are informed by EPA, State, or local authorities of the presence of any of the following at the point of discharge to a receiving water flowing through or immediately adjacent to your site and/or to constructed or natural site drainage features or storm drain inlets:
      - sediment plume
      - suspended solids
      - unusual color
      - presence of odor
      - decreased clarity
      - presence of foam
      - visible sheen on the water surface or visible oily deposits on the bottom or shoreline of the receiving water
6. EPA requires corrective action as a result of permit violations found during an inspection carried out under Part 4.8.

**Provide a description of the problem** (CGP Part 5.4.1.a)
Provide a summary description of the condition you found that triggered corrective action, the cause of the problem (if identifiable), and the specific location where it was found. Be as specific as possible about the location; it is recommended that you refer to a precise point on your site map.

## Instructions for Section C

You must complete Section C within 24 hours after completing the correction action. (CGP Part 5.4)

**Deadlines for completing corrective action for condition # 1, 2, 3, 4, or 6 (if not relating to a dewatering discharge)** (CGP Part 5.2.1)
Check the box to confirm that you met the deadlines that apply to each triggering condition. You are always required to check the first box (i.e., 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.). Only one of the next three boxes should be checked depending on the situation that applies to this corrective action.

Check the second box if the corrective action for this particular triggering condition does not require a new or replacement control, or a significant repair. These actions must be completed by the close of the next business day from the time of discovery of the condition.

Check the third box if the corrective action for this particular triggering condition requires a new or replacement control, or a significant repair. These actions must be completed by no later than seven calendar days from the time of discover of the condition.

Check the fourth box if the corrective action for this particular triggering condition requires a new or replacement control, or a significant repair, and if it is infeasible to complete the work within seven calendar days. Additionally, you will need to fill out the table below the checkbox that requires:

1. An explanation as to why it was infeasible to complete the installation or repair within seven calendar days of discovering the condition.
2. Provide the schedule you will adhere to for installing the stormwater control and making it operational as soon as feasible after the seventh day following discovery.

Note: Per Part 5.2.1.c, 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 calendar days of completing this work.

**Deadlines for completing corrective action for condition # 5a, 5b, or 6 related to a dewatering discharge** (CGP Part 5.2.2)
These deadlines apply to conditions relating to construction dewatering activities. Check the box to confirm that you met the deadlines that apply to each triggering condition. You are required to check all of the boxes in this section to indicate your compliance with the corrective action deadlines.

**List of modification(s) to correct problem**
Provide a list of modifications you completed to correct the problem.

**Date of completion**
Enter the date you completed the modification. The work must be completed by the deadline you indicated above.

**SWPPP update necessary?**
Check "Yes" or "No" to indicate if a SWPPP update is necessary consistent with Part 7.4.1.a in order to reflect changes implemented at your site. If "Yes," then enter the date you updated your SWPPP. The SWPPP updates must be made within seven calendar days of completing a corrective action. (CGP Part 5.2.1.c)

## Instructions for Section D

Each corrective action log entry must be signed and certified following completion of Section D to be considered complete. (CGP Part 5.4.2)

**Operator or "Duly Authorized Representative" – MANDATORY** (CGP Appendix G Part G.11.2 and CGP Appendix H Section X)

At a minimum, the corrective action log must be signed by either (1) the person who signed the NOI, or (2) a duly authorized representative of that person. The following requirements apply:

If the signatory will be the person who signed the NOI for permit coverage, as a reminder, that person must be one of the following types of individuals:

- *For a corporation*: By a responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- *For a partnership or sole proprietorship*: By a general partner or the proprietor, respectively.
- *For a municipality, State, Federal, or other public agency*: By either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a Federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

If the signatory will be a duly authorized representative, the following requirements must be met:

- The authorization is made in writing by the person who signed the NOI (see above);
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

Sign, date and print your name and affiliation.

**Contractor or Subcontractor - OPTIONAL**

Where you rely on a contractor or subcontractor to complete this log and the associated corrective action, you should consider requiring the individual(s) to sign and certify each log entry. Note that this does not relieve you, the permitted operator, of the requirement to sign and certify the log as well. If applicable, sign, date, and print your name and affiliation.

## Recordkeeping

Logs must be retained for at least 3 years from the date your permit coverage expires or is terminated. (CGP Part 5.4.4)

Keep copies of your signed corrective action log entries 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. (CGP Part 5.4.3) Include a copy of the corrective action log in your SWPPP. (CGP Part 7.2.7.e)

## Note

While EPA has made every effort to ensure the accuracy of all instructions contained in this template, it is the permit, not this template, that determines the actual obligations of regulated construction stormwater discharges. In the event of a conflict between this template and any corresponding provision of the CGP, you must abide by the requirements in the permit. EPA welcomes comments on this Corrective Action Log Template at any time and will consider those comments in any future revision. You may contact EPA for CGP-related inquiries at cgp@epa.gov

**2022 Construction General Permit Dewatering Inspection Report**

**Project Name:** _____

**NPDES ID Number:** _____

| **Section A – Dewatering Discharges (CGP Part 4.6.3)**<br>Complete this section within 24 hours of completing the inspection. | |
|---|---|
| **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:**<br>1. Dewatering water prior to treatment by a dewatering control(s) and the final discharge after treatment; and<br>2. Dewatering control(s); and<br>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.

**Project Name:** _____

**NPDES ID Number:** _____

| **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:** |

## General Tips for Using This Template

This Dewatering Inspection Report Template is provided to assist you in preparing dewatering inspection reports for EPA's 2022 Construction General Permit (CGP). If you are covered under the 2022 CGP, you can use this template to create a dewatering inspection report form that complies with the minimum reporting requirements of Part 4.6.3 of the permit. Note that the use of this form is optional; you may use your own inspection report form provided it includes the minimum information required in Part 4.6.3 of the CGP.

This template is for dewatering inspections only. A separate site inspection report template that does not include dewatering inspections and complies with the minimum reporting requirements of Part 4.7 of the permit is available at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates.

If you are covered under a State CGP, this template may be helpful in developing a report that can be used for that permit; however, it will need to be modified to meet the specific requirements of that permit. If your permitting authority requires you to use a specific inspection report form, you should not use this form.

The following tips for using this template will help you ensure that the minimum permit requirements are met:

- **Review the inspection requirements.** Before you start developing your inspection report form, read the CGP's Part 4 inspection requirements. This will ensure that you have a working understanding of the permit's underlying inspection requirements.
- **Complete all required blank fields.** Fill out all blank fields. Only by filling out all fields will the template be compliant with the requirements of the permit. (Note: Where you do not need the number of rows provided in the template form for your inspection, you may delete these as you see fit. Or, if you need more space to document your findings, you may insert additional rows in the electronic version of this form or use the bottom of the page in the field version of this form.)
- **Use your site map to document inspection findings.** In several places in the template, you are directed to specify the location of certain features of your site, including where stormwater controls are installed and where you will be stabilizing exposed soil. You are also asked to fill in location information for unsafe conditions and the locations of any discharges occurring during your inspections. Where you are asked for location information, EPA encourages you to reference the point on your SWPPP site map that corresponds to the requested location on the inspection form. Using the site map as a tool in this way will help you conduct efficient inspections, will assist you in evaluating problems found, and will ensure proper documentation.
- **Include the inspection form with your SWPPP.** Once your form is complete, make sure to include a copy of the inspection form in your SWPPP in accordance with Part 7.2.7.e of the CGP.
- **Retain copies of all inspection reports with your records.** You must also retain copies of all inspection reports in your records in accordance with the requirements in Part 4.7.3 of the CGP. These reports must be retained for at least 3 years from the date your permit coverage expires or is terminated in accordance with the requirements in Part 4.7.4 of the CGP.

## Instructions for Section A

**Inspector Name**

Enter the name of the person that conducted the inspection. Include the person's contact information (title, affiliated company name, address, email, and phone number).

**Inspection Date**

Enter the date you performed the inspection.

**Inspection Location**

If your project has multiple locations where you conduct separate dewatering inspections, specify the location where this inspection is being conducted. Otherwise, you can enter "dewatering operation."

**Discharge Start and End Times**

Enter the approximate time the dewatering discharge started and ended on the day of the inspection.

**Rate of Discharge**
Enter the rate of discharge in gallons per day on the day of inspection.

To estimate the approximate discharge rate on the day of dewatering inspection, one approach is to use the manufacturer's design pump rating for the pump model in use. For example, a pump rated at 164 gpm (gallons per minute) by the manufacturer can be assumed to be discharging at 164 gpm in most cases. To convert to gallons per day, multiply the rate in gpm by the ratio of minutes in one-day (1,440 minutes per day), resulting in a discharge rate of 236,160 gallons per day.

In cases where the dewatering discharge is being pumped over long distances or a substantial distance uphill, which will result in a reduced pump rate relative to manufacturer's specification, the operator may improve the accuracy of the estimate by estimating the time required to fill a container of a known volume. For example, if it takes 60 seconds to fill an empty 55-gallon barrel, the estimated discharge rate is 55 gpm, or 79,200 gallons per day.

**Indicators of Pollutant Discharge**
For the point of discharge, describe any observed sediment plume, suspended solids, unusual color, presence of odor, decreased clarity, or presence of foam; and/or a visible sheen on the water surface or visible oily deposits on the bottom or shoreline of the receiving water.

**Corrective Action Required?**
Answer "Yes" if during your inspection you found any of the conditions listed above in the instructions for the Indicators of Pollutant Discharge section. If you answer "Yes," you must take corrective action and complete a corrective action log, found at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates. Answer "No" if you did not observe any of the listed pollutant indicators.

**Photographs**
As required in CGP Part 8.2.1.a, attach photos of: (1) 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.

## Instructions for Section B

Each inspection report must be signed and certified to be considered complete (CGP Part 4.7.2).

**Operator or "Duly Authorized Representative" – MANDATORY** (CGP Appendix G Part G.11.2 and CGP Appendix H Section X)
At a minimum, the dewatering inspection report must be signed by either (1) the person who signed the NOI, or (2) a duly authorized representative of that person. The following requirements apply:

If the signatory will be the person who signed the NOI for permit coverage, as a reminder, that person must be one of the following types of individuals:

- *For a corporation*: By a responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- *For a partnership or sole proprietorship*: By a general partner or the proprietor, respectively.

- *For a municipality, State, Federal, or other public agency*: By either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a Federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

If the signatory will be a duly authorized representative, the following requirements must be met:

- The authorization is made in writing by the person who signed the NOI (see above);
- The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
- The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

Sign, date and print your name and affiliation.

**Contractor or Subcontractor - OPTIONAL**

Where you rely on a contractor or subcontractor to complete the dewatering inspection report, you should consider requiring the individual(s) to sign and certify each report. Note that this does not relieve you, the permitted operator, of the requirement to sign and certify the dewatering inspection report as well. If applicable, sign, date, and print your name and affiliation.

## Note

While EPA has made every effort to ensure the accuracy of all instructions contained in this template, it is the permit, not this template, that determines the actual obligations of regulated construction stormwater discharges. In the event of a conflict between this template and any corresponding provision of the CGP, you must abide by the requirements in the permit. EPA welcomes comments on this Dewatering Inspection Report Template at any time and will consider those comments in any future revision. You may contact EPA for CGP-related inquiries at cgp@epa.gov







EPA 833-B-22-001

# Inspection and Monitoring Guide for Construction Dewatering

## EPA's 2022 Construction General Permit

## February 2022



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# Section 1: Introduction

This guide describes how to conduct inspections and turbidity benchmark monitoring for discharges from construction dewatering activities. Its target audience is operators covered under EPA's 2022 Construction General Permit (CGP) who will be discharging dewatering water.

**Authorized dewatering discharges under EPA's CGP**

The CGP defines dewatering as "the act of draining accumulated stormwater and/or groundwater from building foundations, vaults, and trenches, or other similar points of accumulation" (CGP, Appendix A). The CGP includes **uncontaminated** construction dewatering water as an authorized (i.e., allowed) non-stormwater discharge, provided the operator satisfies the conditions specified in Part 2.4 of the CGP.

This guide does not impose any new legally binding requirements on EPA, States, Tribes, territories, or the regulated community; it does not confer legal rights or impose legal obligations upon any member of the public. In the event of a conflict between this document and any statute, regulation, or permit, this document would not be controlling.

Interested parties are free to raise questions and objections about this guide's substance, and about its applicability to a particular situation. EPA retains the discretion to adopt approaches on a case-by-case basis that differ from those described in this guide, where appropriate.

## 1.A Introduction to CGP Dewatering Inspection and Monitoring Requirements

The 2022 CGP established inspection and turbidity benchmark monitoring requirements for dewatering discharges. These include the following:

- **Dewatering inspections for all sites.** All sites discharging dewatering water must complete inspections of dewatering operations once per day on any day there is a dewatering discharge. Operators must check for signs of sediment or other visual indicators of pollution in dewatering discharges and take corrective action, when needed.
- **Turbidity benchmark monitoring for operators discharging to sensitive waters.** Operators that discharge dewatering water to sensitive waters must sample that dewatering water once per day for turbidity analysis. They must then compare the weekly average results with the assigned benchmark threshold. Where weekly average turbidity results exceed the benchmark, the operator must take corrective action.

**Sensitive waters**

The CGP defines "sensitive waters" as receiving waters listed as impaired for sediment or a sediment-related parameter, or receiving waters designated as a Tier 2, Tier 2.5, or Tier 3 for antidegradation purposes. See CGP, Part 3.3.

- **State, Tribal, or territorial required monitoring.** Dewatering discharges may be subject to additional State-, Tribe-, or territory-specific requirements. Consult CGP, Part 9, to determine if you must conduct additional monitoring at each dewatering discharge point.

# Section 2: Prepare for Inspection and Monitoring

Preparing to inspect and monitor dewatering discharges requires that you collect information about your construction site and your site's dewatering operations. Most of this information should have been collected previously, to be used in submitting a Notice of Intent (NOI) for coverage under the CGP and developing the monitoring procedures section of the site's stormwater pollution prevention plan (SWPPP).

You will need to compile the dewatering information if it has not already been developed. This guide suggests resources for doing so—for example, determining receiving waters and evaluating SWPPP site map components. Note that EPA has a suggested template for SWPPPs, the *Construction Stormwater Pollution Prevention Plan (SWPPP) Template*, available at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates.

## 2.A Determine Where Dewatering Discharges Are Occurring

**What if my site does not discharge dewatering water?**

The CGP does not require dewatering inspections or turbidity benchmark monitoring if dewatering water stays on-site. Retained water may, for instance, be allowed to evaporate or infiltrate into the soil (unless ground water contamination concerns exist as described in CGP, Part 2.2.2) or be used for on-site dust control, irrigation, or other construction-related purposes.

The following documents will direct you to the location(s) of dewatering discharges from your site, the first step toward planning for inspection of dewatering discharges and possible turbidity benchmark monitoring.

- A copy of the CGP and the accompanying fact sheet.
- A copy of the CGP NOI submitted to EPA. The NOI identifies the site's discharge points and receiving waters and indicates whether there will be a discharge of dewatering water.
- The SWPPP, which must include:
  - Procedures for dewatering inspection, maintenance, and corrective action (CGP, Part 7.2.7).
  - Procedures for turbidity benchmark monitoring from dewatering discharges, if applicable (CGP, Part 7.2.8).
  - A site map that:
    - Shows the location(s) of any receiving waters within the site and all receiving waters within 1 mile downstream of the site's discharge point(s) (CGP, Part 7.2.4.c).

**Discharge point**

For the purposes of the CGP, the discharge point is the location where concentrated stormwater flows or dewatering water are discharged from the construction site. See CGP, Appendix A.

- Identifies if any receiving waters are listed as impaired or identified as a Tier 2, Tier 2.5, or Tier 3 water (CGP, Part 7.2.4.c).
- Shows all discharge locations, as well as the location(s) where turbidity benchmark monitoring will take place, if applicable to your site (CGP, Part 7.2.4.g).

You should visit all dewatering operations and dewatering discharge points to verify the information in the SWPPP. For each dewatering operation, note:

- Whether ground water, accumulated stormwater, or a combination of the two is being dewatered. Ground water and stormwater have different potential pollutants.
- Whether the dewatering operation is continuous or intermittent and the expected frequency of dewatering discharges. Continuous dewatering may occur at sites with high ground water or alluvial aquifers, or when work is done next to receiving waters. Intermittent dewatering may occur during wet weather periods.
- Whether dewatering water is discharged to a municipal separate storm sewer system (MS4). If you discharge to an MS4, you should contact the operator of the system (e.g., the local public works department, the highway department) to alert them to the discharge.
- Whether the receiving water is a sensitive water.

You should consider taking photos of each dewatering operation and discharge point before commencing dewatering. You will later be able to use these initial photos as a baseline to identify erosion or other adverse impacts from dewatering.

**Municipal separate storm sewer systems (MS4s)**

An MS4 is "a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains)…Owned and operated by a…public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes…that discharges to waters of the United States" and is "Designed or used for collecting or conveying storm water; which is not a combined sewer; and which is not part of a Publicly Owned Treatment Works" [40 CFR 122.26(b)(8)].

## 2.B Determine Which CGP Requirements Apply at Each Dewatering Discharge Point

### Daily Dewatering Inspections

All operators must inspect dewatering operations once per day when dewatering discharge is occurring (CGP, Part 4.3.2). Daily dewatering inspections are in addition to site inspections required by CGP Part 4.2.

### Turbidity Benchmark Monitoring

You must carry out turbidity benchmark monitoring if you discharge dewatering water to sensitive waters (CGP, Part 3.3). You must collect at least one turbidity sample from each dewatering discharge point, each day a discharge occurs. Samples may be taken at any time during the day while dewatering water is being discharged. You may consider taking the daily turbidity sample while you conduct daily dewatering inspections.

**What is turbidity?**

The CGP defines turbidity as "a condition of water quality characterized by the presence of suspended solids and/or organic material" (CGP, Appendix A). Water with low turbidity appears clear; water with higher turbidity appears cloudy or murky.

Turbidity samples must be analyzed using a turbidity meter that reports results in nephelometric turbidity units (NTUs) and conforms with an EPA-approved method under 40 CFR Part 136 (e.g., EPA Method 180.1). Compare the turbidity level in each sample to the CGP turbidity benchmark threshold to determine if corrective action is required to reduce turbidity levels in dewatering discharges.

The turbidity benchmark threshold is 50 NTUs (referred to as the "standard 50 NTU benchmark"). However, if you can demonstrate that your receiving water's water quality standard for turbidity is higher than 50 NTUs, CGP Part 3.3.2.b describes a process to request EPA approval of a turbidity benchmark for your site that is higher than the standard 50 NTU benchmark.

Benchmarks as used in the CGP are not effluent limits. Instead, a benchmark acts as a trigger to require corrective action when the weekly average of turbidity monitoring results exceeds it. Corrective actions include steps such as shutting off the dewatering discharge, investigating whether dewatering controls are operating effectively and could be the cause of the exceedance, and adjusting the controls as needed to lower the turbidity levels below the benchmark. Corrective actions are described in more detail in Section 4.

## What Is a Sensitive Water?

CGP Part 3.3 defines a "sensitive water" as a receiving water that is either or both of the following:

- Impaired for sediment or a sediment-related parameter. (An impaired water is a water that a State, a Tribe, or EPA identifies as not meeting water quality standards for a specific parameter.)
- Designated as a Tier 2, 2.5, or 3 water for antidegradation purposes.

**Sediment-related parameters**

The CGP defines a "sediment-related parameter" as a pollutant parameter that is closely related to sediment such as turbidity, total suspended solids, total suspended sediment, transparency, sedimentation, and siltation (CGP, Appendix A).

The Federal antidegradation policy at 40 CFR 131.12 requires different levels of protection, or "tiers," for waters of the United States. For antidegradation purposes, Tier 2 waters are those waters whose quality exceeds the levels needed to support propagation of fish, shellfish, and wildlife, as well as recreation in and on the water. Tier 3 waters are Outstanding Natural Resource Waters, such as waters of national and State parks and wildlife refuges and waters of exceptional recreational or ecological significance. Some States and Tribes designate Tier 2.5 high quality waters, which require a level of protection equal to or greater than Tier 2 waters, but less than that given to Tier 3 waters.

## How Do I Know If I Am Discharging to a Sensitive Water?

If you filed an NOI to obtain CGP coverage, you will have already identified your receiving waters and whether they are impaired or designated as Tier 2, 2.5, or 3 waters.

Waters impaired for sediment and sediment-related parameters are identified on each State's Clean Water Act, Section 303(d) list—that is, the list of impaired and threatened waters (e.g., stream/river segments, lakes). States submit their 303(d) lists for EPA approval every 2 years.

For each water on the list, the State identifies the pollutant causing the impairment, when known (EPA, 2021).

EPA's Stormwater Discharge Mapping Tools publishes information on waterbody impairments by segment. You can also refer to the State's 303(d) list, but you will need to know the name of the waterbody and the segment identification number. EPA's How's My Waterway? webpage is useful for identifying which waterbody segment receives discharges from your construction site.

EPA's Construction General Permit Resources, Tools, and Templates webpage provides links to a list of currently designated Tier 2, Tier 2.5, and Tier 3 waters in the areas where the CGP is in effect. You should not assume that a water does not receive Tier 2, Tier 2.5, or Tier 3 protection solely based on the absence of information contained in this list. Contact your State or Tribal authority if you need help determining whether your site discharges to a Tier 2, Tier 2.5, or Tier 3 water.

## 2.C Determine Where You Will Collect Samples

If your site has one or more discharge points through which treated dewatering water flows to a sensitive receiving water, each of these dewatering discharges must be sampled and analyzed for turbidity each day a discharge occurs. As previously mentioned, the SWPPP site map must identify discharge points, receiving waters, and the specific turbidity sampling locations (CGP, Part 7.2.4.g).

The CGP does not prescribe an exact sampling location for turbidity benchmark monitoring; you are responsible for identifying a safe and accessible sampling location that is representative of the discharge. (A sample is representative if it has the same physical and chemical characteristics as the dewatering discharge.) CGP Part 3.3.1.b stipulates that "[s]amples must be taken after the dewatering water has been treated by installed treatment devices…and prior to its discharge off site into a receiving water, constructed or natural site drainage feature, or storm drain inlet"—that is, before the treated dewatering water commingles with stormwater or other pollutant sources.

Note that the sampling location for turbidity benchmark monitoring may be different than the discharge point based on the configuration of the dewatering operation. However, the sampling location for a particular discharge point should be the same from sample to sample unless adverse conditions prevent safe access.

### Sampling from a Pipe or Hose

If dewatering water flows from the treatment control through a pipe or hose to the discharge point, take the sample directly from the pipe or hose. Typically, a cuvette is used to collect the sample and the same cuvette is used for the analysis. This avoids having to transfer the sample from the sampling container to the cuvette for analysis.

**What is a cuvette?**

A cuvette is a small tube-like container with straight sides and a circular or square cross section. It is sealed at one end, and made of a clear, transparent material such as plastic, glass, or fused quartz. Cuvettes hold the sample, and the turbidity meter passes a beam of light through the sample within the cuvette to measure turbidity.



For hard-to-reach locations, you may need to fasten a collection bottle to a pole. If you take the sample in a bottle or other container, you must transfer the sample to the cuvette for analysis. Before transferring the sample, gently agitate or mix it to keep solids in suspension while transferring. (Otherwise, the transfer process can cause a turbidity result that is artificially low

and is not representative of the discharge.) Take care when transferring to the cuvette to minimize formation of air bubbles, which can cause a turbidity result that is artificially high and is not representative of the discharge.

## Sampling Overland Flow

In some areas of your site, it may be difficult to obtain a sample because the dewatering discharge drains overland flow and is not deep enough to collect a sample. If the flow is too shallow to directly fill a cuvette, consider:

- Concentrating overland flow by excavating a small depression in an existing ditch or other location where stormwater runoff flows.

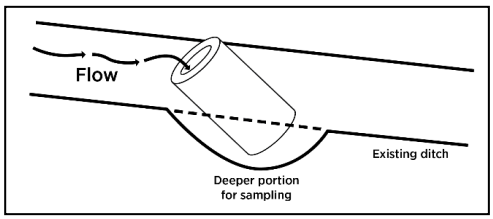



***Figure 1. Sampling overland flow by deepening an existing ditch***

- Installing a trough, gutter, or ditch to intercept and concentrate dewatering flow.

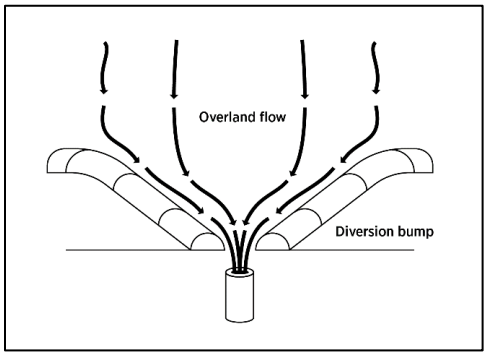



***Figure 2. Sample overland flow from vegetated areas by constructing a shallow ditch to intercept the runoff and a deepened area to place bottles to catch the runoff.***

- Installing "speed" bumps to convey and concentrate overland flow. A container positioned on the edge of the collection area can collect samples directly.

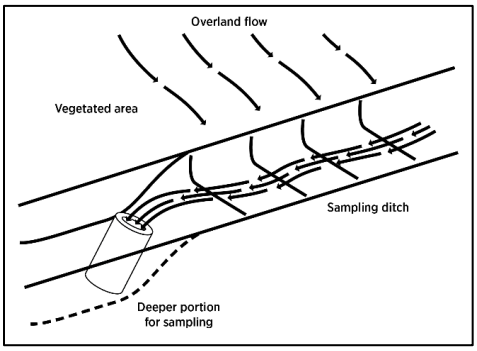



***Figure 3. Sample overland flow by constructing diversion bumps to collect and concentrate the flow.***

If you dig a ditch or disturb the earth in some way, line the disturbance with concrete or plastic to avoid contaminating stormwater samples with sediment or other pollutants.

### Sampling from a Drainage Ditch or Swale

If dewatering water is discharged via a drainage ditch or vegetated swale, collect the sample from a consistently flowing part of the ditch/swale. If the ditch/swale is too small or shallow, install a barrier device in the channel or deepen a small area so you can sample directly into the bottles. If you dig a ditch or disturb the earth in some way, line the disturbance with concrete or plastic so that you do not contaminate your stormwater samples with sediment or other pollutants.

### Sampling from a Stormwater Detention/Retention Basin

If you need to sample from a detention or retention basin, only do so at the structure's outlet and only when a discharge from the basin occurs. You are not required to conduct turbidity benchmark monitoring if the on-site basin that receives dewatering water is not discharging, but you should check the basin outlet for discharge every day dewatering is occurring. Note that if the basin receives other inflows in addition to dewatering water (e.g., stormwater), the discharge from the basin must still meet the turbidity benchmark.

### Potential Sampling Issues

Potential problems for dewatering sampling include adverse weather and lack of accessibility.

- **Adverse weather.** High tides and high flow or flood conditions can make it difficult to reach the dewatering sampling location, pipes and hoses may be clogged or submerged, and dewatering treatment controls may be overloaded. You should use your best professional judgment when choosing sampling locations during adverse weather. In some cases, you may need to sample at a point before the discharge point.
- **Discharge point/sampling location is inaccessible.** Discharge points and sampling locations may not be accessible for a variety of reasons. In these instances, you may need to identify an alternate, representative sampling location. Go upstream of the dewatering sampling location until a sample can be taken. If you cannot collect a sample, make a note on your turbidity benchmark monitoring data table (see the sample in Appendix A) and take photos if possible.

## 2.D Select Dewatering Inspection and Monitoring Staff

Each operator, or group of multiple operators, covered under the CGP must have a "stormwater team" responsible for monitoring activities and corrective actions.[1] Section 6 of this guide provides an overview of training requirements and recommendations for stormwater team members who will inspect and monitor dewatering operations. It may be advantageous to have the person or persons performing dewatering inspections also conduct turbidity benchmark monitoring, when required. Using the same person or team for inspections and turbidity benchmark monitoring will help produce consistent, comparable samples over time.

Some permitted construction sites have one operator each; others may have multiple operators. Where multiple operators are operating on one site, they may coordinate representation on the stormwater team to avoid duplicating efforts (CGP, Part 3.3). CGP Part 7.2.8 requires that your

[1] Part 6.1 of the 2022 CGP lists which construction site staff must be represented on the stormwater team. Part 6.2 of the CGP lists the general training requirements for members of the stormwater team.

SWPPP describe any coordinating arrangement you may have with any other permitted operators on the same site for compliance with the turbidity benchmark monitoring requirements, including which parties have which specific responsibilities.

A written agreement is the best practice when stormwater compliance, monitoring, and corrective actions are shared among multiple operators. A written agreement that assigns specific monitoring responsibilities to specific members of the stormwater team, identified by operator and position, will help to make sure that dewatering inspection and turbidity benchmark monitoring activities are not missed because of communication breakdowns and will clarify each operator's monitoring responsibilities during a regulatory inspection.

## 2.E Select a Turbidity Meter That Meets EPA Requirements

Only purchase a turbidity meter that conforms with an EPA-approved method in 40 CFR Part 136 (e.g., EPA Method 180.1). This information should be readily available from the manufacturer or retailer.

Samples must be measured using a turbidity meter that reports results in NTUs. EPA-compliant (field or benchtop) turbidity meters comply with the methods outlined in 40 CFR Part 136. The most common approved method used for turbidity monitoring is *EPA Method 180.1: Determination of Turbidity by Nephelometry*, the standard for determining turbidity in drinking, ground, surface, waste, and seawater samples. The applicable range of EPA Method 180.1 is 0–40 NTUs, making it ideal for low-range samples. The method can be modified for higher levels of turbidity with dilution of the sample. EPA has approved other methods for turbidity.[2] Some methods are better suited for measuring higher or lower levels of turbidity; choose a method to reflect the expected level of turbidity of the dewatering discharge.

Things to look for when purchasing a turbidity meter include, but are not limited to:

- The meter complies with an approved EPA method. (This is usually highlighted by the manufacturer.)
- The meter is durable and weather-resistant if it will be used in the field.
- Calibration materials are readily available.

Potential issues with turbidity meters include:

- **Malfunctions**. If the turbidity meter malfunctions or fails to calibrate correctly, it should be repaired or recalibrated, or another sampling device should be used.
- **Turbidity sample exceeds the meter's range.** If the sample's turbidity level is outside the meter's range, refer to the manufacturer's manual. You may need to dilute the sample to obtain a result. *EPA Method 180.1: Determination of Turbidity by Nephelometry* describes how to dilute a sample to obtain a turbidity result.

[2] Standard Method 2130 B-2011, ASTM D1889-00, and USGS 1-3860-85 are also approved methods under 40 CFR Part 136.

## 2.F Document Dewatering Inspection and Monitoring Procedures in Your SWPPP

You must correctly document dewatering inspection and turbidity benchmark monitoring procedures in your SWPPP (CGP, Parts 7.2.7 and 7.2.8). If your site is required to conduct turbidity benchmark monitoring, the SWPPP must describe the procedures for collecting and evaluating samples, reporting results to EPA, keeping records of monitoring information, and taking corrective action when necessary. The SWPPP must identify the specific type of turbidity meter used for monitoring and all manuals or manufacturer instructions on how to operate and calibrate the meter (CGP, Part 7.2.8).

## 2.G Collect and Organize Inspection and Monitoring Supplies

You should make a list and collect all the supplies you will need for the required turbidity benchmark monitoring. These supplies should be stored and organized in a common location to ensure they are accessible when you need to sample. They include, but are not limited to:

- **Sampling equipment.** Ensure the turbidity meters are in working condition, calibration solutions are available and not expired, and that any other needed sampling materials (e.g., cuvettes, wipes, extra batteries) are stocked.
- **Personal protective equipment.** Hard hats, vests, safety glasses, etc., should be readily accessible on-site for inspection and monitoring activities.
- **Documentation**. Appendix A provides a sample turbidity benchmark monitoring data table.

# Section 3: Conduct Inspections and Monitoring and Evaluate Results

This section addresses how to conduct dewatering inspections, perform turbidity benchmark monitoring of dewatering discharges (if required), and evaluate inspection observations and sampling results. The section covers inspection procedures, how to collect and analyze samples, and how to record the results. Recall that operators must inspect dewatering discharges every day these discharges are occurring. Turbidity benchmark monitoring must be performed every day discharges are occurring, but only for discharges to a sensitive water.

## 3.A Inspect Dewatering Operations

You must inspect dewatering operations once each day when dewatering water is being discharged to ensure that dewatering treatment controls are working correctly; to evaluate whether there are observable indicators of pollutant discharges; and, if so, to know whether you need to take action to correct any problems at the site or with the dewatering controls that may have contributed to the pollutant discharges. CGP Part 4.6.3.e identifies two general conditions to watch for during dewatering inspections, either of which would mean you must take corrective actions:

- A sediment plume, sheen, suspended solids, unusual color, presence of odor, decreased clarity, or presence of foam.
- A visible sheen or visible hydrocarbon or sediment deposits on the bottom or shoreline of the receiving water.



***Figure 4. Dewatering discharge operations.***

You should give special attention to the dewatering operation during initial setup, when the dewatering operation changes, and after major storm events. If you observe any of the pollutant indicators identified above during your inspection, you must conduct corrective action under CGP Parts 5.1.5.b and 5.2.2. Section 4 presents corrective actions to consider when you observe pollutant indicators in dewatering discharges.

CGP Part 4.6.3.f requires photo documentation of dewatering inspections. You must take photos of:

1. 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.

Field personnel will also need to estimate the rate of discharge, in gallons per day (gpd), if the dewatering treatment control does not have a flow gauge. Operators may rely on the manufacturer's design pump rating for the pump model in use. For example, a pump rated at 164 gallons per minutes (gpm) by the manufacturer can be assumed to be discharging at 164 gpm in most cases. To convert to gpd, multiply the rate in gpm by 1,440 (the number of minutes in one day), resulting in a daily discharge rate of 236,160 gallons.[3] If the dewatering discharge is being pumped over long distances or a substantial distance uphill—which will result in a pump rate lower than the manufacturer's specification—the operator may improve the accuracy of the estimate by estimating the time required to fill a container of a known volume. For example, if it takes 60 seconds to fill an empty 55-gallon barrel, the estimated discharge rate is 55 gpm, or 79,200 gpd.

Refer to Section 5.A of this guide for dewatering inspection recordkeeping requirements.

Operators not subject to turbidity benchmark monitoring can skip to Section 4.

## 3.B Collect and Analyze Turbidity Benchmark Monitoring Samples

The protocol below outlines the appropriate steps for collecting a grab sample for turbidity benchmark monitoring. A grab sample is a single sample obtained by filling up a container directly from the source. Always wear clean, disposable, powder-free gloves during sampling activities. To avoid sample contamination, dispose of the gloves after using them once. You should refer to the turbidity meter manufacturer's instructions for details on calibrating and using your meter.



***Figure 5. Turbidity sample collected in a cuvette.***

- Conduct a daily calibration verification consistent with the manufacturer's instructions.
- Fill the cuvette (or other sample container) directly from the sampling location. Make sure not to set its opening on the ground, or against the mouth of the discharge point, to avoid contaminating the sample.
- If you have used a different container to collect the sample, transfer the sample to the cuvette.
    - Gently agitate or mix the sample before transferring to keep the solids in suspension during the transfer.
    - Pour the sample onto the interior wall of the cuvette to avoid bubble formation.
- Wipe the outside of the cuvette with a clean cloth or tissue and gently agitate the sample to disperse the solids before inserting the turbidity meter.

[3] The example assumes that the site is dewatering 24 hours per day. If not, use the number of minutes the pump is operating each day to calculate the daily discharge.

- Run the meter and record the result in NTUs on the sampling form, as described in Section 3.C below.
- Empty the cuvette and other sampling container (if you used one). Rinse and dry them before collecting and analyzing another sample.

If you are taking multiple dewatering samples for analysis with a benchtop turbidity meter in the trailer, be sure to properly label the containers so the sample results can be matched to each sampling location.

## 3.C Record Information for Each Monitoring Event

You must keep records of the following information for each turbidity sample (CGP, Standard Condition G.10.3).

- The date, time, and exact location of the turbidity sample.
- The person(s) who performed the sampling and analyses.
- The analytical techniques or methods used. For this, it is sufficient to record the make and model of the turbidity meter.
- The date and time each sample was analyzed. Note that sampling and analysis times may be the same if using a field meter, or they may be different if samples are collected and taken to a different location for analysis, such as a benchtop turbidity meter in the trailer, office, or elsewhere nearby. 40 CFR Part 136 specifies that turbidity samples must be analyzed within 48 hours of collection, which is the maximum holding time.
- The turbidity result for each sample. The CGP requires turbidity monitoring results to be rounded to the nearest whole number.

Record the required information on your monitoring data table (a sample table is provided in Appendix A).

## 3.D Evaluate Turbidity Benchmark Monitoring Results

The analysis of your turbidity benchmark monitoring results will determine if you must perform corrective action to reduce weekly average turbidity below the standard 50 NTU benchmark or the EPA-approved alternate benchmark for your dewatering discharges. The turbidity benchmark is not an effluent limit; rather it provides an action level that if exceeded indicates that the dewatering controls may not be working to protect water quality, in which case you must investigate and take appropriate corrective actions.

For each week that dewatering water is being discharged, you must compare the weekly average of turbidity monitoring results to the standard 50 NTU benchmark, or alternate benchmark if approved by EPA. The weekly average is calculated as the sum of the turbidity results divided by the number of samples. If you analyze more than one turbidity sample in a day, each result must be included in the weekly average calculation (Table 1). See CGP Part 3.3.3.c. For averaging purposes, a "monitoring week" starts with a Monday

**Alternate benchmark thresholds**

CGP Part 3.3.2.b allows you to request a turbidity benchmark that is higher than 50 NTUs if you have information showing the higher number is the same as your receiving water's water quality standard for turbidity. You must, however, use the standard 50 NTU benchmark until EPA approves an alternate benchmark.

and ends on the Sunday. Once a new monitoring week starts, you will need to calculate a new average for that week of turbidity monitoring results.

In the example shown in Table 1, the operator collected six samples within a monitoring week, with two samples taken on Friday and none taken on days when dewatering discharges did not occur. The resulting weekly average is 53 NTUs (rounded to the nearest whole number). In this case, the operator must take corrective action to reduce turbidity in their dewatering discharges because the weekly average exceeds the standard 50 NTU benchmark. See Section 4 for information on potential corrective actions.

**Table 1. Example Weekly Average Turbidity Calculation, Intermittent Discharge**

| Day of the Week | Number of Turbidity Samples | Result (NTUs) |
|---|---|---|
| Monday | 1 | 43 |
| Tuesday | 1 | 68 |
| Wednesday | 0 | No discharge |
| Thursday | 1 | 41 |
| Friday | 2 | 72 |
| | | 48 |
| Saturday | 1 | 45 |
| Sunday | 0 | No discharge |
| *Weekly total* | *6* | *317* |
| **Weekly average** | **—** | **53** |

Similarly, if the operator only discharges dewatering water on one day during a monitoring week the turbidity result(s) from that day is the weekly average for that monitoring week, as shown in Table 2.

**Table 2. Example Weekly Average Turbidity Calculation, One Sampling Event**

| Day of the Week | Number of Turbidity Samples | Result (NTUs) |
|---|---|---|
| Monday | 0 | No discharge |
| Tuesday | 0 | No discharge |
| Wednesday | 0 | No discharge |
| Thursday | 1 | 28 |
| Friday | 0 | No discharge |
| Saturday | 0 | No discharge |
| Sunday | 0 | No discharge |
| *Weekly total* | *1* | *28* |
| **Weekly average** | **—** | **28** |

# Section 4: Take Corrective Action

You must take corrective action if any of the following triggering conditions occurs:

- The weekly average of your turbidity monitoring results exceeds the standard 50 NTU benchmark or an alternate EPA-approved benchmark (CGP, Part 5.1.5.a).
- During dewatering discharge, you observe a sediment plume, suspended solids, unusual color, presence of odor, decreased clarity, or foam (CGP, Parts 4.6.3.e and 5.1.5.b) at the point of discharge to receiving waters or to constructed or natural site drainage features or storm drain inlets.
- During dewatering discharge, you observe a visible sheen on the water surface or visible oily deposits on the receiving water's bottom or shoreline (CGP, Parts 4.6.3.e and 5.1.5.b).
- EPA, State, or local authorities inform you that your dewatering discharge or the receiving water for the discharge has visual pollution indicators described above (CGP, Part 5.1.5.b).

## 4.A Corrective Action Deadlines

If your inspection observations or turbidity benchmark monitoring results trigger a corrective action, you must document the triggering condition in your corrective action log within 24 hours of identifying it, as well as the date and time it was identified. (See CGP Part 5.4 and Section 5.C of this guide.) You must also do all of the following:

- 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 and 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.B Corrective Action Options

A successful corrective action will minimize or eliminate indicators of pollutants (e.g., sediment plume or sheen) observed in dewatering discharge or, if you are required to conduct turbidity benchmark monitoring, reduce turbidity such that the weekly average is below the benchmark threshold.

### Pollutant Indicators Observed During a Dewatering Inspection

Table 3 presents possible corrective actions to address inspection observations of pollutant indicators. Some of them—such as evaluating the effectiveness of the dewatering treatment control—may require the assistance of an engineer, the vendor who provided the control, or another subject matter expert.

**Table 3. Corrective Actions to Consider When Pollutant Indicators Are Observed in Dewatering Discharge**

| Observed Pollutant Indicator | Potential Corrective Actions |
|---|---|
| Dewatering water is causing erosion between the treatment control and the receiving water. | • Stop dewatering if the downgradient area shows signs of instability or erosion.<br>• Investigate whether channels used to convey dewatering discharges are stabilized and protected with vegetation, riprap, erosion control blankets, or a similar erosion control measure. If not, implement appropriate erosion control measures.<br>• Move dewatering controls installed on steep slopes to a flatter area.<br>• Install outlet protection or a velocity dissipation device.<br>• Move the discharge location, if possible, to a stable, erosion-resistant surface (e.g., well-vegetated grassy areas, clean filter stone, geotextile underlayment).<br>• Check for leaking pumps, hoses, and pipe connections and fix if identified. Leaks under pressure can be significant causes of erosion. |
| Pollutant indicators such as a sediment plume, suspended solids, unusual color, odor, decreased clarity, or foam are observed in or on the dewatering water discharge. | • If ongoing construction activity is identified as the pollutant source, install or maintain stormwater control measures between active construction areas and the dewatering operation to minimize the transport of sediment and other pollutants into the dewatering operation.<br>• If the dewatering control is not operating properly, maintain the dewatering treatment control to remove accumulated sediment and other pollutants. Sediment is typically removed before storage volume is reduced by one-third.<br>• If you observe a distinct color or odor, look for raw materials, chemicals, or other materials used or stored near the area being dewatered. Move these materials away from the dewatering operation if you determine them to be the source of color, odor, foam, or sheen.<br>• If you observe foam, check for and clean up any leaks or spills near the dewatering operation.<br>• Stop dewatering and evaluate whether the installed dewatering treatment control is the correct treatment control for the site. Visual turbidity may indicate that installed dewatering controls are ineffective for the soil composition or site conditions, are undersized, or were incorrectly installed. For example, sediment filtration practices |

| Observed Pollutant Indicator | Potential Corrective Actions |
|---|---|
| | (e.g., dewatering bag filters, silt fence enclosures, sediment traps, basins) are effective at removing larger sediment particles, but fine particles need advanced treatment technology. An undersized or incorrectly installed treatment control may result in the discharge of untreated or partially treated dewatering water. An undersized treatment control will also need more frequent maintenance than a correctly sized one. |
| The water surface has a visible sheen or the receiving water's bottom or shoreline has visible oily deposits. | • Check upstream and downstream of the dewatering discharge location to see if a sheen or oily deposits may be coming from a different source such as a spill or other discharge from your site or a neighboring property.<br>• Verify that your dewatering treatment control is equipped with an oil-water separator to remove oil, grease, and other hydrocarbons. If not, add an oil-water separator to the dewatering treatment control.<br>• If an oil-water separator is already in place, perform any necessary maintenance to ensure that it is operating properly. |

## Exceedances of the Turbidity Benchmark Threshold

If the weekly average turbidity result exceeds the standard 50 NTU benchmark or an EPA-approved alternate benchmark, the magnitude of the exceedance may drive your corrective action response.

For example, if the weekly average of your turbidity monitoring results is slightly above the benchmark threshold, then maintenance of treatment controls and retraining sampling and analysis personnel (to ensure that related errors are not compromising the accuracy of the results) may be enough to reduce the site's weekly average turbidity result below the threshold.

You should safely shut off the discharge if the weekly average of your turbidity monitoring results significantly exceeds 50 NTUs or a single sample is extremely high (e.g., 355 NTUs or greater). In the latter case, the weekly average turbidity value will exceed 50 NTUs regardless of the turbidity values the other days during the week. See CGP Part 5.2.2.a. Evaluate the cause of the high turbidity; you may need to install a different treatment control or additional treatment controls to reduce turbidity levels below the benchmark threshold in highly turbid dewatering water.

You should also look at the individual turbidity results. Are they similar or was the weekly average influenced by an outlier that is significantly higher or lower than the other results for the week? For example, if most of the turbidity results are around 70 NTUs, one would expect the weekly average to be around 70 NTUs—but an outlier may be influencing that average. In the Table 1 example in Section 3.D, four of the six samples were between 40 and 50 NTUs, while the other two were 68 and 72 NTUs.

You should consider the possibility of unusual events or sampling conditions. (For example, were the two high-turbidity samples shown in Table 1 taken during unusual conditions?) You should evaluate outliers across weeks to see if a pattern emerges. Note that if you try to reduce the influence of outliers on the weekly average by performing more turbidity tests, each test result must be included in the weekly average calculation (CGP, Part 3.3.3.c).

Table 4 presents possible corrective actions to consider when the weekly average of your turbidity monitoring results exceeds 50 NTUs or an EPA-approved alternate benchmark threshold. If you consistently exceed the turbidity benchmark, consider whether you can avoid discharging to a sensitive water. Depending on dewatering flow rate, climate, and regulatory requirements, you may be able to land-apply and infiltrate (unless ground water contamination could result) dewatering water on-site.

**Table 4. Corrective Actions to Consider for Weekly Turbidity Benchmark Monitoring Result Exceedances**

| Possible Cause of Turbidity Benchmark Monitoring Exceedance | Potential Corrective Actions |
|---|---|
| Sampling and analysis errors | • Reevaluate sampling locations to ensure the samples are representative of treated dewatering water. (For example, the designated sampling location may have been inaccessible; a dewatering sample may have been taken from a different location and therefore returned an unexpected turbidity result.)<br>• Verify that the meter was calibrated before the analysis.<br>• Make sure the cuvette, or other sampling container, is cleaned before the sample is collected. Solids or other residual pollutants from a previous sampling event may contaminate the sample.<br>• Clean the outside of the cuvette prior to analysis. Dirt, smears, and ink can interfere with the meter's analysis, potentially resulting in an incorrect, elevated result. Refer to the meter's manual for directions on preparing cuvettes.<br>• Check the cuvette for bubbles in the sample. Bubbles can cause an artificially high turbidity result. |
| Inadequate operation or maintenance of the dewatering treatment control | • Maintain the dewatering treatment control to remove accumulated sediment and other pollutants. Sediment is typically removed before storage volume is reduced by one-third.<br>• Replace and clean filter media used in dewatering controls when the pressure differential equals or exceeds the manufacturer's specifications (CGP, Part 2.4.7).<br>• Evaluate whether the installed dewatering treatment control is the correct treatment control for the site. Elevated turbidity may indicate that installed dewatering controls are ineffective for the soil composition or site conditions, are undersized, or were incorrectly installed. For example, sediment filtration practices (e.g., dewatering bag filters, silt |

| Possible Cause of Turbidity Benchmark Monitoring Exceedance | Potential Corrective Actions |
|---|---|
| | fence enclosures, sediment traps, basins) are effective at removing larger sediment particles, but fine particles need advanced treatment technology. An undersized or incorrectly installed treatment control may result in the discharge of untreated or partially treated dewatering water. An undersized treatment control will also need more frequent maintenance than a correctly sized one. |
| Erosion between the dewatering treatment control and the sampling location | • Stop dewatering if the downgradient area shows signs of instability or erosion.<br>• Investigate whether channels used to convey dewatering discharges are stabilized and protected with vegetation, riprap, erosion control blankets, or a similar erosion control measure. If not, implement appropriate erosion control measures.<br>• Move dewatering controls installed on steep slopes to a flatter area.<br>• Install outlet protection or a velocity dissipation device.<br>• Relocate discharge location, if possible, to a stable, erosion-resistant surface (e.g., well-vegetated grassy areas, clean filter stone, geotextile underlayment).<br>• Check for leaking pumps, hoses, and pipe connections and fix if identified. Leaks under pressure can be significant causes of erosion. |

You may resume discharging from your dewatering activities after completing the relevant corrective actions, including making any adjustments, repairs, or replacements to the dewatering controls. You should consider taking photographs of corrective actions, when possible, to supplement the descriptions in your corrective action log.

# Section 5: Reporting and Recordkeeping

It is important that accurate recordkeeping of dewatering inspections and turbidity benchmark monitoring become a standard operating procedure at your construction site. You need to be able to show that records of dewatering inspections and turbidity benchmark monitoring, if required, meet all permit requirements. It is always preferable to document more than less when dealing with permit compliance. Create easy-to-use logbooks for keeping track of dewatering events. Ensure that your site map is current and easy to understand. Develop simple instruction sheets for recording inspection information and turbidity benchmark monitoring activities. Your SWPPP must include these instruction sheets (CGP, Part 7.2.7.e), and you should keep copies of the sheets with the sampling equipment.

When possible, record information on standardized forms such as EPA's dewatering inspection report template and corrective action log template (both available at EPA's CGP resources, tools, and templates webpage), as well as the sample Turbidity Benchmark Monitoring Data Table in Appendix A of this guide. This will provide consistency in information reported.

If possible, regularly transfer inspection and turbidity benchmark monitoring information into databases or spreadsheets. This will provide back-up records for hard-copy logs or forms as well as provide an easy way to analyze your sampling data.

## 5.A Recordkeeping for Dewatering Inspections

The following information must be recorded for each dewatering inspection (CGP, Part 4.6.3):

- The inspection date.
- Names and titles of personnel conducting the inspection.
- The approximate time that the dewatering discharge began and ended on the day of inspection. If dewatering is continuous, include this information in the record.
- Estimates of the rate (in gpd) of discharge on the day of inspection. You will need to read the flow meter, or estimate flow rate, and convert gpm into gpd using the number of minutes the site was discharging dewatering water. A continuous discharge, for example, would multiply gpm by 1,440 minutes to obtain gpd. See also Section 3.A.
- Evidence of pollutants at the point of discharge, including:
    - a sediment plume, suspended solids, unusual color, presence of odor, decreased clarity, or presence of foam and/or
    - a visible sheen on the water surface or visible oily deposits on the bottom or shoreline of the receiving water.
- Photographs of:
    - the dewatering water before treatment by a dewatering control(s) and the final discharge after treatment;
    - the dewatering treatment control(s); and

- 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 do not need to submit your inspection records to EPA, but you must maintain them at the permitted site, or at an easily accessible location, so that they are immediately available at the time of an on-site inspection or upon request by EPA. You must keep these records for at least three years after permit coverage is terminated or expires.

## 5.B Reporting Turbidity Monitoring Results

You must submit reports of your weekly average turbidity results to EPA no later than 30 days following the end of each monitoring quarter, shown in Table 5. If there are monitoring weeks in which there was no dewatering discharge, or if there is a monitoring quarter with no dewatering discharge, you must indicate this in the quarterly turbidity monitoring report.

**Table 5. Monitoring Quarters and Deadlines for Reporting Monitoring Data**

| Monitoring Quarter | Months | Reporting Deadline |
|---|---|---|
| 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 |

When you report your turbidity monitoring results for the quarter, you will be entering data for each monitoring week that have been given pre-assigned dates to ensure accuracy. Refer to Table K-1 in CGP Appendix K for a table of these dates.

Operators covered under the CGP submit all records and forms through the National Pollutant Discharge Elimination System Electronic Reporting Tool (NeT-CGP), including the quarterly turbidity monitoring reports, unless the applicable EPA Regional Office grants a waiver from electronic reporting. If you are granted such a waiver, you will use the Turbidity Monitoring Report Form in CGP Appendix K. Your NeT-CGP account will include the alternate turbidity benchmark if approved by EPA. You can find more information on electronic reporting at https://www.epa.gov/compliance/npdes-ereporting.

**Reporting requirements for sites with multiple operators**

Where multiple operators are subject to the turbidity monitoring requirements associated with the same site, and one operator has agreed to be responsible for the monitoring activities, only that operator is required to report the site's weekly average turbidity results. The operator submitting the turbidity monitoring reports must indicate that it is fulfilling the obligations of other operators covered under the permit for the same project site, and must identify the NPDES ID number(s) for all other such operators (Turbidity Monitoring Report Form, CGP, Appendix K).

## 5.C Corrective Action Log

You must record each corrective action related to your dewatering operations in the site's corrective action log. This log is a CGP-required record of the operator's responses to observed indicators of pollutants or turbidity benchmark exceedances (CGP, Part 5.4). Record corrective actions as follows:

- Within 24 hours of identifying the corrective action trigger, document the specific trigger and the date and time it was identified.
- Within 24 hours of completing the corrective action (in accordance with the deadlines in CGP Part 5.2), document the actions taken to address the condition, including whether any SWPPP modifications are required.
- Each entry to the corrective action log must be signed by the operator's signatory in accordance with the CGP's Standard Permit Conditions (CGP, Appendix G). The signatory may be either the person holding the position that signed the NOI for coverage under the CGP or a duly authorized representative of that person. See CGP Appendix G, Section G.11.2.

You may prepare, sign, and maintain an electronic corrective action log, instead of a paper log, if the records are:

- in a format that can be read in a similar manner as a paper record;
- legally dependable with no less evidentiary value than their paper equivalent; and
- 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. See footnote to CGP Part 5.4.3.

As mentioned previously, you may use EPA's Corrective Action Log Template, available at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates, to document your corrective actions as required under CGP Part 5.4.

The corrective action log, or an up-to-date copy, must be kept at the site or at an easily accessible location, so that it is immediately available at the time of an on-site inspection or upon request by EPA (CGP, Part 5.4.3). Additionally, the operator must keep the complete corrective action log for at least three years from the date CGP coverage expires or is terminated.

# Section 6: Train Personnel

Each operator, or group of multiple operators on a single site, must assemble a "stormwater team" that will carry out activities, including those related to dewatering discharges, necessary to comply with the CGP. Each stormwater team member must understand the CGP requirements (CGP, Part 6.2), including:

- The permit requirements and deadlines associated with installation, maintenance, and removal of stormwater controls and stabilization.
- The locations of all stormwater and dewatering controls on the site required by this permit and how they are to be maintained.
- The proper procedures to follow with respect to the permit's pollution prevention requirements.
- When and how to conduct stormwater and dewatering inspections, record applicable findings, and take corrective action.

Any stormwater team member who performs dewatering inspections must be a "qualified person."

Before February 17, 2023, the qualified person, or persons, must be "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" (CGP, Part 6.3).

Beginning February 17, 2023, all qualified persons conducting site inspections, including dewatering inspections, must:

- have completed the EPA construction inspection course developed for this permit and have passed the exam or
- hold a current valid construction inspection certification or license from a program that, at a minimum, covers the following:
    - 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; and
    - performance of inspections, including the proper completion of required reports and documentation, consistent with the CGP's site inspection requirements (CGP, Part 6.3).

The EPA CGP construction inspection course is offered free of charge. Several private companies and some State governments and municipalities offer construction stormwater inspection training and certification, usually for a fee.

In addition to these training requirements, you should train staff responsible for turbidity benchmark monitoring in the procedures for sample collection, reporting, and recordkeeping. Trainings should be held regularly to update staff on any changes to the permit or SWPPP related to procedures for turbidity benchmark monitoring from dewatering discharges. Employees who will be responsible for turbidity benchmark monitoring should be trained on the following:

- Where to monitor.
- How to collect and analyze samples for turbidity.
- How to interpret turbidity results.
- How to keep accurate and complete records.
- How to report turbidity benchmark monitoring results to EPA.

# Section 7: References

U.S. Environmental Protection Agency. (1992). *NPDES storm water sampling guidance document*. EPA 833-8-92-001.

U.S. Environmental Protection Agency. (2015). *Getting up to speed: Groundwater contamination*. EPA 625-R-93-002.

U.S. Environmental Protection Agency. (2021). *Overview of listing impaired waters under CWA Section 303(d)*.

U.S. Environmental Protection Agency. (2022). *NPDES general permit for discharges from construction activities (CGP).*

U.S. Geological Survey. 2019. *Water-quality benchmarks for contaminants*.

# Appendix A: Sample Turbidity Benchmark Monitoring Data Table

## Turbidity Benchmark Monitoring Data Table

| | |
|---|---|
| **Operator:** | **Project Name:** |
| **Dewatering Discharge Point ID** (if multiple discharge points)**:** | **Sample Location:** |
| **Turbidity Meter** (make and model)**:** | **Test Method** (e.g., EPA 180.1)**:** |

| Sample Collection | | | Turbidity Analysis | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Name of Individual Collecting Sample** | **Date** | **Time** | **Name of Individual Analyzing Sample** | **Date** | **Time** | **Meter Calibrated?** | **Turbidity Result (NTUs)** | **Notes** |
| | | | | | | ☐ Yes | | |
| | | | | | | ☐ Yes | | |
| | | | | | | ☐ Yes | | |
| | | | | | | ☐ Yes | | |
| | | | | | | ☐ Yes | | |
| | | | | | | ☐ Yes | | |
| | | | | | | ☐ Yes | | |
| | | | | | | ☐ Yes | | |
| | | | | | | ☐ Yes | | |
| | | | | | | ☐ Yes | | |
| | | | | | | ☐ Yes | | |
| | | | | | | ☐ Yes | | |

## Appendix E

**Reportable Quantity (RQ) Spill Form**

***STORM WATER POLLUTION PREVENTION PLAN***

*HAZARDOUS SUBSTANCE REPORTABLE QUANTITY RELEASE FORM*

The discharges of hazardous substances in storm water discharges from construction sites must be prevented or minimized in accordance with the SWPPP. Where a release containing a hazardous substance in an amount equal to or in excess of a Reportable Quantity (RQ) established under 40CFR and/or EPA's list of RQ's (whichever is more restrictive) occurs, the following steps must be taken:

1. All measures must be taken to contain and abate the spill and to prevent the discharge of the pollutant(s) to off-site locations, receiving waters, wetlands and/or resource areas.

2. Notice must be provided to the National Response Center (NRC) at 1-800-424-8802 in accordance with regulations referenced above as soon as site staff has knowledge of the discharge.

3. Contact the Project Manager, Owner or Environmental Consultant/LSP of Record immediately upon knowledge of release.

4. The SWPPP must be modified within seven (7) calendar days of knowledge of the discharge to provide a description of the release, the circumstances leading to the release, and the date of the release. The plans must identify measures to prevent the recurrence of such releases and to respond to such releases.

| **Date of Spill** | **Material Spilled** | **Approximate Quantity of Spill (in gallons)** | **Agency(s) Notified** | **Date of Notification** | **SWPPP Revision Date** |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
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| | | | | | |
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| | | | | | |
| | | | | | |
| | | | | | |

Note: The Contractor is responsible for maintaining a list of current RQ's for all hazardous substances encountered, stored on-site or anticipated to be encountered.

## Appendix F

**SWPPP Amendment Log**

## ***SWPPP AMENDMENT LOG***

| No. | Description of the Amendment | Date of Amendment | Amendment Prepared by [Insert Name(s) and Title] |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
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## Appendix G

**Training Log**

## ***STORMWATER POLLUTION PREVENTION TRAINING LOG***

Project Name: Heritage on Main

Project Location: **107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St, Town of Medway, MA 02053**

Instructor's Name(s):

Instructor's Title(s):

Course Location: _____ Date: _____

Course Length (hours): _____

Stormwater Training Topic: *(check as appropriate)*

- ❑ **Sediment and Erosion Controls**
- ❑ **Emergency Procedures**
- ❑ **Stabilization Controls**
- ❑ **Inspections/Corrective Actions**
- ❑ **Pollution Prevention Measures**

Specific Training Objective:_____

_____

Attendee Roster: *(attach additional pages as necessary)*

| No. | Name of Attendee | Company |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |

**Appendix H**
**Delegation of Authority Form**

***STORM WATER POLLUTION PREVENTION PLAN***
***DELEGATION OF AUTHORITY***

*107-119 Main St, 1 & 3 Elm St, 0 & 26 Kelley St*
*Town of Medway*
*Norfolk County, Massachusetts*

**Permit Authorization for:**
**Storm Water Discharges Associated**
**With Construction Activity Under NPDES**
**NOI General Permit # MAR10 _____**
***Submitted on _____ ,***

In accordance with the NPDES General Permit for Storm Water discharges from construction activities,. Signatory requirements.

I hereby authorize _____ to sign on my behalf, all applicable reports and certifications as required under this permit as part of the Storm Water Pollution Prevention Plan.

*[Principal Officer of the General Contractor]*

| | |
|---|---|
| Signature | Date |
| Printed Name | Title |
| Company Name | Business Telephone Number |
| Business Address | City, State, Zip Code |

# Appendix I

## Endangered Species Documentation

# 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: 08/14/2026 19:06:44 UTC
Project Code: 2026-0132218
Project Name: Heritage on Main

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:

*Updated 4/12/2023 - Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.*

## About Official Species Lists

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. Federal and non-Federal project proponents have responsibilities under the Act to consider effects on listed species.

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 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. 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 by returning to an existing project's page in IPaC.

## Endangered Species Act Project Review

Please visit the "**New England Field Office Endangered Species Project Review and Consultation**" website for step-by-step instructions on how to consider effects on listed

species and prepare and submit a project review package if necessary:

https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review

***NOTE*** Please do not use the **Consultation Package Builder** tool in IPaC except in specific situations following coordination with our office. Please follow the project review guidance on our website instead and reference your **Project Code** in all correspondence.

**Northern Long-eared Bat -** (**Updated 4/12/2023**) The Service published a final rule to reclassify the northern long-eared bat (NLEB) as endangered on November 30, 2022. The final rule went into effect on March 31, 2023. You may utilize the **Northern Long-eared Bat Rangewide Determination Key** available in IPaC. More information about this Determination Key and the Interim Consultation Framework are available on the northern long-eared bat species page:

https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis

For projects that previously utilized the 4(d) Determination Key, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective. If your project was not completed by March 31, 2023, and may result in incidental take of NLEB, please reach out to our office at newengland@fws.gov to see if reinitiation is necessary.

*Additional Info About Section 7 of the Act*
Under section 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether projects may affect threatened and endangered species and/or designated critical habitat. If a Federal agency, or its non-Federal representative, determines 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 Federal agency also may need to consider proposed species and proposed critical habitat in the consultation. 50 CFR 402.14(c)(1) specifies the information required for consultation under the Act regardless of the format of the evaluation. 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/service/section-7-consultations

In addition to consultation requirements under Section 7(a)(2) of the ESA, please note that under sections 7(a)(1) 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. Please contact NEFO if you would like more information.

**Candidate species** that appear on the enclosed species list have no current protections under the ESA. The species' occurrence on an official species list does not convey a requirement to

consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

**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 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:

https://www.fws.gov/program/migratory-bird-permit

https://www.fws.gov/library/collections/bald-and-golden-eagle-management

Please feel free to contact us at **newengland@fws.gov** with your **Project Code** in the subject line if you need more information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Attachment(s): Official Species List

Attachment(s):

- Official Species List

# 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".

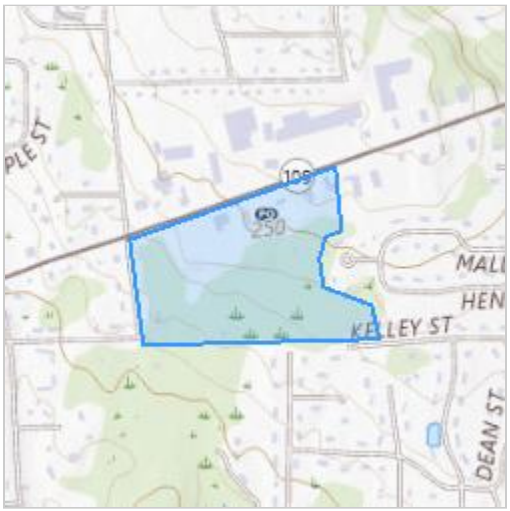
This species list is provided by:

**New England Ecological Services Field Office**
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

# PROJECT SUMMARY

Project Code: 2026-0132218
Project Name: Heritage on Main
Project Type: Residential Construction
Project Description: Multi-use development
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.14910705,-71.41691977015148,14z




Counties: Norfolk County, Massachusetts

# 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.

## MAMMALS

| NAME | STATUS |
|---|---|
| Tricolored bat *Perimyotis subflavus*<br>No critical habitat has been designated for this species.<br>Species profile: https://ecos.fws.gov/ecp/species/10515 | Proposed Endangered |

## INSECTS

| NAME | STATUS |
|---|---|
| Monarch butterfly *Danaus plexippus*<br>There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat.<br>Species profile: https://ecos.fws.gov/ecp/species/9743 | Proposed Threatened |

## 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.

# IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Ross Pennington
Address: 20 Winthrop Square, 4th Floor
City: Boston
State: MA
Zip: 02113
Email hpennington@bohlereng.com
Phone: 2528137444

# 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: 08/21/2026 18:08:39 UTC
Project code: 2026-0132218
Project Name: Heritage on Main

Federal Nexus: no
Federal Action Agency (if applicable):

**Subject:** Record of project representative's no effect determination for 'Heritage on Main'

Dear Ross Pennington:

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 August 21, 2026, for 'Heritage on Main' (here forward, Project). This project has been assigned Project Code 2026-0132218 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 and Tricolored Bat Range-wide 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 and/or Tricolored Bat**

Based upon your IPaC submission and a standing analysis, your project has reached the following effect determinations:

| Species | Listing Status | Determination |
|---|---|---|
| Tricolored bat (*Perimyotis subflavus*) | Proposed Endangered | No effect |

Federal agencies must consult with U.S. Fish and Wildlife Service under section 7(a)(2) of the Endangered Species Act (ESA) when an action *may affect* a listed species. Tricolored bat is proposed for listing as endangered under the ESA, but not yet listed. For actions that may affect a proposed species, agencies cannot consult, but they can *confer* under the authority of section 7(a)(4) of the ESA. Such conferences can follow the procedures for a consultation and be adopted as such if and when the proposed species is listed. Should the tricolored bat be listed, agencies must review projects that are not yet complete, or projects with ongoing effects within the tricolored bat range that previously received a NE or NLAA determination from the key to confirm that the determination is still accurate.

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 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 key for the northern long-eared bat and tricolored 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* Proposed Threatened

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**

If there are no updates on listed species, no further consultation/coordination for this project is required with respect to the species covered by this key. 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 2026-0132218 associated with this Project.

**Action Description**
You provided to IPaC the following name and description for the subject Action.

**1. Name**

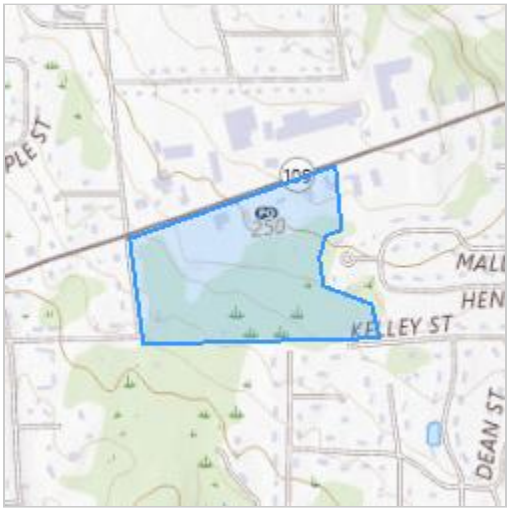
Heritage on Main

**2. Description**

The following description was provided for the project 'Heritage on Main':

> Multi-use development

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.14910705,-71.41691977015148,14z



# DETERMINATION KEY RESULT

Based on the information you provided, you have determined that the Proposed Action will have no effect on the species covered by this determination key. 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 listed bats or any other listed species that is not covered by an existing section 10 (a)(1)(A) Recovery Permit, exempted under section 4(d) or authorized by a section 6 cooperative agreement? **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. Is the action area wholly within Zone 2 of the year-round active area for northern long-eared bat and/or tricolored bat?

   **Automatically answered**
   *No*

3. Does the action area intersect Zone 1 of the year-round active area for northern long-eared bat and/or tricolored bat?

   **Automatically answered**
   *No*

4. Does any component of the action involve leasing, construction or operation of wind turbines? Answer 'yes' if the activities considered are conducted with the intention of gathering survey information to inform the leasing, construction, or operation of wind turbines.

   *No*

5. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

   **Note for projects in Pennsylvania**: Projects requiring authorization under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act would be considered as having a federal nexus. Since the U.S. Army Corps of Engineers (Corps) has issued the Pennsylvania State Programmatic General Permit (PASPGP), which may be verified by the PA Department of Environmental Protection or certain Conservation Districts, the need to receive a Corps authorization to perform the work under the PASPGP serves as a federal nexus. As such, if proposing to use the PASPGP, you would answer ‘yes’ to this question.

   *No*

6. [Semantic] Is the action area located within 0.5 miles of a known bat hibernaculum or winter roost? Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your state wildlife agency.

   **Automatically answered**
   *No*

7. Does the action area contain any winter roosts or caves (or associated sinkholes, fissures, or other karst features), mines, rocky outcroppings, or tunnels that could provide habitat for hibernating bats?

   *No*

8. Does the action area contain (1) talus or (2) anthropogenic or naturally formed rock shelters or crevices in rocky outcrops, rock faces or cliffs?

   *No*

9. Is the action located in New England (CT, MA, ME, NH, RI, or VT)?

   *Yes*

10. Will the action cause effects to a covered bridge, a bridge with wood or timber as a component of the construction or a bridge with stone or masonry as a component of the construction? Note: see the New England and Maine Ecological Services Bridge and Culvert Survey Letter for more information.

    *No*

11. Will the action cause effects to any "cave-like" culvert(s) - a culvert that is long enough (likely greater than 200 feet long) that it remains dark in the middle during daylight hours and maintains relatively stable temperatures. Note: see the New England and Maine Ecological Services Bridge and Culvert Survey Letter for more information.

    *No*

12. Are trees present within 1000 feet of the action area? **Note:** If there are trees within the action area that are of a sufficient size to be potential roosts for bats answer "Yes". If unsure, additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines.

    *Yes*

13. Does the action include the intentional exclusion of bats from a building or building-like structure? **Note:** Exclusion is conducted to deny bats' entry or reentry into a building. To be effective and to avoid harming bats, it should be done according to established standards. If your action includes bat exclusion and you are unsure whether northern long-eared bats or tricolored bats are present, answer "Yes." Answer "No" if there are no signs of bat use in the building/structure. If unsure, contact your local Ecological Services Field Office to help assess whether northern long-eared bats or tricolored bats may be present. Contact a Nuisance Wildlife Control Operator (NWCO) for help in how to exclude bats from a structure safely without causing harm to the bats (to find a NWCO certified in bat standards, search the Internet using the search term "National Wildlife Control Operators Association bats"). Also see the White-Nose Syndrome Response Team's guide for bat control in structures.

    *No*

14. Does the action involve removal, modification, or maintenance of a human-made building-like structure (barn, house, or other building) **known or suspected to contain roosting bats?**

    *No*

15. Will the action cause construction of one or more new roads open to the public?

    For federal actions, answer ‘yes’ when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

    *No*

16. Will the action include or cause any construction or other activity that is reasonably certain to increase average night-time traffic permanently or temporarily on one or more existing roads? **Note:** For federal actions, answer ‘yes’ when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.). .

    *Yes*

17. Will the increased vehicle traffic occur on any road that lies between any two areas of contiguous forest that are each greater than or equal to 10 acres in extent and are separated by less than 1,000 feet? Bats may cross a road by flying between forest patches that are up to 1,000 feet apart. **Note:** If forested areas exist in the project area, but will be removed as part of the project, contiguous forest areas should only be considered if roads will cross through forest patches that are remaining on the landscape after tree cutting activities have been conducted. "Contiguous forest" of 10 acres or more may include areas where multiple forest patches are separated by less than 1,000 feet of non-forested area if the forested patches, added together, comprise at least 10 acres.

    *No*

18. Will the proposed Action involve the creation of a new water-borne contaminant source (e.g., leachate pond, pits containing chemicals that are not NSF/ANSI 60 compliant)?

    **Note:** For information regarding NSF/ANSI 60 please visit https://www.nsf.org/knowledge-library/nsf-ansi-standard-60-drinking-water-treatment-chemicals-health-effects

    *No*

19. Will the proposed action involve the creation of a new point source discharge from a facility other than a water treatment plant or storm water system?

    *No*

20. Will the action include drilling or blasting?

    *No*

21. Will the action involve military training (e.g., smoke operations, obscurant operations, exploding munitions, artillery fire, range use, helicopter or fixed wing aircraft use at night)?

    *No*

22. Will the proposed action involve the use of herbicides or pesticides (e.g., fungicides, insecticides, or rodenticides)?

    *No*

23. Will the action include or cause activities that are reasonably certain to cause chronic or intense nighttime noise (above current levels of ambient noise in the area) in suitable summer habitat for the northern long-eared bat or tricolored bat during the active season? Chronic noise is noise that is continuous or occurs repeatedly again and again for a long time. Sources of chronic or intense noise that could cause adverse effects to bats may include, but are not limited to: road traffic; trains; aircraft; industrial activities; gas compressor stations; loud music; crowds; oil and gas extraction; construction; and mining.
    **Note:** Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines.

    *No*

24. Does the action include, or is it reasonably certain to cause, the use of permanent or temporary artificial lighting within 1000 feet of suitable forested northern long-eared bat or tricolored bat roosting habitat? **Note:** Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines.

    *No*

25. Will the action include tree cutting or other means of knocking down or bringing down trees, tree topping, or tree trimming?

    *Yes*

26. Is the project related to the production of coal, including projects that support the mining of coal, as well as the production and/or distribution of energy produced from coal?

    *No*

27. Will the proposed action occur exclusively in an already established and currently maintained utility right-of-way?

    *No*

28. Does the action include emergency cutting or trimming of hazard trees in order to remove an imminent threat to human safety or property? See hazard tree note at the bottom of the key for text that will be added to response letters

    **Note:** A "hazard tree" is a tree that is an immediate threat to lives, public health and safety, or improved property.

    *No*

29. Does the project intersect with the 0- 9.9% forest density category?

    **Automatically answered**
    *No*

30. Does the project intersect with the 10.0- 19.9% forest density category map?

    **Automatically answered**
    *No*

31. Does the project intersect with the 20.0- 29.9% forest density category map?

    **Automatically answered**
    *No*

32. Does the project intersect with the 30.0- 100% forest density category map?

    **Automatically answered**
    *Yes*

33. Will the action cause trees to be cut, knocked down, or otherwise brought down across an area greater than 100 acres in total extent?

    *No*

34. Will the proposed action result in the use of prescribed fire?

    **Note:** If the prescribed fire action includes other activities than application of fire (e.g., tree cutting, fire line preparation) please consider impacts from those activities within the previous representative questions in the key. This set of questions only considers impacts from flame and smoke.

    *No*

35. Does the action area intersect the tricolored bat species list area?

    **Automatically answered**
    *Yes*

36. Is the action area located within 0.5-mile of radius of an entrance/opening to any known tricolored bat hibernacula or winter roost?

    Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your state wildlife agency.

    **Automatically answered**
    *No*

37. [Semantic] Is the action area located within 0.25 miles of a culvert that is known to be occupied by northern long-eared or tricolored bats? **Note:** The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

    **Automatically answered**
    *No*

38. Has a presence/probable absence bat survey targeting the tricolored bat and following the Service's Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines been conducted within the project area?

    *No*

39. Is suitable summer habitat for the tricolored bat present within 1000 feet of project activities? (If unsure, answer ""Yes."") **Note:** If there are trees within the action area that may provide potential roosts for tricolored bats (e.g., clusters of leaves in live and dead deciduous trees, Spanish moss (*Tillandsia usneoides*), clusters of dead pine needles of large live pines) answer ""Yes."" For a complete definition of suitable summer habitat for the tricolored bat, please see the Service's Range-wide Indiana Bat and Northern long-eared Bat Survey Guidelines.

    *No*

40. Do you have any documents that you want to include with this submission?
*No*

# PROJECT QUESTIONNAIRE

Enter the extent of the action area (in acres) from which trees will be removed - round up to the nearest tenth of an acre. For this question, include the entire area where tree removal will take place, even if some live or dead trees will be left standing.

*13.5*

# IPAC USER CONTACT INFORMATION

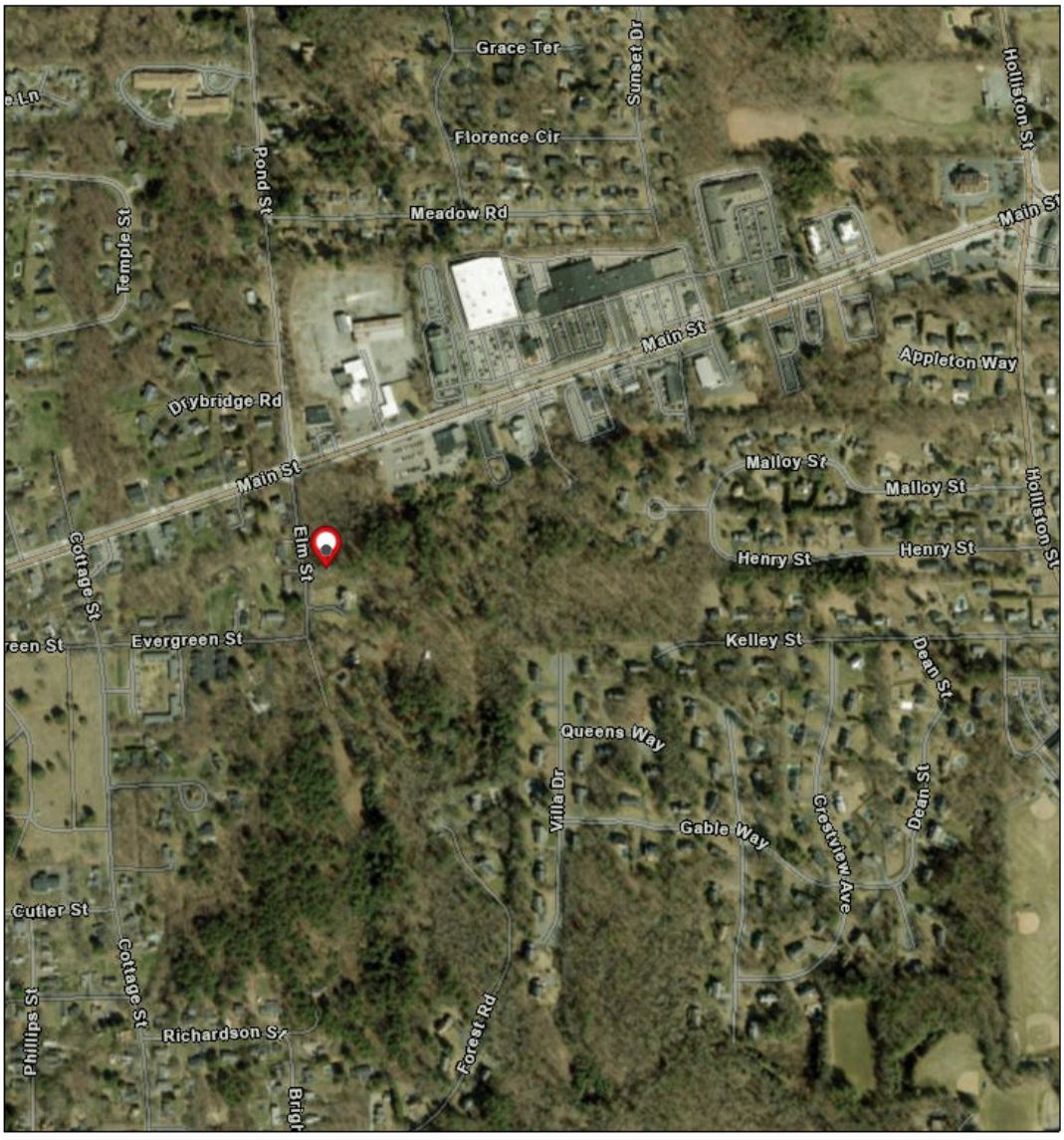
Agency: Private Entity
Name: Ross Pennington
Address: 20 Winthrop Square, 4th Floor
City: Boston
State: MA
Zip: 02113
Email hpennington@bohlereng.com
Phone: 2528137444

# 3 Elm St, Medway, MA, 02053, USA

## Area of Interest (AOI) Information

Area : 8,751,295,730.5 ft²

Aug 24 2026 15:59:06 Eastern Daylight Time



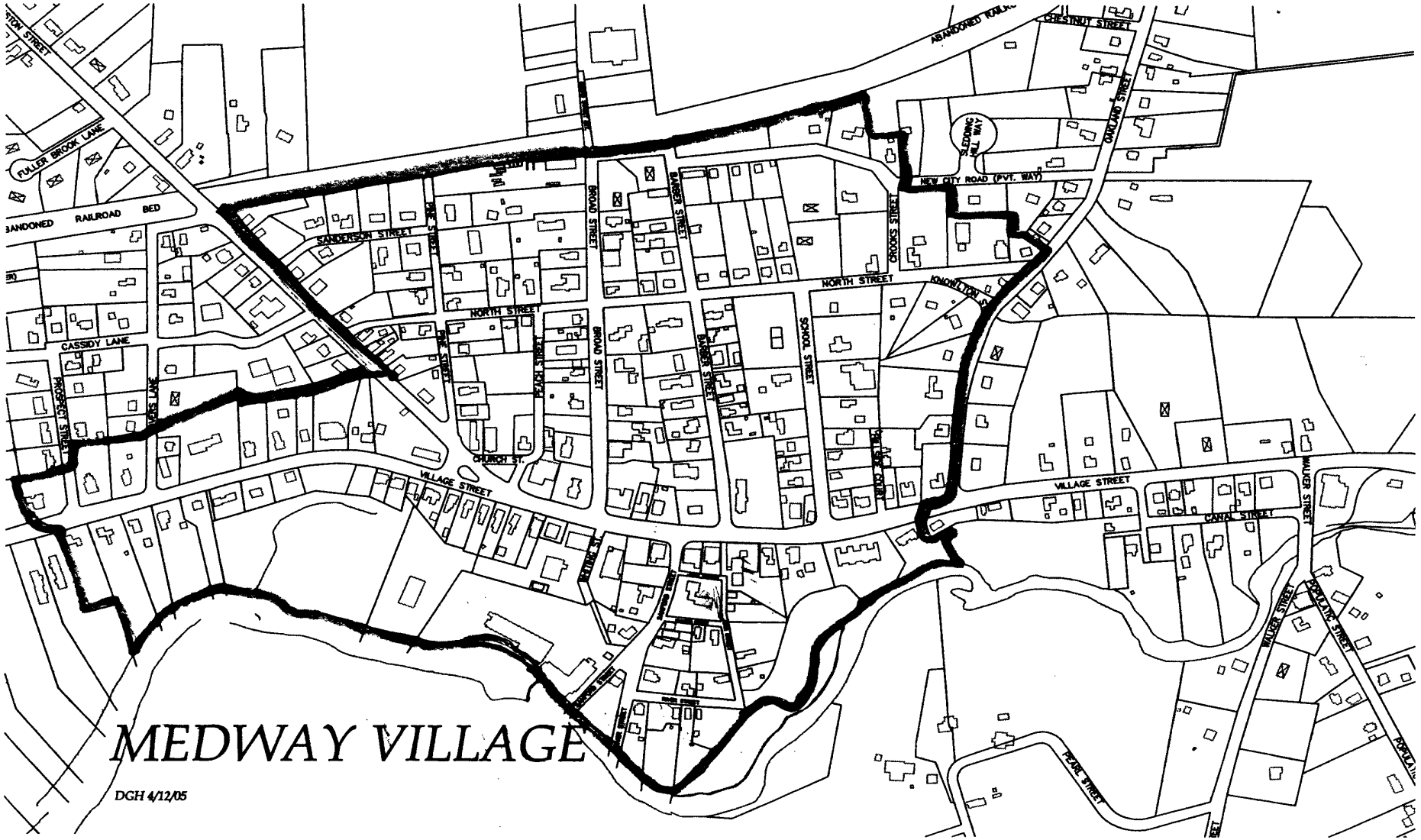
## Summary

| Name | Count | Area(ft²) | Length(ft) |
|---|---|---|---|
| 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 |

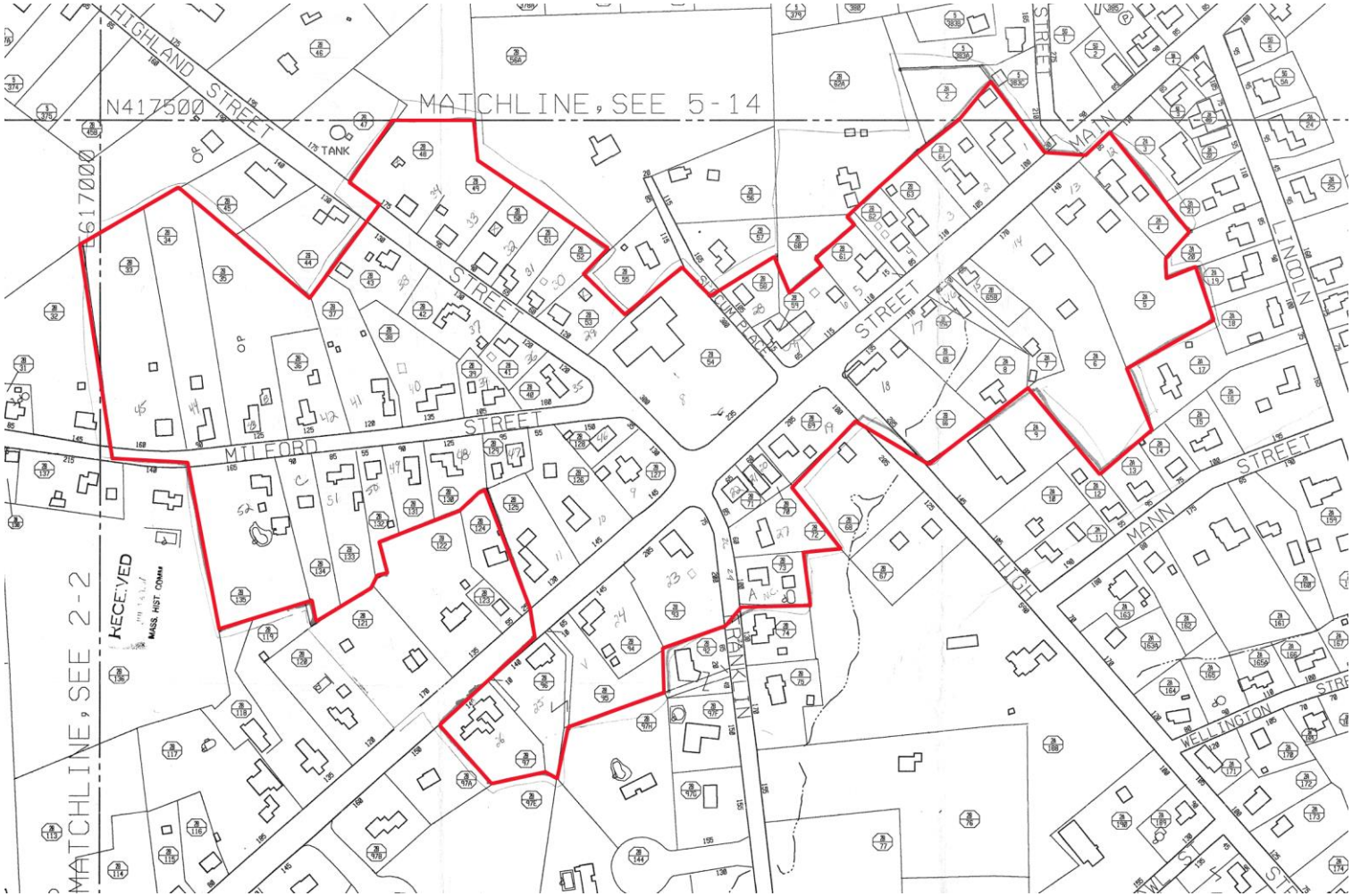
DISCLAIMER: Use of this App does NOT replace the Endangered Species Act (ESA) Section 7 consultation process; it is a first step in determining if a proposed Federal action overlaps with listed species or critical habitat presence. Because the data provided through this App are updated regularly, reporting 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 J

## Historic Properties Documentation


FULLER BROOK LANE
ABANDONED RAILROAD BED
SANDERSON STREET
CASSIDY LANE
PROSPECT STREET
PINE STREET
BROAD STREET
BARRET STREET
CROOKS STREET
SCHOOL STREET
NORTH STREET
CHURCH ST
VILLAGE STREET
CHESTNUT STREET
OAKLAND STREET
NEW CITY ROAD (FVY. WAY)
CANAL STREET
WALKER STREET
POPLAR STREET
PEARL STREET
MEDWAY VILLAGE
DGH 4/12/05

# Rabbit Hill National Register Historic District Map



## Appendix K

**Copy of 2022 USEPA Construction General Permit**

**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=68001003650036
Date: 2022.01.18 14:06:55 -06'00'

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.

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# 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.

(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.

## 1.2 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.

**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 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.

***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.<br>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.

### 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.

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.

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:

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[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.

**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

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[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.

**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., sediment 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)**<br><br>**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<br>• 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<br>• 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).

**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.

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

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.

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;

**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;

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[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.

**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

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.

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.

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.<br>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.

**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.

**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.

**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.

**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.

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.

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.

**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.

**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.

**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.

**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

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-Wg

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).

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.

**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

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.

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).

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.

**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

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, enforcement, 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

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.

**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

## 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.

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

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.

**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.

**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:

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.

**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

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=swqb

**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.

| 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

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

!SA 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:

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

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@puebloftesuque.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 NO! 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).

**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.** 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)

**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.

(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,

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.

**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

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 to 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).

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.

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.

(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.

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

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

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<br>• Fine Sediment<br>• 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**<br>Attn: Appeals Processing Desk<br>300 Desmond Drive SE<br>Lacey, WA 98503<br><br>**Pollution Control Hearings Board**<br>1111 Israel RD SW<br>STE 301<br>Tumwater, WA 98501 | **Department of Ecology**<br>Attn: Appeals Processing Desk<br>PO Box 47608<br>Olympia, WA 98504-7608<br><br>**Pollution Control Hearings Board**<br>PO Box 40903<br>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

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

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.

# Appendix A - Definitions and Acronyms

## 1. Definitions

"Action Area" – all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. See 50 CFR 402. For the purposes of this permit and for application of the threatened and endangered species protection eligibility requirements, the following areas are included in the definition of action area:

- The areas on the construction site where stormwater discharges originate and flow toward the point of discharge into the receiving waters. This includes:
    - areas on the construction site where excavation, site development, or other ground disturbance activities occur, and
    - areas where stormwater controls will be constructed and operated, including any areas where stormwater flows to and from the stormwater controls.
- The areas in the vicinity of the construction site where stormwater discharges flow from the construction site to one or more points of discharge into receiving waters. (Example: Where stormwater flows into an off-site ditch, swale, or gully that leads to receiving waters.
- The extent of the receiving water potentially affected by stormwater discharges from your construction site through alteration of water chemistry, turbidity, temperature, or bank structure (i.e., erosive flow), regardless of whether the construction site is adjacent to the receiving water.

"Agricultural Land" - cropland, grassland, rangeland, pasture, and other agricultural land, on which agricultural and forest-related products or livestock are produced and resource concerns may be addressed. Agricultural lands include cropped woodland, marshes, incidental areas included in the agricultural operation, and other types of agricultural land used for the production of livestock.

"Antidegradation Policy" or "Antidegradation Requirements" - the water quality standards regulation that requires States and Tribes to establish a three-tiered antidegradation program:

1. Tier 1 maintains and protects existing uses and water quality conditions necessary to support such uses. An existing use can be established by demonstrating that fishing, swimming, or other uses have actually occurred since November 28, 1975, or that the water quality is suitable to allow such uses to occur. Where an existing use is established, it must be protected even if it is not listed in the water quality standards as a designated use. Tier 1 requirements are applicable to all surface waters.
2. Tier 2 maintains and protects "high quality" waters -- waterbodies where existing conditions are better than necessary to support CWA § 101(a)(2) "fishable/swimmable" uses. Water quality can be lowered in such waters. However, State and Tribal Tier 2 programs identify procedures that must be followed and questions that must be answered before a reduction in water quality can be allowed. In no case may water quality be lowered to a level which would interfere with existing or designated uses.
3. Tier 3 maintains and protects water quality in outstanding national resource waters (ONRWs). Except for certain temporary changes, water quality cannot be lowered in such waters. ONRWs generally include the highest quality waters of the United States. However, the ONRW classification also offers special protection for waters of exceptional ecological significance, i.e., those which are important, unique, or sensitive ecologically.

Decisions regarding which water bodies qualify to be ONRWs are made by States and authorized Indian Tribes.

"Arid Areas" – areas with an average annual rainfall of 0 to 10 inches. For assistance in determining average annual rainfall in specific locations, refer to the NOAA National Mapping webpage (https://www.ncdc.noaa.gov/cag/national/mapping), the PRISM Climate Group's Time Series Values for individual locations (https://prism.oregonstate.edu/explorer/), or EPA's US EPA EnviroAtlas (https://www.epa.gov/enviroatlas).

"Bank" (e.g., stream bank or river bank) – the rising ground bordering the channel of a water of the U.S.

"Biodegradable" – capable of decomposing under ambient soil conditions into naturally occurring materials over a period of time (e.g., one year).

"Bluff" – a steep headland, promontory, riverbank, or cliff.

"Borrow Areas" – the areas where materials are dug for use as fill, either onsite or off-site.

"Business day" – for the purposes of this permit, a business day is a calendar day on which construction activities will take place.

"Bypass" – the intentional diversion of waste streams from any portion of a treatment facility. See 40 CFR 122.41(m)(1)(i).

"Cationic Treatment Chemical" – polymers, flocculants, or other chemicals that contain an overall positive charge. Among other things, they are used to reduce turbidity in stormwater discharges by chemically bonding to the overall negative charge of suspended silts and other soil materials and causing them to bind together and settle out. Common examples of cationic treatment chemicals are chitosan and cationic PAM.

"Commencement of Construction Activities" – the initial disturbance of soils (or 'breaking ground') associated with clearing, grading, or excavating activities or other construction-related activities (e.g., grubbing; stockpiling of fill material; placement of raw materials at the site).

"Common Plan of Development or Sale" – A contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one common plan. The "common plan" of development or sale is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, sales pitch, advertisement, drawing, permit application, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating construction activities may occur on a specific plot.

"Construction Activities" – earth-disturbing activities, such as the clearing, grading, and excavation of land, and other construction-related activities (e.g., grubbing; stockpiling of fill material; placement of raw materials at the site) that could lead to the generation of pollutants. Some of the types of pollutants that are typically found at construction sites are:

- sediment;
- nutrients;
- heavy metals;
- pesticides and herbicides;
- oil and grease;
- bacteria and viruses;
- trash, debris, and solids;

- treatment polymers; and
- any other toxic chemicals.

"Construction and Development Effluent Limitations and New Source Performance Standards" (C&D Rule) – as published in 40 CFR § 450, the regulation requiring effluent limitations guidelines (ELGs) and new source performance standards (NSPS) for controlling the discharge of pollutants from construction sites.

"Construction Site" or "Site" – the land or water area where construction activities will occur and where stormwater controls will be installed and maintained. The construction site includes construction support activities, which may be located at a different part of the property from where the primary construction activity will take place, or on a different piece of property altogether.

"Construction Support Activity" – a construction-related activity that specifically supports the construction activity and involves earth disturbance or pollutant-generating activities of its own, and can include activities associated with concrete or asphalt batch plants, equipment staging yards, materials storage areas, excavated material disposal areas, and borrow areas.

"Construction Waste" – discarded material (such as packaging materials; scrap construction materials; masonry products; timber, steel, pipe, and electrical cuttings; plastics; and styrofoam).

"Conveyance Channel" – a temporary or permanent waterway designed and installed to safely convey stormwater flow within and out of a construction site.

"Critical Habitat" – as defined in the Endangered Species Act at 16 U.S.C. 1531 for a threatened or endangered species, (i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of the Endangered Species Act, on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the Endangered Species Act, upon a determination by the Secretary that such areas are essential for the conservation of the species.

"CWA" – the Clean Water Act or the Federal Water Pollution Control Act, 33 U.S.C. section 1251 et seq.

"Dewatering" – the act of draining accumulated stormwater and/or ground water from building foundations, vaults, and trenches, or other similar points of accumulation. Examples can include, but are not limited to:

- Surface area dewatering: water pumped from disturbed surface areas (e.g., trenches, sumps, excavation pits, or other excavations associated with construction where sediment-laden ground water or surface water/storm inflow must be removed) or from sediment basins or similar impoundments for maintenance or decommissioning purposes.
- Ground water dewatering: water discharged from well development, well pump tests, or pumping of ground water from a construction area. Common methods of ground water dewatering from a construction area include sumps and wells, generally described as follows:
  - Sumps: lowers ground water levels near the construction area. Dewatering using sumps consists of pumping ground water out of a lower collection point(s) typically gravity-fed by local ground water.
  - Wells: drilled wells, including bored/augured, driven, or jetted, which use vacuum or pumping to lower the ground water at greater depths than sumps. The two most common types of wells used for dewatering ground water are:

- Wellpoints: small-diameter shallow wells which are connected via a header pipe. A pump creates a vacuum in the header pipe.
- Deep Wells: larger-diameter holes, drilled relatively deep (typically greater than 10 feet), pumped by submersible electric pumps.

"Dewatering Water" – as used in this permit, water discharged from dewatering operations.

"Discharge" – when used without qualification, means the "discharge of a pollutant."

"Discharge of a Pollutant" – any addition of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source," or any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation. This includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works. See 40 CFR 122.2.

"Discharge Point" – for the purposes of this permit, the location where collected and concentrated stormwater flows or dewatering water are discharged from the construction site.

"Discharge-Related Activity" – activities that cause, contribute to, or result in stormwater and allowable non-stormwater point source discharges, and measures such as the siting, construction, and operation of stormwater controls to control, reduce, or prevent pollutants from being discharged.

"Discharge to an Impaired Water" – for the purposes of this permit, a discharge to an impaired water occurs if the first water of the U.S. to which you discharge is identified by a State, Tribe, or EPA pursuant to Section 303(d) of the Clean Water Act as not meeting an applicable water quality standard and (1) requires development of a total maximum daily load (TMDL) (pursuant to section 303(d) of the CWA; or (2) is addressed by an EPA-approved or established TMDL; or (3) is not in either of the above categories but the waterbody is covered by a pollution control program that meets the requirements of 40 CFR 130.7(b)(1). For discharges that enter a storm sewer system prior to discharge, the water of the U.S. to which you discharge is the first water of the U.S. that receives the stormwater discharge from the storm sewer system.

"Domestic Waste" – for the purposes of this permit, typical household trash, garbage or rubbish items generated by construction activities.

"Drainageway" – an open linear depression, whether constructed or natural, that functions for the collection and drainage of surface water.

"Drought-Stricken Area" – for the purposes of this permit, an area in which the National Oceanic and Atmospheric Administration's U.S. Seasonal Drought Outlook indicates for the period during which the construction will occur that any of the following conditions are likely: (1) "Drought to persist or intensify", (2) "Drought ongoing, some improvement", (3) "Drought likely to improve, impacts ease", or (4) "Drought development likely". See http://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.php.

"Earth-Disturbing Activity"– actions taken to alter the existing vegetation and/or underlying soil of a site, such as clearing, grading, site preparation (e.g., excavating, grubbing, cutting, and filling), soil compaction, and movement and stockpiling of top soils.

"Earth-Disturbing Activities Conducted Prior to Active Mining Activities" – Consists of two classes of earth-disturbing (i.e., clearing, grading and excavation) activities:

a. activities performed for purposes of mine site preparation, including: cutting new rights of way (except when related to access road construction); providing access to a mine site for vehicles and equipment (except when related to access road construction); other earth disturbances associated with site preparation activities on any areas where active mining

activities have not yet commenced (e.g., for heap leach pads, waste rock facilities, tailings impoundments, wastewater treatment plants); and

b. construction of staging areas to prepare for erecting structures such as to house project personnel and equipment, mill buildings, etc., and construction of access roads.

Note: only earth-disturbing activities associated with the construction of staging areas and the construction of access roads conducted prior to active mining (see (b) above) are considered to be "construction" and therefore stormwater discharges from these activities are eligible for coverage under this permit. See Part 1.2.1.b. The activities described in (a) above are not considered to be "construction" and therefore stormwater discharges associated with this activity are not eligible for coverage under this permit.

"Effective Operating Condition" – for the purposes of this permit, a stormwater control is kept in effective operating condition if it has been implemented and maintained in such a manner that it is working as designed to minimize pollutant discharges.

"Effluent Limitations" – for the purposes of this permit, any of the Part 2 or Part 3 requirements.

"Effluent Limitations Guideline" (ELG) – defined in 40 CFR § 122.2 as a regulation published by the Administrator under section 304(b) of the CWA to adopt or revise effluent limitations.

"Eligible" – for the purposes of this permit, refers to stormwater and allowable non-stormwater discharges that are authorized for coverage under this general permit.

"Emergency-Related Project" – 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.

"Endangered Species" – defined in the Endangered Species Act at 16 U.S.C. 1531 as any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the provisions of this Act would present an overwhelming and overriding risk to man.

"Excursion" – a measured value that exceeds a specified limit.

"Existing Site" – a site where construction activities commenced prior to February 16, 2017.

"Exit Points" – any points of egress from the construction site to be used by vehicles and equipment during construction activities.

"Exposed Soils" – for the purposes of this permit, soils that as a result of earth-disturbing activities are left open to the elements.

"Federal Facility" – any buildings, installations, structures, land, public works, equipment, aircraft, vessels, and other vehicles and property, owned by, or constructed or manufactured for the purpose of leasing to, the Federal government.

"Federal Operator" – an entity that meets the definition of "Operator" in this permit and is either any department, agency or instrumentality of the executive, legislative, and judicial branches of the Federal government of the United States, or another entity, such as a private contractor, performing construction activity for any such department, agency, or instrumentality.

"Final Stabilization" – on areas not covered by permanent structures, either (1) uniform, perennial vegetation *(e.g., evenly distributed, without large bare areas)* has been established, or for arid or semi-arid areas, will be established that provides 70 percent or more of the cover that is provided by vegetation native to local undisturbed areas, and/or (2) permanent non-

vegetative stabilization measures (e.g., riprap, gravel, gabions, and geotextiles) have been implemented to provide effective cover for exposed portions of the site

"General Contractor" – for the purposes of this permit, the primary individual or company solely accountable to perform a contract. The general contractor typically supervises activities, coordinates the use of subcontractors, and is authorized to direct workers at a site to carry out activities required by the permit.

"Hazardous Substances" or "Hazardous or Toxic Waste" – for the purposes of this permit, any liquid, solid, or contained gas that contain properties that are dangerous or potentially harmful to human health or the environment. See also 40 CFR §261.2.

"Historic Property" – as defined in the National Historic Preservation Act regulations, means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian Tribe or Native Hawaiian organization and that meet the National Register criteria.

"Impaired Water"– a water identified by the State, Tribe, or EPA as not meeting an applicable water quality standard and (1) requires development of a TMDL (pursuant to section 303(d) of the CWA; or (2) is addressed by an EPA-approved or established TMDL; or (3) is not in either of the above categories but the waterbody is covered by a pollution control program that meets the requirements of 40 CFR 130.7(b)(1).

"Impervious Surface" – for the purpose of this permit, any land surface with a low or no capacity for soil infiltration including, but not limited to, pavement, sidewalks, parking areas and driveways, packed gravel or soil, or rooftops.

"Indian Country" or "Indian Country Lands" – defined at 40 CFR §122.2 as:

1. All land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation;
2. All dependent Indian communities with the borders of the United States whether within the originally or subsequently acquired territory thereof, and whether within or without the limits of a State; and
3. All Indian allotments, the Indian titles to which have not been extinguished, including rights-of-ways running through the same.

"Infeasible" – for the purpose of this permit, infeasible means not technologically possible or not economically practicable and achievable in light of best industry practices. EPA notes that it does not intend for any permit requirement to conflict with State water rights law.

"Install" or "Installation" – when used in connection with stormwater controls, to connect or set in position stormwater controls to make them operational.

"Jar test" – a test designed to simulate full-scale coagulation/flocculation/sedimentation water treatment processes by taking into account the possible conditions.

"Landward" – positioned or located away from a waterbody, and towards the land.

"Large Construction Activity" – defined at 40 CFR § 122.26(b)(14)(x) and incorporated here by reference. Large construction activity includes clearing, grading, and excavating resulting in a land disturbance that will disturb equal to or greater than five acres of land or will disturb less than five acres of total land area but is part of a larger common plan of development or sale that will ultimately disturb equal to or greater than five acres. Large construction activity does

not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site.

"Linear Construction Site" – includes the construction of roads, bridges, conduits, substructures, pipelines, sewer lines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities in a long, narrow area.

"Minimize" – to reduce and/or eliminate to the extent achievable using stormwater controls that are technologically available and economically practicable and achievable in light of best industry practices.

"Mining Activity" – for the purposes of this permit, includes mining-related construction activities defined at 40 CFR 122.26(b)(14)(x) and 122.26(b)(15)(i), and active mining activities defined at 40 CFR 122.26(b)(14)(iii). Both of these sub categories of activities include earth-disturbing activities, with the latter also including such activities as: extraction, removal or recovery, and beneficiation of mined material from the earth; removal of overburden and waste rock to expose mineable material; and site reclamation and closure activities.

"Mining Operations" – for the purposes of this permit, mining operations are grouped into two distinct categories, with distinct effluent limits and requirements applicable to each: 1) earth-disturbing activities conducted prior to active mining activities; and 2) active mining activities, which includes reclamation.

"Municipal Separate Storm Sewer System" or "MS4" – defined at 40 CFR §122.26(b)(8) as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

1. Owned and operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian Tribe or an authorized Indian Tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;
2. Designed or used for collecting or conveying stormwater;
3. Which is not a combined sewer; and
4. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR §122.2.

"National Pollutant Discharge Elimination System" (NPDES) – defined at 40 CFR §122.2 as the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of CWA. The term includes an 'approved program.'

"Native Topsoil" – the uppermost layer of naturally occurring soil for a particular area, and is often rich in organic matter, biological activity, and nutrients.

"Natural Buffer" – for the purposes of this permit, an area of undisturbed natural cover surrounding waters of the United States within which construction activities are restricted. Natural cover includes the vegetation, exposed rock, or barren ground that exists prior to commencement of earth-disturbing activities.

"Natural Vegetation" – vegetation that occurs spontaneously without regular management, maintenance, or species introductions or removals, and that generally has a strong component of native species..

"New Operator of a Permitted Site" – 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".

"New Site" – a site where construction activities commenced on or after February 16, 2017.

"New Source" – for the purposes of this permit, a construction project that commenced construction activities after February 1, 2010.

"New Source Performance Standards (NSPS)" – for the purposes of this permit, NSPS are technology-based standards that apply to construction sites that are new sources under 40 CFR 450.24.

"Non-Stormwater Discharges" – discharges that do not originate from storm events. They can include, but are not limited to, discharges of process water, air conditioner condensate, non-contact cooling water, vehicle wash water, sanitary wastes, concrete washout water, paint wash water, irrigation water, or pipe testing water.

"Non-Turbid" – a discharge that is free from visual turbidity.

"Notice of Intent" (NOI) – the form (electronic or paper) required for authorization of coverage under the Construction General Permit.

"Notice of Termination" (NOT) – the form (electronic or paper) required for terminating coverage under the Construction General Permit.

"NPDES eReporting Tool" (NeT) – EPA's online system for submitting electronic Construction General Permit forms.

"Operational" – for the purposes of this permit, stormwater controls are made "operational" when they have been installed and implemented, are functioning as designed, and are properly maintained.

"Operator" – for the purposes of this permit and in the context of stormwater discharges associated with construction activity, any party associated with a construction project that meets either of the following two criteria:

1. 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
2. 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)*.

This definition is provided to inform permittees of EPA's interpretation of how the regulatory definitions of "owner or operator" and "facility or activity" are applied to discharges of stormwater associated with construction activity. Subcontractors generally are not considered operators for the purposes of this permit.

"Ordinary High Water Mark" – the line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, and/or the presence of litter and debris.

"Permitting Authority" – for the purposes of this permit, EPA, a Regional Administrator of EPA, or an authorized representative.

"Point(s) of Discharge" – see "Discharge Point."

"Point Source" – any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.

"Pollutant" – defined at 40 CFR §122.2. A partial listing from this definition includes: dredged spoil, solid waste, sewage, garbage, sewage sludge, chemical wastes, biological materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial or municipal waste.

"Pollution Prevention Controls" – stormwater controls designed to reduce or eliminate the addition of pollutants to construction site discharges through analysis of pollutant sources, implementation of proper handling/disposal practices, employee education, and other actions.

"Polymers" – for the purposes of this permit, coagulants and flocculants used to control erosion on soil or to enhance the sediment removal capabilities of sediment traps or basins. Common construction site polymers include polyacrylamide (PAM), chitosan, alum, polyaluminum chloride, and gypsum.

"Prohibited Discharges" – discharges that are not allowed under this permit, including:

1. Wastewater from washout of concrete;
2. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
3. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;
4. Soaps or solvents used in vehicle and equipment washing;
5. Toxic or hazardous substances from a spill or other release; and
6. Waste, garbage, floatable debris, construction debris, and sanitary waste.

"Provisionally Covered Under this Permit" – for the purposes of this permit, EPA provides temporary coverage under this permit for emergency-related projects prior to receipt of a complete and accurate NOI. Discharges from earth-disturbing activities associated with the emergency-related projects are subject to the terms and conditions of the permit during the period of temporary coverage.

"Qualified Person" – 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.

"Receiving Water" – a "Water of the United States" as defined in 40 CFR §122.2 into which the regulated stormwater discharges.

"Run-On" – sources of stormwater that drain from land located upslope or upstream from the regulated site in question.

"Seasonally Dry Period" – 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 and supporting maps for assistance in determining whether a site is operating during a seasonally dry period for the area, located at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates.

"Sediment-Related parameter" – for the purposes of this permit, a pollutant parameter that is closely related to sediment such as turbidity, total suspended solids (TSS), total suspended sediment, transparency, sedimentation, and siltation.

"Semi-Arid Areas" – areas with an average annual rainfall of 10 to 20 inches. For assistance in determining average annual rainfall in specific locations, refer to the NOAA National Mapping webpage (https://www.ncdc.noaa.gov/cag/national/mapping), the PRISM Climate Group's Time Series Values for individual locations (https://prism.oregonstate.edu/explorer/), or EPA's US EPA EnviroAtlas (https://www.epa.gov/enviroatlas).

"Shared Control" - for the purposes of this permit, a stormwater control, such as a sediment basin or pond, used by two or more operators that is installed and maintained for the purpose of minimizing and controlling pollutant discharges from a construction site with multiple operators associated with a common plan of development or sale. Any operators that are contributing stormwater from their construction activities to a shared control are considered to rely upon a shared control.

"Small Construction Activity" – defined at 40 CFR §122.26(b)(15) and incorporated here by reference. A small construction activity includes clearing, grading, and excavating resulting in a land disturbance that will disturb equal to or greater than one (1) acre and less than five (5) acres of land or will disturb less than one (1) acre of total land area but is part of a larger common plan of development or sale that will ultimately disturb equal to or greater than one (1) acre and less than five (5) acres. Small construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site.

"Small Residential Lot" – for the purpose of this permit, a lot being developed for residential purposes that will disturb less than 1 acre of land, but is part of a larger residential project that will ultimately disturb greater than or equal to 1 acre.

"Snowmelt" – the conversion of snow into overland stormwater and ground water flow as a result of warmer temperatures.

"Spill" – for the purpose of this permit, the release of a hazardous or toxic substance from its container or containment.

"Stabilization" – the use of vegetative and/or non-vegetative cover to prevent erosion and sediment loss in areas exposed through the construction process.

"Steep Slopes" – where a State, Tribe, local government, or industry technical manual (e.g., stormwater BMP manual) has defined what is to be considered a "steep slope", this permit's definition automatically adopts that definition. Where no such definition exists, steep slopes are automatically defined as those that are 15 percent or greater in grade.

"Storm Sewer System" – a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) designed or used for collecting or conveying stormwater.

"Stormwater" – stormwater runoff, snowmelt runoff, and surface runoff and drainage.

"Stormwater Control" - refers to any best management practice or other method (including narrative effluent limitations) used to prevent or reduce the discharge of pollutants to waters of the United States.

"Stormwater Discharge Associated with Construction Activity" – as used in this permit, a discharge of pollutants in stormwater to waters of the United States from areas where earth-disturbing activities (e.g., clearing, grubbing, grading, or excavation) occur, or where construction materials or equipment storage or maintenance (e.g., fill piles, borrow area,

concrete truck chute washdown, fueling), or other industrial stormwater directly related to the construction process (e.g., concrete or asphalt batch plants), are located.

"Stormwater Inlet" – a structure placed below grade to conduct water used to collect stormwater runoff for conveyance purposes.

"Stormwater Team" – the group of individuals responsible for oversight of the development and modifications of the SWPPP, and oversight of compliance with the permit requirements. The individuals on the "Stormwater Team" must be identified in the SWPPP.

"Storm Event" – a precipitation event that results in a measurable amount of precipitation.

"Storm Sewer" – a system of pipes (separate from sanitary sewers) that carries stormwater runoff from buildings and land surfaces.

"Subcontractor" – for the purposes of this permit, an individual or company that takes a portion of a contract from the general contractor or from another subcontractor.

"SWPPP" (Stormwater Pollution Prevention Plan) – a site-specific, written document that, among other things: (1) identifies potential sources of stormwater pollution at the construction site; (2) describes stormwater controls to reduce or eliminate pollutants in stormwater discharges from the construction site; and (3) identifies procedures the operator will implement to comply with the terms and conditions of this general permit.

"Temporary Stabilization" – a condition where exposed soils or disturbed areas are provided temporary vegetative and/or non-vegetative protective cover to prevent erosion and sediment loss. Temporary stabilization may include temporary seeding, geotextiles, mulches, and other techniques to reduce or eliminate erosion until either final stabilization can be achieved or until further construction activities take place to re-disturb this area.

"Thawing Conditions" – for the purposes of this permit, thawing conditions are expected based on the historical likelihood of two or more days with daytime temperatures greater than 32˚F. This date can be determined by looking at historical weather data. Note: the estimation of thawing conditions is for planning purposes only. During construction the permittee will be required to conduct site inspections based upon actual conditions (i.e., if thawing conditions occur sooner than expected, the permittee will be required to conduct inspections at the regular frequency).

"Threatened Species" – defined in the Endangered Species Act at 16 U.S.C. 1531 as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

"Tier 2 Waters" – for antidegradation purposes, pursuant to 40 CFR 131.12(a)(2), those waters that are characterized as having water quality that exceeds the levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water.

"Tier 2.5 Waters" – for antidegradation purposes, those waters designated by States or Tribes as requiring a level of protection equal to and above that given to Tier 2 waters, but less than that given Tier 3 waters. Some States have special requirements for these waters.

"Tier 3 Waters" – for antidegradation purposes, pursuant to 40 CFR 131.12(a)(3), Tier 3 waters are identified by States as having high quality waters constituting an Outstanding National Resource Water (ONRW), such as waters of National Parks and State Parks, wildlife refuges, and waters of exceptional recreational or ecological significance.

"Total Maximum Daily Load" or "TMDL" – the sum of the individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background. If receiving water has only one point source discharger, the TMDL is the sum of that point source WLA plus the LAs for any nonpoint sources of pollution and natural background sources,

tributaries, or adjacent segments. TMDLs can be expressed in terms of mass per time, toxicity, or other appropriate measure.

"Toxic Waste" – see "Hazardous Substances."

"Treatment Chemicals" – polymers, flocculants, or other chemicals used to reduce turbidity in stormwater.

"Turbidity" – a condition of water quality characterized by the presence of suspended solids and/or organic material.

"Uncontaminated Discharge" – in the context of authorized non-stormwater discharges, a discharge that meets applicable water quality standards.

"Upland" – the dry land area above and 'landward' of the ordinary high water mark.

"Upset" – Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond your reasonable control. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. See 40 CFR 122.41(n)(1).

"Visual Turbidity" – for the purposes of this permit, visual turbidity is present when there is a sediment plume in the discharge or the discharge appears cloudy, opaque, or has a visible contrast that can be visually identified by an observer.

"Water-Dependent Structures" – structures or facilities that are required to be located directly adjacent to a waterbody or wetland, such as a marina, pier, boat ramp, etc.

"Water Quality Standards" – defined in 40 CFR § 131.3, and are provisions of State (including Tribal) or Federal law which consist of a designated use or uses for the waters of the United States, water quality criteria for such waters based upon such uses, and an antidegradation policy to protect high-quality waters. Water quality standards protect the public health or welfare, enhance the quality of water and serve the purposes of the Act.

"Waters of the United States" – see definition at 40 CFR 122.2.

"Wetland" – those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. On-site evaluations are typically required to confirm the presence and boundaries of wetlands.

### 2. Acronyms

ACHP – Advisory Council on Historic Preservation

BMP – Best Management Practice

CBI – Confidential Business Information

CGP – Construction General Permit

CFR – Code of Federal Regulations

CWA – Clean Water Act

CZMA – Coastal Zone Management Act

ECHO – EPA Enforcement and Compliance History Online

ELG – Effluent Limitations Guideline

EPA – United States Environmental Protection Agency
ESA – Endangered Species Act
FR – Federal Register
MS4 – Municipal Separate Storm Sewer System
MSGP – Multi-Sector General Permit
NEPA – National Environmental Policy Act
NeT – NPDES eReporting Tool
NTU - Nephelometric turbidity units
NHPA – National Historic Preservation Act
NMFS – United States National Marine Fisheries Service
NPDES – National Pollutant Discharge Elimination System
NOI – Notice of Intent
NOT – Notice of Termination
NPDES – National Pollutant Discharge Elimination System
NRC – National Response Center
NRCS – National Resources Conservation Service
NSPS – New Source Performance Standards
ONRW – Outstanding National Resource Water
PAM – Polyacrylamide
POTW – Publicly Owned Treatment Works
RUSLE – Revised Universal Soil Loss Equation
SDS – Safety Data Sheet
SHPO – State Historic Preservation Office
SPCC – Spill Prevention Control and Countermeasure
SWPPP – Stormwater Pollution Prevention Plan
THPO – Tribal Historic Preservation Office
TMDL – Total Maximum Daily Load
TSS – Total Suspended Solids
UIC – Underground Injection Control
USDA – United States Department of Agriculture
USFWS – United States Fish and Wildlife Service
USGS – United States Geological Survey
WQS – Water Quality Standard

## Appendix B - Permit Areas Eligible for Coverage and EPA Regional Addresses

Permit coverage for stormwater discharges from construction activity occurring within the following areas is provided by legally separate and distinctly numbered permits. For assistance in determining whether your construction activities are located within Indian country, refer to the Bureau of Indian Affairs' digital map of the land areas of Federally-recognized Tribes at https://biamaps.doi.gov/indianlands/#.

### B.1 EPA Region 1

The permit offers coverage for stormwater discharges from construction activity from the following areas in EPA Region 1:

| Permit No. | Areas of Coverage/Where EPA is Permitting Authority |
|---|---|
| **CTR10I000** | Indian country within the State of Connecticut |
| **MAR100000** | Commonwealth of Massachusetts (except Indian country) |
| **MAR10I000** | Indian country within the State of Massachusetts |
| **NHR100000** | State of New Hampshire |
| **RIR10I000** | Indian country within the State of Rhode Island |
| **VTR10F000** | Areas in the State of Vermont located at a Federal Facility (as defined in Appendix A) |
| **1R10I000** | All areas of Indian country not identified above that are not already covered by an EPA-approved permitting program with authorization to issue permits in Indian country |

For stormwater discharges in EPA Region 1 outside the areas of coverage identified above, please contact your State NPDES permitting authority to obtain coverage under a State-issued NPDES permit.

**EPA Region 1 Address:**
U.S. EPA Region 1
Office of Ecosystem Protection
Stormwater and Construction Permits Section
5 Post Office Square, Suite 100
(OEP 06-1)
Boston, MA 02109-3912

### B.2 EPA Region 2

The permit offers coverage for stormwater discharges from construction activity from the following areas in EPA Region 2:

| Permit No. | Areas of Coverage/Where EPA is Permitting Authority |
|---|---|
| **NYR10I000** | Indian country within the State of New York |
| **PRR100000** | Commonwealth of Puerto Rico |
| **02R10I000** | All areas of Indian country not identified above that are not already covered by an EPA-approved permitting program with authorization to issue permits in Indian country |

For stormwater discharges in EPA Region 2 outside the areas of coverage identified above, please contact your State NPDES permitting authority to obtain coverage under a State-issued NPDES permit.

**EPA Region 2 Address:**
*For Puerto Rico:*
U.S. EPA Region 2
Caribbean Environmental Protection Division
NPDES Stormwater Program
City View Plaza II – Suite 7000
48 Rd. 165 Km 1.2
Guaynabo, PR 00968-8069

*For New York:*
U.S. EPA Region 2
NPDES Stormwater Program
290 Broadway, 24th Floor
New York, NY 10007-1866

### B.3 EPA Region 3

The permit offers coverage for stormwater discharges from construction activity from the following areas in EPA Region 3:

| Permit No. | Areas of Coverage/Where EPA is Permitting Authority |
|---|---|
| **DCR100000** | District of Columbia |
| **DER10F000** | Areas in the State of Delaware located at a Federal Facility (as defined in Appendix A) |
| **VAR10I000** | Indian country within the State of Virginia |
| **03R10I000** | All areas of Indian country not identified above that are not already covered by an EPA-approved permitting program with authorization to issue permits in Indian country |

For stormwater discharges in EPA Region 3 outside the areas of coverage identified above, please contact your State NPDES permitting authority to obtain coverage under a State-issued NPDES permit.

**EPA Region 3 Address:**
U.S. EPA Region 3
Office of NPDES Permits and Enforcement
NPDES Permits Branch, Mailcode 3WP41
1650 Arch Street
Philadelphia, PA 19103

### B.4 EPA Region 4

The permit offers coverage for stormwater discharges from construction activity from the following areas in EPA Region 4:

| Permit No. | Areas of Coverage/Where EPA is Permitting Authority |
|---|---|
| **ALR10I000** | Indian country within the State of Alabama |
| **FLR10I00E** | Indian country within the State of Florida |
| **MSR10I000** | Indian country within the State of Mississippi |
| **NCR10I000** | Indian country within the State of North Carolina |
| **04R10I000** | All areas of Indian country not identified above that are not already covered by an EPA-approved permitting program with authorization to issue permits in Indian country (except Catawba lands in South Carolina) |

For stormwater discharges in EPA Region 4 outside the areas of coverage identified above, please contact your State NPDES permitting authority to obtain coverage under a State-issued NPDES permit.

**EPA Region 4 Address:**
U.S. EPA Region 4
Water Protection Division
NPDES Stormwater Program
Atlanta Federal Center
61 Forsyth Street SW
Atlanta, GA 30303-3104

### B.5 EPA Region 5

The permit offers coverage for stormwater discharges from construction activity from the following areas in EPA Region 5:

| Permit No. | Areas of Coverage/Where EPA is Permitting Authority |
|---|---|
| **MIR10I000** | Indian country within the State of Michigan, except the L'Anse Reservation of the Keweenaw Bay Indian Community |
| **MNR10I000** | Indian country within the State of Minnesota, except sites located in the Fond du Lac Reservation discharging to Outstanding Reservation Resources Waters (ORRWs)[1] |
| **WIR10I000** | Indian country within the State of Wisconsin, except sites located in the Bad River Band of Lake Superior Tribe of Chippewa Indians discharging to Outstanding Tribal Resource Waters (OTRWs) or Tier 3 waters[2] |
| **05R10I000** | All areas of Indian country not identified above that are not already covered by an EPA-approved permitting program with authorization to issue permits in Indian country |

[1] The Tribe has identified Perch Lake, Rice Portage Lake, Miller Lake, Deadfish Lake, and Jaskari Lake as ORRWs.
[2] The Tribe has identified the following as OTRWs or Tier 3 waters: 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.

For stormwater discharges in EPA Region 5 outside the areas of coverage identified above, please contact your State NPDES permitting authority to obtain coverage under a State-issued NPDES permit.

**EPA Region 5 Address:**
U.S. EPA Region 5
NPDES Program Branch
77 W. Jackson Blvd.
Mail Code WN16J
Chicago, IL 60604-3507

### B.6 EPA Region 6

The permit offers coverage for stormwater discharges from construction activity from the following areas in EPA Region 6:

| Permit No. | Areas of Coverage/Where EPA is Permitting Authority |
|---|---|
| **LAR10I000** | Indian country within the State of Louisiana |
| **NMR100000** | State of New Mexico, except Indian country |
| **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. |
| **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). |
| **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). |
| **TXR10I000** | Indian country within the State of Texas |
| **06R10I000** | All areas of Indian country not identified above that are not already covered by an EPA-approved permitting program with authorization to issue permits in Indian country |

For stormwater discharges in EPA Region 6 outside the areas of coverage identified above, please contact your State NPDES permitting authority to obtain coverage under a State-issued NPDES permit.

**EPA Region 6 Address:**
U.S. EPA Region 6
NPDES Stormwater Program (WQ-PP)
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

### B.7 EPA Region 7

The permit offers coverage for stormwater discharges from construction activity from the following areas in EPA Region 7:

| Permit No. | Areas of Coverage/Where EPA is Permitting Authority |
|---|---|
| **IAR10I000** | Indian country within the State of Iowa |
| **KSR10I000** | Indian country within the State of Kansas |
| **NER10I000** | Indian country within the State of Nebraska, except Pine Ridge Reservation lands (see Region 8) |
| **07R10I000** | All areas of Indian country not identified above that are not already covered by an EPA-approved permitting program with authorization to issue permits in Indian country |

For stormwater discharges in EPA Region 7 outside the areas of coverage identified above, please contact your State NPDES permitting authority to obtain coverage under a State-issued NPDES permit.

**EPA Region 7 Address:**
U.S. EPA Region 7
NPDES Stormwater Program
11201 Renner Blvd
Lenexa, KS 66219

### B.8 EPA Region 8

The permit offers coverage for stormwater discharges from construction activity from the following areas in EPA Region 8:

| Permit No. | Areas of Coverage/Where EPA is Permitting Authority |
|---|---|
| **COR10F000** | Areas in the State of Colorado located at a Federal Facility (as defined in Appendix A), except those located on Indian country |
| **COR10I000** | Indian country within the State of Colorado, as well as the portion of the Ute Mountain Reservation located in New Mexico |
| **MTR10I000** | Indian country within the State of Montana |
| **NDR10I000** | Indian country within the State of North Dakota, as well as that portion of the Standing Rock Reservation located in South Dakota (except for the portion of the lands within the former boundaries of the Lake Traverse Reservation which is covered under South Dakota permit SDR10000I listed below) |
| **SDR10I000** | Indian country within the State of South Dakota, as well as the portion of the Pine Ridge Reservation located in Nebraska and the portion of the lands within the former boundaries of the Lake Traverse Reservation located in North Dakota (except for the Standing Rock Reservation which is covered under North Dakota permit NDR10000I listed above) |
| **UTR10I000** | Indian country within the State of Utah, except Goshute and Navajo Reservation lands (see Region 9) |
| **WYR10I000** | Indian country within the State of Wyoming |
| **08R10I000** | All areas of Indian country not identified above that are not already covered by an EPA-approved permitting program with authorization to issue permits in Indian country |

For stormwater discharges in EPA Region 8 outside the areas of coverage identified above, please contact your State NPDES permitting authority to obtain coverage under a State-issued NPDES permit.

**EPA Region 8 Address:**
EPA Region 8 Storm Water Program
Mailcode: 8P-W-WW
1595 Wynkoop Street
Denver, CO 80202-1129

### B.9 EPA Region 9

The permit offers coverage for stormwater discharges from construction activity from the following areas in EPA Region 9:

| Permit No. | Areas of Coverage/Where EPA is Permitting Authority |
|---|---|
| **ASR100000** | Island of American Samoa |
| **AZR10I000** | Indian country within the State of Arizona, as well as Navajo Reservation lands in New Mexico and Utah |
| **CAR10I000** | Indian country within the State of California |
| **GUR100000** | Island of Guam |
| **JAR100000** | Johnston Atoll |
| **MPR100000** | Commonwealth of the Northern Mariana Islands |
| **MWR100000** | Midway Island and Wake Island |
| **NVR10000I** | Indian country within the State of Nevada, as well as the Duck Valley Reservation in Idaho, the Fort McDermitt Reservation in Oregon and the Goshute Reservation in Utah |
| **09R10I000** | All areas of Indian country not identified above that are not already covered by an EPA-approved permitting program with authorization to issue permits in Indian country |

For stormwater discharges in EPA Region 9 outside the areas of coverage identified above, please contact your State NPDES permitting authority to obtain coverage under a State-issued NPDES permit.

**EPA Region 9 Address:**
U.S. EPA Region 9
Water Division
NPDES Stormwater Program (WTR-2-3)
75 Hawthorne Street
San Francisco, CA 94105-3901

### B.10 EPA Region 10

The permit offers coverage for stormwater discharges from construction activity from the following areas in EPA Region 10:

| Permit No. | Areas of Coverage/Where EPA is Permitting Authority |
|---|---|
| **AKR10I000** | Indian country lands as defined in 18 U.S.C. 1151 within the State of Alaska |
| **AKR10F000** | Denali National Park and Preserve |
| **IDR10I000** | Indian country within the State of Idaho, except Duck Valley Reservation lands (see Region 9) |
| **ORR10I000** | Indian country within the State of Oregon, except Fort McDermitt Reservation lands (see Region 9) |
| **WAR10F000** | Areas in the State of Washington, except those located on Indian country, subject to construction activity by a Federal Operator |
| **WAR10I000** | Indian country within the State of Washington |
| **010R10I000** | All areas of Indian country not identified above that are not already covered by an EPA-approved permitting program with authorization to issue permits in Indian country |

For stormwater discharges in EPA Region 10 outside the areas of coverage identified above, please contact your State NPDES permitting authority to obtain coverage under a State-issued NPDES permit.

**EPA Region 10 Address:**
U.S. EPA Region 10
NPDES Stormwater Program
1200 6th Avenue (OWW-191)
Seattle, WA 98101-3140

# Appendix C - Small Construction Waivers and Instructions

These waivers are only available to stormwater discharges associated with small construction activities (i.e., 1-5 acres). As the operator of a small construction activity, you may be able to qualify for a waiver in lieu of needing to obtain coverage under this general permit based on: (A) a low rainfall erosivity factor, (B) a TMDL analysis, or (C) an equivalent analysis that determines allocations for small construction sites are not needed. Each operator, otherwise needing permit coverage, must notify EPA of its intention for a waiver. It is the responsibility of those individuals wishing to obtain a waiver from coverage under this general permit to submit a complete and accurate waiver certification as described below. Where the operator changes or another is added during the construction project, the new operator must also submit a waiver certification to be waived.

## C.1 Rainfall Erosivity Waiver

Under this scenario the small construction project's rainfall erosivity factor calculation ("R" in the Revised Universal Soil Loss Equation) is less than five during the period of construction activity. The operator must certify to EPA that construction activity will occur only when the rainfall erosivity factor is less than five. The period of construction activity begins at initial earth disturbance and ends with final stabilization. Where vegetation will be used for final stabilization, the date of installation of a stabilization practice that will provide interim non-vegetative stabilization can be used for the end of the construction period, provided the operator commits (as a condition of waiver eligibility) to periodically inspect and properly maintain the area until the criteria for final stabilization as defined in the CGP have been met. If use of this interim stabilization eligibility condition was relied on to qualify for the waiver, signature on the waiver with its certification statement constitutes acceptance of and commitment to complete the final stabilization process. The operator must submit a waiver certification to EPA prior to commencing construction activities.

> *Note: The rainfall erosivity factor "R" is determined in accordance with Chapter 2 of Agriculture Handbook Number 703, Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE), pages 21–64, dated January 1997; United States Department of Agriculture (USDA), Agricultural Research Service.*

EPA has developed an online rainfall erosivity calculator to help small construction sites determine potential eligibility for the rainfall erosivity waiver. You can access the calculator from EPA's website at: https://www.epa.gov/npdes/rainfall-erosivity-factor-calculator-small-construction-sites. The R factor can easily be calculated by using the construction site latitude/longitude or address and estimated start and end dates of construction. This calculator may also be useful in determining the time periods during which construction activity could be waived from permit coverage. You may find that moving your construction activity by a few weeks or expediting site stabilization will allow you to qualify for the waiver. Use this online calculator or the Construction Rainfall Erosivity Waiver Fact Sheet (https://www.epa.gov/sites/production/files/2015-10/documents/fact3-1.pdf) to assist in determining the R Factor for your small construction site.

If you are the operator of the construction activity and eligible for a waiver based on low erosivity potential, you can submit a rainfall erosivity waiver electronically via EPA's NPDES eReporting Tool (NeT) (https://www.epa.gov/npdes/stormwater-discharges-construction-activities#ereporting), unless you received a waiver from your EPA Regional Office (see Part 1.4.1 of the CGP for information about receiving a waiver from electronic reporting).

*Note: If the R factor is five or greater, you do not qualify for the rainfall erosivity waiver, and must obtain coverage under an NPDES permit (e.g., the CGP), unless you qualify for the Water Quality Waiver as described in section B below.*

If your small construction project continues beyond the projected completion date given on the waiver certification, you must recalculate the rainfall erosivity factor for the new project duration. If the R factor is below five, you must update all applicable information on the waiver certification and retain a copy of the revised waiver as part of your records. The new waiver certification must be submitted prior to the projected completion date listed on the original waiver form to assure your exemption from permitting requirements is uninterrupted. If the new R factor is five or above, you must obtain NPDES permit coverage.

### C.2 TMDL Waiver

This waiver is available if EPA has established or approved a TMDL that addresses the pollutant(s) of concern for the impaired water and has determined that controls on stormwater discharges from small construction activity are not needed to protect water quality. The pollutant(s) of concern include sediment (such as total suspended solids, turbidity or siltation) and any other pollutant that has been identified as a cause of impairment of any waterbody that will receive a discharge from the construction activity. Information on TMDLs that have been established or approved by EPA is available from EPA online at https://www.epa.gov/tmdl and from State and Tribal water quality agencies.

If you are the operator of the construction activity and eligible for a waiver based on compliance with an EPA-established or approved TMDL, you must provide the following information in order to be waived from permitting requirements:

1. Name, address and telephone number of the construction site operator(s);
2. Name (or other identifier), address, county or similar governmental subdivision, and latitude/longitude of the construction project or site;
3. Estimated construction start and completion (i.e., final stabilization) dates, and total acreage (to the nearest quarter acre) to be disturbed;
4. The name of the waterbody(s) that would be receiving stormwater discharges from your construction project;
5. The name and approval date of the TMDL;
6. A statement, signed and dated by an authorized representative as provided in Appendix G, Subsection G.11, that certifies that the construction activity will take place and that the stormwater discharges will occur, within the drainage area addressed by the TMDL.

### C.3 Equivalent Analysis Waiver

This waiver is available for discharges to non-impaired waters only. The operator can develop an equivalent analysis that determines allocations for his/her small construction site for the pollutant(s) of concern or determines that such allocations are not needed to protect water quality. This waiver requires a small construction operator to develop an equivalent analysis based on existing in-stream concentrations, expected growth in pollutant concentrations from all sources, and a margin of safety.

If you are a construction operator who wants to use this waiver, you must develop your equivalent analysis and provide the following information to be waived from permitting requirements:

1. Name, address and telephone number of the construction site operator(s);

2. Name (or other identifier), address, county or similar governmental subdivision, and latitude/longitude of the construction project or site;
3. Estimated construction start and completion (i.e., final stabilization) dates, and total acreage (to the nearest quarter acre) to be disturbed;
4. The name of the waterbody(s) that would be receiving stormwater discharges from your construction project;
5. Your equivalent analysis;
6. A statement, signed and dated by an authorized representative as provided in Appendix G, Subsection G.11, that certifies that the construction activity will take place and that the stormwater discharges will occur, within the drainage area addressed by the equivalent analysis.

### C.4 Waiver Deadlines and Submissions

1. Waiver certifications must be submitted prior to commencement of construction activities.
2. If you submit a TMDL or equivalent analysis waiver request, you are not waived until EPA approves your request. As such, you may not commence construction activities until receipt of approval from EPA.
3. Late Notifications: Operators are not prohibited from submitting waiver certifications after initiating clearing, grading, excavation activities, or other construction activities. The Agency reserves the right to take enforcement for any unpermitted discharges that occur between the time construction commenced and waiver authorization is granted.

Submittal of a waiver certification is an optional alternative to obtaining permit coverage for discharges of stormwater associated with small construction activity, provided you qualify for the waiver. Any discharge of stormwater associated with small construction activity not covered by either a permit or a waiver may be considered an unpermitted discharge under the Clean Water Act. As mentioned above, EPA reserves the right to take enforcement for any unpermitted discharges that occur between the time construction commenced and either discharge authorization is granted or a complete and accurate waiver certification is submitted. EPA may notify any operator covered by a waiver that they must obtain NPDES permit coverage. EPA may notify any operator who has been in non-compliance with a waiver that they may no longer use the waiver for future projects. Any member of the public may petition EPA to take action under this provision by submitting written notice along with supporting justification.

Complete and accurate TMDL or equivalent analysis waiver requests must be sent to the applicable EPA Regional Office address specified in Appendix B.

# Appendix D - Eligibility Worksheet Relating to Threatened and Endangered Species Protection

## D.1 Introduction

This appendix provides a printable worksheet that can be helpful in selecting and documenting your eligibility criteria with respect to the protection of Federally listed threatened or endangered species and Federally designated "critical habitat" under the Endangered Species Act (ESA) [hereinafter "ESA-listed species and designated critical habitat(s)"] from discharges and discharge-related activities authorized under this permit. This is important because Section 9 of the ESA prohibits all persons and agencies from "taking" threatened and endangered species (16 U.S.C. § 1532(19)).

While coordination between you and the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS) (together, referred to as the "Services") may not be required in all cases, EPA encourages you to coordinate with the Services, to document that coordination, and to do so early in the planning process prior to submitting your NOI.

## D.2 Certifying ESA Eligibility Criterion for the CGP

To be eligible for coverage under the CGP, you must certify that you meet one of the criteria listed in this worksheet (Section D.5), which is then submitted with your NOI for coverage under this permit. If you do not meet one of the ESA eligibility criteria outlined in the worksheet below, you are not eligible for coverage under this permit. These criteria ensure that coverage is available only for discharges and discharge-related activities that (1) avoid or eliminate any short- or long-term adverse effects to ESA-listed species and designated critical habitat(s), or (2) may result in any short- or long-term adverse effects that result in incidental take addressed under the incidental take statement of a biological opinion or permit for take issued under Section 10 of the ESA.

As part of your determination of eligibility, EPA has developed a worksheet that assists operators in arriving at the correct criterion. The following requirements apply to the completion of the worksheet depending on how you are submitting your NOI for permit coverage:

1. If the EPA Regional Office grants you a waiver from electronic reporting, in accordance with Part 1.1.5 of the CGP, you must complete the worksheet in section D.4 of this appendix to provide all information as required on your NOI that supports the eligibility criterion you qualify under per Part 1.1.5 of the permit. **You must submit the worksheet with your NOI. If you do not submit the worksheet with your NOI, your NOI will be considered incomplete.**
2. If you do not have a waiver from electronic reporting, you must **complete your eligibility criteria selection outlined in the Endangered Species Protection section of the NOI in the NPDES eReporting Tool (NeT-CGP)** and provide all information as required on your NOI that supports the eligibility criterion you qualify under per Part 1.1.5 of the permit. The printable worksheet in this appendix may be helpful to you in preparing to submit your NOI, but you do not have to use it.

## D.3 What to Expect Once you Submit your NOI

After you submit your NOI and before your NOI is authorized, EPA may notify you if any additional controls are necessary to ensure your discharges are not likely to result in any short- or long-term adverse effects on ESA-listed species and critical habitat.

The Services have the opportunity, within 14 days of submission of the NOI, to advise EPA whether either agency believes the planned discharges meet the selected eligibility criterion; whether the eligibility criterion could be met with additional conditions; or whether the eligibility criterion is not met. With respect to ESA issues, EPA recognizes the Services' expertise and will carefully consider their conclusion(s) in identifying eligibility for authorization, either with or without additional conditions. In the event EPA has placed a hold on your NOI based on NMFS or USFWS' recommendation, EPA will notify you as to whether your discharges are authorized or whether an individual permit will be required. If you do not hear from EPA within 14 days, you may assume that your discharge is authorized without further conditions.

### D.4 Worksheet Instructions

Follow the instructions within the worksheet below to determine which criterion you are eligible for coverage under this permit. Check only 1 criterion, answer the required questions, and include the required information.

Please keep the following in mind as you complete the worksheet:

- The worksheet requires that you answer questions in a sequential order so that you can select the correct eligibility criterion. The worksheet does not go through each criterion alphabetically, but rather is organized in a way that allows you to eliminate those criteria that do not apply to your site. For instance, Step 1 of the worksheet requires you to determine whether criterion B, E, or F applies first, in that order, before proceeding to determining whether criterion A applies in Step 2.
- You must consider ESA-listed species and/or designated critical habitat(s) under the jurisdiction of both the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) and select the criterion that best applies to your site. You must comply with any applicable terms, conditions, or other requirements developed in theprocess of meeting one of the eligibility criteria in this section to remain eligible for coverage under this permit.
- When evaluating the potential effects of your activities, you must consider effects to listed species or critical habitats within the "action area" of your construction activity, as identified by the USFWS IPaC and/or the NOAA website resources on page D-10 through D-11 of this appendix. Please Note: *NMFS' jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers.* The definition of "action area," which is contained in Appendix A, is repeated below forconvenience.

"Action Area" – all areas to be affected directly or indirectly by the federal action and not merely theimmediate area involved in the action. See 50 CFR part 402. For the purposes of this permit and for application of the Endangered Species Act requirements, the following areas are included in the definition of action area:

- The **areas on the construction site** where stormwater discharges originate and flow toward the point of discharge into the receiving waters. This includes:
  - areas on the construction site where excavation, site development, or other ground disturbance activities occur, and
  - areas where stormwater controls will be constructed and operated, including any areas where stormwater flows to and from the stormwater controls.
- The areas **in the vicinity of the construction site** where stormwater discharges flow from the construction site to one or more points of discharge into receiving waters. (Example: Where stormwater flows into an off-site ditch, swale, or gully that leads to receiving waters.)
- **The extent of the receiving water** potentially affected by stormwater discharges from your construction site through alteration of water chemistry, turbidity, temperature, or bank structure (i.e., erosive flow), regardless of whether the construction site is adjacent to the receiving water.

**D.5 Worksheet**

## Step 1 – Determine if You Meet the Eligibility Requirements of Criterion B, E, or F

***Instructions***

- First determine whether you are eligible under Criterion B by reviewing the eligibility requirements below.
- If you determine that your facility does not meet Criterion B (e.g., due to difference in action area described, lack of analysis of appropriate effects, new listings or designation of critical habitat), proceed to check if you meet the requirements for Criterion E or F.

### Criterion B Eligibility Requirements

**If your discharges and discharge-related activities were already addressed in another operator's valid certification of eligibility under the current 2022 CGP that included your action area** (e.g., a general contractor or developer may have completed and filed an NOI for the entire action area with the necessary ESA certifications (Criterion A, C, D, E, or F)), you may be eligible under Criterion B. In order to be eligible for coverage, you must confirm that **all** three of the following are true (**check all that apply**):

☐ I have confirmed that the other operator's certification of eligibility accounted for my action area and that the eligibility certification was valid.

☐ There has been no lapse of NPDES permit coverage in the other operator's certification.

☐ I will comply with all measures that formed the basis of the other operator's valid certification of eligibility.

***Instructions***

- **If all three of the above are true, you may check Criterion B below and answer questions B1-B5, and if applicable, B6-B7.**
- **If any of the above are not true** (for example, if there are any listed species in your action area that were not addressed in the other operator's certification, you are not eligible under Criterion B), **you may not select Criterion B and must proceed to check if you meet the requirements for Criterion E or F.**

☐ **B Eligibility requirements met by another operator under the 2022 CGP.** The construction site's discharges and discharge-related activities were already addressed in another operator's valid certification of eligibility for your "action area" under eligibility Criterion A, C, D, E, or F of the 2022 CGP and you have confirmed that no additional ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS not considered in the

that certification may be present or located in the "action area." To certify your eligibility under this criterion, there must be no lapse of NPDES permit coverage in the other CGP operator's certification. By certifying eligibility under this criterion, you agree to comply with any conditions upon which the other CGP operator's certification was based. You must include below the NPDES ID from the other 2022 CGP operator's notification of authorization under this permit and list any measures that you must comply with). If your certification is based on another 2022 CGP operator's certification under Criterion C, you must provide EPA with the relevant supporting information required of existing dischargers in Criterion C.

**B1.** Provide the NPDES ID from the other CGP operator's NOI authorized under this permit:

_ _ _ _ _ _ _ _ _ _

**B2.** Identify the eligibility criterion of the other CGP operator's NOI? (check only one)

☐ A ☐ C ☐ D ☐ E ☐ F

**B3.** Provide the authorization date of the other CGP operator's NOI (MM/DD/YYYY):

_ _ / _ _ / _ _ _ _

By certifying eligibility under Criterion B, you must comply with any terms and conditions imposed under the eligibility requirements of the criterion for which the other operator has established eligibility (either Criterion A, C, D, E, or F) to ensure that your discharges and discharge-related activities are protective of listed species and/or critical habitat. *Note: If you are unable to meet these eligibility requirements, then you may either establish eligibility under one of the other criteria, or you may consider applying to EPA for an individual permit.*

**B4.** List any measures that formed the basis of the other operator's valid certification of eligibility that you will comply with (or enter "N/A" if none exist):

**B5.** Check to confirm you have provided documentation in your SWPPP supporting your eligibility under Criterion B, including any of the terms and conditions, as well as the other operator's basis for establishing eligibility. Yes ☐

**If your certification is based on another operator's certification under Criterion C, you must provide the following:**

**B6.** What Federally listed species and/or designated habitat are located in your "action area"? (attached separate sheet if necessary)

**B7.** What is the distance between your site and the listed species or designated critical habitat (in miles)? _____

***Instructions***

- **If you selected Criterion B above and answered questions B1-B5, and if applicable, B6-B7, you are done with this worksheet. If you are *not* filing electronically, you must submit this worksheet with your NOI.**
- If you are not eligible under Criterion B, proceed to check if you meet the requirements for Criterion E or F.






## Criterion E Eligibility Requirements

If consultation under ESA section 7 has concluded, you may be eligible for coverage under Criterion E. In order to be eligible for coverage under Criterion E, **you must confirm that both of the following are true (check all that apply)**:

☐ A consultation between a Federal agency and USFWS and/or the NMFS under section 7 of the ESA has concluded**.** Consultations can be either formal or informal, and would have occurred only as a result of a separate Federal action (e.g., during application for an individual wastewater discharge permit or the issuance of a wetlands dredge and fill permit), and the consultation must have addressed the effects of your construction activity's discharges and discharge-related activities on all ESA-listed threatened or endangered species and all designated critical habitat under the jurisdiction of each Service, as appropriate, in your action area. The result of this consultation must be either:

i. A biological opinion currently in effect that determined that the action in question (taking into account the effects of your facility's discharges and discharge-related activities) is likely to adversely affect, but is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The biological opinion must have included the effects of your facility's discharges[1] and discharge-related activities on all the listed species and designated

[1] Effects of discharge include, but are not limited to, the analysis of the hydrological, chemical, and biological effects of the discharge on listed species, their prey, and their habitat, as well as critical habitat, where designated. For example, the

critical habitat in your action area under the jurisdiction of each Service, as appropriate. To be eligible under (i), any reasonable and prudent measures specified in the incidental take statement must be implemented;

ii. Written concurrence (e.g., letter of concurrence) from the applicable Service(s) with a determination that your facility's discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat. The concurrence letter must have included the effects of your facility's discharges and discharge-related activities on all the ESA-listed species and/or designated critical habitat on your species list(s) acquired from USFWS and/or NMFS as part of this worksheet.

☐ The consultation does not warrant reinitiation under 50 CFR §402.16; or, if reinitiation of consultation is required (e.g., due to a new species listing, critical habitat designation, or new information), the Federal action agency has reinitiated the consultation and the result of the consultation is consistent with the statements above. Include any reinitiation documentation from the Services or consulting Federal agency with your NOI.

***Instructions***

- **If both of the above are true, you may check Criterion E below and answer questions E1-E6.**
  - For more information on section 7 consultation, see 50 CFR part 402. If you receive a "jeopardy opinion," you may continue to work with USFWS and/or NMFS and your permitting authority to modify your project so that it will not jeopardize listed species or designated critical habitat.
  - Note that most consultations are accomplished through informal consultation. When conducting informal ESA section 7 consultation as a non-Federal representative, you must follow the procedures found in 50 CFR Part 402 of the ESA regulations. You must notify the Services of your intention and agreement to conduct consultation as a non-Federal representative.
  - Consultation may also occur in the context of another Federal action at the construction site (e.g., where ESA section 7 consultation was performed for issuance of a wetlands dredge and fill permit for the project or where a NEPA review is performed for the project that incorporates a section 7 consultation).
  - Any terms and conditions developed through consultations to protect listed species and critical habitat must be incorporated into the SWPPP. As noted above, a Federal operator may, if they wish, initiate consultation with the Services at Step Four. Non-Federal operators may seek technical assistance from the Services at Step 5.
  - Whether ESA section 7 consultation must be performed with either USFWS, NMFS, or both Services depends on the listed species that may be affected by the operator's stormwater discharges. In general, NMFS has jurisdiction over marine, estuarine, and anadromous species. Operators should also be aware that while formal section 7 consultation provides protection from incidental takings liability, informal consultation does not.

- **If not, proceed to check if you meet the requirements for Criterion F.**

effects analysis would have evaluated whether the various pollutants in the discharge (e.g., TSS, metals) would adversely affect listed species through exposure to the pollutants, or to their prey or habitat. Effects that look only at short-term effects unrelated to the stormwater discharge effects to listed species are not sufficient for these purposes.

☐ **E** **ESA Section 7 consultation has successfully concluded.** Consultation between a Federal Agency and the USFWS and/or NMFS under section 7 of the ESA has concluded. The consultation must have addressed the effects of the construction site's discharges and discharge-related activities on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS. To certify eligibility under this criterion, **Indicate the result of the consultation**:

☐ Biological opinion and/or conference opinion and incidental take statement currently in effect currently in effect from USFWS and/or NMFS that concludes that the action in question (taking into account the effects of your site's discharges and discharge-related activities) is not likely to jeopardize the continued existence of ESA-listed species, nor the destruction or adverse modification of critical habitat;

**Or**

☐ Written concurrence from USFWS and/or NMFS with a finding that the site's discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat.

**E1.** Identify the federal action agency or agencies involved:

**E2.** Identify the Service(s) field or regional offices providing the consultation:

**E3.** Identify any tracking numbers associated with the consultation (e.g., IPaC number, ECO number):

**E4.** What is the date the consultation was completed? (MM/DD/YYYY) __ __ / __ __ / __ __ __ __

**E5.** Check to confirm that correspondence with USFWS and/or NMFS documenting the Biological Opinion, conference opinion (IPaC or ECO tracking number) or concurrence is attached. Yes ☐

**E6.** Check to confirm you have provided documentation in your SWPPP supporting your eligibility under Criterion E, including copies of the correspondence between yourself and the Services. Yes ☐

***Instructions***

- **If you selected Criterion E above and answered questions E1-E6, you are done with this worksheet. If you are not filing electronically, you must submit this worksheet with your NOI.**
- If you are not eligible under Criterion E, proceed to check if you meet the requirements for Criterion F.

## Criterion F Eligibility Requirements

If your construction activities are the subject of a permit under ESA section 10, and this authorization addresses the effects of your site's discharges and discharge-related activities on ESA-listed species and designated critical habitat in your action area, you may be eligible for coverage under Criterion F. In order to be eligible or coverage under Criterion F, **you must confirm that the following is true:**

☐ A permit or permits issued under section 10 of the ESA specifically address the effects of your facility's discharges and discharge-related activities (if applicable) on all federally-listed species and designated critical habitat in your action area.

Note: You must follow USFWS and/or NMFS procedures when applying for an ESA section 10 permit (see 50 CFR §17.22(b)(1) for USFWS and §222.22 for NMFS). Application instructions for section 10 permits can be obtained from http://www.fws.gov and http://www.nmfs.noaa.gov or by contacting the appropriate Service office.

***Instructions***

- **If the above is true, you may check Criterion F below and answer questions F1-F6.**
- If you are not eligible under criterion F, proceed to Step 2.

☐ **F** **Issuance of section 10 permit**. Potential take is authorized through the issuance of a permit under section 10 of the ESA by the USFWS and/or NMFS, and this authorization addresses the effects of the site's discharges and discharge-related activities on ESA-listed species and designated critical habitat. You must include copies of the correspondence between yourself and the participating agencies in your SWPPP and your NOI.

**F1.** Which Service provided the section 10 permit? (check all that apply)

USFWS ☐ NMFS ☐

**F2.** Identify the field or regional offices providing the permit(s):

**F3.** Identify any tracking numbers associated with the consultation (e.g., IPaC number, ECO number):

**F4.** What is the date the permit(s) was granted? (MM/DD/YYY) __ __ / __ __ / __ __ __ __
(2nd permit date, if applicable: __ __ / __ __ / __ __ __ __ )

**F5.** Check to confirm that correspondence with USFWS and/or NMFS and a copy of the section 10 permit or relevant tracking number(s) (IPaC and/or ECO number) is attached. Yes ☐

**F6.** Check to confirm you have provided documentation in your SWPPP supporting your eligibility under Criterion F, including a copy of the section 10 permit and copies of the correspondence between yourself and the Services. Yes ☐

***Instructions***

- **If you selected Criterion F above and answered questions F1-F6, you are done with this worksheet. If you are not filing electronically, you must submit this worksheet with your NOI.**
- If you are not eligible under Criterion F, proceed to Step 2.

## Step 2 – Determine if Listed Threatened or Endangered Species or their Designated Critical Habitat(s) are Likely to Occur in your Site's Action Area

***Instructions***

- **First, determine the extent of your action area.** You must determine whether species listed as either threatened or endangered, or their critical habitat(s) are located in your site's action area (i.e., all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action, including areas beyond the footprint of the site that are likely to be affected by stormwater discharges, discharge-related activities, and authorized non-stormwater discharges).

You must consider the following in determining the action area for your site, and **confirm that all the following are true**:

☐ In determining my "action area", I have considered that discharges of pollutants from the project site can expand the action area well beyond the footprint of my site and the discharge point(s). I have taken into account the controls I will be implementing to minimize pollutants and the receiving waterbody characteristics (e.g., perennial, intermittent, ephemeral) in determining the extent of physical, chemical, and/or biotic effects of the

discharges. I confirm that all receiving waterbodies that could receive pollutants from my site are included in my action area.

☐ In determining my "action area", I have considered that discharge-related activities must also be accounted for in determining my action area. I understand that discharge-related activities are any activities that cause, contribute to, or result in stormwater and authorized non-stormwater point source discharges, and measures such as the siting, construction, timing,[2] and operation of stormwater controls to control, reduce, or prevent pollutants from being discharged. I understand that any new or modified stormwater controls that will have noise or other similar effects, and any disturbances associated with construction of controls, are part of my action area.

If you have any questions about determining the extent of your action area, you may contact EPA or the Services for assistance. https://www.epa.gov/npdes/contact-us-stormwater#regional

***Instructions***

- **Next, you must identify, to the best of your ability, any species listed as either threatened or endangered, or their critical habitat(s), that are located in your site's action area (see definitions of these terms in Appendix A).** You must follow the instructions on the https://www.epa.gov/npdes/construction-general-permit-threatened-and-endangered-species to obtain lists of any ESA-protected species and/or critical habitat that are expected to exist in your county, township, or the receiving water for your discharge.
- If ESA-protected resources occur within your action area, keep a copy of the species and critical habitat list(s) from the Service(s) with your SWPPP and use the list(s) to complete your NOI. For USFWS species, attach to this worksheet the full printout from your IPaC query/Official Species List. You can include the map from your IPaC query. For NMFS species, attach to this worksheet the full printout of the report from your query of the mapping resource you used (either the National or Greater Atlantic Region Mapper). The printed report from NMFS mappers will include a map of your query.

[2] Timing considerations could be related to, for example, a time of the year where a migratory bird species is present in the action area and the operator might want to consider that in terms of their construction sequencing; there are other times of the year where this consideration might not be relevant.

***Instructions***

- **After completing Step 2 above, if there are <u>no</u> listed species and <u>no</u> critical habitat areas in your action area,** you may be eligible for criterion A.

## Criterion A Eligibility Requirements

In order to be eligible for coverage under criterion A, you must confirm that all the following are true (**check all that apply**):

☐ I confirm that I have used the species location resources of **BOTH** NMFS and USFWS to identify any ESA-listed species within my action area.

☐ I have confirmed there to be no ESA-listed species and no critical habitat in my action area.

***Instructions***

- **If all of the above are true, you may check criterion A below and answer questions A1-A5.**
- **If any of the above is not true, you may not select criterion A and must proceed to Step 3** to determine if you can become eligible under criterion C.

Note: For existing dischargers that have previously obtained coverage under criterion A, you must verify whether ESA-protected species and/or critical habitat are expected to exist in your action area, as described above. Please note that if you now find that your action area overlaps with ESA-protected species or critical habitat, you must proceed to Step 3.

☐ **A <u>No ESA-listed species and/or designated critical habitat present in action area</u>**. You certify that ESA-listed species and designated critical habitat(s) under the jurisdiction of the USFWS or NMFS are not likely to occur in your site's "action area" as defined in Appendix A of this permit.. *Please Note: NMFS' jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers.*

**A1.** USFWS information sources used (reliance on State resources is not acceptable):

Note: If your Official Species List from USFWS indicated no species or critical habitat were present in your action area, include the full consultation tracking code at the top of your Official Species List in your NOI in the basis statement for Criterion A. If an Official Species List was not available on IPaC, list the contact date and name of the Service staff with whom you corresponded to verify no USFWS species or critical habitat were present in your action area.

**A2.** NMFS information sources used (reliance on State resources is not acceptable):

**A3.** I confirm that aerial image(s) of the site is attached. Yes ☐

**A4.** I confirm that a printout of the species' list(s) showing no ESA-listed species or critical habitat in my action area is attached. Yes ☐

**A5.** Check to confirm you have provided documentation in your SWPPP supporting your eligibility under Criterion A. For USFWS species, include the full printout from your IPaC query/Official Species List. You can include the map from your IPaC query. For NMFS species, include the full printout from the appropriate NMFS website resources on page X with the correct Region selected. Yes ☐

***Instructions***

- **If you selected Criterion A above and answered questions A1-A5, you are done with this worksheet. If you are not filing electronically, you must submit this worksheet with your NOI.**




- **If listed species and/or critical habitat may exist in your action area, you must do one or more of the following**:



  - **Conduct visual inspections.** This method may be particularly suitable for construction sites that are smaller in size or located in non-natural settings such as highly urbanized areas or industrial parks where there is little or no natural habitat, or for construction activities that discharge directly into municipal stormwater collection systems.
  - **Conduct a formal biological survey**. In some cases, particularly for larger construction sites with extensive stormwater discharges, biological surveys may be an appropriate way to assess whether species are located in the action area and whether there are likely to be short- or long-term adverse effects to such species. Biological surveys are frequently performed by environmental consulting firms.
  - **If required, conduct an environmental assessment under the National Environmental Policy Act (NEPA).** Some construction activities might require review under NEPA for specific reasons, such as Federal funding or other Federal involvement in the project. Note: Coverage under the CGP does not trigger such a review for individual projects/sites. EPA has complied with NEPA in the issuance of the CGP.

    **and**
  - **Follow the instructions in Steps 3 – 5 below, as applicable.** Note that many but not all measures imposed to protect listed species under these steps will also protect critical habitat. Thus, meeting the eligibility requirements of this CGP may require measures to protect critical habitat that are separate from those to protect listed species.

## Step 3 – Assess if the Construction Activity's Discharges or Discharge-Related Activities Are Likely to Result in Short- or Long-Term Adverse Effects to Listed Threatened or Endangered Species or Designated Critical Habitat

***Instructions***

- If in Step 2 you identified that listed species and/or designated critical habitat could exist in your action area, **you must next assess whether your discharges or discharge-related activities are likely to result in short- or long-term adverse effects to ESA-listed threatened or endangered species or designated critical habitat**.

Potential short- or long-term adverse effects from discharges and discharge-related activities include:

- **Hydrological**. Stormwater discharges may cause siltation, sedimentation, or induce other changes in receiving waters such as temperature, salinity, or pH. These effects will vary with the amount of stormwater discharged and the volume and condition of the receiving water. Where a stormwater discharge constitutes a minute portion of the total volume of the receiving water, adverse hydrological effects are less likely. Construction activity itself may also alter drainage patterns on a site where construction occurs that can impact listed species or critical habitat.
- **Habitat**. Excavation, site development, grading, and other surface disturbance activities from construction activities, including the installation or placement of stormwater controls, may result in adverse effects to listed species or their habitat. Stormwater may drain or inundate listed species habitat.
- **Toxicity**. In some cases, pollutants in construction stormwater may have toxic effects on listed species. For example: Stormwater discharges from construction on or adjacent to agricultural property may contain pesticides. Stormwater discharges from projects involving pavement and roofing could include tar and asphalt.

The scope of effects to consider will vary with each site. If you are having difficulty determining whether your project is likely to result in short- or long-term adverse effects to listed species or critical habitat, or one of the Services has already raised concerns to you, you should contact the appropriate Services office for assistance.

***Instructions***

- **If any short- or long-term adverse effects to listed threatened or endangered species or their critical habitat <u>are not</u> likely, then you may check Criterion C below and answer questions C1-C8.**
- **If any short- or long-term adverse effects to listed threatened or endangered species or their critical habitat <u>are</u> likely, you must follow Step 4 below.** You may still be eligible for Criterion C if you are able to install and implement appropriate measures to avoid the likelihood of adverse effects.

**Criterion C Eligibility Requirements**

☒ **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, you must indicate below1) the ESA-listed species and/or designated habitat located in your "action area" using the process outlined in this Appendix; 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. You must also include a copy of your site map from your SWPPP showing the upland and in-water extent of your "action area" with your NOI.

**C1.** I confirm that both ESA-listed species and designated critical habitat under the jurisdiction of the USFWS and/or NMFS were considered in my evaluation. Yes ☒

**C2.** Provide the USFWS information resources and expertise used to arrive at this criterion selection:

Refer to appendix I for details.

**C3.** Provide the NMFS information resources and expertise used to arrive at this criterion selection:

**C4.** What ESA-listed species and/or designated critical habitat are located in your "action area?" (or attach a printout of the species' list(s))

Refer to appendix I for details.

**C5.** What is the distance between your site and the ESA-listed species and/or designated critical habitat within the action area (in miles, state "on site" if the ESA-listed species and/or designated critical habitat is within the area to be disturbed)? Refer to appendix I for details.

**C6.** Provide the rationale describing specifically how any short- or long-term adverse effects to ESA-listed species will be avoided from the discharge and discharge-related activities.

Refer to appendix I for details. Best management practices will be used to mitigate and avoid adverse discharge and discharge-related activities.

**C7.** I confirm that a site map from my SWPPP showing the upland and in-water extent of my "action area" is attached. Yes ☒

**C8.** Check to confirm you have provided documentation in your SWPPP supporting your eligibility under Criterion C. Yes ☒

***Instructions***

- **If you selected Criterion C above and answered questions C1-C8, you are done with this worksheet. If you are not filing electronically, you must submit this worksheet with your NOI.** 

- If not, please proceed to step 4. 

## Step 4 - Determine if Measures Can Be Implemented to Avoid Adverse Effects

***Instructions***

If you make a preliminary decision in Step 3 that short- or long-term adverse effects from your construction activity's discharges or discharge-related activities are likely to occur, you can still receive coverage under eligibility Criterion C of the CGP if appropriate measures are undertaken to avoid or eliminate the likelihood of short- or long-term adverse effects prior to applying for CGP coverage.

These measures may involve relatively simple changes to construction activities such as re-routing a stormwater discharge to bypass an area where species are located, relocating stormwater controls, or by modifying the "footprint" of the construction activity. If you are unable to ascertain which measures to implement to avoid the likelihood of short- or long-term adverse effects, you must coordinate with USFWS and/or NMFS, in which case you would not be eligible for coverage under eligibility Criterion C, but may instead be eligible for coverage under eligibility criterion D (described in more detail in Step 5).

- **If you are able to install and implement appropriate measures to avoid the likelihood of short- or long-term adverse effects, then you may go back and check eligibility Criterion C above and answer questions C1-C8 above, and C9-C10 below.** The measures you adopt to avoid or eliminate short- or long-term adverse effects must be implemented for the duration of the construction project and your coverage under the CGP.
- **If you cannot ascertain which measures to implement to avoid the likelihood of adverse effects,** you must follow the procedures in Step 5.

**C9.** I confirm that I have or will install and implement appropriate measures to avoid the likelihood of any short- or long-term adverse effects to ESA-listed threatened or endangered species or their critical habitat. Yes ☒

**C10.** Provide a description of the measures installed/to be installed and implemented to avoid likelihood of any short- or long-term adverse effects.

Refer to appendix L for details.

***Instructions***

- **If you selected Criterion C above and answered questions C1-C10, you are done with this worksheet. If you are not filing you NOI electronically, you must submit this worksheet with your NOI.**
- If you are not eligible for Criterion C, please proceed to step 5.

## Step 5 - Determine if the Eligibility Requirements of Criterion D Can Be Met

***Instructions***

- If in Step 4 you cannot ascertain which measures to implement to avoid the likelihood of short- or long-term adverse effects, you must contact USFWS and/or NMFS. You may still be eligible for CGP coverage if likely adverse effects can be addressed through meeting criterion D.
- If you meet the requirements of criterion D, **then you may check criterion D below and answer questions D1-D5.**

### Criterion D Eligibility Requirements

☐ **D** **Coordination with USFWS and/or NMFS has successfully concluded.** Coordination between you and the USFWS and/or NMFS has concluded. The coordination must have addressed the effects of your site's discharges and discharge-related activities on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS, and resulted in a written confirmation from USFWS and/or NMFS that the effects of your site's discharges and discharge-related activities are not likely to result in short- or long-term adverse effects for ESA-listed species and/or designated critical habitat in your action area. By certifying eligibility under this criterion, you agree to comply with any conditions you must meet for your site's discharges and discharge-related activities to not likely result in any short- or long-term adverse effects. You must include copies of the correspondence with the participating agencies in your SWPPP and your NOI.

**D1.** Which Service participated in coordination? (check all that apply) USFWS ☐ NMFS ☐

**D2.** Identify the field and/or regional office(s) that provided the coordination?

**D3.** What is the date the coordination concluded? (MM/DD/YYY) __ __ / __ __ / __ __ __ __

**D4.** Check to confirm that correspondence with USFWS and/or NMFS documenting concurrence is attached. Yes ☐

**D5.** Check to confirm you have provided documentation in your SWPPP supporting your eligibility under Criterion D, including copies of the correspondence between yourself and the Services. Yes ☐

***Instructions***

- **If you selected Criterion D above and answered questions D1-D5, you are done with this worksheet. If you are not filing electronically, you must submit this worksheet with your NOI.**




**Paperwork Reduction Act Notice**

This collection of information is approved by OMB under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. (OMB Control No. 2040-0305). Responses to this collection of information are mandatory (40 CFR 122.26). An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The public reporting and recordkeeping burden for this collection of information is estimated to be 3.3 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates and any suggested methods for minimizing respondent burden to the Regulatory Support Division Director, U.S. Environmental Protection Agency (2821T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

## Appendix E – Historic Property Screening Process

### Background

Section 106 of the National Historic Preservation Act (NHPA) requires Federal agencies to take into account the effects of Federal "undertakings", such as the issuance of this permit, on historic properties that are either listed on, or eligible for listing on, the National Register of Historic Places. To address any issues relating to historic properties in connection with the issuance of this permit, EPA developed the screening process in this appendix that enables construction operators to appropriately consider the potential impacts, if any, of their installation of stormwater controls on historic properties and to determine whether actions can be taken, if applicable, to mitigate any such impacts. Although the coverages of individual construction sites under this permit do not constitute separate Federal undertakings, the screening process in this appendix provides an appropriate site-specific means of addressing historic property issues in connection with EPA's issuance of the permit.

***Key Terms***

***Historic property***- prehistoric or historic districts, sites, buildings, structures, or objects that are included in or eligible for inclusion in the National Register of Historic Places, including artifacts, records, and remains that are related to and located within such properties

***SHPO*** – The State Historic Preservation Officer for a particular State

***THPO or Tribal representative*** – The Tribal Historic Preservation Officer for a particular Tribe or, if there is no THPO, the representative designated by such Tribe for NHPA purposes

### Instructions for All Construction Operators

You are required to follow the screening process in this appendix to determine if your installation of stormwater controls on your site has the potential to cause effects to historic properties, and whether or not you need to contact your SHPO, THPO, or other Tribal representative for further information. **You may not submit your NOI until you have completed this screening process.** The following four steps describe how applicants can meet the historic property requirements under this permit:

Step 1 *Are you installing any stormwater controls that require subsurface earth disturbance?*[1]

The first step of the screening process is to determine if you will install stormwater controls that cause subsurface earth disturbance. The installation of the following types of stormwater controls require subsurface earth disturbance:[2]

- Dikes
- Berms
- Catch Basins
- Ponds
- Ditches
- Trenches
- Culverts
- Channels

[1] You are only required to consider earth-disturbing activities related to the installation of stormwater controls in the NHPA screening process. You are not reqired to consider other earth-disturbing activities at the site. If you are installing one of the above stormwater controls or another type of control that requires subsurface earth disturbance, your stormwater controls have the potential to have an effect on historic properties. If this is the case, then you must proceed to Step 2.

[2] This list is not intended to be exhaustive. Other stormwater controls that are not on this list may involve earth-disturbing activities and must also be examined for the potential to affect historic properties.

- Perimeter Drains
- Swales

If you are not installing one of the above stormwater controls or another type of control that requires subsurface earth disturbance, then you may indicate this on your NOI, and no further screening is necessary. During the 14-day waiting period after submitting your NOI, the SHPO, THPO, or other Tribal representative may request that EPA hold up authorization based on concerns about potential adverse effects to historic properties. EPA will evaluate any such request and notify you if any additional controls to address adverse effects to historic properties are necessary.

Step 2 *Have prior professional cultural resource surveys or other evaluations determined that historic properties do not exist, or have prior disturbances precluded the existence of historic properties?*

If you are installing a stormwater control that requires subsurface earth disturbance, you must next determine if no historic properties exist on your site based on prior professional cultural resource surveys or other evaluations, or if the existence of historic properties has been precluded because of prior earth disturbances.

If prior to your project it has already been determined that no historic properties exist at your site based on available information, including information that may be provided by your applicable SHPO, THPO, or other Tribal representative, then you may indicate this on your NOI, and no further screening steps are necessary. Similarly, if prior earth disturbances have eliminated the possibility that historic properties exist on your site, you may indicate this on your NOI, and no further screening steps are necessary. After submitting your NOI, and during the 14-day waiting period, the SHPO, THPO, or other Tribal representative may request that EPA hold up authorization based on concerns about potential adverse effects to historic properties. EPA will evaluate any such request and notify you if any additional measures to address adverse effects to historic properties are necessary.

If neither of these circumstances exists for your project, you must proceed to Step 3.

Step 3 *If you are installing any stormwater controls that require subsurface earth disturbance, you must determine if these activities will have an effect on historic properties.*

If your answer to the question in Step 2 is "no", then you must assess whether your earth-disturbing activities related to the installation of stormwater controls will have an effect on historic properties. This assessment may be based on historical sources, knowledge of the area, an assessment of the types of earth-disturbing activities you are engaging in, considerations of any controls and/or management practices you will adopt to ensure that your stormwater control-related earth-disturbing activities will not have an effect on historic properties, and any other relevant factors. If you determine based on this assessment that earth disturbances related to the installation of your stormwater controls will have no effect on historic properties, you may indicate this on your NOI, and document the basis for your determination in your SWPPP, and no further screening steps are necessary. After submitting your NOI, and during the 14-day waiting period, the SHPO, THPO, or other Tribal representative may request that EPA hold up authorization based on concerns about potential adverse effects to historic properties. EPA will evaluate any such request and notify you if any further processes are necessary including any additional measures to address adverse effects to historic properties are necessary.

If none of the circumstances in Steps 1 - 3 exist for your project, you must proceed to Step 4.

Step 4: *If you are installing any stormwater controls that require subsurface earth disturbance and you have not satisfied the conditions in Steps 1 - 3, you must contact and consult with the appropriate historic preservation authorities.*

Where you are installing stormwater controls that require subsurface earth disturbance, and you cannot determine in Step 3 that these activities will have no effect on historic properties, then you must contact the relevant SHPO, THPO, or other Tribal representative to request their views as to the likelihood that historic properties are potentially present on your site and may be impacted by the installation of these controls.

> *Note: Addresses for SHPOs may be found at https://ncshpo.org/directory/, and addresses for THPOs may be found at https://grantsdev.cr.nps.gov/THPO_Review/index.cfm. If a Tribe does not have a THPO, you should contact the appropriate Tribal government office designated by the Tribe for this purpose.*

You must submit the following minimum information in order to properly initiate your request for information:

1. Project name (*i.e.*, the name or title most commonly associated with your project);
2. A narrative description of the project;
3. Name, address, phone and fax number, and email address (if available) of the operator;
4. Most recent U.S. Geological Survey (USGS) map section (7.5 minute quadrangle) showing actual project location and boundaries clearly indicated; and
5. Sections of the SWPPP site map (see Part 7.2.4) that show locations where stormwater controls that will cause subsurface earth disturbance will be installed (see Step 1).

Without submitting this minimum information, you will not have been considered to have properly initiated your request. You will need to provide the SHPO, THPO, or other Tribal representative **a minimum of 15 calendar days** after they receive these materials to respond to your request for information about your project.

If you do not receive a response within 15 calendar days after receipt by the SHPO, THPO, or other Tribal representative of your request, then you may indicate this on your NOI, and no further screening steps are necessary. Or, if the applicable SHPO, THPO, or other Tribal representative responds to your request with an indication that no historic properties will be affected by the installation of stormwater controls at your site, then you may indicate this on your NOI, and no further screening steps are necessary. After submitting your NOI, and during the 14-day waiting period, the SHPO, THPO, or other Tribal representative may request that EPA hold up authorization based on concerns about potential adverse effects to historic properties. EPA will evaluate any such request and notify you if any further processes are necessary including any additional measures to address adverse effects to historic properties are necessary.

If within 15 calendar days of receipt of your request the applicable SHPO, THPO, or other Tribal representative responds with a request for additional information or for further consultation regarding appropriate measures for treatment or mitigation of effects on historic properties caused by the installation of stormwater controls on your site, you must comply with this request and proceed to Step 5.

Step 5: *Consultation with applicable consulting parties.*

If, following your discussions with the appropriate historic preservation authorities in Step 4, the applicable SHPO, THPO, Tribal representative, or any other consulting party requests additional information or further consultation, you must respond with such information or consult to determine impacts to historic properties that may be caused by the installation of stormwater controls on your site and appropriate measures for treatment or mitigation of such impacts. If as a result of your discussions with the applicable SHPO, THPO, Tribal representative, or any other

consulting party, you enter into, and comply with, a written agreement regarding treatment and/or mitigation of impacts on your site, then you may indicate this on your NOI, and no further screening steps are necessary.

If, however, agreement on an appropriate treatment or mitigation plan cannot be reached between you and the SHPO, THPO, Tribal representative, or any other consulting party within 30 days of your response to the SHPO, THPO, Tribal representative, or any other consulting party's request for additional information or further consultation, you may submit your NOI, but you must indicate that you have not negotiated measures to avoid or mitigate such effects. You must also include in your SWPPP the following documentation:

1. Copies of any written correspondence between you and the SHPO, THPO, Tribal representative, or any other consulting party; and
2. A description of any significant remaining disagreements as to mitigation measures between you and the SHPO, THPO, Tribal representative, or any other consulting party.

After submitting your NOI, and during the 14-day waiting period, the SHPO, THPO, ACHP, Tribal representative, or any other consulting party may request that EPA place a hold on authorization based upon concerns regarding potential adverse effects to historic properties. EPA, in coordination with the ACHP, will evaluate any such request and notify you if any further processes are necessary including any additional measures to address adverse effects to historic properties are necessary.

## Appendix F – Buffer Requirements.

The purpose of this appendix is to assist you in complying with the requirements in Part 2.2.1 of the permit regarding the establishment of natural buffers and/or equivalent sediment controls. This appendix is organized as follows:

F.1 SITES THAT ARE REQUIRED TO PROVIDE AND MAINTAIN NATURAL BUFFERS AND/OR EQUIVALENT EROSION AND SEDIMENT CONTROLS ..... 2
F.2 COMPLIANCE ALTERNATIVES AND EXCEPTIONS ..... 3
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## F.1 SITES THAT ARE REQUIRED TO PROVIDE AND MAINTAIN NATURAL BUFFERS AND/OR EQUIVALENT EROSION AND SEDIMENT CONTROLS

The requirement in Part 2.2.1 to provide and maintain natural buffers and/or equivalent erosion and sediment controls applies for any discharges to waters of the U.S. located within 50 feet of your site's earth disturbances. If the receiving water is not located within 50 feet of earth-disturbing activities, Part 2.2.1 does not apply. See Figure F – 1.

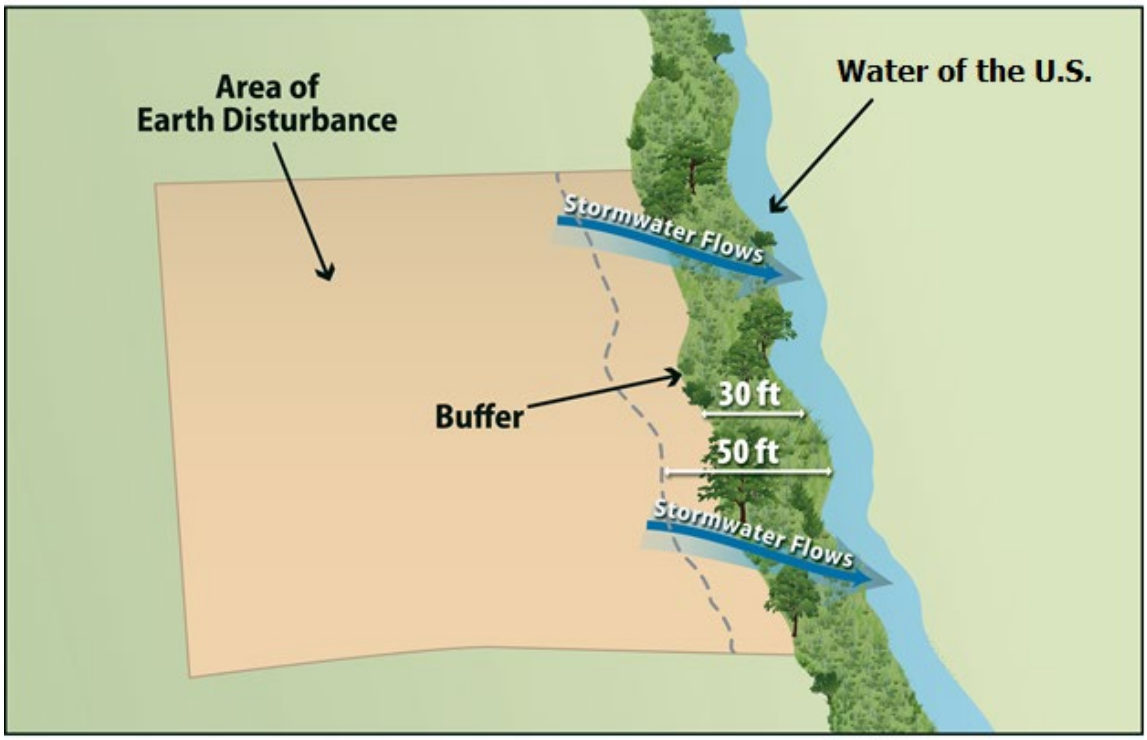



**Figure F-1 Example of earth-disturbing activities within 50 feet of a water of the U.S.**

## F.2 COMPLIANCE ALTERNATIVES AND EXCEPTIONS

### F.2.1 Compliance Alternatives

If Part 2.2.1 applies to your site, you have three compliance alternatives from which you can choose, unless you qualify for any of the exceptions (see below and Part 2.2.1.a):

1. Provide and maintain a 50-foot undisturbed natural buffer; or
2. Provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by erosion and sediment controls that achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer; or
3. 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.

The compliance alternative selected must be maintained throughout the duration of permit coverage.

See Part F.2.2 below for exceptions to the compliance alternatives.

See Part F.2.3 for requirements applicable to providing and maintaining natural buffers under compliance alternatives 1 and 2 above.

See Part F.2.4 for requirements applicable to providing erosion and sediment controls that achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer under compliance alternatives 2 and 3 above.

### F.2.2 Exceptions to the Compliance Alternatives

The following exceptions apply to the requirement to implement one of the Part 2.2.1.a compliance alternatives (see also Part 2.2.1.b):

- The following disturbances are exempt from the requirements Part 2.2.1 and this Appendix[1]:
  - Construction approved under a CWA Section 404 permit; or
  - Construction of a water-dependent structure or water access areas *(e.g., pier, boat ramp, trail)*.
- If there is no discharge of stormwater to waters of the U.S. through the area between the disturbed portions of the site and any waters of the U.S. located within 50 feet of your site, you are not required to comply with the requirements in Part 2.2.1 and this Appendix. This includes situations where you have implemented controls measures, such as a berm or other barrier, that will prevent such discharges.
- Where no natural buffer exists due to preexisting development disturbances *(e.g., structures, impervious surfaces)* that occurred prior to the initiation of planning for the current development of the site, you are not required to comply with the requirements in Part 2.2.1 and this Appendix.
  Where some natural buffer exists but portions of the area within 50 feet of the receiving water are occupied by preexisting development disturbances, you are

[1] This exemption does not apply, however, to disturbances within 50 feet of a receiving water that are adjacent to the disturbances listed here (i.e., construction permitted under CWA Section 404, or construction of a water-dependent structure or water access area) and that are covered by this permit.

required to comply with the requirements in Part 2.2.1 and this Appendix. For the purposes of calculating the sediment load reduction for either compliance alternative 2 or 3, you are not expected to compensate for the reduction in buffer function that would have resulted from the area covered by these preexisting disturbances. Clarity about how to implement the compliance alternatives for these situations is provided in F.2.3 and F.2.4 below.

If during your project, you will disturb any portion of these preexisting disturbances, the area removed will be deducted from the area treated as a "natural buffer."

- For "linear construction sites" (see Appendix A), you are not required to comply with this requirement if site constraints *(e.g., limited right-of-way)* make it infeasible to implement one of the Part 2.2.1.a compliance alternatives, provided that, to the extent feasible, you limit disturbances within 50 feet of any waters of the U.S. and/or you provide supplemental erosion and sediment controls to treat stormwater discharges from earth disturbances within 50 feet of the receiving water You must also document in your SWPPP your rationale for why it is infeasible for you to implement one of the Part 2.2.1.a compliance alternatives, and describe any buffer width retained and supplemental erosion and sediment controls installed.
- For "small residential lot" construction *(i.e., a lot being developed for residential purposes that will disturb less than 1 acre of land, but is part of a larger residential project that will ultimately disturb greater than or equal to 1 acre),* you have the option of complying with one of the "small residential lot" compliance alternatives in Part F.3 of this appendix.

Note that you must document in your SWPPP if any disturbances related to any of the above exceptions occurs within the buffer area on your site.

### F.2.3 Requirements for Providing and Maintaining Natural Buffers

This part of the appendix applies to you if you choose compliance alternative 1 (50-foot buffer), compliance alternative 2 (a buffer of < 50 feet supplemented by additional erosion and sediment controls that achieve the equivalent sediment load reduction as the 50-foot buffer), or if you are providing a buffer in compliance with one of the "small residential lot" compliance alternatives in Part F.3.

**Buffer Width Measurement**

Where you are retaining a buffer of any size, the buffer should be measured perpendicularly from any of the following points, whichever is further landward from the water:

1. The ordinary high water mark of the water body, defined as the line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, and/or the presence of litter and debris; or
2. The edge of the stream or river bank, bluff, or cliff, whichever is applicable.

Refer to Figures F – 2 and F - 3. You may find that specifically measuring these points is challenging if the flow path of the receiving water changes frequently, thereby causing the measurement line for the buffer to fluctuate continuously along the path of the waterbody. Where this is the case, EPA suggests that rather than measuring each change or deviation along the water's edge, it may be easier to select regular intervals

from which to conduct your measurement. For instance, you may elect to conduct your buffer measurement every 5 to 10 feet along the length of the water.

Additionally, note that if earth-disturbing activities will take place on both sides of a receiving water that flows through your site, to the extent that you are establishing a buffer around this water, it must be established on both sides. For example, if you choose compliance alternative 1, and your project calls for disturbances on both sides of a small stream, you would need to retain the full 50 feet of buffer on both sides of the water. However, if your construction activities will only occur on one side of the stream, you would only need to retain the 50-foot buffer on the side of the stream where the earth-disturbance will occur.

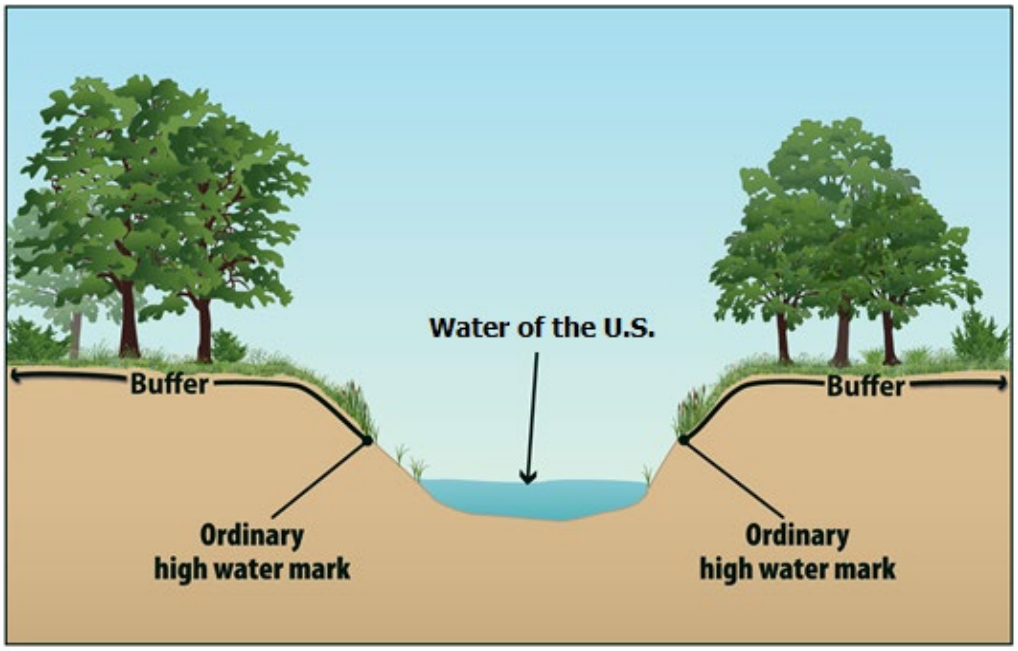



**Figure F-2 Buffer measurement from the ordinary high water mark of the water body, as indicated by a clear natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, and/or the presence of litter/debris.**

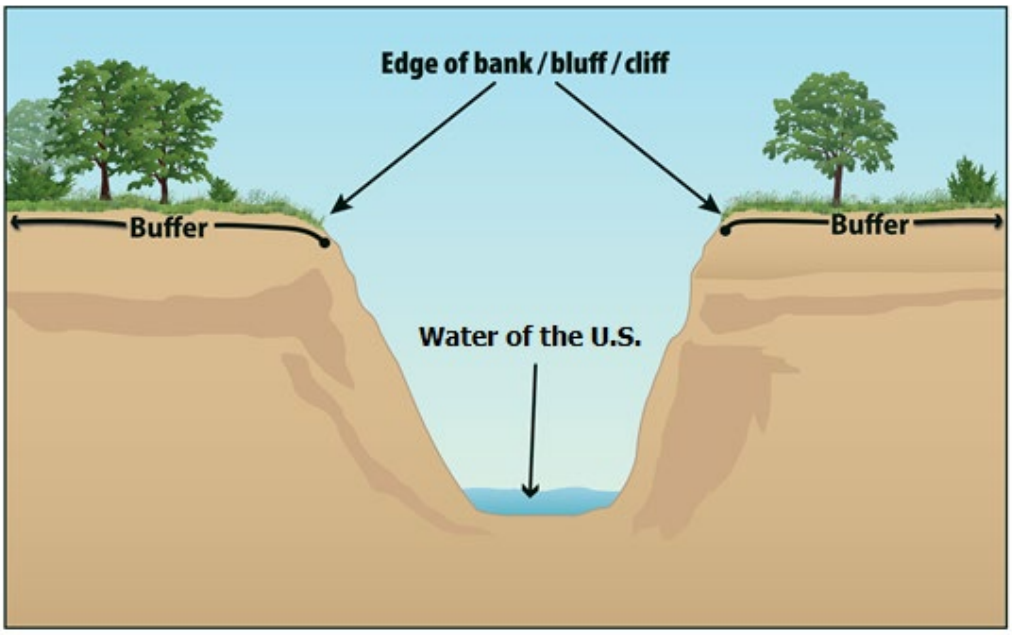



**Figure F-3 Buffer measurement from the edge of the bank, bluff, or cliff, whichever is applicable.**

**Limits to Disturbance Within the Buffer**

You are considered to be in compliance with the requirement to provide and maintain a natural buffer if you retain and protect from construction activities the natural buffer that existed prior to the commencement of construction. If the buffer area contains no vegetation prior to the commencement of construction (e.g., sand or rocky surface), you are not required to plant vegetation. As noted above, any preexisting structures or impervious surfaces may occur in the natural buffer provided you retain and protect from disturbance the buffer areas outside of the preexisting disturbance.

To ensure that the water quality protection benefits of the buffer are retained during construction, you are prohibited from conducting any earth-disturbing activities within the buffer during permit coverage. In furtherance of this requirement, **prior to commencing earth-disturbing activities on your site, you must delineate, and clearly mark off, with flags, tape, or a similar marking device, the buffer area on your site.** The purpose of this requirement is to make the buffer area clearly visible to the people working on your site so that unintended disturbances are avoided.

While you are not required to enhance the quality of the vegetation that already exists within the buffer, you are encouraged to do so where such improvements will enhance the water quality protection benefits of the buffer. (Note that any disturbances within the buffer related to buffer enhancement are permitted and do not constitute construction disturbances.) For instance, you may want to target plantings where limited vegetation exists, or replace existing vegetation where invasive or noxious plant species (see http://plants.usda.gov/java/noxiousDriver) have taken over. In the case of invasive or noxious species, you may want to remove and replace them with a diversity of native trees, shrubs, and herbaceous plants that are well-adapted to the climatic, soil, and hydrologic conditions on the site. You are also encouraged to limit the removal of naturally deposited leaf litter, woody debris, and other biomass, as this material contributes to the ability of the buffer to retain water and filter pollutants.

If a portion of the buffer area adjacent to the receiving water is owned by another party and is not under your control, you are only required to retain and protect from construction activities the portion of the buffer area that is under your control. For example, if you comply with compliance alternative 1 (provide and maintain a 50-foot buffer), but 10 feet of land immediately adjacent to the receiving water is owned by a different party than the land on which your construction activities are taking place and you do not have control over that land, you must only retain and protect from construction activities the 40-foot buffer area that occurs adjacent to the property on which your construction activities are taking place. EPA would consider you to be in compliance with this requirement regardless of the activities that are taking place in the 10-foot area that is owned by a different party than the land on which your construction activities are taking place that you have no control over.

**Discharges to the Buffer**

**You must ensure that all discharges from the area of earth disturbance to the natural buffer are first treated by the site's erosion and sediment controls** (*for example, you must comply with the Part 2.2.3 requirement to install sediment controls along any perimeter areas of the site that will receive pollutant discharges*), **and if necessary to prevent erosion caused by stormwater flows within the buffer, you must use velocity dissipation devices**. The purpose of this requirement is to decrease the rate of stormwater flow and encourage infiltration so that the pollutant filtering functions of the buffer will be achieved. To comply with this requirement, construction operators typically will use devices that physically dissipate stormwater flows so that the discharge entering the buffer is spread out and slowed down.

**SWPPP Documentation**

You are required to document in your SWPPP the natural buffer width that is retained. For example, if you are complying with alternative 1, you must specify in your SWPPP that you are providing a 50-foot buffer. Or, if you will be complying with alternative 2, you must document the reduced width of the buffer you will be retaining (and you must also describe the erosion and sediment controls you will use to achieve an equivalent sediment reduction, as required in Part F.2.4 below). Note that you must also show any buffers on your site map in your SWPPP consistent with Part 7.2.4.j. Additionally, if any disturbances related to the exceptions in Part F.2.2 occur within the buffer area, you must document this in the SWPPP.

### F.2.4 Guidance for Providing the Equivalent Sediment Reduction as a 50-foot Buffer

This part of the appendix applies to you if you choose compliance alternative 2 (provide and maintain a buffer that is less than 50 feet that is supplemented by erosion and sediment controls that achieve the sediment load reduction equivalent to a 50-foot buffer) or compliance alternative 3 (implement erosion and sediment controls to achieve the sediment load reduction equivalent to a 50-foot buffer).

**Determine Whether it is Feasible to Provide a Reduced Buffer**

EPA recognizes that there will be a number of situations in which it will be infeasible to provide and maintain a buffer of any width. While some of these situations may exempt you from the buffer requirement entirely (see F.2.2), if you do not qualify for one of these exemptions, there still may be conditions or circumstances at your site that make it infeasible to provide a natural buffer. For example, there may be sites where a significant portion of the property on which the earth-disturbing activities will occur is located within the buffer area, thereby precluding the retention of natural buffer areas.

Therefore, you should choose compliance alternative 2 if it is feasible for you to retain some natural buffer on your site. (Note: For any buffer width retained, you are required to comply with the requirements in Part F.2.3, above, concerning the retention of vegetation and restricting earth disturbances.) Similarly, if you determine that it is infeasible to provide a natural buffer of any size during construction, you should choose alternative 3.

**Design Controls That Provide Equivalent Sediment Reduction as 50-foot Buffer**

You must next determine what additional controls must be implemented on your site that, alone or in combination with any retained natural buffer, achieve a reduction in sediment equivalent to that achieved by a 50-foot buffer.

Note that if only a portion of the natural buffer is less than 50 feet, you are only required to implement erosion and sediment controls that achieve the sediment load reduction equivalent to the 50-foot buffer for discharges through that area. You would not be required to provide additional treatment of stormwater discharges that flow through 50 feet or more of natural buffer. See Figure F-4.

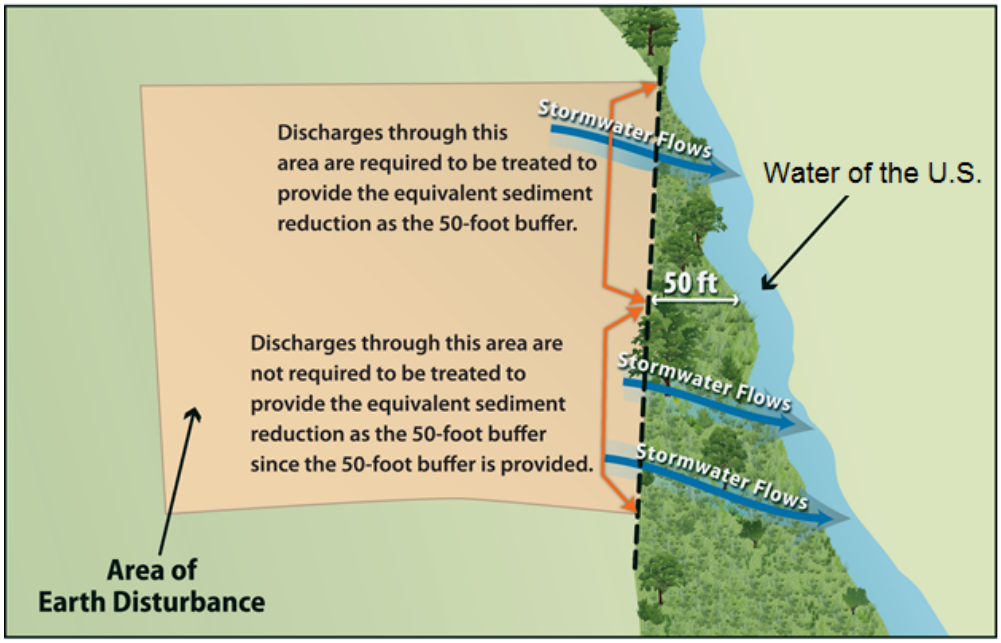



**Figure F-4 Example of how to comply with the requirement to provide the equivalent sediment reduction when only a portion of your earth-disturbances discharge to a buffer of less than 50-feet.**

Steps to help you meet compliance alternative 2 and 3 requirements are provided below.

**Step 1 - Estimate the Sediment Reduction from the 50-foot Buffer**

In order to design controls that match the sediment removal efficiency of a 50-foot buffer, you first need to know what this efficiency is for your site. The sediment removal efficiencies of natural buffers vary according to a number of site-specific factors, including precipitation, soil type, land cover, slope length, width, steepness, and the types of erosion and sediment controls used to reduce the discharge of sediment prior to the buffer. EPA has simplified this calculation by developing buffer performance tables covering a range of vegetation and soil types for the areas covered by the CGP. See

Attachment 1 of this Appendix, Tables F-8 through F-15. Note: buffer performance values in Tables F-8 through F-15 represent the percent of sediment captured through the use of perimeter controls (e.g., silt fences) and 50-foot buffers at disturbed sites of fixed proportions and slopes.[2]

Using Tables F-8 through F-15 (see Attachment 1 of this Appendix), you can determine the sediment removal efficiency of a 50-foot buffer for your geographic area by matching the vegetative cover type that best describes your buffer area and the type of soils that predominate at your site. For example, if your site is located in Massachusetts (Table F-9), and your buffer vegetation corresponds most closely with that of tall fescue grass, and the soil type at your site is best typified as sand, your site's sediment removal efficiency would be 81 percent.

In this step, you should choose the vegetation type in the tables that most closely matches the vegetation that would exist naturally in the buffer area on your site regardless of the condition of the buffer. However, because you are not required to plant any additional vegetation in the buffer area, in determining what controls are necessary to meet this sediment removal equivalency in Step 2 below, you will be able to take credit for this area as a fully vegetated "natural buffer."

Similarly, if a portion of the buffer area adjacent to the receiving water is owned by another party and is not under your control, you can treat the area of land not under your control as having the equivalent vegetative cover and soil type that predominates on the portion of the property on which your construction activities are occurring.

*For example, if your earth-disturbances occur within 50 feet of a receiving water, but the 10 feet of land immediately adjacent to the receiving water is owned by a different party than the land on which your construction activities are taking place and you do not have control over that land, you can treat the 10 foot area adjacent to the stream as having the equivalent soil and vegetation type that predominates in*

[2] EPA used the following when developing the buffer performance tables:

- The sediment removal efficiencies are based on the U.S. Department of Agriculture's RUSLE2 ("Revised Universal Soil Loss Equation 2") model for slope profiles using a 100-foot long denuded slopes.
- Sediment removal was defined as the annual sediment delivered at the downstream end of the 50-foot natural buffer (tons/yr/acre) divided by the annual yield from denuded area (tons/yr/acre).
- As perimeter controls are also required by the CGP, sediment removal is in part a function of the reduction due to a perimeter control (i.e., silt fence) located between the disturbed portion of the site and the upstream edge of the natural buffer and flow traveling through a 50-foot buffer of undisturbed natural vegetation.
- It was assumed that construction sites have a relatively uniform slope without topographic features that accelerate the concentration for erosive flows.
- It was assumed that vegetation has been removed from the disturbed portion of the site and a combination of cuts and fills have resulted in a smooth soil surface with limited retention of near-surface root mass.

To represent the influence of soil, EPA analyzed 11 general soil texture classifications in its evaluation of buffer performance. To represent different types of buffer vegetation, EPA evaluated 4 or more common vegetative types for each State/Territory covered under the permit. For each vegetation type evaluated, EPA considered only permanent, non-grazed, and non-harvested vegetation, on the assumption that a natural buffer adjacent to the receiving water will typically be undisturbed. EPA also evaluated slope steepness and found that sediment removal efficiencies present in Tables G-8 through G-15 are achievable for slopes that are less than nine percent.

*the 40 foot area under your control. You would then make the same assumption in Step 2 for purposes of determining the equivalent sediment removal.*

Alternatively, you may do your own calculation of the effectiveness of the 50-foot buffer based upon your site-specific conditions, and may use this number as your sediment removal equivalency standard to meet instead of using Tables F-8 through F-15. This calculation must be documented in your SWPPP.

**Step 2 - Design Controls That Match the Sediment Removal Efficiency of the 50-foot Buffer**

Once you determine the estimated sediment removal efficiency of a 50-foot buffer for your site in Step 1, you must next select stormwater controls that will provide an equivalent sediment load reduction. These controls can include the installation of a single control, such as a sediment pond or additional perimeter controls, or a combination of stormwater controls. Whichever control(s) you select, you must demonstrate in your SWPPP that the controls will provide at a minimum the same sediment removal capabilities as a 50-foot natural buffer (Step 1). You may take credit for the removal efficiencies of your required perimeter controls in your calculation of equivalency, because these were included in calculating the buffer removal efficiencies in Tables F-8 through F-15. (Note: You are reminded that the controls must be kept in effective operating condition until you complete final stabilization on the disturbed portions of the site discharging to the receiving water)

To make the determination that your controls and/or buffer area achieve an equivalent sediment load reduction as a 50-foot buffer, you should use a model or other type of calculation. As mentioned above, there are a variety of models available that can be used to support your calculation, including USDA's RUSLE-series programs and the WEPP erosion model, SEDCAD, SEDIMOT, or other models. A couple of examples are provided in Attachment 3 to help illustrate how this determination could be made.

If you retain a buffer of less than 50 feet, you may take credit for the removal that will occur from the reduced buffer and only need to provide additional controls to make up the difference between the removal efficiency of a 50 foot buffer and the removal efficiency of the narrower buffer. For example, if you retain a 30 foot buffer, you can account for the sediment removal provided by the 30 foot buffer retained, and you will only need to design controls to make up for the additional removal provided by the 20 feet of buffer that is not being provided. To do this, you would plug the width of the buffer that is retained into RUSLE or another model, along with other stormwater controls that will together achieve a sediment reduction equivalent to a natural 50-foot buffer.

As described in Step 1 above, you can take credit for the area you retained as a "natural buffer" as being fully vegetated, regardless of the condition of the buffer area.

*For example, if your earth-disturbances occur 30 feet from a receiving water, but the 10 feet of land immediately adjacent to the receiving water is owned by a different party than the land on which your construction activities are taking place and you do not have control over that land, you can treat the 10-foot area as a natural buffer, regardless of the activities that are taking place in the area. Therefore, you can assume (for purposes of your equivalency calculation) that your site is providing the sediment removal equivalent of a 30-foot buffer, and you will only need to design controls to make up for the additional removal provided by the 20-foot of buffer that is not being provided.*

**Step 3 - Document How Site-Specific Controls Will Achieve the Sediment Removal Efficiency of the 50-foot Buffer**

In Steps 1 and 2, you determined both the expected sediment removal efficiency of a 50-foot buffer at your site, and you used this number as a performance standard to design controls to be installed at your site, which alone or in combination with any retained natural buffer, achieves the expected sediment removal efficiency of a 50-foot buffer at your site. The final step is to document in your SWPPP the information you relied on to calculate the equivalent sediment reduction as an undisturbed natural buffer.

EPA will consider your documentation to be sufficient if it generally meets the following:

- For Step 1, refer to the table in Attachment 1 that you used to derive your estimated 50-foot buffer sediment removal efficiency performance. Include information about the buffer vegetation and soil type that predominate at your site, which you used to select the sediment load reduction value in Tables F-8 through F-15. Or, if you conducted a site-specific calculation for sediment removal efficiency, provide the specific removal efficiency, and the information you relied on to make your site-specific calculation.
- For Step 2, (1) Specify the model you used to estimate sediment load reductions from your site; and (2) the results of calculations showing how your controls will meet or exceed the sediment removal efficiency from Step 1.

If you choose compliance alternative 3, you must also include in your SWPPP a description of why it is infeasible for you to provide and maintain an undisturbed natural buffer of any size.

## F.3 SMALL RESIDENTIAL LOT COMPLIANCE ALTERNATIVES

EPA has developed two additional compliance alternatives applicable only to "small residential lots" that are unable to provide and maintain a 50 foot buffer.

A **small residential lot** is a lot or grouping of lots being developed for residential purposes that will disturb less than 1 acre of land, but that is part of a larger residential project that will ultimately disturb greater than or equal to 1 acre.

The following steps describe how a small residential lot operator would achieve compliance with one these 2 alternatives.

### F.3.1 Small Residential Lot Compliance Alternative Eligibility

In order to be eligible for the small residential lot compliance alternatives, the following conditions must be met:

**a.** The lot or grouping of lots meets the definition of "small residential lot"; and

**b.** The operator must follow the guidance for providing and maintaining a natural buffer in Part F.2.3 of this Appendix, including:

**i.** Ensure that all discharges from the area of earth disturbance to the natural buffer are first treated by the site's erosion and sediment controls, and use velocity dissipation devices if necessary to prevent erosion caused by stormwater within the buffer;

**ii.** Document in the SWPPP the natural buffer width retained on the property, and show the buffer boundary on your site plan; and

**iii.** Delineate, and clearly mark off, with flags, tape, or other similar marking device, all natural buffer areas.

### F.3.2 Small Residential Lot Compliance Alternatives

You must next choose from one of two small residential lot compliance alternatives and implement the stormwater control practices associated with that alternative.

*Note: The compliance alternatives provided below are not mandatory. Operators of small residential lots can alternatively choose to comply with the any of the options that are available to other sites in Part 2.2.1.a and F.2.1 of this Appendix.*

**Small Residential Lot Compliance Alternative 1**

Alternative 1 is a straightforward tiered-technology approach that specifies the controls that a small residential lot must implement based on the buffer width retained. To meet the requirements of small residential lot compliance alternative 1, you must implement the controls specified in Table F–1 based on the buffer width to be retained. See footnote 3, below, for a description of the controls you must implement.

*For example, if you are an operator of a small residential lot that will be retaining a 35-foot buffer and you choose Small Residential Lot Compliance Alternative 1, you must implement double perimeter controls between earth disturbances and the receiving water*

In addition to implementing the applicable control, you must also document in your SWPPP how you will comply with small residential lot compliance alternative 1.

**Table F-1 Alternative 1 Requirements[3]**

| Retain 50-foot Buffer | Retain <50 and >30 foot Buffer | Retain ≤ 30 foot Buffer |
|---|---|---|
| No Additional Requirements | Double Perimeter Controls | Double Perimeter Controls and 7-Day Site Stabilization |

**Small Residential Lot Compliance Alternative 2**

Alternative 2 specifies the controls that a builder of a small residential lot must implement based on both the buffer width retained and the site's sediment discharge risk. By incorporating the sediment risk, this approach may result in the implementation of controls that are more appropriate for the site's specific conditions.

**Step 1 – Determine Your Site's Sediment Risk Level**

To meet the requirements of Alternative 2, you must first determine your site's sediment discharge "risk level" based on the site's slope, location, and soil type. To help you to determine your site's sediment risk level, EPA developed five different tables for different slope conditions. You should select the table that most closely corresponds to your site's average slope.

*For example, if your site's average slope is 7 percent, you should use Table G–4 to determine your site's sediment risk.*

After you determine which table applies to your site, you must then use the table to determine the "risk level" (e.g., "low", "moderate", or "high") that corresponds to your site's location and predominant soil type.[4]

*For example, based on Table F-3, a site located in New Hampshire with a 4 percent average slope and with predominately sandy clay loam soils would fall into the "moderate" risk level.*

[3] **Description of Additional Controls Applicable to Small Residential Lot Compliance Alternatives 1 and 2:**

- **No Additional Requirements:** If you implement a buffer of 50 feet or greater, then you are not subject to any additional requirements. Note that you are required to install perimeter controls between the disturbed portions of your site and the buffer in accordance with Part 2.2.3.
- **Double Perimeter Control:** In addition to the reduced buffer width retained on your site, you must provide a double row of perimeter controls between the disturbed portion of your site and the receiving water spaced a minimum of 5 feet apart.
- **Double Perimeter Control and 7-Day Site Stabilization:** In addition to the reduced buffer width retained on your site and the perimeter control implemented in accordance with Part 2.2.3, you must provide a double row of perimeter controls between the disturbed portion of your site and the receiving water spaced a minimum of 5 feet apart, and you are required to complete the stabilization activities specified in Parts 2.2.14 within 7 calendar days of the temporary or permanent cessation of earth-disturbing activities.

[4] One source for determining your site's predominant soil type is the USDA's Web Soil Survey located at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

**Table F-2 Risk Levels for Sites with Average Slopes of ≤ 3 Percent**

| Soil Type / Location | Clay | Silty Clay Loam or Clay-Loam | Sand | Sandy Clay Loam, Loamy Sand or Silty Clay | Loam, Silt, Sandy Loam or Silt Loam |
|---|---|---|---|---|---|
| **CNMI / Guam** | Moderate | Moderate | Moderate | Moderate | High |
| **Puerto Rico** | Moderate | Moderate | Moderate | Moderate | High |
| **Virgin Islands** | Low | Moderate | Low | Moderate | Moderate |
| **American Samoa** | Moderate | Moderate | Moderate | Moderate | High |
| **Massachusetts and New Hampshire** | Low | Moderate | Low | Low | Moderate |
| **Idaho** | Low | Low | Low | Low | Low |
| **New Mexico** | Low | Low | Low | Low | Low |
| **Washington D.C.** | Low | Moderate | Low | Low | Moderate |

**Table F-3 Risk Levels for Sites with Average Slopes of > 3 Percent and ≤ 6 Percent**

| Soil Type / Location | Clay | Silty Clay Loam or Clay-Loam | Sand | Sandy Clay Loam, Loamy Sand or Silty Clay | Loam, Silt, Sandy Loam or Silt Loam |
|---|---|---|---|---|---|
| **CNMI / Guam** | Moderate | Moderate | Moderate | Moderate | High |
| **Puerto Rico** | Moderate | Moderate | Moderate | Moderate | High |
| **Virgin Islands** | Moderate | Moderate | Moderate | Moderate | High |
| **American Samoa** | High | High | Moderate | High | High |
| **Massachusetts and New Hampshire** | Moderate | Moderate | Low | Moderate | High |
| **Idaho** | Low | Low | Low | Low | Low |
| **New Mexico** | Low | Low | Low | Low | Moderate |
| **Washington D.C.** | Moderate | Moderate | Moderate | Moderate | High |

**Table F-4 Risk Levels for Sites with Average Slopes of > 6 Percent and ≤ 9 Percent**

| Soil Type / Location | Clay | Silty Clay Loam or Clay-Loam | Sand | Sandy Clay Loam, Loamy Sand or Silty Clay | Loam, Silt, Sandy Loam or Silt Loam |
|---|---|---|---|---|---|
| **CNMI / Guam** | Moderate | High | Moderate | High | High |
| **Puerto Rico** | Moderate | High | Moderate | Moderate | High |
| **Virgin Islands** | Moderate | Moderate | Moderate | Moderate | High |
| **American Samoa** | High | High | High | High | High |
| **Massachusetts and New Hampshire** | Moderate | Moderate | Moderate | Moderate | High |
| **Idaho** | Low | Low | Low | Low | Low |
| **New Mexico** | Low | Low | Low | Low | Moderate |
| **Washington D.C.** | Moderate | Moderate | Moderate | Moderate | High |

**Table F-5 Risk Levels for Sites with Average Slopes of > 9 Percent and ≤ 15 Percent**

| Soil Type / Location | Clay | Silty Clay Loam or Clay-Loam | Sand | Sandy Clay Loam, Loamy Sand or Silty Clay | Loam, Silt, Sandy Loam or Silt Loam |
|---|---|---|---|---|---|
| **CNMI / Guam** | High | High | High | High | High |
| **Puerto Rico** | High | High | High | High | High |
| **Virgin Islands** | Moderate | High | Moderate | High | High |
| **American Samoa** | High | High | High | High | High |
| **Massachusetts and New Hampshire** | Moderate | Moderate | Moderate | Moderate | High |
| **Idaho** | Low | Low | Low | Low | Low |
| **New Mexico** | Low | Moderate | Low | Moderate | Moderate |
| **Washington D.C.** | Moderate | High | Moderate | Moderate | High |

**Table F-6 Risk Levels for Sites with Average Slopes of > 15 Percent**

| Soil Type / Location | Clay | Silty Clay Loam or Clay-Loam | Sand | Sandy Clay Loam, Loamy Sand or Silty Clay | Loam, Silt, Sandy Loam or Silt Loam |
|---|---|---|---|---|---|
| **CNMI / Guam** | High | High | High | High | High |
| **Puerto Rico** | High | High | High | High | High |
| **Virgin Islands** | High | High | High | High | High |
| **American Samoa** | High | High | High | High | High |
| **Massachusetts and New Hampshire** | High | High | Moderate | High | High |
| **Idaho** | Low | Low | Low | Low | Moderate |
| **New Mexico** | Moderate | Moderate | Moderate | Moderate | High |
| **Washington D.C.** | High | High | Moderate | High | High |

**Step 2 – Determine Which Additional Controls Apply**

Once you determine your site's "risk level", you must next determine the additional controls you need to implement on your site, based on the width of buffer you plan to retain. Table F-7 specifies the requirements that apply based on the "risk level" and buffer width retained. See footnote 3, above, for a description of the additional controls that are required.

*For example, if you are the operator of a small residential lot that falls into the "moderate" risk level, and you decide to retain a 20-foot buffer, using Table F-7 you would determine that you need to implement double perimeter controls to achieve compliance with small residential lot compliance alternative 2.*

You must also document in your SWPPP your compliance with small residential lot compliance alternative 2.

**Table F-7. Alternative 2 Requirements[2]**

| Risk Level Based on Estimated Soil Erosion | Retain ≥ 50' Buffer | Retain <50' and >30' Buffer | Retain ≤30' and >10' Buffer | Retain ≤ 10' Buffer |
|---|---|---|---|---|
| **Low Risk** | No Additional Requirements | No Additional Requirements | Double Perimeter Control | Double Perimeter Control |
| **Moderate Risk** | No Additional Requirements | Double Perimeter Control | Double Perimeter Control | Double Perimeter Control and 7-Day Site Stabilization |
| **High Risk** | No Additional Requirements | Double Perimeter Control | Double Perimeter Control and 7-Day Site Stabilization | Double Perimeter Control and 7-Day Site Stabilization |

**ATTACHMENT 1**

Sediment Removal Efficiency Tables[5]

EPA recognizes that very high removal efficiencies, even where theoretically achievable by a 50-foot buffer, may be very difficult to achieve in practice using alternative controls. Therefore in the tables below, EPA has limited the removal efficiencies to a maximum of 90%. Efficiencies that were calculated at greater than 90% are shown as 90%, and this is the minimum percent removal that must be achieved by alternative controls.

**Table F-8 Estimated 50-foot Buffer Performance in Idaho***

| | Estimated % Sediment Removal | | | | |
|---|---|---|---|---|---|
| **Type of Buffer Vegetation**** | **Clay** | **Silty Clay Loam or Clay-Loam** | **Sand** | **Sandy Clay Loam, Loamy Sand or Silty Clay** | **Loam, Silt, Sandy Loam or Silt Loam** |
| **Tall Fescue Grass** | 42 | 52 | 44 | 48 | 85 |
| **Medium-density Weeds** | 28 | 30 | 28 | 26 | 60 |
| **Low-density Warm-season Native Bunchgrass (i.e., Grama Grass)** | 25 | 26 | 24 | 24 | 55 |
| **Northern Mixed Prairie Grass** | 28 | 30 | 28 | 26 | 50 |
| **Northern Range Cold Desert Shrubs** | 28 | 28 | 24 | 26 | 50 |

* Applicable for sites with less than nine percent slope
** Characterization focuses on the under-story vegetation

**Table F-9 Estimated 50-foot Buffer Performance in Massachusetts and New Hampshire***

| | Estimated % Sediment Removal | | | | |
|---|---|---|---|---|---|
| **Type of Buffer Vegetation**** | **Clay** | **Silty Clay Loam or Clay-Loam** | **Sand** | **Sandy Clay Loam, Loamy Sand or Silty Clay** | **Loam, Silt, Sandy Loam or Silt Loam** |
| **Warm-season Grass (i.e., Switchgrass, Lemongrass)** | 79 | 90 | 90 | 90 | 90 |
| **Cool-season Dense Grass (Kentucky Bluegrass, Smooth Bromegrass, Timothy)** | 78 | 90 | 90 | 90 | 90 |
| **Tall Fescue Grass** | 76 | 90 | 81 | 89 | 90 |
| **Medium-density Weeds** | 66 | 76 | 60 | 72 | 66 |

* Applicable for sites with less than nine percent slope
** Characterization focuses on the under-story vegetation

[5] The buffer performances were calculated based on a denuded slope upgradient of a 50-foot buffer and a perimeter controls, as perimeter controls are a standard requirement (see Part 2.2.3).

**Table F-10 Estimated 50-foot Buffer Performance in New Mexico***

| | Estimated % Sediment Removal | | | | |
|---|---|---|---|---|---|
| **Type of Buffer Vegetation **** | **Clay** | **Silty Clay Loam or Clay-Loam** | **Sand** | **Sandy Clay Loam, Loamy Sand or Silty Clay** | **Loam, Silt, Sandy Loam or Silt Loam** |
| **Tall Fescue grass** | 71 | 85 | 80 | 86 | 90 |
| **Medium-density Weeds** | 56 | 73 | 55 | 66 | 78 |
| **Low-density Warm-season Native Bunchgrass (i.e., Grama Grass)** | 53 | 70 | 51 | 62 | 67 |
| **Southern Mixed Prairie Grass** | 53 | 71 | 52 | 63 | 50 |
| **Southern Range Cold Desert Shrubs** | 56 | 73 | 55 | 65 | 53 |

* Applicable for sites with less than nine percent slope
** Characterization focuses on the under-story vegetation

**Table F-11 Estimated 50-foot Buffer Performance in Washington, DC***

| | Estimated % Sediment Removal | | | | |
|---|---|---|---|---|---|
| **Type of Buffer Vegetation **** | **Clay** | **Silty Clay Loam or Clay-Loam** | **Sand** | **Sandy Clay Loam, Loamy Sand or Silty Clay** | **Loam, Silt, Sandy Loam or Silt Loam** |
| **Warm-season Grass (i.e., Switchgrass, Lemongrass)** | 82 | 90 | 90 | 90 | 90 |
| **Cool-season Dense Grass (Kentucky Bluegrass, Smooth Bromegrass, Timothy)** | 81 | 90 | 90 | 90 | 90 |
| **Tall Fescue Grass** | 79 | 90 | 83 | 89 | 90 |
| **Medium-density Weeds** | 71 | 79 | 66 | 75 | 74 |

* Applicable for sites with less than nine percent slope
** Characterization focuses on the under-story vegetation

**Table F-12 Estimated 50-foot Buffer Performance in American Samoa***

| | Estimated % Sediment Removal | | | | |
|---|---|---|---|---|---|
| **Type of Buffer Vegetation **** | **Clay** | **Silty Clay Loam or Clay-Loam** | **Sand** | **Sandy Clay Loam, Loamy Sand or Silty Clay** | **Loam, Silt, Sandy Loam or Silt Loam** |
| **Bahiagrass (Permanent cover)** | 82 | 90 | 90 | 90 | 83 |
| **Warm-season Grass (i.e., Switchgrass, Lemongrass)** | 82 | 90 | 90 | 90 | 85 |
| **Dense Grass** | 82 | 90 | 90 | 90 | 83 |
| **Tall Fescue Grass** | 82 | 89 | 82 | 89 | 79 |
| **Medium-density Weeds** | 70 | 73 | 62 | 75 | 59 |

* Applicable for sites with less than nine percent slope
** Characterization focuses on the under-story vegetation

**Table F-13 Estimated 50-foot Buffer Performance in CNMI and Guam***

| | Estimated % Sediment Removal | | | | |
|---|---|---|---|---|---|
| **Type of Buffer Vegetation **** | **Clay** | **Silty Clay Loam or Clay-Loam** | **Sand** | **Sandy Clay Loam, Loamy Sand or Silty Clay** | **Loam, Silt, Sandy Loam or Silt Loam** |
| **Bahiagrass (Permanent cover)** | 80 | 90 | 90 | 90 | 89 |
| **Warm-season Grass (i.e., Switchgrass, Lemongrass)** | 80 | 90 | 90 | 90 | 90 |
| **Dense Grass** | 79 | 90 | 90 | 90 | 89 |
| **Tall Fescue Grass** | 76 | 90 | 80 | 88 | 87 |
| **Medium-density Weeds** | 63 | 73 | 53 | 68 | 61 |

* Applicable for sites with less than nine percent slope
** Characterization focuses on the under-story vegetation

**Table F-14 Estimated 50-foot Buffer Performance in Puerto Rico***

| | Estimated % Sediment Removal | | | | |
|---|---|---|---|---|---|
| **Type of Buffer Vegetation**** | **Clay** | **Silty Clay Loam or Clay-Loam** | **Sand** | **Sandy Clay Loam, Loamy Sand or Silty Clay** | **Loam, Silt, Sandy Loam or Silt Loam** |
| **Bahiagrass (Permanent cover)** | 83 | 90 | 90 | 90 | 90 |
| **Warm-season Grass (i.e., Switchgrass, Lemongrass)** | 83 | 90 | 90 | 90 | 90 |
| **Dense Grass** | 83 | 90 | 90 | 90 | 90 |
| **Tall Fescue Grass** | 82 | 90 | 84 | 90 | 89 |
| **Medium-density Weeds** | 72 | 78 | 65 | 76 | 64 |

* Applicable for sites with less than nine percent slope
** Characterization focuses on the under-story vegetation

**Table F-15 Estimated 50-foot Buffer Performance in Virgin Islands***

| **Type of Buffer Vegetation**** | **Clay** | **Silty Clay Loam or Clay-Loam** | **Sand** | **Sandy Clay Loam, Loamy Sand or Silty Clay** | **Loam, Silt, Sandy Loam or Silt Loam** |
|---|---|---|---|---|---|
| **Bahiagrass (Permanent cover)** | 85 | 90 | 90 | 90 | 90 |
| **Warm-season Grass (i.e., Switchgrass, Lemongrass)** | 86 | 90 | 90 | 90 | 90 |
| **Dense Grass** | 85 | 90 | 90 | 90 | 90 |
| **Tall Fescue Grass** | 85 | 90 | 88 | 90 | 89 |
| **Medium-density Weeds** | 75 | 77 | 71 | 78 | 63 |

* Applicable for sites with less than nine percent slope
** Characterization focuses on the under-story vegetation

**ATTACHMENT 2**

Using the Sediment Removal Efficiency Tables – Questions and Answers

- *What if my specific buffer vegetation is not represented in Tables F-8 through F-15?* Tables F-8 through F-15 provide a wide range of factors affecting buffer performance; however, there are likely instances where the specific buffer vegetation type on your site is not listed. If you do not see a description of the type of vegetation present at your site, you should choose the vegetation type that most closely matches the vegetation type on your site. You can contact your local Cooperative Extension Service Office (http://nifa.usda.gov/partners-and-extension-map) for assistance in determining the vegetation type in Tables F-8 through F-15 that most closely matches your site-specific vegetation.
- *What if there is high variability in local soils?* EPA recognizes that there may be a number of different soil type(s) on any given construction site. General soil information can be obtained from USDA soil survey reports (http://websoilsurvey.nrcs.usda.gov) or from individual site assessments performed by a certified soil expert. Tables F-8 through F-15 present eleven generic soil texture classes, grouping individual textures where EPA has determined that performance is similar. If your site contains different soil texture classes, you should use the soil type that best approximates the predominant soil type at your site.
- *What if my site slope is greater than 9 percent after final grade is reached?* As indicated in the buffer performance tables, the estimated sediment removal efficiencies are associated with disturbed slopes of up to 9 percent grade. Where your graded site has an average slope of greater than 9 percent, you should calculate a site-specific buffer performance.
- *How do I calculate my own estimates for sediment reduction at my specific site?* If you determine that it is necessary to calculate your own sediment removal efficiency using site-specific conditions (e.g., slopes at your site are greater than 9 percent), you can use a range of available models that are available to facilitate this calculation, including USDA's RUSLE-series programs and the WEPP erosion model, SEDCAD, SEDIMOT, or other equivalent models.
- *What is my estimated buffer performance if my site location is not represented by Tables F-8 through F-15?* If your site is located in an area not represented by Tables F-8 through F-15, you should use the table that most closely approximates conditions at your site. You may instead choose to conduct a site-specific calculation of the buffer performance.
- *What if only a portion of my site drains to the buffer area?* If only a portion of your site drains to a receiving water, where that water is within 50 feet of your earth disturbances, you are only required to meet the equivalency requirement for the stormwater flows corresponding to those portions of the site. See Example 2 below for an example of how this is expected to work.

**ATTACHMENT 3**

Examples of How to Use the Sediment Removal Efficiency Tables

*Example 1. Comparatively Wet Location (7.5 acre site located in Massachusetts)*

The operator of a 7.5-acre construction site in Massachusetts has determined that it is infeasible to establish a buffer of any size on the site, and is now required to select and install controls that will achieve an equivalent sediment load reduction as that estimated in F-9 for their site conditions. The first step is to identify what percentage of eroded sediment is estimated to be retained from a 50-foot buffer. For this example, it is assumed that the site has a relatively uniform gentle slope (3 percent), so Table F-9 can be used to estimate the 50-foot buffer sediment load reduction. If the site's buffer vegetation is best typified by cool-season dense grass and the underlying soil is of a type best described as loamy sand, the 50-foot buffer is projected to capture 90 percent of eroded sediment from the construction site.

The second step is to determine what sediment controls can be selected and installed in combination with the perimeter controls already required to be implemented at the site (see Part 2.2.3), which will achieve the 90 percent sediment removal efficiency from Table F-9. For this example, using the RUSLE2 profile model, it was determined that installing a pair of shallow-sloped diversion ditches to convey runoff to a well-designed and maintained sediment basin provides 99 percent sediment removal. Because the estimated sediment reduction is greater than the required 90 percent that a 50-foot buffer provides, the operator will have met the buffer requirements. See Figure F-5. The operator could also choose a different set of controls, as long as they achieve at least a 90 percent sediment removal efficiency.

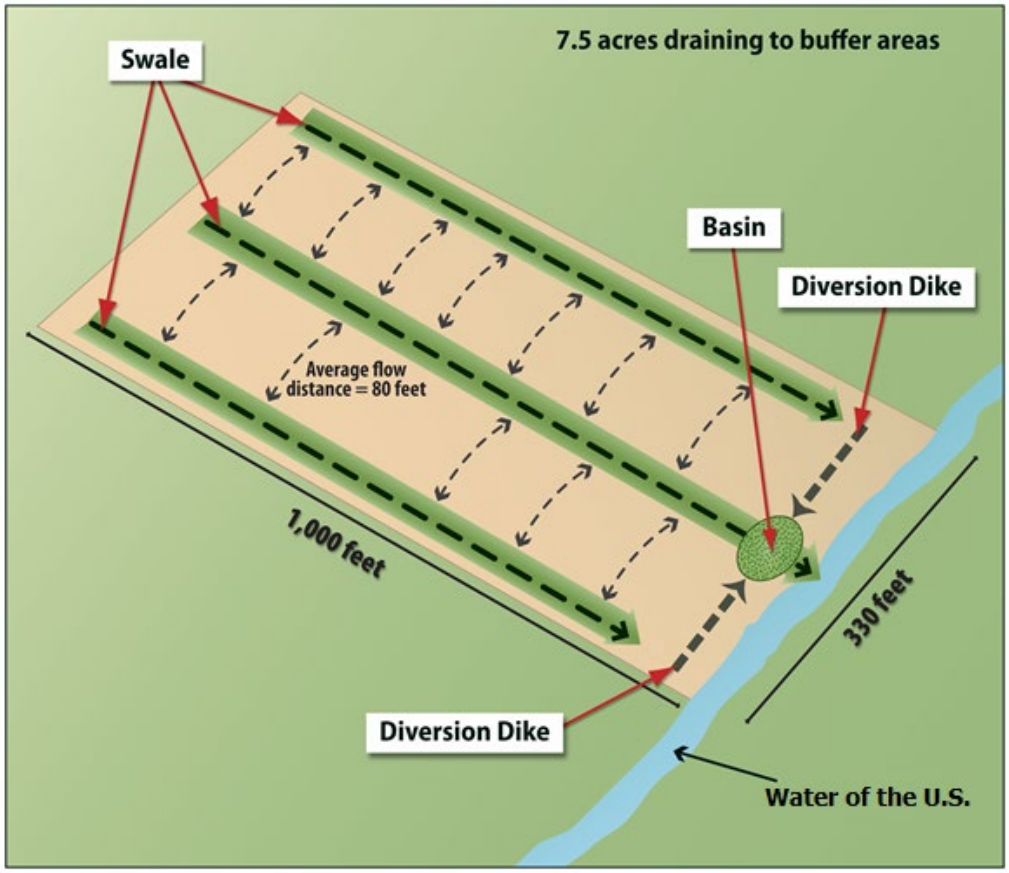



**Figure F-5 Example 1 – Equivalent Sediment Load Reductions at a 7.5 ac Site in MA.**

*Example 2. Arid Location With Pre-existing Disturbances in the Natural Buffer (6.5 acre site located in New Mexico)*

An operator of a site in New Mexico determines that it is not feasible to provide a 50-foot buffer, but a 28-foot buffer can be provided. Because the operator will provide a buffer that is less than 50 feet, the operator must determine which controls, in combination with the 28-foot buffer, achieve a sediment load reduction equivalent to the 50-foot buffer. In this example, the project will disturb 6.5 acres of land, but only 1.5 acres of the total disturbed area drains to the buffer area. Within the 28-foot buffer area is a preexisting concrete walkway. Similar to Example 1, the equivalence analysis starts with Step 1 in Part F.2.4 of this Appendix with a review of the New Mexico buffer performance (Table F-10). The operator determines that the predominate vegetation type in the buffer area is prairie grass, the soil type is similar to silt, and the site is of a uniform, shallow slope (e.g., 3 percent grade). Although the operator will take credit for the disturbance caused by the concrete walkway as a natural buffer in Step 2, here the operator can treat the entire buffer area as being naturally vegetated with prairie grass. Based on this information, the operator refers to Table F-10 to estimate that the 50-foot buffer would retain 50 percent of eroded soil.

The second step is to determine, based on the 50 percent sediment removal efficiency found in Table F-10, what sediment controls, in combination with the 28-foot buffer area, can be implemented to reduce sediment loads by 50 percent or more. The operator does not have to account the reduction in buffer function caused by the preexisting walkway, and can take credit for the entire 28-foot buffer being fully vegetated in the analysis. For this example, using the RUSLE2 profile model, the operator determined that installing a fiber roll barrier between the

silt fence (already required by Part 2.2.3) and the 28-foot buffer will achieve an estimated 84 percent sediment removal efficiency. See Figure F-6. Note that this operator is subject to the requirement in Part F.2.3 of this Appendix to ensure that discharges through the silt fence, fiber roll barrier, and 28-foot buffer do not cause erosion within the buffer. The estimated sediment reduction is greater than the required 50 percent; therefore the operator will have met the buffer alternative requirement.

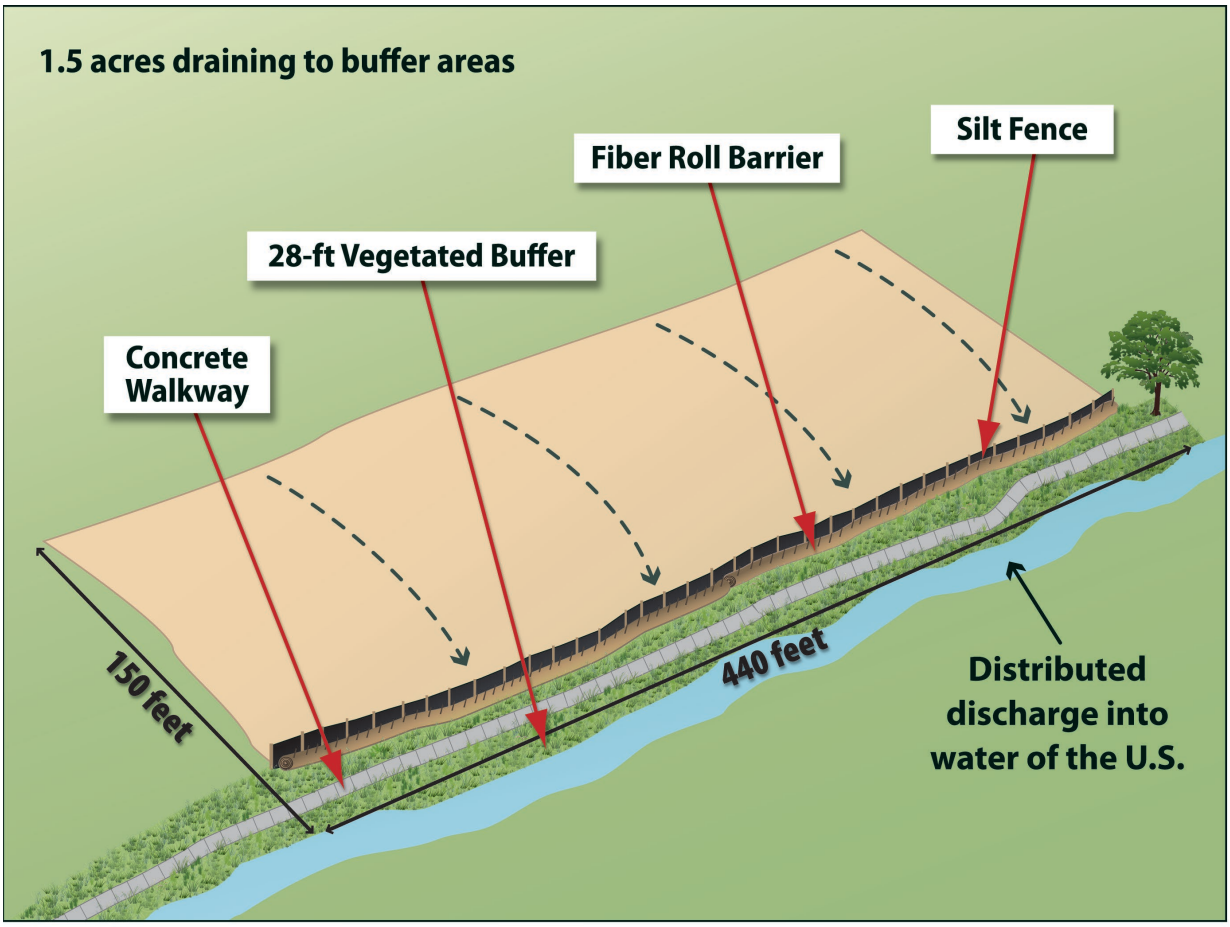



**Figure F-6 Example 2 – Equivalent Sediment Load Reductions at a 6.5 ac Site in NM.**

# Appendix G - Standard Permit Conditions

Standard permit conditions in Appendix G are consistent with the general permit provisions required under 40 CFR 122.41.

## G.1 Duty To Comply.

You must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

**G.1.1** You must comply with effluent standards or prohibitions established under section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish these standards, even if the permit has not yet been modified to incorporate the requirement.

**G.1.2** Penalties for Violations of Permit Conditions: EPA and other federal agencies are required to adjust their maximum and minimum statutory civil penalty amounts through rulemaking by January 15 each year to account for inflation. EPA's annual rulemaking adjustments, codified in 40 C.F.R. § 19.4, are mandated by the Federal Civil Penalties Inflation Adjustment Act of 1990, as amended through the Federal Civil Penalties Inflation Adjustment Act Improvements Act of 2015 (28 U.S.C. § 2461 note). As such, the civil penalty amounts below may change in the future due to inflation. See 40 C.F.R. § 19.4 for the most up-to-date civil penalty amounts.

G.1.2.1 *Criminal Penalties.*

a. *Negligent Violations*. The CWA provides that any person who negligently violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to criminal penalties of not less than $2,500 nor more than $25,000 per day of violation, or imprisonment of not more than one year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation or by imprisonment of not more than two years, or both.

b. *Knowing Violations.* The CWA provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $5,000 nor morethan $50,000 per day of violation, or by imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both.

c. *Knowing Endangerment.* The CWA provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act and who knows at that time that he or she is placing another person in imminent danger of death or serious bodily injury shall upon conviction be subject to a fine of not more than $250,000 or by imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, aperson shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the Act, shall, upon conviction of violating the imminent danger provision be subject to a fine of not more than $1,000,000 and can fined up to $2,000,000 for second or subsequent convictions.

d. *False Statement.* The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both. The Act further provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

G.1.2.2 *Civil Penalties.* The CWA provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a civil penalty not to exceed the maximum amount authorized by Section 309(d) of the Act, as adjusted pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990 (28 U.S.C. § 2461 note), and codified at 40 CFR § 19.4.

G.1.2.3 *Administrative Penalties.* The CWA provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to an administrative penalty, as follows:

a. *Class I Penalty*. Not to exceed the maximum amounts authorized by Section 309(g)(2)(A) of the Act and the Federal Civil Penalties Inflation Adjustment Act of 1990 as amended by the Federal Civil Penalties Inflation Adjustment Act Improvements Act of 2015 (28 U.S.C. § 2461 note), and codified at 40 CFR § 19.4.

b. *Class II Penalty*. Not to exceed the maximum amounts authorized by Section 309(g)(2)(B) of the Act and the Federal Civil Penalties Inflation Adjustment Act of 1990, as amended by the Federal Civil Penalties Inflation Adjustment Act Improvements Act of 2015 (28 U.S.C. § 2461 note), and codified at 40 CFR § 19.4.

### G.2 Duty to Reapply.

If you wish to continue an activity regulated by this permit after the expiration date of this permit, you must apply for and obtain authorization as required by the new permit once EPA issues it.

### G.3 Need to Halt or Reduce Activity Not a Defense.

It shall not be a defense for you in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

### G.4 Duty to Mitigate.

You must take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

### G.5 Proper Operation and Maintenance.

You must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by you to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the

operation of backup or auxiliary facilities or similar systems which are installed by you only when the operation is necessary to achieve compliance with the conditions of this permit.

### G.6 Permit Actions.

This permit may be modified, revoked and reissued, or terminated for cause. Your filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

### G.7 Property Rights.

This permit does not convey any property rights of any sort, or any exclusive privileges.

### G.8 Duty to Provide Information.

You must furnish to EPA or an authorized representative (including an authorized contractor acting as a representative of EPA), within a reasonable time, any information that EPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. You must also furnish to EPA or an authorized representative upon request, copies of records required to be kept by this permit.

### G.9 Inspection and Entry.

You must allow EPA or an authorized representative (including an authorized contractor acting as a representative of EPA), upon presentation of credentials and other documents as may be required by law, to:

**G.9.1** Enter upon your premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

**G.9.2** Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

**G.9.3** Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

**G.9.4** Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

### G.10 Monitoring and Records.

**G.10.1** Samples and measurements taken for the purpose of monitoring must be representative of the volume and nature of the monitored activity.

**G.10.2** You must retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date the permit expires or the date the permittee's authorization is terminated. This period may be extended by request of EPA at any time.

**G.10.3** Records of monitoring information must include:

G.10.3.1 The date, exact place, and time of sampling or measurements;

G.10.3.2 The individual(s) who performed the sampling or measurements;

G.10.3.3 The date(s) analyses were performed

G.10.3.4 The individual(s) who performed the analyses;

G.10.3.5 The analytical techniques or methods used; and

G.10.3.6 The results of such analyses.

**G.10.4** Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in the permit.

**G.10.5** The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

**G.11 Signatory Requirements.**

**G.11.1** All applications, including NOIs and NOTs, must be signed as follows:

G.11.1.1 For a corporation: By a responsible corporate officer. For the purpose of this subsection, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

G.11.1.2 For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or

G.11.1.3 For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official. For purposes of this subsection, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

**G.11.2** Your SWPPP (including changes to your SWPPP inspection reports), corrective action log, turbidity monitoring report, site inspection and dewatering inspection reports, and any other compliance documentation required under this permit, must be signed by a person described in Appendix G, Subsection G.11.1 above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

G.11.2.1 The authorization is made in writing by a person described in Appendix G, Subsection G.11.1;

G.11.2.2 The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental

matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

G.11.2.3 The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

**G.11.3** Changes to Authorization. If an authorization under this permit is no longer accurate because a different operator has responsibility for the overall operation of the construction site, a new NOI must be submitted to EPA. See Table 1 in Part 1.4.3 of the permit. However, if the only change that is occurring is a change in contact information or a change in the facility's address, the operator need only make a modification to the existing NOI submitted for authorization.

**G.11.4** Any person signing documents in accordance with Appendix G, Subsections G.11.1 or G.11.2 above must include the following 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 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."

**G.11.5** For persons signing NOIs electronically, in addition to meeting other applicable requirements in Appendix G, Subsection G.11, such signatures must meet the same signature, authentication, and identity-proofing standards set forth at 40 CFR § 3.2000(b) for electronic reports (including robust second-factor authentication).

**G.11.6** The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

**G.12 Reporting Requirements.**

**G.12.1** Planned changes. You must give notice to EPA as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

G.12.1.1 The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or

G.12.1.2 The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a)(1).

**G.12.2** Anticipated noncompliance. You must give advance notice to EPA of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

**G.12.3** Transfers. This permit is not transferable to any person except after notice to EPA. Where a facility wants to change the name of the permittee, the original permittee (the first owner or operators) must submit a Notice of Termination pursuant to Part 8. The new

owner or operator must submit a Notice of Intent in accordance with Part 1.4 and Table 1. See also requirements in Appendix G, Subsections G.11.1 and G.11.2.

**G.12.4** Monitoring reports. Monitoring results must be reported at the intervals specified elsewhere in this permit.

G.12.4.1 Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by EPA for reporting results of monitoring of sludge use or disposal practices.

G.12.4.2 If you monitor any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR 136 unless otherwise specified in 40 CFR Part 503, or as specified in the permit, the results of this monitoring must be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by EPA.

**G.12.5** Compliance schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date.

**G.12.6** Twenty-four hour reporting. In addition to reports required elsewhere in this permit:

G.12.6.1 You must report any noncompliance which may endanger health or the environment directly to the EPA Regional Office (see contacts at https://www2.epa.gov/national-pollutant-discharge-elimination-system-npdes/contact-us-stormwater#regional). Any information must be provided orally within 24 hours from the time you become aware of the circumstances. A written submission must also be provided within five days of the time you become aware of the circumstances. The written submission must contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

G.12.6.2 The following shall be included as information which must be reported within 24 hours under this paragraph.

a. Any unanticipated bypass which exceeds any effluent limitation in the permit. (See 40 CFR 122.41(m)(3)(ii))

b. Any upset which exceeds any effluent limitation in the permit

c. Violation of a maximum daily discharge limit for any numeric effluent limitation. (See 40 CFR 122.44(g).)

G.12.6.3 EPA may waive the written report on a case-by-case basis for reports under Appendix G, Subsection G.12.6.2 if the oral report has been received within 24 hours.

**G.12.7** Other noncompliance. You must report all instances of noncompliance not reported under Appendix G, Subsections G.12.4, G.12.5, and G.12.6, at the time monitoring reports are submitted. The reports must contain the information listed in Appendix G, Subsection G.12.6.

**G.12.8** Other information. Where you become aware that you failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Permitting Authority, you must promptly submit such facts or information.

**G.13 Bypass.**

**G.13.1** Definitions.

G.13.1.1 Bypass means the intentional diversion of waste streams from any portion of a treatment facility See 40 CFR 122.41(m)(1)(i).

G.13.1.2 Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production. See 40 CFR 122.41(m)(1)(ii).

**G.13.2** Bypass not exceeding limitations. You may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Appendix G, Subsections G.13.3 and G.13.4. See 40 CFR 122.41(m)(2).

**G.13.3** Notice.

G.13.3.1 Anticipated bypass. If you know in advance of the need for a bypass, you must submit prior notice, if possible at least ten days before the date of the bypass. See 40 CFR 122.41(m)(3)(i).

G.13.3.2 Unanticipated bypass. You must submit notice of an unanticipated bypass as required in Appendix G, Subsection G.12.6 (24-hour notice). See 40 CFR 122.41(m)(3)(ii).

**G.13.4** Prohibition of bypass. See 40 CFR 122.41(m)(4).

G.13.4.1 Bypass is prohibited, and EPA may take enforcement action against you for bypass, unless:

a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

c. You submitted notices as required under Appendix G, Subsection G.13.3.

G.13.4.2 EPA may approve an anticipated bypass, after considering its adverse effects, if EPA determines that it will meet the three conditions listed above in Appendix G, Subsection G.13.4.1.

**G.14 Upset.**

**G.14.1** Definition. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond your reasonable control. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. See 40 CFR 122.41(n)(1).

**G.14.2** Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Appendix G, Subsection G.14.3 are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. See 40 CFR 122.41(n)(2).

**G.14.3** Conditions necessary for a demonstration of upset. See 40 CFR 122.41(n)(3). A permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

G.14.3.1 An upset occurred and that you can identify the cause(s) of the upset;

G.14.3.2 The permitted facility was at the time being properly operated; and

G.14.3.3 You submitted notice of the upset as required in Appendix G, Subsection G.12.6.2.b (24 hour notice).

G.14.3.4 You complied with any remedial measures required under Appendix G, Subsection G.4.

**G.14.4** Burden of proof. In any enforcement proceeding, you, as the one seeking to establish the occurrence of an upset, have the burden of proof. See 40 CFR 122.41(n)(4).

### G.15 Retention of Records.

Copies of the SWPPP and all documentation required by this permit, including records of all data used to complete the NOI to be covered by this permit, must be retained for at least three years from the date that permit coverage expires or is terminated. This period may be extended by request of EPA at any time.

### G.16 Reopener Clause.

**G.16.1** Procedures for modification or revocation. Permit modification or revocation will be conducted according to 40 CFR §122.62, §122.63, §122.64 and §124.5.

**G.16.2** Water quality protection. If there is evidence indicating that the stormwater discharges authorized by this permit cause, have the reasonable potential to cause or contribute to an excursion above any applicable water quality standard, you may be required to obtain an individual permit, or the permit may be modified to include different limitations and/or requirements.

**G.16.3** Timing of permit modification. EPA may elect to modify the permit prior to its expiration (rather than waiting for the new permit cycle) to comply with any new statutory or regulatory requirements, such as for effluent limitation guidelines that may be promulgated in the course of the current permit cycle.

### G.17 Severability.

Invalidation of a portion of this permit does not necessarily render the whole permit invalid. EPA's intent is that the permit is to remain in effect to the extent possible; in the event that any part of this permit is invalidated, EPA will advise the regulated community as to the effect of such invalidation.

## Appendix H - Notice of Intent (NOI) Form and Instructions

Part 1.4.1 requires you to use the NPDES eReporting Tool, or "NeT" system, to prepare and submit your NOI electronically. However, if the EPA Regional Office grants you a waiver to use a paper NOI form, and you elect to use it, you must complete and submit the following form.

| NPDES Form 3510-9 | EPA | U.S. Environmental Protection Agency<br>Washington, DC 20460<br>Notice of Intent for the 2022 NPDES Construction General Permit | OMB No. 2040-0305<br>Exp. Date 01/31/2025 |
|---|---|---|---|

Submission of this Notice of Intent (NOI) constitutes notice that the operator identified in Section III of this form requests authorization to discharge pursuant to the NPDES Construction General Permit (CGP) permit number identified in Section II of this form. Submission of this NOI also constitutes notice that the operator identified in Section III of this form meets the eligibility requirements of Part 1.1 CGP for the project identified in Section IV of this form. Permit coverage is required prior to commencement of construction activity until you are eligible to terminate coverage as detailed in Part 8 of the CGP. To obtain authorization, you must submit a complete and accurate NOI form. Discharges are not authorized if your NOI is incomplete or inaccurate or if you were never eligible for permit coverage. Refer to the instructions at the end of this form.

## SECTION I. APPROVAL TO USE PAPER NOI FORM

**Paper NOI Form**

Have you been granted a waiver from electronic reporting from the Regional Office*? ☐ Yes ☐ No

If yes, check which waiver you have been granted, the name of the EPA Regional Office staff person who granted the waiver, and the date of approval:

Waiver granted:

☐ The owner/operator's 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.

☐ The owner/operator has issues regarding available computer access or computer capability.

| Name of EPA staff person that granted the waiver | Date approval obtained (MM/DD/YYYY) |
|---|---|
| | |

*** Note: You are required to obtain approval from the applicable Regional Office prior to using this paper NOI form. If you have not obtained a waiver, you must file this form electronically using the NPDES eReporting Tool (NeT).**

## SECTION II. PERMIT INFORMATION

**Permit**

| **NPDES ID** (EPA Use Only) | Master Permit Number (see Appendix B of the CGP for the list of eligible permit numbers) |
|---|---|
| | |

## SECTION III. OPERATOR INFORMATION

**Operator Information**

Operator Name

Are you requesting coverage under this NOI as a "Federal Operator" or for a "Federal Facility" as defined in Appendix A? ☐ Yes ☐ No

Mailing Address

Street

| City | State | ZIP Code |
|---|---|---|
| | | |

County or Similar Government Division

Operator Point of Contact Information:

| First Name | Middle Initial | Last Name |
|---|---|---|
| | | |

Title

| Phone Number | Email Address |
|---|---|
| | |

**NOI Preparer**

Complete if NOI was prepared by someone other than the certifier:

| First Name | Middle Initial | Last Name |
|---|---|---|
| | | |

Organization

| Phone number | Email address |
|---|---|
| | |

## SECTION IV. PROJECT/SITE INFORMATION

**Project/Site Address**

Project/Site Name

Street/Location

| City | State | ZIP Code |
|---|---|---|
| | | |

County or Similar Government Division:

For the project/site you are seeking permit coverage, provide the following information:

| Latitude (in decimal degrees to four decimal places): | Longitude (in decimal degrees to four decimal places): |
|---|---|
| ° N | ° W |

Latitude/Longitude Data Source: ☐ Map ☐ GPS ☐ Other (Specify):

Horizontal Reference Datum: ☐ NAD 27 ☐ NAD 83 ☐ WGS 84

**Site Information**

Is your site located in 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 name of Indian reservation, if applicable), or if not in Indian country, provide the name of the Indian Tribe associated with the property:

**Project Information**

| Estimated Project Start Date (MM/DD/YYYY) | Estimated Project Completion Date (MM/DD/YYYY) |
|---|---|
| | |

Estimated Area to be Disturbed (to the nearest quarter acre):

Type of Construction Site (check all that apply):

☐ Single-Family Residential ☐ Multi-Family Residential ☐ Commercial

☐ Industrial ☐ Institutional ☐ Highway or Road

☐ Utility ☐ Other (Specify):

Was the pre-development land use used for agriculture (see Appendix A for definition of "agricultural land")? ☐ Yes ☐ No

Have earth-disturbing activities commenced on your project/site? ☐ Yes ☒ No

If yes, is your project an "emergency-related project" (see Appendix A)? ☒ Yes ☐ No

**Project Information**

| | | |
|---|---|---|
| Have stormwater discharges from your project/site been covered previously under an NPDES permit? | ☐ Yes | ☐ No |
| If yes, provide the NPDES ID (if you had coverage under EPA's 2017 CGP) or the NPDES permit number (if you had coverage under an EPA individual permit): _____ | | |
| Are there other operators that are covered under this permit for the same project site? | ☐ Yes | ☐ No |
| If yes, provide the NPDES ID number for all other operators at the site who have coverage under this permit: _____ | | |
| Will there be demolition of any structure built or renovated before January 1, 1980? | ☐ Yes | ☐ No |
| If yes, do any of the structures being demolished have at least 10,000 square feet of floor space? | ☐ Yes | ☐ No |
| 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 |

## SECTION V. DISCHARGE INFORMATION

**Project Information**

| | | |
|---|---|---|
| By indicating "Yes," I confirm that I understand that the CGP only authorizes the allowable stormwater discharges in Part 1.2.1 and the allowable non-stormwater discharges listed in Part 1.2.2. 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 Stormwater Pollution Prevention Plan (SWPPP), during an inspection, etc. If any discharges requiring NPDES permit coverage other than the allowable stormwater and non-stormwater discharges listed in Parts 1.2.1 and 1.2.2 will be discharged, they must be covered under another NPDES permit. | ☐ Yes | |
| 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 |

**Receiving Waters Information**

**For each point of discharge, provide the following receiving water information. (Attach a separate list if necessary)**

| Point of Discharge ID | Provide the name of the first water of the U.S. that receives stormwater directly from the point of discharge and/or from the MS4 that the point of discharge discharges to: | If the receiving water is impaired (on the CWA 303(d) list), list the pollutants that are causing the impairment: | If a TMDL been completed for this receiving waterbody, providing the following information: |
|---|---|---|---|
| | | | **TMDL Name and ID:** |
| | | | **Pollutant(s) for which there is a TMDL:** |
| | | | **TMDL Name and ID:** |
| | | | **Pollutant(s) for which there is a TMDL:** |

**Receiving Waters Information**

| For each point of discharge, provide the following receiving water information. (Attach a separate list if necessary) | | | |
|---|---|---|---|
| **Point of Discharge ID** | **Provide the name of the first water of the U.S. that receives stormwater directly from the point of discharge and/or from the MS4 that the point of discharge discharges to:** | **If the receiving water is impaired (on the CWA 303(d) list), list the pollutants that are causing the impairment:** | **If a TMDL been completed for this receiving waterbody, providing the following information:** |
| | | | **TMDL Name and ID:**<br>**Pollutant(s) for which there is a TMDL:** |
| | | | **TMDL Name and ID:**<br>**Pollutant(s) for which there is a TMDL:** |
| | | | **TMDL Name and ID:**<br>**Pollutant(s) for which there is a TMDL:** |
| | | | **TMDL Name and ID:**<br>**Pollutant(s) for which there is a TMDL:** |
| | | | **TMDL Name and ID:**<br>**Pollutant(s) for which there is a TMDL:** |

Are any of the waters of the U.S. to which you discharge designated by the State or Tribal authority under its antidegradation policy as a Tier 2 (or Tier 2.5) water (water quality exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water) or as a Tier 3 water (Outstanding National Resource Water)? (See Appendix F). ☐ Yes ☐ No

If yes, name(s) of receiving water(s) and its designation (Tier 2, Tier 2.5 or Tier 3):

## SECTION VI. CHEMICAL TREATMENT INFORMATION

**Chemical Treatment**

Will you use polymers, flocculants, or other treatment chemicals at your construction site? ☐ Yes ☐ No

If yes, will you use cationic treatment chemicals at your construction site*? ☐ Yes ☐ No

If yes, have you been authorized to use cationic treatment chemicals by your applicable EPA Regional Office in advance of filing your NOI*? ☐ Yes ☐ No

If you have been authorized to use cationic treatment chemicals by your applicable EPA Regional Office, attach a copy of your authorization letter and include documentation of the appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards.

Please indicate the treatment chemicals that you will use:

* Note: You are ineligible for coverage under this permit unless you notify your applicable EPA Regional Office in advance and the EPA 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 not lead to a violation of water quality standards.

## SECTION VII. STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND PERSONNEL TRAINING INFORMATION

**SWPPP**

Has the SWPPP been prepared in advance of filing this NOI, as required? ☐ Yes ☐ No

By indicating "Yes," I confirm that all required personnel, including those conducting inspections at your site, will meet the training requirements in Part 6 of this permit. ☐ Yes

**SWPPP Contact Information**

| First Name | Middle Initial | Last Name |
|---|---|---|
| | | |

Professional Title

| Phone number | Email address |
|---|---|
| | |

## SECTION VIII. ENDANGERED SPECIES PROTECTION

**Endangered Species Protection**

In accordance with Part 1.1.5, if the EPA Regional Office grants you a waiver from electronic reporting, you must complete the worksheet in Appendix D to select your eligibility criteria with respect to the protection of Federally listed threatened or endangered species and Federally designated "critical habitat" under the Endangered Species Act (ESA) [hereinafter "ESA-listed species and designated critical habitat(s)"] from discharges and discharge-related activities authorized under this permit.

**You must submit the ESA worksheet and all required supporting documentation with this NOI. If you do not submit the worksheet and the required supporting documentation with your NOI, your NOI will be considered incomplete.** After you submit your NOI and before your NOI is authorized, EPA may notify you if any additional controls are necessary to ensure your discharges are not likely to result in any short- or long-term adverse effects on ESA-listed species and critical habitat.

By indicating "Yes," I confirm that you have included the completed ESA worksheet from Appendix D and all required supporting information for your criterion selection with the submission of this NOI. ☐ Yes

## SECTION IX. HISTORIC PRESERVATION

**Historic Preservation**

Are you installing any stormwater controls as described in Appendix E that require subsurface earth disturbance? (Appendix E, Step 1) ☐ Yes ☐ No

If yes, have prior surveys or evaluations conducted on the site have already determined historic properties do not exist, or that prior disturbances have precluded the existence of historic properties? (Appendix E, Step 2) ☐ Yes ☐ No

If no, have you determined that your installation of subsurface earth-disturbing stormwater controls will have no effect on historic properties? (Appendix E, Step 3) ☐ Yes ☐ No

If no, did the SHPO, THPO, or other Tribal representative (whichever applies) respond to you within the 15 calendar days to indicate whether the subsurface earth disturbances caused by the installation of stormwater controls affect historic properties? (Appendix E, Step 4) ☐ Yes ☐ No

If yes, describe the nature of their response:

- ☐ Written indication that no historic properties will be affected by the installation of stormwater controls.
- ☐ Written indication that adverse effects to historic properties from the installation of stormwater controls can be mitigated by agreed upon actions.
- ☐ No agreement has been reached regarding measures to mitigate effects to historic properties from the installation of stormwater controls.
- ☐ Other (Specify):

## SECTION X. CERTIFICATION INFORMATION

**Certification Information**

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.

| First Name | Middle Initial | Last Name |
|---|---|---|
| | | |

| Title |
|---|
| |

| Signature | Date (MM/DD/YYYY) |
|---|---|
| | |

| Email Address |
|---|
| |

## General Instructions

### Who Must File an NOI Form?

Under the provisions of the Clean Water Act, as amended (33 U.S.C. 1251 et. seq.; the Act), Federal law prohibits stormwater discharges from certain construction activities to waters of the U.S. unless that discharge is covered under a National Pollutant Discharge Elimination System (NPDES) permit. Operators of construction sites where one or more acres are disturbed, smaller sites that are part of a larger common plan of development or sale where there is a cumulative disturbance of at least one acre, or any other site specifically designated by the Director, must obtain coverage under an NPDES general permit. For coverage under the 2022 CGP, each person, firm, public organization, or any other entity that meets either of the following criteria must file a Notice of Intent form: (1) they have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or (2) they have day-to-day operational control of those activities at the project necessary to ensure compliance with the permit conditions. If you have questions about whether you need a NPDES stormwater permit, or if you need information to determine whether EPA or your State agency is the permitting authority, contact your EPA Regional Office.

### Completing the Form

Obtain and read a copy of the 2022 CGP, viewable at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#cgp. To complete this form, type or print uppercase letters, in the appropriate areas only. Please place each character between the marks (abbreviate if necessary to stay within the number of characters allowed for each item). Use one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions on this form, telephone EPA's NOI Processing Center at (866) 352-7755. **Please submit the original document with signature in ink - do not send a photocopied signature.**

### Section I. Approval to Use Paper NOI Form

You must indicate whether you have been granted a waiver from electronic reporting from the EPA Regional Office. Note that you are not authorized to use this paper NOI form unless the EPA Regional Office has approved its use. Where you have obtained approval to use this form, indicate the waiver that you have been granted, the name of the EPA staff person who granted the waiver, and the date that approval was provided.

See https://www.epa.gov/npdes/contact-us-stormwater#regional for a list of EPA Regional Office contacts.

### Section II. Permit Information

Provide the master permit number of the permit under which you are applying for coverage (see Appendix B of the general permit for the list of eligible master permit numbers)

### Section III. Operator Information

Provide the legal name of the person, firm, public organization, or any other entity that operates the project described in this NOI. Refer to Appendix A of the permit for the definition of "operator".

Indicate whether you are seeking coverage under this permit as a "Federal Operator" or "Federal Facility" as defined in Appendix A.

Also provide a point of contact, the operator's mailing address, county, telephone number, and e-mail address (to be notified via e-mail of NOI approval when available). Correspondence for the NOI will be sent to this address.

If the NOI was prepared by someone other than the certifier (for example, if the NOI was prepared by the facility SWPPP contact or a consultant for the certifier's signature), include the full name, organization, phone number, and email address of the NOI preparer.

### Section IV. Project/Site Information

Enter the official or legal name and complete street address, including city, State, ZIP code, and county or similar government subdivision of the project or site. If the project or site lacks a street address, indicate the general location of the site (e.g., Intersection of State Highways 61 and 34). Complete site information must be provided for permit coverage to be granted.

Provide the latitude and longitude of your facility in decimal degrees format. The latitude and longitude of your facility can be determined in several different ways, including through the use of global positioning system (GPS) receivers, U.S. Geological Survey (U.S.G.S.) topographic or quadrangle maps, and web-based siting tools, among others. For consistency, EPA requests that measurements be taken from the approximate center of the construction site. For linear construction sites, the measurement should be taken midpoint of the site. If known, enter the horizontal reference datum for your latitude and longitude. The horizontal reference datum is shown on the bottom left corner of USGS topographic maps; it is also available for GPS receivers.

Indicate whether the project is in Indian country lands or located on a property of religious or cultural significance to an Indian Tribe, and if so, provide the name of the Indian Tribe associated with the area of Indian country (including name of Indian reservation, if applicable), or if not in Indian country, provide the name of the Indian Tribe associated with the property.

Enter the estimated construction start and completion dates using four digits for the year (i.e., 10/06/2012). Indicate to the nearest quarter acre the estimated area to be disturbed. Indicate the type of construction site.

Indicate whether the pre-development land use of the site was used for agriculture Appendix A defines "agricultural land" as cropland, grassland, rangeland, pasture, and other agricultural land, on which agricultural and forest-related products or livestock are produced and resource concerns may be addressed. Agricultural lands include cropped woodland, marshes, incidental areas included in the agricultural operation, and other types of agricultural land used for the production of livestock.

Indicate whether earth-disturbing activities have already commenced on your project/site. If earth-disturbing activities have commenced on your site because stormwater discharges from the site have been previously covered under a NPDES permit, you must provide the 2017 CGP NPDES ID or

the NPDES permit number if coverage was under an individual permit.

Indicate if demolition is occurring, and if so, if the structure has at least 10,000 square feet of floor space.

Indicate if there are other operators covered under this permit for the same project site. If there are multiple operators, provide the NPDES ID number for the other operators at the site who have coverage under this permit.

Indicate whether you will be discharging dewatering water, as defined in Appendix A, during the course of the project. If you will be discharging dewatering water, indicate whether the site from which you will be dewatering is located on a current or former Federal or State remediation site. Federal remediation sites include cleanups covered by Superfund (both National Priorities List (NPL) sites and non-NPL sites), Resource Conservation and Recovery Act (RCRA) corrective actions sites, cleanups at Federal Facilities, and Federal, State, or Tribal brownfields sites. State remediation sites could include, for instance, brownfield site cleanups funded by the State, State superfund sites, and petroleum tank release sites. Operators may use online mapping resources, such as EPA's Cleanups in My Community Map, to help determine if they are located on a remediation site. The Cleanups in My Community Map is viewable at:

https://ordspub.epa.gov/ords/cimc/f?p=cimc:map::::71

**Section V. Discharge Information**

You must confirm that you understand that the CGP only authorizes the allowable stormwater discharges listed in Part 1.2.1 and the allowable non-stormwater discharges listed in Part 1.2.2. Any discharges not expressly authorized under the CGP are not covered by the CGP or the permit shield provision of the CWA Section 402(k) and they cannot become authorized or shielded by disclosure to EPA, State, or local authorities via the NOI to be covered by the permit or by any other means (e.g., in the SWPPP or during an inspection). If any discharges requiring NPDES permit coverage other than the allowable stormwater and non-stormwater discharges listed in Parts 1.2.1 and 1.2.2 will be discharged, they must either be eliminated or covered under another NPDES permit.

Indicate whether discharges from the site will enter into a municipal separate storm sewer system (MS4), as defined in Appendix A.

Also, indicate whether any waters of the U.S. exist within 50 feet from your site. Note that if "yes", you are required to comply with the requirement in Part 2.2.1 of the permit to provide natural buffers or equivalent erosion and sediment controls.

For each unique point of discharge you list, you must specify the name of the first water of the U.S. that receives stormwater directly from the point of discharge and/or from the MS4 that the point of discharge discharges to. You must specify whether any waters of the U.S. that you discharge to are listed as "impaired" as defined in Appendix A, and the pollutants for which the water is impaired. You must identify any Total Maximum Daily Loads (TMDL) that have been completed for any of the waters of the U.S. that you discharge to. Operators may find it useful to use EPA's Discharge Mapping Tool to determine whether the water of the U.S. is impaired, the pollutant causing the impairment, and whether a TMDL exists for the water body. The Discharge Mapping Tool is viewable at https://www.epa.gov/npdes/epas-stormwater-discharge-mapping-tools.

Indicate whether discharges from the site will enter into a water of the U.S. that is designated as a Tier 2, Tier 2.5, or Tier 3 water. A list of Tier 2, 2.5, and 3 waters is provided at https://www.epa.gov/npdes/construction-general-permit-resources-tools-and-templates. If the answer is "yes", name all waters designated as Tier 2, Tier 2.5, or Tier 3 to which the site will discharge.

**Section VI. Chemical Treatment Information**

Indicate whether the site will use polymers, flocculants, or other treatment chemicals. Indicate whether the site will employ cationic treatment chemicals. If the answer is "yes" to either question, indicate which chemical(s) you will use. Note that you are not eligible for coverage under this permit to use cationic treatment chemicals unless you notify your applicable EPA Regional Office in advance and the EPA 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 not lead to a violation of water quality standards. If you have been authorized to use cationic treatment chemicals by your applicable EPA Regional Office, attach a copy of your authorization letter and include documentation of the appropriate controls and implementation procedures designed to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards. Examples of cationic treatment chemicals include, but are not limited to, cationic polyacrylamide (C-PAM), PolyDADMAC (POLY DIALLYL DIMETHYL AMMONIUM CHLORIDE), and chitosan.

**Section VII. Stormwater Pollution Prevention Plan (SWPPP) and Personnel Training Information**

All sites eligible for coverage under this permit are required to prepare a SWPPP in advance of filing the NOI, in accordance with Part 7. Indicate whether the SWPPP has been prepared in advance of filing the NOI.

Confirm that all required personnel, including those conducting inspections at your site, will meet the training requirements in Part 6 of this permit.

Indicate the street, city, State, and ZIP code where the SWPPP can be found. Indicate the contact information (name, organization, phone, and email) for the person who developed the SWPPP for this project.

**Section VIII. Endangered Species Information**

Confirm that you have included the completed ESA worksheet from Appendix D and all required supporting information for your criterion selection with the submission of this NOI.

**Section IX. Historic Preservation**

Use the instructions in Appendix E to complete the questions on the NOI form regarding historic preservation.

**Section X. Certification Information**

The NOI must be signed as follows:

*For a corporation:* By a responsible corporate officer. For the purpose of this Section, a responsible corporate officer means:

(i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making

major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

*For a partnership or sole proprietorship:* By a general partner or the proprietor, respectively; or

*For a municipality, State, Federal, or other public agency:* By either a principal executive officer or ranking elected official. For purposes of this Part, a principal executive officer of a Federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA). Include the name and title of the person signing the form and the date of signing. An unsigned or undated NOI form will not be considered eligible for permit coverage.

**Modifying Your NOI**

If you have been granted a waiver from your Regional Office from electronic reporting, and if after submitting your NOI you need to correct or update any fields on this NOI form, you may do so by indicating changes on this same form.

**Paperwork Reduction Act Notice**

This collection of information is approved by OMB under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. (OMB Control No. 2040-0305). Responses to this collection of information are mandatory (40 CFR 122.26). An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The public reporting and recordkeeping burden for this collection of information is estimated to be 3.3 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates and any suggested methods for minimizing respondent burden to the Regulatory Support Division Director, U.S. Environmental Protection Agency (2821T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

**Submitting Your Form**

Submit your NOI form by mail to one of the following addresses:

**For Regular U.S. Mail Delivery:**
Stormwater Notice Processing Center
Mail Code 4203M, ATTN: 2022 CGP
U.S. EPA
1200 Pennsylvania Avenue, NW
Washington, DC 20460

**For Overnight/Express Mail Delivery:**
Stormwater Notice Processing Center
William Jefferson Clinton East Building - Room 7420
ATTN: 2022 CGP
U.S. EPA
1201 Constitution Avenue, NW
Washington, DC 20004

Visit this website for instructions on how to submit electronically:

https://www.epa.gov/npdes/stormwater-discharges-construction-activities#ereporting

## Appendix I - Notice of Termination (NOT) Form and Instructions

Part 8.3 requires you to use the NPDES eReporting Tool, or "NeT" system, to prepare and submit your NOT electronically. However, if the EPA Regional Office grants you a waiver to use a paper NOT form, and you elect to use it, you must complete and submit the following form.

| NPDES Form 3510-13 | EPA | U.S. Environmental Protection Agency<br>Washington, DC 20460<br>Notice of Termination for the 2022 NPDES Construction General Permit | OMB No. 2040-0305<br>Exp. Date 01/31/2025 |
|---|---|---|---|

Submission of this Notice of Termination constitutes notice that the operator identified in Section III of this form is no longer authorized discharge pursuant to the NPDES Construction General Permit (CGP) from the site identified in Section IV of this form. All necessary information must be included on this form. Refer to the instructions at the end of this form.

## SECTION I. APPROVAL TO USE PAPER NOI FORM

**Paper NOI Form**

Have you been granted a waiver from electronic reporting from the Regional Office*? ☐ Yes ☐ No

If yes, check which waiver you have been granted, the name of the EPA Regional Office staff person who granted the waiver, and the date of approval:

Waiver granted:

☐ The owner/operator's 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.

☐ The owner/operator has issues regarding available computer access or computer capability.

| Name of EPA staff person that granted the waiver | Date approval obtained (MM/DD/YYYY) |
|---|---|
| | |

*** Note: You are required to obtain approval from the applicable Regional Office prior to using this paper NOI form. If you have not obtained a waiver, you must file this form electronically using the NPDES eReporting Tool (NeT).**

## SECTION II. PERMIT INFORMATION

**Permit**

NPDES ID

Reason for Termination (Check only one):

☐ You have completed all construction activities at your site, and you have met all other requirements in Part 8.2.1.

Check this box to confirm that you have attached photographs as required by Part 8.2.1.a that document your compliance with the permit's final stabilization requirements.

☐ 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).

If any portion of your site is covered by one of the Part 2.2.14c.iii exceptions to the final stabilization criteria, 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 even though it appears to be unstabilized.

☐ Another operator has assumed control over all areas of the site and that operator has submitted an NOI and obtained coverage under the CGP.

☐ You have obtained coverage under an individual permit or another general NPDES permit addressing stormwater discharges from the construction site.

## SECTION III. OPERATOR INFORMATION

**Operator Information**

Operator Name

Mailing Address

Street

| City | State | ZIP Code |
|---|---|---|
| | | |

County or Similar Government Division

| Phone Number | Email Address |
|---|---|
| | |

## SECTION IV. PROJECT/SITE INFORMATION

**Project/Site Address**

| | | |
|---|---|---|
| Project/Site Name | | |
| Street/Location | | |
| City | State | ZIP Code |
| County or Similar Government Division: | | |

## SECTION V. CERTIFICATION INFORMATION

**Certification Information**

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.

| | | |
|---|---|---|
| First Name | Middle Initial | Last Name |
| Title | | |
| Signature | | Date (MM/DD/YYYY) |
| Email Address | | |

## General Instructions

### Who May File an NOT Form?

Permittees who are presently covered under the EPA-issued 2022 Construction General Permit (CGP) for Stormwater Discharges Associated with Construction Activity may submit an NOT form when: (1) earth-disturbing activities at the site are completed and the conditions in Parts 8.2.1.a through 8.2.1.b are met; or (2) the permittee has transferred all areas under its control to another operator, and that operator has submitted and obtained coverage under this permit; or (3) the permittee has obtained coverage under a different NPDES permit for the same discharges.

### Completing the Form

Type or print, using uppercase letters, in the appropriate areas only. Please place each character between the marks. Abbreviate if necessary to stay within the number of characters allowed for each item. Use only one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions about this form, refer to https://www.epa.gov/npdes/stormwater-discharges-construction-activities#cgp or telephone EPA's NOI Processing Center at (866) 352-7755. **Please submit original document with signature in ink - do not send a photocopied signature.**

### Section I. Approval to Use Paper NOI Form

You must indicate whether you have been granted a waiver from electronic reporting from the EPA Regional Office. Note that you are not authorized to use this paper NOT form unless the EPA Regional Office has approved its use. Where you have obtained approval to use this form, indicate the waiver that you have been granted, the name of the EPA staff person who granted the waiver, and the date that approval was provided.

See https://www.epa.gov/npdes/contact-us-stormwater#regional for a list of EPA Regional Office contacts.

### Section II. Permit Information

Enter the existing NPDES ID assigned to the project . If you do not know the NPDES ID number, or contact EPA's NOI Processing Center at (866) 352-7755.

Indicate your reason for submitting this Notice of Termination by checking the appropriate box. Check only one. If you selected the first box, confirm that you have attached photographs as required by Part 8.2.1.a. All submitted photographs must: (1) be taken both before and after the site has met the final stabilization criteria in Part 2.2.14.c; (2) be clear and in focus, and in the original format and resolution; and (3) 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).

If any portion of your site is covered by one of the Part 2.2.14c.iii final stabilization exceptions, indicate which exception applies and provide an explanation with your photographs that describes why this portion of the site is in compliance even though it may appear to be unstabilized.

### Section III. Operator Information

Provide the legal name of the person, firm, public organization, or any other entity that operates the project described in this NOT and is covered by the NPDES ID identified in Section II. Enter the complete mailing address, telephone number, and email address of the operator.

### Section IV. Project/Site Information

Enter the official or legal name and complete street address, including city, State, ZIP code, and county or similar government subdivision of the project or site. If the project or site lacks a street address, indicate the general location of the site (e.g., Intersection of State Highways 61 and 34). Complete site information must be provided for termination of permit coverage to be valid.

### Section V. Certification Information

The NOT, must be signed as follows:

*For a corporation:* By a responsible corporate officer. For the purpose of this Part, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy-or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

*For a partnership or sole proprietorship:* By a general partner or the proprietor, respectively; or

*For a municipality, State, Federal, or other public agency:* By either a principal executive officer or ranking elected official. For purposes of this Part, a principal executive officer of a Federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

Include the name, title, and email address of the person signing the form and the date of signing. An unsigned or undated NOT form will not be considered valid termination of permit coverage.

### Paperwork Reduction Act Notice

This collection of information is approved by OMB under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. (OMB Control No. 2040-0305). Responses to this collection of information are mandatory (40 CFR 122.26). An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a

currently valid OMB control number. The public reporting and recordkeeping burden for this collection of information is estimated to be 1.2 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates and any suggested methods for minimizing respondent burden to the Regulatory Support Division Director, U.S. Environmental Protection Agency (2821T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

**Submitting Your Form**

Submit your NOT form by mail to one of the following addresses:

For Regular U.S. Mail Delivery:
Stormwater Notice Processing Center
Mail Code 4203M, ATTN: 2022 CGP
U.S. EPA
1200 Pennsylvania Avenue, NW
Washington, DC 20460

For Overnight/Express Mail Delivery:
Stormwater Notice Processing Center
William Jefferson Clinton East Building - Room 7420
ATTN: 2022 CGP
U.S. EPA
1201 Constitution Avenue, NW
Washington, DC 20004

Visit this website for instructions on how to submit electronically:

https://www.epa.gov/npdes/stormwater-discharges-construction-activities#ereporting

## Appendix J - Suggested Format for Request for Chemical Treatment

If you plan to add "cationic treatment chemicals" (as defined in Appendix A) to stormwater and/or authorized non-stormwater prior to discharge, Part 1.1.9 requires you to notify your applicable EPA Regional Office in advance of submitting your NOI. The EPA Regional Office will authorize 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. To notify your EPA Regional Office, you may use following form.

| NPDES Form 6100-066 | EPA | U.S. Environmental Protection Agency<br>Washington, DC 20460<br><br>Suggested Form for Notifying EPA about Proposed Use of Cationic Treatment Chemicals under the 2022 NPDES Construction General Permit | OMB No. 2040-0305<br>Exp. Date 01/31/2025 |
|---|---|---|---|

Under Part 1.1.9 of the 2022 CGP, 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 Notice of Intent (NOI) until you notify your applicable EPA Regional Office 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. You may use this suggested form to notify your EPA Regional Office about your proposed use of cationic treatment chemicals.

## SECTION I. OPERATOR INFORMATION

**Operator Information**

| | | | |
|---|---|---|---|
| Operator Name | | | |
| Mailing Address | | | |
| Street | | | |
| City | State | ZIP Code | |
| County or Similar Government Division | | | |
| Phone Number | Email Address | | |

## SECTION II. PROJECT/SITE INFORMATION

**Project/Site Information**

| | | | |
|---|---|---|---|
| Project/Site Name | | | |
| Project/Site Address | | | |
| Street/Location | | | |
| City | State | ZIP Code | |
| County or Similar Government Division | | | |
| Site Contact Information (if different from operator) | | | |
| First Name | Middle Initial | Last Name | |
| Phone Number | | | |
| Receiving Waterbodies | | | |
| Name(s) of Receiving Waterbodies: | | | |

## SECTION III. MAP

**Map**

Attach a map that illustrates the entire site including all of the below items. Include this map in your Stormwater Pollution Prevention Plan (SWPPP).
- All receiving waterbodies
- All proposed location(s) of chemical treatment system(s)
- All proposed point(s) of discharge to receiving waterbodies
- All soil types within areas to be disturbed
- All areas of earth disturbance
- Sufficient indication of topography to indicate where stormwater flows

Attach a schematic drawing of the proposed treatment system(s). Include all components of the treatment train, sample points, and pipe configurations. In addition to sufficient holding capacity upstream of treatment, the system must have the capacity to hold water for testing and to re-treat water that does not meet water quality standards.

## SECTION IV. RESPONSIBLE PERSONNEL

**Responsible Personnel**

| Treatment System Operator or Company Name (if subcontracted out): | | |
|---|---|---|
| Street/Location | | |
| City | State | ZIP Code |

| Responsible Personnel | |
|---|---|
| List personnel who will be responsible for operating the chemical treatment systems and application of the chemicals. | Cite the training that the personnel have received in operation and maintenance of the treatment system(s) and use of the specific chemical(s) proposed. |
| | |
| | |
| | |
| | |
| | |

## SECTION V. PROPOSED TREATMENT

**Proposed Treatment**

| | |
|---|---|
| Check proposed treatment system to be used: | ☐ Chitosan enhanced sand filtration with discharge to infiltration (ground water). |
| | ☐ Chitosan enhanced sand filtration with discharge to temporary holding ponds (batch). |
| | ☐ Chitosan enhanced sand filtration with discharge to surface waters (flow-through). |
| | ☐ Other (describe below and submit documentation that the proposed system and chemical(s) demonstrate the ability to remove turbidity and produce non-toxic effluent/discharge): |
| Check proposed cationic chemical(s) to be used: | ☐ FlocClear™ (2% chitosan acetate solution). |
| | ☐ StormKlear™ LiquiFloc™ (1% chitosan acetate solution). |
| | ☐ ChitoVan™ (1% chitosan acetate solution). |
| | ☐ StormKlear™ LiquiFloc™ (3% chitosan acetate solution). |
| | ☐ Other (Specify): |

| Estimated Treatment Period Start Date (MM/DD/YYYY) | Estimated Treatment Period End Date (MM/DD/YYYY) |
|---|---|

Describe sampling and recordkeeping schedule. Attach additional sheets as needed:

**Proposed Treatment**

Explain why you have selected this proposed treatment system and chemicals. Include an explanation of why the use of cationic treatment chemicals is necessary at the site. Reference how the soil types on your site influenced your choices. Describe or provide an illustration of how the site of the discharge will be stabilized and why the discharge location will not cause erosion of the discharge water's bank or bed (please note that a permit from the Corps and State agencies may be necessary to place rock in the water body for this stabilization). Attach as many additional sheets as needed for a full explanation. If you have a report from a chemical treatment contractor describing their recommended approach you may attach that.

## SECTION VI. CERTIFICATION INFORMATION

**Certification Information**

I have documented and hereby certify that the following information is correct and has been documented in the SWPPP for this project:

- The SWPPP includes a complete site-specific description of the chemical treatment system herein proposed for use, including specifications, design, and Material Safety Data Sheets for all chemicals to be used.
- The controls to be used on the site are compatible with the safe and effective use of cationic chemical treatment.
- I verified through jar tests that the site soil is conducive to chemical treatment.
- I verified that the chemical treatment system operators for this project received training.
- I read, understand, and will follow all conditions and design criteria in the applicable use designation(s).
- If the discharge is to Tribal waters, I notified the appropriate Tribal government of the intent to use chemical treatment on a site located within that jurisdiction.
- I will keep the use level designation, operation and maintenance manual, and training certificate on site prior to and during use of chemical treatment.
- A licensed engineer designed the system for this project including system sizing, pond sizing, and flow requirements.
- I verify that the discharge will not adversely affect downstream conveyance systems or stream channels (e.g., cause erosion).

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.

Authorized Official

| First Name | Middle Initial | Last Name |
|---|---|---|
| | | |

Title

| Signature | Date (MM/DD/YYYY) |
|---|---|
| | |

Email Address

**Section I. Operator Information**

Provide the legal name of the person, firm, public organization, or any other entity that operates the project. Refer to Appendix A of the permit for the definition of "operator." Provide the operator's mailing address, county, telephone number, and e-mail address.

**Section II. Project/Site Information**

Enter the official or legal name and complete street address, including city, State, ZIP code, and county or similar government subdivision of the project or site. If the project or site lacks a street address, indicate the general location of the site (e.g., Intersection of State Highways 61 and 34).

Provide site contact information, if different from the operator.

Provide the name of the receiving waterbodies to which your site/project will discharge.

**Section III. Map**

Attach a map of the entire site that includes the identified items. Attach a schematic of the proposed treatment system(s) that includes the identified items.

**Section IV. Responsible Personnel**

Provide the legal name of the treatment system operator or company and complete street address, including city, State, including city, State, and ZIP code.

List personnel who will be responsible for operating the chemical treatment systems and application of the chemicals. For each personnel listed, cite the training that the personnel have received in operation and maintenance of the treatment system(s) and use of the specific chemical(s) proposed.

**Section V. Proposed Treatment**

Indicate the proposed treatment system and proposed cationic chemicals to be used. Indicate the estimated treatment start and end dates. Describe the sampling and recordkeeping schedule. Explain why you have selected the proposed treatment system and chemicals.

**Section VI. Certification Information**

The form must be signed as follows:

For a corporation: By a responsible corporate officer. For the purpose of this Section, a responsible corporate officer means:

(i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or

For a municipality, State, Federal, or other public agency: By either a principal executive officer or ranking elected official. For purposes of this Part, a principal executive officer of a Federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA). Include the name and title of the person signing the form and the date of signing.

**Submitting Your Form**

Submit this form to your applicable EPA Regional Office. Contact information can be found at: https://www.epa.gov/npdes/contact-us-stormwater#regional

## Appendix K – Turbidity Monitoring Report Form and Instructions

Part 3.3 requires you to use the EPA NPDES eReporting Tool, or "NeT" system, to prepare and submit your report electronically. However, if the EPA Regional Office grants you a waiver to use a paper form, and you elect to use it, you must complete and submit the following form.

| NPDES Form 6100-065 | EPA | U.S. Environmental Protection Agency<br>Washington, DC 20460<br>Turbidity Monitoring Report Form for Dewatering Discharges to Sensitive Waters Under the 2022 NPDES Construction General Permit | OMB No. 2040-0305<br>Exp. Date 01/31/2025 |
|---|---|---|---|

## SECTION I. APPROVAL TO USE PAPER FORM

**Paper Form**

Have you been granted a waiver from electronic reporting from the Regional Office*? ☐ Yes ☐ No

If yes, check which waiver you have been granted, and provide the name of the EPA Regional Office staff person who granted the waiver, and the date of approval:

Waiver granted:

☐ The owner/operator's 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.

☐ The owner/operator has issues regarding available computer access or computer capability.

| Name of EPA staff person that granted the waiver | Date approval obtained (MM/DD/YYYY) |
|---|---|
| | |

*** Note: You are required to obtain approval from the applicable Regional Office prior to using this paper form. If you have not obtained a waiver, you must file this form electronically using the NPDES eReporting Tool (NeT).**

## SECTION II. PERMIT INFORMATION

**Permit**

**NPDES ID**

Does this report fulfill turbidity monitoring report obligations of other operators that are covered under this permit for the same project site? ☐ Yes ☐ No

If yes, provide the NPDES ID number(s) for all other such operators at the same project site: _____

## SECTION III. OPERATOR INFORMATION

**Operator Information**

Operator Name

Mailing Address

Street

| City | State | ZIP Code |
|---|---|---|
| | | |

County or Similar Government Division:

| Phone Number | Email Address |
|---|---|
| | |

**Preparer**

Complete if form was prepared by someone other than the certifier:

| First Name | Middle Initial | Last Name |
|---|---|---|
| | | |

Organization

| Phone Number | Email Address |
|---|---|
| | |

## SECTION IV. SITE INFORMATION

**Site Address**

Site Name

**Site Address**

| Street/Location | | |
|---|---|---|
| City | State | ZIP Code |
| County or Similar Government Division: | | |

## SECTION IV. MONITORING QUARTER

**Monitoring Quarter**

Identify monitoring quarter (select only one):

- ☒ Quarter 1 (January 1 – March 31)
- ☒ Quarter 2 (April 1 – June 30)
- ☒ Quarter 3 (July 1 – September 30)
- ☒ Quarter 4 (October 1 – December 31)

## SECTION IVI. TURBIDITY MONITORING DATA

**Turbidity Monitoring Data**

Discharge Point Description/ Name:

Was dewatering water discharged during the monitoring quarter? ☐ Yes (Enter the data below) ☒ No (Skip to Section VII)

| Specific Week within Monitoring Quarter[1] | Weekly Average (NTU)[2] | Benchmark Threshold (NTU) | Alternate Benchmark Threshold (NTU)[3] | Average exceeds Benchmark?[4] |
|---|---|---|---|---|
| Week 1 | | 50 | | ☒ Yes ☒ No |
| Week 2 | | 50 | | ☒ Yes ☒ No |
| Week 3 | | 50 | | ☒ Yes ☒ No |
| Week 4 | | 50 | | ☒ Yes ☒ No |
| Week 5 | | 50 | | ☒ Yes ☒ No |
| Week 6 | | 50 | | ☒ Yes ☒ No |
| Week 7 | | 50 | | ☒ Yes ☒ No |
| Week 8 | | 50 | | ☒ Yes ☒ No |
| Week 9 | | 50 | | ☒ Yes ☒ No |
| Week 10 | | 50 | | ☒ Yes ☒ No |
| Week 11 | | 50 | | ☒ Yes ☒ No |
| Week 12 | | 50 | | ☒ Yes ☒ No |
| Week 13 | | 50 | | ☒ Yes ☒ No |
| Week 14 | | 50 | | ☒ Yes ☒ No |

[1] Refer to Table K-1 to determine the specific monitoring week number for which you are reporting turbidity data for this quarter.

[2] Report to the nearest whole number. Enter "N/A" if no dewatering discharge occurred during any particular week.

[3] Prior approval from the EPA Regional Office is required pursuant to Part 3.3.2.b. Unless and until EPA approves your request to use an alternate benchmark, you are required to use the standard benchmark of 50 NTU and take any required corrective actions if an exceedance occurs. Enter "N/A" if you have not received approval for an alternate benchmark threshold.

[4] If "Yes," the operator must conduct follow-up corrective action pursuant to Part 5.2.2 and document any corrective action taken in the corrective action log in accordance with Part 5.4.

## VII. CERTIFICATION INFORMATION

**Certification Information**

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.

| First Name | Middle Initial | Last Name |
|---|---|---|
| | | |

| Title |
|---|
| |

| Signature | Date (MM/DD/YYYY) |
|---|---|
| | |

| Phone Number | Email Address |
|---|---|
| | |

## General Instructions

### Who Must Submit A Turbidity Monitoring Report to EPA?

Sites covered under the Construction General Permit (CGP or permit) that are required to monitor pursuant to Part 3.3 of the permit must submit Turbidity Monitoring Reports consistent with the reporting requirements specified in Part 3.3.4 of the permit.

### When Must I Submit A Turbidity Monitoring Report to EPA?

You must submit your report to EPA no later than 30 days following the end of each monitoring quarter. Submit a form for every quarter the site is active.

| Monitoring Quarter # | Months | Reporting Deadline |
|---|---|---|
| 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 |

### Completing the Form

Obtain and read a copy of the 2022 CGP, viewable at https://www.epa.gov/npdes/stormwater-discharges-construction-activities#cgp. To complete this form, type or print, using uppercase letters, in the appropriate areas only. Please submit the original document with signature in ink - do not send a photocopied signature. **Photocopy your form for your records before you send the completed original form to the appropriate address.**

### Section I. Approval to Use Paper Form

You must indicate whether you have been granted a waiver from electronic reporting from the EPA Regional Office. Note that you are not authorized to use this paper form unless the EPA Regional Office has approved its use. Where you have obtained approval to use this form, indicate the waiver that you have been granted, the name of the EPA staff person who granted the waiver, and the date that approval was provided. See https://www.epa.gov/npdes/contact-us-stormwater for a list of EPA Regional Office contacts.

### Section II. Permit Information

Provide the NPDES ID (i.e., NOI tracking number) assigned to the site for which this form is being submitted. Submit the form only for sites discharging dewatering water to a sediment-impaired water or a water designated as a Tier 2, Tier 2.5, or Tier 3 water.

Indicate whether this report fulfills turbidity monitoring report obligations of other operators that are covered under this permit for the same project site. If the answer is yes, provide all relevant NPDES ID numbers.

### Section III. Operator Information

Provide the legal name of the person, firm, public organization, or any other entity that is considered the operator of the site. See Part 1.1.1 and Appendix A for the definition of "operator." Provide the operator's mailing address, phone number, and e-mail. The operator information in this Section should match the operator information provided on your NOI form.

If this form was prepared by someone other than the certifier, include the name, organization, phone number, and email address of the person who prepared this form.

### Section IV. Site Information

Enter the official or legal name and complete street address, including city, State, ZIP code, and county or similar government subdivision of the site. If the site lacks a street address, indicate the general location (e.g., Intersection of State Highways 61 and 34). The site information in this Section should match the site information provided on your NOI form.

### Section V. Monitoring Quarter

Indicate the appropriate monitoring quarter (Quarter 1, 2, 3, or 4). The monitoring quarters are specified in the table in the section titled "When Must I Submit A Turbidity Monitoring Report to EPA." Select only one quarter.

### Section VI. Turbidity Monitoring Data

Provide the discharge point description/name if you are discharging dewatering water from more than one point at the site. If you are discharging from only one point at the site, leave the spaces blank.

Submit Section VI data for each dewatering discharge point. For example, if you are discharging dewatering water from two points at the site, then submit two Section VIs (one for each discharge point).

Indicate whether dewatering occurred during the monitoring quarter. If "Yes" enter the data in the data table. If "No" skip to Section VII.

For averaging purposes, a monitoring week starts with a Monday and ends on Sunday. A numerical value is assigned for each week, which is called a Week Number (e.g., 1, 2, 3 etc.). The form includes a Week Number for each week of the year. Refer to Table K-1 for the dates that correspond with each Week Number.

Next, calculate the weekly average turbidity value for the corresponding monitoring week. The weekly average is calculated by adding all of the individual turbidity results for that monitoring week and dividing by the total number of samples. The calculation for the weekly average includes only those days when dewatering discharge occurred. Days when no dewatering discharge occurred, and therefore do not have turbidity data associated with them, are not included in the calculation of the weekly average. 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 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 29 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).

If you collect and analyze more than one turbidity sample per day from your dewatering discharge, you must include any additional results in the calculation of your weekly average. 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).

Enter the weekly average turbidity values for the corresponding week into the table. Enter "N/A" into the table for the turbidity weekly average if no dewatering discharge occurred during the week.

The benchmark threshold for turbidity for this permit is 50 NTUs unless EPA has authorized the use of an alternate benchmark in accordance with Part 3.3.2.b. If you are using an alternate benchmark threshold, enter the number into the table for the corresponding week. Unless and until EPA approves your request to use an alternate benchmark, you are required to use the standard benchmark of 50 NTU and take any required corrective actions if an exceedance occurs. Enter "N/A" if you have not received approval for an alternate benchmark threshold.

For each week with a value for the weekly average, select "Yes" or "No" in the table to indicate whether the weekly average value exceeds the 50 NTU benchmark or the alternate turbidity benchmark (whichever is applicable). If "Yes", the operator must conduct follow-up corrective action pursuant to Part 5.2.2 and document any corrective action taken in the corrective action log in accordance with Part 5.4.

**Section VII. Certification Information**

Forms must be signed by a person described below, or by a duly authorized representative of that person.

*For a corporation:* By a responsible corporate officer. For the purpose of this Section, a responsible corporate officer means:

(i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

*For a partnership or sole proprietorship:* By a general partner or the proprietor, respectively; or

*For a municipality, State, Federal, or other public agency:* By either a principal executive officer or ranking elected official. For purposes of this Part, a principal executive officer of a Federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA). Include the name and title of the person signing the form and the date of signing.

A person is a duly authorized representative only if:

1. The authorization is made in writing by a person described above;

2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company, (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) and

3. The written authorization is submitted to the Director.

An unsigned or undated form will be considered incomplete.

**Submitting Your Form**

If you have been granted a waiver from your Regional Office to submit a paper form, you must send your form by mail to one of the following addresses:

**For Regular U.S. Mail Delivery:**

Stormwater Notice Processing Center
Mail Code 4203M, ATTN: 2022 CGP Reports
U.S. EPA
1200 Pennsylvania Avenue, NW
Washington, DC 20460

**For Overnight/Express Mail Delivery:**

Stormwater Notice Processing Center
William Jefferson Clinton East Building - Room 7420
ATTN: 2022 CGP Reports
U.S. EPA
1201 Constitution Avenue, NW
Washington, DC 20004

Visit this website for instructions on how to submit electronically:

https://epanet.zendesk.com/hc/en-us/sections/115000949868-CGP-Training-Material

**Revisions to a Submitted Form**

If you have previously submitted a form with an error, submit a revised form with the correct information. After discovering the error, submit the revised form as soon as possible. Make a notation on the revised form where the correction was made.

**Paperwork Reduction Act Notice**

This collection of information is approved by OMB under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. (OMB Control No. 2040-0305). Responses to this collection of information are mandatory (40 CFR 122.26). An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The public reporting and recordkeeping burden for this collection of information is

estimated to be 0.2 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates and any suggested methods for minimizing respondent burden to the Regulatory Support Division Director, U.S. Environmental Protection Agency (2821T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

# Table K-1: 2022 CGP - Dates Corresponding to Monitoring Weeks for Each Monitoring Quarter

| 2022 | | | |
|---|---|---|---|
| Monitoring Quarter | Week # | *Monday* Start Date | *Sunday* End Date |
| 1 | 1 | 1/3/22 | 1/9/22 |
| | 2 | 1/10/22 | 1/16/22 |
| | 3 | 1/17/22 | 1/23/22 |
| | 4 | 1/24/22 | 1/30/22 |
| | 5 | 1/31/22 | 2/6/22 |
| | 6 | 2/7/22 | 2/13/22 |
| | 7 | 2/14/22 | 2/20/22 |
| | 8 | 2/21/22 | 2/27/22 |
| | 9 | 2/28/22 | 3/6/22 |
| | 10 | 3/7/22 | 3/13/22 |
| | 11 | 3/14/22 | 3/20/22 |
| | 12 | 3/21/22 | 3/27/22 |
| | 13 | 3/28/22 | 4/3/22 |
| 2 | 1 | 4/4/22 | 4/10/22 |
| | 2 | 4/11/22 | 4/17/22 |
| | 3 | 4/18/22 | 4/24/22 |
| | 4 | 4/25/22 | 5/1/22 |
| | 5 | 5/2/22 | 5/8/22 |
| | 6 | 5/9/22 | 5/15/22 |
| | 7 | 5/16/22 | 5/22/22 |
| | 8 | 5/23/22 | 5/29/22 |
| | 9 | 5/30/22 | 6/5/22 |
| | 10 | 6/6/22 | 6/12/22 |
| | 11 | 6/13/22 | 6/19/22 |
| | 12 | 6/20/22 | 6/26/22 |
| | 13 | 6/27/22 | 7/3/22 |
| 3 | 1 | 7/4/22 | 7/10/22 |
| | 2 | 7/11/22 | 7/17/22 |
| | 3 | 7/18/22 | 7/24/22 |
| | 4 | 7/25/22 | 7/31/22 |
| | 5 | 8/1/22 | 8/7/22 |
| | 6 | 8/8/22 | 8/14/22 |
| | 7 | 8/15/22 | 8/21/22 |
| | 8 | 8/22/22 | 8/28/22 |
| | 9 | 8/29/22 | 9/4/22 |
| | 10 | 9/5/22 | 9/11/22 |
| | 11 | 9/12/22 | 9/18/22 |
| | 12 | 9/19/22 | 9/25/22 |
| | 13 | 9/26/22 | 10/2/22 |
| 4 | 1 | 10/3/22 | 10/9/22 |
| | 2 | 10/10/22 | 10/16/22 |
| | 3 | 10/17/22 | 10/23/22 |
| | 4 | 10/24/22 | 10/30/22 |
| | 5 | 10/31/22 | 11/6/22 |
| | 6 | 11/7/22 | 11/13/22 |
| | 7 | 11/14/22 | 11/20/22 |
| | 8 | 11/21/22 | 11/27/22 |
| | 9 | 11/28/22 | 12/4/22 |
| | 10 | 12/5/22 | 12/11/22 |
| | 11 | 12/12/22 | 12/18/22 |
| | 12 | 12/19/22 | 12/25/22 |
| | 13 | 12/26/22 | 1/1/23 |

| 2023 | | | |
|---|---|---|---|
| Monitoring Quarter | Week # | *Monday* Start Date | *Sunday* End Date |
| 1 | 1 | 1/2/23 | 1/8/23 |
| | 2 | 1/9/23 | 1/15/23 |
| | 3 | 1/16/23 | 1/22/23 |
| | 4 | 1/23/23 | 1/29/23 |
| | 5 | 1/30/23 | 2/5/23 |
| | 6 | 2/6/23 | 2/12/23 |
| | 7 | 2/13/23 | 2/19/23 |
| | 8 | 2/20/23 | 2/26/23 |
| | 9 | 2/27/23 | 3/5/23 |
| | 10 | 3/6/23 | 3/12/23 |
| | 11 | 3/13/23 | 3/19/23 |
| | 12 | 3/20/23 | 3/26/23 |
| | 13 | 3/27/23 | 4/2/23 |
| 2 | 1 | 4/3/23 | 4/9/23 |
| | 2 | 4/10/23 | 4/16/23 |
| | 3 | 4/17/23 | 4/23/23 |
| | 4 | 4/24/23 | 4/30/23 |
| | 5 | 5/1/23 | 5/7/23 |
| | 6 | 5/8/23 | 5/14/23 |
| | 7 | 5/15/23 | 5/21/23 |
| | 8 | 5/22/23 | 5/28/23 |
| | 9 | 5/29/23 | 6/4/23 |
| | 10 | 6/5/23 | 6/11/23 |
| | 11 | 6/12/23 | 6/18/23 |
| | 12 | 6/19/23 | 6/25/23 |
| | 13 | 6/26/23 | 7/2/23 |
| 3 | 1 | 7/3/23 | 7/9/23 |
| | 2 | 7/10/23 | 7/16/23 |
| | 3 | 7/17/23 | 7/23/23 |
| | 4 | 7/24/23 | 7/30/23 |
| | 5 | 7/31/23 | 8/6/23 |
| | 6 | 8/7/23 | 8/13/23 |
| | 7 | 8/14/23 | 8/20/23 |
| | 8 | 8/21/23 | 8/27/23 |
| | 9 | 8/28/23 | 9/3/23 |
| | 10 | 9/4/23 | 9/10/23 |
| | 11 | 9/11/23 | 9/17/23 |
| | 12 | 9/18/23 | 9/24/23 |
| | 13 | 9/25/23 | 10/1/23 |
| 4 | 1 | 10/2/23 | 10/8/23 |
| | 2 | 10/9/23 | 10/15/23 |
| | 3 | 10/16/23 | 10/22/23 |
| | 4 | 10/23/23 | 10/29/23 |
| | 5 | 10/30/23 | 11/5/23 |
| | 6 | 11/6/23 | 11/12/23 |
| | 7 | 11/13/23 | 11/19/23 |
| | 8 | 11/20/23 | 11/26/23 |
| | 9 | 11/27/23 | 12/3/23 |
| | 10 | 12/4/23 | 12/10/23 |
| | 11 | 12/11/23 | 12/17/23 |
| | 12 | 12/18/23 | 12/24/23 |
| | 13 | 12/25/23 | 12/31/23 |

| 2024 | | | |
|---|---|---|---|
| Monitoring Quarter | Week # | *Monday* Start Date | *Sunday* End Date |
| 1 | 1 | 1/1/24 | 1/7/24 |
| | 2 | 1/8/24 | 1/14/24 |
| | 3 | 1/15/24 | 1/21/24 |
| | 4 | 1/22/24 | 1/28/24 |
| | 5 | 1/29/24 | 2/4/24 |
| | 6 | 2/5/24 | 2/11/24 |
| | 7 | 2/12/24 | 2/18/24 |
| | 8 | 2/19/24 | 2/25/24 |
| | 9 | 2/26/24 | 3/3/24 |
| | 10 | 3/4/24 | 3/10/24 |
| | 11 | 3/11/24 | 3/17/24 |
| | 12 | 3/18/24 | 3/24/24 |
| | 13 | 3/25/24 | 3/31/24 |
| 2 | 1 | 4/1/24 | 4/7/24 |
| | 2 | 4/8/24 | 4/14/24 |
| | 3 | 4/15/24 | 4/21/24 |
| | 4 | 4/22/24 | 4/28/24 |
| | 5 | 4/29/24 | 5/5/24 |
| | 6 | 5/6/24 | 5/12/24 |
| | 7 | 5/13/24 | 5/19/24 |
| | 8 | 5/20/24 | 5/26/24 |
| | 9 | 5/27/24 | 6/2/24 |
| | 10 | 6/3/24 | 6/9/24 |
| | 11 | 6/10/24 | 6/16/24 |
| | 12 | 6/17/24 | 6/23/24 |
| | 13 | 6/24/24 | 6/30/24 |
| 3 | 1 | 7/1/24 | 7/7/24 |
| | 2 | 7/8/24 | 7/14/24 |
| | 3 | 7/15/24 | 7/21/24 |
| | 4 | 7/22/24 | 7/28/24 |
| | 5 | 7/29/24 | 8/4/24 |
| | 6 | 8/5/24 | 8/11/24 |
| | 7 | 8/12/24 | 8/18/24 |
| | 8 | 8/19/24 | 8/25/24 |
| | 9 | 8/26/24 | 9/1/24 |
| | 10 | 9/2/24 | 9/8/24 |
| | 11 | 9/9/24 | 9/15/24 |
| | 12 | 9/16/24 | 9/22/24 |
| | 13 | 9/23/24 | 9/29/24 |
| | 14 | 9/30/24 | 10/6/24 |
| 4 | 1 | 10/7/24 | 10/13/24 |
| | 2 | 10/14/24 | 10/20/24 |
| | 3 | 10/21/24 | 10/27/24 |
| | 4 | 10/28/24 | 11/3/24 |
| | 5 | 11/4/24 | 11/10/24 |
| | 6 | 11/11/24 | 11/17/24 |
| | 7 | 11/18/24 | 11/24/24 |
| | 8 | 11/25/24 | 12/1/24 |
| | 9 | 12/2/24 | 12/8/24 |
| | 10 | 12/9/24 | 12/15/24 |
| | 11 | 12/16/24 | 12/22/24 |
| | 12 | 12/23/24 | 12/29/24 |
| | 13 | 12/30/24 | 1/5/25 |

| 2025 | | | |
|---|---|---|---|
| Monitoring Quarter | Week # | *Monday* Start Date | *Sunday* End Date |
| 1 | 1 | 1/6/25 | 1/12/25 |
| | 2 | 1/13/25 | 1/19/25 |
| | 3 | 1/20/25 | 1/26/25 |
| | 4 | 1/27/25 | 2/2/25 |
| | 5 | 2/3/25 | 2/9/25 |
| | 6 | 2/10/25 | 2/16/25 |
| | 7 | 2/17/25 | 2/23/25 |
| | 8 | 2/24/25 | 3/2/25 |
| | 9 | 3/3/25 | 3/9/25 |
| | 10 | 3/10/25 | 3/16/25 |
| | 11 | 3/17/25 | 3/23/25 |
| | 12 | 3/24/25 | 3/30/25 |
| | 13 | 3/31/25 | 4/6/25 |
| 2 | 1 | 4/7/25 | 4/13/25 |
| | 2 | 4/14/25 | 4/20/25 |
| | 3 | 4/21/25 | 4/27/25 |
| | 4 | 4/28/25 | 5/4/25 |
| | 5 | 5/5/25 | 5/11/25 |
| | 6 | 5/12/25 | 5/18/25 |
| | 7 | 5/19/25 | 5/25/25 |
| | 8 | 5/26/25 | 6/1/25 |
| | 9 | 6/2/25 | 6/8/25 |
| | 10 | 6/9/25 | 6/15/25 |
| | 11 | 6/16/25 | 6/22/25 |
| | 12 | 6/23/25 | 6/29/25 |
| | 13 | 6/30/25 | 7/6/25 |
| 3 | 1 | 7/7/25 | 7/13/25 |
| | 2 | 7/14/25 | 7/20/25 |
| | 3 | 7/21/25 | 7/27/25 |
| | 4 | 7/28/25 | 8/3/25 |
| | 5 | 8/4/25 | 8/10/25 |
| | 6 | 8/11/25 | 8/17/25 |
| | 7 | 8/18/25 | 8/24/25 |
| | 8 | 8/25/25 | 8/31/25 |
| | 9 | 9/1/25 | 9/7/25 |
| | 10 | 9/8/25 | 9/14/25 |
| | 11 | 9/15/25 | 9/21/25 |
| | 12 | 9/22/25 | 9/28/25 |
| | 13 | 9/29/25 | 10/5/25 |
| 4 | 1 | 10/6/25 | 10/12/25 |
| | 2 | 10/13/25 | 10/19/25 |
| | 3 | 10/20/25 | 10/26/25 |
| | 4 | 10/27/25 | 11/2/25 |
| | 5 | 11/3/25 | 11/9/25 |
| | 6 | 11/10/25 | 11/16/25 |
| | 7 | 11/17/25 | 11/23/25 |
| | 8 | 11/24/25 | 11/30/25 |
| | 9 | 12/1/25 | 12/7/25 |
| | 10 | 12/8/25 | 12/14/25 |
| | 11 | 12/15/25 | 12/21/25 |
| | 12 | 12/22/25 | 12/28/25 |
| | 13 | 12/29/25 | 1/4/26 |

| 2026 | | | |
|---|---|---|---|
| Monitoring Quarter | Week # | *Monday* Start Date | *Sunday* End Date |
| 1 | 1 | 1/5/26 | 1/11/26 |
| | 2 | 1/12/26 | 1/18/26 |
| | 3 | 1/19/26 | 1/25/26 |
| | 4 | 1/26/26 | 2/1/26 |
| | 5 | 2/2/26 | 2/8/26 |
| | 6 | 2/9/26 | 2/15/26 |
| | 7 | 2/16/26 | 2/22/26 |
| | 8 | 2/23/26 | 3/1/26 |
| | 9 | 3/2/26 | 3/8/26 |
| | 10 | 3/9/26 | 3/15/26 |
| | 11 | 3/16/26 | 3/22/26 |
| | 12 | 3/23/26 | 3/29/26 |
| | 13 | 3/30/26 | 4/5/26 |
| 2 | 1 | 4/6/26 | 4/12/26 |
| | 2 | 4/13/26 | 4/19/26 |
| | 3 | 4/20/26 | 4/26/26 |
| | 4 | 4/27/26 | 5/3/26 |
| | 5 | 5/4/26 | 5/10/26 |
| | 6 | 5/11/26 | 5/17/26 |
| | 7 | 5/18/26 | 5/24/26 |
| | 8 | 5/25/26 | 5/31/26 |
| | 9 | 6/1/26 | 6/7/26 |
| | 10 | 6/8/26 | 6/14/26 |
| | 11 | 6/15/26 | 6/21/26 |
| | 12 | 6/22/26 | 6/28/26 |
| | 13 | 6/29/26 | 7/5/26 |
| 3 | 1 | 7/6/26 | 7/12/26 |
| | 2 | 7/13/26 | 7/19/26 |
| | 3 | 7/20/26 | 7/26/26 |
| | 4 | 7/27/26 | 8/2/26 |
| | 5 | 8/3/26 | 8/9/26 |
| | 6 | 8/10/26 | 8/16/26 |
| | 7 | 8/17/26 | 8/23/26 |
| | 8 | 8/24/26 | 8/30/26 |
| | 9 | 8/31/26 | 9/6/26 |
| | 10 | 9/7/26 | 9/13/26 |
| | 11 | 9/14/26 | 9/20/26 |
| | 12 | 9/21/26 | 9/27/26 |
| | 13 | 9/28/26 | 10/4/26 |
| 4 | 1 | 10/5/26 | 10/11/26 |
| | 2 | 10/12/26 | 10/18/26 |
| | 3 | 10/19/26 | 10/25/26 |
| | 4 | 10/26/26 | 11/1/26 |
| | 5 | 11/2/26 | 11/8/26 |
| | 6 | 11/9/26 | 11/15/26 |
| | 7 | 11/16/26 | 11/22/26 |
| | 8 | 11/23/26 | 11/29/26 |
| | 9 | 11/30/26 | 12/6/26 |
| | 10 | 12/7/26 | 12/13/26 |
| | 11 | 12/14/26 | 12/20/26 |
| | 12 | 12/21/26 | 12/27/26 |
| | 13 | 12/28/26 | 1/3/27 |

| 2027 | | | |
|---|---|---|---|
| Monitoring Quarter | Week # | *Monday* Start Date | *Sunday* End Date |
| 1 | 1 | 1/4/27 | 1/10/27 |
| | 2 | 1/11/27 | 1/17/27 |
| | 3 | 1/18/27 | 1/24/27 |
| | 4 | 1/25/27 | 1/31/27 |
| | 5 | 2/1/27 | 2/7/27 |
| | 6 | 2/8/27 | 2/14/27 |
| | 7 | 2/15/27 | 2/21/27 |
| | 8 | 2/22/27 | 2/28/27 |
| | 9 | 3/1/27 | 3/7/27 |
| | 10 | 3/8/27 | 3/14/27 |
| | 11 | 3/15/27 | 3/21/27 |
| | 12 | 3/22/27 | 3/28/27 |
| | 13 | 3/29/27 | 4/4/27 |

## Appendix L

**Site Maps (Bound Separately)**