

STORMWATER MANAGEMENT & POLLUTION PREVENTION PLAN

Prepared for:

Cornwall Logistics, LLC

**Proposed Industrial Warehouse
Section 9, Block 1, Lot 25.22
2615 US Route 9 West
Town of Cornwall
Orange County, NY**

Prepared by:



1904 Main Street
Lake Como, NJ 07719
(732) 974-0198



Joshua M. Sewald, PE
NY Professional Engineer License #097639

January 2023,
Last Revised October 2023
DEC# 2803-99-012

TABLE OF CONTENTS

	Page No.
I. Introduction	2
II. Existing Site Conditions	2
III. Proposed Site Conditions	3
IV. Erosion and Sedimentation Controls	6
V. Existing Drainage Conditions.....	12
VI. Proposed Drainage Conditions.....	12
VII. Alternative Site Plans	18

APPENDIX

- NRCS Soil Mapping
- Geotechnical Reports
- Existing and Proposed Hydrographs – 1-, 10- & 100-Year Storm
- Stormwater Collection System Calculations (Pipesizing)
- Outlet Protection Calculations
- Site Logbook
- MS4 SWPPP Acceptance Form
- Maintenance and Inspection Checklist
- Drainage Area Maps
- Overall Phasing Plan
- Preliminary and Final Major Site Plans (Attached Separately)

I. INTRODUCTION

Dynamic Engineering Consultants, PC has been retained by the Applicant (Cornwall Logistics, LLC) to prepare a New York State Department of Environmental Conservation (NYSDEC or Department) Stormwater Pollution Prevention Plan (SWPPP) for the Proposed Project located within the Ramapo River watershed. The Project Site is located at 2615 US Route 9W in the Town of Cornwall, Orange County, New York (Section 9 Block 1, Lot 25.22). This report has been developed in accordance with:

- The NYSDEC State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity General Permit Number (GP-0-20-001) (Appendix A), and
- 2015 New York State Stormwater Management Design Manual

II. EXISTING SITE CONDITIONS

The site currently is undeveloped and heavily wooded with pockets of wetlands and steep slopes throughout the site. The Project Site is generally bound by The Moodna Creek stream and Town of New Windsor Municipal Boundary to the north, the Town of New Windsor Municipal Boundary to the east, US Route 9W to the south, and residential developments to the west. The existing conditions on site are depicted on the ALTA/NSPS Survey, prepared by Lanc & Tully Engineering & Surveying, P.C., dated March 31, 2021.

Topography

The site contains a high point near the center of the site and generally slopes outwards in all directions. The majority of the site slopes to the north and northwest property boundaries towards Moodna Creek located off the property. The remainder of the site slopes to the south towards several pockets of wetlands located near the southern property lines.

Surface Water

An existing stream is identified within Wetland 'D' on the site near the southern property boundary. Additionally, there six pockets of wetlands in the western half of the site. Located off site along the northern and eastern property line is Moodna Creek.

Hydrologic Soil Groups

Soil characteristics are described in Table 1, below. This information has been compiled from data available from the USDA NRCS Web Soil Survey. Hydrologic soils are grouped into A, B, C, D; Group A soils have a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission. Group B soils have a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep, moderately well-drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission. Group C soils have a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission. Group D soils have a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high-water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Table 1 – Soil Characteristics

SOIL TYPE (SYMBOL)	SOIL TYPE (NAME)	HYDROLOGIC SOIL GROUP
BnB	Bath-Nassau channery silt loams, 3 to 8 percent slopes	C
ErA	Erie gravelly silt loam, 0 to 3 percent slopes	D
MdB	Mardin gravelly silt loam, 3 to 8 percent slopes	D
MNE	Mardin soils, steep	D
SXC	Swartswood and Mardin soils, sloping, very stony	C

Soil Borings

Soil borings, test pits and standard penetration tests were completed by Dynamic Earth, LLC. Soil boring and permeability reports can be found in the appendix of this report.

Groundwater

Investigation of groundwater conditions was conducted by Dynamic Earth, LLC as part of their geotechnical analysis. Groundwater was typically encountered at depths ranging between approximately 1 foot and 6.3 feet below ground surface (bgs) throughout the project site; corresponding to elevations ranging between 227.0 feet and 183.7 feet, however there were several test locations where no groundwater was encountered.

III. PROPOSED SITE CONDITIONS

The project proposes the construction of five (5) one-story warehouse buildings with associated parking, loading docks and access drives. The subject property is approximately 8,612,518 square feet (197.7 acres); however, the Total Site Area is confined to approximately 7,656,057 square feet (175.80 acres) area within the subject property due to wetlands, and steep slopes. The Project Area is defined by the limit of disturbance from within the Total Site Area. The Project Area will comprise of 5,651,481 square feet (129.70 acres). The Proposed Development Coverage Area consists of the area that will be developed with impervious coverage from site amenities such as the buildings and roads. Of the 129.70 acres available, approximately 2,600,373 square feet (59.70 acres) will comprise of the Proposed Development Coverage Area

Table 2 - Project Summary

Description	Acres
Subject Property	197.70
Total Site Area	175.80
Project Area	129.70
Existing Development Coverage Area	0.00

Proposed Development Coverage Area	59.70
------------------------------------	-------

The Proposed Project is depicted in detail on the Preliminary and Final Major Site Plan drawings, prepared by Dynamic Engineering, dated 12/13/2022, last revised 05/18/2023.

Construction Stormwater Team

The construction stormwater team will be listed in appendix of this report before construction begins. Each developer or contractor must sign a certification which will be maintained on-site document with the approved SWPPP. The responsibility for the ESC plan will be designated to the trained contractor. All erosion and sedimentation controls will be installed, monitored, repaired and replaced in accordance with the New York State Standards and Specifications for Erosion and Sediment Control.

Based on the scope of the proposed development, it is not feasible to limit disturbance to five (5) acres. Construction activities will be phased to limit areas of disturbance to the maximum extent practicable and soil management practices will be implemented to minimize the potential for increased pollution of stormwater runoff. Phasing plans will be developed and submitted to the local MS4 Official for review.

As the project anticipates disturbance greater than five acres of soil, the following phased general construction stages have been developed. The Overall Phasing Plan for the project site can be viewed in the appendix.

Construction Phasing

The Proposed Project will entail the following activities:

1. Land Clearing
2. Grading
3. Building Construction
4. Stormwater Management Practices
5. Parking lot construction and final stabilization

Below is a discussion of site-specific practices that will be implemented to protect water quality during each construction stage. Further, when site disturbances exceed 5 acres the qualified inspector will conduct at least two site inspections every seven calendar days. The two inspections will be separated by a minimum of two full calendar days. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures will be initiated by the end of the next business day and completed within seven days from the date the soil disturbance activity ceased.

Based on the qualified inspectors site inspections, additional site-specific practices may be installed if determined necessary to protect water quality.

Details for the erosion control measures can be found on the Erosion and Stormwater Pollution Prevention Plan drawings.

Stage 1

Prior to the start of construction, the work area will be prepared by installing public safety measures such as:

- Construction fencing,
- Permits and/or signs.

- Plan Stage 1 – Clearing and Grading. Sediment and erosion control devices to be placed

around and throughout the construction envelope during this construction phase include:

- Construction fence demarcating the limit of disturbance;
- Stabilized construction entrance established along the access road to the site;
- Delineation of a vehicle and equipment staging area with flags, tape and/or spray paint;
- Field office trailers for the construction engineers and managers, portable toilets, and dumpsters for trash will be installed within this area, as necessary;
- Delineation of material stockpile area with silt fencing;
- Silt fencing;
- Haybales;
- Paved surface inlet protection; and
- Spill kits

Site Clearing

The project entails clearing and re-grading approximately 129.7 acres. Sediment laden debris will be stockpiled within designated material stockpile areas. Cleared debris may be also temporarily stockpiled until it is transported offsite for disposal.

Grading

The proposed project, will require significant regrading of the site as depicted on the Grading Plans. To the maximum extent practicable, the required clean suitable soil/fill material will be placed immediately, however, in the event stockpile of material is necessary, designated stockpile areas will be demarcated with haybales and silt fencing.

Fill material shall be spread and compacted in layers one foot or less in thickness.

Stage 2

Building Construction

Concrete will be poured for the building foundations. The concrete truck washout will remain at the site near the stabilized construction entrance. Upon completion of the foundation, construction of the superstructure will begin. Finally, interior fit-out activities will commence.

Stage 3

Stormwater Management Practices

The project includes installation of storm drains, catch basins, piping, aboveground and underground infiltration and detention units, and structural manufactures stormwater treatment devices to capture, infiltrate, and treat stormwater runoff prior to discharge to tributary to the Moodna Creek to the north of the site and the Moodna Creek Tributary to the south of the site opposite of U.S. Route 9W. Associated drains and piping will be installed to convey stormwater to each designated stormwater management practice. Additionally, subsurface utility installation will be conducted during this phase. Prior to stabilization, all drain inlets will be protected with inlet protection measures.

In the event stormwater pools within utility trenches or excavation pits, localized dewatering will occur, as necessary.

Parking Lot

Construction of the sidewalks, curbs, drive aisles, loading docks and parking lot will constitute final stabilization of the Project Site. As appropriate, the installed stormwater infrastructure will be put on-line for the capture, conveyance, and discharge of site stormwater.

IV. EROSION AND SEDEMENTATION CONTROLS

Erosion and Sedimentation Controls

The Erosion and Stormwater Pollution Prevention Plans, depict the specific locations, sizes, and lengths of each erosion and sediment control practice, as detailed below. All contractors and sub-contractors will be required to understand the Erosion and Stormwater Pollution Prevention Plans and sign the certification statement provided described above. The responsibility for the Erosion and Stormwater Pollution Prevention Plans will be designated to the trained contractor. All erosion and sedimentation controls will be installed, monitored, repaired and replaced in accordance with the New York State Standards and Specifications for Erosion and Sediment Control.

Stabilized Construction Access

Stabilized construction access points will be used at all points of construction ingress and egress. The construction access point will consist of a stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving the Project Site to or from a public right-of-way, street, alley, sidewalk, or parking area. The purpose of stabilized construction access is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets. The stabilized construction access points will be established at two site access points from U.S. Route 9W. The stabilized construction access points will be constructed in accordance with the 2016 New York State Standards and Specifications for Erosion and Sediment Control.

Temporary Stockpiles

Materials, such as topsoil, will be temporarily stockpiled, as necessary, on the Project Site during the construction process. Temporary stockpile areas will be located, as depicted on the Erosion and Stormwater Pollution Prevention Plans, in areas away from storm drainage, water bodies and/or drainage courses to the maximum extent practicable. The stockpile areas will be surrounded with silt fencing to prevent runoff sediment laden runoff from exiting these areas. Soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, and will be kept covered when not in use with appropriately anchored plastic tarps. Broken or ripped tarps will be promptly replaced.

Silt Fence

Silt fencing will be installed, as depicted on the Erosion and Stormwater Pollution Prevention Plans, and in accordance with the New York State Standards and Specifications for Erosion and Sediment Control. These barriers may extend into non-impact areas to provide adequate protection of adjacent lands. Silt fencing will serve to intercept sediment laden runoff from areas with disturbed soils, reduce the runoff velocity and initiate deposition of the transported sediment. Tall stakes will be used for the silt fencing to allow for visibility above potential snowpack.

Haybales

A temporary barrier of straw, or similar material, used to intercept sediment laden runoff in areas where it is not feasible to utilize silt fence, as depicted on the Erosion and Stormwater Pollution Prevention Plans. All bales shall be placed in accordance with the New York State Standards and Specifications for Erosion and Sediment Control.

Catch Basin Inlet Protection

Catch basins within and surrounding the project site with the potential to receive sediment laden runoff from the site will be protected by a filter fabric drop or manufactured insert inlet protection measures. The filter fabric barriers will be installed around inlets to detain water and thereby reducing the sediment content of sediment laden water by settling thus preventing heavily sediment

laden water from entering a storm drain system. The top of the barrier will be maintained to allow overflow to drop into the drop inlet and not bypass the inlet to unprotected lower areas. Support stakes for fabric will be installed in accordance with the New York State Standards and Specifications for Erosion and Sediment Control.

Geotextile Filter Bag

In the event that dewatering is required, or stormwater ponding is present, localized dewatering will occur and geotextile bags will be used to trap and retain sediment onsite from pumped water.

Concrete Truck Washout

A concrete truck washout will be installed nearby the stabilized construction entrances along the access road in accordance with the New York State Standards and Specifications for Erosion and Sediment Control. The concrete truck washout will allow concrete truck mixers and equipment to be washed after their loads have been discharged, to prevent highly alkaline runoff from entering storm drainage systems or leaching into soil. They will be constructed to contain solids, wash water, and rainfall in addition to allowing for the evaporation of such waters.

Dust Control

Dust control measures will be implemented throughout the project site. To the extent practical construction activities will be phased to minimize the amount of area disturbed at one time. For disturbed areas, not subject to traffic, vegetation will be utilized to stabilize the exposed surfaces. For disturbed areas subject to traffic dust control methods utilizing water or wind breakers will be used as necessary.

Sprinkling

To provide short term dust control the project site may be sprayed with water until the surface is wet. No surface runoff will be generated from spraying activities.

Windbreakers

A silt fence or similar barrier may be used, if deemed necessary by the trained contractor, to control air currents at intervals equal to ten times the barrier height. Preservation of the existing wind barrier vegetation will occur to the maximum extent practical.

Winter Stabilization

Sediment and erosion controls will be modified in the as follows during winter months:

Snow Management

A snow management plan will be prepared allowing for adequate storage of mounded snow and control of the melt water, while not impacting ongoing construction activities. Stabilized construction access points will be widened as necessary to allow for snow management and stockpiling. Snow management activities (plowing) must not destroy or de grade installed erosion and sediment control practices. A minimum 25-foot buffer will be maintained, to the extent practical, from all perimeter controls such as silt fencing. Drainage structures must be kept open and free of snow and ice dams. All debris, ice dams, or debris from plowing operations, that restrict the flow of runoff and meltwater, shall be removed.

Exposed Soil

Exposed soils will be protected by the use of established vegetation, anchored straw mulch, rolled stabilization matting, or other durable covering. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures as described above will be initiated. Disturbed areas remaining exposed for more than 14 days during construction

operations will be stabilized temporarily. Straw or manufactured mulch will be applied at double the typical application rate when mulching is alone used for stabilization. Stone paths will be utilized when deemed necessary by the trained contractor or qualified inspector to stabilize access perimeters of buildings under construction and areas where construction vehicle traffic is anticipated.

Erosion and Sedimentation Control Inspections

Inspections by Qualified Inspector

Inspections will be completed by a qualified inspector to fully document each inspection. Site inspection checklists and guidelines can be found in the appendix of this report.

Erosion and sediment control measures will be inspected in accordance with SPDES requirements as follows:

- Start of construction;
- When soil disturbance activities are on-going, a qualified inspector will conduct a site inspection at least once every seven calendar days;
- When soil disturbance activities have been temporarily suspended and temporary stabilization measures have been applied to all disturbed areas, a qualified inspector will conduct a site inspection at least once every 30 calendar days. The applicant or operator will notify the NYSDEC Regional Office stormwater contact person in writing prior to reducing the frequency of inspections.

The qualified inspector will maintain a record of all inspection reports in a logbook, maintained onsite. Any changes to the proposed SWPPP will be documented. During each inspection, the following information will be recorded:

- Indicate on a site map all areas of the Project Site that have undergone temporary or permanent stabilization.
- Indicate all disturbed areas that have not undergone active work during the previous 14-day period. Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of the sediment storage volume.
- Inspect all erosion and sediment control practices and document all maintenance activities.
- Document any excessive deposition of sediment or ponding water along barrier or diversion systems.

At a minimum, the qualified inspector shall inspect:

- All erosion and sediment control practices and pollution prevention measures;
- All post-construction stormwater management practices under construction;
- All areas of disturbance that have not achieved final stabilization;
- All points of discharge to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site, and;
- All points of discharge from the construction site.

Inspections by Trained Contractor

ESC inspections will be conducted daily by a trained contractor to determine when ESC measures need maintenance or repair. The trained contractor will inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily. If deficiencies are identified, the trained contractor shall begin implementing corrective actions within one business day and will complete the corrective actions in a reasonable time frame.

If soil disturbance activities become temporarily suspended and temporary stabilization measures have been applied to all disturbed areas or if soil disturbance activities shut down with partial project completion, the daily inspections will also be suspended until soil disturbance activities resume.

Maintenance and inspection schedules for the contractor(s) have been provided in the appendix of this report.

Stabilized Construction Access Point

Periodic inspections and maintenance will be provided after each rainfall event and on an as needed basis at the discretion trained contractor and/or qualified inspector. The entrances will be maintained in a condition which will prevent tracking of sediment onto public rights-of-way.

Temporary Stockpiles

The stockpiles will be inspected to confirm the integrity of the surrounding silt fencing.

Silt Fence

Silt fencing will be frequently monitored frequently for degradation and blockage. Maintenance will be performed as needed and material removed when bulges develop in the fencing.

Haybales

Haybales will be frequently monitored for degradation and blockage. Replacement will occur promptly when the qualified inspector has determined the straw bale is no longer functioning as intended.

Catch Basin Inlet Protection

The fabric barrier will be inspected after each rainfall event and removal of sediment and/or repairs will be performed as needed.

Geotextile Filter Bag

The geotextile filter bag is considered full and should be replaced when remaining bag flow area has been reduced by 75%.

Concrete Truck Washout

The concrete washout areas will be inspected daily for damage or leaks by the trained contractor. Facilities will be repaired or replaced immediately upon the discovery of any leaks or damages. Accumulated hardened material will be removed when 75% of the storage capacity of the structure is filled.

Dust Control

Dust control measures will be maintained through dry weather periods until all disturbed areas are stabilized.

Winter Stabilization

The site will be inspected frequently to ensure that the erosion and sediment control plan is functioning as intended.

Compliance inspections must be performed and reports filed properly in accordance with this SWPPP during a winter shutdown as described above.

Soil Stabilization Plan

Please refer to the Soil Erosion and Sediment Control Notes & Details for detailed information regarding temporary and permanent stabilization.

Temporary Soil Stabilization

Disturbed areas will be stabilized as soon as possible after construction is completed. Temporary seeding or mulching will be used on areas which will be exposed for more than 14 days and maintenance will be performed as necessary to ensure continued stabilization.

Permanent Soil Stabilization

Permanent stabilization will be performed as soon as possible after the completion of final grading and utility installation. Permanent seeding will be used on unpaved areas.

Inspections

Implementation of the Soil Stabilization Plan will be inspected at the same frequency at erosion and sediment controls. Site inspection checklists and guidelines can be found in appendix of this report.

Good Housekeeping and Pollution Prevention Measures

Vehicle and Construction Equipment Staging and Maintenance

Vehicle and construction equipment staging and maintenance areas will be located away from all drainage ways. Equipment cleaning, maintenance and repair will be conducted in designated areas with the perimeter of the area protected by silt fencing.

Equipment and Vehicle Washing

The erosion and sedimentation controls and concrete washout area detailed above, will be maintained as necessary to contain soil and prevent vehicles tracking material off site. Wash waters will consist of clean water only. No soaps, detergents, or solvents will be used to clean construction equipment and vehicle while onsite.

Construction Materials and Debris

The Project Site will be inspected at the end of each work day for building materials, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials that may be exposed to precipitation and stormwater. Materials identified as having the potential to discharge pollutants will be protected from precipitation and stormwater. Solid wastes will be disposed of in accordance with local, state and federal laws.

Spill and Leak Prevention Plan

The spill prevention and control plan, detailed below, will be implemented by the trained contractor, as necessary, in accordance with the NYSDEC Spill Guidance Manual.

Spill Prevention

Refueling equipment shall be located at least 100 feet from all wetlands, streams and other surface waters.

All construction vehicles will be inspected daily for visible leaks of automotive fluid. If a leak is identified, immediate actions, as detailed in the spill prevention and control plan, will be taken to contain and clean up spilled fluids.

The trained contractor is responsible for maintaining all necessary Material Safety Data Sheets (MSDS) for all materials to be stored on-site. All state and federal regulations shall be followed for the storage, handling, application, usage, and disposal of pesticides, fertilizers, and petroleum products. All workers on-site will be required to be trained on safe handling and spill prevention procedures for all materials used during construction. Informational material regarding proper handling, spill response, spill kit location, and emergency actions to be taken, will be posted and available to all construction personnel.

Spill Reporting and Initial Notification Requirements

20-gallon spill kits for fast response for emergency oil, water-based and chemical liquid spills will be distributed around active construction areas. Spill kits, will include:

- 15 x 19" Pads
- 3" x 12' Sorbent Socks
- 18 x 18" Pillows
- Nitrile Gloves
- Emergency Handbook
- Googles
- Disposal Bags

Under New York State law, all petroleum and most hazardous material spills must be reported to DEC Hotline (1-800-457-7362). If a spill is discovered and the responsible party cannot be located, the person who discovers who discovers the spill shall report the spill. Parties responsible for spills will be informed of their responsibilities by the trained contractor. In the event of additional on-scene assistance is required, local authorities shall be contacted.

Petroleum spills must be reported to DEC unless they meet all of the following criteria:

- The spill is known to be less than 5 gallons;
- The spill is contained and under the control of the spiller;
- The spill has not and will not reach any State's water or land; and
- The spill is cleaned up within 2 hours of discovery.

For spills not deemed reportable, it is strongly recommended that the facts concerning the incident be documented by the spiller and a record maintained for one year.

Steps Following an Accidental Spill

- No party shall place themselves in a hazardous situation;
- Stay upwind and updrift of the accident site;
- Do not walk in or near the spill, leak, or fire until this can be done safely;
- Treat any unknown substance as a hazardous material until the identity of the substance becomes known;
- Defer to the authority of the response agencies who have the responsibility and resources for taking actions at the emergency scene;

Sanitary facilities

Sanitary facilities will be provided for onsite personnel by the Contractor and must be utilized by all construction personnel.

Prohibited Discharges

The following discharges are prohibited:

- Wastewater from washout of concrete;
- Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
- Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;
- Soaps or solvents used in vehicle and equipment washing; and
- Toxic or hazardous substances from a spill or other release.

Inspections

Pollution prevention measure inspections within the active work area will be conducted by a qualified professional and trained contractor as described above. If deficiencies are identified, the qualified inspector shall begin implementing corrective actions within one business day and will complete the corrective actions in a reasonable time frame.

V. EXISTING DRAINAGE CONDITIONS

Pre-Construction Stormwater

The site has been evaluated using the TR-55 'Urban Hydrology for Small Watersheds' standards with the following existing drainage sub-watershed area as depicted on the Existing Drainage Area Map.

Ex. Study Area North (Moodna Creek): This study area consists of the majority of the project site. Under existing conditions this study area consists of large wooded areas, wetland C, stone walls, and steep slopes. Stormwater in this study area flows north overland and is ultimately tributary to the Moodna Creek located just outside of the property boundaries.

Ex. Study Area North (Moodna Creek) Undisturbed: This study area consists of the remaining area outside of the project site. Under existing conditions this study area consists of large wooded areas, wetland C, stone walls, and steep slopes. Stormwater in this study area flows north overland and is ultimately tributary to the Moodna Creek located just outside of the property boundaries.

Ex. Study Area South (Route 9W): This study area consists of the southern portion of the site. Under existing conditions this study area consists of large wooded areas, stone walls, and steep slopes. Stormwater in this study area flows south overland and is ultimately tributary to an existing culvert located within U.S. Route 9W before discharging to a tributary of the Moodna Creek offsite.

Ex. Study Area South (Route 9W) Undisturbed: This study area consists of the southern portion of the site that is outside of the project site. Under existing conditions this study area consists of large wooded areas, stone walls, and steep slopes. Stormwater in this study area flows south overland and is ultimately tributary to an existing culvert located within U.S. Route 9W before discharging to a tributary of the Moodna Creek offsite.

VI. PROPOSED DRAINAGE CONDITIONS

Post Construction Stormwater

In the proposed condition, the site will utilize a number of infiltration and detention facilities which will release stormwater runoff at a controlled rate through outlet control structures into the onsite tributary. The infiltration and detention facilities have been designed to satisfy the channel protection, overbank flood, and extreme storm requirements set forth by the New York State Stormwater Design

Manual. Stormwater management systems for the proposed site has been designed to comply NYSDEC standards as well as the local ordinances as described in the chapter 121 of the Town of Cornwall's Stormwater Management ordinances.

The site has been evaluated using the TR-55 'Urban Hydrology for Small Watersheds' standards and with the following proposed drainage sub-watershed areas as depicted on the Proposed Drainage Area Map. Please note, all of the sub-drainage areas described below are ultimately tributary to the point of analysis described above.

Prop. Study Area AG Infiltration Basin A: This area consists of the roof area of the northern half of building A, the parking area, loading areas, and landscape areas around the north, west, and south half building A. Under proposed conditions stormwater runoff is tributary via overland flow and the proposed stormwater conveyance system to proposed AG Infiltration Basin A and is ultimately tributary to the Moodna Creek.

Prop. Study Area AG Infiltration Basin B: This area consists of the roof area of the southern half of building A and northern half of building C, the remaining portion of the loading zones along the north and south side of the building A, the parking on the east side of building A and north side of building C, the northern roadway, and immediate landscaping areas around AG Infiltration Basin B. Under proposed conditions, stormwater runoff is tributary via overland flow and the proposed stormwater conveyance system to AG Infiltration Basin B and is ultimately tributary to the Moodna Creek.

Prop. Study Area AG Infiltration Basin C: This area consists of the roof area of the southern half of building C, the loading zones along building C, the parking area along the south side of building C, the roadway traveling between building C and buildings B & D, and immediate landscaping areas around AG Infiltration Basin C. Under proposed conditions, stormwater runoff is tributary via overland flow and the proposed stormwater conveyance system to AG Infiltration Basin C and is ultimately tributary to the Moodna Creek

Prop. Study Area North (Moodna Creek) Undetained: This area consists of portions of the landscaped areas below the roadway along the northern, wetland C, and eastern portions of the roadway and the roof runoff from building B. Under proposed conditions, stormwater runoff from the buildings is collected via proposed roof leaders on each building and discharged into an open space area where it will overland flow along with the remaining open space areas through a swale where it will be tributary to the Moodna Creek.

Prop. Study Area North (Moodna Creek) Undisturbed: This area consists of the wooded areas beyond the project site area along the western, northern, and eastern property boundaries. Under proposed conditions, the area is to remain exactly as it is represented in existing conditions and will drain via overland flow where it will be tributary to the Moodna Creek.

Prop. Study Area AG Infiltration Basin G/H: This area consists of the easternmost driveway from U.S. Route 9W, a portion of the roadway around building C and in between building C and building E, and the immediate landscape area around the AG Infiltration Basin G/H. Under proposed conditions, stormwater runoff is tributary via overland flow or the proposed stormwater conveyance system to either of the two (2) shared aboveground infiltration basins that are noted as AG Infiltration Basin South 2 and is ultimately tributary to U.S. Route 9W.

Prop. Study Area UG Detention Basin E: This area consists of the eastern half of Building D and southern parking lot of building D. Under proposed conditions, stormwater runoff is tributary via the proposed stormwater conveyance system to Underground Detention Basin E located in the southern

parking area of building D and is ultimately tributary to U.S. Route 9W.

Prop. Study Area UG Detention Basin F: This area consists of the parking area, loading zone, and roadway directly in front of building E. Under proposed conditions, stormwater runoff is tributary via the proposed stormwater conveyance system to Underground Detention Basin F located next to the trailer parking for building E and is ultimately tributary to U.S. Route 9W.

Prop. Study Area South (Route 9) Undetained: This area consists of the western portion of building D, all of building E and the landscaped areas below the southern roadway. Under proposed conditions the roof runoff from buildings D & E are collected via roof leaders and discharged to the adjacent wetlands next to each building. All runoff from this point is ultimately tributary via overland flow to U.S. Route 9W.

Prop. Study Area South (Route 9) Undisturbed: This area consists of wooded and wetlands areas between Buildings B, D, & E. Under proposed conditions the area will remain exactly as it is currently represented in existing conditions and will drain via overland flow to either wetlands A or D next to each building. All runoff from this point is ultimately tributary via overland flow to U.S. Route 9W.

Site Planning Practices

The project complies with the local zoning ordinance as a special permitted use. The proposed project contains only one (1) variance for building height which does not exceed beyond 10% of the ordinance requirement. The proposed disturbance will be primarily limited to interior portions of the site and is intended to preserve undisturbed areas and mature vegetation. The project is intended to limit disturbance to the existing wetlands to the maximum extent practicable.

Water Quality

Post-construction stormwater quality was evaluated in accordance with the 2015 NYSDEC SMDM. The Water Quality Volume (WQv) was determined and incorporated into the project's overall design.

The WQv is intended to improve water quality by capturing and treating runoff from small, frequent storm events that tend to contain higher pollutant levels. The WQv is reduced to the maximum extent practical through the proposed site design and any remaining WQv is treated prior to site discharge. Runoff reduction is achieved by infiltration. Areas of the site where in-situ soils are not favorable for infiltration practices will utilize manufactured treatment devices to treat stormwater runoff to 80% removal of total suspended solids and 40% phosphorus removal.

The required **WQv** for the project is **7.38 ac-ft** calculated as follows:

Existing Impervious Surfaces = 0.00 AC

New Impervious Surfaces = **59.70 AC**

Total Site Area = 197.67 AC

Compute Impervious Cover

Impervious Cover (I) = $(59.70) / 197.67 = 30.2\%$

Compute Runoff Coefficient

$$R_v = 0.05 + (I)(0.009) = 0.05 + (30.2)(0.009) = 0.32$$

Compute Water Quality Volume (WQv)

From Figure 4.1 of Stormwater Management Design Manual, 90% Rainfall = 1.4”

$$WQ_v = [(P)(R_v)(A)] / 12 = [(1.4'')(0.32)(197.67)] / 12 = 7.38 \text{ ac-ft.}$$

Based on the output from the HydroCAD model of the proposed stormwater management system, the volume provided below the outlet is 8.05 ac-ft.

Please refer to the summary below:

Water Quality Volume Summary

Water Quality Volume	321,508 cf	7.38 ac-ft
Minimum Runoff Reduction Volume (cubic feet)	82,723 cf	1.90 ac-ft
Runoff Reduction (proposed infiltration)	350,658 cf	8.05 ac-ft

WQv Summary Table (Moodna Creek)		
Study Area	WQv Required (ac-ft)	WQv Provided (ac-ft)
Basin A	1.53	1.54
Basin B	2.59	2.65
Basin C	2.29	2.35
Total	6.42	6.54

WQv Summary Table (Route 9)		
Study Area	WQv Required (ac-ft)	WQv Provided (ac-ft)
Basin E	0.44	0.00
Basin F	0.39	0.00
Basin G/H	0.66	1.51
Total	1.49	1.51

Water Quantity

Water quantity control practices for the channel protection volume, overbank flood and extreme flood conditions in the pre- and post-construction condition are detailed below.

Study Area North (Moodna Creek) (CFS)		
Design Storm	Existing Combined Runoff Rates (cfs)	Proposed Combined Runoff Rates (cfs)
1-Year (channel protection)	61.64	53.91
10-Year (overbank flood)	190.15	151.30

100-Year (extreme flood)	445.06	382.84
--------------------------	--------	--------

Study Area South (Route 9W) (CFS)		
Design Storm	Existing Combined Runoff Rates (cfs)	Proposed Combined Runoff Rates (cfs)
1-Year (channel protection)	25.95	25.61
10-Year (overbank flood)	83.82	68.14
100-Year (extreme flood)	200.42	162.74

Overall Runoff Rates (CFS)		
Design Storm	Existing Combined Runoff Rates (cfs)	Proposed Combined Runoff Rates (cfs)
1-Year (channel protection)	84.06	77.70
10-Year (overbank flood)	264.24	215.05
100-Year (extreme flood)	622.73	544.19

Runoff reduction volume

Runoff Reduction Volume (RRv) is a reduction of the total Water Quality Volume (WQv) by application of green infrastructure techniques and Standard Stormwater Management Practices (SMPs) to replicate pre-development hydrology. It is intended to improve the mitigation of the negative effects of stormwater runoff from development by incorporating the design and layout of stormwater management features into the site planning process.

The RRv requirement can be accomplished by application of on-site green infrastructure techniques, standard stormwater management practices with runoff reduction capacity, and good operation and maintenance. The process is an iterative five-step approach that combines site planning with the use of green infrastructure techniques and standard stormwater management practices until the RRv requirement is met.

The five-step process is as follows:

1. Site planning to preserve natural features and reduce impervious cover;
2. Calculation of the water quality volume for the site;
3. Incorporation of green infrastructure techniques and standard SMPs with RRv capacity;
4. Use of standard SMPs, where applicable; and
5. Design of volume and peak rate control practices where required.

If by using these techniques the calculated RRv is greater than the required WQv, the RRv requirement is met.

The runoff reduction technique selected for this project is infiltration. Infiltration was determined to be suitable for the proposed project in consideration of factors including site topography, slopes, soil properties, project layout, and maintenance requirements.

As indicated in the water quality drainage calculations on the previous page, the proposed infiltration basin provides a total dead storage area of 8.05 ac-ft below the low flow orifice. This volume exceeds the required water quality volume (WQv) of 7.38 ac-ft. Therefore, the required runoff reduction volume goals are met on this project.

Soil Data

Soil Group	Area (AC)	HSG Specific Reduction Factor (S)
A	0.00	55%
B	0.00	40%
C	16.44	30%
D	181.23	20%
TOTAL	197.67 AC	21%

Runoff Reduction Volume (RRv) Summary

Required Runoff Reduction Volume (RRv)	1.55 ac-ft
Provided Water Quality Treatment Volume	8.05 ac-ft

Required RRv = (P) * (Rv) * (Aic) * (S) / 12 = (1.4") * (0.32) * (197.67 ac-ft) * (0.21) / 12 = 1.55 ac-ft

Stormwater Management Practices

Impacts to stormwater as a result of the development have been reduced through the implementation of volume reduction (infiltration) techniques. Utilization of structural stormwater controls, such as underground infiltration units, will infiltrate and treat runoff to satisfy the post-construction requirements of the SPDES General Permit for Stormwater Discharges from Construction Activity - GP-0-20-001.

Infiltration Facilities

The proposed aboveground and underground infiltration facilities have been designed in accordance with the following requirements set forth by the New York State Stormwater Design Manual:

- *The bottom of the infiltration facility shall be separated by at least three feet vertically from the seasonally high-water table or bedrock layer.*
- *A minimum pretreatment volume of 25% of the WQv must be provided prior to entry to an infiltration facility.*

Based on the relatively shallow depths from the existing grades to the seasonally high-water table (SHWT), it was necessary to raise the grade on-site in order to provide the necessary separation between the SHWT and the proposed infiltration facilities. As such, it will be necessary to, place the proposed infiltration facilities in fill soils.

Inspection

During construction, a qualified inspector will inspect all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP.

Operation and Maintenance Plan

The responsibility for implementation of long-term operation and maintenance of a postconstruction stormwater management practice is the responsibility of the applicant. A maintenance agreement will be used to ensure long term operation and maintenance of the stormwater management practices.

Operation and maintenance for each stormwater management practice or runoff reduction technique, inclusive of inspection and maintenance schedules and actions to ensure continuous and effective operation, is detailed below.

Underground Infiltration Facilities

The applicant will be responsible for long term operation and maintenance of the underground infiltration facilities. Maintenance of the underground infiltration facilities will require the upstream collection system feeding the chambers be routinely inspected and cleaned. Upstream catch basins shall incorporate a sump and hooded outlet pipes as preventive measures. Debris accumulating in these structures shall be inspected and cleaned once every 2-3 months.

VII. Alternative Site Plans

Proposed Action

Under the Proposed Action, five (5) buildings are proposed. The buildings A-E would have a total building footprint of 1,725,476 sf and broken up into footprints of 362,094 sf, 145,281 sf, 752,943 sf, 273,495 sf, and 191,663 sf respectively. The site features two (2) entrances along U.S. Route 9W. Loop roads are provided along buildings B-E to avoid passenger vehicles traveling through loading zones. Building A will require vehicles to travel through the loading zones to reach parking lots on the south side of the building or circulate directly to Building B.

The Proposed Action balances the site effect by maximizing building yield and while allowing efficient space for stormwater management system installation preventing disturbance to the immediate surrounding wetlands areas on site. The Proposed Action proposes four (4) aboveground infiltration basins, one (1) aboveground detention basin, two (2) underground infiltration basins, and one (1) underground detention basin. In order to keep existing drainage patterns, a series of inlets will need to be installed to collect and route runoff to a stormwater management basin before ultimately discharging to the appropriate study area. Under existing conditions, the majority of runoff would drain overland to the Moodna Creek located to the north of the site, while the remaining runoff would flow towards U.S. Route 9W where it will pass through a culvert before ultimately discharging to a tributary of the Moodna Creek.

Alternate Site Plan 'A'

Under Alternative Site Plan 'A', five (5) buildings are proposed. The buildings A-E would have a total building footprint of 2,050,649 sf and broken up into footprints of 794,850 sf, 145,381 sf, 615,880 sf, 273,556 sf, and 220,982 sf respectively. The site features two (2) entrances along U.S. Route 9W. Loop roads are provided along buildings B-D to avoid passenger vehicles traveling through loading zones. Buildings A & E will require vehicles to travel through the loading zones to reach parking lots on the far side of the building or circulate through the rest of the site.

Due to the orientation of buildings A & C and the existing grades on the site. Alternative Site Plan 'A' would require significantly more fill to establish finished floors compared to the Proposed Action. Furthermore, due to the large impervious area throughout the site, there is little space remaining to provide adequate aboveground stormwater management systems to manage the increased runoff from the proposed project. As a result, a series of underground basins will be required underneath large pavement sections to provide the necessary volume for the site. In order to keep existing drainage patterns, a series of inlets will need to be installed to collect and route runoff to a stormwater management basin before ultimately discharging to the appropriate study area. Under existing conditions, the majority of runoff would drain overland to the Moodna Creek located to the north of the site, while the remaining runoff would flow towards U.S. Route 9W where it will pass through a culvert before ultimately discharging to a tributary of the Moodna Creek.

Alternate Site Plan 'B'

Under Alternative Site Plan 'B', five (5) buildings are proposed. The buildings A-E would have a total building footprint of 2,020,594 sf and broken up into footprints of 794,850 sf, 145,381 sf, 615,880 sf, 273,568 sf, and 190,915 sf respectively. Alternative Site Plan 'B' features a smaller footprint for building E, a new road around the loading zone to the parking area of building E to remove passenger vehicles from entering the loading zone of building E, and a connection to the loading zone from building B to building A. The site features two (2) entrances along U.S. Route 9W. Loop roads are provided along buildings B-E to avoid passenger vehicles traveling through loading zones. Building A will require vehicles to travel through the loading zones to reach parking lots on the far side of the building or circulate through the rest of the site.

Due to the orientation of buildings A & C and the existing grades on the site. Alternative Site Plan 'A' would require significantly more fill to establish finished floors compared to the Proposed Action. Furthermore, due to the large impervious area throughout the site, there is little space remaining to provide adequate stormwater management systems to manage the increased runoff from the proposed project. As a result, a series of underground basins will be required underneath large pavement sections to provide the necessary volume for the site. In order to keep existing drainage patterns, a series of inlets will need to be installed to collect and route runoff to a stormwater management basin before ultimately discharging to the appropriate study area. Under existing conditions, the majority of runoff would drain overland to the Moodna Creek located to the north of the site, while the remaining runoff would flow towards U.S. Route 9W where it will pass through a culvert before ultimately discharging to a tributary of the Moodna Creek.

Alternate Site Plan 'C'

Under Alternative Site Plan 'C', four (4) buildings are proposed. The buildings A-D would have a total building footprint of 1,303,524 sf and broken up into footprints of 359,726 sf, 145,381 sf, 524,849 sf, and 273,568 sf respectively. Alternative Site Plan 'C' features no proposed buildings within the highway commercial zone portion of the property which and a rotated building C. The site features two (2) entrances along U.S. Route 9W. Loop roads are provided along buildings B-D to avoid passenger vehicles traveling through loading zones. Building A will require vehicles to travel through the loading zones to reach parking lots on the far side of the building or circulate through the rest of the site.

Under Alternative Site Plan 'C', building A has been shortened in width and building C has been rotated perpendicular to U.S. Route 9W. These changes result in more favorable positions from a grading perspective by resulting in less fill required by the site to create finished floors for buildings A & C. Due to the changes in the building layout, open space is available on the site to establish to provide both aboveground and underground stormwater management basins to manage the increased runoff from the proposed project. In order to keep existing drainage patterns, a series of inlets will need to be installed to collect and route runoff to a stormwater management basin before ultimately discharging to the appropriate study area. Under existing conditions, the majority of runoff would drain overland to the Moodna Creek located to the north of the site, while the remaining runoff would flow towards U.S. Route 9W where it will pass through a culvert before ultimately discharging to a tributary of the Moodna Creek.

Alternate Site Plan 'D'

Under Alternative Site Plan 'D', five (5) buildings are proposed. The buildings A-E would have a total building footprint of 1,629,206 sf and broken up into footprints of 326,467 sf, 145,381 sf, 692,875 sf, 273,568 sf and 190,915 sf respectively. Alternative Site Plan 'D' features a wider Building A and thinner Building C than the Proposed Action. The site features two (2) entrances along U.S. Route 9W. Loop

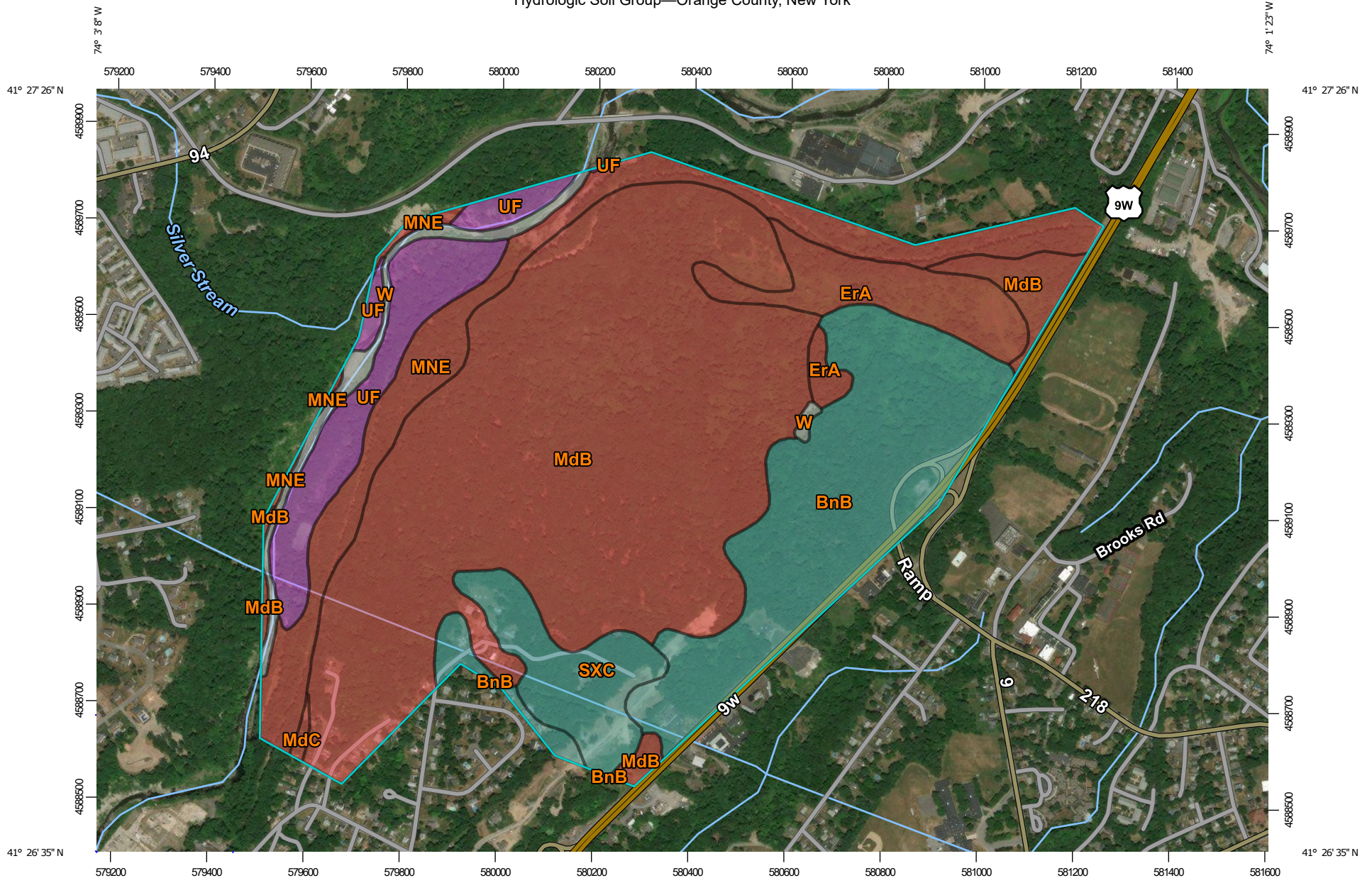
roads are provided along buildings B-E to avoid passenger vehicles traveling through loading zones. Building A will require vehicles to travel through the loading zones to reach parking lots on the far side of the building or circulate through the rest of the site.

The changes in Alternative Site Plan 'D' result in more favorable positions from a grading perspective by resulting in less fill required by the site to create finished floors for buildings A & C. Due to the changes in the building layout, open space is available on the site to establish to provide both aboveground and underground stormwater management basins to manage the increased runoff from the proposed project. In order to keep existing drainage patterns, a series of inlets will need to be installed to collect and route runoff to a stormwater management basin before ultimately discharging to the appropriate study area. Under existing conditions, the majority of runoff would drain overland to the Moodna Creek located to the north of the site, while the remaining runoff would flow towards U.S. Route 9W where it will pass through a culvert before ultimately discharging to a tributary of the Moodna Creek.

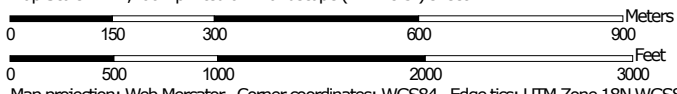
APPENDIX

NRCS SOIL MAPPING

Hydrologic Soil Group—Orange County, New York



Map Scale: 1:11,100 if printed on A landscape (11" x 8.5") sheet.



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




Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

1/6/2021
Page 1 of 4

MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





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

Soil Rating Lines


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

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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: Orange County, New York
 Survey Area Data: Version 21, Jun 11, 2020

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

Date(s) aerial images were photographed: Oct 7, 2013—Feb 26, 2017

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BnB	Bath-Nassau channery silt loams, 3 to 8 percent slopes	C	67.1	18.7%
ErA	Erie gravelly silt loam, 0 to 3 percent slopes	D	19.9	5.5%
MdB	Mardin gravelly silt loam, 3 to 8 percent slopes	D	183.1	50.9%
MdC	Mardin gravelly silt loam, 8 to 15 percent slopes	D	0.6	0.2%
MNE	Mardin soils, steep	D	38.5	10.7%
SXC	Swartswood and Mardin soils, sloping, very stony	C	18.7	5.2%
UF	Udifluvents-Fluvaquents complex, frequently flooded	A	24.3	6.8%
W	Water		7.5	2.1%
Totals for Area of Interest			359.8	100.0%

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

GEOTECHNICAL REPORTS

REPORT OF SUPPLEMENTAL GEOTECHNICAL AND STORMWATER BASIN AREA INVESTIGATION

PROPOSED INDUSTRIAL WAREHOUSE

2615 US Route 9 West
Section 9; Block 1, Lot 25.22
Town of Cornwall, Orange County, New York

Prepared for:

CORNWALL LOGISTICS, LLC
c/o TREETOP DEVELOPMENT, LLC
500 Frank W Burr Boulevard # 47
Teaneck, New Jersey 07666

Prepared by:



245 Main Street, Suite 113
Chester, New Jersey 07930


Patrick J. Granitzki, P.E.
Senior Principal
NY PE License No. 99342


Francis Van Cleve
Principal

Project No.: 2803-99-012E
July 12, 2023

REPORT OF SUPPLEMENTAL GEOTECHNICAL AND STORMWATER BASIN AREA INVESTIGATION

Proposed Industrial Warehouse
2615 US Route 9 West
Section 9; Block 1, Lot 25.22
Town of Cornwall, Orange County, New York

TABLE OF CONTENTS

1.0	SUMMARY OF FINDINGS	1
2.0	INTRODUCTION	5
2.1	Authorization.....	5
2.2	Purpose.....	5
2.3	Scope	5
2.3.1	Field Exploration	6
2.3.2	Geophysical Survey	12
2.3.3	Laboratory Testing Program.....	13
3.0	SITE DESCRIPTION	14
3.1	Location and Description.....	14
3.2	Existing Conditions	14
3.3	Proposed Construction.....	14
4.0	SUBSURFACE CONDITIONS	17
4.1	Site Geology.....	17
4.2	United States Department of Agriculture (USDA) Soil Survey.....	17
4.3	Subsurface Soil Profile	18
4.4	Groundwater and Seasonal High Groundwater.....	19
4.5	Geophysical Investigation Results	20
5.0	CONCLUSIONS AND RECOMMENDATIONS.....	21
5.1	General.....	21
5.2	Site Preparation and Earthwork.....	21
5.3	Structural Fill and Backfill	24
5.4	Groundwater Control	26
5.5	Foundation Recommendations	27
5.6	Floor Slab	28
5.7	Pavement Design Criteria	29

REPORT OF SUPPLEMENTAL GEOTECHNICAL AND STORMWATER BASIN AREA INVESTIGATION

Proposed Industrial Warehouse
2615 US Route 9 West
Section 9; Block 1, Lot 25.22
Town of Cornwall, Orange County, New York

TABLE OF CONTENTS (Continued)

5.8	Retaining Walls and Lateral Earth Pressures.....	30
5.9	Seismic and Liquefaction Considerations.....	32
5.10	Temporary Excavations.....	32
5.11	Seasonal High Groundwater and Infiltration.....	32
5.12	Supplemental Post-Investigation Services.....	36
6.0	GENERAL COMMENTS	37

APPENDICES

Supplemental Test Location Plan
Conceptual Blasting Plan
Records of Supplemental Subsurface Exploration
Geophysical Survey – Seismic Refraction Data
USDA – NRCS Custom Soil Resources Report for Orange County, NY
Geotechnical Terms and Symbols
USCS Standard Classification System

1.0 SUMMARY OF FINDINGS

Dynamic Earth, LLC (Dynamic Earth) has completed a supplemental exploration and evaluation of the subsurface conditions for the proposed site development located at 2615 US Route 9 West in the Town of Cornwall, Orange County, New York. The site is further identified as Section 9; Block 1, Lot 25.22 and is shown on the enclosed *Supplemental Test Location Plan*.

Dynamic Earth previously completed a January 4, 2023 *Report of Preliminary Geotechnical Investigation and Stormwater Basin Area Report* at the subject site. Subsequent to our initial report, additional testing was requested to further evaluate the existing site soils, the potential consistency/rippability of bedrock, the depth to bedrock, and provide supplemental geotechnical recommendations, as applicable. In addition, a supplemental stormwater basin area investigation was requested within the area of proposed stormwater management facilities. The results of our supplemental investigation and recommendations related to the proposed site development are included herein.

At the time of our investigation, the subject site was undeveloped and wooded. Based on a July 10, 2023 *Overall Grading Plan* prepared by our affiliate company, Dynamic Engineering Consultants, PC (Dynamic), the proposed site development will include construction of five warehouse buildings occupying a total footprint area of approximately 1.726 million square feet, as described below:

- **Building A (Northwestern Portion of Site):** Proposed Building A will occupy a footprint area of 362,277 square feet and have a finished floor elevation of approximately 223.0 feet. Earth cuts on the order of four feet are proposed within the southwestern portion of the building footprint, and earth fills on the order of 18 feet are proposed within the northeastern portion of the building footprint.
- **Building B (Western Portion of Site):** Proposed Building B will occupy a footprint area of 145,381 square feet and have a finished floor elevation of approximately 230.0 feet. Earth cuts ranging between approximately one foot and four feet are proposed throughout the building footprint;
- **Building C (Northeastern Portion of Site):** Proposed Building C will occupy a footprint area of 753,125 square feet and have a finished floor elevation of approximately 194.0 feet. Earth cuts on the order of 13 feet are proposed within the southwestern portion of the building footprint, and earth fills on the order of 33 feet are proposed within the northeastern portion of the building footprint;

- **Building D (Southern Portion of Site):** Proposed Building D will occupy a footprint area of 273,568 square feet and have a finished floor elevation of approximately 230.0 feet. Earth cuts on the order of eight feet are proposed within the central portion of the building footprint, and earth fills on the order of 10 feet are proposed within the southern portion of the building footprint.

- **Building E (Southeastern Portion of Site):** Proposed Building E will occupy a footprint area of 191,755 square feet and have a finished floor elevation of approximately 204.5 feet. Earth cuts on the order of eight feet are proposed within the eastern portion of the building footprint, and earth fills on the order of 20 feet are proposed within the southern portion of the building footprint.

- **Additional Site Improvements:** Proposed parking areas and roadways will be located throughout the site (surrounding the buildings) and an access road connecting to Route 9W will be located within the eastern portion of the overall site. The majority of proposed pavement areas will include earth cuts and fills on the order of five to ten feet; however relatively deeper earth cuts on the order 28 feet will be required within the central portion of the site, and large earth fills up to approximately 50 feet are anticipated within proposed pavement/roadway areas within the eastern portion of the overall site. Earth retaining wall structures are proposed throughout the site that will typically have maximum exposed wall heights on the order of 20 to 30 feet. In addition, eight stormwater management facilities (identified as Basins A through H) are proposed at various locations throughout the site.

The supplemental subsurface exploration included reconnaissance of the project site, drilling soil borings, excavating structural test pits and soil profile pits, performing in-situ permeability testing, performing a geophysical survey (seismic refraction), and supplemental evaluation of the geotechnical conditions relevant to the proposed construction details provided. A summary of Dynamic Earth's findings and recommendations is presented below:

- **Generalized Subsurface Conditions:** The soil borings and soil profile pits were performed within undeveloped areas and encountered approximately two inches to 17 inches of topsoil at the surface. Beneath the surface cover, existing fill material was encountered in one test location (SPP-209) that generally consisted of sand with silt, gravel and trace amounts of debris (ceramic fragments). The existing fill material was encountered to a depth of approximately three feet below the ground surface; corresponding to an elevation of 134.0 feet. Beneath the surface cover or existing fill material (where encountered), natural glacial till deposits were encountered that consisted of gravel (USCS: GP, GP-GM, GW, GM, GC-GM, and GC), sand (USCS: SP, SP-SM, SW-SM, SM, and SC), silt (USCS: ML) and clay (USCS: CL and CL-ML). The natural glacial deposits were encountered to depths ranging between approximately 0.7 feet and 20.0 feet below the ground surface; corresponding to elevations ranging between 232.8 feet and 122.0 feet. As evident by relatively shallow refusal depths, oversized cobble/boulder sized fragments were observed

throughout this stratum. The natural glacial were underlain by weathered rock/rock that was encountered to depths ranging between approximately two feet and 50 feet below the ground surface; corresponding to elevations ranging between 229.0 feet and 114.0 feet.

- **Groundwater and Seasonal High Groundwater:** Indicators of seasonal high groundwater (i.e. based on soil mottling) were encountered within the soil profile pits at depths ranging between approximately 1.2 feet and 9.0 feet below the ground surface; corresponding to elevations ranging between 227.0 feet and 132.6 feet. Groundwater was encountered within the soil borings, test pits, and soil profile pits at depths ranging between approximately two feet and 15 feet below the ground surface; corresponding to elevations ranging between 229.5 feet and 133.5 feet. Apparent perched water was encountered at depths ranging between one foot and nine feet below the ground surface, corresponding to elevations ranging between 235.0 feet and 131.7 feet. Groundwater levels are expected to fluctuate seasonally, and following significant periods of precipitation.
- **Foundations and Floor Slabs:** The subsurface conditions encountered within the area of the proposed building footprints included natural glacial till deposits underlain by weathered rock/rock. Based on the subsurface conditions encountered, conventional shallow foundations and ground supported floor slabs bearing within approved subgrade materials are expected to be suitable for the proposed site development. **Due to the moisture sensitivity of on-site soils, at least partial overexcavation and replacement and/or subgrade stabilization should be anticipated within proposed floor slab areas.**
- **Pavement:** The majority of the on-site soils are preliminarily expected to be suitable for support of proposed pavement, provided these materials are properly evaluated and inspected during construction as detailed herein. **Due to the moisture sensitivity of on-site soils, at least partial overexcavation and replacement and/or subgrade stabilization should be anticipated within proposed pavement areas.**
- **Difficult Excavation/Rock Removal:** Refusal was encountered on apparent boulders and weathered rock at depths as shallow as approximately two feet below the ground surface. In addition, split spoon sampler refusal was encountered on very stiff glacial soils/weathered rock as shallow as approximately 1.7 feet below the ground surface. As such, difficult excavation should be anticipated and construction budgets should include unit rate allotments for difficult excavation. Furthermore, blasting may potentially be required to remove rock within areas of proposed relatively deeper cuts, as indicated on the *Conceptual Rock Blasting Plan* included in the Appendix of this report.
- **Groundwater Control:** Dynamic Earth anticipates the static groundwater level will be deeper than the majority of proposed foundation and utility excavations. While evidence of seasonal high groundwater was generally observed at depths deeper than the proposed finished floor elevations, considerations for permanent groundwater control should be planned where portions of the proposed structure extend deeper than the seasonal high groundwater depth. In addition, the contractor should anticipate the need for temporary construction phase groundwater control to remove perched, trapped or infiltrating water within the underlying weathered rock/rock (particularly following periods of wet weather).

- **Use of Site Soils as Structural Fill:** The natural on-site soils (above the zone of saturation) are expected to be suitable for reuse as structural fill provided oversized materials are segregated and moisture contents are within tolerable limits for compaction. The natural soils are extremely moisture sensitive and will likely require moisture conditioning during periods of favorable weather to be reused as structural fill material. **Where cobbles, boulders, and weathered rock/rock are excavated, additional handling to process oversized rock should be expected to crush the materials to an acceptable size and gradation to be used a structural fill material (as detailed herein).**

Detailed design criteria and construction recommendations for proposed foundations, floor slabs, pavements and related earthwork are discussed in the following report. Dynamic Earth should remain involved to provide consultation and review during final design.

2.0 INTRODUCTION

2.1 Authorization

Dynamic Earth was authorized to conduct a supplemental geotechnical and stormwater basin area investigation in accordance with our April 14, 2023 *Contract Amendment Request* to Mr. Reuben Twersky of Treetop Development, LLC, authorized on April 19, 2023.

2.2 Purpose

The purpose of this subsurface exploration and analysis was to:

- ascertain the various soil profile components at test locations;
- estimate the engineering characteristics of the proposed foundation bearing and subgrade materials;
- provide geotechnical criteria for use by the design engineers in preparing the proposed foundations, floor slab, stormwater management facilities, retaining wall, and pavement designs;
- evaluating the potential rippability of the underlying rock using geophysical methods;
- provide supplemental recommendations for required earthwork and subgrade preparation;
- record groundwater levels at the time of the investigation and discuss the potential impact on the proposed construction; and
- recommend additional investigation, if warranted.

2.3 Scope

The scope of the supplemental exploration and analysis included site geologic research and evaluation, subsurface exploration, field testing and sampling, geophysical survey, and geotechnical engineering analysis and evaluation of the subsurface materials. This *Report of Supplemental Geotechnical and Stormwater Basin Area Investigation* is limited to addressing the site conditions as they relate to the physical support of the proposed construction. Dynamic Earth previously completed *Phase I Environmental Site Assessment Report* that was issued on January 28, 2021.

Dynamic previously completed a January 4, 2023 *Report of Preliminary Geotechnical Investigation and Stormwater Basin Area Report* at the subject site. The recommendations included herein should be utilized to supplement the recommendations of our January 4, 2023 report.

2.3.1 Field Exploration

This supplemental field exploration was conducted by means of 26 soil borings (identified as soil borings B-101 through B-123 and offset borings B-105A, B-107A, and B120A); 15 structural test pits (identified as TP-101 through TP-115); 20 soil profile pits (identified as soil profile pits SPP-201 through SPP-220); 16 corresponding in-situ infiltration tests (identified as PT-101 through PT-120, excluding PT-204, PT-205, PT-206, and PT-208).

Our previous subsurface investigation included 20 soil borings (identified as Borings B-1 through B-19 and offset Boring B-7A); seven rock probes (identified as P-1 through P-7); a total of 63 soil profile pits (identified as SPP-1 through SPP-25 and SPP-101 through SPP-138); and 59 corresponding in-situ infiltration tests (identified as PT-1 through PT-138, excluding PT-119, PT-120, PT-123, and PT-134).

The borings were drilled using hollow stem auger drilling techniques with a track-mounted drill rig; the structural test pits and soil profile pits were performed with a track-mounted excavator; and the rock probes were performed using continuous probe drilling techniques with a track-mounted drill rig. Test locations are summarized in the following table and are shown on the accompanying *Supplemental Test Location Plan*.

TEST LOCATION SUMMARY		
Number	Proposed Location	Final Depth (feet)
B-101	Warehouse Building E	15.2 ²
B-102		10.1 ²
B-103	Warehouse Building D	2.2 ²
B-104		10.1 ²
B-105		2.7 ²
B-105A		10.5 ²
B-106	Warehouse Building B	9.4 ²
B-107		6.9 ²
B-107A		11.9 ²
B-108	Warehouse Building A	8.3 ²
B-109		4.2 ²
B-110	Retaining Wall – Western Portion of Site	10.2 ²
B-111	Warehouse Building A	9.4 ²
B-112		7.1 ²
B-113	Retaining Wall – Central Portion of Site	15.4 ²
B-114	Warehouse Building C	12.0 ²
B-115	Retaining Wall – Central Portion of Site	7.8 ²

TEST LOCATION SUMMARY		
Number	Proposed Location	Final Depth (feet)
B-116	Warehouse Building C	8.0 ²
B-117		11.5 ²
B-118	Retaining Wall – Northern Portion of Site	19.6 ²
B-119	Warehouse Building C	8.1 ²
B-120	Retaining Wall – Northern Portion of Site	3.0 ²
B-120A		10.1 ²
B-121	Retaining Wall – Eastern Portion of Site	6.0 ²
B-122	Near Access Road – Eastern Portion of Site	26.0 ¹
B-123	Access Road – Central Portion of Site	22.0 ¹
TP-101	Warehouse Building D	11.0 ²
TP-102		9.0 ²
TP-103	Warehouse Building B	5.0 ²
TP-104		7.0 ²
TP-105	Warehouse Building A	9.5 ²
TP-106	Retaining Wall – Western Portion of Site	8.0 ²
TP-107	Warehouse Building C	12.0 ²
TP-108		6.0 ²
TP-109		11.0 ²
TP-110	Access Road – Central Portion of Site	5.0 ²
TP-111	Warehouse Building E	8.5 ²
TP-112		2.8 ²
TP-113	Access Road – Eastern Portion of Site	12.0
TP-114		6.7 ²
TP-115	Retaining Wall – Central Portion of Site	7.7 ²
SPP-201/PT-201	Underground Basin D	3.3 ²
SPP-202/PT-202		9.0 ²
SPP-203/PT-203		4.2 ²
SPP-204/PT-204		3.0 ²
SPP-205/PT-205		2.0 ²
SPP-206/PT-206		2.8 ²
SPP-207/PT-207	Underground Basin E	4.2 ²
SPP-208/PT-208		5.0 ²
SPP-209/PT-209	Above-ground Basin G	12.0
SPP-210/PT-210		10.4
SPP-211/PT-211	Above-ground Basin H	10.1 ²
SPP-212/PT-212		12.0
SPP-213/PT-213	East of Above-ground Basin C	11.7
SPP-214/PT-214		7.1 ²

TEST LOCATION SUMMARY		
Number	Proposed Location	Final Depth (feet)
SPP-215/PT-215	Above-ground Basin C	3.8 ³
SPP-216/PT-216		12.0
SPP-217/PT-217		10.0
SPP-218/PT-218	Above-ground Basin B	9.1 ²
SPP-219/PT-219		5.8 ²
SPP-220/PT-220	Above-ground Basin A	8.5 ²
PREVIOUS INVESTIGATION		
B-1	Warehouse Building D	11.5 ²
B-2		20.5 ¹
B-3		15.5 ²
B-4	Warehouse Building E	6.2 ²
B-5		8.3 ²
B-6		20.0 ²
B-7	Warehouse Building B	2.2 ²
B-7A		13.5 ²
B-8	Warehouse Building A	20.1 ²
B-9	Warehouse Building B	9.5 ²
B-10	Warehouse Building A	4.4 ²
B-11		7.8 ²
B-12	Pavement/West of Warehouse Building C	17.0 ²
B-13		25.0 ¹
B-14		20.8 ²
B-15	Warehouse Building C	22.0
B-16	East of Warehouse Building C	22.0
B-17	Warehouse Building C	25.8 ²
B-18	Northeastern Stormwater Basin Area	19.0 ¹
B-19		27.0 ¹
P-1	Warehouse Building B	50.0
P-2		50.0
P-3	Warehouse Building D	50.0
P-4		50.0
P-5	Warehouse Building E	50.0
P-6	Warehouse Building E	50.0
P-7	Warehouse Building C	50.0
SPP-1/PT-1	Underground Basin E	9.8 ²
SPP-2/PT-2	Potential Stormwater Management Area – Southern Portion of Site	6.7 ²

TEST LOCATION SUMMARY		
Number	Proposed Location	Final Depth (feet)
SPP-3/PT-3	Underground Basin D	9.2 ²
SPP-4/PT-4	Potential Stormwater Management Area – Western Portion of Site	11.0
SPP-5/PT-5		12.3 ²
SPP-6/PT-6		11.5
SPP-7/PT-7		12.2
SPP-8/PT-8		7.5 ²
SPP-9/PT-9		11.7 ²
SPP-10/PT-10		10.8 ²
SPP-11/PT-11	Near Above-ground Basin A	8.8 ²
SPP-12/PT-12	Potential Stormwater Management Area – Northwestern Portion of Site	10.8
SPP-13/PT-13	Potential Stormwater Management Area – Central Portion of Site	8.2
SPP-14/PT-14		11.3
SPP-15/PT-15	Potential Stormwater Management Area – Southern Portion of Site	11.2
SPP-16/PT-16		8.0 ²
SPP-17/PT-17		11.5
SPP-18/PT-18	Potential Stormwater Management Area – Northern Portion of Site	10.7
SPP-19/PT-19		9.9
SPP-20/PT-20		14.5 ²
SPP-21/PT-21	Above-ground Basin C	11.2
SPP-22/PT-22	Potential Stormwater Management Area – Eastern Portion of Site	11.2
SPP-23/PT-23		13.0
SPP-24/PT-24	Above-ground Basin H	11.5
SPP-25/PT-25	Above-ground Basin G	14.0
SPP-101/PT-101	Underground Basin E	3.7 ²
SPP-102/PT-102		5.0 ²
SPP-103/PT-103		3.5 ²
SPP-104/PT-104	Potential Stormwater Management Area – Southern Portion of Site	9.3 ²
SPP-105/PT-105		3.0 ²
SPP-106/PT-106		3.0 ²
SPP-107/PT-107	Underground Basin D	2.5 ²
SPP-108/PT-108		4.0 ²
SPP-109/PT-109	Potential Stormwater Management Area – Central Portion of Site	4.5 ²
SPP-110/PT-110		4.5 ²
SPP-111/PT-111		4.2 ²
SPP-112/PT-112		6.0 ²
SPP-113/PT-113		7.0 ²

TEST LOCATION SUMMARY		
Number	Proposed Location	Final Depth (feet)
SPP-114/PT-114	Potential Stormwater Management Area – Northwestern Portion of Site	7.0 ²
SPP-115/PT-115		11.0
SPP-116/PT-116		11.0
SPP-117/PT-117		12.0
SPP-118/PT-118		8.5 ²
SPP-119/PT-119	Above-ground Basin B	4.5 ²
SPP-120/PT-120		8.5 ²
SPP-121/PT-121		8.0 ²
SPP-122/PT-122	Potential Stormwater Management Area – Northeastern Portion of Site	7.0 ²
SPP-123/PT-123		4.9 ²
SPP-124/PT-124		11.0
SPP-125/PT-125		10.1
SPP-126/PT-126	Above-ground Basin C	11.3
SPP-127/PT-127		12.0
SPP-128/PT-128	Potential Stormwater Management Area – Northeastern Portion of Site	13.2 ²
SPP-129/PT-129	Potential Stormwater Management Area – Eastern Portion of Site	7.0 ²
SPP-130/PT-130		11.0
SPP-131/PT-131	Above-ground Basin H	10.8
SPP-132/PT-132		11.1
SPP-133/PT-133		10.8
SPP-134/PT-134		Potential Stormwater Management Area – Eastern Portion of Site
SPP-135/PT-135	Above-ground Basin H	9.0 ²
SPP-136/PT-136		12.0
SPP-137/PT-137		12.0
SPP-138/PT-138		12.0
B-101	Warehouse Building E	15.2 ²
B-102		10.1 ²
B-103	Warehouse Building D	2.2 ²
B-104		10.1 ²
B-105		2.7 ²
B-105A		10.5 ²
B-106	Warehouse Building B	9.4 ²
B-107		6.9 ²
B-107A		11.9 ²
B-108	Warehouse Building A	8.3 ²
B-109		4.2 ²

TEST LOCATION SUMMARY		
Number	Proposed Location	Final Depth (feet)
B-110	Western Retaining Wall	10.2 ²
B-111	Warehouse Building A	9.4 ²
B-112		7.1 ²
B-113	Central Retaining Wall	15.4 ²
B-114	Warehouse Building C	12.0 ²
B-115	Central Retaining Wall	7.8 ²
B-116	Warehouse Building C	8.0 ²
B-117		11.5 ²
B-118	Northern Retaining Wall	19.6 ²
B-119	Warehouse Building C	8.1 ²
B-120	Northern Retaining Wall	3.0 ²
B-120A		10.1 ²
B-121	Eastern Access Road	6.0 ²
B-122		26.0 ¹
B-123	Central Access Road	22.0 ¹
TP-101	Warehouse Building D	11.0 ²
TP-102		9.0 ²
TP-103	Warehouse Building B	5.0 ²
TP-104		7.0 ²
TP-105	Warehouse Building A	9.5 ²
TP-106	Western Retaining Wall	8.0 ²
TP-107	Warehouse Building C	12.0 ²
TP-108		6.0 ²
TP-109		11.0 ²
TP-110	Central Access Road	5.0 ²
TP-111	Warehouse Building E	8.5 ²
TP-112		2.8 ²
TP-113	Eastern Access Road	12.0
TP-114	Eastern Access Road	6.7 ²
TP-115	Central Retaining Wall	7.7 ²

¹ Rock coring was performed

² Refusal on underlying weathered rock/boulders

³ Refusal due to excessive water influx

The soil borings, test pits, rock probes, and soil profile pits were completed in the presence of a Dynamic Earth representative who performed field tests, recorded visual classifications, and collected samples of the various strata encountered. The test locations were located in the field using conventional taping procedures and/or a handheld GPS device, and are presumed to be accurate within several feet of the location plotted on the plans.

Soil borings and standard penetration tests (SPTs) were conducted in general accordance with ASTM D6151 (*Standard Practice for Using Hollow-Stem Augers for Geotechnical Exploration and Soil Sampling*) and ASTM D1586 (*Standard Test Method for Standard Penetration Test and Split Barrel Sampling of Soils*), respectively. Unconfined compressive strength (Q_p) values were assessed with a pocket penetrometer within the fine-grained soils. The N-value and/or unconfined compressive strength for various soil types can be correlated with engineering behavior of soils to develop foundation and earthwork recommendations.

Rock cores were obtained using a diamond bit core barrel in accordance with ASTM designation D 2113 (*Standard Practice for Rock Core Drilling and Sampling of Rock for Site Exploration*). Rock Quality Designations (RQD's) were determined in accordance with ASTM D 6032 (*Standard Test Method for Determining Rock Quality Designation (RQD) of Rock Core*) and are provided on the boring logs within the appendix of this report. RQD is defined as the sum of the length of core fragments four inches or greater between natural breaks divided by the length of the core run and is expressed as a percentage. RQD is an indication of the relative frequency of jointing or natural fracturing of the bedrock.

The soils encountered within the area of the proposed/anticipated stormwater management facilities were classified using the United States Department of Agriculture (USDA) Classification System and observations were made for groundwater and/or soil mottling and mineral deposits potentially indicative of zones of saturation or seasonal high groundwater.

In-situ infiltration testing was performed at soil profile pit locations in general accordance with the January *New York State Stormwater Management Design Manual 2015 – Appendix D: Infiltration Testing*. Detailed results of the infiltration testing are included herein.

Groundwater level observations were recorded during and at the completion of field operations prior to backfilling the borings. Seasonal variations, temperature, anthropogenic, seasonality, soil permeability, and precipitation will influence the actual and observed groundwater levels. Groundwater elevations derived from sources other than seasonally observed groundwater monitoring wells may not be representative of true groundwater levels.

2.3.2 Geophysical Survey

Dynamic Earth coordinated with a geophysical specialist to perform a preliminary study that included seismic using seismic refraction survey methods to further evaluate the underlying bedrock within areas of proposed earth cuts, based on the aforementioned grading plan. The purpose of the seismic refraction survey was to map the approximate depth to bedrock, evaluate the potential rippability of rock and review the potential need for blasting. Detailed results of the testing are summarized herein and included within the Appendix of this report.

2.3.3 Laboratory Testing Program

The laboratory testing program for the supplemental investigation was in progress at the time of this report. Once the laboratory testing is complete, the results will be provided as an addendum. Results of the laboratory testing from our previous investigation are included below.

Each sample was visually classified in general accordance with the visual-manual method (ASTM D2488). In addition, representative samples of selected strata encountered during the preliminary investigation were subjected to a laboratory testing program which included moisture content determinations (ASTM D2216), Atterberg limits (ASTM D4318), and washed gradation analyses (ASTM D422) in order to perform supplementary engineering soil classifications in general accordance with ASTM D2487. The soil strata tested were classified by the Unified Soil Classification System (USCS) and results of the laboratory testing are summarized in the following table.

SUMMARY OF PREVIOUS INVESTIGATION LABORATORY TEST RESULTS							
Boring	Sample No.	Depth (feet)	Moisture Content (%)	Liquid Limit	Plasticity Index	Percent Passing No. 200 (%)	USCS Classification
B-1	S-5	8-10	10.4	Not Tested		38	SC
B-2	S-1	0-2	26.2	Not Tested		56	CL
B-3	S-2	2-4	11.1	28	11	37	CL
B-12	S-5	8-10	9.3	25	10	46	SC
B-13	S-4	6-8	9.2	25	10	44	SC
B-14	S-2	2-4	9.6	Not Tested		20	SM
B-15	S-4	6-8	5.6	Not Tested		9	SW-SM
B-16	S-7	15-17	6.8	Not Tested		11	GP-GM
B-17	S-2	2-4	10.3	23	9	41	SC
B-18	S-6	10-12	11.1	Not Tested		13	SM
B-19	S-3	4-6	10.5	Not Tested		16	GC

The engineering classifications are useful when considered in conjunction with the additional site data to estimate other properties of the soil types encountered and to predict the soil's behavior under construction and service loads.

3.0 SITE DESCRIPTION

3.1 Location and Description

The subject site is located at 2615 US Route 9 West in the Town of Cornwall, Orange County, New York and is further identified as Section 9; Block 1, Lot 25.22. The subject site is bound to the north by Moodna Creek with Forge Hill Road beyond; to the east by US Route 9 West with commercial properties beyond; to the south by residential properties; and to the west by Moodna Creek with residential properties beyond. The site of the proposed construction is shown on the attached *Supplemental Test Location Plan* in the Appendix of this report.

3.2 Existing Conditions

Surface Cover/Development: At the time of our supplemental investigation, the subject site was undeveloped and wooded. A series of stacked rock walls, generally about three feet in height, were found intersecting the site. The surface cover observed at the time of our investigation included vegetation/topsoil.

Topography: Topographic information was provided on a May 18, 2021 *Wetlands Map* prepared by Lanc & Tully Engineering and Surveying. The existing topography at the site includes several hills within the southern portion of the property; with local peaks typically ranging in elevation between approximately 230.0 feet and 244.0 feet. Existing site grades generally slope downward towards the north and east; reaching low elevations of approximately 136.0 feet near the northern and eastern property boundaries. The elevations referenced on the survey are given in 1988 North American Vertical Datum (NAVD 88). All elevations given in this report are referenced in NAVD 88, unless otherwise noted.

Site Drainage: Surface runoff generally appears to follow existing site topography toward low lying areas and inlet structures located along adjacent roadways. The terminus of the pipes was not determined.

3.3 Proposed Construction

Based on a July 10, 2023 *Overall Grading Plan* prepared by Dynamic, the proposed site development will include construction of five warehouse buildings occupying a total footprint area of approximately 1.726 million square feet, as described below:

- **Building A (Northwestern Portion of Site):** Proposed Building A will occupy a footprint area of 362,277 square feet and have a finished floor elevation of approximately 223.0 feet.

Earth cuts on the order of four feet are proposed within the southwestern portion of the building footprint, and earth fills on the order of 18 feet are proposed within the northeastern portion of the building.

- **Building B (Western Portion of Site):** Proposed Building B will occupy a footprint area of 145,381 square feet and have a finished floor elevation of approximately 230.0 feet. Earth cuts ranging between approximately one foot and four feet are proposed throughout the building footprint;
- **Building C (Northeastern Portion of Site):** Proposed Building C will occupy a footprint area of 753,125 square feet and have a finished floor elevation of approximately 194.0 feet. Earth cuts on the order of 13 feet are proposed within the southwestern portion of the building footprint, and earth fills on the order of 33 feet are proposed within the northeastern portion of the building;
- **Building D (Southern Portion of Site):** Proposed Building D will occupy a footprint area of 273,568 square feet and have a finished floor elevation of approximately 230.0 feet. Earth cuts on the order of eight feet are proposed within the central portion of the building footprint, and earth fills on the order of 10 feet are proposed within the southern portion of the building.
- **Building E (Southeastern Portion of Site):** Proposed Building E will occupy a footprint area of 191,755 square feet and have a finished floor elevation of approximately 204.5 feet. Earth cuts on the order of eight feet are proposed within the eastern portion of the building footprint, and earth fills on the order of 20 feet are proposed within the southern portion of the building.
- **Pavement Areas:** Proposed parking areas and roadways will be located throughout the site (surrounding the buildings) and an access road connecting to Route 9W will be located within the eastern portion of the overall site. The majority of proposed pavement areas will include earth cuts and fills on the order of five to ten feet; however relatively deeper earth cuts on the order 28 feet will be required within the central portion of the site, and large earth fills up to approximately 50 feet are anticipated within proposed pavement/roadway areas within the eastern portion of the overall site.
- **Retaining Walls:** Earth retaining wall structures are proposed around the perimeter of the site and adjacent to proposed pavement areas within the central portion of the site. Retaining wall details have not been finalized at this time; however based on the grading plan, typical maximum exposed wall heights will be on the order of 20 to 30 feet.

- **Stormwater Management Facilities:** Eight stormwater management facilities, including five above ground basins and three underground basins are proposed throughout the site, as summarized below:
 - **Above-ground Basin A:** Located within the northwestern portion of the site with a proposed bottom elevation of 195.0 feet;
 - **Above-ground Basin B:** Located within the northeastern portion of the site with a proposed bottom elevation of 142.0 feet;
 - **Above-ground Basin C:** Located within the northeastern portion of the site with a proposed bottom elevation of 152.0 feet;
 - **Underground Basin D:** Located within the southern/central portion of the site with a proposed basin bottom elevation of 217.5 feet;
 - **Underground Basin E:** Located within the southern portion of the site with a proposed basin bottom elevation of 218.5 feet;
 - **Underground Basin F:** Located within the southeastern portion of the site with a proposed basin bottom elevation of 190.0 feet.
 - **Above-ground Basin G:** Located within the eastern portion of the site with a proposed bottom elevation of 137.5 feet; and
 - **Above-ground Basin H:** Located within the eastern portion of the site with a proposed bottom elevation of 137.5 feet.

The proposed buildings are expected to be concrete and metal framed structures constructed with a concrete slab-on-grade. The final structural loads have not been developed at this time. Based on our experience with similar facilities, we assume that the maximum loads will be less than the following:

- Axial Column Loads – 120 kips;
- Wall Loads – 3.0 kips per linear foot;
- Floor Slab Loads – 600 pounds per square feet;
- Light Duty Pavement – 60,000 Equivalent Single Axle Loads (ESAL's); and
- Heavy Duty Pavement – 1,700,000 Equivalent Single Axle Loads (ESAL's)

The scope of Dynamic Earth's investigation and the professional advice contained in this report were generated based on the project details and loading noted herein. Any revisions or additions to the design details enumerated in this report should be brought to the attention of Dynamic Earth for additional evaluation as warranted.

4.0 SUBSURFACE CONDITIONS

4.1 Site Geology

The geologic site setting includes the Manhattan Prong Physiographic Province of New York. Specifically, the site is underlain by Quaternary Aged Glacial and Alluvial Deposits that is reported to be underlain by bedrock of unknown origin. The glacial till deposits reportedly include heterogeneous deposits of sand, silt, clay and cobble/boulder-sized fragments. Graywacke and shale bedrock are mapped underlying a relatively small area within the southeastern portion of the site.

4.2 United States Department of Agriculture (USDA) Soil Survey

Based on a review of the United States Department of Agriculture – Natural Resources Conservation Services (USDA-NRCS) soil survey, the soil resources mapped within the area of subject site are described below.

Bath-Nassau channery silt loams, 3 to 8 percent slope (BnB): This soil series is mapped within the eastern portions of the site. The typical soil profile (as reported in the soil survey) generally consists of channery silt loam to a depth of 29 inches; very channery silt loam to a depth of 53 inches; underlain by unweathered bedrock to a depth of 57 inches below the natural ground surface (limit of the report). Groundwater is reported to be between 24 to 30 inches below the natural ground surface.

Erie gravelly silt loam, 0 to 3 percent slope (ErA): This soil series is mapped within a relatively small area within the northeast portion of the site. The typical soil profile (as reported in the soil survey) generally consists of gravelly silt loam to a depth of ten inches; underlain by channery silt loam to a depth of 70 inches below the natural ground surface (limit of the report). Groundwater is reported to be approximately between six to 18 inches below the natural ground surface.

Mardin gravelly silt loam, 3 to 8 percent slope (MdB): This soil series is mapped within the central portion of the site (covering majority of the site). The typical soil profile (as reported in the soil survey) generally consists of gravelly silt loam to a depth of 72 inches below the natural ground surface (limit of the report). Groundwater is reported to be approximately 13 to 24 inches below the natural ground surface.

Mardin soils, steep (MNE): This soil series is mapped within a small area within the northeastern and western portions of the site, near the edge of the property. The typical soil profile (as reported in the soil survey) generally consists of gravelly silt loam to a depth of 72 inches below the natural

ground surface (limit of the report). Groundwater is reported to be approximately between 13 to 24 inches below the natural ground surface.

Swartswood and Mardin soils, sloping, very stony (SXC): This soil series is mapped within the northern portion of the site. The typical soil profile (as reported in the soil survey) generally consists of gravelly loam to a depth of three inches; underlain by gravelly fine sandy loam to a depth of 60 inches below the natural ground surface (limit of the report). Groundwater is reported to be between 23 to 31 inches below the natural ground surface.

Udifluvents-Fluvaquents complex, frequently flooded (UF): This soil series is mapped within a relatively small area within the western portion of the site. The typical soil profile generally consists of very gravelly loam to a depth of four inches; underlain by very gravelly sand to a depth of 70 inches below the ground surface (limit of the report). Groundwater is reported to be approximately between 24 to 72 inches below the natural ground surface.

Water (W): This soil series is mapped within a relatively small area within the eastern portion of the site. The typical soil profile (as reported in the soil survey) generally consists of water.

4.3 Subsurface Soil Profile

Details of the subsurface materials encountered are presented in the *Records of Subsurface Exploration* within the Appendix of this report. The subsurface soil conditions encountered in the supplemental investigation and previous investigations consisted of the following generalized strata in order of increasing depth.

Surface Cover: The soil borings and soil profile pits were performed within undeveloped areas and encountered approximately two inches to 17 inches of topsoil at the surface. Relatively deeper root mats/roots were observed within the soil profile pits to depths up to 86 inches below the ground surface.

Existing Fill Material: Beneath the surface cover material, existing fill material was encountered at one soil profile pit location within the southeastern portion of the site (SPP-209) that generally consisted of sand with silt, gravel, and debris. The debris encountered included ceramic tiles. The existing fill material was encountered to a depth of approximately three feet below the ground surface; corresponding to an elevation of 134.0 feet.

Glacial Till Deposits: Beneath the surface cover or existing fill material (where encountered), natural glacial till deposits were encountered that consisted of gravel (USCS: GP, GP-GM, GW, GM, GC-GM, and GC), sand (USCS: SP, SP-SM, SW-SM, SM, and SC), silt (USCS: ML) and

clay (USCS: CL and CL-ML). The natural glacial deposits were encountered to depths ranging between approximately 0.7 feet and 20.0 feet below the ground surface; corresponding to elevations ranging between 232.8 feet and 122.0 feet. As evident by relatively shallow refusal depths, oversized cobble/boulder sized fragments were observed throughout this stratum. Except where split spoon sampler refusal was encountered, Standard Penetration Test (SPT) N-values ranged between three blows per foot (bpf) and 73 bpf, and averaged approximately 36 bpf, generally indicating a relatively dense condition within the coarse-grained soils. Unconfined compressive strength (Q_p) pocket penetrometer values within this stratum ranged between 0.25 tons per square foot (tsf) and 4.5 tsf; and averaged approximately 2.3 tsf, generally indicating a relatively very stiff consistency within the fine-grained soils.

Weathered Rock: Beneath the natural glacial deposits, weathered rock was encountered that generally sampled as sand (USCS: SW and SC), clay (USCS: CL and CL-ML) and gravel sized rock fragments (USCS: GW, GP, GC, and GM). The weathered rock was encountered to refusal depths ranging between approximately two feet and 25.8 feet below the ground surface; corresponding to elevations ranging between 229.0 feet and 118.7 feet. Except where split spoon sampler refusal was encountered, SPT N-values ranged between 31 bpf and 96 bpf, and averaged approximately 66 bpf, generally indicating a relatively very dense condition. Refusal is anticipated to be the top of rock.

Bedrock: Beneath the weathered rock, rock was encountered within rock probes and during coring operations performed at Borings B-2, B-13, B-18, B-19, B-122 and B-123. Based on the rock core samples, the rock encountered generally consisted of slightly to highly weathered shale. Rock coring was performed to boring termination depths ranging between 19 feet and 27 feet below the ground surface; corresponding to elevations ranging between 215.5 feet and 114.0 feet. Rock was encountered within rock probes to termination depths up to 50 feet below the ground surface; corresponding to elevations ranging between 182.0 feet and 155.0 feet. Rock core recoveries ranged from 50 percent and 93 percent; and the Rock Quality Designation (RQD) encountered in the core samples ranged between approximately zero and 80 percent; generally corresponding to a very poor to fair rock mass quality.

4.4 Seasonal High Groundwater and Groundwater

Indicators of seasonal high groundwater (i.e. based on soil mottling) were encountered within the soil profile pits at depths ranging between approximately 1.2 feet and 9.0 feet below the ground surface; corresponding to elevations ranging between 227.0 feet and 132.6 feet. Groundwater was encountered within the soil borings, test pits, and soil profile pits at depths ranging between approximately two feet and 15 feet below the ground surface; corresponding to elevations ranging between 229.5 feet and 133.5 feet. Apparent perched water was encountered at depths ranging between one foot and nine feet below the ground surface, corresponding to elevations ranging

between 235.0 feet and 131.7 feet. Groundwater levels are expected to fluctuate seasonally, and following significant periods of precipitation.

4.5 Geophysical Investigation Results

The geophysical survey was targeted to select areas of the subject site where significant earth cuts are proposed, generally near the proposed building/pavement areas within the central, western, and southern portions of the site. A summary of the results of the geophysical survey is included below and the detailed results of the testing are included within the Appendix of this report.

Geophysical Survey Seismic Refraction: Seismic refraction results were generally consistent with the subsurface conditions encountered in the soil borings and test pits; and indicate overburden soil underlain by a weathered rock (transitional zone) and rock strata. The weathered rock is generally designated as the zone between a P wave velocity of 7,500 feet per second (fps) to the top of continuous competent bedrock at 9,500 fps. The top of continuous competent rock was generally undulating within the seismic profiles, and was encountered at depths ranging between eight feet and 25 feet below the ground surface; corresponding to elevations ranging between 222.0 feet and 176.0 feet. Approximate bedrock surface elevation contours are included on Figure 3: Inferred Bedrock Elevation Contours from Seismic Velocity Model Plan included within the geophysical survey in the appendix of this report.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 General

Conventional shallow foundations and ground supported floor slabs are expected to be feasible for proposed structures bearing within approved on-site materials and/or controlled compacted structural fill material, provided the subgrade soils are properly, prepared and tested during construction. The on-site soils are preliminarily expected to be suitable for support of proposed floor slabs and pavements. Due to moisture sensitivity of the on-site soils, at least partial overexcavation, replacement, and/or moisture conditioning should be included as part of project planning for the proposed development.

An isolated layer of existing fill material was encountered in one of the soil profile pit excavations (SPP-209) within the eastern corner of the site (near Above-ground Basin G). Since this isolated location is outside of the proposed building footprints, we do not anticipate that existing fill material will be encountered within the proposed building footprint areas. However, if existing fill material is encountered beneath proposed floor slabs and foundations, it will need to be overexcavated and replaced with structural fill material, as detailed herein.

Relatively shallow refusal and difficult drilling/excavating was encountered during this investigation due to apparent cobbles/boulders and underlying weathered rock. In addition, based on the geophysical survey, the top of rock is expected to be encountered within areas of deeper earth cuts. As such, the contractor should anticipate difficult excavation to remove cobbles/boulders and weathered rock/rock, particularly where existing site elevations are lowered as part of the proposed site grading. Where areas of relatively deeper cuts are proposed, rock blasting may be required. Conceptual areas that may require rock blasting based on our investigation and geophysical survey are provided on the attached *Conceptual Blasting Plan*.

The recommendations presented herein are sufficient to support the initial design and planning phase. These recommendations are contingent on the assumption that Dynamic Earth will remain involved in the final design process and that Dynamic Earth will be engaged to conduct the necessary construction phase geotechnical testing and inspection to ensure these recommendations are properly implemented.

5.2 Site Preparation and Earthwork

Surface Cover Stripping: Prior to the start of construction, all utilities should be identified and secured. If encountered, existing structural elements, such as concrete foundations, slabs, and remnant basement walls, should be removed entirely from below proposed foundations and slabs

and excavated to at least two feet below pavement subgrades. Remnant structural elements may remain in-place below these depths below pavements provided they do not interfere with future construction. Any slabs left in-place should be thoroughly fractured to promote vertical drainage in the presence of a qualified Geotechnical Engineer and should be backfilled with structural fill in accordance with the recommendations included herein.

The surface cover materials, including vegetation and topsoil, should be removed from within, and at least five feet beyond the limits of the proposed buildings and new pavement areas as well as any other area which will require fill placement. Removal of trees should include root mats and tree stumps.

Surface Preparation/Proofrolling: Prior to placing any fill or subbase materials to raise or restore grades to the desired building pad or pavement subgrade elevations, the existing exposed soils should be compacted to a firm and unyielding surface with several passes in two perpendicular directions with a vibratory, smooth drum roller during favorable moisture conditions. The drum roller should be operated in the static mode or a kneading “sheepsfoot” roller should be used where fine-grained soils are encountered at the subgrade elevation and/or where water is suspected near subgrade elevations. The surface should then be proofrolled with a loaded tandem axle truck in the presence of Dynamic Earth to help identify soft or loose pockets which may require removal and replacement or further investigation. Dynamic Earth anticipates at least partial overexcavation if the subgrade is wetted or subjected to repeated construction traffic. Any fill or backfill should be placed and compacted in accordance with the recommendations included herein.

Subgrade Protection and Inspection: Portions of the on-site soils are considered extremely moisture sensitive and every effort should be made to minimize disturbance of the on-site soils by construction traffic and surface runoff. The on-site soils will likely become unsuitable if exposed to moisture and/or construction traffic. If these materials become overly wetted, the on-site soils will likely require increased handling such as discing and drying during extended periods of favorable weather and/or partial overexcavation and stabilization. Stabilization methods that can be evaluated for the site include the use of a triaxle geogrid such as Tensar TX-5 or TX-7, or cement/lime mixing as directed by the geotechnical engineer.

The subgrades and soil stockpiles should be sealed daily and construction traffic be minimized to designated non-structural areas and following periods of precipitation as an attempt to minimize deterioration of otherwise suitable subgrade soils. Dynamic Earth should be retained as the Geotechnical Engineer of Record to inspect soil conditions during construction and verify the suitability of prepared foundation, floor slab and pavement subgrades for support of design loads.

Difficult Excavation/Rock Removal: Difficult auger refusal and split spoon refusal was encountered while drilling as shallow as 1.7 feet below the ground surface. **As such, difficult**

excavation to remove weathered rock, oversized cobble/boulder sized fragments and/or debris should be anticipated, particularly where existing site elevations are lowered as part of the site development (such as within portions of the central, southern and western areas of the site and within the cut areas of the proposed stormwater management facilities). Where areas of deeper cuts are proposed into the underlying competent rock, rock blasting may be required. Construction budgets should include unit rate cost and schedules related to difficult excavation and rock blasting.

Heavy Excavation Equipment: While small boulders and cobbles may typically be removed with conventional excavation equipment, heavy excavation equipment will likely be required to excavate the weathered rock and/or for larger boulders. Based on the twelfth edition of the *Handbook of Ripping* prepared by Caterpillar, typically a Caterpillar D8R, D9R, D10R and D-11R can rip shale rock materials with seismic velocities of up to 6,000 fps, 7,500 fps, 9,000 fps and 10,500 fps, respectively. **As such, the uppermost part of weathered rock underlying the site is expected to be rippable with heavy excavation equipment. The rippability of the weathered rock stratum highly depends on the type of equipment used; as such, the contractor should confirm with the equipment manufacturer that the proper equipment is selected.** Depending on the equipment utilized, the underlying portions of the weathered rock and rock with seismic velocities beyond these limits will likely require blasting.

Potential Blasting Considerations: As shown on the *Conceptual Rock Blasting Plan* included within the appendix of this report, the areas where deeper cuts are proposed into the underlying competent rock will likely require blasting. Based on review of the grading plan and the subsurface rock profile data, three areas were preliminarily identified that may require blasting; including an approximate 205,000 square area within the central portion of the site (to the west of Building C); an approximate 45,000 square foot area within the western portion of the site (north of Building B); and an approximate 20,000 square foot area within the southeastern portion of the site (east of Building E). **These locations should be considered preliminarily in nature and will depend on review of the final grading/foundation plans and the consultation with a specialty blasting contractor. In addition, the specialty contractor is responsible for determining the specific blasting procedures and/or alternatives means of rock removal in accordance with the local Township requirements.**

Earthwork during Freezing Weather: When temperatures fall below freezing for prolonged periods of time, the moisture within the soil matrix will freeze. Fine-grained soils (as encountered during this investigation) have a higher susceptibility to frost than well drained granular soils and could freeze at faster rates. Frost susceptible soils will often become unstable once they thaw, even if the material is properly placed and compacted. As such, special construction methods, additional handling and/or construction sequencing should be planned when weather forecasts predict

periods of freezing ambient air temperatures. **Fill and subbase material should not be placed on water, snow, ice, or frozen soil.** Subgrade materials that freeze will need to be removed and replaced with suitable structural fill material prior to placement of subsequent fill layers, subbase material and/or surficial cover material as detailed throughout this report. Frozen soils are not suitable for placement as structural fill material and generally need to be exported from the site, unless construction schedules allow for stockpiling and drying of these materials during warmer weather. The contractor should be responsible for including budgetary rates for earthwork during periods of potential freezing weather and for protection against freezing subgrades.

5.3 Structural Fill and Backfill

Import/On-site Structural Fill Material: Soils placed as structural fill material should consist of well graded sand or gravel with a maximum particle size of three inches in diameter and less than 15 percent of material passing the number 200 sieve. These materials should be free of objectionable debris (clay clumps, organic and/or deleterious material, etc.) and within moisture contents suitable for compaction. Alternative soil types with higher percentages of silt and clay may be considered, provided that the contractor is able to achieve proper compaction and maintain suitable subgrade once the material is placed. Fine-grained soils and/or granular soils with higher percentages of silt and clay are extremely moisture sensitive and will only be suitable for reuse as structural fill material under ideal weather conditions. Materials wetted beyond the optimum moisture content; that contain oversized rock or debris; or with increased amounts of objectionable debris will not be suitable for reuse as structural fill material without special handling. As such, the contractor should be responsible for importing structural fill material and/or processing on-site soils as required so that these materials are suitable for structural fill placement.

Cobbles, boulders, excavated rock, and/or oversized debris greater than three inches in diameter will need to be separated from on-site soils to be placed as structural fill. Approved material between three and 12 inches in diameter may be crushed or individually placed in fill layers deeper than two feet below proposed subgrade levels. Care must be taken to individually seat any large particles and to compact soil around large particles with hand operated equipment to minimize the risk of void formation. The larger material should not be placed near areas of the proposed utility or planned excavation. Oversized materials/rock fragments larger than approximately 12 inches are not expected to be adequate for use as fill or backfill and should be removed from the site or crushed to an adequate size.

The on-site materials included natural glacial deposits (above the zone of saturation) and underlying weathered rock/rock. Portions of the natural glacial deposits are expected to be suitable for reuse as structural fill material, provided moisture contents are within tolerable limits to achieve compaction and oversized materials are separated and/or processed to an

acceptable size. Portions of the natural glacial deposits are considered extremely moisture sensitive and will likely require moisture conditioning to be suitable for reuse as structural fill material. Moisture conditioning methods may include discing/aerating soils during a period of favorable weather, mixing with lime or cement, and/or mixing with granular soils. Portions of the underlying weathered rock/rock may be suitable for reuse on-site, provided they are processed to an acceptable size and gradation as detailed herein. Reuse of these materials will be contingent upon further evaluation during construction.

Rock Fill Material: An alternative to exporting oversized weathered rock/rock materials, considerations for using these materials as rock fill may be evaluated, provided these materials are processed and placed in accordance with the recommendations included herein. Rock fills should not be used in areas that will interfere with future construction (i.e. below proposed footings or near proposed utility excavations). Rock fills typically should not be placed within 15 feet of proposed utilities or foundations or within three feet of the ground surface.

Rock fills generally consist of placing rock in controlled lifts so that void space is minimized. The material should be placed evenly with a dozer so overall lift thickness is less than 1.5 times the largest particle size. Based on our regional experience and the average estimated particle size encountered during this investigation, we preliminary expect that lifts thickness on the order of approximately 18 inches to 24 inches should be expected. Thicker lifts may be evaluated once excavated material is stockpiled, but in no case shall the lifts be thicker than 36 inches (for 24 inch diameter sized rock). Rock larger than 24 inches in diameter shall be processed to a smaller size (less than 24 inches) or removed from the site. The stockpiled material should be evaluated prior to fill placement and test lifts should be performed to confirm the suitability and requirements for use of rock fill.

Rock fills should be compacted with a 20 ton, vibratory, smooth drum roller. Soil particle size with a maximum diameter less than the void space within the rock fill material should be placed over the lift until there is no visible movement and prevent soil from migrating into the rock fill. Alternatively, geotextiles may be considered to prevent the soil from migrating to the rock fill.

Compaction and Placement Requirements: Structural fill and backfill should be placed in maximum 12 inch loose lifts and compacted to 95 percent of the maximum dry density within a targeted two percent of the optimum moisture content as determined by ASTM D 1557 (Modified Proctor). Variations in moisture content may be acceptable subject to Dynamic Earth's on-site geotechnical engineer's approval if the contractor is able to achieve the necessary compaction. Dynamic Earth recommends using a minimum 20-ton smooth drum roller to compact subgrade soils beneath pavements or slabs and hand operated vibratory jumping jacks and plate compactors within confined excavations for foundations or utilities. The drum roller should be operated in the static mode or a kneading "sheepsfoot" roller should be used to compact fine-grained soils. Fill

material compacted with hand operated equipment, static drum roller and/or sheepsfoot roller, may need to be placed in thinner, loose lifts and an increased number of passes may be required to achieve proper compaction.

Structural Fill Testing: Before filling operations begin, representative samples of each proposed fill material (on-site and imported) should be collected. The samples should be tested to determine the maximum dry density, optimum moisture content, natural moisture content, gradation, and plasticity of the soil. These tests are needed for quality control during compaction and also to determine if the fill material is acceptable. The placement of all fill and backfill will need to be monitored by Dynamic Earth to ensure that the specified material and lift thicknesses are properly installed. A sufficient number of in-place density tests should be performed during fill placement to ensure that the specified compaction is achieved throughout the height of the fill or backfill.

Submerged Fill: If required, the initial 18 to 24 inches of backfill at excavations that extend below the groundwater level (in conjunction with dewatering methods) may consist of nominally one inch, crushed stone (such as AASHTO #57 Stone) placed to raise grade above water levels before subsequent lifts of structural fill. Submerged fill should be separated from surrounding soils with a fines barrier geotextile, such as Mirafi FW700 or equivalent to prevent future migration of fines content from surrounding soils.

5.4 Groundwater Control

Groundwater and/or perched zones of saturation above the underlying rock stratum may be encountered within proposed excavations, particularly where existing site elevations will be lowered as part of the proposed grading. **As such, the contractor should anticipate the need for groundwater control during construction.**

While groundwater control means and methods are the responsibility of the contractor, excavations extending to depths of approximately two feet below the static groundwater elevation typically may be controlled by sump pumps and strategically placed sump pits in and adjacent to excavations for relatively small areas. Larger excavations and excavations extending deeper than two feet below groundwater may require deeper well recovery points. Surface water runoff must be controlled and diverted away from construction areas by grading and limiting the exposure of excavations to rainfall.

In addition, the project structural engineer and architect should review the groundwater and seasonal high groundwater levels encountered and evaluate the potential need for permanent groundwater control measures.

5.5 Foundation Recommendations

Anticipated Bearing Strata: Proposed foundations are expected to bear within the natural glacial deposits, underlying weathered rock/rock, and/or newly placed compacted structural fill material placed to raise site grades. Approved portions of these materials are expected to be suitable for support of proposed foundations, provided they are properly tested and inspected during construction. Due to the moisture sensitivity of the on-site soils, project planning should include at least partial overexcavation and replacement and/or moisture conditioning. If encountered, existing fill material is not suitable for direct foundation support and will need to be overexcavated and replaced with structural fill material where encountered below foundation influence zones.

Conventional Shallow Foundations: The proposed structures may be supported on conventional shallow foundations bearing within newly placed compacted structural fill material and/or approved natural soils. Foundations bearing within newly placed compacted structural fill material and/or approved natural soils may be designed to impart a maximum allowable net bearing pressure of 3,000 pounds per square foot (psf). Foundations extended to bear within the underlying weathered rock may be designed to impart a maximum allowable net bearing pressure of 5,000 psf. Regardless of loading conditions, proposed foundations should be sized no less than minimum dimensions of 24 inches for continuous wall footings and 36 inches for isolated column footings.

Footings should be designed so that the maximum toe pressure due to the combined effect of vertical loads and overturning moment does not exceed the recommended maximum allowable net bearing pressure recommended above. In addition, positive contact pressure should be maintained throughout the base of the footings such that no uplift or tension exists between the base of the footings and the supporting soil. Uplift loads should be resisted by the weight of the concrete. Side friction should be neglected when proportioning the footings so that lateral resistance should be provided by friction resistance at the base of the footings.

Lateral resistance should be provided by friction at the base of the footing with a recommended coefficient of friction against sliding as follows:

- Formed concrete on gravel subbase material – 0.40;
- Mass concrete on gravel subbase material – 0.45; and
- Mass concrete on on-site natural soils – 0.35.

Inspection/Overexcavation Criteria: The suitability of the bearing soils along and below the footing bottoms must be verified by Dynamic Earth's geotechnical engineer prior to placing concrete, especially to confirm that unsuitable materials are removed (if encountered) and new fills are adequately placed and compacted. If required, any overexcavation to be restored with

structural fill (on-site or imported) will need to extend at least one foot laterally beyond footing edges for each vertical foot of overexcavation. The bottom of overexcavations should be compacted with smooth drum rollers, walk-behind compactors, vibrating plates or plate tampers (“jumping jacks”) to compact locally disturbed materials and densify underlying natural soil zones. Unsuitable materials should be overexcavated prior to placing new fill material where site grades are to be raised.

Settlement: Dynamic Earth estimates post construction settlements of proposed building foundations on the order of one inch if the recommendations outlined in this report are properly implemented. Differential settlements of building foundations should be less than one-half inch.

Partial Rock Support: Footings should not bear partially on rock and partially on soil due to the risk of brittle fracture at hinging points. Any foundation subgrades that would result in partially supported rock conditions should be overexcavated an additional six inches and replaced with well graded, compacted structural fill, to provide a cushion against brittle fracture. Alternatively, isolated spread footings may be extended to bear entirely on rock.

Frost Coverage: Footings subject to frost action should be placed at least 40 inches below adjacent exterior grades or as required by the local building code to provide protection from frost penetration. Interior footings not subject to frost action (including during the period of construction) may be placed at a minimum depth of 18 inches below the slab subgrade.

5.6 Floor Slab

Dynamic Earth anticipates that the approved on-site soils and/or compacted structural fill material placed over approved natural subgrades will be suitable for support of the proposed floor slabs, provided these materials are properly evaluated, compacted and proofrolled as detailed herein.

Due to the moisture sensitivity of the on-site soils, at least partial overexcavation and replacement and/or subgrade stabilization should be anticipated below proposed floor slabs.

Depending on construction phase evaluation, overexcavation may be limited (to a typical depth of approximately two feet) with the use of geogrid reinforcement (such as Tensar TX-5 or TX-7 or equivalent). In addition, any areas that become softened or disturbed as a result of wetting and/or repeated exposure to construction traffic should be removed and replaced with compacted structural fill. Alternatively, moisture conditioning methods may be evaluated by Dynamic Earth at the time of construction. We expect that the properly prepared on-site soils are will yield a minimum subgrade modulus (k) of 125 psi/in. If encountered, existing fill material may need to be overexcavated and replaced below proposed floor slabs.

A minimum four-inch layer of stone should be installed below the floor slabs to provide a capillary break. A moisture vapor barrier beneath the floor slab is recommended. Total and post-construction settlements of floor slabs installed in accordance with the recommendations outlined in this report are estimated to be less than one-quarter inch.

5.7 Pavement Design Criteria

General: Dynamic Earth anticipates that the majority of the on-site soils will be suitable for support of proposed pavements. **Due to the moisture sensitivity of the on-site soils, at least partial overexcavation and replacement and/or subgrade stabilization should be anticipated below proposed pavements.** Pavement life may benefit from using a geogrid (such as Tensar TX-5 or TX-7 or equivalent) to provide additional subgrade reinforcement to minimize the amount of overexcavation and attempt to stabilize marginally suitable subgrade soils. Depending on the overall subgrade conditions and weather conditions, more extensive mitigation efforts may be required. If encountered, existing fill material may need to be overexcavated and replaced below pavement subgrades.

Design Criteria: A design California Bearing Ratio (CBR) value of seven has been assigned to the anticipated properly prepared fill soils for pavement design purposes. This value was correlated with pertinent soil support values and assumed traffic loads to prepare flexible and rigid pavement designs per the AASHTO *Guide for the Design of Pavement Structures*.

Pavement Sections: The recommended flexible pavement section is presented below in tabular format:

RECOMMENDED FLEXIBLE PAVEMENT SECTION			
Layer	Material ¹	Thickness (Inches)	
		Standard Duty	Heavy Duty
Surface	NYSDOT TYPE 7 OR 7F TOP PG64E-22	1.5	2.5
Base	NYSDOT TYPE 3 BASE PG64E-22	3.0	4.0
Subbase	NYSDOT TYPE 2 SUBBASE COURSE	6.0	8.0

A rigid concrete pavement should be used to provide suitable support at areas of high traffic or severe turns, or extreme loading (such as dumpster area pads and driveway aprons). The recommended rigid pavement is presented below in tabular format:

RECOMMENDED RIGID PAVEMENT SECTION			
Layer	Material	Thickness (inches)	
		Standard Duty	Heavy Duty
Surface	4,000 psi air-entrained concrete	5.0	6.0
Base	NYSDOT TYPE 2 SUBBASE COURSE	6.0	8.0

Additional Design Considerations: The pavement section thickness designs presented in this report are based on the design parameters detailed herein and are contingent on proper construction, inspection and maintenance. The designs are contingent on achieving the minimum soil support value in the field. To accomplish this requirement, all subgrade soil and supporting fill or backfill must be placed, prepared and evaluated as detailed in Sections 5.2 and 5.3 of this report. Proper drainage must be provided for the pavement structure including appropriate grading and surface water control, as well as measures to drain water from the subgrade such as bleeder drains at inlets.

The performance of the pavement also will depend on the quality of materials and workmanship. Dynamic Earth recommends that New York State Department of Transportation (NYSDOT) standards for materials, workmanship, and maintenance be applied to this site. Project specifications should include verifying that the installed asphaltic concrete material composition is within tolerance for the specified materials and that the percentage of air voids of the installed pavement is within specified ranges for the respective materials. All rigid concrete pavements should be suitably air-entrained, jointed and reinforced.

5.8 Retaining Walls and Lateral Earth Pressures

General: Earth retaining wall structures are proposed around the perimeter of the site and adjacent to proposed pavement areas within the central portion of the site. Retaining wall details have not been finalized at this time; however, based on the grading plan, typical maximum exposed wall heights will be on the order of 20 to 30 feet. As such, Dynamic Earth presents the following design recommendations for earth retaining structures. Dynamic Earth can assist with design of the walls, if requested.

Soil Parameters and Design Considerations: Proposed earth retaining structures that are free to rotate generally can be designed to resist active earth pressures. Restrained walls and retaining wall corners need to be designed to resist at-rest earth pressures. Backfill soils adjacent to these structures should consist of freely draining materials composed primarily of sand and gravel. The soil

parameters provided below apply to the anticipated properly compacted granular fill and backfill placed in a well-drained, level condition and may be used for preliminary design of retaining structures. Based on the subgrade soils encountered during this investigation, we preliminarily anticipate that only limited portions of the on-site materials will be suitable for reuse as structural fill material behind proposed walls. **Considerations for using the on-site soils as backfill may be evaluated by Dynamic Earth, but since these materials include a high percentage of fine-grained silt/clay, imported granular fill material may be required.**

SUMMARY OF LATERAL EARTH PRESSURE PARAMETERS						
Stratum	Moist Density, γ_{moist} (pcf)	Internal Friction Angle, Φ (degrees)	Coefficient of Active Earth Pressure (K_a)	Coefficient of Passive Earth Pressure (K_p)	Coefficient of At-Rest Earth Pressure (K_o)	Cohesion (psf)
Natural Glacial Deposits (Fine Grained)	125	20	0.49	2.04	0.66	750
Natural Glacial Deposits (Granular)	135	30	0.33	3.0	0.50	0
Weathered Rock/Rock	155	36	0.26	3.85	0.41	0
Import/Compacted Granular Soil	135	32	0.31	3.25	0.47	0

The effect of any surcharge loads including construction equipment, traffic, and temporary and permanent stockpiles also will need to be included in earth pressure calculations. Dynamic Earth would be pleased to assist with the calculation of lateral earth pressures based on the soil parameters presented herein during the structural design phase.

Wall footings should be designed so that the combined effect of vertical and horizontal resultant loads and overturning moment does not exceed the maximum allowable soil bearing capacity recommended in this report.

Adequate drainage of water which may collect on the backfill side of the retaining walls should be incorporated into the design and/or hydrostatic pressures should be added to the pressure calculations. A system of perforated drain pipes should be used at the base of the backfill side of the basement wall structure in order to collect and remove the water and relieve hydrostatic pressure.

Dynamic Earth recommends that granular soils be used to backfill the proposed subgrade and retaining walls. Clays and silts or soils with a fine fraction with a liquid limit exceeding 40 or a plastic index exceeding 20 should not be used as backfill. Acceptable backfill should be placed in maximum nine-inch loose lifts and compacted to 95 percent of the maximum dry density, within two percent of the optimum moisture content, as determined by ASTM D 1557 (Modified Proctor). A maximum density of 155 pounds per cubic foot should not be exceeded in order to avoid creating excessive lateral pressure on the walls during compaction operations.

Dynamic Earth recommends that backfill directly behind the walls be compacted with light, hand-held compactors. Heavy compactors and grading equipment should not be allowed to operate within a zone measured at a 45-degree angle from the base of the walls during backfilling to avoid developing excessive temporary or long-term lateral soil pressures.

Resistance to sliding should be provided by friction resistance at the base of the retaining structure foundation as indicated in Section 5.5 of this report. Passive earth pressures at the toe of the retaining structure should be neglected in the design.

Due to the cobbles/boulders encountered within the on-site soils and underlying weathered rock/rock, difficult excavation should be anticipated within the area of proposed retaining walls.

5.9 Seismic and Liquefaction Considerations

Based on the results of the investigation, the site is most consistent with a Site Class C defined by the *International Building Code*. Based on the seismic zone and soil profile, liquefaction considerations are not expected to have a substantial impact on design.

5.10 Temporary Excavations

The granular soils encountered during the investigation are consistent with Type C Soil Conditions as defined by 29 CFR Part 1926 (OSHA) which require a maximum unbraced excavation angle of 1.5:1 (horizontal: vertical). Actual conditions encountered during construction should be evaluated by a competent person (as defined by OSHA) to ensure that safe excavation methods and/or shoring and bracing requirements are implemented.

5.11 Seasonal High Groundwater and Infiltration

Indicators of seasonal high groundwater (i.e. based on soil mottling) were encountered within the soil profile pits at depths ranging between approximately 1.2 feet and 9.0 feet below the ground surface; corresponding to elevations ranging between 227.0 feet and 132.6 feet. Groundwater ws

encountered within the soil profile pits at depths ranging between 2.5 feet and 11.6 feet below the ground surface; corresponding to elevations ranging between 226.0 feet and 129.5 feet. In-situ infiltration rates ranged between zero inches per hour and greater than 20.0 inches per hour. In-situ infiltration testing was not performed at soil profile pit locations SPP-204, SPP-205, SPP-206, SPP-208, and previous locations SPP-119, SPP-120, SPP-123, and SPP-134 due to an excessive amount of coarse fragments encountered within the soil profile. In accordance with the requirements of the New York Stormwater Manual, infiltration testing was performed within soil stratum above the weathered rock/rock. Infiltration testing of the underlying weathered rock/rock was not performed as part of this investigation.

A summary of the seasonal high groundwater levels and in-situ infiltration testing is presented in the following table:

SOIL MOTTLING, GROUNDWATER, AND INFILTRATION SUMMARY							
Location	Approximate Surface Elevation	Mottling		Groundwater		Infiltration	
		Depth (Feet)	Elevation (Feet)	Depth (Feet)	Elevation (Feet)	Depth (inches)	Rate (in/hour)
SPP-201	216.7	Not Encountered		Not Encountered		16.0	>20.0
SPP-202	224.5	6.3	218.2	Not Encountered		60.0	>20.0
SPP-203	221.0	Not Encountered		Not Encountered		26.0	0.0
SPP-204	224.7	Not Encountered		Not Encountered		N/A	
SPP-205	221.1	Not Encountered		Not Encountered		N/A	
SPP-206	222.3	Not Encountered		Not Encountered		N/A	
SPP-207	216.0	Not Encountered		Not Encountered		36.0	0.0
SPP-208	219.5	Not Encountered		Not Encountered		N/A	
SPP-209	137.0	Not Encountered		Not Encountered		60.0	>20.0
SPP-210	136.5	Not Encountered		Not Encountered		60.0	>20.0
SPP-211	136.9	Not Encountered		Not Encountered		60.0	>20.0
SPP-212	137.5	4.9	132.6	Not Encountered		60.0	>20.0
SPP-213	146.0	6.0	140.0	7.7	138.3	50.0	>20.0
SPP-214	150.0	Not Encountered		3.8	146.3	24.0	>20.0
SPP-215	154.0	Not Encountered		2.8	151.2	7.0	>20.0
SPP-216	150.0	Not Encountered		10.7	139.3	60.0	>20.0
SPP-217	150.0	7.3	142.7	7.3	142.7	36.0	0.75
SPP-218	142.8	Not Encountered		Not Encountered		36.0	6.0
SPP-219	141.5	Not Encountered		Not Encountered		24.0	>20.0

SOIL MOTTLING, GROUNDWATER, AND INFILTRATION SUMMARY							
Location	Approximate Surface Elevation	Mottling		Groundwater		Infiltration	
		Depth (Feet)	Elevation (Feet)	Depth (Feet)	Elevation (Feet)	Depth (inches)	Rate (in/hour)
SPP-220	196.0	Not Encountered		7.7	188.3	36.0	1.5
SPP-1	226.0	Not Encountered		Not Encountered		48.0	2.0
SPP-2	220.0	1.8	218.2	Not Encountered		36.0	5.0
SPP-3	222.0	Not Encountered		Not Encountered		48.0	2.5
SPP-4	230.0	3.3	226.7	4.0	226.0	36.0	0.5
SPP-5	224.0	2.7	221.3	Not Encountered		24.0	0.1
SPP-6	229.0	2.0	227.0	4.3	224.7	18.0	0.1
SPP-7	231.0	5.8	225.2	11.6	219.4	36.0	0.1
SPP-8	212.0	3.0	209.0	3.0	209.0	24.0	0.2
SPP-9	211.0	2.3	208.7	4.0	207.0	30.0	0.1
SPP-10	216.0	5.5	210.5	Not Encountered		48.0	0.1
SPP-11	200.0	3.0	197.0	6.0	194.0	24.0	0.3
SPP-12	189.0	1.3	187.7	5.3	183.7	36.0	5.0
SPP-13	210.0	1.3	208.7	2.8	207.2	18.0	0.1
SPP-14	193.0	2.0	191.0	10.0	183.0	48.0	0.0
SPP-15	203.0	1.5	201.5	7.6	195.4	24.0	0.5
SPP-16	207.0	1.4	205.6	Not Encountered		36.0	0.1
SPP-17	197.0	2.0	195.0	Not Encountered		48.0	1.0
SPP-18	191.0	3.0	188.0	8.5	182.5	48.0	0.5
SPP-19	140.0	1.3	138.7	7.0	133.0	48.0	4.0
SPP-20	143.0	6.5	136.5	Not Encountered		24.0	0.5
SPP-21	152.0	2.5	149.5	2.5	149.5	24.0	3.0
SPP-22	145.0	Not Encountered		Not Encountered		24.0	0.5
SPP-23	140.0	Not Encountered		Not Encountered		48.0	3.5
SPP-24	137.0	2.5	134.5	7.5	129.5	48.0	6.0
SPP-25	136.0	2.5	133.5	3.5	132.5	24.0	2.5
SPP-101	220.0	2.3	217.7	Not Encountered		16.0	0.25
SPP-102	224.0	Not Encountered		Not Encountered		30.0	1.0
SPP-103	228.0	Not Encountered		Not Encountered		24.0	0.5
SPP-104	222.0	2.7	219.3	Not Encountered		24.0	2.75
SPP-105	222.0	Not Encountered		Not Encountered		12.0	20.5

SOIL MOTTLING, GROUNDWATER, AND INFILTRATION SUMMARY							
Location	Approximate Surface Elevation	Mottling		Groundwater		Infiltration	
		Depth (Feet)	Elevation (Feet)	Depth (Feet)	Elevation (Feet)	Depth (inches)	Rate (in/hour)
SPP-106	219.0	Not Encountered		Not Encountered		14.0	24.0
SPP-107	224.0	Not Encountered		Not Encountered		12.0	0.1
SPP-108	222.0	Not Encountered		Not Encountered		24.0	0.25
SPP-109	214.0	Not Encountered		Not Encountered		24.0	0.4
SPP-110	216.0	Not Encountered		Not Encountered		20.0	0.25
SPP-111	214.0	Not Encountered		Not Encountered		12.0	0.4
SPP-112	211.0	Not Encountered		Not Encountered		30.0	0.25
SPP-113	208.0	Not Encountered		Not Encountered		32.0	0.0
SPP-114	206.0	Not Encountered		Not Encountered		21.0	0.1
SPP-115	206.0	Not Encountered		Not Encountered		18.0	2.75
SPP-116	197.0	8.5	188.5	Not Encountered		51.0	24.0
SPP-117	193.0	9.0	184.0	Not Encountered		47.0	24.0
SPP-118	187.0	Not Encountered		5.5	182.0	41.0	24.0
SPP-119	142.0	Not Encountered		Not Encountered		N/A	
SPP-120	143.0	Not Encountered		Not Encountered		N/A	
SPP-121	142.0	5.0	137.0	Not Encountered		48.0	0.25
SPP-122	140.0	3.3	136.7	Not Encountered		32.0	0.0
SPP-123	142.0	Not Encountered		Not Encountered		N/A	
SPP-124	165.0	Not Encountered		Not Encountered		36.0	24.0
SPP-125	140.0	Not Encountered		Not Encountered		16.0	24.0
SPP-126	142.0	1.2	140.8	5.2	136.8	14.0	0.0
SPP-127	166.0	Not Encountered		11.0	155.0	48.0	24.0
SPP-128	142.0	Not Encountered		Not Encountered		30.0	10.0
SPP-129	137.0	Not Encountered		Not Encountered		48.0	24.0
SPP-130	137.0	Not Encountered		Not Encountered		24.0	0.75
SPP-131	137.0	Not Encountered		Not Encountered		48.0	24.0
SPP-132	137.0	Not Encountered		5.0	132.0	16.0	0.5
SPP-133	137.0	Not Encountered		5.3	131.7	24.0	1.0
SPP-134	140.0	Not Encountered		Not Encountered		N/A	
SPP-135	137.0	Not Encountered		Not Encountered		24.0	6.0
SPP-136	137.0	Not Encountered		Not Encountered		16.0	0.5

SOIL MOTTLING, GROUNDWATER, AND INFILTRATION SUMMARY							
Location	Approximate Surface Elevation	Mottling		Groundwater		Infiltration	
		Depth (Feet)	Elevation (Feet)	Depth (Feet)	Elevation (Feet)	Depth (inches)	Rate (in/hour)
SPP-137	137.0	Not Encountered		Not Encountered		32.0	14.0
SPP-138	136.0	Not Encountered		Not Encountered		24.0	1.25

5.12 Supplemental Post-Investigation Services

Final Design/Review: Since these geotechnical investigation activities have been completed during the initial design phase, many critical assumptions regarding assumed structural loads, existing and proposed elevations, etc. affect the geotechnical analysis. The considerations presented in this report should be considered to help develop the optimum site design and grading, and Dynamic Earth should remain involved during final design. In particular, Dynamic Earth should be engaged to review final site plans (including final grading, structural foundation plans, and retaining wall plans) as related to the proposed excavation/blasting of rock and provide supplemental recommendations, if applicable.

Construction Monitoring and Testing: The recommendations presented herein are contingent on the owner retaining Dynamic Earth to perform inspection, testing, and consultation during construction as described in previous sections of this report. **Construction phase evaluation by Dynamic Earth should be performed to further evaluate the lateral extent of existing fill material and to confirm their suitability for structural support.** In addition, limited overexcavation and replacement of fill material within pavement areas and/or special handling should be expected. Monitoring and testing should also be performed to verify that suitable materials are used for controlled fill, and that they are properly placed and compacted over suitable subgrade soils. Testing of fill placement will also be critical to limiting differential settlement.

Vibration/Sound Monitoring Considerations: The proposed construction activities will include blasting of rock that could will generate sound and potentially transmit ground vibrations into adjacent structures. In some cases, these vibrations may cause annoyance and/or structural damage. As such, Dynamic Earth recommends a professional noise consultant familiar with this report should work with the specialty blasting contractor to assist with preparation of vibration and noise requirements and a monitoring plan. Dynamic Earth would be pleased to assist with this process, if requested.

6.0 GENERAL COMMENTS

Supplemental recommendations may be required upon finalization of construction plans or if significant changes are made in the characteristics or location of the proposed structure. Dynamic Earth should be included as a consultant to the design team and should be provided final plans for review to confirm these criteria apply or to modify recommendations as necessary.

The recommendations presented herein should be utilized by a qualified engineer in preparing the project plans and specifications. The engineer should consider these recommendations as minimum physical standards that may be superseded by local and regional building codes and structural considerations. These recommendations are prepared for the use of the client for the specific project detailed and should not be used by any third party. These recommendations are relevant to the design phase and should not be substituted for construction specifications.

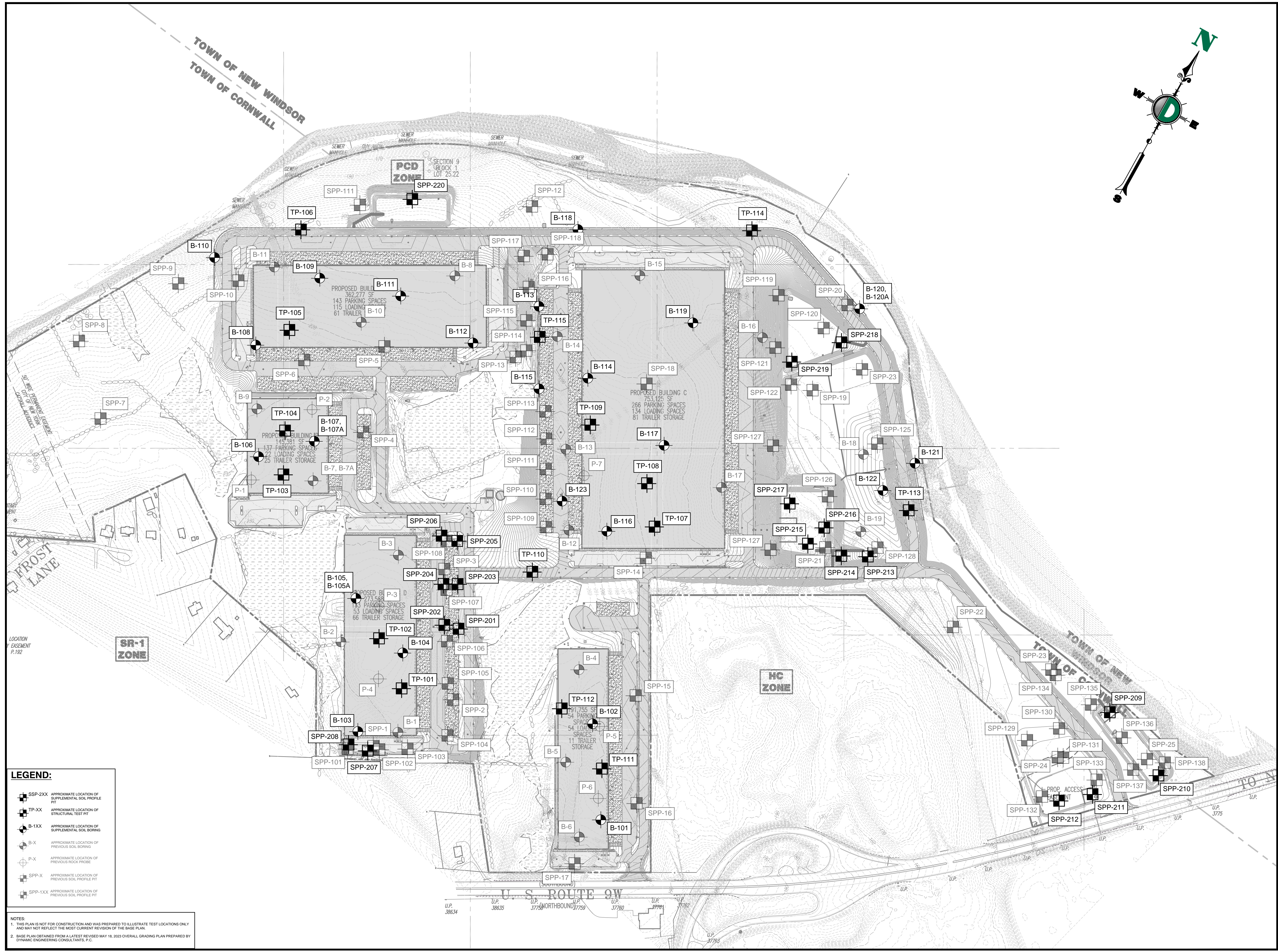
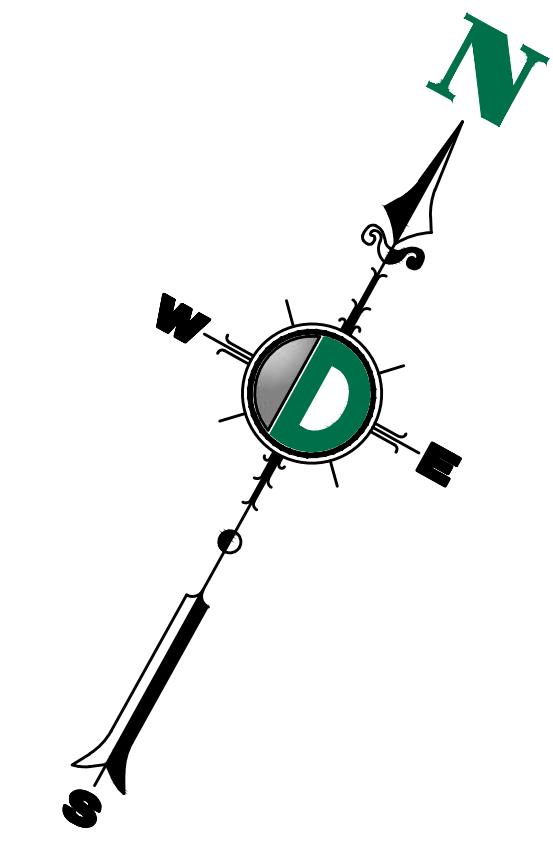
The possibility exists that conditions between borings may differ from those at specific boring locations, and conditions may not be as anticipated by the designers or contractors. In addition, the construction process may itself alter soil conditions. Therefore, Dynamic Earth's Geotechnical Engineers or their representatives should observe and document the construction procedures used and the conditions encountered, as well as conduct testing and inspection to ensure the design criteria are met or recommendations to address deviations are implemented.

Dynamic Earth assumes that a qualified contractor will be employed to perform the construction work, and that the contractor will be required to exercise care to ensure all excavations are performed in accordance with applicable regulations and good practice. Particular attention should be paid to avoiding damaging or undermining adjacent properties and maintaining slope stability.

The exploration and analysis of the foundation conditions reported herein are presented to form a reasonable basis for foundation design. The recommendations submitted for the proposed construction are based on the available soil information and the preliminary design details furnished or assumed. Deviations from the noted subsurface conditions encountered during construction should be brought to the attention of the geotechnical engineer.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been promulgated after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology. No other warranties are implied or expressed.

Supplemental Test Location Plan



LEGEND:

	APPROXIMATE LOCATION OF SUPPLEMENTAL SOIL PROFILE PIT
	APPROXIMATE LOCATION OF STRUCTURAL TEST PIT
	APPROXIMATE LOCATION OF SUPPLEMENTAL SOIL BORING
	APPROXIMATE LOCATION OF PREVIOUS SOIL BORING
	APPROXIMATE LOCATION OF PREVIOUS ROCK PROBE
	APPROXIMATE LOCATION OF PREVIOUS SOIL PROFILE PIT
	APPROXIMATE LOCATION OF PREVIOUS SOIL PROFILE PIT

NOTES:
 1. THIS PLAN IS NOT FOR CONSTRUCTION AND WAS PREPARED TO ILLUSTRATE TEST LOCATIONS ONLY AND MAY NOT REFLECT THE MOST CURRENT REVISION OF THE BASE PLAN.
 2. BASE PLAN OBTAINED FROM A LATEST REVISION MAY 18, 2023 OVERALL GRADING PLAN PREPARED BY DYNAMIC ENGINEERING CONSULTANTS, P.C.

REV.	DATE	COMMENTS

PROJECT: **CORNWALL LOGISTICS, LLC**
PROPOSED INDUSTRIAL WAREHOUSE
 266 US ROUTE 9 WEST
 SECTION 9, BLOCK 1, LOT 25.22
 TOWN OF CORNWALL, ORANGE COUNTY, NEW YORK

DESIGNED BY: FVC
 CHECKED BY: FVC
 DRAWN BY: SH

811 PROTECT YOURSELF
 ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DIGGING THE EARTH'S SURFACE ANYWHERE IN ANY STATE.
 FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

DYNAMIC EARTH, LLC
 GEOTECHNICAL INVESTIGATION • CONSTRUCTION PHASE TESTING/INSPECTION
 RETAINING WALL/SEPTIC SYSTEM DESIGN • LEAP SERVICES
 PHASE II ENVIRONMENTAL SITE ASSESSMENTS • SITE REMEDIATION
 245 Main Street, Suite 113
 Chester, NJ 07930
 T: 908.879.9229 | F: 908.879.0222
 Offices conveniently located at:
 Littleton, Colorado • 303.751.1100
 Chicago, Illinois • 708.879.9229
 Newark, New Jersey • 973.592.7200
 Fort Mill, South Carolina • 704.544.6118
 New York, New York • 212.486.0500
 Philadelphia, Pennsylvania • 215.253.4888
 Houston, Texas • 281.398.4400
 Little Rock, Arkansas • 501.648.2004
 Dallas, Texas • 972.382.2000
 Annapolis, Maryland • 410.551.5555

www.dynamiccec.com

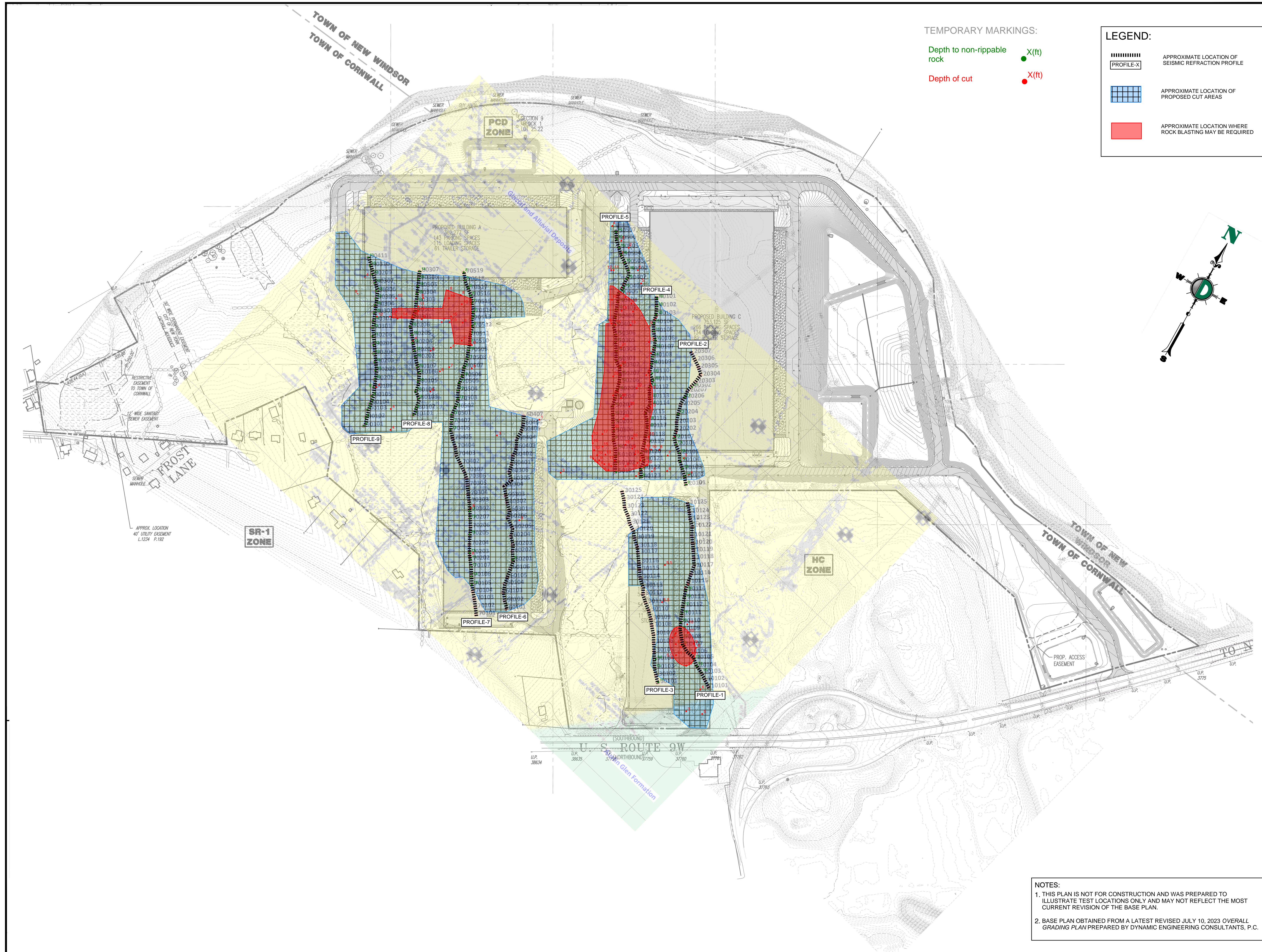
P.H. HOWELL
 PROFESSIONAL ENGINEER
 NEW JERSEY LICENSE No. 47287

TITLE: **SUPPLEMENTAL TEST LOCATION PLAN**

SCALE: (H) DATE: 6/26/2023
 (V)
 PROJECT No: 2803-99-012E

SHEET No: **1** OF 1
 Rev. #:

Conceptual Rock Blasting Plan

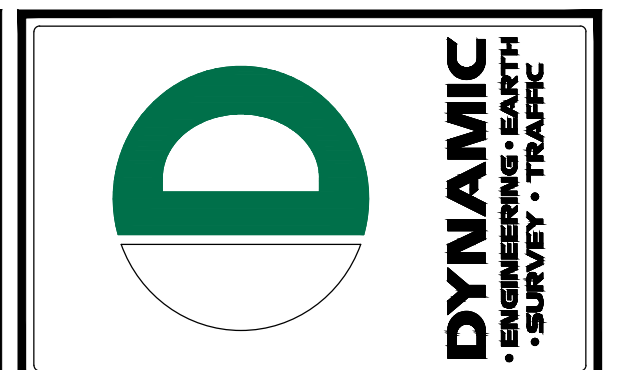
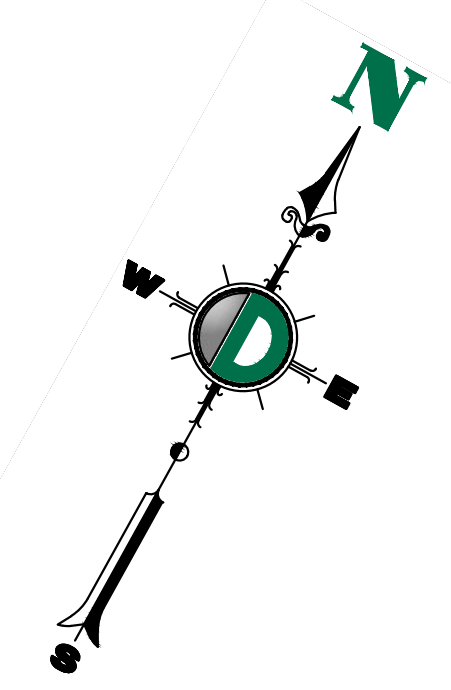


TEMPORARY MARKINGS:

- Depth to non-rippable rock ● X(ft)
- Depth of cut ● X(ft)

LEGEND:

- APPROXIMATE LOCATION OF SEISMIC REFRACTION PROFILE
- APPROXIMATE LOCATION OF PROPOSED CUT AREAS
- APPROXIMATE LOCATION WHERE ROCK BLASTING MAY BE REQUIRED



NO.	REV.	DATE	COMMENTS

PROJECT:	CORNWALL LOGISTICS, LLC c/o TREETOP DEVELOPMENT, LLC PROPOSED INDUSTRIAL WAREHOUSE 261 SLOUS ROUTE 9 WEST SECTION 9, BLOCK 1, LOT 25.22 TOWN OF CORNWALL, ORANGE COUNTY, NEW YORK
DRAWN BY:	GIS
DESIGNED BY:	
CHECKED BY:	

811 PROTECT YOURSELF
 ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DIG INTO THE EARTH'S SURFACE ANYWHERE IN ANY STATE.
 FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

DYNAMIC EARTH, LLC
 GEOTECHNICAL INVESTIGATION • CONSTRUCTION PHASE TESTING/INSPECTION
 RETAINING WALL/SEPTIC SYSTEM DESIGN • SITE SERVICES
 PHASE II ENVIRONMENTAL SITE ASSESSMENTS • SITE REMEDIATION
 50 Park Place, Mezzanine Level
 Newark, NJ 07102
 T: 973.755.7200
 Offices conveniently located at:
 Littleton, Colorado • T: 303.755.7200
 Chicago, New Jersey • T: 908.679.9229
 Newark, New Jersey • T: 973.755.7200
 Springfield, New Jersey • T: 732.974.0118
 Newburgh, Pennsylvania • T: 517.465.0515
 Philadelphia, Pennsylvania • T: 215.553.4888
 Bethlehem, Pennsylvania • T: 610.398.4400
 High Point, North Carolina • T: 703.626.0700
 Houston, Texas • T: 281.390.4400
 Fort Worth, Texas • T: 952.444.2044
 Dallas, Texas • T: 972.444.2044
 Deltona, Florida • T: 321.921.8570

www.dynamiccec.com

TITLE:	CONCEPTUAL ROCK BLASTING PLAN
SCALE:	N.T.S.
DATE:	06/22/2023
PROJECT No:	2803-99-012E
SHEET No:	1
Rev. #:	1

NOTES:
 1. THIS PLAN IS NOT FOR CONSTRUCTION AND WAS PREPARED TO ILLUSTRATE TEST LOCATIONS ONLY AND MAY NOT REFLECT THE MOST CURRENT REVISION OF THE BASE PLAN.
 2. BASE PLAN OBTAINED FROM A LATEST REVISED JULY 10, 2023 OVERALL GRADING PLAN PREPARED BY DYNAMIC ENGINEERING CONSULTANTS, P.C.

**Records of Supplemental
Subsurface Exploration**



BOREHOLE LOG

Boring No : B-101

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 205.0 feet	Date Started: 05-11-2023	Groundwater Data	Depth (ft)	EI. (ft)	Additional Groundwater Data	Depth (ft)	EI. (ft)
Termination Depth: 15.2 feet	Date Completed: 05-11-2023						
Proposed Location: Building E	Logged by: A. Park	While Drilling: ▽	15.0	190.0			
Drill/Test Method: HSA/SPT	Contractor: General Borings	At Completion: ▼	15.0	190.0			
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
0.0-2.0	S-1	SS	12	--	1 3	6	Surface Cover	6 inches of topsoil	Qp = 1.25 tsf	
					3 4					
2.0-4.0	S-2	SS	0	--	2 2	6	Glacial Deposits	Light brown silty clay, little coarse to fine gravel, trace medium to fine sand, moist, stiff (CL-ML)	No recovery	
					4 10					
4.0-6.0	S-3	SS	16	--	15 9	11	Glacial Deposits	Light brown clay, little coarse to fine sand, trace coarse to fine gravel, moist, very stiff (CL)	Qp = 4.0 tsf Apparent perched groundwater from 6 feet to 8.3 feet Qp = 1.5 tsf	
					2 13					
6.0-8.0	S-4	SS	24	--	11 11	22	Glacial Deposits	As above, wet, stiff (CL)	Qp = 2.5 tsf	
					11 15					
8.0-8.3	S-5	SS	3	--	50/4	50/4	Glacial Deposits	Dark brown clay, some coarse to fine gravel, little silt, trace coarse to fine sand, wet, very stiff (CL)		
					--	--				
10.0-11.3	S-6	SS	7	--	6 13	63/9	Weathered Rock	Gray brown coarse to fine gravel, some clay, trace coarse to fine sand, moist, very dense (GC)	Hard augering	
					50/3	--				
15.0-15.2	S-7	SS	5	--	50/2	50/2	Weathered Rock	Gray coarse to fine gravel, some silt, wet, very dense (GM)	Boring B-101 encountered refusal at approximately 15.2 feet below the ground surface on apparent bedrock.	
					--	--				



BOREHOLE LOG

Boring No : B-102

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 210.0 feet	Date Started: 05-11-2023	Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 10.0 feet	Date Completed: 05-11-2023						
Proposed Location: Building E	Logged by: A. Park	At Completion: ▼	6.0	204.0			
Drill/Test Method: HSA/SPT	Contractor: General Borings						
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
0.0-2.0	S-1	SS	12	--	1 2 3 3	5		Surface Cover	5 inches of topsoil	Qp = 1.75 tsf
2.0-4.0	S-2	SS	10	--	3 2 3 9	5		Glacial Deposits	Light brown silt, trace coarse to fine sand, moist, stiff (ML)	
4.0-6.0	S-3	SS	0	--	37 28 21 15	49			Light brown silt, trace medium to fine sand, moist, stiff (ML)	Qp = 1.75 tsf
6.0-7.4	S-4	SS	14	--	19 19 50/5 --	69/11			Weathered Rock	No recovery
10.0-10.1	S-5	SS	0	--	50/1 --	50/1			Gray coarse to fine gravel, some coarse to fine sand, trace silt, wet, very dense (GP)	
									No recovery Boring B-102 encountered refusal at approximately 10.1 feet below the ground surface on probable bedrock.	



BOREHOLE LOG

Boring No : B-103

Project: Proposed Industrial Warehouse							Proj. No.: 2803-99-012E						
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York							Client: Cornwall Logistics, LLC c/o Treetop Development, LLC						
Surface Elevation: 220.0 feet		Date Started: 05-11-2023		Groundwater Data		Depth	El.	Additional Groundwater Data		Depth	El.		
Termination Depth: 2.2 feet		Date Completed: 05-11-2023				(ft)	(ft)			(ft)	(ft)		
Proposed Location: Building D		Logged by: A. Park		While Drilling: ▽		NE	-						
Drill/Test Method: HSA/SPT		Contractor: General Borings		At Completion: ▼		NE	-						
Hammer Type: Auto		Rig Type: Diedrich D50											
Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks			
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N							
0.0-2.0	S-1	SS	12	--	2 2	5	Surface Cover	5 inches of topsoil	Qp = 1.5 tsf				
					3 36		Glacial Deposits	Light brown clay, little coarse to fine gravel, trace coarse to fine sand, trace roots, moist, medium stiff (CL)					
2.0-2.2	S-2	SS	0	--	50/2	50/2		No recovery					
								Boring B-103 encountered refusal at approximately 2.2 feet below the ground surface on probable boulder.					



BOREHOLE LOG

Boring No : B-104

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 236.5 feet	Date Started: 05-11-2023	Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 10.1 feet	Date Completed: 05-11-2023						
Proposed Location: Building D	Logged by: A. Park	At Completion: ▼	NE	-			
Drill/Test Method: HSA/SPT	Contractor: General Borings						
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
0.0-2.0	S-1	SS	12	--	2 2	4	Glacial Deposits	Surface Cover 6 inches of topsoil	Qp = 1.75 tsf	
					2 4			Light brown clay, trace coarse to fine sand, moist, very stiff (CL)		
2.0-4.0	S-2	SS	7	--	6 9	28		Light brown silty clay, little coarse to fine gravel, trace coarse to fine sand, moist, stiff (CL-ML)	Qp = 1.5 tsf	
					19 16			As above, moist, very stiff (CL-ML)	Qp = 4.0 tsf	
4.0-6.0	S-3	SS	10	--	25 18	30		As above, moist, stiff (CL-ML)		
					12 17			As above, moist, stiff (CL-ML)	Apparent perched groundwater at 6.5 feet Qp = 1.5 tsf	
6.0-8.0	S-4	SS	11	--	17 15	32				
					17 18					
8.0-8.4	S-5	SS	0	--	50/5	50/5	Weathered Rock	No recovery		
					--	--				
10.0-10.1	S-6	SS	0	--	50/1	50/1		No recovery Boring B-104 encountered refusal at approximately 10.1 feet below the ground surface on apparent bedrock.		
					--	--				



BOREHOLE LOG

Boring No : B-105

Page 1 of 1

Project: Proposed Industrial Warehouse				Proj. No.: 2803-99-012E						
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York				Client: Cornwall Logistics, LLC c/o Treetop Development, LLC						
Surface Elevation: 235.5 feet		Date Started: 05-12-2023		Groundwater Data		Depth	EI.	Additional Groundwater Data	Depth	EI.
Termination Depth: 2.7 feet		Date Completed: 05-12-2023				(ft)	(ft)		(ft)	(ft)
Proposed Location: Building D		Logged by: A. Park		While Drilling: ▽		NE	-			
Drill/Test Method: HSA/SPT		Contractor: General Borings		At Completion: ▼		NE	-			
Hammer Type: Auto		Rig Type: Diedrich D50								

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
0.0-2.0	S-1	SS	14	--	1 1	3	<div style="display: flex; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); margin-right: 5px;"> 5 10 15 20 </div> </div>	Surface Cover 6 inches of topsoil Light brown silt, trace coarse to fine sand, moist, very stiff (ML)	Qp = 1.5 tsf	
2.0-2.7	S-2	SS	4	--	8 50/2	50/2		Glacial Deposits Gray and light brown coarse to fine gravel, some silt, little coarse to fine sand, moist, very dense (GM)		
									Boring B-105 encountered refusal at approximately 2.7 feet below the ground surface on probable boulder.	



BOREHOLE LOG

Boring No : B-105A

Page 1 of 1

Project: Proposed Industrial Warehouse				Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York				Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation:	235.5 feet	Date Started:	05-12-2023	Groundwater Data	Depth	El.	Additional Groundwater Data	Depth	El.
Termination Depth:	10.5 feet	Date Completed:	05-12-2023		(ft)	(ft)			
Proposed Location:	Building D	Logged by:	A. Park	While Drilling:	6.0	229.5			
Drill/Test Method:	HSA/SPT	Contractor:	General Borings	At Completion:	6.0	229.5			
Hammer Type:	Auto	Rig Type:	Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
							Surface Cover	silt/ silt	Same as boring B-105	Description based on auger cuttings
							Glacial Deposits	silt/ silt	Same as boring B-105	
4.0-6.0	S-1	SS	14	--	20 10 9 11	19	▼		Light brown silt, some coarse to fine gravel, moist, very stiff (ML)	Augered to 4 feet Qp = 4.0 tsf
6.0-8.0	S-2	SS	15	--	37 25 17 17	42			As above, wet (ML)	Qp = 2.5 tsf
8.0-10.0	S-3	SS	7	--	28 29 36 17	65			Light brown clay, little coarse to fine gravel, wet, very stiff (CL)	Qp = 3.5 tsf
									Boring B-105A encountered refusal at approximately 10.5 feet below the ground surface on apparent bedrock.	



BOREHOLE LOG

Boring No : B-106

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 231.5 feet	Date Started: 05-12-2023	Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 9.4 feet	Date Completed: 05-12-2023						
Proposed Location: Building B	Logged by: A. Park	At Completion: ▼	NE	-			
Drill/Test Method: HSA/SPT	Contractor: General Borings						
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
								Surface Cover	6 inches of topsoil	
1.0-3.0	S-1	SS	15	--	1 3 4 6	7		Glacial Deposits	Light brown silt, little coarse to fine gravel, trace coarse to fine sand, moist, stiff (ML)	Qp = 2.0 tsf
3.0-5.0	S-2	SS	9	--	4 9 13 12	22			As above, moist, very stiff (ML)	Qp = 2.25 tsf
5.0-7.0	S-3	SS	16	--	11 13 12 18	25			As above, moist, hard (ML)	Qp = 4.5 tsf
7.0-8.6	S-4	SS	18	--	19 32 52 50/1	84			Light brown coarse to fine gravel, and silt, trace coarse to fine sand, moist, very dense (GM)	
9.0-9.4	S-5	SS	4	--	64/5 --	64/5		Weathered Rock	Gray coarse to fine gravel, some clay, wet, very dense (GC)	
									Boring B-106 encountered refusal at approximately 9.4 feet below the ground surface on apparent bedrock.	



BOREHOLE LOG

Boring No : B-107

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 234.0 feet	Date Started: 05-15-2023	Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 6.9 feet	Date Completed: 05-15-2023						
Proposed Location: Building B	Logged by: A. Park	At Completion: ▼	NE	-			
Drill/Test Method: HSA/SPT	Contractor: General Borings						
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks	
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N					
0.0-1.7	S-1	SS	10	--	1	4	11	Surface Cover	silt/ silt/ silt/	6 inches of topsoil	Qp = 4.0 tsf
					7	50/2				Light brown silt, little coarse to fine sand, moist, very stiff (ML)	
3.0-5.0	S-2	SS	18	--	25	14	26	Glacial Deposits	silt/ silt/ silt/	Dark brown silt, little coarse to fine sand, trace coarse to fine gravel, moist, very stiff (ML)	Qp = 4.0 tsf
					12	15					
5.0-6.9	S-3	SS	15	--	6	5	12	Glacial Deposits	silt/ silt/ silt/	Dark brown coarse to fine sand, some silt, moist, medium dense (SM)	
					7	50/5					
										Boring B-107 encountered refusal at approximately 6.9 feet below the ground surface on probable boulder.	



BOREHOLE LOG

Boring No : B-107A

Page 1 of 1

Project: Proposed Industrial Warehouse				Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York				Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation:	234.0 feet	Date Started:	05-15-2023	Groundwater Data	Depth	El.	Additional Groundwater Data	Depth	El.
Termination Depth:	11.9 feet	Date Completed:	05-15-2023		(ft)	(ft)			
Proposed Location:	Building B	Logged by:	A. Park	While Drilling:	NE	-			
Drill/Test Method:	HSA/SPT	Contractor:	General Borings	At Completion:	NE	-			
Hammer Type:	Auto	Rig Type:	Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
							5	Glacial Deposits	Same as boring B-107	Augered to 8 feet
8.0-10.0	S-1	SS	12	--	7 11	23	10		Light brown clay, little coarse to fine gravel, trace silt, wet, very stiff (CL)	Apparent perched groundwater from 8 feet to 10 feet Qp = 4.0 tsf
10.0-11.9	S-2	SS	12	--	12 35 50 50/5	85	15		Light brown coarse to fine sand, some silt, little coarse to fine gravel, trace clay, wet to moist (SM)	
							20		Boring B-107A encountered refusal at approximately 11.9 feet below the ground surface on probable bedrock.	



BOREHOLE LOG

Boring No : B-108

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 226.5 feet	Date Started: 05-15-2023	Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 8.3 feet	Date Completed: 05-15-2023						
Proposed Location: Building A	Logged by: A. Park	While Drilling: ▽	NE	-			
Drill/Test Method: HSA/SPT	Contractor: General Borings	At Completion: ▼	NE	-			
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
0.0-2.0	S-1	SS	16	--	2 4	12	Surface Cover Glacial Deposits 	5 inches of topsoil	Qp = 3.25 tsf Qp = 3.5 tsf	
2.0-4.0	S-2	SS	14	--	8 27	53		Light brown silt, some coarse to fine sand, trace coarse to fine gravel, trace roots, moist, very stiff (ML)		
4.0-5.3	S-3	SS	5	--	8 17	53		Light brown and gray silt, some coarse to fine sand, little coarse to fine gravel, moist, very stiff (ML)		
4.0-5.3	S-3	SS	5	--	19 47	97/9	Weathered Rock 	Gray coarse to fine sand, some coarse to fine gravel, trace silt, moist, very dense (SP)		
8.0-8.3	S-4	SS	4	--	50/3 --	50/3		Gray coarse to fine sand, some coarse to fine gravel, trace silt, moist, very dense (SP)		
8.0-8.3	S-4	SS	4	--	50/4 --	50/4		Gray coarse to fine gravel, some coarse to fine sand, trace silt, moist, very dense (GP)	Boring B-108 encountered refusal at approximately 8.3 feet below the ground surface on apparent bedrock.	



BOREHOLE LOG

Boring No : B-109

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 212.5 feet	Date Started: 05-15-2023	Groundwater Data	Depth (ft)	EI. (ft)	Additional Groundwater Data	Depth (ft)	EI. (ft)
Termination Depth: 4.2 feet	Date Completed: 05-15-2023						
Proposed Location: Building A	Logged by: A. Park	While Drilling: ▽	NE	-			
Drill/Test Method: HSA/SPT	Contractor: General Borings	At Completion: ▼	NE	-			
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
0.0-2.0	S-1	SS	9	--	2 2	5	Surface Cover	4 inches of topsoil		
2.0-3.6	S-2	SS	14	--	3 3	51	Glacial Deposits	Light brown silt, some coarse to fine sand, little coarse to fine gravel, moist, very stiff (ML)		
					4 8					
4.0-4.2	S-3	SS	1	--	43 50/1	50/2	Weathered Rock	Gray coarse to fine gravel, some silt, little coarse to fine sand, moist, very dense (GM)		
					50/2 --					
								Gray coarse to fine gravel, trace silt, moist, very dense (GP)	Boring B-109 encountered refusal at approximately 4.2 feet below the ground surface on apparent bedrock.	



BOREHOLE LOG

Boring No : B-109A

Page 1 of 1

Project: Proposed Industrial Warehouse				Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York				Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation:	212.5 feet	Date Started:	05-15-2023	Groundwater Data	Depth	El.	Additional Groundwater Data	Depth	El.
Termination Depth:	3.0 feet	Date Completed:	05-15-2023		(ft)	(ft)			
Proposed Location:	Building A	Logged by:	A. Park	While Drilling:	NE	-			
Drill/Test Method:	HSA/SPT	Contractor:	General Borings	At Completion:	NE	-			
Hammer Type:	Auto	Rig Type:	Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
0.0-3.0				--	--			Surface Cover	4 inches of topsoil	Description based on auger cuttings
				--	--			Glacial Deposits	Same as boring B-109	
				--	--				Same as boring B-109	
									Boring B-109A encountered refusal at approximately three feet below the ground surface on apparent bedrock.	



BOREHOLE LOG

Boring No : B-110

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 201.0 feet	Date Started: 05-15-2023	Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 10.2 feet	Date Completed: 03-17-2022						
Proposed Location: Northwestern Retaining Wall	Logged by: A. Park	At Completion: ▼	NE	-			
Drill/Test Method: HSA/SPT	Contractor: General Borings						
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
0.0-2.0	S-1	SS	13	--	4 6	18	Glacial Deposits	Surface Cover 4 inches of topsoil		
					12 10			Brown coarse to fine gravel, some clay, little coarse to fine sand, trace silt, moist, medium dense (GC)		
2.0-4.0	S-2	SS	20	--	10 21	42		Brown silt, little coarse to fine gravel, trace coarse to fine sand, moist, hard (ML)	Qp = 4.5 tsf	
					21 27					
4.0-6.0	S-3	SS	16	--	35 17	34		Brown clay, some coarse to fine gravel, trace coarse to fine sand, moist, hard (CL)	Qp = 4.5 tsf	
					17 16					
6.0-8.0	S-4	SS	16	--	19 19	36	Dark brown clay, some coarse to fine gravel, trace coarse to fine sand, moist, hard (CL)	Qp = 4.25 tsf		
					17 24					
8.0-10.0	S-5	SS	16	--	18 10	26	As above, moist, hard (CL)	Qp = 4.5 tsf		
					16 14					
10.0-10.2	S-6	SS	0	--	50/2	50/2	No recovery			
					--			Boring B-110 encountered refusal at approximately 10.2 feet below the ground surface on probable bedrock.		



BOREHOLE LOG

Boring No : B-111

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 211.0 feet	Date Started: 05-15-2023	Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 9.4 feet	Date Completed: 05-15-2023						
Proposed Location: Building A	Logged by: A. Park	While Drilling: ▽	NE	-			
Drill/Test Method: HSA/SPT	Contractor: General Borings	At Completion: ▼	NE	-			
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
0.0-2.0	S-1	SS	6	--	3 4	10	Surface Cover 	4 inches of topsoil	Qp = 1.75 tsf	
2.0-4.0	S-2	SS	20	--	6 6	24		Light brown silt, some medium to fine sand, trace clay, moist, stiff (ML)		
					8 13			Light brown silt, some medium to fine sand, little coarse to fine gravel, trace clay, moist, hard (ML)		
5.0-7.0	S-3	SS	0	--	11 12	43		Glacial Deposits		
					16 21			No recovery		
7.0-8.7	S-4	SS	18	--	22 18	71	Weathered Rock			
					23 30		Gray coarse to fine gravel, some coarse to fine sand, trace silt, wet, very dense (GP)			
9.0-9.4	S-5	SS	4	--	41 50/2	50/5		As above (GP)		
									Boring B-111 encountered refusal at approximately 9.4 feet below the ground surface on apparent bedrock.	



BOREHOLE LOG

Boring No : B-112

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 213.5 feet	Date Started: 05-18-2023	Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 7.1 feet	Date Completed: 05-18-2023						
Proposed Location: Building A	Logged by: U. Khan	While Drilling: ▽	NE	-			
Drill/Test Method: HSA/SPT	Contractor: General Borings	At Completion: ▼	NE	-			
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
0.0-2.0	S-1	SS	15	--	3 3	6	Glacial Deposits	Grayish brown clayey silt, little coarse to fine gravel, little coarse to fine sand, moist, medium stiff (ML)	8 inches of topsoil surface cover stripped as part of clearing Qp = 1.0 tsf	
2.0-4.0	S-2	SS	12	--	21 22	41		Grayish brown coarse to fine gravel, some coarse to fine sand, little silt, wet, dense (GM)	Apparent perched groundwater from 2 feet to 6 feet	
4.0-6.0	S-3	SS	16	--	9 14	35		Grayish brown silt, some coarse to fine gravel, little coarse to fine sand, wet, very stiff (ML)	Qp = 2.0 tsf	
6.0-6.9	S-4	SS	7	--	32 50/5	50/5		Grayish brown silt, some coarse to fine gravel, little coarse to fine sand, little clay, moist, stiff (ML)	Qp = 2.0 tsf	
7.0-7.1	S-5	SS	0	--	60/0.5	0.5		No recovery		
Boring B-112 encountered refusal at approximately 7.1 feet below the ground surface on probable boulder.										



BOREHOLE LOG

Boring No : B-113

Page 1 of 1

Project: Proposed Industrial Warehouse				Proj. No.: 2803-99-012E						
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York				Client: Cornwall Logistics, LLC c/o Treetop Development, LLC						
Surface Elevation: 197.0 feet		Date Started: 05-16-2023		Groundwater Data		Depth	EI.	Additional Groundwater Data	Depth	EI.
Termination Depth: 15.5 feet		Date Completed: 05-16-2023				(ft)	(ft)		(ft)	(ft)
Proposed Location: Central Retaining Wall		Logged by: A. Park		While Drilling: ▽		NE	-			
Drill/Test Method: HSA/SPT		Contractor: General Borings		At Completion: ▼		NE	-			
Hammer Type: Auto		Rig Type: Diedrich D50								

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)					
0.0-2.0	S-1	SS	10	--	3	4	15	Surface Cover	6 inches of topsoil	
					11	17			Brown coarse to fine gravel, some coarse to fine sand, trace silt, moist, medium dense (GP)	
2.0-4.0	S-2	SS	0	--	11	13	30		No recovery	
					17	21			No recovery	
4.0-6.0	S-3	SS	0	--	42	20	40			
					20	21				
6.0-8.0	S-4	SS	16	--	25	24	40		Glacial Deposits	Dark brown coarse to fine sand, some coarse to fine gravel, trace silt, moist, dense (SP)
					16	12				
8.0-10.0	S-5	SS	14	--	10	10	19			Brown clay, little coarse to fine sand, trace coarse to fine gravel, moist, stiff (CL)
					9	13				
10.0-12.0	S-6	SS	22	--	18	22	48			Brown silt, some coarse to fine sand, little coarse to fine gravel, moist, hard (ML)
					26	34				
15.0-15.4	S-7	SS	3	--	30/5	--	50/5		Weathered Rock	Gray coarse to fine gravel, trace silt, moist, very dense (GP)
					--	--				
										Boring B-113 encountered refusal at approximately 15.5 feet below the ground surface on probable bedrock



BOREHOLE LOG

Boring No : B-114

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 194.0 feet	Date Started: 05-16-2023	Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 12.0 feet	Date Completed: 05-16-2023						
Proposed Location: Building C	Logged by: A. Park	While Drilling: ▽	10.0	184.0			
Drill/Test Method: HSA/SPT	Contractor: General Borings	At Completion: ▼	10.0	184.0			
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks	
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N					
0.0-2.0	S-1	SS	16	--	2 2	5	5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200	Surface Cover	5 inches of topsoil	Qp = 2.0 tsf	
					3 4				Dark brown clay, trace coarse to fine sand, moist, stiff (CL)		
2.0-4.0	S-2	SS	20	--	12 17	32				Brown coarse to fine sand, some silt, some coarse to fine gravel, moist, dense (SM)	Qp = 4.5 tsf
					15 8			5	Glacial Deposits	Brown clay, some coarse to fine sand, little coarse to fine gravel, moist, hard (CL)	
4.0-6.0	S-3	SS	7	--	4 10	18				Brown clay, some coarse to fine gravel, little coarse to fine sand, trace silt, moist, very stiff (CL)	Qp = 2.5 tsf
					8 8				As above, moist, very stiff (CL)		
6.0-8.0	S-4	SS	6	--	8 6	14			As above, moist, very stiff (CL)	Qp = 2.5 tsf	
					8 10						
8.0-10.0	S-5	SS	14	--	12 12	30				Qp = 2.5 tsf	
					18 14		▼ 10	Weathered Rock	Gray coarse to fine gravel, some silt, trace coarse to fine sand, wet, very dense (GP)		
10.0-12.0	S-6	SS	16	--	22 46	96				Qp = 2.5 tsf	
					50 47						
										Boring B-114 encountered refusal at approximately 12 feet below the ground surface on apparent bedrock.	



BOREHOLE LOG

Boring No : B-115

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 208.0 feet	Date Started: 05-17-2023	Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 8.0 feet	Date Completed: 05-17-2023						
Proposed Location: Central Retaining Wall	Logged by: A. Park	While Drilling: ▽	NE	-			
Drill/Test Method: HSA/SPT	Contractor: General Borings	At Completion: ▼	NE	-			
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
0.0-2.0	S-1	SS	10	--	3 7	15	Surface Cover	6 inches of topsoil		
2.0-4.0	S-2	SS	13	--	8 11	53		Dark brown coarse to fine sand, some silt, little coarse to fine gravel, moist, medium dense (SM)		
					14 26			Dark brown coarse to fine sand, some coarse to fine gravel, little silt, moist, very dense (SM)		
4.0-6.0	S-3	SS	14	--	3 3	6		Glacial Deposits	Brown clay, some coarse to fine sand, trace coarse to fine gravel, moist, very stiff (CL)	Qp = 3.25 tsf
					3 4		As above, moist, stiff (CL)		Qp = 2.0 tsf	
6.0-7.8	S-4	SS	9	--	10 7	15				
					8 50/4					
Boring B-115 encountered refusal at approximately eight feet below the ground surface on probable boulder.										



BOREHOLE LOG

Boring No : B-116

Page 1 of 1

Project: Proposed Industrial Warehouse				Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York				Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 119.0 feet		Date Started: 05-17-2023		Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 8.0 feet		Date Completed: 05-17-2022							
Proposed Location: Building C		Logged by: A. Park		While Drilling: ▽	NE	-			
Drill/Test Method: HSA/SPT		Contractor: General Borings		At Completion: ▼	NE	-			
Hammer Type: Auto		Rig Type: Diedrich D50							

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
0.0-2.0	S-1	SS	7	--	3 3	7	Surface Cover Glacial Deposits	5 inches of topsoil	Qp = 3.0 tsf	
					4 7			Light brown coarse to fine gravel, and silt, moist, loose (GM)		
2.0-4.0	S-2	SS	14	--	12 16	33		Light brown coarse to fine sand, some silt, little coarse to fine gravel, moist, dense (SM)		
					17 16					
4.0-6.0	S-3	SS	18	--	8 13	25		Light brown coarse to fine sand, and silt, little coarse to fine gravel, moist, medium dense (SM)		
					12 11					
6.0-8.0	S-4	SS	22	--	10 13	35		Light brown clay, some medium to fine sand, little coarse to fine gravel, moist, very stiff (CL)		
					22 22					
Boring B-116 encountered refusal at approximately eight feet below the ground surface on probable boulder.										



BOREHOLE LOG

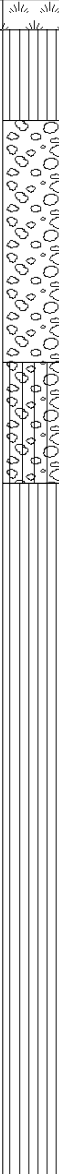
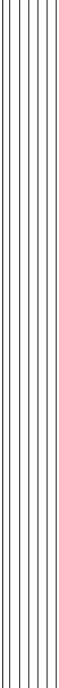
Boring No : B-117

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 188.0 feet	Date Started: 05-17-2022	Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 11.5 feet	Date Completed: 05-17-2022						
Proposed Location: Building C	Logged by: A. Park	While Drilling: ▽	NE	-			
Drill/Test Method: HSA/SPT	Contractor: General Borings	At Completion: ▼	NE	-			
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
0.0-2.0	S-1	SS	18	--	1 2	4		4 inches of topsoil	Qp = 2.75 tsf	
2.0-4.0	S-2	SS	18	--	2 7	31		Light brown silt, little coarse to fine sand, trace roots, moist, very stiff (ML)	Qp = 2.25 tsf	
					9 14			Light brown silt, some coarse to fine sand, trace coarse to fine gravel, moist, very stiff (ML)		
4.0-6.0	S-3	SS	14	--	3 5	10		Light brown clay, some coarse to fine gravel, trace coarse to fine sand, moist, very stiff (CL)	Qp = 2.5 tsf	
					5 13					
6.0-8.0	S-4	SS	10	--	10 35	64	Light brown coarse to fine gravel, and clay, wet, very dense (GC)			
					29 13					
8.0-10.0	S-5	SS	8	--	10 20	85	As above, very dense (GC)			
					65 63					
							Weathered Rock	Yellow brown coarse to fine gravel, trace silt, moist, very dense (GP-GM)		
								Boring B-117 encountered refusal at approximately 11.5 feet below the ground surface on apparent bedrock.		

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 185.0 feet	Date Started: 05-18-2023	Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 19.6 feet	Date Completed: 05-18-2023						
Proposed Location: Northwestern Retaining Wall	Logged by: U. Khan	At Completion: ▼	8.0	177.0			
Drill/Test Method: HSA/SPT	Contractor: General Borings						
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
0.0-2.0	S-1	SS	5	--	2 3	9	Surface Cover 	6 inches of topsoil	Qp = 0.5 tsf	
					6 9			Dark brown silt, trace coarse to fine gravel, trace fine sand, roots, soft (ML)		Hard augering
2.0-4.0	S-2	SS	3	--	12 31	55		Brown coarse to fine gravel, some coarse to fine sand, trace silt, moist, very dense (GP)		
					24 21			No recovery		
4.0-6.0	S-3	SS	0	--	36 34	58				
					24 28					
6.0-8.0	S-4	SS	3	--	27 20	42			Brown coarse to fine gravel, some coarse to fine sand, little silt, moist, dense (GM)	
					22 25					
8.0-10.0	S-5	SS	5	--	9 9	17	Glacial Deposits 	Grayish brown silt, some coarse to fine gravel, little coarse to fine sand, wet, stiff (ML)	Qp = 2.0 tsf	
					8 7					
10.0-12.0	S-6	SS	15	--	7 22	62		Grayish brown to gray silt, some coarse to fine gravel, trace coarse to fine sand, moist, very stiff (ML)	Qp = 3.5 tsf	
					40 37					
14.5-16.5	S-7	SS	13	--	29 14	37		Gray silt and coarse to fine gravel, little coarse to fine sand, stiff (ML)	Qp = 2.0 tsf	
					23 24					
19.5-19.6	S-8	SS	1	--	50/1 --	50/1	Weathered Rock	Gray coarse to fine gravel, wet, very dense (GP) Boring B-118 encountered refusal at approximately 19.6 feet below the ground surface on apparent bedrock.		



BOREHOLE LOG

Boring No : B-119

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 171.0 feet	Date Started: 05-18-2023	Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 8.1 feet	Date Completed: 05-18-2023						
Proposed Location: Building C	Logged by: U. Khan	At Completion: ▽	4.0	167.0			
Drill/Test Method: HSA/SPT	Contractor: General Borings						
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
0.0-2.0	S-1	SS	3	--	2 2	4	Surface Cover	Topsoil	Qp = 0.5 tsf	
					2 2					Dark brown silt, some coarse to fine gravel, little coarse to fine sand, trace roots, moist, soft (ML)
2.0-4.0	S-2	SS	3	--	6 5	11	Glacial Deposits	Brown coarse to fine sand, some silt, moist, medium dense (SM)	Hard augering	
					6 7					Brown coarse to fine sand, and coarse to fine gravel, little silt, wet, medium dense (SM)
4.0-6.0	S-3	SS	10	--	9 9	17		As above, wet, very dense (SM)		
6.0-6.8	S-4	SS	4	--	9 50/4	50/4				
8.0-8.1	S-5	SS	0	--	50/1 --	50/1	Weathered Rock	No recovery	Boring B-119 encountered refusal at approximately 8.1 feet below the ground surface on probable bedrock.	



BOREHOLE LOG

Boring No : B-120

Page 1 of 1

Project: Proposed Industrial Warehouse				Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York				Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 144.0 feet		Date Started: 05-19-2023		Groundwater Data	Depth	El.	Additional Groundwater Data	Depth	El.
Termination Depth: 3.0 feet		Date Completed: 05-19-2023			(ft)	(ft)			
Proposed Location: Northwestern Retaining Wall		Logged by: U. Khan		While Drilling: ▽	NE	-			
Drill/Test Method: HSA/SPT		Contractor: General Borings		At Completion: ▼	NE	-			
Hammer Type: Auto		Rig Type: Diedrich D50							

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)					
0.0-2.0	S-1	SS	6	--	4	5	15	Glacial Deposits	Dark brown silt, little coarse to fine sand, little coarse to fine gravel, trace roots, moist, soft (ML)	Qp = 0.5 tsf
					10	13				
2.0-2.4	S-2	SS	0	--	50/5	--	50/5			
Boring B-120 encountered refusal at approximately three feet below the ground surface on probable boulder.										



BOREHOLE LOG

Boring No : B-120A

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 144.0 feet	Date Started: 05-19-2023	Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 10.1 feet	Date Completed: 05-19-2023						
Proposed Location: Northwestern Retaining Wall	Logged by: U. Khan	While Drilling: ▽	NE	-			
Drill/Test Method: HSA/SPT	Contractor: General Borings	At Completion: ▼	NE	-			
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)					
2.0-4.0	S-1	SS	4	--	6	12	30	Glacial Deposits 	Same as boring B-120A	Augered to 2 feet Qp = 1.0 tsf
					18	23			Brown silt, little coarse to fine sand, little coarse to fine gravel, medium stiff (ML)	
4.0-6.0	S-2	SS	3	--	48	35	50		Brown coarse to fine gravel, trace coarse to fine sand, trace silt, moist, very dense (GP)	
					15	8				
6.0-8.0	S-3	SS	6	--	9	34	73		Brown coarse to fine gravel, some coarse to fine sand, little silt, moist, very dense (GM)	
					39	30				
8.0-10.0	S-4	SS	4	--	20	33	74	Brown coarse to fine sand, and coarse to fine gravel, little silt, moist, very dense (SM)		
					41	52				
10.0-10.1	S-5	SS	1	--	50/1	--	50/1		Brown coarse to fine gravel, moist, very dense (GP) Boring B-120A encountered refusal at approximately 10.1 feet below the ground surface on probable bedrock.	
					--	--				



BOREHOLE LOG

Boring No : B-121

Page 1 of 1

Project: Proposed Industrial Warehouse				Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York				Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 138.0 feet		Date Started: 05-19-2023		Groundwater Data	Depth	El.	Additional Groundwater Data	Depth	El.
Termination Depth: 6.0 feet		Date Completed: 05-19-2023			(ft)	(ft)			
Proposed Location: Eastern Retaining Wall		Logged by: U. Khan		While Drilling: ▽	NE	-			
Drill/Test Method: HSA/SPT		Contractor: General Borings		At Completion: ▼	NE	-			
Hammer Type: Auto		Rig Type: Diedrich D50							

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks	
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N					
0.0-2.0	S-1	SS	9	--	2 3	6	Glacial Deposits	Surface Cover	8 inches of topsoil	Qp = 0.5 tsf	
2.0-4.0	S-2	SS	5	--	3 11	49		Glacial Deposits	silt/silt		Dark brown silt, some coarse to fine sand, little coarse to fine gravel, trace roots, moist, soft (ML)
					5 25						Gray brown coarse to fine sand, some coarse to fine gravel, some silt, moist, dense (SM)
4.0-5.1	S-3	SS	3	--	24 45	78/10	Glacial Deposits	silt/silt	As above, very dense (SM)		
					29 28						
					50/4 --						
Boring B-121 encountered refusal at approximately 6 feet below the ground surface on probable bedrock.											



BOREHOLE LOG

Boring No : B-122

Page 2 of 2

Project: Proposed Industrial Warehouse				Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York				Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation:	139.0 feet	Date Started:	05-22-2023	Groundwater Data	Depth	El.	Additional Groundwater Data	Depth	El.
Termination Depth:	26.0 feet	Date Completed:	05-23-2023		(ft)	(ft)			
Proposed Location:	Eastern Retaining Wall	Logged by:	U. Khan	While Drilling:	NE	-			
Drill/Test Method:	HSA/SPT	Contractor:	General Borings	At Completion:	NE	-			
Hammer Type:	Auto	Rig Type:	Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
					02:38		Rock			Loss of water from 24 to 26 feet
							30			Boring B-122 was terminate at approximately 26 feet below the ground surface.
							35			
							40			
							45			



BOREHOLE LOG

Boring No : B-123

Page 1 of 1

Project: Proposed Industrial Warehouse		Proj. No.: 2803-99-012E					
Location: 2615 US Route 9 West, Town of Cornwall, Orange County, New York		Client: Cornwall Logistics, LLC c/o Treetop Development, LLC					
Surface Elevation: 213.0 feet	Date Started: 05-23-2023	Groundwater Data	Depth (ft)	El. (ft)	Additional Groundwater Data	Depth (ft)	El. (ft)
Termination Depth: 22.0 feet	Date Completed: 05-24-2023						
Proposed Location: Building C	Logged by: U. Khan	While Drilling: ▽	NE	-			
Drill/Test Method: HSA/SPT	Contractor: General Borings	At Completion: ▼	NE	-			
Hammer Type: Auto	Rig Type: Diedrich D50						

Sample Information							Depth (ft)	Strata	DESCRIPTION OF MATERIALS (Classification)	Remarks
Depth (Feet)	Number	Type	Rec (in)	RQD %	Blows per 6" or drill time (mm:ss)	N				
							5	Glacial Deposits	Augered to 17 feet	Augered to 17 feet
17.0-22.0	C-1	NX	55	40	05:22 06:22 04:29 05:15 05:07		20	Rock	Blueish gray, hard shale, moderately weathered	
									Boring B-123 was terminated at approximately 22 feet below the ground surface.	



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-201**

Project: Proposed Industrial Warehouse Project No.: 2803-89-012E #REF!
 Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Client: Cornwall Logistic, LLC c/o Treestop Development, LLC

Surface Elevation (ft): 216.7	Date Started: 5/22/2023	Groundwater Data	Depth (ft): 5/22/2023	EL. (ft)	Groundwater Comments
Termination Depth (ft): 3.3	Date Completed: 5/22/2023	Storage	NE	-	
Proposed Location: SWM	Logged by: A. Park	Groundwater	NE	-	
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management	Mottling	NE	-	
	Rig Type: Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING		LAB RESULTS			
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)		No.		
0-9	TOPSOIL Dark Brown (7.5YR 3/3)	SANDY LOAM	10	0	0	0	SUBANGULAR BLOCKY	MODERATE	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	MEDIUM	NONE							
9-40	Brown (7.5YR 4/4)	VERY FLAGGY LOAM	20	35	10	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC			NONE		NONE			BAG	20	S-1	PT-201 @ 16" > 20.0 iph	

Additional Remarks: Weathered rock encountered from approximately nine inches to 40 inches below the ground surface. Soil profile pit SPP-201 encountered refusal at approximately 3.3 feet below the ground surface on apparent bedrock.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-202**

Project: Proposed Industrial Warehouse Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Project No.: 2803-89-012E #REF!

Surface Elevation (ft): 224.5 Date Started: 5/22/2023 Groundwater Data Depth (ft): El. (ft): Groundwater Comments

Termination Depth (ft): 9.0 Date Completed: 5/22/2023 Logged by: A. Park Storage: NE - -

Proposed Location: SWM Contractor: Neighbors Property Management Excavation / Test Method: Visual Observation Rig Type: Bobcat E60 Moisture: 6.3 218.2 Light gray mottles (Gley1 7/N) from 75" to 108"

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING			LAB RESULTS	
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)	No.		
0-9	TOPSOIL Dark Brown (7.5YR 5/3)	SANDY LOAM	0	0	0	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	FINE	NONE						
9-34	Brown (7.5YR 5/3)	SANDY LOAM	0	0	0	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	FEW (5% MAX)	MEDIUM	NONE		BAG	15	S-1		
34-75	Brown (7.5YR 5/3)	LOAMY SAND	10	0	0	0	SUBANGULAR BLOCKY	MODERATE	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	FEW (5% MAX)	FINE	NONE		BAG	45	S-2	PT-202 @ 60" > 20.0 lph	
75-108	Brown (7.5YR 5/3)	EXTREMELY FLAGGY LOAM	10	65	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC			NONE		FEW (5% MAX)	FINE <SMM	FAINT	BAG	100	S-3	

Additional Remarks: Weathered rock encountered from approximately 75 inches to 108 inches below the ground surface. Soil profile pit SPP-202 encountered refusal at approximately nine feet below the ground surface on apparent bedrock.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-203**

Project: Proposed Industrial Warehouse Project No.: 2803-89-012E #REF!
 Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Client: Cornwall Logistic, LLC c/o Treestop Development, LLC

Surface Elevation (ft): 221.0	Date Started: 5/22/2023	Groundwater Data	Depth (ft):	EL. (ft):	Groundwater Comments
Termination Depth (ft): 4.2	Date Completed: 5/22/2023		Storage:		
Proposed Location: SWM	Logged by: A. Park		Groundwater:		
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management		Mottling:		
	Rig Type: Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING			LAB RESULTS		
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)	No.			
0-9	TOPSOIL Brown (7.5YR 4/2)	SANDY LOAM	0	0	0	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	MEDIUM	NONE							
9-34	Brown (7.5YR 5/2)	SILT LOAM	0	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	MODERATELY STICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE	FIRM	NONE				BAG	25	S-1	PT-203 @ 26" = 0.0 lph
34-50	Brown (7.5YR 5/2)	COBBLY SANDY LOAM	10	30	0	0	SUBANGULAR BLOCKY	MODERATE	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	NONPLASTIC			NONE		NONE				BAG	40	S-2	

Additional Remarks: Soil profile pit SPP-203 encountered refusal at approximately 4.2 feet below the ground surface on apparent bedrock.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-204**

Project: Proposed Industrial Warehouse Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Project No.: 2803-89-012E #REF!

Surface Elevation (ft): 224.7 Date Started: 5/22/2023 Groundwater Data Depth (ft): El. (ft): Groundwater Comments

Termination Depth (ft): 3.0 Date Completed: 5/22/2023 Storage: NE -

Proposed Location: SWM Logged by: A. Park Excavation: NE -

Excavation / Test Method: Visual Observation Contractor: Neighbors Property Management Monitoring: NE -

Rig Type: Bobcat E60

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING		LAB RESULTS	
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)		No.
0-8	TOPSOIL Brown (7.5YR 4/2)	SANDY LOAM	10	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	FINE	NONE					
8-36	Brown (7.5YR 5/3)	SANDY LOAM	10	0	0	0	SUBANGULAR BLOCKY	MODERATE	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	NONPLASTIC			FEW (5% MAX)	FINE	NONE			BAG	20	S-1

Additional Remarks: Soil profile pit SPP-204 encountered refusal at approximately three feet below the ground surface on apparent bedrock.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-205**

Project: Proposed Industrial Warehouse Project No.: 2803-89-012E #REF!
 Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Client: Cornwall Logistic, LLC c/o Trestop Development, LLC

Surface Elevation (ft): 221.1	Date Started: 5/19/2023	Groundwater Data	Depth (ft):	El. (ft):	Groundwater Comments
Termination Depth (ft): 2.0	Date Completed: 5/19/2023		(ft):	(ft):	
Proposed Location: SWM	Logged by: A. Park	Storage:	NE		
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management	Groundwater:	NE		
	Rig Type: Bobcat E60	Mottling:	NE		

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING		LAB RESULTS	
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)		No.
0-8	TOPSOIL Brown (7.5YR 4/2)	LOAMY SAND	10	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	FINE	NONE					
8-24	Yellowish Brown (10YR 5/4)	CHANNERY SILT LOAM	15	10	0	0	SUBANGULAR BLOCKY	MODERATE	FINE	MOIST	FIRM	SLIGHTLY STICKY	NONPLASTIC			NONE		NONE			BAG	20	S-1

Additional Remarks: Soil profile pit SPP-205 encountered refusal at approximately two feet below the ground surface on apparent bedrock.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-206**

Project: Proposed Industrial Warehouse Project No.: 2803-89-012E #REF!
 Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Client: Cornwall Logistic, LLC c/o Trestop Development, LLC

Surface Elevation (ft): 222.3	Date Started: 5/22/2023	Groundwater Data	Depth (ft):	EL. (ft):	Groundwater Comments
Termination Depth (ft): 2.8	Date Completed: 5/22/2023		Storage:		
Proposed Location: SWM	Logged by: A. Park		Groundwater:		
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management		Mottling:		
	Rig Type: Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING		LAB RESULTS	
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)		No.
0-8	TOPSOIL Brown (7.5YR 4/2)	SANDY LOAM	0	0	0	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	MEDIUM	NONE					
8-33	Brown (7.5YR 5/2)	GRAVELLY SILT LOAM	30	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	MODERATELY STICKY	NONPLASTIC			FEW (5% MAX)	FINE	NONE			BAG	26	S-1

Additional Remarks: Soil profile pit SPP-206 encountered refusal at approximately 2.8 feet below the ground surface on apparent bedrock.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-207**

Project: Proposed Industrial Warehouse Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Project No.: 2803-89-012E #REF!
 Client: Cornwall Logistic, LLC c/o Treestop Development, LLC

Surface Elevation (ft): 216.0	Date Started: 5/22/2023	Groundwater Data	Depth (ft):	EL. (ft):	Groundwater Comments
Termination Depth (ft): 4.2	Date Completed: 5/22/2023	Storage:	NE		
Proposed Location: SWM	Logged by: A. Park	Groundwater:	NE		
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management	Mottling:	NE		
	Rig Type: Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING			LAB RESULTS		
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)	No.			
0-10	TOPSOIL Brown (7.5YR 4/2)	SANDY LOAM	0	0	0	0	SUBANGULAR BLOCKY	MODERATE	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	MEDIUM	NONE							
10-38	Brown (7.5YR 5/3)	SILT LOAM	10	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE	FIRM	NONE				BAG	30	S-1	PT-207 @ 36" = 0.0 lph
38-50	Brown (7.5YR 5/3)	VERY CHANNERY SILT LOAM	35	10	10	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	NONPLASTIC			NONE		NONE				BAG	40	S-2	

Additional Remarks: Soil profile pit SPP-207 encountered refusal at approximately 4.2 feet below the ground surface on apparent bedrock.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-208**

Project: Proposed Industrial Warehouse Project No.: 2803-89-012E #REF!
 Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Client: Cornwall Logistic, LLC c/o Treestop Development, LLC

Surface Elevation (ft): 219.5	Date Started: 5/22/2023	Groundwater Data	Depth (ft):	El. (ft):	Groundwater Comments
Termination Depth (ft): 5.0	Date Completed: 5/22/2023	Storage:	NE	-	
Proposed Location: SWM	Logged by: A. Park	Groundwater:	NE	-	
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management	Mottling:	NE	-	
	Rig Type: Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING		LAB RESULTS	
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)		No.
0-10	TOPSOIL Brown (7.5YR 4/2)	SANDY LOAM	0	0	0	0	SUBANGULAR BLOCKY	MODERATE	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	MEDIUM	NONE					
10-28	Brown (7.5YR 5/2)	SILT LOAM	10	10	0	0	SUBANGULAR BLOCKY	MODERATE	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG	20	S-1
28-60	Gray (10YR 6/1)	EXTREMELY CHANNERY SILT LOAM	65	15	0	0	SUBANGULAR BLOCKY	MODERATE	FINE	MOIST	FIRM	NONSTICKY	NONPLASTIC			NONE		NONE			BAG	50	S-2

Additional Remarks: Weathered rock encountered from approximately 28 inches to 60 inches below the ground surface. Soil profile pit SPP-208 encountered refusal at approximately five feet below the ground surface on apparent bedrock.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-209**

Project: Proposed Industrial Warehouse Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Project No.: 2803-89-012E #REF!

Surface Elevation (ft): 137.0 Date Started: 5/23/2023 Groundwater Data Depth (ft): El. (ft): Groundwater Comments

Termination Depth (ft): 12.0 Date Completed: 5/23/2023 Logged by: A. Park Storage: NE -

Proposed Location: SWM Contractor: Neighbors Property Management Excavation / Test Method: Visual Observation Rig Type: Bobcat E60 Mottling: NE -

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING		LAB RESULTS		
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)		No.	
0-8	TOPSOIL Brown (7.5YR 4/2)	LOAMY SAND	10	0	0	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	FINE	NONE						
8-36	FILL Dark Yellowish Brown (10YR 4/6)	SANDY LOAM	20	10	0	0	SUBANGULAR BLOCKY	MODERATE	FINE	MOIST	FIRM	SLIGHTLY STICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG	25	S-1	
36-144	Dark Yellowish Brown (10YR 4/6)	VERY COBBLY LOAMY SAND	25	35	0	0	SUBANGULAR BLOCKY	WEAK	VERY FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC			NONE		NONE			BAG	45	S-2	PT-209 @ 60" > 20.0 lph

Additional Remarks: Existing fill material encountered to approximately 36 inches below the ground surface. The debris encountered included ceramics. Soil profile pit SPP-209 was terminated at approximately 12 feet below the ground surface.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-210**

Page 1 of 1

Project: Proposed Industrial Warehouse	Project No.: 2803-89-012E	#REF!
Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey	Client: Cornwall Logistic, LLC c/o Treestop Development, LLC	

Surface Elevation (ft): 136.5	Date Started: 5/23/2023	Groundwater Data	Depth (ft):	El. (ft)	Groundwater Comments
Termination Depth (ft): 10.4	Date Completed: 5/23/2023		Storage:		
Proposed Location: SWM	Logged by: A. Park		Groundwater:		
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management		Mottling:		
	Rig Type: Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING			LAB RESULTS		
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)	No.			
0-12	TOPSOIL Brown (7.5YR 4/2)	LOAMY SAND	GRAVEL	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	FINE	NONE							
12-44	Dark Yellowish Brown (10YR 4/6)	SANDY LOAM	GRAVEL	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	SLIGHTLY STICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	FEW (5% MAX)	MEDIUM	NONE			BAG	25	S-1		
44-125	Dark Yellowish Brown (10YR 4/6)	VERY COBBLY LOAMY SAND	GRAVEL	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	VERY FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC			NONE		NONE			BAG	30	S-2	PT-210 @ 60" > 20.0 lph	

Additional Remarks: Soil profile pit SPP-210 encountered refusal at approximately 10.4 feet below the ground surface due to continuous dry cave-in of the excavation side-walls.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-211**

Project: Proposed Industrial Warehouse Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Project No.: 2803-89-012E #REF!
 Client: Cornwall Logistic, LLC c/o Treestop Development, LLC

Surface Elevation (ft): 136.9	Date Started: 5/23/2023	Groundwater Data	Depth (ft):	El. (ft):	Groundwater Comments
Termination Depth (ft): 10.1	Date Completed: 5/23/2023		Storage:		
Proposed Location: SWM	Logged by: A. Park		Groundwater:		
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management		Mottling:		
	Rig Type: Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING			LAB RESULTS	
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)	No.		
0-9	TOPSOIL Brown (7.5YR 4/2)	SANDY LOAM	0	0	0	0	SUBANGULAR BLOCKY	WEAK	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	FINE	NONE						
9-44	Dark Yellowish Brown (10YR 4/6)	COBBLY LOAMY SAND	20	30	0	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG	40	S-1	
44-121	Dark Yellowish Brown (10YR 4/6)	VERY COBBLY LOAMY SAND	30	45	5	5	SUBANGULAR BLOCKY	WEAK	VERY FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC			NONE		NONE			BAG	110	S-2	PT-211 @ 60" > 20.0 lph

Additional Remarks: Soil profile pit SPP-211 encountered refusal at approximately 10.1 feet below the ground surface on apparent boulder.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-212**

Project: Proposed Industrial Warehouse Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Project No.: 2803-89-012E #REF! Client: Cornwall Logistic, LLC c/o Trestop Development, LLC

Surface Elevation (ft): 137.5	Date Started: 5/23/2023	Groundwater Data	Depth (ft): 4.9	El. (ft): 132.6	Groundwater Comments Strong Brown (7.5YR 5/8) mottles from 59 to 144 inches
Termination Depth (ft): 12.0	Date Completed: 5/23/2023	Storage	NE		
Proposed Location: SWM	Logged by: A. Park	Groundwater	NE		
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management	Mottling	4.9		
	Rig Type: Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING			LAB RESULTS	
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)	No.		
0-12	TOPSOIL Brown (7.5YR 4/2)	SANDY LOAM	0	0	0	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	MEDIUM	NONE						
12-59	Brown (7.5YR 5/3)	SANDY LOAM	20	40	10	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FIRM	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG	40	S-1	
59-144	Yellowish Brown (10YR 5/6)	VERY COBBLY SANDY LOAM	20	35	10	0	SUBANGULAR BLOCKY	MODERATE	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC			NONE		FEW (5% MAX)	FINE <SMM	FAINT	BAG	70	S-2	PT-212 @ 60" > 20.0 lph

Additional Remarks: Soil profile pit SPP-212 was terminated at approximately 12 feet below the ground surface.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-213**

Project: Proposed Industrial Warehouse Project No.: 2803-89-012E #REF!
 Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Client: Cornwall Logistic, LLC c/o Treestop Development, LLC

Surface Elevation (ft): 146.0	Date Started: 5/23/2023	Groundwater Data	Depth (ft): 6.0	El. (ft): 140.0	Groundwater Comments Greenish Gray mottles (Gley1 6/1) from 72" to 140"
Termination Depth (ft): 11.7	Date Completed: 5/23/2023		Storage: NE		
Proposed Location: SWM	Logged by: A. Park		Excavation: 7.7	138.3	
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management		Mottling: 6.0		
	Rig Type: Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING			LAB RESULTS		
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)	No.			
0-10	TOPSOIL Brown (7.5YR 4/2)	LOAMY SAND	10	0	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	FEW (5% MAX)	FINE	NONE							
10-72	Yellowish Brown (10YR 5/6)	STONEY LOAM	10	20	20	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	FEW (5% MAX)	FINE	NONE				BAG	50	S-1	PT-213 @ 50" > 20.0 iph
72-92	Yellowish Brown (10YR 5/6)	COBBLY LOAMY SAND	10	20	10	0	SUBANGULAR BLOCKY	MODERATE	COARSE	MOIST	FIRM	MODERATELY STICKY	MODERATELY PLASTIC	CLEAR <2.5"	WAVY	NONE		CMN (20% MAX)	MEDIUM 5MM-15MM	DISTINCT		BAG	90	S-2	
92-140	Yellowish Brown (10YR 5/6)	COBBLY LOAMY SAND	10	20	10	0	SUBANGULAR BLOCKY	MODERATE	COARSE	WET	FIRM	MODERATELY STICKY	MODERATELY PLASTIC			NONE		CMN (20% MAX)	MEDIUM 5MM-15MM	DISTINCT					

Additional Remarks: Soil profile pit SPP-213 was terminated at approximately 11.7 feet below the ground surface.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-214**

Project: Proposed Industrial Warehouse Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Project No.: 2803-89-012E #REF!
 Client: Cornwall Logistic, LLC c/o Treestop Development, LLC

Surface Elevation (ft): 150.0	Date Started: 5/23/2023	Groundwater Data	Depth (ft):	El. (ft):	Groundwater Comments
Termination Depth (ft): 4.6	Date Completed: 5/23/2023		Storage:		
Proposed Location: SWM	Logged by: A. Park		Groundwater:	146.2	
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management		Mottling:	146.2	Light Greenish Gray mottles (Gley 1 7/1) from 45" to 55"
	Rig Type: Bobcat E90				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING			LAB RESULTS	
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)	No.		
0-6	TOPSOIL Brown (7.5YR 4/2)	LOAMY SAND	0	0	0	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	FEW (5% MAX)	FINE	NONE						
6-45	Light Brownish Gray (10YR 6/2)	COBBLY SILTY CLAY LOAM	10	20	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FIRM	MODERATELY STICKY	MODERATELY PLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG	25	S-1	PT-214 @ 24" > 20.0 iph
45-55	Dark Yellowish Brown (10YR 4/6)	COBBLY SILTY CLAY LOAM	10	20	0	0	SUBANGULAR BLOCKY	MODERATE	MEDIUM	WET	FIRM	MODERATELY STICKY	MODERATELY PLASTIC			NONE		FEW (5% MAX)	FINE <5MM	DISTINCT	BAG	55	S-2	

Additional Remarks: Soil profile pit SPP-214 encountered refusal at approximately 4.6 feet below the ground surface on apparent boulder.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-215**

Project: Proposed Industrial Warehouse Project No.: 2803-89-012E #REF!
 Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Client: Cornwall Logistic, LLC c/o Trestop Development, LLC

Surface Elevation (ft): 154.0	Date Started: 5/25/2023	Groundwater Data	Depth (ft):	El. (ft):	Groundwater Comments
Termination Depth (ft): 3.8	Date Completed: 5/25/2023		Storage:		
Proposed Location: SWM	Logged by: A. Park		Groundwater:	151.2	
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management		Mottling:		
	Rig Type: Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING			LAB RESULTS		
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)	No.			
0-6	TOPSOIL Brown (7.5YR 4/2)	LOAMY SAND	0	0	0	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	FEW (5% MAX)	MEDIUM	NONE							
6-33	Brown (10YR 3/2)	LOAMY SAND	10	0	0	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	CMN (20% MAX)	FINE	NONE				BAG	20	S-1	PT-215 @ 7" > 20.0 iph
33-45	Brown (10YR 3/2)	LOAM	10	0	0	0	SUBANGULAR BLOCKY	WEAK	FINE	WET	FRIABLE	NONSTICKY	NONPLASTIC			NONE		NONE				BAG	40	S-2	

Additional Remarks: Soil profile pit SPP-215 was terminated at approximately 3.8 feet below the ground surface due to rapid groundwater infiltration.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-216**

Page 1 of 1

Project: Proposed Industrial Warehouse Project No.: 2803-89-012E #REF!
 Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Client: Cornwall Logistic, LLC c/o Treestop Development, LLC

Surface Elevation (ft): 150.0	Date Started: 5/26/2023	Groundwater Data	Depth (ft):	El. (ft):	Groundwater Comments
Termination Depth (ft): 12.0	Date Completed: 5/26/2023		Storage:		
Proposed Location: SWM	Logged by: A. Park		Groundwater:	139.3	
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management		Mottling:		
	Rig Type: Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING			LAB RESULTS	
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)	No.		
0-6	TOPSOIL Brown (7.5YR 4/2)	LOAMY SAND	GRAVEL	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	FINE	NONE						
6-30	Dark Yellowish Brown (10YR 4/6)	GRAVELLY SANDY LOAM	GRAVEL	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	FEW (5% MAX)	FINE	NONE			BAG	15	S-1	
30-85	Dark Yellowish Brown (10YR 4/6)	LOAMY SAND	GRAVEL	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG	40	S-2	PT-216 @ 60" > 20.0 lph
85-128	Brown (10YR 3/2)	LOAMY SAND	GRAVEL	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG	95	S-3	
128-144	Brown (10YR 3/2)	LOAM	GRAVEL	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	WET	FRIABLE	NONSTICKY	NONPLASTIC			NONE		NONE			BAG	140	S-4	

Additional Remarks: Soil profile pit SPP-216 was terminated at approximately 12 feet below the ground surface.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-217**

Project: Proposed Industrial Warehouse Project No.: 2803-89-012E #REF!
 Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Client: Cornwall Logistic, LLC c/o Treestop Development, LLC

Surface Elevation (ft): 150.0	Date Started: 5/25/2023	Groundwater Data	Depth (ft):	El. (ft):	Groundwater Comments
Termination Depth (ft): 10.0	Date Completed: 5/25/2023		Storage:		
Proposed Location: SWM	Logged by: A. Park		Groundwater:	142.7	
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management		Mottling:	142.7	Light Greenish Gray mottles (Gley1 7/1) 87" to 120"
	Rig Type: Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING			LAB RESULTS	
							Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)	No.		
0-7	TOPSOIL Brown (7.5YR 4/2)	LOAMY SAND	GRAVEL	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	FINE	NONE						
7-87	Dark Yellowish Brown (10YR 4/6)	SANDY LOAM	GRAVEL	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	MODERATE	MEDIUM	MOIST	FRIABLE	SLIGHTLY STICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	NONE		NONE			BAG	30	S-1	PT-217 @ 36" = 0.8 iph
87-120	Dark Yellowish Brown (10YR 4/6)	GRAVELLY SANDY LOAM	GRAVEL	COBBLES	STONES	BOULDERS	SUBANGULAR BLOCKY	MODERATE	MEDIUM	WET	FRIABLE	SLIGHTLY STICKY	SLIGHTLY PLASTIC			NONE		FEW (5% MAX)	FINE <5MM	FAINT	BAG	100	S-2	

Additional Remarks: Soil profile pit SPP-217 was terminated at approximately 10 feet below the ground surface.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-218**

Project: Proposed Industrial Warehouse Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Project No.: 2803-89-012E #REF!
 Client: Cornwall Logistic, LLC c/o Trestop Development, LLC

Surface Elevation (ft): 142.8	Date Started: 5/25/2023	Groundwater Data	Depth (ft):	EL. (ft):	Groundwater Comments
Termination Depth (ft): 9.1	Date Completed: 5/25/2023	Storage:	NE		
Proposed Location: SWM	Logged by: A. Park	Groundwater:	NE		
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management	Mottling:	NE		
	Rig Type: Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING			LAB RESULTS	
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)	No.		
0-12	TOPSOIL Brown (7.5YR 4/2)	SANDY LOAM	0	0	0	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	FINE	NONE						
12-60	Brownish Yellow (10YR 6/6)	COBBLY SANDY LOAM	20	30	20	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	FEW (5% MAX)	FINE	NONE			BAG	30	S-1	PT-218 @ 36" = 6.0 lph
60-109	Brownish Yellow (10YR 6/6)	GRAVELLY LOAMY SAND	30	20	10	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	SLIGHTLY STICKY	NONPLASTIC			NONE		NONE			BAG	90	S-2	

Additional Remarks: Soil profile pit SPP-218 encountered refusal at approximately 9.1 feet below the ground surface on apparent boulder.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-219**

Project: Proposed Industrial Warehouse Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Project No.: 2803-89-012E #REF! Client: Cornwall Logistic, LLC c/o Treestop Development, LLC

Surface Elevation (ft): 141.5	Date Started: 5/25/2023	Groundwater Data	Depth (ft):	EL. (ft):	Groundwater Comments
Termination Depth (ft): 5.8	Date Completed: 5/25/2023		Storage:		
Proposed Location: SWM	Logged by: A. Park		Groundwater:		
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management		Mottling:		
	Rig Type: Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING			LAB RESULTS		
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)	No.			
0-7	TOPSOIL Brown (7.5YR 4/2)	LOAMY SAND	10	0	0	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	FINE	NONE							
7-89	Brownish Yellow (10YR 6/6)	VERY COBBLY LOAMY SAND	20	35	20	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC			NONE		NONE				BAG	50	S-1	PT-219 @ 24" > 20.0 iph

Additional Remarks: Soil profile pit SPP-219 encountered refusal at approximately 5.8 feet below the ground surface on apparent boulder.



SOIL PROFILE PIT LOG

Soil Profile Pit: **SPP-220**

Project: Proposed Industrial Warehouse Project No.: 2803-89-012E #REF!
 Location: 2615 U.S. Route 9 West, Town of Cornwall, Orange County, New Jersey Client: Cornwall Logistic, LLC c/o Trestop Development, LLC

Surface Elevation (ft): 196.0	Date Started: 5/25/2023	Groundwater Data	Depth (ft):	EL. (ft):	Groundwater Comments
Termination Depth (ft): 8.5	Date Completed: 5/25/2023		Storage:		
Proposed Location: SWM	Logged by: A. Park		Groundwater:	188.3	
Excavation / Test Method: Visual Observation	Contractor: Neighbors Property Management		Mottling:		
	Rig Type: Bobcat E60				

DEPTH (IN)	COLOR	SOIL TEXTURE	COARSE FRAGMENTS (%)				STRUCTURE			WATER CONTENT	CONSISTENCY			BOUNDARY		ROOTS	MOTTLING			SAMPLING			LAB RESULTS	
			GRAVEL	COBBLES	STONES	BOULDERS	Shape	Grade	Size		Resistance to Rupture	Stickiness	Plasticity	Distinctness	Topography		Quantity	Size	Contrast	Type	Depth (ft)	No.		
0-12	TOPSOIL Brown (7.5YR 4/2)	LOAMY SAND	10	0	0	0	SUBANGULAR BLOCKY	WEAK	FINE	MOIST	FRIABLE	NONSTICKY	NONPLASTIC	CLEAR <2.5"	SMOOTH	MNY (>20% MAX)	MEDIUM	NONE						
12-82	Dark Yellowish Brown (10YR 4/6)	STONEY SILTY CLAY LOAM	0	20	20	0	SUBANGULAR BLOCKY	MODERATE	COARSE	MOIST	FIRM	MODERATELY STICKY	MODERATELY PLASTIC	CLEAR <2.5"	WAVY	NONE		NONE			BAG	40	S-1	PT-220 @ 36" = 1.5 iph
82-102	Dark Yellowish Brown (10YR 4/6)	STONEY SILTY CLAY LOAM	0	20	20	0	SUBANGULAR BLOCKY	MODERATE	COARSE	WET	FIRM	MODERATELY STICKY	MODERATELY PLASTIC			NONE		NONE						

Additional Remarks: Soil profile pit SPP-220 encountered refusal at approximately 8.5 feet below the ground surface on apparent bedrock.

INFILTRATION TEST REPORT

Client: Treetop Development

Test Hole No.: PT-201/SPP-201

Project: Industrial Warehouse

Date: 05/24/2023

Location: Cornwall, NY

Weather: 69F Sunny

Project No.: 2803-99-012E

Project Manager: F. Van Cleve

Surface Elevation: 216.5 feet

Test Depth: 1.3 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	24	0	24	0.01	>20.0
2	24	0	24	0.01	>20.0
3	24	0	24	0.01	>20.0
4	24	0	24	0.01	>20.0
5	24	0	24	0.01	>20.0
6	24	0	24	0.01	>20.0

INFILTRATION TEST REPORT

Client: Treetop Development

Test Hole No.: PT-202/SPP-202

Project: Industrial Warehouse

Date: 05/24/2023

Location: Cornwall, NY

Weather: 69F Sunny

Project No.: 2803-99-012E

Project Manager: F. Van Cleve

Surface Elevation: 224.5 feet

Test Depth: 5.0 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	26	0	26	0.01	>20.0
2	26	0	26	0.01	>20.0
3	26	0	26	0.01	>20.0
4	26	0	26	0.01	>20.0
5	26	0	26	0.01	>20.0
6	26	0	26	0.01	>20.0
7	26	0	26	0.01	>20.0
8	26	0	26	0.01	>20.0
9	26	0	26	0.01	>20.0

INFILTRATION TEST REPORT

Client: Treetop Development

Test Hole No.: PT-203/SPP-203

Project: Industrial Warehouse

Date: 05/24/2023

Location: Cornwall, NY

Weather: 69F Sunny

Project No.: 2803-99-012E

Project Manager: F. Van Cleve

Surface Elevation: 221.0 feet

Test Depth: 2.2 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	24	24	0	0.5	0.0
2	24	24	0	0.5	0.0
3	24	24	0	0.5	0.0
4	24	24	0	0.5	0.0

INFILTRATION TEST REPORT

Client: Treetop Development
Project: Industrial Warehouse
Location: Cornwall, NY
Project No.: 2803-99-012E

Test Hole No.: PT-207/SPP-207
Date: 05/24/2023
Weather: 69F Sunny
Project Manager: F. Van Cleve

Surface Elevation: 216.0 feet

Test Depth: 3.0 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	24	24	0	0.5	0.0
2	24	24	0	0.5	0.0
3	24	24	0	0.5	0.0
4	24	24	0	0.5	0.0

INFILTRATION TEST REPORT

Client: Treetop Development
Project: Proposed Warehouse Buildings
Location: US Highway 9W, Town of Cornwall,
 Orange County, New York

Test Hole No.: PT-209/SPP-209
Date: 5/19/2023
Weather: Cloudy

Project No.: 2803-99-015E

Project Manager: F. Van Cleve

Surface Elevation: 137.0 feet

Test Depth: 5.0 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	24	0	24	0.06	>20.0
2	24	0	24	0.06	>20.0
3	24	0	24	0.06	>20.0
4	24	0	24	0.06	>20.0

INFILTRATION TEST REPORT

Client: Treetop Development
Project: Proposed Warehouse Buildings
Location: US Highway 9W, Town of Cornwall,
 Orange County, New York

Test Hole No.: PT-210/SPP-210
Date: 5/19/2023
Weather: Cloudy

Project No.: 2803-99-015E

Project Manager: F. Van Cleve

Surface Elevation: 136.5 feet

Test Depth: 5.0 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	24	0	24	0.01	>20.0
2	24	0	24	0.01	>20.0
3	24	0	24	0.01	>20.0
4	24	0	24	0.01	>20.0

INFILTRATION TEST REPORT

Client: Treetop Development
Project: Proposed Warehouse Buildings
Location: US Highway 9W, Town of Cornwall,
 Orange County, New York

Test Hole No.: PT-211/SPP-211
Date: 5/19/2023
Weather: Cloudy

Project No.: 2803-99-015E

Project Manager: F. Van Cleve

Surface Elevation: 137.0 feet

Test Depth: 5.0 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	24	0	24	0.096	>20.0
2	24	0	24	0.096	>20.0
3	24	0	24	0.096	>20.0
4	24	0	24	0.096	>20.0

INFILTRATION TEST REPORT

Client: Treetop Development
Project: Proposed Warehouse Buildings
Location: US Highway 9W, Town of Cornwall,
 Orange County, New York

Test Hole No.: PT-212/SPP-212
Date: 5/19/2023
Weather: Cloudy

Project No.: 2803-99-015E

Project Manager: F. Van Cleve

Surface Elevation: 137.5 feet

Test Depth: 5.0 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	24	0	24	0.024	>20.0
2	24	0	24	0.024	>20.0
3	24	0	24	0.024	>20.0
4	24	0	24	0.024	>20.0
5	24	0	24	0.024	>20.0
6	24	0	24	0.024	>20.0
7	24	0	24	0.024	>20.0

INFILTRATION TEST REPORT

Client: Treetop Development

Test Hole No.: PT-213/SPP-213

Project: Industrial Warehouse

Date: 05/24/2023

Location: Cornwall, NY

Weather: 69F Sunny

Project No.: 2803-99-012E

Project Manager: F. Van Cleve

Surface Elevation: 146.0 feet

Test Depth: 4.2 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	23	1	22	0.5	>20.0
2	23	1	22	0.5	>20.0
3	23	1	22	0.5	>20.0
4	23	1	22	0.5	>20.0

INFILTRATION TEST REPORT

Client: Treetop Development

Test Hole No.: PT-214/SPP-214

Project: Industrial Warehouse

Date: 05/24/2023

Location: Cornwall, NY

Weather: 69F Sunny

Project No.: 2803-99-012E

Project Manager: F. Van Cleve

Surface Elevation: 150.0 feet

Test Depth: 2.0 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	24	4	20	1.0	20.0
2	24	0	24	1.0	>20.0
3	24	0	24	1.0	>20.0
4	24	0	24	1.0	>20.0

INFILTRATION TEST REPORT

Client: Treetop Development
Project: Proposed Warehouse Buildings
Location: US Highway 9W, Town of Cornwall,
 Orange County, New York

Test Hole No.: PT-215/SPP-215
Date: 5/19/2023
Weather: Cloudy

Project No.: 2803-99-015E

Project Manager: F. Van Cleve

Surface Elevation: 154.0 feet

Test Depth: 0.6 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	24	6.75	17.25	0.2	>20.0
2	24	6.75	17.25	0.2	>20.0
3	24	6.75	17.25	0.2	>20.0
4	24	6.75	17.25	0.2	>20.0

INFILTRATION TEST REPORT

Client: Treetop Development
Project: Proposed Warehouse Buildings
Location: US Highway 9W, Town of Cornwall,
 Orange County, New York

Test Hole No.: PT-216/SPP-216
Date: 5/19/2023
Weather: Cloudy

Project No.: 2803-99-015E

Project Manager: F. Van Cleve

Surface Elevation: 150.0 feet

Test Depth: 5.0 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	24	11.0	13.0	0.50	6.5
2	24	6.75	17.25	0.25	4.3
3	24	17.5	6.5	0.25	1.6
4	24	17.0	7.0	0.25	1.75
5	24	17.0	7.0	0.25	1.75
6	24	17.25	6.75	0.25	1.7

INFILTRATION TEST REPORT

Client: Treetop Development
Project: Proposed Warehouse Buildings
Location: US Highway 9W, Town of Cornwall,
 Orange County, New York

Test Hole No.: PT-217/SPP-217
Date: 5/19/2023
Weather: Cloudy

Project No.: 2803-99-015E

Project Manager: F. Van Cleve

Surface Elevation: 147.0 feet

Test Depth: 3.0 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	24	23	1.0	0.25	0.25
2	24	23.25	0.75	1.0	0.75
3	24	23.25	0.75	1.0	0.75
4	24	23.25	0.75	1.0	0.75

INFILTRATION TEST REPORT

Client: Treetop Development
Project: Proposed Warehouse Buildings
Location: US Highway 9W, Town of Cornwall,
 Orange County, New York

Test Hole No.: PT-218/SPP-218
Date: 5/19/2023
Weather: Cloudy

Project No.: 2803-99-015E

Project Manager: F. Van Cleve

Surface Elevation: 143.0 feet

Test Depth/Elevation: 3.0 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	24	16.5	7.5	1.0	7.5
2	24	16.5	7.5	1.0	7.5
3	24	19	5.0	1.0	5.0
4	24	19	5.0	1.0	5.0
5	24	19	5.0	1.0	5.0

INFILTRATION TEST REPORT

Client: Treetop Development
Project: Proposed Warehouse Buildings
Location: US Highway 9W, Town of Cornwall,
 Orange County, New York

Test Hole No.: PT-219/SPP-219
Date: 5/19/2023
Weather: Cloudy

Project No.: 2803-99-015E

Project Manager: F. Van Cleve

Surface Elevation: 141.5 feet

Test Depth/Elevation: 2.0 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	24	0	24	0.1	>20.0
2	24	0	24	0.1	>20.0
3	24	0	24	0.1	>20.0
4	24	0	24	0.1	>20.0

INFILTRATION TEST REPORT

Client: Treetop Development
Project: Proposed Warehouse Buildings
Location: US Highway 9W, Town of Cornwall,
 Orange County, New York

Test Hole No.: PT-220/SPP-220
Date: 5/19/2023
Weather: Cloudy

Project No.: 2803-99-015E

Project Manager: F. Van Cleve

Surface Elevation: 196.0 feet

Test Depth/Elevation: 3.0 feet

Reading No.	Water Level (Inches)		Water Level Fall (Inches)	Time Interval (Hours)	Rate of Flow (Inches/ Hour)
	Start	Finish			
1	24	14.0	10.0	0.2	2.0
2	24	14.25	9.75	0.2	1.95
3	24	14.25	9.75	0.2	1.95
4	24	16.5	7.5	0.2	1.5
5	24	16.75	7.25	0.2	1.45
6	24	16.5	7.5	0.2	1.5

**Geophysical Survey –
Seismic Refraction Data**



**BEDROCK DEPTH/RIPPABILITY MAPPING
THREE PROPOSED CUT AREAS TOTALING ~46 ACRES
CORNWALL, ORANGE COUNTY, NEW YORK**

June 5, 2023
Revised June 30, 2023

Prepared for:

Dynamic Earth
1904 Main Street
Lake Como, NJ 07719

Prepared by:

RETTEW Field Services, Inc.
3020 Columbia Avenue
Lancaster, PA 17603

RETTEW Project No. 113642065

June 5, 2023

Revised June 30, 2023

Francis Van Cleve, PE
Dynamic Earth
1904 Main Street
Lake Como, NJ 07719

RE: Report for: Bedrock Depth/Rippability Mapping
Three Proposed Cut Areas Totaling ~46 Acres
Cornwall Logistics Site, Cornwall, NY
RETTEW Project No. 113642065

Dear Francis:

Pursuant to your request, RETTEW Field Services, Inc. (RETTEW) has completed a geophysical survey at the above-referenced site. The purpose of the survey was to map the depth to rock and thickness of overburden beneath three areas of proposed grading cuts on an industrial development site, as shown on **Figure 1**. The geophysical survey was conducted in accessible locations cleared by the client's contractor through the wooded site. The following report and figures describe the methods and results of the investigation.

SITE DESCRIPTION

The site is located on a hilly, wooded lot, in Orange County, New York. At the time of the geophysical survey, access was limited to only those profiles cut and cleared by contractors (**Figure 1**).

The site bedrock geology, reported by the Geologic Map of New York State (Fisher, D.W., Isachsen, Y.W., and Rickard, L.V., 1970), indicates that the site is underlain by Quaternary-aged glacial and alluvial deposits with unknown bedrock geology underlying the unconsolidated material.

Boring and test pit logs provided by the client indicate glacial deposits over slightly weathered rock. The weathered rock thickness varied from 0 to a little over 5 feet. The location of the borings and test pits are shown on **Figure 1** and on each profile on **Figure 2**. Please note that the only a few borings and test pits are located directly on the seismic lines.

SURVEY METHODS

In order to determine bedrock depths and rippability beneath the study area, RETTEW performed a seismic refraction survey, which consisted of nine profiles, or lines, recorded as shown on **Figure 1**. The principles of seismic refraction are described in the accompanying Introduction to Seismic Refraction (**Appendix A**), and generally involve measuring the travel times of shock waves traveling from a surficial source (shot point) to a linear array of ground motion sensors (geophones). At a distance from the shot point, the first arrivals of seismic energy are waves that have been refracted along whatever stiffness or competence contrast or contrasts (called refractors) are present in the subsurface. The travel times of these refracted arrivals can be used to compute a cross-sectional profile of these differing strata.

For this survey, a Geometrics 24-channel Geode seismograph was used to record seismic travel times at linear arrays of Mark Products 4.5-Hertz geophones spaced at constant 10-foot intervals along each of the profiles. Shot points were spaced at approximately 40-foot intervals to provide multi-fold, reversed seismic data. At each shot point, seismic signal was generated with repeated blows of an automated weight drop seismic source. Waveform data were recorded on the internal hard drive of the seismograph computer. The location and elevation of each shot point were surveyed using a Topcon global navigational satellite system (GNSS) receiver.

Processing and interpretation of the seismic refraction data were completed using the SeisImager software package (PickWin and PlotRefa) by OYO Corporation. First arrival travel times, or first breaks, were selected on the waveform data using PickWin. From the first arrival times and geophone locations, T-X graphs were compiled for each line using the routine PlotRefa. The compiled T-X data for each shot generally display two linear segments. A two-segment model is consistent with a two-layer stratigraphy (presumably consisting of soil/weathered rock overlying competent bedrock). PlotRefa (part of SeisImager) uses multiple methods – such as time-term inversion, generalized reciprocal, ray-tracing, and tomographic inversion – to determine the best seismo-stratigraphic model based on the T-X data.

Time-term and ray-tracing methods produce simple stratigraphic models consisting of lines representing the depths to the base of each layer, and a single weighted average velocity for each layer. These results can only be depicted as lines (with a polyline separating layers of constant velocity). On **Figure 2** the polyline representing the inferred bedrock based on the time-term and ray-tracing methods is shown as a red-dashed line on each profile.

Tomographic inversion produces a distributed relative velocity model – i.e., the subsurface is treated as a “stack of bricks”, with the inversion finding the best-fitting velocity for each individual brick. Therefore, tomographic data can be contoured (as in **Figure 2**) which present color-contour velocity models of each profile from SeisImager tomographic inversion. The velocities are determined by the tomographic inversion, and do not necessarily coincide with critical values from ripping charts nor do they exactly match the results of the time-term and ray-tracing methods.

The different seismic methods may produce slightly different results based on the actual stratigraphy of the site. For example, tomography works better where there are gradational boundaries between strata (e.g., where there is a thick weathering or saprolite zone at the top of rock), whereas the layer-based methods are better suited to distinct boundaries such as between clean flat carbonate rock and the overlying residual clay soil mantle. RETTEW performs all inversion methods and compares the results to available borings (if available) and geologic data to arrive at the best stratigraphic model for any site.

On each profile in **Figure 2**, the vertical scale represents the depth in feet and horizontal axis represents an along-profile distance in feet. The colors and selected velocity contours on each seismic cross section are from the tomographic inversion using SeisImager. Based on a combination of time-term, ray-tracing, and tomographic inversion methods, the red-dashed line represents the inferred bedrock depth and boundary between marginally rippable and non-rippable rock. The blue-dashed velocity contours on each profile, at 3,500, 7,500, and 9500 feet per second (fps), depict the various rippabilities for the material based on the tomographic models. The middle, medium-dashed blue contour (7,500 fps) is the inferred top of the transition zone (where rock boulders and weathered rock interfinger with clay or soil-filled seams and fractures), while the bottom (long-dashed blue) velocity contour (9,500 fps) depicts the base

of the transition zone, or top of continuous competent bedrock. In the transition zone, intermediate velocities represent complicated paths for the transmitted seismic energy which may travel alternately through rock pinnacles, possible boulders, and soil cutters. Note that areas where the ray-tracing (red-dashed line) deviates from the middle-dashed blue 7,500-fps tomographic contour indicate a higher probability of weathered rock (saprolite), rock fracturing, and other anomalous features that have a direct effect on the velocity of the seismic waves.

SURVEY RESULTS

The seismic cross sections for the survey area are shown on **Figure 2**. The data indicate a general two-layer stratigraphy consisting of a residual soil mantle overlying successively deeper marginal to non-rippable competent bedrock. The uppermost layer (in a generalized two-layer model) has average P-wave velocities of generally less than 5,000 feet per second (fps) with a thickness ranging from 10 to 20 feet (weighted average velocity of 1,340 fps). This is consistent with a compact residual soil mantle and rippable glacial rocks (shaded blue to white). The deepest layers have velocities well over 16,000 fps (shaded white to brown), consistent with competent rock (Carmichael, R. S., 1989). Comparison of the seismic results with client borings and trench pits log show a general correlation of the ray-tracing method (red wavy line) as the inferred bedrock surface rather than the 7,500-fps or 9,500-fps contours from the inversion method.

Figures 3 and 4 represent the inferred elevations and depths to bedrock (or overburden thickness), respectively, based on the red-dashed line from the ray-tracing method which aligns slightly better with the borings and test pits. The insert contour maps (upper right) show the inferred elevations of the 7,500 fps and the 9,500 fps contours from the inversion method for comparison. The orange-to-brown shading on **Figure 3** represents the higher bedrock elevations, while the red shading on **Figure 4** highlights the shallowest rock (or thinnest overburden areas). In general, most of the survey area displays competent rock depths shallower than approximately 20 feet, with the shallowest around 8 feet. However, bedrock boulders and other anomalous features may result in rock at or near the surface. These extreme bedrock highs are most likely located in the areas of the brown and red shading on **Figures 3 and 4**, respectively.

The seismic survey results show a generally irregular rock surface. Please note that differences in boring and test pit elevations, RETTEW's RTK-GPS survey elevations, and USGS LiDAR elevations all varied by a couple of feet. In addition, note that where borings and test pits are offset from the seismic profiles, their elevations cannot be directly compared. In general, the boring and test pit elevations were about 2.5 feet higher than the LiDAR data. RETTEW adjusted the RTK-GPS elevations to match the LiDAR data during post-processing with a median shift of less than one foot.

The seismic velocity models from the ray-tracing method (red-dashed line) were compared to standard ripping charts (see e.g., **Appendix B**, Caterpillar, Inc., 1995) using the inferred/assumed layer compositions to determine the general rippability of each stratum. In general, the surficial layer and material down to about the average inferred marginal bedrock layer should be readily to marginally rippable with a D9 multi- or single-shank ripper doing open field ripping, based on a weighted average velocity of less than 2,000 fps. Below the blue-dashed lines, ripping will get more difficult with depth. Below the red-dashed line, the basal half-space has a weighted average layer velocity of over 16,000 fps based on the ray-tracing model (red-dashed line) and is into the non-rippable range. For trenching (as opposed to open field ripping), material may also become non-rippable for a CAT-330 tracked excavator or equivalent. Please note that trenching can become non-rippable at tomographic velocities as low as 3,500 fps (upper,

A large, stylized handwritten signature in blue ink, appearing to read "Lee K. King". The signature is written in a cursive, flowing style with a large, sweeping arch at the top.A small, handwritten mark in blue ink, resembling a checkmark or a stylized letter 'v'.

Geyer, A.R. and Wilshusen, J.P., 1982, Engineering Characteristics of the Rocks of Pennsylvania, Pennsylvania Geologic Survey, Harrisburg, PA.

Fisher, D.W., Isachsen, Y.W., and Rickard, L.V., 1970, Geologic Map of New York State, consisting of 5 sheets: Niagara, Finger Lakes, Hudson-Mohawk, Adirondack, and Lower Hudson, New York State Museum and Science Service, Map and Chart Series No. 15, scale 1:250,000.

Kirsten, HAD (1982). A classification system for excavating in natural materials. Civil Engineering (Siviele Ingenieurswese), 24(7), 293-308.

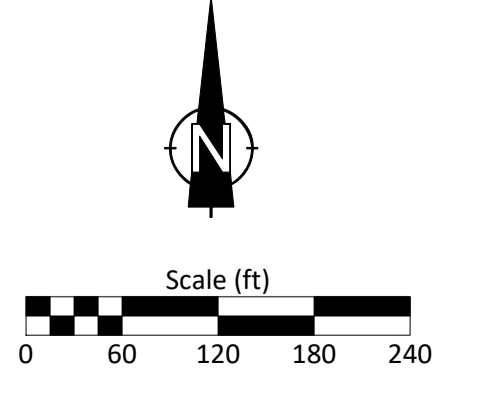
Z:\Shared\Projects\11364\113642065 - Dynamic Earth Proposed Warehouse Cornwall, NY\GP\REPORT\113642065_Revised Report_2023-06-30.docx

ENCLOSURES



- Legend**
- * Seismic Shot Location
 - Seismic Geophone Location
 - - - Geologic Contact
 - ⊕ Boring Location (by others)
 - ⊕ Test Pit (by others)

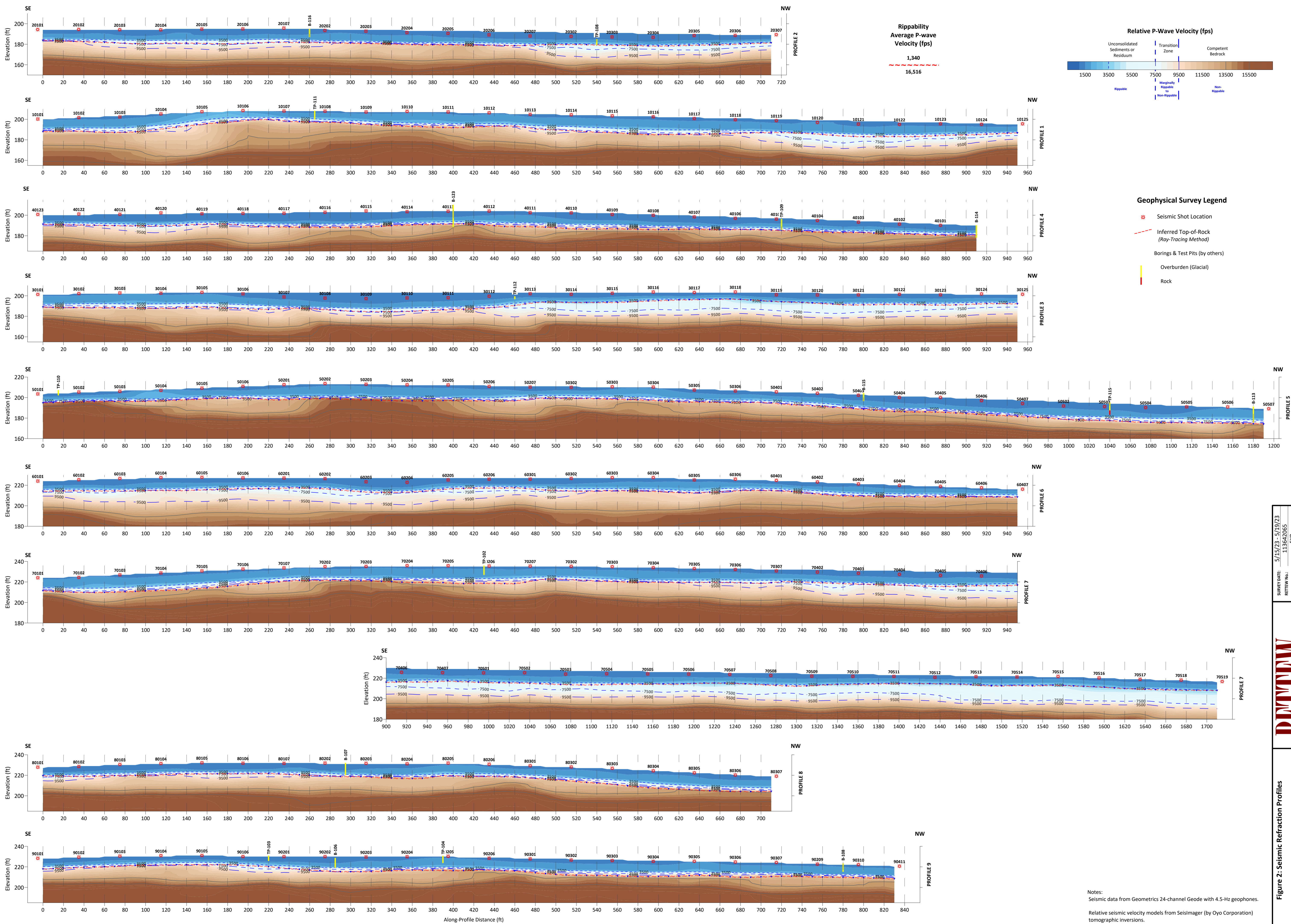
Notes:
 Coordinates in NY East State Plane 1983 FIPS 3101, NAD83 (US feet).
 Seismic profile locations and elevations based on RETTEW Field Services RTK-GNSS survey.
 Basemap provided by Client KMZ file.
 Geologic information from NYS Museum, NYS Geological Survey, NYS Museum Technology Center, 1999, 1:250,000 Bedrock geology of NYS.



SURVEY DATE:	5/15/23 - 5/19/23
REVIEW NO.:	113642065
REVIEWED BY:	FKB
DRAWN BY:	CHR
REVISION DATE:	06/30/2023
SCALE:	1" = 120'
FIGURE NO.:	1 of 4



Figure 1: Data Coverage and Geologic Setting Map
 Cornwall Logistics Site
 Cornwall, NY



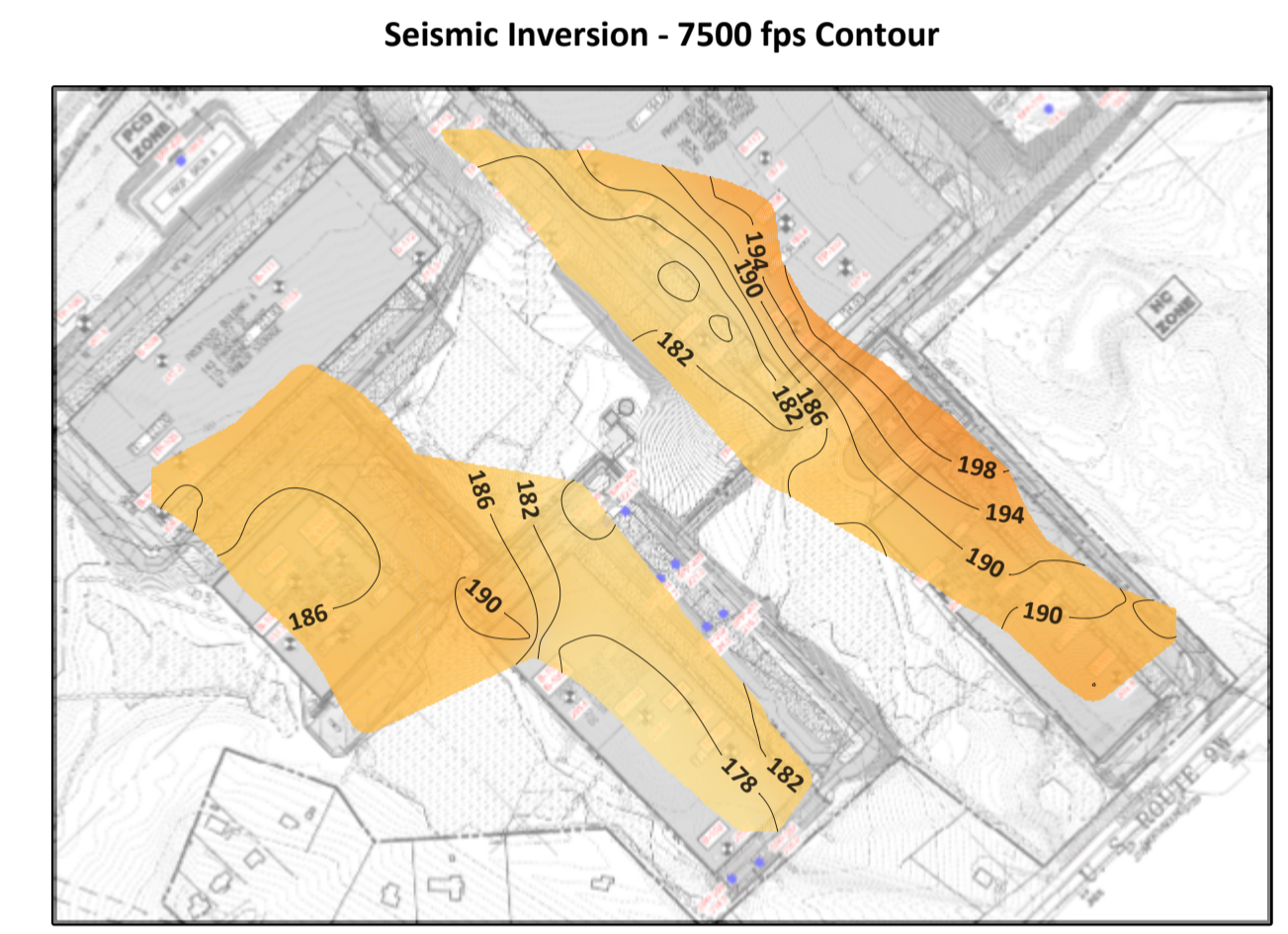
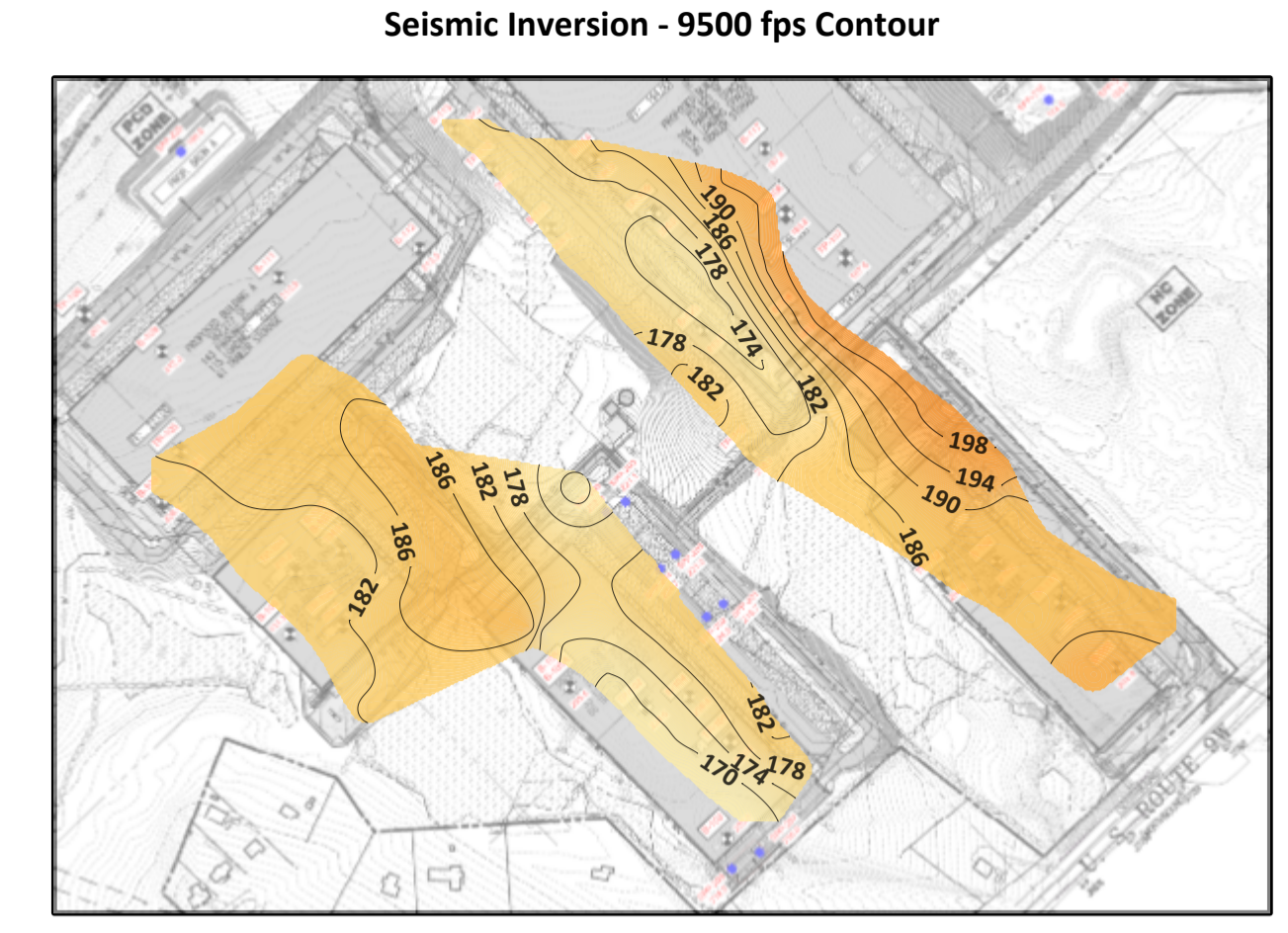
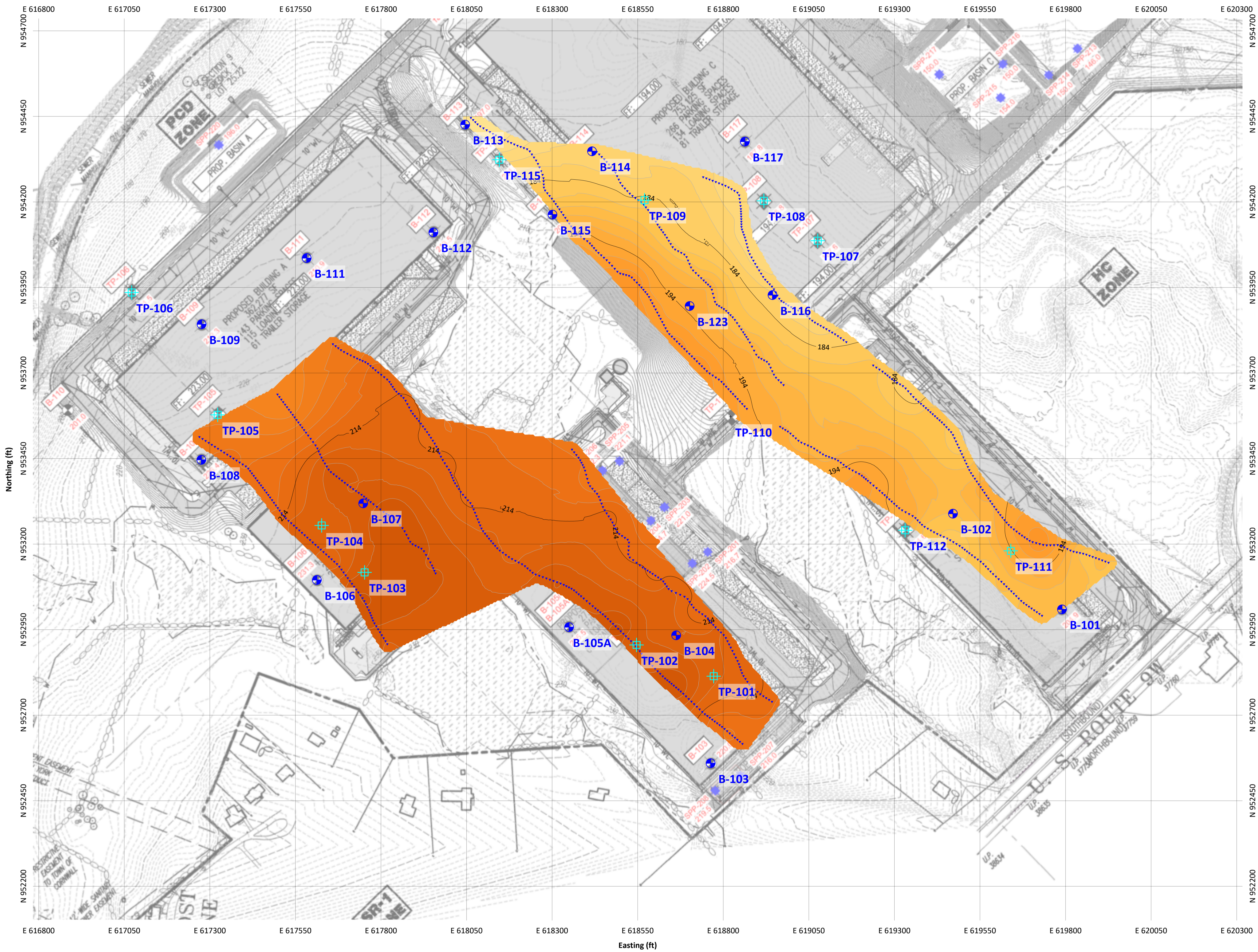
Notes:
 Seismic data from Geometrics 24-channel Geode with 4.5-Hz geophones.
 Relative seismic velocity models from SeisImager (by Oyo Corporation) tomographic inversions.

Figure 2: Seismic Refraction Profiles
 Cornwall Logistics Site
 Cornwall, NY

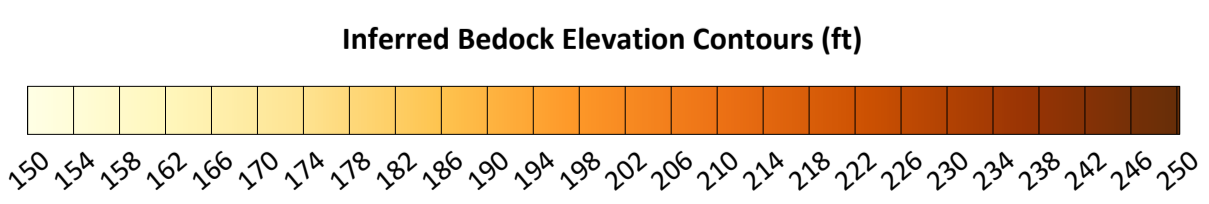
RETTENBERG
 RETTENBERG ENGINEERING, INC.
 1000 STATE ST., SUITE 200
 CORNWALL, NY 12418
 PHONE: 845.338.8899

SURVEY DATE:	5/15/23 - 5/19/23
PROJECT NO.:	113642065
REVIEWED BY:	FKB
DRAWN BY:	CHR
REVISION DATE:	06/30/2023
SCALE:	1" = 40'
FIGURE NO.:	2 of 4

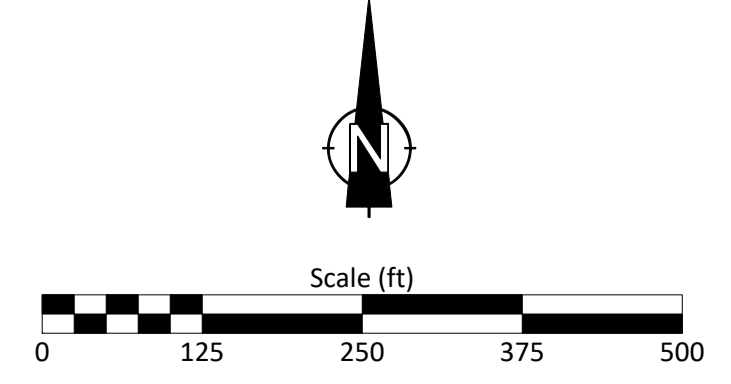
Inferred Bedrock - Ray-Tracing Method



Legend
 • Seismic Geophone Location



Notes:
 Coordinates in NY East State Plane 1983 FIPS 3101, NAD83 (US feet).
 Seismic profile locations and elevations based on RETTEW Field Services RTK-GNSS survey.
 Basemap provided by Client KMZ file.
 Inferred top-of-bedrock surface based on seismic velocity models (see report).

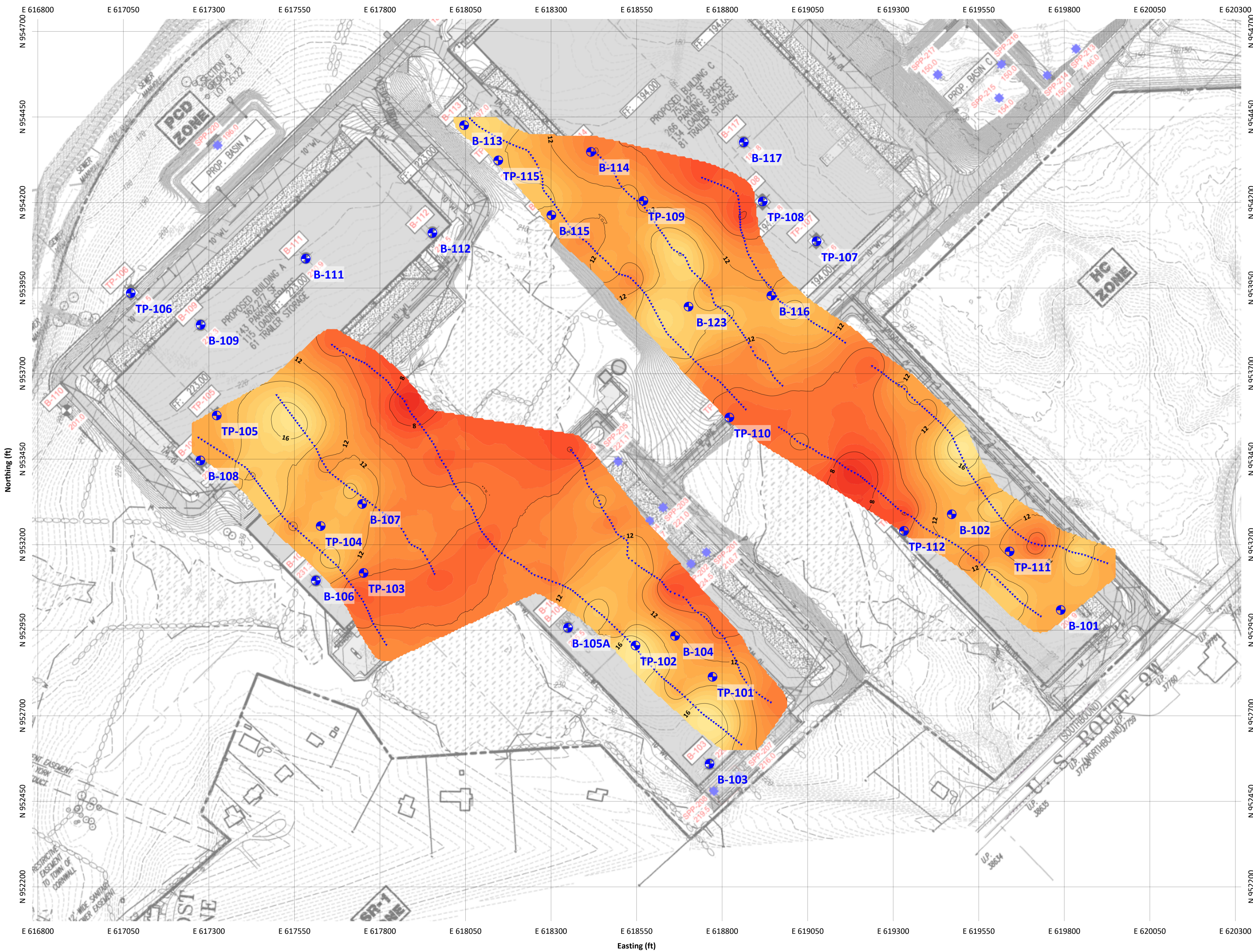


SURVEY DATE:	5/15/23 - 5/19/23
REVIEWED BY:	FKB
DRAWN BY:	CHR
REVISION DATE:	06/30/2023
SCALE:	1" = 120'
FIGURE NO.	3 of 4

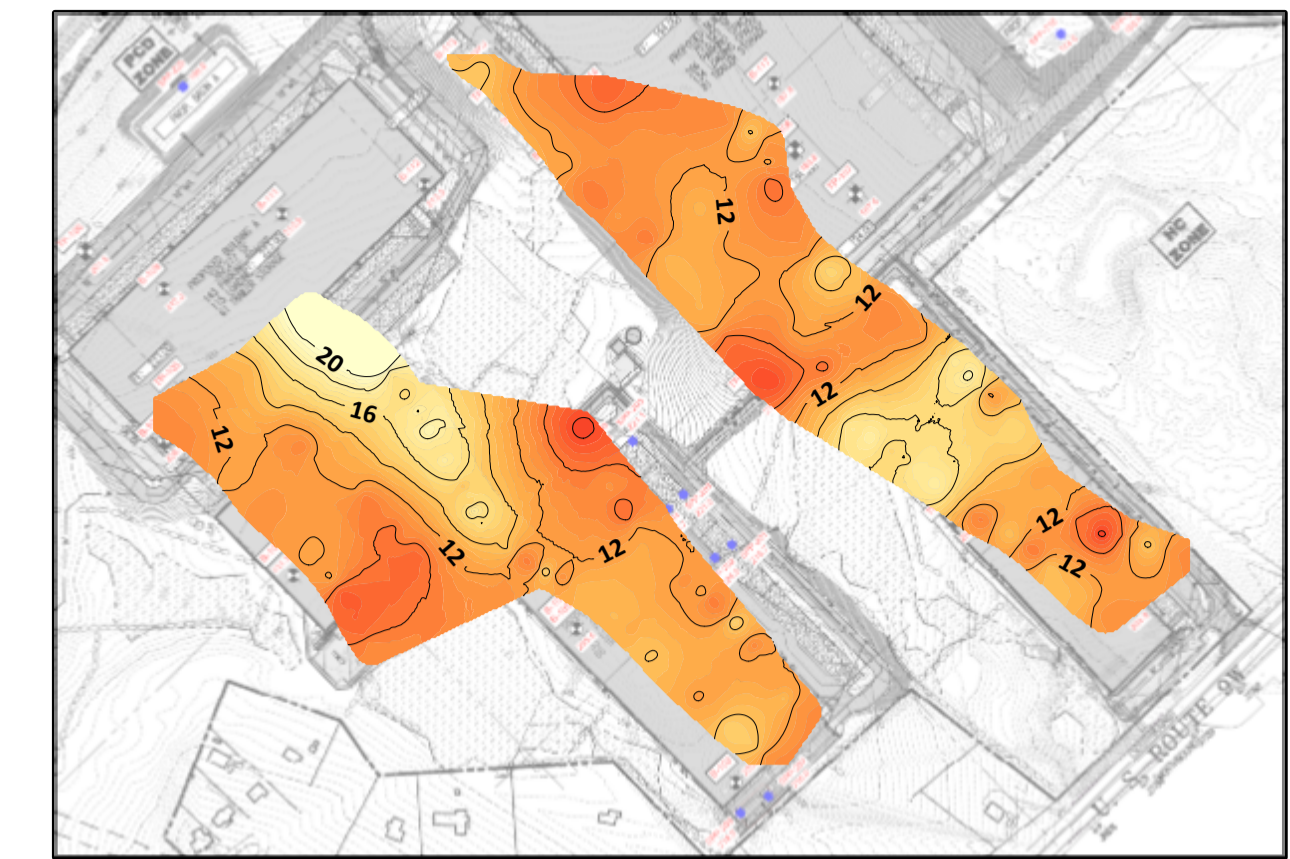


Figure 3: Inferred Bedrock Elevations from Seismic Velocity Model
 Cornwall Logistics Site
 Cornwall, NY

Inferred Bedrock Depth- Ray-Tracing Method



Inferred Bedrock Depth - Seismic Inversion - 7500 fps Contour



Legend

- Seismic Geophone Location

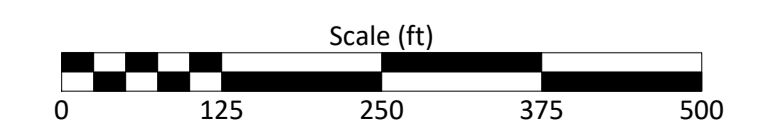
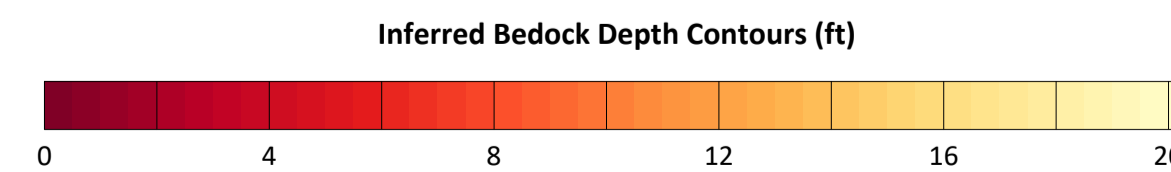
Notes:

Coordinates in NY East State Plane 1983 FIPS 3101, NAD83 (US feet).

Seismic profile locations and elevations based on RETTEW Field Services RTK-GNSS survey.

Basemap provided by Client KMZ file.

Inferred top-of-bedrock surface based on seismic velocity models (see report).



SURVEY DATE:	5/15/23 - 5/19/23
REVIEW NO.:	113642065
REVIEWED BY:	FKB
DRAWN BY:	CHR
REVISION DATE:	06/30/2023
SCALE:	1" = 40'
FIGURE NO.:	4 of 4



Figure 4: Inferred Bedrock Depths from Seismic Velocity Model
 Cornell Logistics Site
 Cornwall, NY

APPENDIX A
Introduction to Seismic Refraction

INTRODUCTION TO SEISMIC REFRACTION

BY TIMOTHY D. BECHTEL, PHD, PG

ENERGY

Mechanical elastic (seismic) waves generated by a hammer blow, weight drop, or explosion.

SENSITIVITY

Sensitive to elastic properties or moduli – generally strongly correlated with density.

BASIC EQUIPMENT

Recording Seismograph (generally 24 or more channels); Geophones (one for each channel); Geophone cable; Hammer or weight plus strike plate or explosives; Trigger switch.

COMMON APPLICATIONS

Determination of the depth and dip of soil horizons and bedrock surfaces. Recent processing advances allow some detection and delineation of discrete targets.

PRINCIPLES

In a uniform isotropic earth, the shock wave from a blow or explosion at the surface travels outward and downward in a hemispherical wave front like a three-dimensional ripple from a pebble in a still pond. At any point on the wave front, a straight line from the shock source to the wave front depicts the path of the seismic wave and is called a ray path (see **Figure SR-1**). In reality, there are several independent shock waves; the fast-moving primary, compressional or P wave front; the slower moving secondary, shear or S wave (both of which form hemispherical wavefronts); and several disk-like wave fronts that travel only along the surface of the earth (called surface waves or ground roll). For the purposes of most seismic refraction surveys, only the fastest moving wave front — the P wave — is considered. S-wave refraction is used in selected circumstances where complete determination of elastic moduli is desired – particularly when it may be desirable to eliminate the effects of water saturation.

In a layered earth, the hemispherical P shock wave defined by the radially distributed P ray paths are deflected according to the laws of optics (Snell's Law) at interfaces between materials with differing seismic velocities (i.e. densities or elastic properties). Figure SR-2 depicts the deflection of ray paths due to an increase in P velocity at a bedding plane. The type of deflection that a ray path will undergo is dependent upon the angle at which it strikes the interface, and falls into one of four categories:

Some direct rays (green in **Figures SR-2** and **SR-3**) travel parallel to the ground surface at the seismic velocity of the upper layer, do not strike the underlying interface, and consequently are not deflected.

Reflected rays (purple in **Figures SR-2** and **SR-3**) arise where direct rays strike the interface, and a portion of the energy is reflected symmetrically back towards the surface.



The portion of the energy of the incident direct wave that is not reflected upward is refracted or bent as it crosses the interface – making refracted waves in the lower layer (red in **Figures SR-2** and **SR-3**).

At a precise angle called the critical angle, the incident ray is refracted directly along the interface, and travels at the higher seismic velocity of the lower layer (see Critically Refracted Wave in **Figure SR-3**). As this critically refracted or head wave races along beneath the interface, it generates a secondary elastic disturbance that travels back to the surface along ray paths that define a wave front analogous to the bow wake of a ship. These returning rays again travel at the slower velocity of the upper layer.

To perform a refraction survey, a linear array of ground motion sensors or geophones is spaced out from the seismic source or shot point, forming a geophone spread. Each geophone is connected to a separate channel in a seismograph which records a wiggle trace representing the ground motion resulting from the passage of the various seismic rays.

As depicted in the time-distance (T-X) curve in **Figure SR-4**, the layered earth structure can be determined by analyzing the seismographic wiggle traces. At distances close to the seismic source, the first wiggle or ground motion (the first arrival after the shot) is due to passage of the direct wave travelling at the velocity of the upper layer. Reflected waves arrive later since they have by definition traveled a greater distance at the same velocity (additional later wiggles are caused by passage of the more slowly travelling S and surface waves). Beyond a distance dictated by the critical angle, the first arrival of seismic energy represents the head wave of the critically refracted ray. These refracted rays also by definition travel a greater distance than the direct wave. However, along part of their path, they have traveled at the higher velocity of the underlying more consolidated layer. At greater distances from the shot point, where the path length in the higher velocity layer becomes significant, the head wave arrivals actually race past the direct wave and become the first arrival (see labeled crossover in **Figure SR-4**). By extension, it can be shown that if a third layer with even greater velocity lies at greater depth, the head wave from this layer will become the first arrival at a sufficient distance from the shot point.

In conventional seismic refraction, only the first P wave arrivals can be reliably selected on a wiggle trace record. The later reflected P wave arrivals are generally obscured by the slower-travelling S and surface waves, and the very slow air blast or sound wave from the shot. To interpret a seismic refraction record, the first arrival travel times are measured for each wiggle trace and plotted at the appropriate point on a time-distance (T-X) curve (see **Figure SR-4**). In a plane-layered earth, these first arrivals define a series of line segments, each representing a discrete layer. The seismic velocity of each layer is simply the reciprocal of the slope of the associated line segment. The thickness of each layer can be calculated from the distances where the line segments intersect. The mathematics for these calculations are easily derived, and can be found in any introductory geophysics text.

True geologic strata are rarely perfectly horizontal. The effect of a dipping interface on a travel time curve cannot be recognized using a single shot point. Calculations based on a T-X curve from a single shot point should always be considered as producing apparent depths to interfaces and apparent seismic velocities for all but the uppermost layer. To determine the true depths and dips of interfaces and the true seismic velocities, it is necessary to reverse the seismic line; that is, move the shot point to a location at or beyond the farthest geophone in the spread, and repeat the shot. The calculation of true depths, dips and velocities from reversed seismic lines is also readily performed.

CAPABILITIES

Conventional seismic refraction can yield accurate measurements of depths and attitudes of soil horizons, groundwater tables, and other relatively distinct and planar strata. Modern computer analysis of multi-fold seismic refraction data (i.e. with many and overlapping shot points) can provide delineation of undulating or even irregular (as opposed to simply planar) interfaces. The latest generation of computer processing techniques require very high-fold data, but in favorable conditions, are capable of resolving even discrete targets such as foundation elements, tunnels or cavities, and can resolve gradational boundaries as well as distinct interfaces. The seismic P-wave velocities of materials are generally an indication of relative density or compaction. S-wave refraction data (collected using specialized geophones, shock sources and field procedures) can provide S-wave velocities that bear a well-constrained empirical relationship to standard penetration test (SPT) N values and therefore bearing capacity. For surveys where matching P- and S-wave velocities are determined, the dynamic elastic moduli of subsurface materials can be calculated (including Poisson's Ratio, Young's or Bulk Modulus, and Shear Modulus or Rigidity).

LIMITATIONS

Seismic data is collected at spaced geophones, and therefore does not provide continuous profile data. If geophones are spaced too widely, thin layers can be missed entirely.

Conventional refraction interpretations are only accurate where the velocity of strata increase with depth. Velocity inversions not only alter the data, but are particularly insidious since the presence of a low velocity zone at depth is not apparent in first arrival data. The latest generation of computer processing techniques do allow detection and delineation of laterally restricted low velocity zones (e.g. tunnels, cavities, gravel lenses, etc.).

Sharp or dramatic interface relief such as limestone pinnacles cannot always be resolved even with very tight geophone spacing. Therefore, refraction profiles of expectedly irregular interfaces should be assumed to represent somewhat smoothed versions of actual relief (see e.g. Figure **SR-5**).

Seismic records can contain noise due to heavy machinery vibrations, vehicular traffic, and sometimes even wind or distant earthquakes. Care must be taken to identify potential sources of seismic noise prior to beginning a survey.

The effective survey depth is limited to approximately 1/5 of the greatest shotpoint to geophone distance. Therefore, very deep surveys may require impractically long lines (requiring consideration of other geophysical techniques such as seismic reflection).

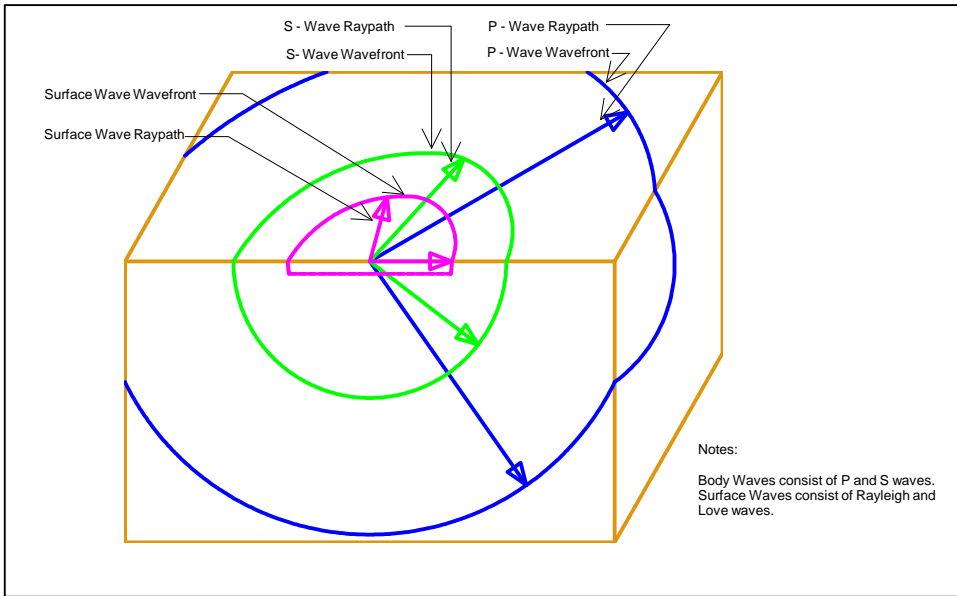


Figure SR-1

Seismic Wave Types

Rev. 04/2018

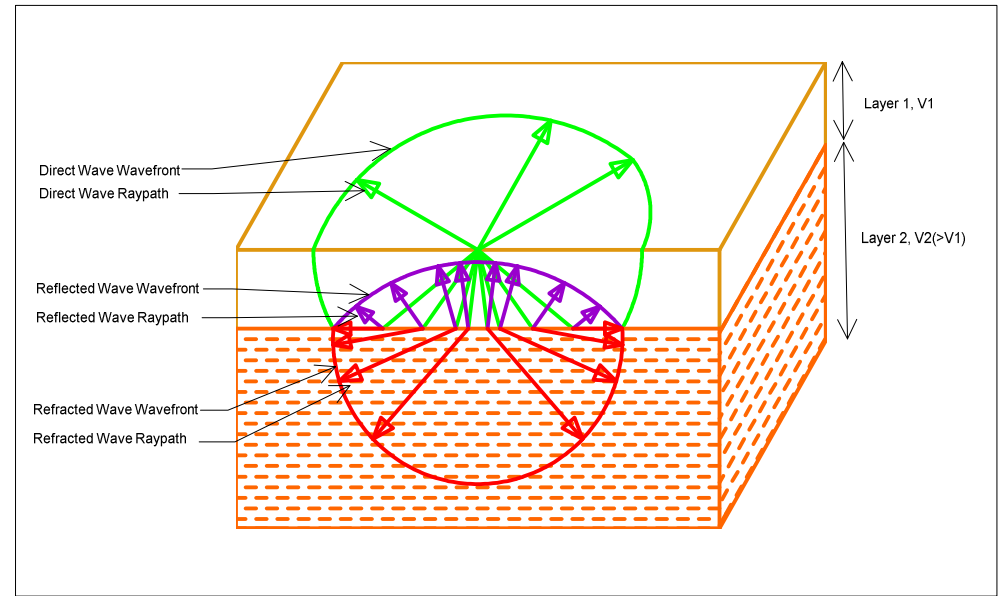


Figure SR-2

Effect of Layering
on Body Wave Raypath

Rev. 04/2018

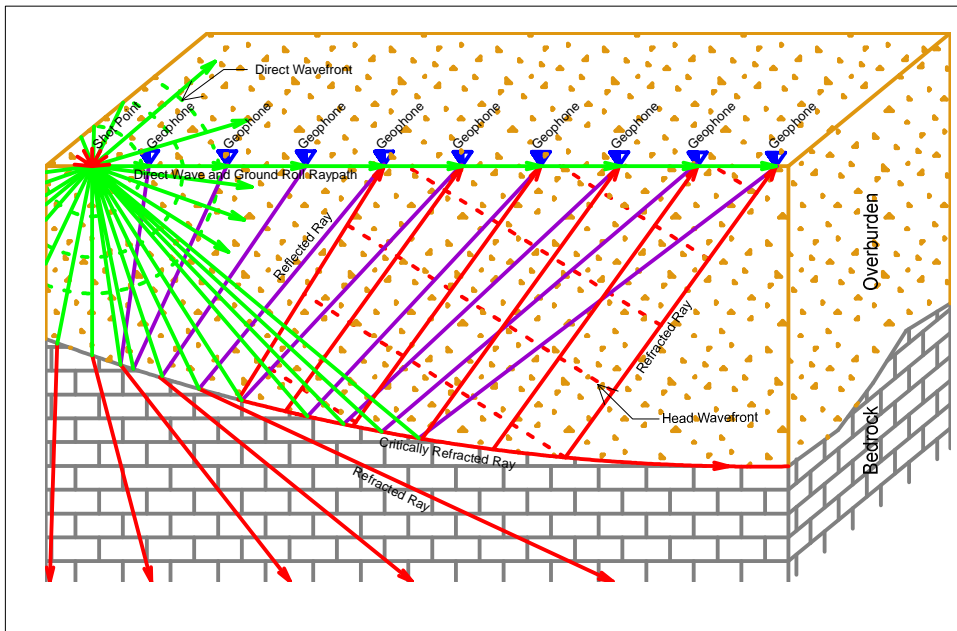


Figure SR-3

Seismic Ray Path Geometry

Rev. 04/2018

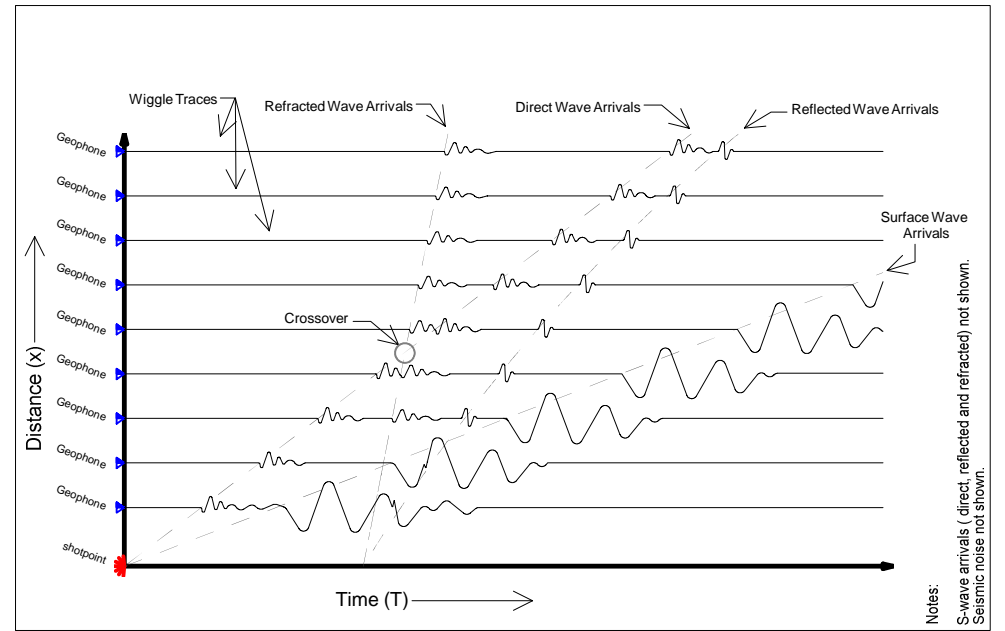


Figure SR-4

Idealized
Seismic Record
and T- X Graph

Rev. 04/2018



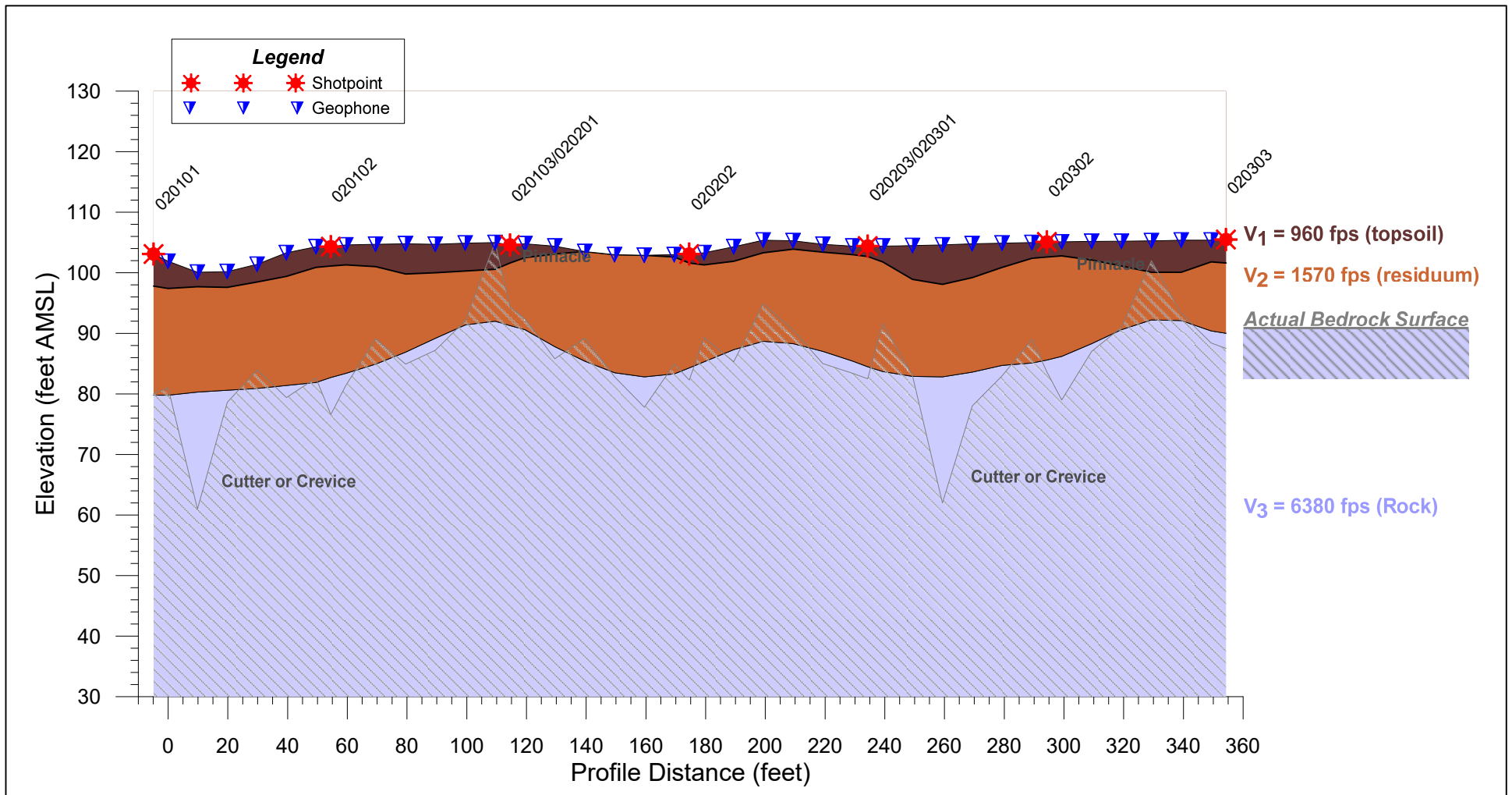


Figure SR-5

Example Karst Terrane Seismic Profile

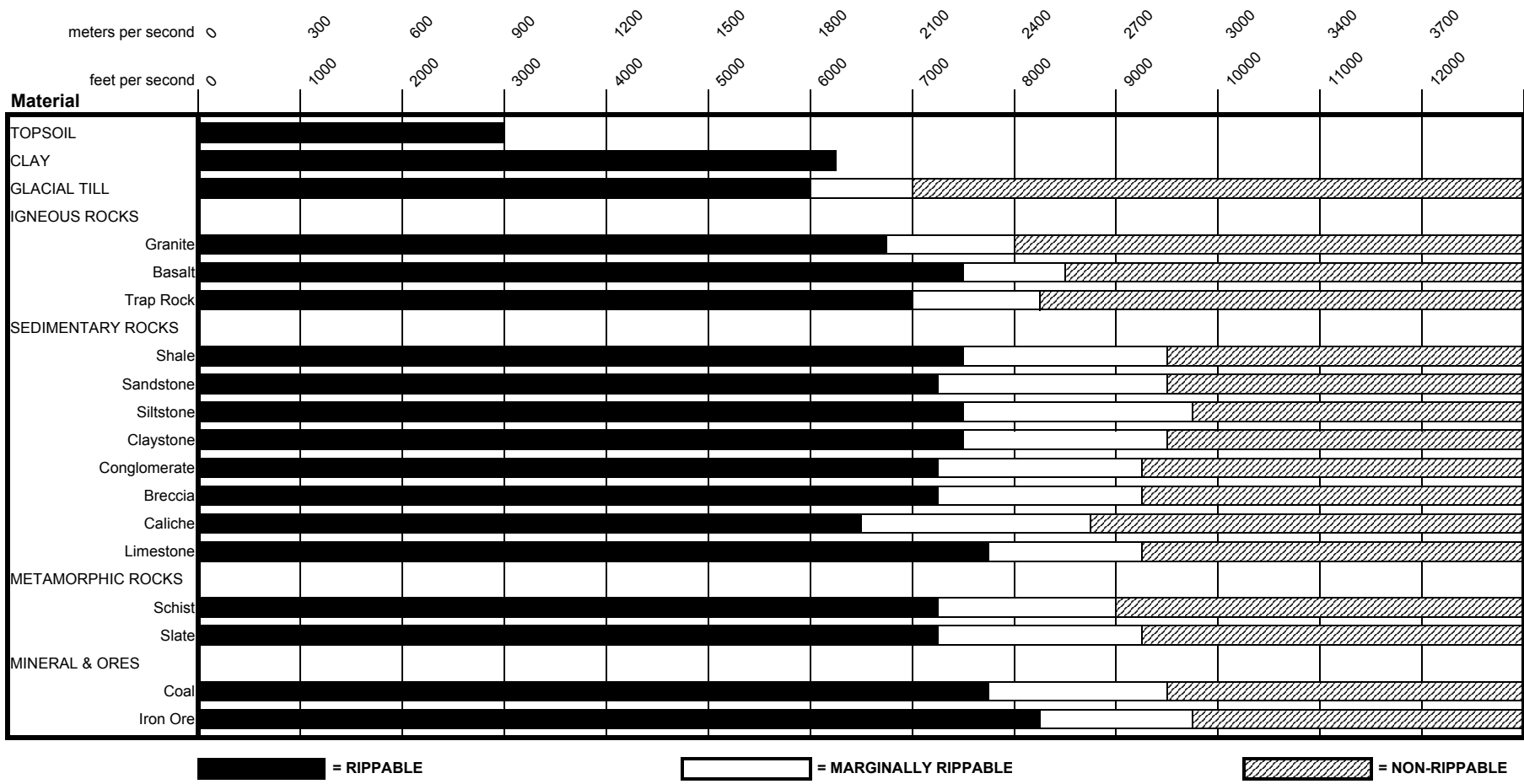
Revised 04/2018

RETTEW

APPENDIX B
Example Ripping Charts

Ripping Chart *
D9R
 Multi or Single Shank No. 9 Ripper
 Estimated by Seismic P-Wave Velocities

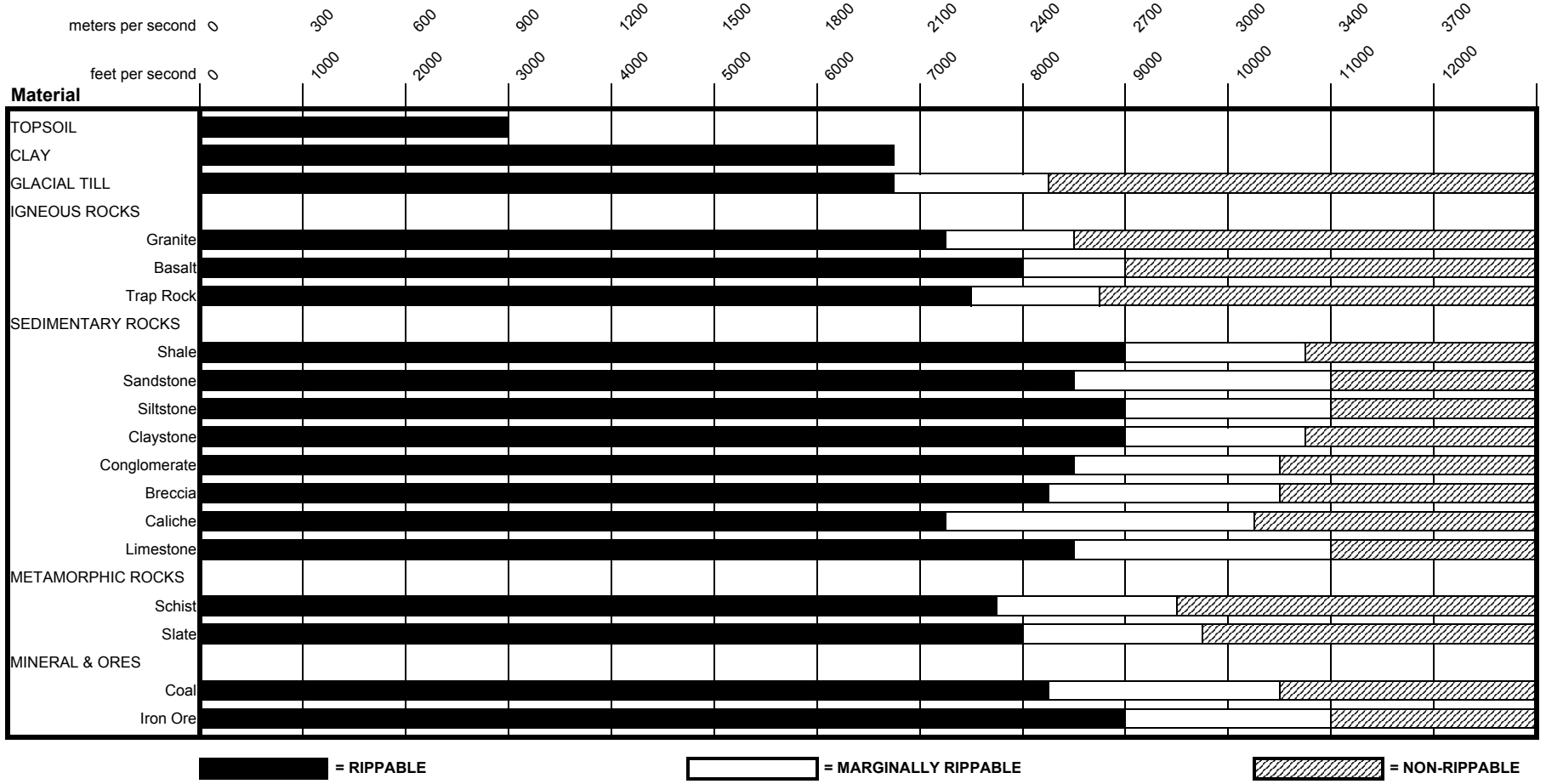
Seismic Velocity



* Caterpillar Performance Handbook, Edition 26, Caterpillar, Inc., Peoria, Illinois

Ripping Chart *
D10N
 Multi or Single Shank No. 10 Ripper
 Estimated by Seismic P-Wave Velocities

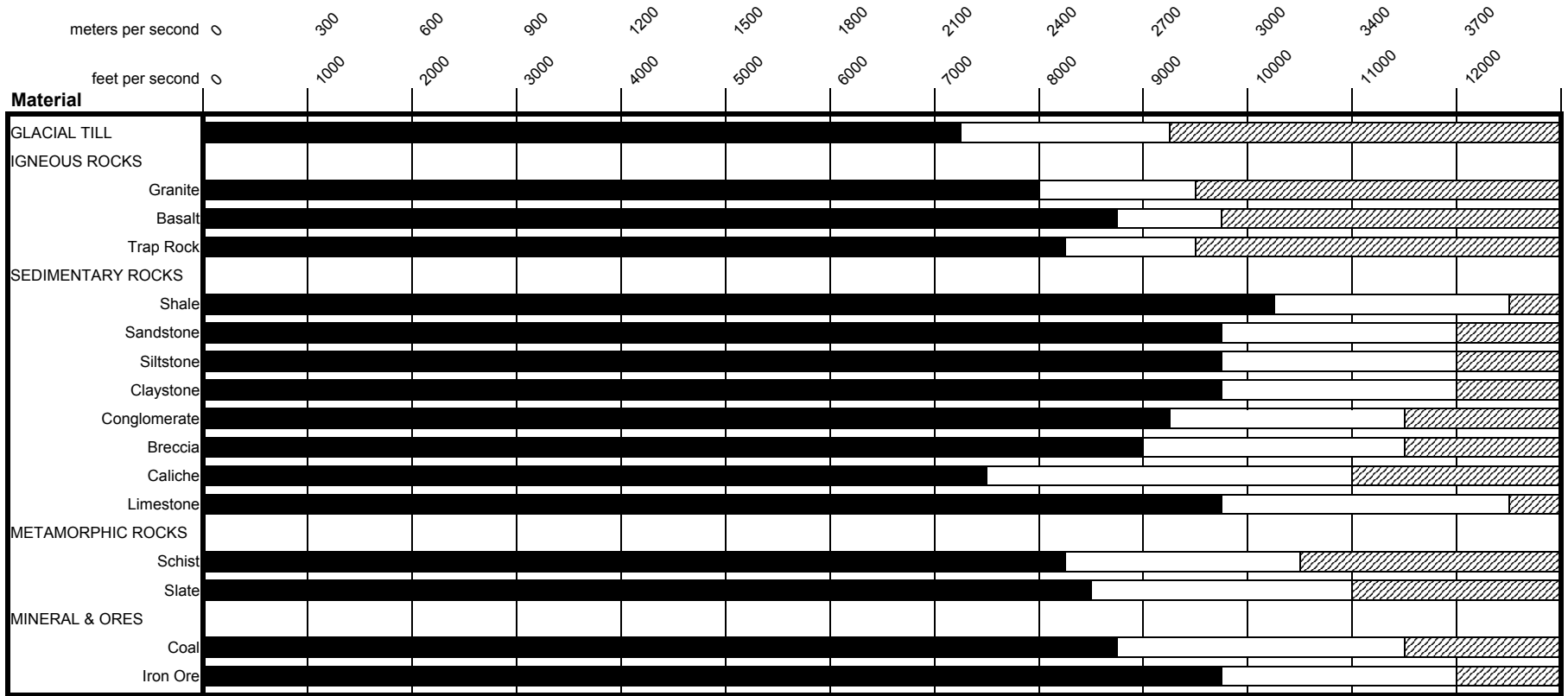
Seismic Velocity



* Caterpillar Performance Handbook, Edition 26, Caterpillar, Inc., Peoria, Illinois

Ripping Chart *
D11N
Multi or Single Shank No. 11 Ripper
Estimated by Seismic P-Wave Velocities

Seismic Velocity



■ = RIPPABLE

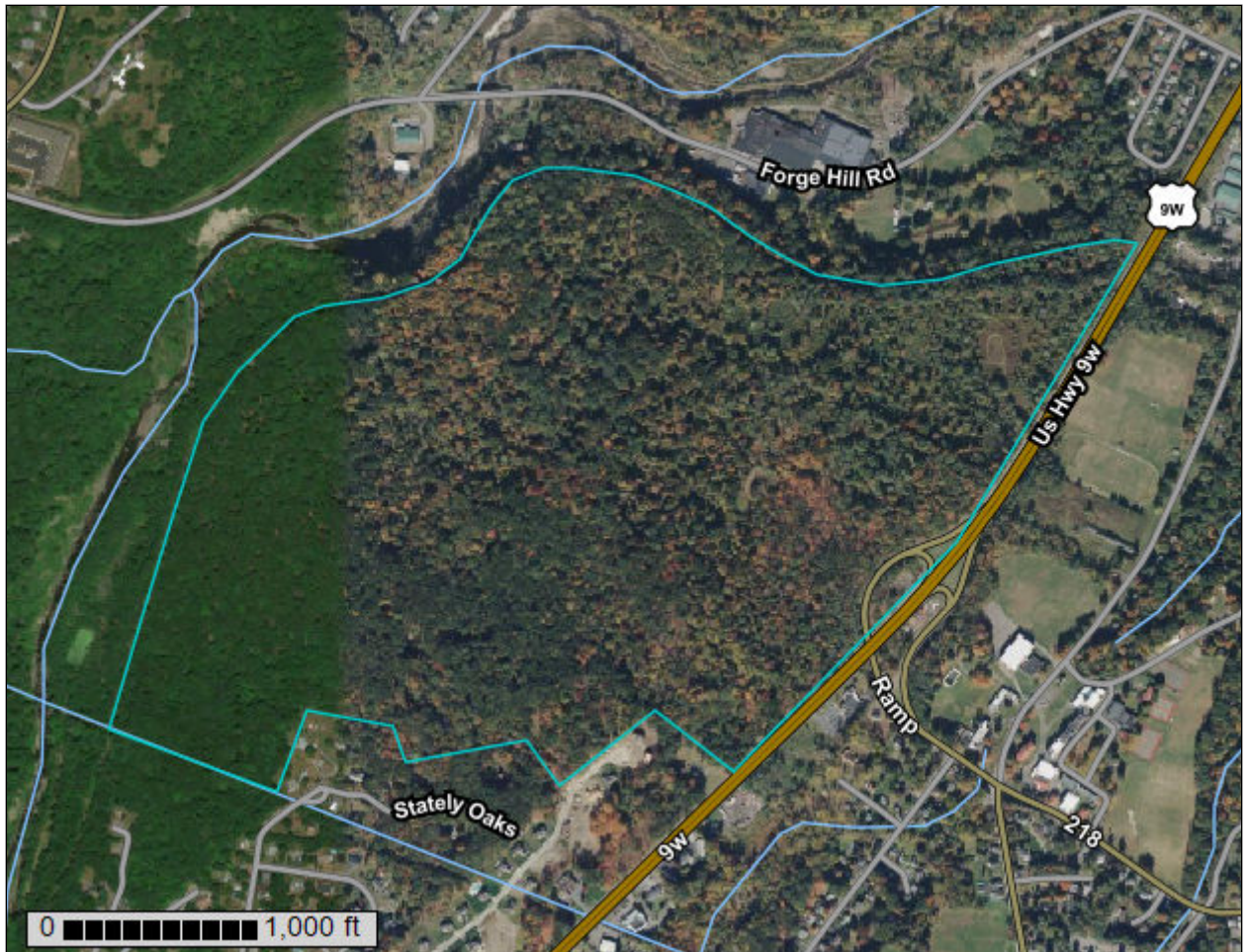
□ = MARGINALLY RIPPABLE

▨ = NON-RIPPABLE

* Caterpillar Performance Handbook, Edition 26, Caterpillar, Inc., Peoria, Illinois

**USDA-NCRS Custom Soil Resource
Report of Orange County, NY**

Custom Soil Resource Report for Orange County, New York



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.

Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	11
Orange County, New York.....	13
BnB—Bath-Nassau channery silt loams, 3 to 8 percent slopes.....	13
ErA—Erie gravelly silt loam, 0 to 3 percent slopes.....	15
MdB—Mardin gravelly silt loam, 3 to 8 percent slopes.....	16
MNE—Mardin soils, steep.....	18
SXC—Swartswood and Mardin soils, sloping, very stony.....	19
UF—Udifluvents-Fluvaquents complex, frequently flooded.....	22
W—Water.....	24
References	25

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

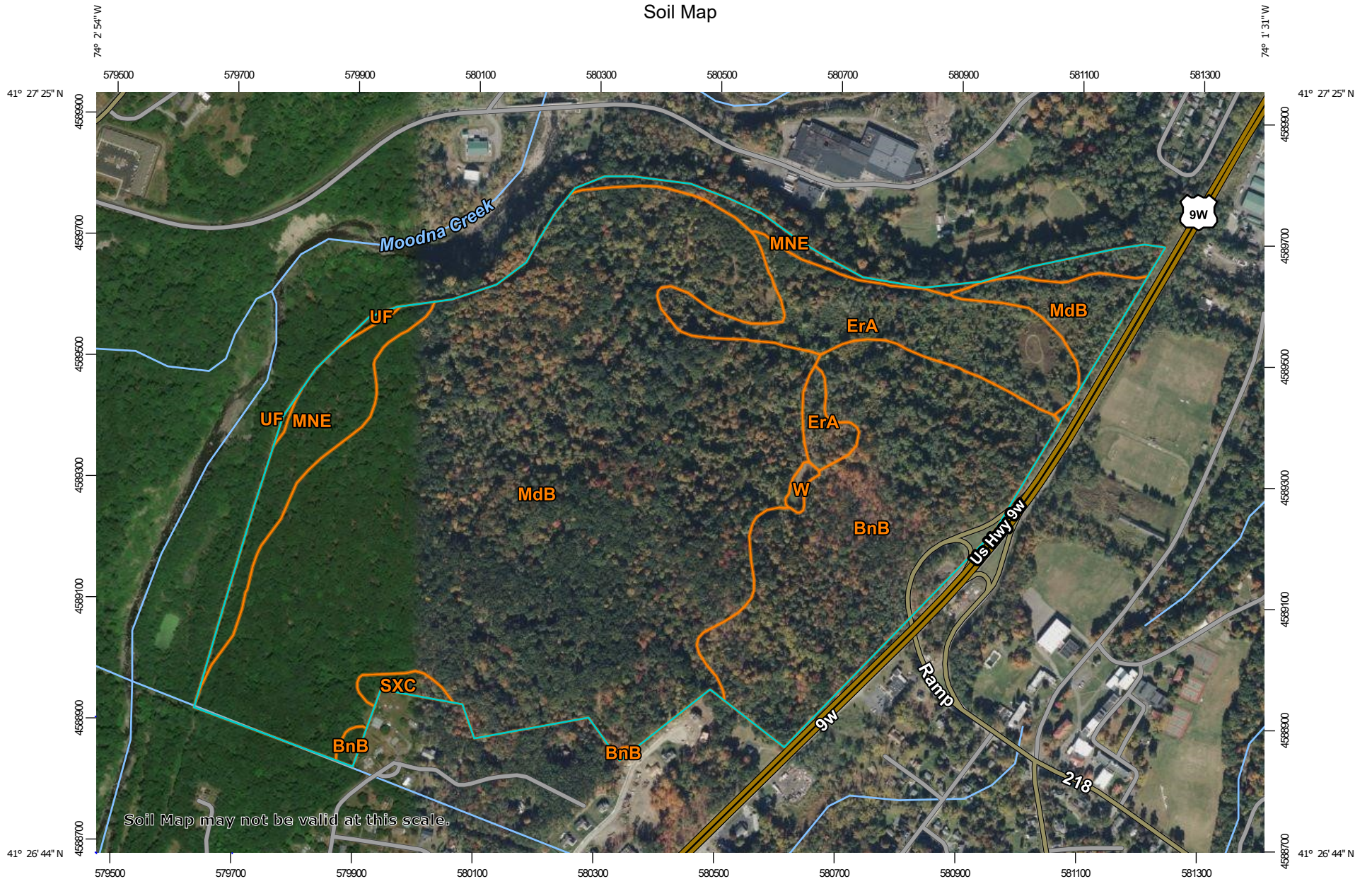
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

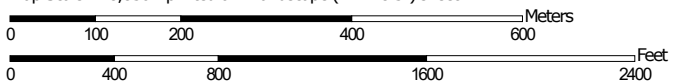
Soil Map

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: 1:8,850 if printed on A landscape (11" x 8.5") sheet.



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

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils







 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


Water Features

 Streams and Canals

Transportation

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

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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: Orange County, New York
 Survey Area Data: Version 22, Aug 29, 2021

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

Date(s) aerial images were photographed: Oct 7, 2013—Oct 14, 2020

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
BnB	Bath-Nassau channery silt loams, 3 to 8 percent slopes	47.5	20.0%
ErA	Erie gravelly silt loam, 0 to 3 percent slopes	19.9	8.4%
MdB	Mardin gravelly silt loam, 3 to 8 percent slopes	153.1	64.5%
MNE	Mardin soils, steep	14.5	6.1%
SXC	Swartwood and Mardin soils, sloping, very stony	1.3	0.5%
UF	Udifulvents-Fluvaquents complex, frequently flooded	0.4	0.2%
W	Water	0.5	0.2%
Totals for Area of Interest		237.1	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

Custom Soil Resource Report

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.

Orange County, New York

BnB—Bath-Nassau channery silt loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9vtn
Elevation: 600 to 1,800 feet
Mean annual precipitation: 42 to 52 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 135 to 215 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Bath and similar soils: 50 percent
Nassau and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bath

Setting

Landform: Drumlinoid ridges, hills, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from gray and brown siltstone, sandstone, and shale

Typical profile

H1 - 0 to 9 inches: channery silt loam
H2 - 9 to 29 inches: channery silt loam
H3 - 29 to 53 inches: very channery silt loam
H4 - 53 to 57 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 22 to 38 inches to fragipan; 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 24 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F140XY030NY - Well Drained Dense Till
Hydric soil rating: No

Description of Nassau

Setting

Landform: Benches, ridges, till plains

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Crest

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Channery loamy till derived mainly from local slate or shale

Typical profile

H1 - 0 to 10 inches: channery silt loam

H2 - 10 to 19 inches: very channery silt loam

H3 - 19 to 23 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Drainage class: Somewhat excessively drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3s

Hydrologic Soil Group: D

Ecological site: F144AY033MA - Shallow Dry Till Uplands

Hydric soil rating: No

Minor Components

Lordstown

Percent of map unit: 9 percent

Hydric soil rating: No

Mardin

Percent of map unit: 5 percent

Hydric soil rating: No

Erie

Percent of map unit: 5 percent

Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent

Hydric soil rating: Unranked

ErA—Erie gravelly silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9vv8

Elevation: 100 to 1,360 feet

Mean annual precipitation: 42 to 52 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 135 to 215 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Erie and similar soils: 75 percent

Minor components: 25 percent

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

Description of Erie

Setting

Landform: Drumlinoid ridges, hills, till plains

Landform position (two-dimensional): Summit, footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave

Across-slope shape: Linear

Parent material: Loamy till derived from siltstone, sandstone, shale, and limestone

Typical profile

H1 - 0 to 10 inches: gravelly silt loam

H2 - 10 to 18 inches: channery silt loam

H3 - 18 to 56 inches: channery silt loam

H4 - 56 to 70 inches: channery silt loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 10 to 21 inches to fragipan

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: D

Ecological site: F144AY037MA - Moist Dense Till Uplands

Hydric soil rating: No

Minor Components

Wurtsboro

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

Bath

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

Mardin

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

Alden

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Swartswood

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

MdB—Mardin gravelly silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2v30j
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Mardin

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till

Typical profile

Ap - 0 to 8 inches: gravelly silt loam

Custom Soil Resource Report

Bw - 8 to 15 inches: gravelly silt loam
E - 15 to 20 inches: gravelly silt loam
Bx - 20 to 72 inches: gravelly silt loam

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 14 to 26 inches to fragipan
Drainage class: Moderately well drained
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 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
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: D
Ecological site: F144AY008CT - Moist Till Uplands
Hydric soil rating: No

Minor Components

Volusia

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluvium, base slope, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Lordstown

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Mountaintop, interfluvium, crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Bath

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluvium, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

MNE—Mardin soils, steep

Map Unit Setting

National map unit symbol: 2v30q
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Mardin

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till

Typical profile

A - 0 to 4 inches: gravelly silt loam
Bw - 4 to 15 inches: gravelly silt loam
E - 15 to 20 inches: gravelly silt loam
Bx - 20 to 72 inches: gravelly silt loam

Properties and qualities

Slope: 25 to 35 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 14 to 26 inches to fragipan
Drainage class: Moderately well drained
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 13 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: F144AY008CT - Moist Till Uplands
Hydric soil rating: No

Minor Components

Bath

Percent of map unit: 8 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lordstown, very stony

Percent of map unit: 7 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, nose slope, side slope, free face
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Volusia

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Head slope, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

SXC—Swartswood and Mardin soils, sloping, very stony

Map Unit Setting

National map unit symbol: 2v30r
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Swartswood, very stony, and similar soils: 41 percent
Mardin, very stony, and similar soils: 39 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Swartswood, Very Stony

Setting

Landform: Hills, till plains

Custom Soil Resource Report

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Crest

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy till derived mainly from quartzite, conglomerate, and sandstone

Typical profile

H1 - 0 to 3 inches: gravelly loam

H2 - 3 to 31 inches: gravelly fine sandy loam

H3 - 31 to 60 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 20 to 36 inches to fragipan

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)

Depth to water table: About 23 to 31 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: C

Ecological site: F140XY030NY - Well Drained Dense Till

Hydric soil rating: No

Description of Mardin, Very Stony

Setting

Landform: Hills, mountains

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Loamy till

Typical profile

A - 0 to 4 inches: gravelly silt loam

Bw - 4 to 15 inches: gravelly silt loam

E - 15 to 20 inches: gravelly silt loam

Bx - 20 to 72 inches: gravelly silt loam

Properties and qualities

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 14 to 26 inches to fragipan

Drainage class: Moderately well drained

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 13 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Custom Soil Resource Report

Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: D

Ecological site: F144AY008CT - Moist Till Uplands

Hydric soil rating: No

Minor Components

Wurtsboro, very stony

Percent of map unit: 5 percent

Landform: Hills, till plains

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Crest

Down-slope shape: Concave

Across-slope shape: Convex

Hydric soil rating: No

Bath, very stony

Percent of map unit: 5 percent

Landform: Hills, mountains

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Nose slope, side slope

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Volusia, very stony

Percent of map unit: 5 percent

Landform: Hills, mountains

Landform position (two-dimensional): Footslope, summit

Landform position (three-dimensional): Side slope, interfluvial, base slope

Down-slope shape: Concave

Across-slope shape: Linear

Hydric soil rating: No

Lordstown

Percent of map unit: 5 percent

Landform: Mountains, hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Mountainflank, nose slope, side slope

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

UF—Udifluvents-Fluvaquents complex, frequently flooded

Map Unit Setting

National map unit symbol: 9vxb
Elevation: 100 to 3,000 feet
Mean annual precipitation: 42 to 52 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 135 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Udifluvents, frequently flooded, and similar soils: 45 percent
Fluvaquents and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udifluvents, Frequently Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium with a wide range of texture

Typical profile

H1 - 0 to 4 inches: gravelly loam
H2 - 4 to 70 inches: very gravelly sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 5.95 in/hr)
Depth to water table: About 24 to 72 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A
Hydric soil rating: No

Description of Fluvaquents

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium with highly variable texture

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 70 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: NoneFrequent
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

Minor Components

Canandaigua

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Humaquepts

Percent of map unit: 5 percent
Landform: Swamps, marshes
Hydric soil rating: Yes

Palms

Percent of map unit: 5 percent
Landform: Marshes, swamps
Hydric soil rating: Yes

Wayland

Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

Walkill

Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

W—Water

Map Unit Setting

National map unit symbol: 9vxh

Mean annual precipitation: 42 to 52 inches

Mean annual air temperature: 46 to 52 degrees F

Frost-free period: 135 to 215 days

Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent

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

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Geotechnical Terms and Symbols



245 Main Street; Suite 110
 Chester, NJ 07930
 908-879-9229: Fax 908-879-0222

GEOTECHNICAL TERMS AND SYMBOLS

SAMPLE IDENTIFICATION

The Unified Soil Classification System is used to identify the soil unless otherwise noted.

SOIL PROPERTY SYMBOLS

- N: Standard Penetration Value: Blows per ft. or a 140 lb. hammer falling 30" on a 2" O.D. split- spoon.
- Qu: Unconfined compressive strength, TSF.
- Qp: Penetrometer value, unconfined compressive strength, TSF.
- Mc: Moisture content, %
- LL: Liquid limit, %
- PI: Plasticity index, %
- δd: Natural dry density, PCF.
- ▼: Apparent groundwater level at time noted after completion of boring.
- =

DRILLING AND SAMPLING SYMBOLS

- NE: Not Encountered (Groundwater was not encountered)
- SS: Split-Spoon – 1½" I.D., 2" O.D., except where noted
- ST: Shelby Tube – 3" O.D., except where noted
- AU: Auger Sample
- OB: Diamond Bit
- CB: Carbide Bit
- WS: Washed Sample

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

<u>Term (Non-Cohesive Soils)</u>	<u>Standard Penetration Resistance</u>
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

<u>Term (Cohesive Soils)</u>	<u>Qu (TSF)</u>
Very Soft	0-0.25
Soft	0.25-0.50
Firm (Medium)	0.50-1.00
Stiff	1.00-2.00
Very Stiff	2.00-4.00
Hard	4.00 +

PARTICLE SIZE

Boulders	8 in. +	Coarse Sand	5mm-0.6mm	Silt	0.074mm-0.005mm
Cobbles	8 in. – 3 in.	Medium Sand	0.6mm-0.2mm	Clay	- 0.005mm
Gravel	3 in. – 5mm	Fine Sand	0.2mm – 0.074mm		

USCS Standard Classification System

UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2488

MAJOR DIVISION		GROUP SYMBOL	LETTER SYMBOL	GROUP NAME	
COARSE GRAINED SOILS CONTAINS MORE THAN 50% FINES	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVEL WITH * 5% FINES		GW	Well-graded GRAVEL
				GP	Poorly graded GRAVEL
		GRAVEL WITH BETWEEN 5% AND 15% FINES		GW-GM	Well-graded GRAVEL with silt
				GW-GC	Well-graded GRAVEL with clay
				GP-GM	Poorly graded GRAVEL with silt
				GP-GC	Poorly graded GRAVEL with clay
	GRAVEL WITH ≥ 15% FINES		GM	Silty GRAVEL	
			GC	Clayey GRAVEL	
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SAND WITH * 5% FINES		SW	Well-graded SAND
				SP	Poorly graded SAND
		SAND WITH BETWEEN 5% AND 15% FINES		SW-SM	Well-graded SAND with silt
				SW-SC	Well-graded SAND with clay
				SP-SM	Poorly graded SAND with silt
				SP-SC	Poorly graded SAND with clay
SAND WITH ≥ 15% FINES			SM	Silty SAND	
			SC	Clayey SAND	
FINE GRAINED SOILS CONTAINS MORE THAN 50% FINES	SILT AND CLAY		ML	Inorganic SILT with low plasticity	
			CL	Lean inorganic CLAY with low plasticity	
			OL	Organic SILT with low plasticity	
	LIQUID LIMIT GREATER THAN 50		MH	Elastic inorganic SILT with moderate to high plasticity	
			CH	Fat inorganic CLAY with moderate to high plasticity	
			OH	Organic SILT or CLAY with moderate to high plasticity	
HIGHLY ORGANIC SOILS			PT	PEAT soils with high organic contents	

NOTES:

- 1) Sample descriptions are based on visual field and laboratory observations using classification methods of ASTM D2488. Where laboratory data are available, classifications are in accordance with ASTM D2487.
- 2) Solid lines between soil descriptions indicate change in interpreted geologic unit. Dashed lines indicate stratigraphic change within the unit.
- 3) Fines are material passing the U.S. Std. #200 Sieve.

**EXISTING AND PROPOSED HYDROGRAPHS – 1, 10-, & 100
YEAR STORM**

2023-07-Existing

Prepared by Dynamic Engineering

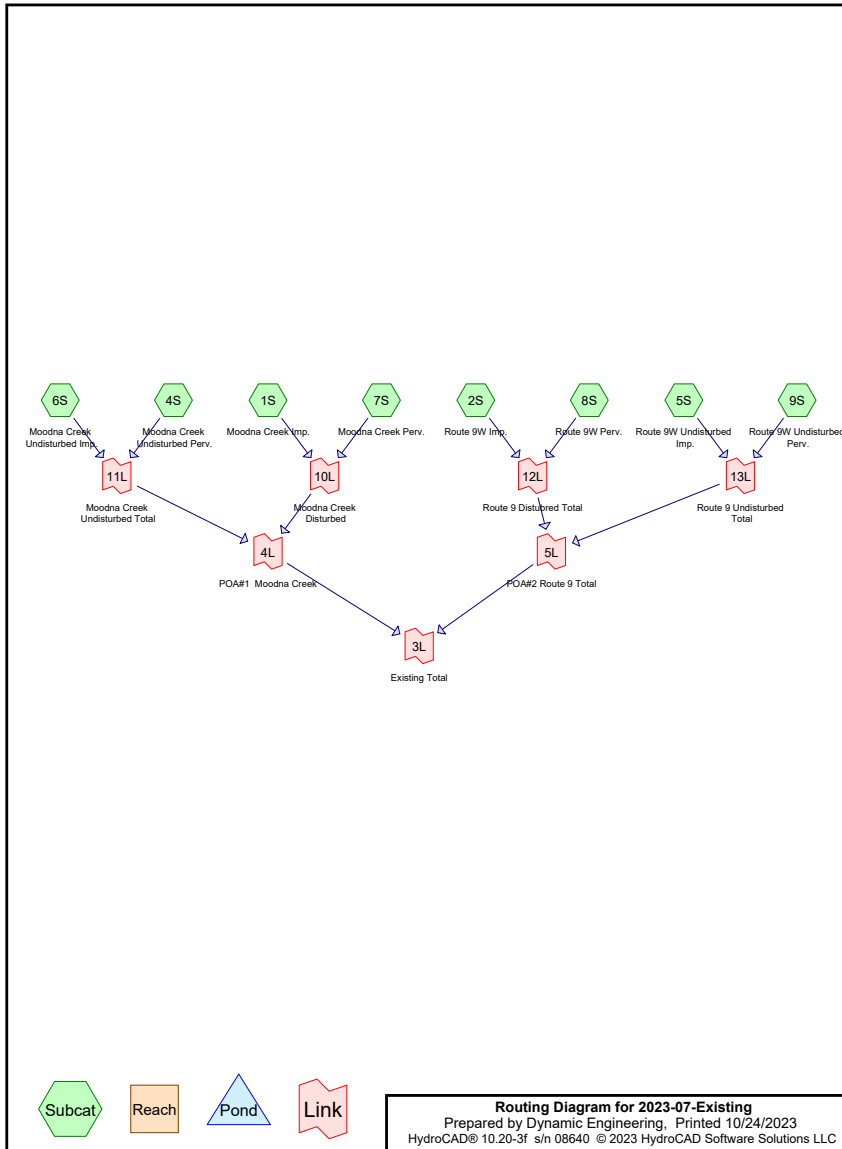
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Printed 10/24/2023

Page 2

Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 7083 NY Orange



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Printed 10/24/2023

Page 3

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	NRCC 24-hr	C	Default	24.00	1	2.64	2
2	10-Year	NRCC 24-hr	C	Default	24.00	1	4.80	2
3	100-Year	NRCC 24-hr	C	Default	24.00	1	8.57	2

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Printed 10/24/2023

Page 4

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.350	98	Impervious (1S, 2S, 5S, 6S)
15.790	70	Woods, Good, HSG C (4S, 7S, 8S, 9S)
175.530	77	Woods, Good, HSG D (4S, 7S, 8S, 9S)
197.670	77	TOTAL AREA

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Printed 10/24/2023

Page 5

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
15.790	HSG C	4S, 7S, 8S, 9S
175.530	HSG D	4S, 7S, 8S, 9S
6.350	Other	1S, 2S, 5S, 6S
197.670		TOTAL AREA

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Printed 10/24/2023

Page 6

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	6.350	6.350	Impervious	1S, 2S, 5S, 6S
0.000	0.000	15.790	175.530	0.000	191.320	Woods, Good	4S, 7S, 8S, 9S
0.000	0.000	15.790	175.530	6.350	197.670	TOTAL AREA	

2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Printed 10/24/2023
Page 7

Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	Rainfall events imported from "NRCS-Rain.txt" for 7083 NY Orange

2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 8

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Moodna Creek Imp.	Runoff Area=3.240 ac 100.00% Impervious Runoff Depth=2.41" Flow Length=2,675' Tc=40.5 min CN=98 Runoff=3.92 cfs 0.651 af
Subcatchment2S: Route 9W Imp.	Runoff Area=0.820 ac 100.00% Impervious Runoff Depth=2.41" Flow Length=843' Tc=24.6 min CN=98 Runoff=1.29 cfs 0.165 af
Subcatchment4S: Moodna Creek	Runoff Area=40.670 ac 0.00% Impervious Runoff Depth=0.82" Flow Length=941' Tc=18.3 min CN=WQ Runoff=26.00 cfs 2.774 af
Subcatchment5S: Route 9W Undisturbed	Runoff Area=0.890 ac 100.00% Impervious Runoff Depth=2.41" Flow Length=1,066' Tc=10.5 min CN=98 Runoff=1.98 cfs 0.179 af
Subcatchment6S: Moodna Creek	Runoff Area=1.400 ac 100.00% Impervious Runoff Depth=2.41" Flow Length=941' Tc=18.3 min CN=98 Runoff=2.52 cfs 0.281 af
Subcatchment7S: Moodna Creek Perv.	Runoff Area=101.430 ac 0.00% Impervious Runoff Depth=0.82" Flow Length=2,675' Tc=40.5 min CN=WQ Runoff=42.64 cfs 6.956 af
Subcatchment8S: Route 9W Perv.	Runoff Area=32.180 ac 0.00% Impervious Runoff Depth=0.76" Flow Length=843' Tc=24.6 min CN=WQ Runoff=16.13 cfs 2.041 af
Subcatchment9S: Route 9W Undisturbed	Runoff Area=17.040 ac 0.00% Impervious Runoff Depth=0.74" Flow Length=1,066' Tc=10.5 min CN=WQ Runoff=12.26 cfs 1.052 af
Link 3L: Existing Total	Inflow=84.06 cfs 14.098 af Primary=84.06 cfs 14.098 af
Link 4L: POA#1 Moodna Creek	Inflow=61.64 cfs 10.662 af Primary=61.64 cfs 10.662 af
Link 5L: POA#2 Route 9 Total	Inflow=25.95 cfs 3.436 af Primary=25.95 cfs 3.436 af
Link 10L: Moodna Creek Disturbed	Inflow=46.49 cfs 7.607 af Primary=46.49 cfs 7.607 af
Link 11L: Moodna Creek Undisturbed Total	Inflow=28.48 cfs 3.055 af Primary=28.48 cfs 3.055 af
Link 12L: Route 9 Disturbed Total	Inflow=17.43 cfs 2.205 af Primary=17.43 cfs 2.205 af
Link 13L: Route 9 Undisturbed Total	Inflow=14.22 cfs 1.231 af Primary=14.22 cfs 1.231 af
Total Runoff Area = 197.670 ac Runoff Volume = 14.098 af Average Runoff Depth = 0.86" 96.79% Pervious = 191.320 ac 3.21% Impervious = 6.350 ac	

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 9

Summary for Subcatchment 1S: Moodna Creek Imp.

Runoff = 3.92 cfs @ 12.54 hrs, Volume= 0.651 af, Depth= 2.41"
 Routed to Link 10L : Moodna Creek Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
* 3.240	98	Impervious
3.240		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0360	0.08		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	262	0.0541	3.74		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
6.4	699	0.0129	1.83		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	302	0.0331	2.93		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.2	315	0.0706	4.28		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
1.5	428	0.0864	4.73		Shallow Concentrated Flow, FG Unpaved Kv= 16.1 fps
7.7	481	0.0042	1.04		Shallow Concentrated Flow, GH Unpaved Kv= 16.1 fps
0.3	88	0.0684	4.21		Shallow Concentrated Flow, HI Unpaved Kv= 16.1 fps
40.5	2,675	Total			

2023-07-Existing

Prepared by Dynamic Engineering

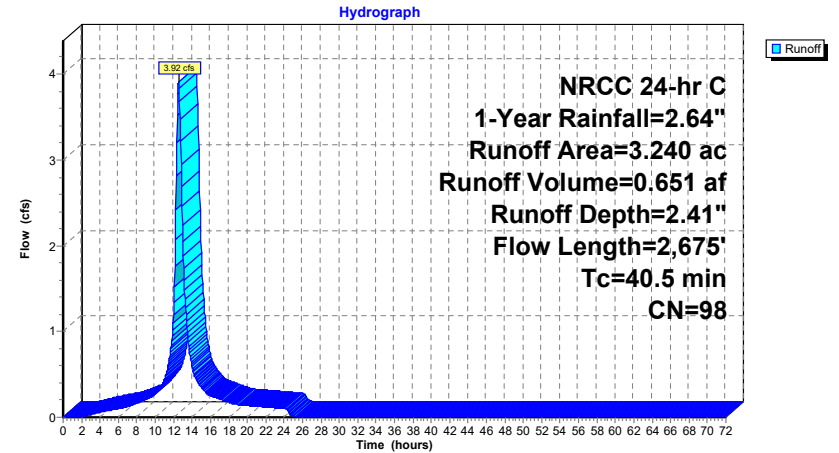
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 10

Subcatchment 1S: Moodna Creek Imp.



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 11

Hydrograph for Subcatchment 1S: Moodna Creek Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	2.41	0.00
1.00	0.03	0.00	0.00	53.00	2.64	2.41	0.00
2.00	0.06	0.00	0.01	54.00	2.64	2.41	0.00
3.00	0.10	0.01	0.03	55.00	2.64	2.41	0.00
4.00	0.14	0.03	0.06	56.00	2.64	2.41	0.00
5.00	0.18	0.06	0.08	57.00	2.64	2.41	0.00
6.00	0.23	0.09	0.10	58.00	2.64	2.41	0.00
7.00	0.28	0.13	0.13	59.00	2.64	2.41	0.00
8.00	0.34	0.18	0.17	60.00	2.64	2.41	0.00
9.00	0.42	0.25	0.21	61.00	2.64	2.41	0.00
10.00	0.52	0.34	0.29	62.00	2.64	2.41	0.00
11.00	0.68	0.49	0.44	63.00	2.64	2.41	0.00
12.00	1.26	1.04	1.20	64.00	2.64	2.41	0.00
13.00	1.96	1.73	2.05	65.00	2.64	2.41	0.00
14.00	2.12	1.89	0.59	66.00	2.64	2.41	0.00
15.00	2.22	1.99	0.35	67.00	2.64	2.41	0.00
16.00	2.30	2.07	0.25	68.00	2.64	2.41	0.00
17.00	2.36	2.13	0.21	69.00	2.64	2.41	0.00
18.00	2.41	2.18	0.18	70.00	2.64	2.41	0.00
19.00	2.46	2.23	0.15	71.00	2.64	2.41	0.00
20.00	2.50	2.27	0.14	72.00	2.64	2.41	0.00
21.00	2.54	2.31	0.13				
22.00	2.58	2.35	0.12				
23.00	2.61	2.38	0.11				
24.00	2.64	2.41	0.10				
25.00	2.64	2.41	0.01				
26.00	2.64	2.41	0.00				
27.00	2.64	2.41	0.00				
28.00	2.64	2.41	0.00				
29.00	2.64	2.41	0.00				
30.00	2.64	2.41	0.00				
31.00	2.64	2.41	0.00				
32.00	2.64	2.41	0.00				
33.00	2.64	2.41	0.00				
34.00	2.64	2.41	0.00				
35.00	2.64	2.41	0.00				
36.00	2.64	2.41	0.00				
37.00	2.64	2.41	0.00				
38.00	2.64	2.41	0.00				
39.00	2.64	2.41	0.00				
40.00	2.64	2.41	0.00				
41.00	2.64	2.41	0.00				
42.00	2.64	2.41	0.00				
43.00	2.64	2.41	0.00				
44.00	2.64	2.41	0.00				
45.00	2.64	2.41	0.00				
46.00	2.64	2.41	0.00				
47.00	2.64	2.41	0.00				
48.00	2.64	2.41	0.00				
49.00	2.64	2.41	0.00				
50.00	2.64	2.41	0.00				
51.00	2.64	2.41	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 12

Summary for Subcatchment 2S: Route 9W Imp.

Runoff = 1.29 cfs @ 12.34 hrs, Volume= 0.165 af, Depth= 2.41"
Routed to Link 12L : Route 9 Disturbed Total

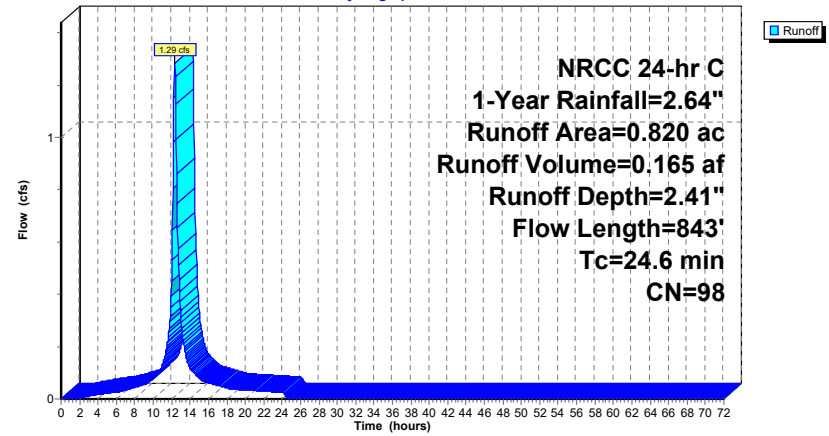
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
* 0.820	98	Impervious
0.820		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	73	0.0550	0.09		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
11.1	770	0.0052	1.16		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
24.6	843	Total			

Subcatchment 2S: Route 9W Imp.

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 13

Hydrograph for Subcatchment 2S: Route 9W Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	2.41	0.00
1.00	0.03	0.00	0.00	53.00	2.64	2.41	0.00
2.00	0.06	0.00	0.00	54.00	2.64	2.41	0.00
3.00	0.10	0.01	0.01	55.00	2.64	2.41	0.00
4.00	0.14	0.03	0.02	56.00	2.64	2.41	0.00
5.00	0.18	0.06	0.02	57.00	2.64	2.41	0.00
6.00	0.23	0.09	0.03	58.00	2.64	2.41	0.00
7.00	0.28	0.13	0.03	59.00	2.64	2.41	0.00
8.00	0.34	0.18	0.04	60.00	2.64	2.41	0.00
9.00	0.42	0.25	0.05	61.00	2.64	2.41	0.00
10.00	0.52	0.34	0.08	62.00	2.64	2.41	0.00
11.00	0.68	0.49	0.13	63.00	2.64	2.41	0.00
12.00	1.26	1.04	0.45	64.00	2.64	2.41	0.00
13.00	1.96	1.73	0.31	65.00	2.64	2.41	0.00
14.00	2.12	1.89	0.12	66.00	2.64	2.41	0.00
15.00	2.22	1.99	0.08	67.00	2.64	2.41	0.00
16.00	2.30	2.07	0.06	68.00	2.64	2.41	0.00
17.00	2.36	2.13	0.05	69.00	2.64	2.41	0.00
18.00	2.41	2.18	0.04	70.00	2.64	2.41	0.00
19.00	2.46	2.23	0.04	71.00	2.64	2.41	0.00
20.00	2.50	2.27	0.03	72.00	2.64	2.41	0.00
21.00	2.54	2.31	0.03				
22.00	2.58	2.35	0.03				
23.00	2.61	2.38	0.03				
24.00	2.64	2.41	0.02				
25.00	2.64	2.41	0.00				
26.00	2.64	2.41	0.00				
27.00	2.64	2.41	0.00				
28.00	2.64	2.41	0.00				
29.00	2.64	2.41	0.00				
30.00	2.64	2.41	0.00				
31.00	2.64	2.41	0.00				
32.00	2.64	2.41	0.00				
33.00	2.64	2.41	0.00				
34.00	2.64	2.41	0.00				
35.00	2.64	2.41	0.00				
36.00	2.64	2.41	0.00				
37.00	2.64	2.41	0.00				
38.00	2.64	2.41	0.00				
39.00	2.64	2.41	0.00				
40.00	2.64	2.41	0.00				
41.00	2.64	2.41	0.00				
42.00	2.64	2.41	0.00				
43.00	2.64	2.41	0.00				
44.00	2.64	2.41	0.00				
45.00	2.64	2.41	0.00				
46.00	2.64	2.41	0.00				
47.00	2.64	2.41	0.00				
48.00	2.64	2.41	0.00				
49.00	2.64	2.41	0.00				
50.00	2.64	2.41	0.00				
51.00	2.64	2.41	0.00				

2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 14

Summary for Subcatchment 4S: Moodna Creek Undisturbed Perv.

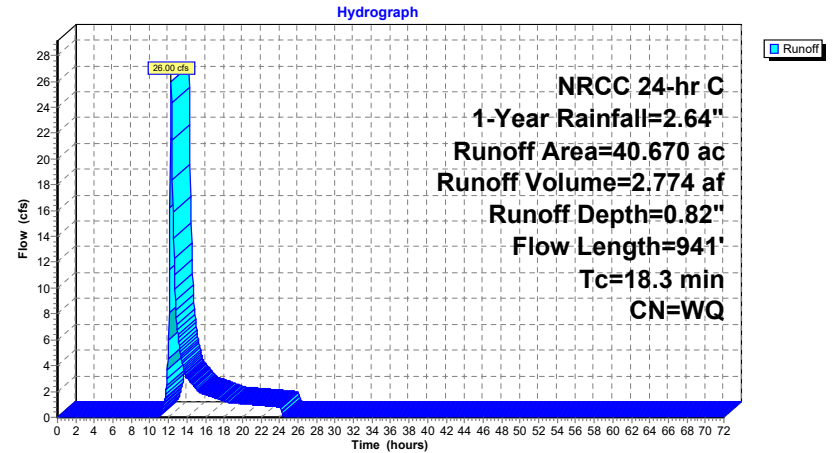
Runoff = 26.00 cfs @ 12.29 hrs, Volume= 2.774 af, Depth= 0.82"
Routed to Link 11L : Moodna Creek Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
39.200	77	Woods, Good, HSG D
1.470	70	Woods, Good, HSG C
40.670		Weighted Average
40.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0950	0.12		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	244	0.0471	3.49		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
1.5	206	0.0194	2.24		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	391	0.0562	3.82		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
18.3	941				Total

Subcatchment 4S: Moodna Creek Undisturbed Perv.



2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 15

Hydrograph for Subcatchment 4S: Moodna Creek Undisturbed Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	0.83	0.00
1.00	0.03	0.00	0.00	53.00	2.64	0.83	0.00
2.00	0.06	0.00	0.00	54.00	2.64	0.83	0.00
3.00	0.10	0.00	0.00	55.00	2.64	0.83	0.00
4.00	0.14	0.00	0.00	56.00	2.64	0.83	0.00
5.00	0.18	0.00	0.00	57.00	2.64	0.83	0.00
6.00	0.23	0.00	0.00	58.00	2.64	0.83	0.00
7.00	0.28	0.00	0.00	59.00	2.64	0.83	0.00
8.00	0.34	0.00	0.00	60.00	2.64	0.83	0.00
9.00	0.42	0.00	0.00	61.00	2.64	0.83	0.00
10.00	0.52	0.00	0.00	62.00	2.64	0.83	0.00
11.00	0.68	0.00	0.15	63.00	2.64	0.83	0.00
12.00	1.26	0.12	5.95	64.00	2.64	0.83	0.00
13.00	1.96	0.43	6.43	65.00	2.64	0.83	0.00
14.00	2.12	0.51	3.05	66.00	2.64	0.83	0.00
15.00	2.22	0.57	2.20	67.00	2.64	0.83	0.00
16.00	2.30	0.62	1.75	68.00	2.64	0.83	0.00
17.00	2.36	0.65	1.50	69.00	2.64	0.83	0.00
18.00	2.41	0.69	1.24	70.00	2.64	0.83	0.00
19.00	2.46	0.71	1.11	71.00	2.64	0.83	0.00
20.00	2.50	0.74	1.05	72.00	2.64	0.83	0.00
21.00	2.54	0.77	0.99				
22.00	2.58	0.79	0.92				
23.00	2.61	0.81	0.86				
24.00	2.64	0.83	0.79				
25.00	2.64	0.83	0.00				
26.00	2.64	0.83	0.00				
27.00	2.64	0.83	0.00				
28.00	2.64	0.83	0.00				
29.00	2.64	0.83	0.00				
30.00	2.64	0.83	0.00				
31.00	2.64	0.83	0.00				
32.00	2.64	0.83	0.00				
33.00	2.64	0.83	0.00				
34.00	2.64	0.83	0.00				
35.00	2.64	0.83	0.00				
36.00	2.64	0.83	0.00				
37.00	2.64	0.83	0.00				
38.00	2.64	0.83	0.00				
39.00	2.64	0.83	0.00				
40.00	2.64	0.83	0.00				
41.00	2.64	0.83	0.00				
42.00	2.64	0.83	0.00				
43.00	2.64	0.83	0.00				
44.00	2.64	0.83	0.00				
45.00	2.64	0.83	0.00				
46.00	2.64	0.83	0.00				
47.00	2.64	0.83	0.00				
48.00	2.64	0.83	0.00				
49.00	2.64	0.83	0.00				
50.00	2.64	0.83	0.00				
51.00	2.64	0.83	0.00				

2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 16

Summary for Subcatchment 5S: Route 9W Undisturbed Imp.

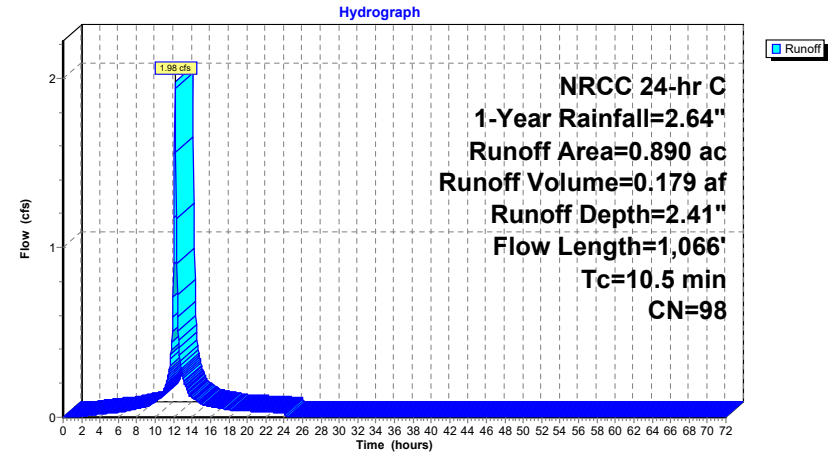
Runoff = 1.98 cfs @ 12.18 hrs, Volume= 0.179 af, Depth= 2.41"
Routed to Link 13L : Route 9 Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
* 0.890	98	Impervious
0.890		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	10	0.0275	0.05		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
0.2	67	0.0784	4.51		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
3.8	340	0.0088	1.51		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.5	311	0.0451	3.42		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.4	338	0.0621	4.01		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
10.5	1,066	Total			

Subcatchment 5S: Route 9W Undisturbed Imp.



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 17

Hydrograph for Subcatchment 5S: Route 9W Undisturbed Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	2.41	0.00
1.00	0.03	0.00	0.00	53.00	2.64	2.41	0.00
2.00	0.06	0.00	0.00	54.00	2.64	2.41	0.00
3.00	0.10	0.01	0.01	55.00	2.64	2.41	0.00
4.00	0.14	0.03	0.02	56.00	2.64	2.41	0.00
5.00	0.18	0.06	0.02	57.00	2.64	2.41	0.00
6.00	0.23	0.09	0.03	58.00	2.64	2.41	0.00
7.00	0.28	0.13	0.04	59.00	2.64	2.41	0.00
8.00	0.34	0.18	0.05	60.00	2.64	2.41	0.00
9.00	0.42	0.25	0.06	61.00	2.64	2.41	0.00
10.00	0.52	0.34	0.09	62.00	2.64	2.41	0.00
11.00	0.68	0.49	0.17	63.00	2.64	2.41	0.00
12.00	1.26	1.04	0.90	64.00	2.64	2.41	0.00
13.00	1.96	1.73	0.24	65.00	2.64	2.41	0.00
14.00	2.12	1.89	0.12	66.00	2.64	2.41	0.00
15.00	2.22	1.99	0.08	67.00	2.64	2.41	0.00
16.00	2.30	2.07	0.06	68.00	2.64	2.41	0.00
17.00	2.36	2.13	0.05	69.00	2.64	2.41	0.00
18.00	2.41	2.18	0.04	70.00	2.64	2.41	0.00
19.00	2.46	2.23	0.04	71.00	2.64	2.41	0.00
20.00	2.50	2.27	0.04	72.00	2.64	2.41	0.00
21.00	2.54	2.31	0.03				
22.00	2.58	2.35	0.03				
23.00	2.61	2.38	0.03				
24.00	2.64	2.41	0.03				
25.00	2.64	2.41	0.00				
26.00	2.64	2.41	0.00				
27.00	2.64	2.41	0.00				
28.00	2.64	2.41	0.00				
29.00	2.64	2.41	0.00				
30.00	2.64	2.41	0.00				
31.00	2.64	2.41	0.00				
32.00	2.64	2.41	0.00				
33.00	2.64	2.41	0.00				
34.00	2.64	2.41	0.00				
35.00	2.64	2.41	0.00				
36.00	2.64	2.41	0.00				
37.00	2.64	2.41	0.00				
38.00	2.64	2.41	0.00				
39.00	2.64	2.41	0.00				
40.00	2.64	2.41	0.00				
41.00	2.64	2.41	0.00				
42.00	2.64	2.41	0.00				
43.00	2.64	2.41	0.00				
44.00	2.64	2.41	0.00				
45.00	2.64	2.41	0.00				
46.00	2.64	2.41	0.00				
47.00	2.64	2.41	0.00				
48.00	2.64	2.41	0.00				
49.00	2.64	2.41	0.00				
50.00	2.64	2.41	0.00				
51.00	2.64	2.41	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 18

Summary for Subcatchment 6S: Moodna Creek Undisturbed Imp.

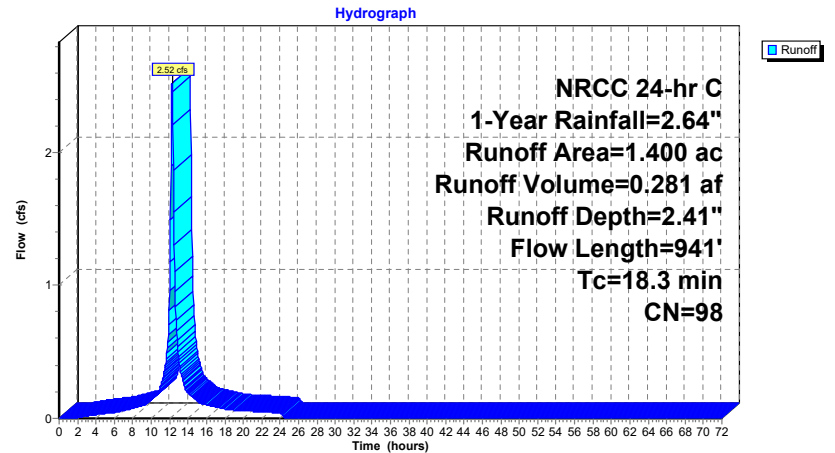
Runoff = 2.52 cfs @ 12.26 hrs, Volume= 0.281 af, Depth= 2.41"
 Routed to Link 11L : Moodna Creek Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
* 1.400	98	Impervious
1.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0950	0.12		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	244	0.0471	3.49		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
1.5	206	0.0194	2.24		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	391	0.0562	3.82		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
18.3	941	Total			

Subcatchment 6S: Moodna Creek Undisturbed Imp.



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 19

Hydrograph for Subcatchment 6S: Moodna Creek Undisturbed Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	2.41	0.00
1.00	0.03	0.00	0.00	53.00	2.64	2.41	0.00
2.00	0.06	0.00	0.01	54.00	2.64	2.41	0.00
3.00	0.10	0.01	0.02	55.00	2.64	2.41	0.00
4.00	0.14	0.03	0.03	56.00	2.64	2.41	0.00
5.00	0.18	0.06	0.04	57.00	2.64	2.41	0.00
6.00	0.23	0.09	0.05	58.00	2.64	2.41	0.00
7.00	0.28	0.13	0.06	59.00	2.64	2.41	0.00
8.00	0.34	0.18	0.08	60.00	2.64	2.41	0.00
9.00	0.42	0.25	0.10	61.00	2.64	2.41	0.00
10.00	0.52	0.34	0.14	62.00	2.64	2.41	0.00
11.00	0.68	0.49	0.24	63.00	2.64	2.41	0.00
12.00	1.26	1.04	0.96	64.00	2.64	2.41	0.00
13.00	1.96	1.73	0.44	65.00	2.64	2.41	0.00
14.00	2.12	1.89	0.19	66.00	2.64	2.41	0.00
15.00	2.22	1.99	0.13	67.00	2.64	2.41	0.00
16.00	2.30	2.07	0.10	68.00	2.64	2.41	0.00
17.00	2.36	2.13	0.09	69.00	2.64	2.41	0.00
18.00	2.41	2.18	0.07	70.00	2.64	2.41	0.00
19.00	2.46	2.23	0.06	71.00	2.64	2.41	0.00
20.00	2.50	2.27	0.06	72.00	2.64	2.41	0.00
21.00	2.54	2.31	0.05				
22.00	2.58	2.35	0.05				
23.00	2.61	2.38	0.05				
24.00	2.64	2.41	0.04				
25.00	2.64	2.41	0.00				
26.00	2.64	2.41	0.00				
27.00	2.64	2.41	0.00				
28.00	2.64	2.41	0.00				
29.00	2.64	2.41	0.00				
30.00	2.64	2.41	0.00				
31.00	2.64	2.41	0.00				
32.00	2.64	2.41	0.00				
33.00	2.64	2.41	0.00				
34.00	2.64	2.41	0.00				
35.00	2.64	2.41	0.00				
36.00	2.64	2.41	0.00				
37.00	2.64	2.41	0.00				
38.00	2.64	2.41	0.00				
39.00	2.64	2.41	0.00				
40.00	2.64	2.41	0.00				
41.00	2.64	2.41	0.00				
42.00	2.64	2.41	0.00				
43.00	2.64	2.41	0.00				
44.00	2.64	2.41	0.00				
45.00	2.64	2.41	0.00				
46.00	2.64	2.41	0.00				
47.00	2.64	2.41	0.00				
48.00	2.64	2.41	0.00				
49.00	2.64	2.41	0.00				
50.00	2.64	2.41	0.00				
51.00	2.64	2.41	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 20

Summary for Subcatchment 7S: Moodna Creek Perv.

Runoff = 42.64 cfs @ 12.60 hrs, Volume= 6.956 af, Depth= 0.82"
 Routed to Link 10L : Moodna Creek Disturbed

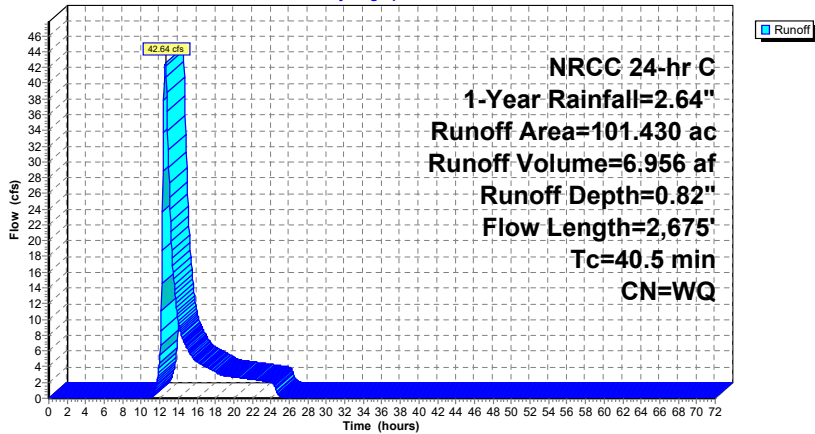
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
99.260	77	Woods, Good, HSG D
2.170	70	Woods, Good, HSG C
101.430		Weighted Average
101.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0360	0.08		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	262	0.0541	3.74		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
6.4	699	0.0129	1.83		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	302	0.0331	2.93		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.2	315	0.0706	4.28		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
1.5	428	0.0864	4.73		Shallow Concentrated Flow, FG Unpaved Kv= 16.1 fps
7.7	481	0.0042	1.04		Shallow Concentrated Flow, GH Unpaved Kv= 16.1 fps
0.3	88	0.0684	4.21		Shallow Concentrated Flow, HI Unpaved Kv= 16.1 fps
40.5	2,675	Total			

Subcatchment 7S: Moodna Creek Perv.

Hydrograph



Hydrograph for Subcatchment 7S: Moodna Creek Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	0.83	0.00
1.00	0.03	0.00	0.00	53.00	2.64	0.83	0.00
2.00	0.06	0.00	0.00	54.00	2.64	0.83	0.00
3.00	0.10	0.00	0.00	55.00	2.64	0.83	0.00
4.00	0.14	0.00	0.00	56.00	2.64	0.83	0.00
5.00	0.18	0.00	0.00	57.00	2.64	0.83	0.00
6.00	0.23	0.00	0.00	58.00	2.64	0.83	0.00
7.00	0.28	0.00	0.00	59.00	2.64	0.83	0.00
8.00	0.34	0.00	0.00	60.00	2.64	0.83	0.00
9.00	0.42	0.00	0.00	61.00	2.64	0.83	0.00
10.00	0.52	0.00	0.00	62.00	2.64	0.83	0.00
11.00	0.68	0.00	0.07	63.00	2.64	0.83	0.00
12.00	1.26	0.12	5.45	64.00	2.64	0.83	0.00
13.00	1.96	0.43	27.35	65.00	2.64	0.83	0.00
14.00	2.12	0.51	9.79	66.00	2.64	0.83	0.00
15.00	2.22	0.57	6.26	67.00	2.64	0.83	0.00
16.00	2.30	0.62	4.64	68.00	2.64	0.83	0.00
17.00	2.36	0.65	3.98	69.00	2.64	0.83	0.00
18.00	2.41	0.69	3.34	70.00	2.64	0.83	0.00
19.00	2.46	0.71	2.85	71.00	2.64	0.83	0.00
20.00	2.50	0.74	2.69	72.00	2.64	0.83	0.00
21.00	2.54	0.77	2.53				
22.00	2.58	0.79	2.37				
23.00	2.61	0.81	2.20				
24.00	2.64	0.83	2.03				
25.00	2.64	0.83	0.21				
26.00	2.64	0.83	0.00				
27.00	2.64	0.83	0.00				
28.00	2.64	0.83	0.00				
29.00	2.64	0.83	0.00				
30.00	2.64	0.83	0.00				
31.00	2.64	0.83	0.00				
32.00	2.64	0.83	0.00				
33.00	2.64	0.83	0.00				
34.00	2.64	0.83	0.00				
35.00	2.64	0.83	0.00				
36.00	2.64	0.83	0.00				
37.00	2.64	0.83	0.00				
38.00	2.64	0.83	0.00				
39.00	2.64	0.83	0.00				
40.00	2.64	0.83	0.00				
41.00	2.64	0.83	0.00				
42.00	2.64	0.83	0.00				
43.00	2.64	0.83	0.00				
44.00	2.64	0.83	0.00				
45.00	2.64	0.83	0.00				
46.00	2.64	0.83	0.00				
47.00	2.64	0.83	0.00				
48.00	2.64	0.83	0.00				
49.00	2.64	0.83	0.00				
50.00	2.64	0.83	0.00				
51.00	2.64	0.83	0.00				

2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 23

Summary for Subcatchment 8S: Route 9W Perv.

Runoff = 16.13 cfs @ 12.38 hrs, Volume= 2.041 af, Depth= 0.76"
Routed to Link 12L : Route 9 Distubred Total

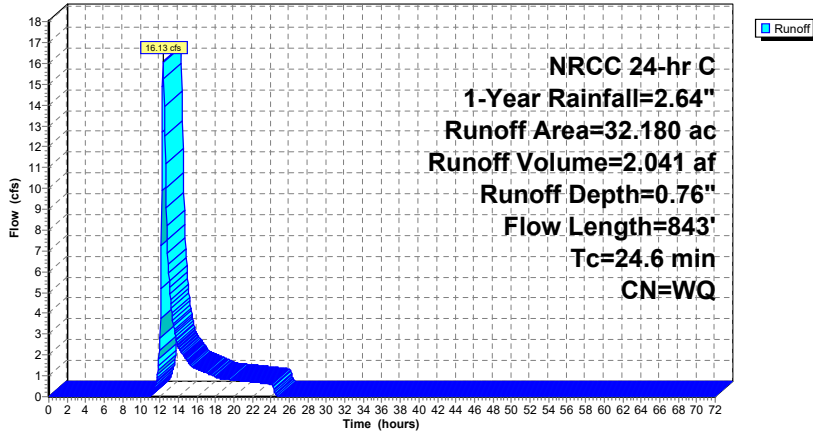
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
7.210	70	Woods, Good, HSG C
24.970	77	Woods, Good, HSG D
32.180		Weighted Average
32.180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	73	0.0550	0.09		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
11.1	770	0.0052	1.16		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
24.6	843				Total

Subcatchment 8S: Route 9W Perv.

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 24

Hydrograph for Subcatchment 8S: Route 9W Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	0.73	0.00
1.00	0.03	0.00	0.00	53.00	2.64	0.73	0.00
2.00	0.06	0.00	0.00	54.00	2.64	0.73	0.00
3.00	0.10	0.00	0.00	55.00	2.64	0.73	0.00
4.00	0.14	0.00	0.00	56.00	2.64	0.73	0.00
5.00	0.18	0.00	0.00	57.00	2.64	0.73	0.00
6.00	0.23	0.00	0.00	58.00	2.64	0.73	0.00
7.00	0.28	0.00	0.00	59.00	2.64	0.73	0.00
8.00	0.34	0.00	0.00	60.00	2.64	0.73	0.00
9.00	0.42	0.00	0.00	61.00	2.64	0.73	0.00
10.00	0.52	0.00	0.00	62.00	2.64	0.73	0.00
11.00	0.68	0.00	0.06	63.00	2.64	0.73	0.00
12.00	1.26	0.09	2.82	64.00	2.64	0.73	0.00
13.00	1.96	0.36	5.54	65.00	2.64	0.73	0.00
14.00	2.12	0.44	2.39	66.00	2.64	0.73	0.00
15.00	2.22	0.49	1.71	67.00	2.64	0.73	0.00
16.00	2.30	0.54	1.33	68.00	2.64	0.73	0.00
17.00	2.36	0.57	1.15	69.00	2.64	0.73	0.00
18.00	2.41	0.60	0.96	70.00	2.64	0.73	0.00
19.00	2.46	0.63	0.85	71.00	2.64	0.73	0.00
20.00	2.50	0.65	0.80	72.00	2.64	0.73	0.00
21.00	2.54	0.67	0.75				
22.00	2.58	0.70	0.70				
23.00	2.61	0.72	0.65				
24.00	2.64	0.73	0.60				
25.00	2.64	0.73	0.01				
26.00	2.64	0.73	0.00				
27.00	2.64	0.73	0.00				
28.00	2.64	0.73	0.00				
29.00	2.64	0.73	0.00				
30.00	2.64	0.73	0.00				
31.00	2.64	0.73	0.00				
32.00	2.64	0.73	0.00				
33.00	2.64	0.73	0.00				
34.00	2.64	0.73	0.00				
35.00	2.64	0.73	0.00				
36.00	2.64	0.73	0.00				
37.00	2.64	0.73	0.00				
38.00	2.64	0.73	0.00				
39.00	2.64	0.73	0.00				
40.00	2.64	0.73	0.00				
41.00	2.64	0.73	0.00				
42.00	2.64	0.73	0.00				
43.00	2.64	0.73	0.00				
44.00	2.64	0.73	0.00				
45.00	2.64	0.73	0.00				
46.00	2.64	0.73	0.00				
47.00	2.64	0.73	0.00				
48.00	2.64	0.73	0.00				
49.00	2.64	0.73	0.00				
50.00	2.64	0.73	0.00				
51.00	2.64	0.73	0.00				

2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 25

Summary for Subcatchment 9S: Route 9W Undisturbed Perv.

Runoff = 12.26 cfs @ 12.19 hrs, Volume= 1.052 af, Depth= 0.74"
Routed to Link 13L : Route 9 Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
4.940	70	Woods, Good, HSG C
12.100	77	Woods, Good, HSG D
17.040		Weighted Average
17.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	10	0.0275	0.05		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
0.2	67	0.0784	4.51		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
3.8	340	0.0088	1.51		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.5	311	0.0451	3.42		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.4	338	0.0621	4.01		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
10.5	1,066	Total			

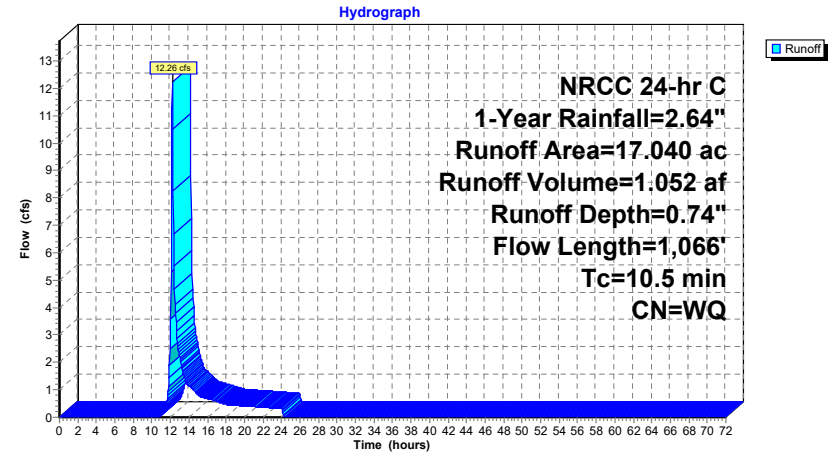
2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 26

Subcatchment 9S: Route 9W Undisturbed Perv.



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 27

Hydrograph for Subcatchment 9S: Route 9W Undisturbed Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	0.73	0.00
1.00	0.03	0.00	0.00	53.00	2.64	0.73	0.00
2.00	0.06	0.00	0.00	54.00	2.64	0.73	0.00
3.00	0.10	0.00	0.00	55.00	2.64	0.73	0.00
4.00	0.14	0.00	0.00	56.00	2.64	0.73	0.00
5.00	0.18	0.00	0.00	57.00	2.64	0.73	0.00
6.00	0.23	0.00	0.00	58.00	2.64	0.73	0.00
7.00	0.28	0.00	0.00	59.00	2.64	0.73	0.00
8.00	0.34	0.00	0.00	60.00	2.64	0.73	0.00
9.00	0.42	0.00	0.00	61.00	2.64	0.73	0.00
10.00	0.52	0.00	0.00	62.00	2.64	0.73	0.00
11.00	0.68	0.00	0.08	63.00	2.64	0.73	0.00
12.00	1.26	0.09	3.58	64.00	2.64	0.73	0.00
13.00	1.96	0.36	2.18	65.00	2.64	0.73	0.00
14.00	2.12	0.44	1.14	66.00	2.64	0.73	0.00
15.00	2.22	0.49	0.82	67.00	2.64	0.73	0.00
16.00	2.30	0.54	0.67	68.00	2.64	0.73	0.00
17.00	2.36	0.57	0.58	69.00	2.64	0.73	0.00
18.00	2.41	0.60	0.47	70.00	2.64	0.73	0.00
19.00	2.46	0.63	0.43	71.00	2.64	0.73	0.00
20.00	2.50	0.65	0.41	72.00	2.64	0.73	0.00
21.00	2.54	0.67	0.39				
22.00	2.58	0.70	0.36				
23.00	2.61	0.72	0.33				
24.00	2.64	0.73	0.31				
25.00	2.64	0.73	0.00				
26.00	2.64	0.73	0.00				
27.00	2.64	0.73	0.00				
28.00	2.64	0.73	0.00				
29.00	2.64	0.73	0.00				
30.00	2.64	0.73	0.00				
31.00	2.64	0.73	0.00				
32.00	2.64	0.73	0.00				
33.00	2.64	0.73	0.00				
34.00	2.64	0.73	0.00				
35.00	2.64	0.73	0.00				
36.00	2.64	0.73	0.00				
37.00	2.64	0.73	0.00				
38.00	2.64	0.73	0.00				
39.00	2.64	0.73	0.00				
40.00	2.64	0.73	0.00				
41.00	2.64	0.73	0.00				
42.00	2.64	0.73	0.00				
43.00	2.64	0.73	0.00				
44.00	2.64	0.73	0.00				
45.00	2.64	0.73	0.00				
46.00	2.64	0.73	0.00				
47.00	2.64	0.73	0.00				
48.00	2.64	0.73	0.00				
49.00	2.64	0.73	0.00				
50.00	2.64	0.73	0.00				
51.00	2.64	0.73	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 28

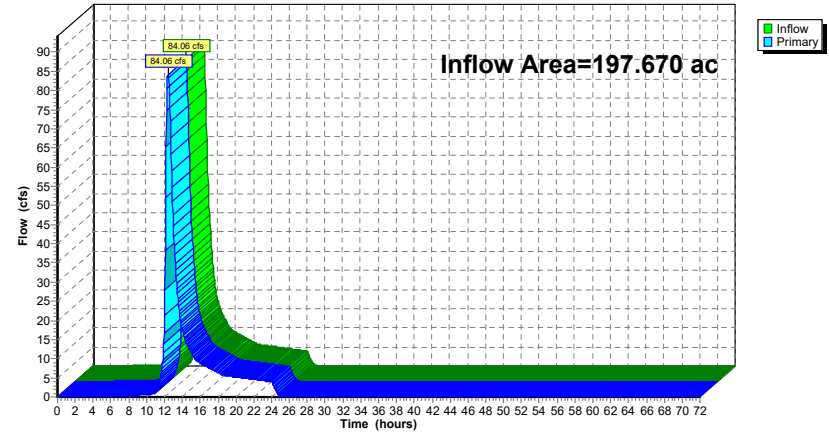
Summary for Link 3L: Existing Total

Inflow Area = 197.670 ac, 3.21% Impervious, Inflow Depth = 0.86" for 1-Year event
 Inflow = 84.06 cfs @ 12.39 hrs, Volume= 14.098 af
 Primary = 84.06 cfs @ 12.39 hrs, Volume= 14.098 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 3L: Existing Total

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 29

Hydrograph for Link 3L: Existing Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.02	0.00	0.02	54.00	0.00	0.00	0.00
3.00	0.07	0.00	0.07	55.00	0.00	0.00	0.00
4.00	0.12	0.00	0.12	56.00	0.00	0.00	0.00
5.00	0.16	0.00	0.16	57.00	0.00	0.00	0.00
6.00	0.20	0.00	0.20	58.00	0.00	0.00	0.00
7.00	0.26	0.00	0.26	59.00	0.00	0.00	0.00
8.00	0.34	0.00	0.34	60.00	0.00	0.00	0.00
9.00	0.42	0.00	0.42	61.00	0.00	0.00	0.00
10.00	0.60	0.00	0.60	62.00	0.00	0.00	0.00
11.00	1.33	0.00	1.33	63.00	0.00	0.00	0.00
12.00	21.32	0.00	21.32	64.00	0.00	0.00	0.00
13.00	44.55	0.00	44.55	65.00	0.00	0.00	0.00
14.00	17.39	0.00	17.39	66.00	0.00	0.00	0.00
15.00	11.64	0.00	11.64	67.00	0.00	0.00	0.00
16.00	8.87	0.00	8.87	68.00	0.00	0.00	0.00
17.00	7.62	0.00	7.62	69.00	0.00	0.00	0.00
18.00	6.34	0.00	6.34	70.00	0.00	0.00	0.00
19.00	5.53	0.00	5.53	71.00	0.00	0.00	0.00
20.00	5.22	0.00	5.22	72.00	0.00	0.00	0.00
21.00	4.91	0.00	4.91				
22.00	4.59	0.00	4.59				
23.00	4.26	0.00	4.26				
24.00	3.92	0.00	3.92				
25.00	0.23	0.00	0.23				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 30

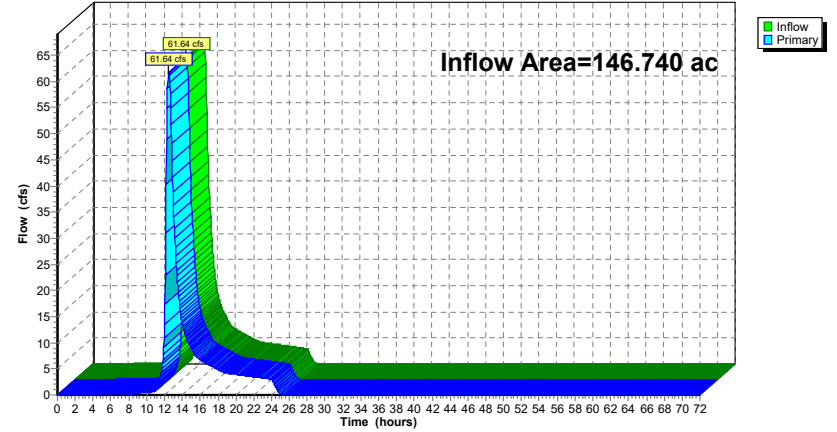
Summary for Link 4L: POA#1 Moodna Creek

Inflow Area = 146.740 ac, 3.16% Impervious, Inflow Depth = 0.87" for 1-Year event
 Inflow = 61.64 cfs @ 12.49 hrs, Volume= 10.662 af
 Primary = 61.64 cfs @ 12.49 hrs, Volume= 10.662 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 3L : Existing Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 4L: POA#1 Moodna Creek

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 31

Hydrograph for Link 4L: POA#1 Moodna Creek

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.01	0.00	0.01	54.00	0.00	0.00	0.00
3.00	0.05	0.00	0.05	55.00	0.00	0.00	0.00
4.00	0.09	0.00	0.09	56.00	0.00	0.00	0.00
5.00	0.12	0.00	0.12	57.00	0.00	0.00	0.00
6.00	0.14	0.00	0.14	58.00	0.00	0.00	0.00
7.00	0.19	0.00	0.19	59.00	0.00	0.00	0.00
8.00	0.24	0.00	0.24	60.00	0.00	0.00	0.00
9.00	0.30	0.00	0.30	61.00	0.00	0.00	0.00
10.00	0.43	0.00	0.43	62.00	0.00	0.00	0.00
11.00	0.89	0.00	0.89	63.00	0.00	0.00	0.00
12.00	13.57	0.00	13.57	64.00	0.00	0.00	0.00
13.00	36.27	0.00	36.27	65.00	0.00	0.00	0.00
14.00	13.62	0.00	13.62	66.00	0.00	0.00	0.00
15.00	8.95	0.00	8.95	67.00	0.00	0.00	0.00
16.00	6.74	0.00	6.74	68.00	0.00	0.00	0.00
17.00	5.78	0.00	5.78	69.00	0.00	0.00	0.00
18.00	4.82	0.00	4.82	70.00	0.00	0.00	0.00
19.00	4.18	0.00	4.18	71.00	0.00	0.00	0.00
20.00	3.94	0.00	3.94	72.00	0.00	0.00	0.00
21.00	3.70	0.00	3.70				
22.00	3.46	0.00	3.46				
23.00	3.21	0.00	3.21				
24.00	2.96	0.00	2.96				
25.00	0.22	0.00	0.22				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 32

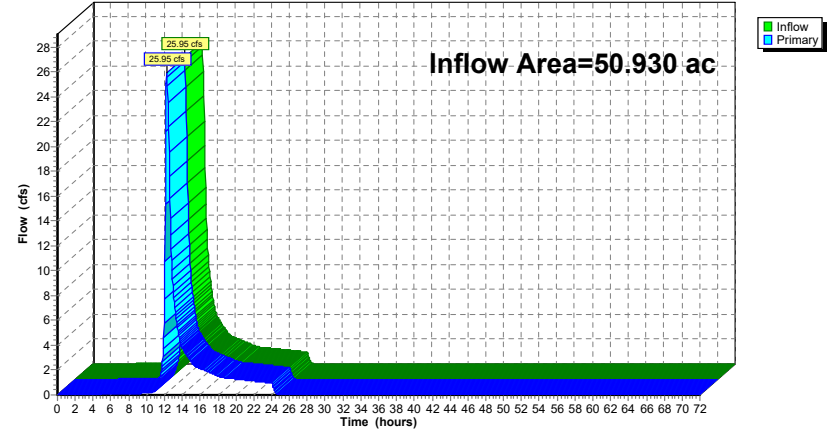
Summary for Link 5L: POA#2 Route 9 Total

Inflow Area = 50.930 ac, 3.36% Impervious, Inflow Depth = 0.81" for 1-Year event
 Inflow = 25.95 cfs @ 12.26 hrs, Volume= 3.436 af
 Primary = 25.95 cfs @ 12.26 hrs, Volume= 3.436 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 3L : Existing Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 5L: POA#2 Route 9 Total

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 33

Hydrograph for Link 5L: POA#2 Route 9 Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.01	0.00	0.01	54.00	0.00	0.00	0.00
3.00	0.02	0.00	0.02	55.00	0.00	0.00	0.00
4.00	0.04	0.00	0.04	56.00	0.00	0.00	0.00
5.00	0.05	0.00	0.05	57.00	0.00	0.00	0.00
6.00	0.06	0.00	0.06	58.00	0.00	0.00	0.00
7.00	0.07	0.00	0.07	59.00	0.00	0.00	0.00
8.00	0.09	0.00	0.09	60.00	0.00	0.00	0.00
9.00	0.12	0.00	0.12	61.00	0.00	0.00	0.00
10.00	0.17	0.00	0.17	62.00	0.00	0.00	0.00
11.00	0.43	0.00	0.43	63.00	0.00	0.00	0.00
12.00	7.76	0.00	7.76	64.00	0.00	0.00	0.00
13.00	8.27	0.00	8.27	65.00	0.00	0.00	0.00
14.00	3.76	0.00	3.76	66.00	0.00	0.00	0.00
15.00	2.69	0.00	2.69	67.00	0.00	0.00	0.00
16.00	2.13	0.00	2.13	68.00	0.00	0.00	0.00
17.00	1.83	0.00	1.83	69.00	0.00	0.00	0.00
18.00	1.52	0.00	1.52	70.00	0.00	0.00	0.00
19.00	1.36	0.00	1.36	71.00	0.00	0.00	0.00
20.00	1.28	0.00	1.28	72.00	0.00	0.00	0.00
21.00	1.21	0.00	1.21				
22.00	1.13	0.00	1.13				
23.00	1.04	0.00	1.04				
24.00	0.96	0.00	0.96				
25.00	0.01	0.00	0.01				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 34

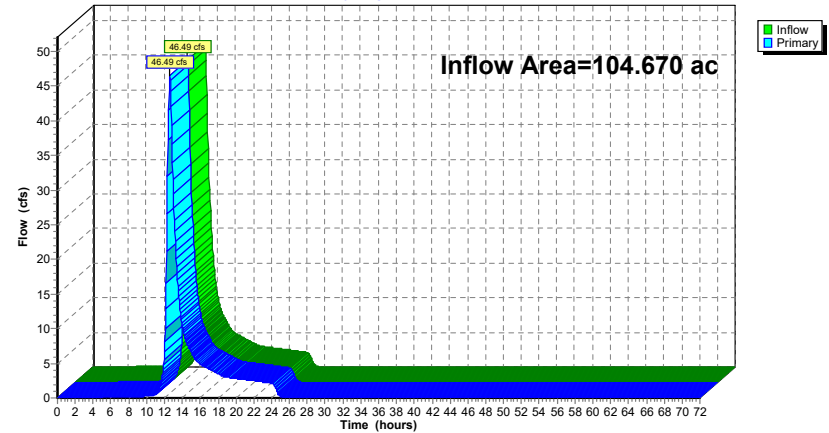
Summary for Link 10L: Moodna Creek Disturbed

Inflow Area = 104.670 ac, 3.10% Impervious, Inflow Depth = 0.87" for 1-Year event
 Inflow = 46.49 cfs @ 12.59 hrs, Volume= 7.607 af
 Primary = 46.49 cfs @ 12.59 hrs, Volume= 7.607 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : POA#1 Moodna Creek

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 10L: Moodna Creek Disturbed

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 35

Hydrograph for Link 10L: Moodna Creek Disturbed

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.01	0.00	0.01	54.00	0.00	0.00	0.00
3.00	0.03	0.00	0.03	55.00	0.00	0.00	0.00
4.00	0.06	0.00	0.06	56.00	0.00	0.00	0.00
5.00	0.08	0.00	0.08	57.00	0.00	0.00	0.00
6.00	0.10	0.00	0.10	58.00	0.00	0.00	0.00
7.00	0.13	0.00	0.13	59.00	0.00	0.00	0.00
8.00	0.17	0.00	0.17	60.00	0.00	0.00	0.00
9.00	0.21	0.00	0.21	61.00	0.00	0.00	0.00
10.00	0.29	0.00	0.29	62.00	0.00	0.00	0.00
11.00	0.51	0.00	0.51	63.00	0.00	0.00	0.00
12.00	6.65	0.00	6.65	64.00	0.00	0.00	0.00
13.00	29.40	0.00	29.40	65.00	0.00	0.00	0.00
14.00	10.38	0.00	10.38	66.00	0.00	0.00	0.00
15.00	6.61	0.00	6.61	67.00	0.00	0.00	0.00
16.00	4.89	0.00	4.89	68.00	0.00	0.00	0.00
17.00	4.19	0.00	4.19	69.00	0.00	0.00	0.00
18.00	3.51	0.00	3.51	70.00	0.00	0.00	0.00
19.00	3.00	0.00	3.00	71.00	0.00	0.00	0.00
20.00	2.83	0.00	2.83	72.00	0.00	0.00	0.00
21.00	2.66	0.00	2.66				
22.00	2.49	0.00	2.49				
23.00	2.31	0.00	2.31				
24.00	2.13	0.00	2.13				
25.00	0.22	0.00	0.22				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

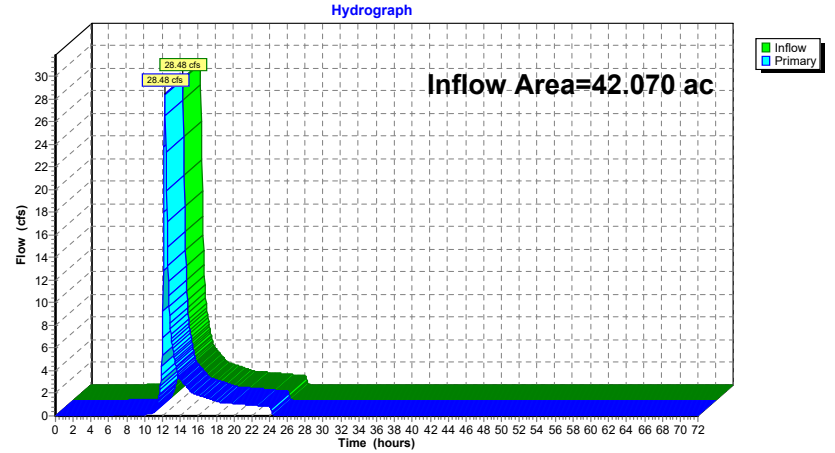
Page 36

Summary for Link 11L: Moodna Creek Undisturbed Total

Inflow Area = 42.070 ac, 3.33% Impervious, Inflow Depth = 0.87" for 1-Year event
 Inflow = 28.48 cfs @ 12.29 hrs, Volume= 3.055 af
 Primary = 28.48 cfs @ 12.29 hrs, Volume= 3.055 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : POA#1 Moodna Creek

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 11L: Moodna Creek Undisturbed Total



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 37

Hydrograph for Link 11L: Moodna Creek Undisturbed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.01	0.00	0.01	54.00	0.00	0.00	0.00
3.00	0.02	0.00	0.02	55.00	0.00	0.00	0.00
4.00	0.03	0.00	0.03	56.00	0.00	0.00	0.00
5.00	0.04	0.00	0.04	57.00	0.00	0.00	0.00
6.00	0.05	0.00	0.05	58.00	0.00	0.00	0.00
7.00	0.06	0.00	0.06	59.00	0.00	0.00	0.00
8.00	0.08	0.00	0.08	60.00	0.00	0.00	0.00
9.00	0.10	0.00	0.10	61.00	0.00	0.00	0.00
10.00	0.14	0.00	0.14	62.00	0.00	0.00	0.00
11.00	0.39	0.00	0.39	63.00	0.00	0.00	0.00
12.00	6.92	0.00	6.92	64.00	0.00	0.00	0.00
13.00	6.87	0.00	6.87	65.00	0.00	0.00	0.00
14.00	3.24	0.00	3.24	66.00	0.00	0.00	0.00
15.00	2.33	0.00	2.33	67.00	0.00	0.00	0.00
16.00	1.85	0.00	1.85	68.00	0.00	0.00	0.00
17.00	1.59	0.00	1.59	69.00	0.00	0.00	0.00
18.00	1.31	0.00	1.31	70.00	0.00	0.00	0.00
19.00	1.18	0.00	1.18	71.00	0.00	0.00	0.00
20.00	1.11	0.00	1.11	72.00	0.00	0.00	0.00
21.00	1.04	0.00	1.04				
22.00	0.97	0.00	0.97				
23.00	0.90	0.00	0.90				
24.00	0.83	0.00	0.83				
25.00	0.00	0.00	0.00				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 38

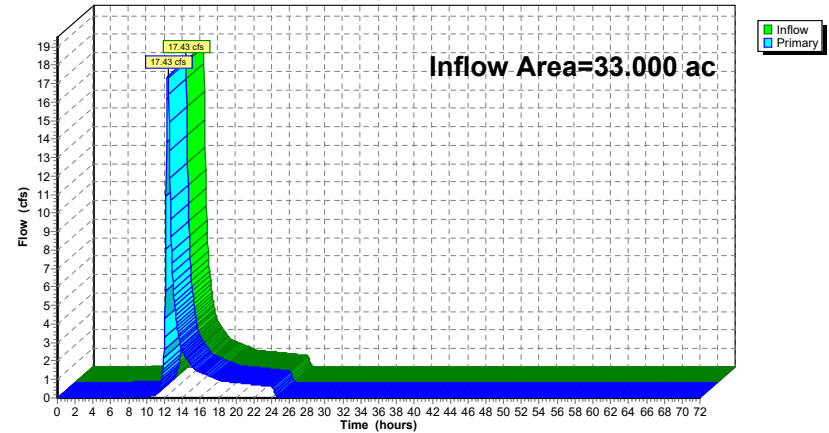
Summary for Link 12L: Route 9 Distubred Total

Inflow Area = 33.000 ac, 2.48% Impervious, Inflow Depth = 0.80" for 1-Year event
 Inflow = 17.43 cfs @ 12.37 hrs, Volume= 2.205 af
 Primary = 17.43 cfs @ 12.37 hrs, Volume= 2.205 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 5L : POA#2 Route 9 Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 12L: Route 9 Distubred Total

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 39

Hydrograph for Link 12L: Route 9 Disturbed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.00	0.00	0.00	54.00	0.00	0.00	0.00
3.00	0.01	0.00	0.01	55.00	0.00	0.00	0.00
4.00	0.02	0.00	0.02	56.00	0.00	0.00	0.00
5.00	0.02	0.00	0.02	57.00	0.00	0.00	0.00
6.00	0.03	0.00	0.03	58.00	0.00	0.00	0.00
7.00	0.03	0.00	0.03	59.00	0.00	0.00	0.00
8.00	0.04	0.00	0.04	60.00	0.00	0.00	0.00
9.00	0.05	0.00	0.05	61.00	0.00	0.00	0.00
10.00	0.08	0.00	0.08	62.00	0.00	0.00	0.00
11.00	0.19	0.00	0.19	63.00	0.00	0.00	0.00
12.00	3.27	0.00	3.27	64.00	0.00	0.00	0.00
13.00	5.85	0.00	5.85	65.00	0.00	0.00	0.00
14.00	2.51	0.00	2.51	66.00	0.00	0.00	0.00
15.00	1.79	0.00	1.79	67.00	0.00	0.00	0.00
16.00	1.40	0.00	1.40	68.00	0.00	0.00	0.00
17.00	1.20	0.00	1.20	69.00	0.00	0.00	0.00
18.00	1.00	0.00	1.00	70.00	0.00	0.00	0.00
19.00	0.88	0.00	0.88	71.00	0.00	0.00	0.00
20.00	0.83	0.00	0.83	72.00	0.00	0.00	0.00
21.00	0.78	0.00	0.78				
22.00	0.73	0.00	0.73				
23.00	0.68	0.00	0.68				
24.00	0.63	0.00	0.63				
25.00	0.01	0.00	0.01				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 40

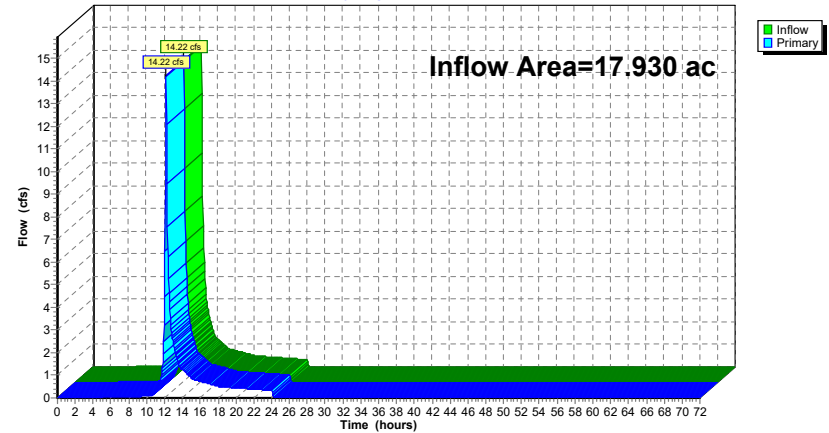
Summary for Link 13L: Route 9 Undisturbed Total

Inflow Area = 17.930 ac, 4.96% Impervious, Inflow Depth = 0.82" for 1-Year event
 Inflow = 14.22 cfs @ 12.19 hrs, Volume= 1.231 af
 Primary = 14.22 cfs @ 12.19 hrs, Volume= 1.231 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 5L : POA#2 Route 9 Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 13L: Route 9 Undisturbed Total

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 41

Hydrograph for Link 13L: Route 9 Undisturbed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.00	0.00	0.00	54.00	0.00	0.00	0.00
3.00	0.01	0.00	0.01	55.00	0.00	0.00	0.00
4.00	0.02	0.00	0.02	56.00	0.00	0.00	0.00
5.00	0.02	0.00	0.02	57.00	0.00	0.00	0.00
6.00	0.03	0.00	0.03	58.00	0.00	0.00	0.00
7.00	0.04	0.00	0.04	59.00	0.00	0.00	0.00
8.00	0.05	0.00	0.05	60.00	0.00	0.00	0.00
9.00	0.06	0.00	0.06	61.00	0.00	0.00	0.00
10.00	0.09	0.00	0.09	62.00	0.00	0.00	0.00
11.00	0.25	0.00	0.25	63.00	0.00	0.00	0.00
12.00	4.48	0.00	4.48	64.00	0.00	0.00	0.00
13.00	2.42	0.00	2.42	65.00	0.00	0.00	0.00
14.00	1.25	0.00	1.25	66.00	0.00	0.00	0.00
15.00	0.90	0.00	0.90	67.00	0.00	0.00	0.00
16.00	0.74	0.00	0.74	68.00	0.00	0.00	0.00
17.00	0.63	0.00	0.63	69.00	0.00	0.00	0.00
18.00	0.52	0.00	0.52	70.00	0.00	0.00	0.00
19.00	0.47	0.00	0.47	71.00	0.00	0.00	0.00
20.00	0.45	0.00	0.45	72.00	0.00	0.00	0.00
21.00	0.42	0.00	0.42				
22.00	0.39	0.00	0.39				
23.00	0.36	0.00	0.36				
24.00	0.33	0.00	0.33				
25.00	0.00	0.00	0.00				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 42

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Moodna Creek Imp.	Runoff Area=3.240 ac 100.00% Impervious Runoff Depth=4.56" Flow Length=2,675' Tc=40.5 min CN=98 Runoff=7.23 cfs 1.232 af
Subcatchment2S: Route 9W Imp.	Runoff Area=0.820 ac 100.00% Impervious Runoff Depth=4.56" Flow Length=843' Tc=24.6 min CN=98 Runoff=2.37 cfs 0.312 af
Subcatchment4S: Moodna Creek	Runoff Area=40.670 ac 0.00% Impervious Runoff Depth=2.44" Flow Length=941' Tc=18.3 min CN=WQ Runoff=81.92 cfs 8.256 af
Subcatchment5S: Route 9W Undisturbed	Runoff Area=0.890 ac 100.00% Impervious Runoff Depth=4.56" Flow Length=1,066' Tc=10.5 min CN=98 Runoff=3.65 cfs 0.338 af
Subcatchment6S: Moodna Creek	Runoff Area=1.400 ac 100.00% Impervious Runoff Depth=4.56" Flow Length=941' Tc=18.3 min CN=98 Runoff=4.65 cfs 0.532 af
Subcatchment7S: Moodna Creek Perv.	Runoff Area=101.430 ac 0.00% Impervious Runoff Depth=2.44" Flow Length=2,675' Tc=40.5 min CN=WQ Runoff=135.74 cfs 20.662 af
Subcatchment8S: Route 9W Perv.	Runoff Area=32.180 ac 0.00% Impervious Runoff Depth=2.33" Flow Length=843' Tc=24.6 min CN=WQ Runoff=53.53 cfs 6.247 af
Subcatchment9S: Route 9W Undisturbed	Runoff Area=17.040 ac 0.00% Impervious Runoff Depth=2.29" Flow Length=1,066' Tc=10.5 min CN=WQ Runoff=40.50 cfs 3.255 af
Link 3L: Existing Total	Inflow=264.24 cfs 40.834 af Primary=264.24 cfs 40.834 af
Link 4L: POA#1 Moodna Creek	Inflow=190.15 cfs 30.682 af Primary=190.15 cfs 30.682 af
Link 5L: POA#2 Route 9 Total	Inflow=83.82 cfs 10.152 af Primary=83.82 cfs 10.152 af
Link 10L: Moodna Creek Disturbed	Inflow=142.94 cfs 21.894 af Primary=142.94 cfs 21.894 af
Link 11L: Moodna Creek Undisturbed Total	Inflow=86.54 cfs 8.789 af Primary=86.54 cfs 8.789 af
Link 12L: Route 9 Disturbed Total	Inflow=55.89 cfs 6.559 af Primary=55.89 cfs 6.559 af
Link 13L: Route 9 Undisturbed Total	Inflow=44.14 cfs 3.593 af Primary=44.14 cfs 3.593 af
Total Runoff Area = 197.670 ac Runoff Volume = 40.834 af Average Runoff Depth = 2.48"	
96.79% Pervious = 191.320 ac 3.21% Impervious = 6.350 ac	

2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 43

Summary for Subcatchment 1S: Moodna Creek Imp.

Runoff = 7.23 cfs @ 12.54 hrs, Volume= 1.232 af, Depth= 4.56"
Routed to Link 10L : Moodna Creek Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
* 3.240	98	Impervious
3.240		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0360	0.08		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	262	0.0541	3.74		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
6.4	699	0.0129	1.83		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	302	0.0331	2.93		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.2	315	0.0706	4.28		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
1.5	428	0.0864	4.73		Shallow Concentrated Flow, FG Unpaved Kv= 16.1 fps
7.7	481	0.0042	1.04		Shallow Concentrated Flow, GH Unpaved Kv= 16.1 fps
0.3	88	0.0684	4.21		Shallow Concentrated Flow, HI Unpaved Kv= 16.1 fps
40.5	2,675	Total			

2023-07-Existing

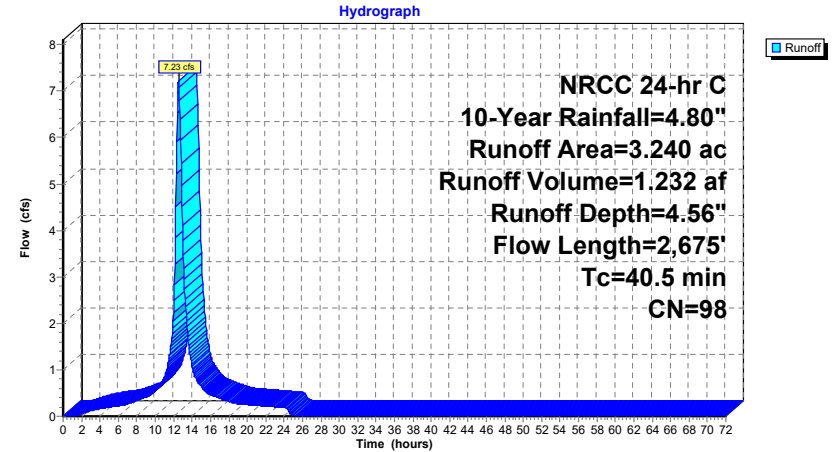
Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 44

Subcatchment 1S: Moodna Creek Imp.



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 45

Hydrograph for Subcatchment 1S: Moodna Creek Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	4.56	0.00
1.00	0.06	0.00	0.00	53.00	4.80	4.56	0.00
2.00	0.12	0.02	0.06	54.00	4.80	4.56	0.00
3.00	0.18	0.06	0.12	55.00	4.80	4.56	0.00
4.00	0.25	0.11	0.16	56.00	4.80	4.56	0.00
5.00	0.33	0.17	0.20	57.00	4.80	4.56	0.00
6.00	0.41	0.24	0.22	58.00	4.80	4.56	0.00
7.00	0.51	0.32	0.27	59.00	4.80	4.56	0.00
8.00	0.62	0.43	0.34	60.00	4.80	4.56	0.00
9.00	0.76	0.56	0.41	61.00	4.80	4.56	0.00
10.00	0.95	0.74	0.56	62.00	4.80	4.56	0.00
11.00	1.24	1.02	0.84	63.00	4.80	4.56	0.00
12.00	2.29	2.06	2.24	64.00	4.80	4.56	0.00
13.00	3.56	3.33	3.77	65.00	4.80	4.56	0.00
14.00	3.85	3.62	1.08	66.00	4.80	4.56	0.00
15.00	4.04	3.80	0.64	67.00	4.80	4.56	0.00
16.00	4.18	3.94	0.46	68.00	4.80	4.56	0.00
17.00	4.29	4.06	0.39	69.00	4.80	4.56	0.00
18.00	4.39	4.15	0.32	70.00	4.80	4.56	0.00
19.00	4.47	4.23	0.27	71.00	4.80	4.56	0.00
20.00	4.55	4.31	0.25	72.00	4.80	4.56	0.00
21.00	4.62	4.38	0.23				
22.00	4.68	4.45	0.22				
23.00	4.74	4.51	0.20				
24.00	4.80	4.56	0.18				
25.00	4.80	4.56	0.02				
26.00	4.80	4.56	0.00				
27.00	4.80	4.56	0.00				
28.00	4.80	4.56	0.00				
29.00	4.80	4.56	0.00				
30.00	4.80	4.56	0.00				
31.00	4.80	4.56	0.00				
32.00	4.80	4.56	0.00				
33.00	4.80	4.56	0.00				
34.00	4.80	4.56	0.00				
35.00	4.80	4.56	0.00				
36.00	4.80	4.56	0.00				
37.00	4.80	4.56	0.00				
38.00	4.80	4.56	0.00				
39.00	4.80	4.56	0.00				
40.00	4.80	4.56	0.00				
41.00	4.80	4.56	0.00				
42.00	4.80	4.56	0.00				
43.00	4.80	4.56	0.00				
44.00	4.80	4.56	0.00				
45.00	4.80	4.56	0.00				
46.00	4.80	4.56	0.00				
47.00	4.80	4.56	0.00				
48.00	4.80	4.56	0.00				
49.00	4.80	4.56	0.00				
50.00	4.80	4.56	0.00				
51.00	4.80	4.56	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 46

Summary for Subcatchment 2S: Route 9W Imp.

Runoff = 2.37 cfs @ 12.34 hrs, Volume= 0.312 af, Depth= 4.56"
 Routed to Link 12L : Route 9 Disturbed Total

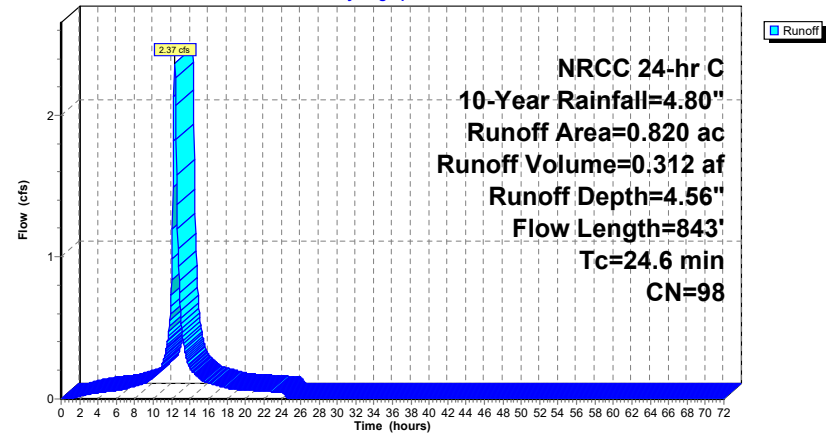
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
* 0.820	98	Impervious
0.820		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	73	0.0550	0.09		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
11.1	770	0.0052	1.16		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
24.6	843	Total			

Subcatchment 2S: Route 9W Imp.

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 47

Hydrograph for Subcatchment 2S: Route 9W Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	4.56	0.00
1.00	0.06	0.00	0.00	53.00	4.80	4.56	0.00
2.00	0.12	0.02	0.02	54.00	4.80	4.56	0.00
3.00	0.18	0.06	0.03	55.00	4.80	4.56	0.00
4.00	0.25	0.11	0.04	56.00	4.80	4.56	0.00
5.00	0.33	0.17	0.05	57.00	4.80	4.56	0.00
6.00	0.41	0.24	0.06	58.00	4.80	4.56	0.00
7.00	0.51	0.32	0.07	59.00	4.80	4.56	0.00
8.00	0.62	0.43	0.09	60.00	4.80	4.56	0.00
9.00	0.76	0.56	0.11	61.00	4.80	4.56	0.00
10.00	0.95	0.74	0.16	62.00	4.80	4.56	0.00
11.00	1.24	1.02	0.25	63.00	4.80	4.56	0.00
12.00	2.29	2.06	0.84	64.00	4.80	4.56	0.00
13.00	3.56	3.33	0.57	65.00	4.80	4.56	0.00
14.00	3.85	3.62	0.21	66.00	4.80	4.56	0.00
15.00	4.04	3.80	0.15	67.00	4.80	4.56	0.00
16.00	4.18	3.94	0.11	68.00	4.80	4.56	0.00
17.00	4.29	4.06	0.09	69.00	4.80	4.56	0.00
18.00	4.39	4.15	0.08	70.00	4.80	4.56	0.00
19.00	4.47	4.23	0.07	71.00	4.80	4.56	0.00
20.00	4.55	4.31	0.06	72.00	4.80	4.56	0.00
21.00	4.62	4.38	0.06				
22.00	4.68	4.45	0.05				
23.00	4.74	4.51	0.05				
24.00	4.80	4.56	0.05				
25.00	4.80	4.56	0.00				
26.00	4.80	4.56	0.00				
27.00	4.80	4.56	0.00				
28.00	4.80	4.56	0.00				
29.00	4.80	4.56	0.00				
30.00	4.80	4.56	0.00				
31.00	4.80	4.56	0.00				
32.00	4.80	4.56	0.00				
33.00	4.80	4.56	0.00				
34.00	4.80	4.56	0.00				
35.00	4.80	4.56	0.00				
36.00	4.80	4.56	0.00				
37.00	4.80	4.56	0.00				
38.00	4.80	4.56	0.00				
39.00	4.80	4.56	0.00				
40.00	4.80	4.56	0.00				
41.00	4.80	4.56	0.00				
42.00	4.80	4.56	0.00				
43.00	4.80	4.56	0.00				
44.00	4.80	4.56	0.00				
45.00	4.80	4.56	0.00				
46.00	4.80	4.56	0.00				
47.00	4.80	4.56	0.00				
48.00	4.80	4.56	0.00				
49.00	4.80	4.56	0.00				
50.00	4.80	4.56	0.00				
51.00	4.80	4.56	0.00				

2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 48

Summary for Subcatchment 4S: Moodna Creek Undisturbed Perv.

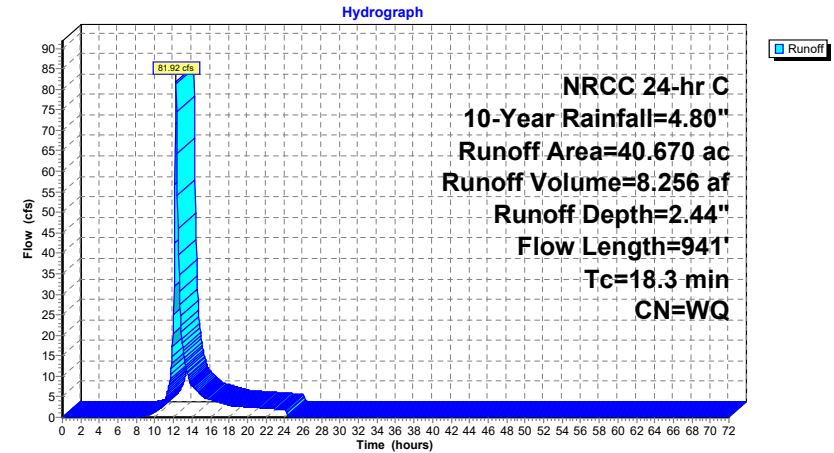
Runoff = 81.92 cfs @ 12.28 hrs, Volume= 8.256 af, Depth= 2.44"
Routed to Link 11L : Moodna Creek Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
39.200	77	Woods, Good, HSG D
1.470	70	Woods, Good, HSG C
40.670		Weighted Average
40.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0950	0.12		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	244	0.0471	3.49		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
1.5	206	0.0194	2.24		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	391	0.0562	3.82		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
18.3	941	Total			

Subcatchment 4S: Moodna Creek Undisturbed Perv.



2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 49

Hydrograph for Subcatchment 4S: Moodna Creek Undisturbed Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	2.46	0.00
1.00	0.06	0.00	0.00	53.00	4.80	2.46	0.00
2.00	0.12	0.00	0.00	54.00	4.80	2.46	0.00
3.00	0.18	0.00	0.00	55.00	4.80	2.46	0.00
4.00	0.25	0.00	0.00	56.00	4.80	2.46	0.00
5.00	0.33	0.00	0.00	57.00	4.80	2.46	0.00
6.00	0.41	0.00	0.00	58.00	4.80	2.46	0.00
7.00	0.51	0.00	0.00	59.00	4.80	2.46	0.00
8.00	0.62	0.00	0.01	60.00	4.80	2.46	0.00
9.00	0.76	0.01	0.43	61.00	4.80	2.46	0.00
10.00	0.95	0.04	1.37	62.00	4.80	2.46	0.00
11.00	1.24	0.11	3.75	63.00	4.80	2.46	0.00
12.00	2.29	0.61	25.14	64.00	4.80	2.46	0.00
13.00	3.56	1.48	17.00	65.00	4.80	2.46	0.00
14.00	3.85	1.70	7.71	66.00	4.80	2.46	0.00
15.00	4.04	1.84	5.45	67.00	4.80	2.46	0.00
16.00	4.18	1.95	4.28	68.00	4.80	2.46	0.00
17.00	4.29	2.04	3.65	69.00	4.80	2.46	0.00
18.00	4.39	2.12	2.99	70.00	4.80	2.46	0.00
19.00	4.47	2.19	2.66	71.00	4.80	2.46	0.00
20.00	4.55	2.25	2.50	72.00	4.80	2.46	0.00
21.00	4.62	2.31	2.34				
22.00	4.68	2.36	2.18				
23.00	4.74	2.41	2.01				
24.00	4.80	2.46	1.84				
25.00	4.80	2.46	0.00				
26.00	4.80	2.46	0.00				
27.00	4.80	2.46	0.00				
28.00	4.80	2.46	0.00				
29.00	4.80	2.46	0.00				
30.00	4.80	2.46	0.00				
31.00	4.80	2.46	0.00				
32.00	4.80	2.46	0.00				
33.00	4.80	2.46	0.00				
34.00	4.80	2.46	0.00				
35.00	4.80	2.46	0.00				
36.00	4.80	2.46	0.00				
37.00	4.80	2.46	0.00				
38.00	4.80	2.46	0.00				
39.00	4.80	2.46	0.00				
40.00	4.80	2.46	0.00				
41.00	4.80	2.46	0.00				
42.00	4.80	2.46	0.00				
43.00	4.80	2.46	0.00				
44.00	4.80	2.46	0.00				
45.00	4.80	2.46	0.00				
46.00	4.80	2.46	0.00				
47.00	4.80	2.46	0.00				
48.00	4.80	2.46	0.00				
49.00	4.80	2.46	0.00				
50.00	4.80	2.46	0.00				
51.00	4.80	2.46	0.00				

2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 50

Summary for Subcatchment 5S: Route 9W Undisturbed Imp.

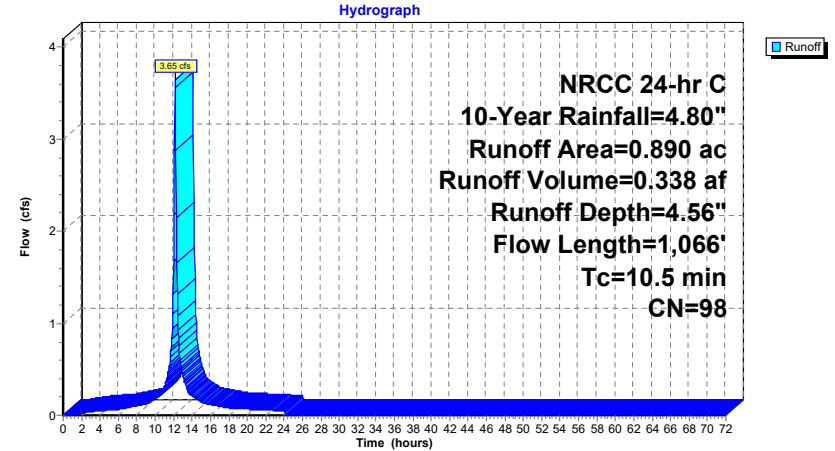
Runoff = 3.65 cfs @ 12.18 hrs, Volume= 0.338 af, Depth= 4.56"
Routed to Link 13L : Route 9 Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
* 0.890	98	Impervious
0.890		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	10	0.0275	0.05		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
0.2	67	0.0784	4.51		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
3.8	340	0.0088	1.51		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.5	311	0.0451	3.42		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.4	338	0.0621	4.01		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
10.5	1,066	Total			

Subcatchment 5S: Route 9W Undisturbed Imp.



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 51

Hydrograph for Subcatchment 5S: Route 9W Undisturbed Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	4.56	0.00
1.00	0.06	0.00	0.00	53.00	4.80	4.56	0.00
2.00	0.12	0.02	0.02	54.00	4.80	4.56	0.00
3.00	0.18	0.06	0.04	55.00	4.80	4.56	0.00
4.00	0.25	0.11	0.05	56.00	4.80	4.56	0.00
5.00	0.33	0.17	0.06	57.00	4.80	4.56	0.00
6.00	0.41	0.24	0.06	58.00	4.80	4.56	0.00
7.00	0.51	0.32	0.08	59.00	4.80	4.56	0.00
8.00	0.62	0.43	0.10	60.00	4.80	4.56	0.00
9.00	0.76	0.56	0.12	61.00	4.80	4.56	0.00
10.00	0.95	0.74	0.18	62.00	4.80	4.56	0.00
11.00	1.24	1.02	0.32	63.00	4.80	4.56	0.00
12.00	2.29	2.06	1.67	64.00	4.80	4.56	0.00
13.00	3.56	3.33	0.44	65.00	4.80	4.56	0.00
14.00	3.85	3.62	0.21	66.00	4.80	4.56	0.00
15.00	4.04	3.80	0.15	67.00	4.80	4.56	0.00
16.00	4.18	3.94	0.12	68.00	4.80	4.56	0.00
17.00	4.29	4.06	0.10	69.00	4.80	4.56	0.00
18.00	4.39	4.15	0.08	70.00	4.80	4.56	0.00
19.00	4.47	4.23	0.07	71.00	4.80	4.56	0.00
20.00	4.55	4.31	0.07	72.00	4.80	4.56	0.00
21.00	4.62	4.38	0.06				
22.00	4.68	4.45	0.06				
23.00	4.74	4.51	0.05				
24.00	4.80	4.56	0.05				
25.00	4.80	4.56	0.00				
26.00	4.80	4.56	0.00				
27.00	4.80	4.56	0.00				
28.00	4.80	4.56	0.00				
29.00	4.80	4.56	0.00				
30.00	4.80	4.56	0.00				
31.00	4.80	4.56	0.00				
32.00	4.80	4.56	0.00				
33.00	4.80	4.56	0.00				
34.00	4.80	4.56	0.00				
35.00	4.80	4.56	0.00				
36.00	4.80	4.56	0.00				
37.00	4.80	4.56	0.00				
38.00	4.80	4.56	0.00				
39.00	4.80	4.56	0.00				
40.00	4.80	4.56	0.00				
41.00	4.80	4.56	0.00				
42.00	4.80	4.56	0.00				
43.00	4.80	4.56	0.00				
44.00	4.80	4.56	0.00				
45.00	4.80	4.56	0.00				
46.00	4.80	4.56	0.00				
47.00	4.80	4.56	0.00				
48.00	4.80	4.56	0.00				
49.00	4.80	4.56	0.00				
50.00	4.80	4.56	0.00				
51.00	4.80	4.56	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 52

Summary for Subcatchment 6S: Moodna Creek Undisturbed Imp.

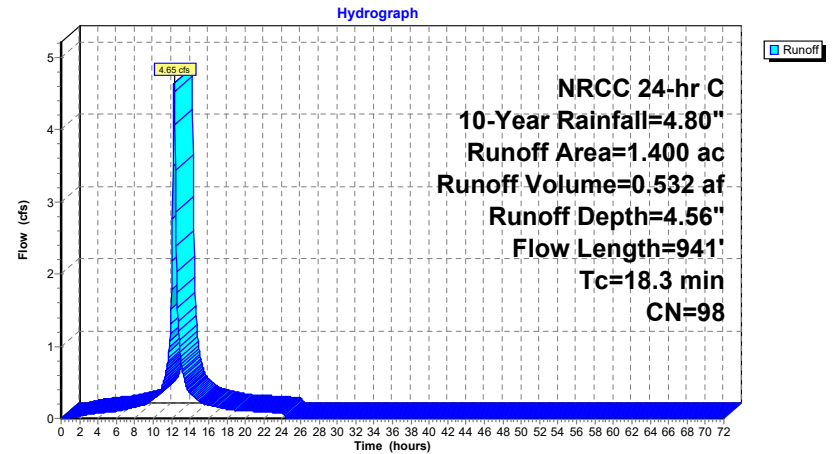
Runoff = 4.65 cfs @ 12.26 hrs, Volume= 0.532 af, Depth= 4.56"
 Routed to Link 11L : Moodna Creek Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
* 1.400	98	Impervious
1.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0950	0.12		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	244	0.0471	3.49		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
1.5	206	0.0194	2.24		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	391	0.0562	3.82		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
18.3	941	Total			

Subcatchment 6S: Moodna Creek Undisturbed Imp.



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 53

Hydrograph for Subcatchment 6S: Moodna Creek Undisturbed Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	4.56	0.00
1.00	0.06	0.00	0.00	53.00	4.80	4.56	0.00
2.00	0.12	0.02	0.03	54.00	4.80	4.56	0.00
3.00	0.18	0.06	0.06	55.00	4.80	4.56	0.00
4.00	0.25	0.11	0.08	56.00	4.80	4.56	0.00
5.00	0.33	0.17	0.09	57.00	4.80	4.56	0.00
6.00	0.41	0.24	0.10	58.00	4.80	4.56	0.00
7.00	0.51	0.32	0.13	59.00	4.80	4.56	0.00
8.00	0.62	0.43	0.16	60.00	4.80	4.56	0.00
9.00	0.76	0.56	0.19	61.00	4.80	4.56	0.00
10.00	0.95	0.74	0.28	62.00	4.80	4.56	0.00
11.00	1.24	1.02	0.45	63.00	4.80	4.56	0.00
12.00	2.29	2.06	1.79	64.00	4.80	4.56	0.00
13.00	3.56	3.33	0.80	65.00	4.80	4.56	0.00
14.00	3.85	3.62	0.35	66.00	4.80	4.56	0.00
15.00	4.04	3.80	0.24	67.00	4.80	4.56	0.00
16.00	4.18	3.94	0.19	68.00	4.80	4.56	0.00
17.00	4.29	4.06	0.16	69.00	4.80	4.56	0.00
18.00	4.39	4.15	0.13	70.00	4.80	4.56	0.00
19.00	4.47	4.23	0.11	71.00	4.80	4.56	0.00
20.00	4.55	4.31	0.11	72.00	4.80	4.56	0.00
21.00	4.62	4.38	0.10				
22.00	4.68	4.45	0.09				
23.00	4.74	4.51	0.08				
24.00	4.80	4.56	0.08				
25.00	4.80	4.56	0.00				
26.00	4.80	4.56	0.00				
27.00	4.80	4.56	0.00				
28.00	4.80	4.56	0.00				
29.00	4.80	4.56	0.00				
30.00	4.80	4.56	0.00				
31.00	4.80	4.56	0.00				
32.00	4.80	4.56	0.00				
33.00	4.80	4.56	0.00				
34.00	4.80	4.56	0.00				
35.00	4.80	4.56	0.00				
36.00	4.80	4.56	0.00				
37.00	4.80	4.56	0.00				
38.00	4.80	4.56	0.00				
39.00	4.80	4.56	0.00				
40.00	4.80	4.56	0.00				
41.00	4.80	4.56	0.00				
42.00	4.80	4.56	0.00				
43.00	4.80	4.56	0.00				
44.00	4.80	4.56	0.00				
45.00	4.80	4.56	0.00				
46.00	4.80	4.56	0.00				
47.00	4.80	4.56	0.00				
48.00	4.80	4.56	0.00				
49.00	4.80	4.56	0.00				
50.00	4.80	4.56	0.00				
51.00	4.80	4.56	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 54

Summary for Subcatchment 7S: Moodna Creek Perv.

Runoff = 135.74 cfs @ 12.56 hrs, Volume= 20.662 af, Depth= 2.44"
 Routed to Link 10L : Moodna Creek Disturbed

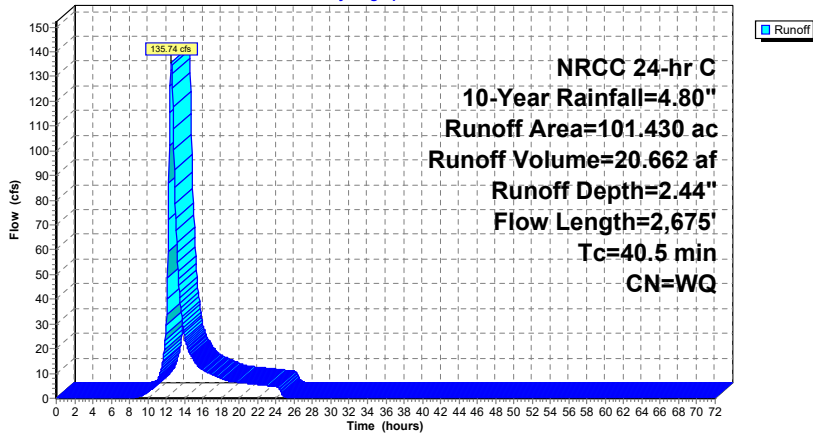
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
99.260	77	Woods, Good, HSG D
2.170	70	Woods, Good, HSG C
101.430		Weighted Average
101.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0360	0.08		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	262	0.0541	3.74		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
6.4	699	0.0129	1.83		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	302	0.0331	2.93		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.2	315	0.0706	4.28		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
1.5	428	0.0864	4.73		Shallow Concentrated Flow, FG Unpaved Kv= 16.1 fps
7.7	481	0.0042	1.04		Shallow Concentrated Flow, GH Unpaved Kv= 16.1 fps
0.3	88	0.0684	4.21		Shallow Concentrated Flow, HI Unpaved Kv= 16.1 fps
40.5	2,675	Total			

Subcatchment 7S: Moodna Creek Perv.

Hydrograph



Hydrograph for Subcatchment 7S: Moodna Creek Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	2.46	0.00
1.00	0.06	0.00	0.00	53.00	4.80	2.46	0.00
2.00	0.12	0.00	0.00	54.00	4.80	2.46	0.00
3.00	0.18	0.00	0.00	55.00	4.80	2.46	0.00
4.00	0.25	0.00	0.00	56.00	4.80	2.46	0.00
5.00	0.33	0.00	0.00	57.00	4.80	2.46	0.00
6.00	0.41	0.00	0.00	58.00	4.80	2.46	0.00
7.00	0.51	0.00	0.00	59.00	4.80	2.46	0.00
8.00	0.62	0.00	0.00	60.00	4.80	2.46	0.00
9.00	0.76	0.01	0.68	61.00	4.80	2.46	0.00
10.00	0.95	0.04	2.49	62.00	4.80	2.46	0.00
11.00	1.24	0.11	6.57	63.00	4.80	2.46	0.00
12.00	2.29	0.61	29.28	64.00	4.80	2.46	0.00
13.00	3.56	1.48	78.67	65.00	4.80	2.46	0.00
14.00	3.85	1.70	25.21	66.00	4.80	2.46	0.00
15.00	4.04	1.84	15.59	67.00	4.80	2.46	0.00
16.00	4.18	1.95	11.37	68.00	4.80	2.46	0.00
17.00	4.29	2.04	9.65	69.00	4.80	2.46	0.00
18.00	4.39	2.12	8.02	70.00	4.80	2.46	0.00
19.00	4.47	2.19	6.82	71.00	4.80	2.46	0.00
20.00	4.55	2.25	6.39	72.00	4.80	2.46	0.00
21.00	4.62	2.31	5.98				
22.00	4.68	2.36	5.57				
23.00	4.74	2.41	5.16				
24.00	4.80	2.46	4.74				
25.00	4.80	2.46	0.49				
26.00	4.80	2.46	0.01				
27.00	4.80	2.46	0.00				
28.00	4.80	2.46	0.00				
29.00	4.80	2.46	0.00				
30.00	4.80	2.46	0.00				
31.00	4.80	2.46	0.00				
32.00	4.80	2.46	0.00				
33.00	4.80	2.46	0.00				
34.00	4.80	2.46	0.00				
35.00	4.80	2.46	0.00				
36.00	4.80	2.46	0.00				
37.00	4.80	2.46	0.00				
38.00	4.80	2.46	0.00				
39.00	4.80	2.46	0.00				
40.00	4.80	2.46	0.00				
41.00	4.80	2.46	0.00				
42.00	4.80	2.46	0.00				
43.00	4.80	2.46	0.00				
44.00	4.80	2.46	0.00				
45.00	4.80	2.46	0.00				
46.00	4.80	2.46	0.00				
47.00	4.80	2.46	0.00				
48.00	4.80	2.46	0.00				
49.00	4.80	2.46	0.00				
50.00	4.80	2.46	0.00				
51.00	4.80	2.46	0.00				

2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 57

Summary for Subcatchment 8S: Route 9W Perv.

Runoff = 53.53 cfs @ 12.36 hrs, Volume= 6.247 af, Depth= 2.33"
Routed to Link 12L : Route 9 Distubred Total

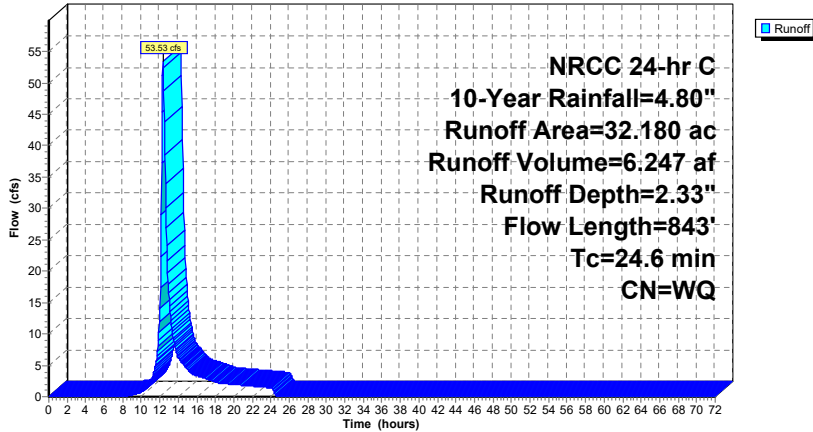
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
7.210	70	Woods, Good, HSG C
24.970	77	Woods, Good, HSG D
32.180		Weighted Average
32.180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	73	0.0550	0.09		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
11.1	770	0.0052	1.16		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
24.6	843				Total

Subcatchment 8S: Route 9W Perv.

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 58

Hydrograph for Subcatchment 8S: Route 9W Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	2.29	0.00
1.00	0.06	0.00	0.00	53.00	4.80	2.29	0.00
2.00	0.12	0.00	0.00	54.00	4.80	2.29	0.00
3.00	0.18	0.00	0.00	55.00	4.80	2.29	0.00
4.00	0.25	0.00	0.00	56.00	4.80	2.29	0.00
5.00	0.33	0.00	0.00	57.00	4.80	2.29	0.00
6.00	0.41	0.00	0.00	58.00	4.80	2.29	0.00
7.00	0.51	0.00	0.00	59.00	4.80	2.29	0.00
8.00	0.62	0.00	0.00	60.00	4.80	2.29	0.00
9.00	0.76	0.00	0.24	61.00	4.80	2.29	0.00
10.00	0.95	0.02	0.81	62.00	4.80	2.29	0.00
11.00	1.24	0.08	2.35	63.00	4.80	2.29	0.00
12.00	2.29	0.53	14.14	64.00	4.80	2.29	0.00
13.00	3.56	1.35	15.43	65.00	4.80	2.29	0.00
14.00	3.85	1.56	6.23	66.00	4.80	2.29	0.00
15.00	4.04	1.70	4.36	67.00	4.80	2.29	0.00
16.00	4.18	1.80	3.35	68.00	4.80	2.29	0.00
17.00	4.29	1.89	2.86	69.00	4.80	2.29	0.00
18.00	4.39	1.96	2.35	70.00	4.80	2.29	0.00
19.00	4.47	2.03	2.07	71.00	4.80	2.29	0.00
20.00	4.55	2.09	1.94	72.00	4.80	2.29	0.00
21.00	4.62	2.14	1.82				
22.00	4.68	2.20	1.69				
23.00	4.74	2.24	1.56				
24.00	4.80	2.29	1.43				
25.00	4.80	2.29	0.01				
26.00	4.80	2.29	0.00				
27.00	4.80	2.29	0.00				
28.00	4.80	2.29	0.00				
29.00	4.80	2.29	0.00				
30.00	4.80	2.29	0.00				
31.00	4.80	2.29	0.00				
32.00	4.80	2.29	0.00				
33.00	4.80	2.29	0.00				
34.00	4.80	2.29	0.00				
35.00	4.80	2.29	0.00				
36.00	4.80	2.29	0.00				
37.00	4.80	2.29	0.00				
38.00	4.80	2.29	0.00				
39.00	4.80	2.29	0.00				
40.00	4.80	2.29	0.00				
41.00	4.80	2.29	0.00				
42.00	4.80	2.29	0.00				
43.00	4.80	2.29	0.00				
44.00	4.80	2.29	0.00				
45.00	4.80	2.29	0.00				
46.00	4.80	2.29	0.00				
47.00	4.80	2.29	0.00				
48.00	4.80	2.29	0.00				
49.00	4.80	2.29	0.00				
50.00	4.80	2.29	0.00				
51.00	4.80	2.29	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 59

Summary for Subcatchment 9S: Route 9W Undisturbed Perv.

Runoff = 40.50 cfs @ 12.18 hrs, Volume= 3.255 af, Depth= 2.29"
 Routed to Link 13L : Route 9 Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
4.940	70	Woods, Good, HSG C
12.100	77	Woods, Good, HSG D
17.040		Weighted Average
17.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	10	0.0275	0.05		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
0.2	67	0.0784	4.51		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
3.8	340	0.0088	1.51		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.5	311	0.0451	3.42		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.4	338	0.0621	4.01		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
10.5	1,066	Total			

2023-07-Existing

Prepared by Dynamic Engineering

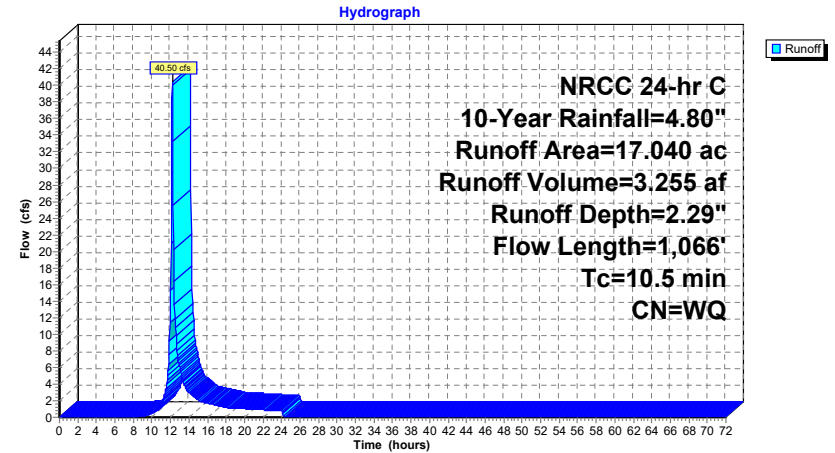
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 60

Subcatchment 9S: Route 9W Undisturbed Perv.



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 61

Hydrograph for Subcatchment 9S: Route 9W Undisturbed Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	2.29	0.00
1.00	0.06	0.00	0.00	53.00	4.80	2.29	0.00
2.00	0.12	0.00	0.00	54.00	4.80	2.29	0.00
3.00	0.18	0.00	0.00	55.00	4.80	2.29	0.00
4.00	0.25	0.00	0.00	56.00	4.80	2.29	0.00
5.00	0.33	0.00	0.00	57.00	4.80	2.29	0.00
6.00	0.41	0.00	0.00	58.00	4.80	2.29	0.00
7.00	0.51	0.00	0.00	59.00	4.80	2.29	0.00
8.00	0.62	0.00	0.01	60.00	4.80	2.29	0.00
9.00	0.76	0.00	0.15	61.00	4.80	2.29	0.00
10.00	0.95	0.02	0.50	62.00	4.80	2.29	0.00
11.00	1.24	0.08	1.56	63.00	4.80	2.29	0.00
12.00	2.29	0.53	15.26	64.00	4.80	2.29	0.00
13.00	3.56	1.35	5.93	65.00	4.80	2.29	0.00
14.00	3.85	1.56	2.97	66.00	4.80	2.29	0.00
15.00	4.04	1.70	2.09	67.00	4.80	2.29	0.00
16.00	4.18	1.80	1.70	68.00	4.80	2.29	0.00
17.00	4.29	1.89	1.44	69.00	4.80	2.29	0.00
18.00	4.39	1.96	1.18	70.00	4.80	2.29	0.00
19.00	4.47	2.03	1.07	71.00	4.80	2.29	0.00
20.00	4.55	2.09	1.01	72.00	4.80	2.29	0.00
21.00	4.62	2.14	0.94				
22.00	4.68	2.20	0.87				
23.00	4.74	2.24	0.81				
24.00	4.80	2.29	0.74				
25.00	4.80	2.29	0.00				
26.00	4.80	2.29	0.00				
27.00	4.80	2.29	0.00				
28.00	4.80	2.29	0.00				
29.00	4.80	2.29	0.00				
30.00	4.80	2.29	0.00				
31.00	4.80	2.29	0.00				
32.00	4.80	2.29	0.00				
33.00	4.80	2.29	0.00				
34.00	4.80	2.29	0.00				
35.00	4.80	2.29	0.00				
36.00	4.80	2.29	0.00				
37.00	4.80	2.29	0.00				
38.00	4.80	2.29	0.00				
39.00	4.80	2.29	0.00				
40.00	4.80	2.29	0.00				
41.00	4.80	2.29	0.00				
42.00	4.80	2.29	0.00				
43.00	4.80	2.29	0.00				
44.00	4.80	2.29	0.00				
45.00	4.80	2.29	0.00				
46.00	4.80	2.29	0.00				
47.00	4.80	2.29	0.00				
48.00	4.80	2.29	0.00				
49.00	4.80	2.29	0.00				
50.00	4.80	2.29	0.00				
51.00	4.80	2.29	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 62

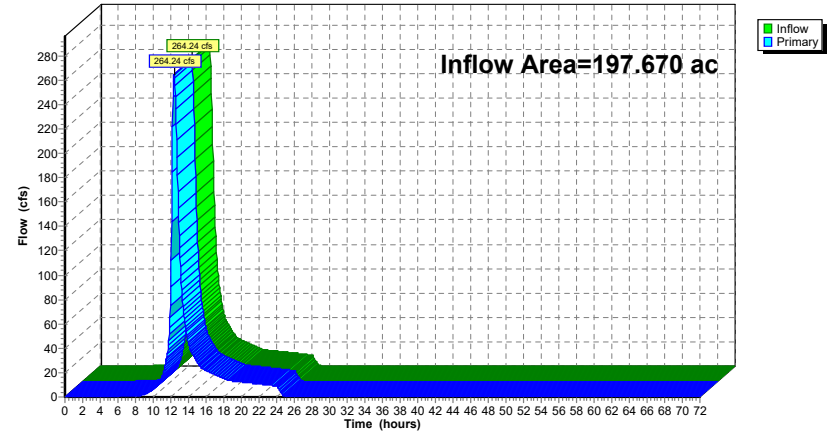
Summary for Link 3L: Existing Total

Inflow Area = 197.670 ac, 3.21% Impervious, Inflow Depth = 2.48" for 10-Year event
 Inflow = 264.24 cfs @ 12.36 hrs, Volume= 40.834 af
 Primary = 264.24 cfs @ 12.36 hrs, Volume= 40.834 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 3L: Existing Total

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 63

Hydrograph for Link 3L: Existing Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.01	0.00	0.01	53.00	0.00	0.00	0.00
2.00	0.13	0.00	0.13	54.00	0.00	0.00	0.00
3.00	0.24	0.00	0.24	55.00	0.00	0.00	0.00
4.00	0.33	0.00	0.33	56.00	0.00	0.00	0.00
5.00	0.39	0.00	0.39	57.00	0.00	0.00	0.00
6.00	0.45	0.00	0.45	58.00	0.00	0.00	0.00
7.00	0.55	0.00	0.55	59.00	0.00	0.00	0.00
8.00	0.71	0.00	0.71	60.00	0.00	0.00	0.00
9.00	2.35	0.00	2.35	61.00	0.00	0.00	0.00
10.00	6.34	0.00	6.34	62.00	0.00	0.00	0.00
11.00	16.09	0.00	16.09	63.00	0.00	0.00	0.00
12.00	90.36	0.00	90.36	64.00	0.00	0.00	0.00
13.00	122.61	0.00	122.61	65.00	0.00	0.00	0.00
14.00	43.97	0.00	43.97	66.00	0.00	0.00	0.00
15.00	28.67	0.00	28.67	67.00	0.00	0.00	0.00
16.00	21.58	0.00	21.58	68.00	0.00	0.00	0.00
17.00	18.34	0.00	18.34	69.00	0.00	0.00	0.00
18.00	15.14	0.00	15.14	70.00	0.00	0.00	0.00
19.00	13.14	0.00	13.14	71.00	0.00	0.00	0.00
20.00	12.32	0.00	12.32	72.00	0.00	0.00	0.00
21.00	11.54	0.00	11.54				
22.00	10.74	0.00	10.74				
23.00	9.92	0.00	9.92				
24.00	9.10	0.00	9.10				
25.00	0.52	0.00	0.52				
26.00	0.01	0.00	0.01				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 64

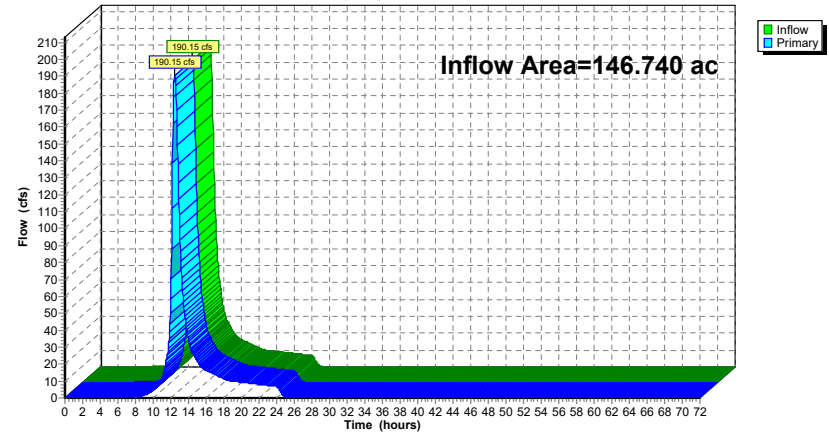
Summary for Link 4L: POA#1 Moodna Creek

Inflow Area = 146.740 ac, 3.16% Impervious, Inflow Depth = 2.51" for 10-Year event
 Inflow = 190.15 cfs @ 12.43 hrs, Volume= 30.682 af
 Primary = 190.15 cfs @ 12.43 hrs, Volume= 30.682 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 3L : Existing Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 4L: POA#1 Moodna Creek

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 65

Hydrograph for Link 4L: POA#1 Moodna Creek

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.09	0.00	0.09	54.00	0.00	0.00	0.00
3.00	0.17	0.00	0.17	55.00	0.00	0.00	0.00
4.00	0.24	0.00	0.24	56.00	0.00	0.00	0.00
5.00	0.28	0.00	0.28	57.00	0.00	0.00	0.00
6.00	0.33	0.00	0.33	58.00	0.00	0.00	0.00
7.00	0.40	0.00	0.40	59.00	0.00	0.00	0.00
8.00	0.51	0.00	0.51	60.00	0.00	0.00	0.00
9.00	1.72	0.00	1.72	61.00	0.00	0.00	0.00
10.00	4.70	0.00	4.70	62.00	0.00	0.00	0.00
11.00	11.62	0.00	11.62	63.00	0.00	0.00	0.00
12.00	58.45	0.00	58.45	64.00	0.00	0.00	0.00
13.00	100.25	0.00	100.25	65.00	0.00	0.00	0.00
14.00	34.35	0.00	34.35	66.00	0.00	0.00	0.00
15.00	21.93	0.00	21.93	67.00	0.00	0.00	0.00
16.00	16.30	0.00	16.30	68.00	0.00	0.00	0.00
17.00	13.85	0.00	13.85	69.00	0.00	0.00	0.00
18.00	11.46	0.00	11.46	70.00	0.00	0.00	0.00
19.00	9.86	0.00	9.86	71.00	0.00	0.00	0.00
20.00	9.25	0.00	9.25	72.00	0.00	0.00	0.00
21.00	8.66	0.00	8.66				
22.00	8.06	0.00	8.06				
23.00	7.45	0.00	7.45				
24.00	6.84	0.00	6.84				
25.00	0.51	0.00	0.51				
26.00	0.01	0.00	0.01				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 66

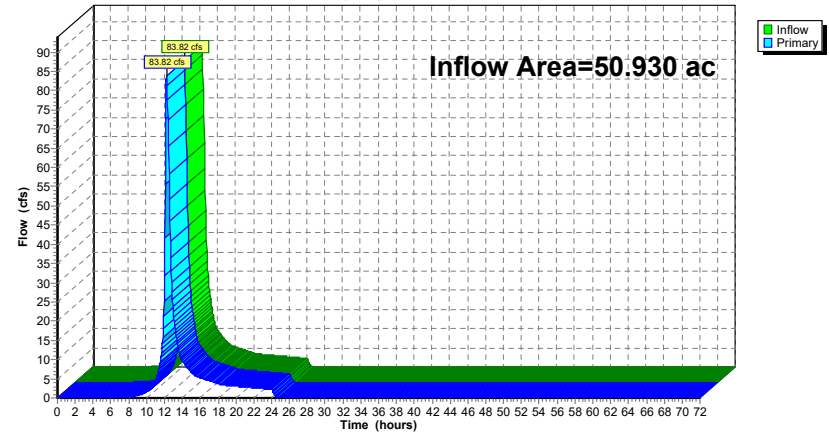
Summary for Link 5L: POA#2 Route 9 Total

Inflow Area = 50.930 ac, 3.36% Impervious, Inflow Depth = 2.39" for 10-Year event
 Inflow = 83.82 cfs @ 12.24 hrs, Volume= 10.152 af
 Primary = 83.82 cfs @ 12.24 hrs, Volume= 10.152 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 3L : Existing Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 5L: POA#2 Route 9 Total

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 67

Hydrograph for Link 5L: POA#2 Route 9 Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.04	0.00	0.04	54.00	0.00	0.00	0.00
3.00	0.07	0.00	0.07	55.00	0.00	0.00	0.00
4.00	0.09	0.00	0.09	56.00	0.00	0.00	0.00
5.00	0.11	0.00	0.11	57.00	0.00	0.00	0.00
6.00	0.12	0.00	0.12	58.00	0.00	0.00	0.00
7.00	0.16	0.00	0.16	59.00	0.00	0.00	0.00
8.00	0.20	0.00	0.20	60.00	0.00	0.00	0.00
9.00	0.63	0.00	0.63	61.00	0.00	0.00	0.00
10.00	1.65	0.00	1.65	62.00	0.00	0.00	0.00
11.00	4.47	0.00	4.47	63.00	0.00	0.00	0.00
12.00	31.90	0.00	31.90	64.00	0.00	0.00	0.00
13.00	22.37	0.00	22.37	65.00	0.00	0.00	0.00
14.00	9.62	0.00	9.62	66.00	0.00	0.00	0.00
15.00	6.74	0.00	6.74	67.00	0.00	0.00	0.00
16.00	5.27	0.00	5.27	68.00	0.00	0.00	0.00
17.00	4.49	0.00	4.49	69.00	0.00	0.00	0.00
18.00	3.69	0.00	3.69	70.00	0.00	0.00	0.00
19.00	3.27	0.00	3.27	71.00	0.00	0.00	0.00
20.00	3.08	0.00	3.08	72.00	0.00	0.00	0.00
21.00	2.88	0.00	2.88				
22.00	2.68	0.00	2.68				
23.00	2.47	0.00	2.47				
24.00	2.27	0.00	2.27				
25.00	0.01	0.00	0.01				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

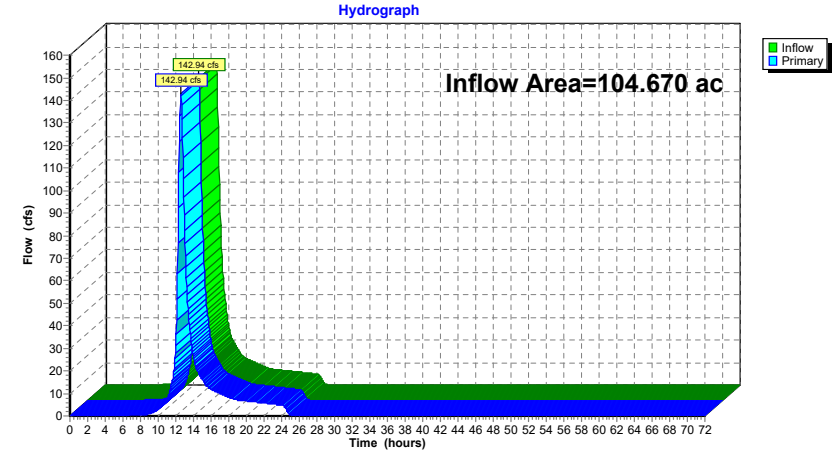
Page 68

Summary for Link 10L: Moodna Creek Disturbed

Inflow Area = 104.670 ac, 3.10% Impervious, Inflow Depth = 2.51" for 10-Year event
 Inflow = 142.94 cfs @ 12.56 hrs, Volume= 21.894 af
 Primary = 142.94 cfs @ 12.56 hrs, Volume= 21.894 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : POA#1 Moodna Creek

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 10L: Moodna Creek Disturbed



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 69

Hydrograph for Link 10L: Moodna Creek Disturbed

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.06	0.00	0.06	54.00	0.00	0.00	0.00
3.00	0.12	0.00	0.12	55.00	0.00	0.00	0.00
4.00	0.16	0.00	0.16	56.00	0.00	0.00	0.00
5.00	0.20	0.00	0.20	57.00	0.00	0.00	0.00
6.00	0.22	0.00	0.22	58.00	0.00	0.00	0.00
7.00	0.27	0.00	0.27	59.00	0.00	0.00	0.00
8.00	0.34	0.00	0.34	60.00	0.00	0.00	0.00
9.00	1.10	0.00	1.10	61.00	0.00	0.00	0.00
10.00	3.05	0.00	3.05	62.00	0.00	0.00	0.00
11.00	7.41	0.00	7.41	63.00	0.00	0.00	0.00
12.00	31.52	0.00	31.52	64.00	0.00	0.00	0.00
13.00	82.44	0.00	82.44	65.00	0.00	0.00	0.00
14.00	26.29	0.00	26.29	66.00	0.00	0.00	0.00
15.00	16.24	0.00	16.24	67.00	0.00	0.00	0.00
16.00	11.83	0.00	11.83	68.00	0.00	0.00	0.00
17.00	10.04	0.00	10.04	69.00	0.00	0.00	0.00
18.00	8.34	0.00	8.34	70.00	0.00	0.00	0.00
19.00	7.09	0.00	7.09	71.00	0.00	0.00	0.00
20.00	6.64	0.00	6.64	72.00	0.00	0.00	0.00
21.00	6.22	0.00	6.22				
22.00	5.79	0.00	5.79				
23.00	5.36	0.00	5.36				
24.00	4.92	0.00	4.92				
25.00	0.51	0.00	0.51				
26.00	0.01	0.00	0.01				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

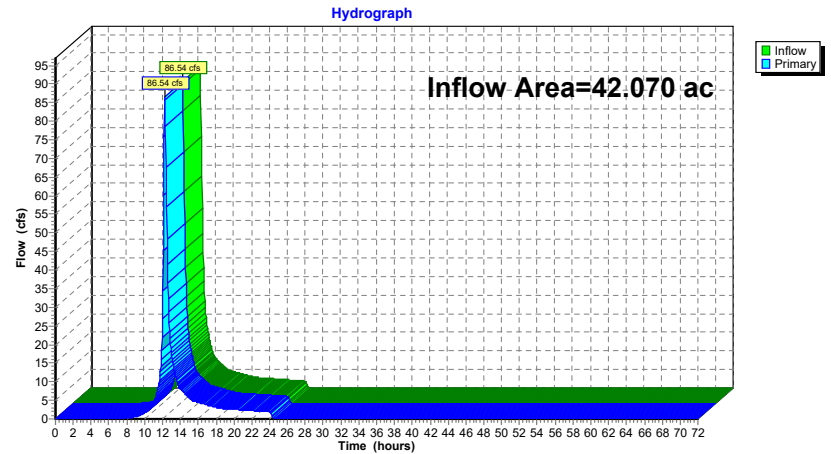
Page 70

Summary for Link 11L: Moodna Creek Undisturbed Total

Inflow Area = 42.070 ac, 3.33% Impervious, Inflow Depth = 2.51" for 10-Year event
 Inflow = 86.54 cfs @ 12.28 hrs, Volume= 8.789 af
 Primary = 86.54 cfs @ 12.28 hrs, Volume= 8.789 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : POA#1 Moodna Creek

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 11L: Moodna Creek Undisturbed Total



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 71

Hydrograph for Link 11L: Moodna Creek Undisturbed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.03	0.00	0.03	54.00	0.00	0.00	0.00
3.00	0.06	0.00	0.06	55.00	0.00	0.00	0.00
4.00	0.08	0.00	0.08	56.00	0.00	0.00	0.00
5.00	0.09	0.00	0.09	57.00	0.00	0.00	0.00
6.00	0.10	0.00	0.10	58.00	0.00	0.00	0.00
7.00	0.13	0.00	0.13	59.00	0.00	0.00	0.00
8.00	0.17	0.00	0.17	60.00	0.00	0.00	0.00
9.00	0.62	0.00	0.62	61.00	0.00	0.00	0.00
10.00	1.65	0.00	1.65	62.00	0.00	0.00	0.00
11.00	4.21	0.00	4.21	63.00	0.00	0.00	0.00
12.00	26.93	0.00	26.93	64.00	0.00	0.00	0.00
13.00	17.81	0.00	17.81	65.00	0.00	0.00	0.00
14.00	8.06	0.00	8.06	66.00	0.00	0.00	0.00
15.00	5.69	0.00	5.69	67.00	0.00	0.00	0.00
16.00	4.47	0.00	4.47	68.00	0.00	0.00	0.00
17.00	3.80	0.00	3.80	69.00	0.00	0.00	0.00
18.00	3.12	0.00	3.12	70.00	0.00	0.00	0.00
19.00	2.77	0.00	2.77	71.00	0.00	0.00	0.00
20.00	2.61	0.00	2.61	72.00	0.00	0.00	0.00
21.00	2.44	0.00	2.44				
22.00	2.27	0.00	2.27				
23.00	2.09	0.00	2.09				
24.00	1.91	0.00	1.91				
25.00	0.00	0.00	0.00				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

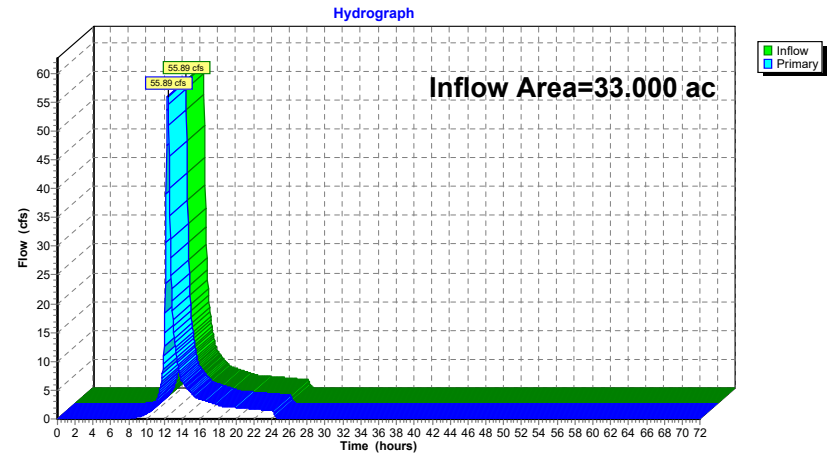
Page 72

Summary for Link 12L: Route 9 Distubred Total

Inflow Area = 33.000 ac, 2.48% Impervious, Inflow Depth = 2.38" for 10-Year event
 Inflow = 55.89 cfs @ 12.36 hrs, Volume= 6.559 af
 Primary = 55.89 cfs @ 12.36 hrs, Volume= 6.559 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 5L : POA#2 Route 9 Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 12L: Route 9 Distubred Total



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 73

Hydrograph for Link 12L: Route 9 Disturbed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.02	0.00	0.02	54.00	0.00	0.00	0.00
3.00	0.03	0.00	0.03	55.00	0.00	0.00	0.00
4.00	0.04	0.00	0.04	56.00	0.00	0.00	0.00
5.00	0.05	0.00	0.05	57.00	0.00	0.00	0.00
6.00	0.06	0.00	0.06	58.00	0.00	0.00	0.00
7.00	0.07	0.00	0.07	59.00	0.00	0.00	0.00
8.00	0.09	0.00	0.09	60.00	0.00	0.00	0.00
9.00	0.35	0.00	0.35	61.00	0.00	0.00	0.00
10.00	0.96	0.00	0.96	62.00	0.00	0.00	0.00
11.00	2.60	0.00	2.60	63.00	0.00	0.00	0.00
12.00	14.97	0.00	14.97	64.00	0.00	0.00	0.00
13.00	16.00	0.00	16.00	65.00	0.00	0.00	0.00
14.00	6.44	0.00	6.44	66.00	0.00	0.00	0.00
15.00	4.51	0.00	4.51	67.00	0.00	0.00	0.00
16.00	3.46	0.00	3.46	68.00	0.00	0.00	0.00
17.00	2.95	0.00	2.95	69.00	0.00	0.00	0.00
18.00	2.43	0.00	2.43	70.00	0.00	0.00	0.00
19.00	2.13	0.00	2.13	71.00	0.00	0.00	0.00
20.00	2.01	0.00	2.01	72.00	0.00	0.00	0.00
21.00	1.88	0.00	1.88				
22.00	1.75	0.00	1.75				
23.00	1.61	0.00	1.61				
24.00	1.48	0.00	1.48				
25.00	0.01	0.00	0.01				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

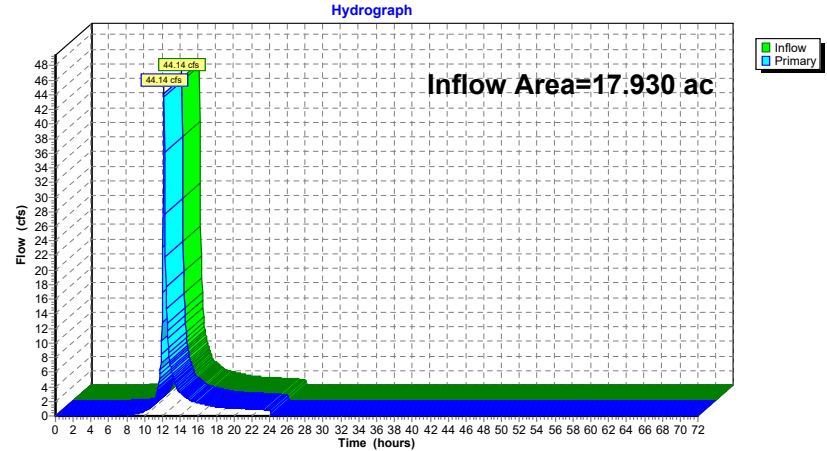
Page 74

Summary for Link 13L: Route 9 Undisturbed Total

Inflow Area = 17.930 ac, 4.96% Impervious, Inflow Depth = 2.40" for 10-Year event
 Inflow = 44.14 cfs @ 12.18 hrs, Volume= 3.593 af
 Primary = 44.14 cfs @ 12.18 hrs, Volume= 3.593 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 5L : POA#2 Route 9 Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 13L: Route 9 Undisturbed Total



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 75

Hydrograph for Link 13L: Route 9 Undisturbed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.02	0.00	0.02	54.00	0.00	0.00	0.00
3.00	0.04	0.00	0.04	55.00	0.00	0.00	0.00
4.00	0.05	0.00	0.05	56.00	0.00	0.00	0.00
5.00	0.06	0.00	0.06	57.00	0.00	0.00	0.00
6.00	0.06	0.00	0.06	58.00	0.00	0.00	0.00
7.00	0.08	0.00	0.08	59.00	0.00	0.00	0.00
8.00	0.11	0.00	0.11	60.00	0.00	0.00	0.00
9.00	0.28	0.00	0.28	61.00	0.00	0.00	0.00
10.00	0.68	0.00	0.68	62.00	0.00	0.00	0.00
11.00	1.87	0.00	1.87	63.00	0.00	0.00	0.00
12.00	16.93	0.00	16.93	64.00	0.00	0.00	0.00
13.00	6.37	0.00	6.37	65.00	0.00	0.00	0.00
14.00	3.18	0.00	3.18	66.00	0.00	0.00	0.00
15.00	2.24	0.00	2.24	67.00	0.00	0.00	0.00
16.00	1.82	0.00	1.82	68.00	0.00	0.00	0.00
17.00	1.54	0.00	1.54	69.00	0.00	0.00	0.00
18.00	1.25	0.00	1.25	70.00	0.00	0.00	0.00
19.00	1.14	0.00	1.14	71.00	0.00	0.00	0.00
20.00	1.07	0.00	1.07	72.00	0.00	0.00	0.00
21.00	1.00	0.00	1.00				
22.00	0.93	0.00	0.93				
23.00	0.86	0.00	0.86				
24.00	0.79	0.00	0.79				
25.00	0.00	0.00	0.00				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 76

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Moodna Creek Imp. Runoff Area=3.240 ac 100.00% Impervious Runoff Depth=8.33"
 Flow Length=2,675' Tc=40.5 min CN=98 Runoff=12.98 cfs 2.249 af

Subcatchment2S: Route 9W Imp. Runoff Area=0.820 ac 100.00% Impervious Runoff Depth=8.33"
 Flow Length=843' Tc=24.6 min CN=98 Runoff=4.25 cfs 0.569 af

Subcatchment4S: Moodna Creek Runoff Area=40.670 ac 0.00% Impervious Runoff Depth=5.77"
 Flow Length=941' Tc=18.3 min CN=WQ Runoff=192.64 cfs 19.553 af

Subcatchment5S: Route 9W Undisturbed Runoff Area=0.890 ac 100.00% Impervious Runoff Depth=8.33"
 Flow Length=1,066' Tc=10.5 min CN=98 Runoff=6.54 cfs 0.618 af

Subcatchment6S: Moodna Creek Runoff Area=1.400 ac 100.00% Impervious Runoff Depth=8.33"
 Flow Length=941' Tc=18.3 min CN=98 Runoff=8.34 cfs 0.972 af

Subcatchment7S: Moodna Creek Perv. Runoff Area=101.430 ac 0.00% Impervious Runoff Depth=5.78"
 Flow Length=2,675' Tc=40.5 min CN=WQ Runoff=319.99 cfs 48.870 af

Subcatchment8S: Route 9W Perv. Runoff Area=32.180 ac 0.00% Impervious Runoff Depth=5.61"
 Flow Length=843' Tc=24.6 min CN=WQ Runoff=128.59 cfs 15.047 af

Subcatchment9S: Route 9W Undisturbed Runoff Area=17.040 ac 0.00% Impervious Runoff Depth=5.56"
 Flow Length=1,066' Tc=10.5 min CN=WQ Runoff=97.03 cfs 7.889 af

Link 3L: Existing Total Inflow=622.73 cfs 95.767 af
 Primary=622.73 cfs 95.767 af

Link 4L: POA#1 Moodna Creek Inflow=445.06 cfs 71.644 af
 Primary=445.06 cfs 71.644 af

Link 5L: POA#2 Route 9 Total Inflow=200.42 cfs 24.123 af
 Primary=200.42 cfs 24.123 af

Link 10L: Moodna Creek Disturbed Inflow=332.95 cfs 51.119 af
 Primary=332.95 cfs 51.119 af

Link 11L: Moodna Creek Undisturbed Total Inflow=200.98 cfs 20.525 af
 Primary=200.98 cfs 20.525 af

Link 12L: Route 9 Disturbed Total Inflow=132.83 cfs 15.616 af
 Primary=132.83 cfs 15.616 af

Link 13L: Route 9 Undisturbed Total Inflow=103.57 cfs 8.507 af
 Primary=103.57 cfs 8.507 af

Total Runoff Area = 197.670 ac Runoff Volume = 95.767 af Average Runoff Depth = 5.81"
96.79% Pervious = 191.320 ac 3.21% Impervious = 6.350 ac

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 77

Summary for Subcatchment 1S: Moodna Creek Imp.

Runoff = 12.98 cfs @ 12.53 hrs, Volume= 2.249 af, Depth= 8.33"
 Routed to Link 10L : Moodna Creek Disturbed

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
* 3.240	98	Impervious
3.240		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0360	0.08		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	262	0.0541	3.74		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
6.4	699	0.0129	1.83		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	302	0.0331	2.93		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.2	315	0.0706	4.28		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
1.5	428	0.0864	4.73		Shallow Concentrated Flow, FG Unpaved Kv= 16.1 fps
7.7	481	0.0042	1.04		Shallow Concentrated Flow, GH Unpaved Kv= 16.1 fps
0.3	88	0.0684	4.21		Shallow Concentrated Flow, HI Unpaved Kv= 16.1 fps
40.5	2,675	Total			

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

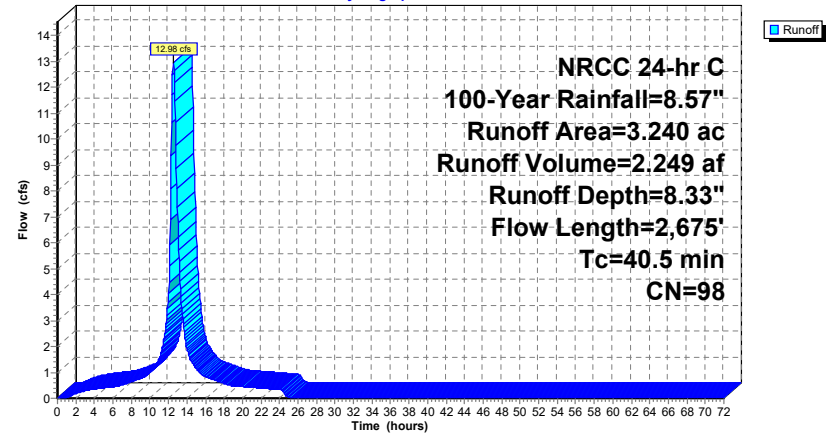
NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 78

Subcatchment 1S: Moodna Creek Imp.

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 79

Hydrograph for Subcatchment 1S: Moodna Creek Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	8.33	0.00
1.00	0.10	0.01	0.02	53.00	8.57	8.33	0.00
2.00	0.21	0.08	0.19	54.00	8.57	8.33	0.00
3.00	0.33	0.17	0.29	55.00	8.57	8.33	0.00
4.00	0.45	0.28	0.35	56.00	8.57	8.33	0.00
5.00	0.59	0.40	0.40	57.00	8.57	8.33	0.00
6.00	0.74	0.54	0.44	58.00	8.57	8.33	0.00
7.00	0.91	0.70	0.52	59.00	8.57	8.33	0.00
8.00	1.11	0.90	0.64	60.00	8.57	8.33	0.00
9.00	1.36	1.14	0.77	61.00	8.57	8.33	0.00
10.00	1.69	1.47	1.03	62.00	8.57	8.33	0.00
11.00	2.21	1.98	1.53	63.00	8.57	8.33	0.00
12.00	4.08	3.85	4.05	64.00	8.57	8.33	0.00
13.00	6.36	6.12	6.76	65.00	8.57	8.33	0.00
14.00	6.88	6.64	1.92	66.00	8.57	8.33	0.00
15.00	7.21	6.97	1.15	67.00	8.57	8.33	0.00
16.00	7.46	7.22	0.83	68.00	8.57	8.33	0.00
17.00	7.66	7.42	0.69	69.00	8.57	8.33	0.00
18.00	7.83	7.60	0.57	70.00	8.57	8.33	0.00
19.00	7.98	7.74	0.48	71.00	8.57	8.33	0.00
20.00	8.12	7.88	0.45	72.00	8.57	8.33	0.00
21.00	8.24	8.00	0.42				
22.00	8.36	8.12	0.39				
23.00	8.47	8.23	0.36				
24.00	8.57	8.33	0.33				
25.00	8.57	8.33	0.03				
26.00	8.57	8.33	0.00				
27.00	8.57	8.33	0.00				
28.00	8.57	8.33	0.00				
29.00	8.57	8.33	0.00				
30.00	8.57	8.33	0.00				
31.00	8.57	8.33	0.00				
32.00	8.57	8.33	0.00				
33.00	8.57	8.33	0.00				
34.00	8.57	8.33	0.00				
35.00	8.57	8.33	0.00				
36.00	8.57	8.33	0.00				
37.00	8.57	8.33	0.00				
38.00	8.57	8.33	0.00				
39.00	8.57	8.33	0.00				
40.00	8.57	8.33	0.00				
41.00	8.57	8.33	0.00				
42.00	8.57	8.33	0.00				
43.00	8.57	8.33	0.00				
44.00	8.57	8.33	0.00				
45.00	8.57	8.33	0.00				
46.00	8.57	8.33	0.00				
47.00	8.57	8.33	0.00				
48.00	8.57	8.33	0.00				
49.00	8.57	8.33	0.00				
50.00	8.57	8.33	0.00				
51.00	8.57	8.33	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 80

Summary for Subcatchment 2S: Route 9W Imp.

Runoff = 4.25 cfs @ 12.34 hrs, Volume= 0.569 af, Depth= 8.33"
 Routed to Link 12L : Route 9 Disturbed Total

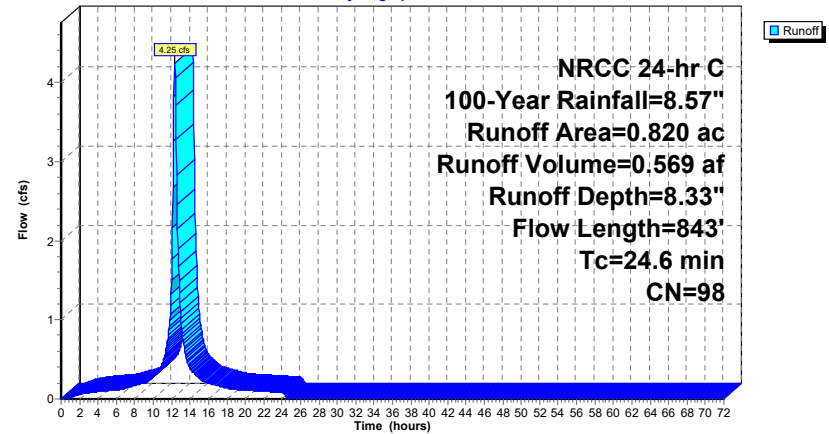
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
* 0.820	98	Impervious
0.820		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	73	0.0550	0.09		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
11.1	770	0.0052	1.16		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
24.6	843	Total			

Subcatchment 2S: Route 9W Imp.

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 81

Hydrograph for Subcatchment 2S: Route 9W Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	8.33	0.00
1.00	0.10	0.01	0.01	53.00	8.57	8.33	0.00
2.00	0.21	0.08	0.06	54.00	8.57	8.33	0.00
3.00	0.33	0.17	0.08	55.00	8.57	8.33	0.00
4.00	0.45	0.28	0.09	56.00	8.57	8.33	0.00
5.00	0.59	0.40	0.10	57.00	8.57	8.33	0.00
6.00	0.74	0.54	0.11	58.00	8.57	8.33	0.00
7.00	0.91	0.70	0.14	59.00	8.57	8.33	0.00
8.00	1.11	0.90	0.17	60.00	8.57	8.33	0.00
9.00	1.36	1.14	0.20	61.00	8.57	8.33	0.00
10.00	1.69	1.47	0.29	62.00	8.57	8.33	0.00
11.00	2.21	1.98	0.45	63.00	8.57	8.33	0.00
12.00	4.08	3.85	1.51	64.00	8.57	8.33	0.00
13.00	6.36	6.12	1.02	65.00	8.57	8.33	0.00
14.00	6.88	6.64	0.38	66.00	8.57	8.33	0.00
15.00	7.21	6.97	0.26	67.00	8.57	8.33	0.00
16.00	7.46	7.22	0.20	68.00	8.57	8.33	0.00
17.00	7.66	7.42	0.17	69.00	8.57	8.33	0.00
18.00	7.83	7.60	0.14	70.00	8.57	8.33	0.00
19.00	7.98	7.74	0.12	71.00	8.57	8.33	0.00
20.00	8.12	7.88	0.11	72.00	8.57	8.33	0.00
21.00	8.24	8.00	0.10				
22.00	8.36	8.12	0.10				
23.00	8.47	8.23	0.09				
24.00	8.57	8.33	0.08				
25.00	8.57	8.33	0.00				
26.00	8.57	8.33	0.00				
27.00	8.57	8.33	0.00				
28.00	8.57	8.33	0.00				
29.00	8.57	8.33	0.00				
30.00	8.57	8.33	0.00				
31.00	8.57	8.33	0.00				
32.00	8.57	8.33	0.00				
33.00	8.57	8.33	0.00				
34.00	8.57	8.33	0.00				
35.00	8.57	8.33	0.00				
36.00	8.57	8.33	0.00				
37.00	8.57	8.33	0.00				
38.00	8.57	8.33	0.00				
39.00	8.57	8.33	0.00				
40.00	8.57	8.33	0.00				
41.00	8.57	8.33	0.00				
42.00	8.57	8.33	0.00				
43.00	8.57	8.33	0.00				
44.00	8.57	8.33	0.00				
45.00	8.57	8.33	0.00				
46.00	8.57	8.33	0.00				
47.00	8.57	8.33	0.00				
48.00	8.57	8.33	0.00				
49.00	8.57	8.33	0.00				
50.00	8.57	8.33	0.00				
51.00	8.57	8.33	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 82

Summary for Subcatchment 4S: Moodna Creek Undisturbed Perv.

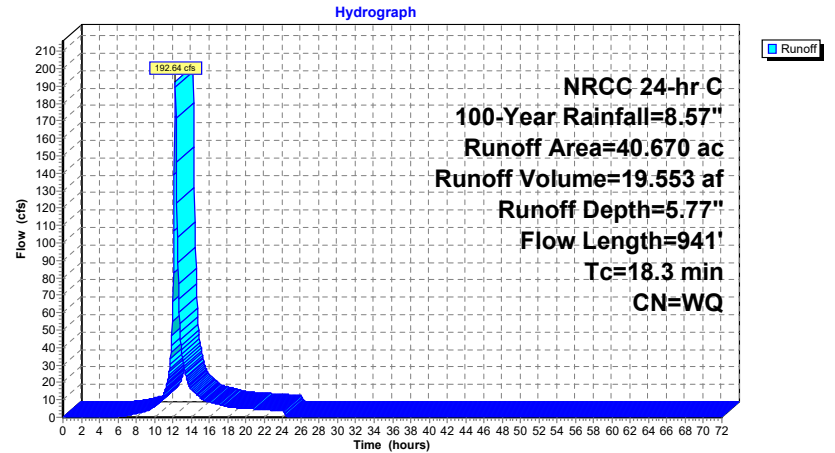
Runoff = 192.64 cfs @ 12.27 hrs, Volume= 19.553 af, Depth= 5.77"
 Routed to Link 11L : Moodna Creek Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
39.200	77	Woods, Good, HSG D
1.470	70	Woods, Good, HSG C
40.670		Weighted Average
40.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0950	0.12		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	244	0.0471	3.49		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
1.5	206	0.0194	2.24		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	391	0.0562	3.82		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
18.3	941				Total

Subcatchment 4S: Moodna Creek Undisturbed Perv.



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 83

Hydrograph for Subcatchment 4S: Moodna Creek Undisturbed Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	5.80	0.00
1.00	0.10	0.00	0.00	53.00	8.57	5.80	0.00
2.00	0.21	0.00	0.00	54.00	8.57	5.80	0.00
3.00	0.33	0.00	0.00	55.00	8.57	5.80	0.00
4.00	0.45	0.00	0.00	56.00	8.57	5.80	0.00
5.00	0.59	0.00	0.00	57.00	8.57	5.80	0.00
6.00	0.74	0.01	0.36	58.00	8.57	5.80	0.00
7.00	0.91	0.03	1.08	59.00	8.57	5.80	0.00
8.00	1.11	0.08	2.13	60.00	8.57	5.80	0.00
9.00	1.36	0.15	3.46	61.00	8.57	5.80	0.00
10.00	1.69	0.29	6.39	62.00	8.57	5.80	0.00
11.00	2.21	0.57	12.98	63.00	8.57	5.80	0.00
12.00	4.08	1.88	66.17	64.00	8.57	5.80	0.00
13.00	6.36	3.80	36.36	65.00	8.57	5.80	0.00
14.00	6.88	4.26	16.11	66.00	8.57	5.80	0.00
15.00	7.21	4.56	11.27	67.00	8.57	5.80	0.00
16.00	7.46	4.78	8.79	68.00	8.57	5.80	0.00
17.00	7.66	4.97	7.44	69.00	8.57	5.80	0.00
18.00	7.83	5.12	6.07	70.00	8.57	5.80	0.00
19.00	7.98	5.26	5.39	71.00	8.57	5.80	0.00
20.00	8.12	5.38	5.06	72.00	8.57	5.80	0.00
21.00	8.24	5.50	4.72				
22.00	8.36	5.61	4.38				
23.00	8.47	5.71	4.03				
24.00	8.57	5.80	3.68				
25.00	8.57	5.80	0.00				
26.00	8.57	5.80	0.00				
27.00	8.57	5.80	0.00				
28.00	8.57	5.80	0.00				
29.00	8.57	5.80	0.00				
30.00	8.57	5.80	0.00				
31.00	8.57	5.80	0.00				
32.00	8.57	5.80	0.00				
33.00	8.57	5.80	0.00				
34.00	8.57	5.80	0.00				
35.00	8.57	5.80	0.00				
36.00	8.57	5.80	0.00				
37.00	8.57	5.80	0.00				
38.00	8.57	5.80	0.00				
39.00	8.57	5.80	0.00				
40.00	8.57	5.80	0.00				
41.00	8.57	5.80	0.00				
42.00	8.57	5.80	0.00				
43.00	8.57	5.80	0.00				
44.00	8.57	5.80	0.00				
45.00	8.57	5.80	0.00				
46.00	8.57	5.80	0.00				
47.00	8.57	5.80	0.00				
48.00	8.57	5.80	0.00				
49.00	8.57	5.80	0.00				
50.00	8.57	5.80	0.00				
51.00	8.57	5.80	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 84

Summary for Subcatchment 5S: Route 9W Undisturbed Imp.

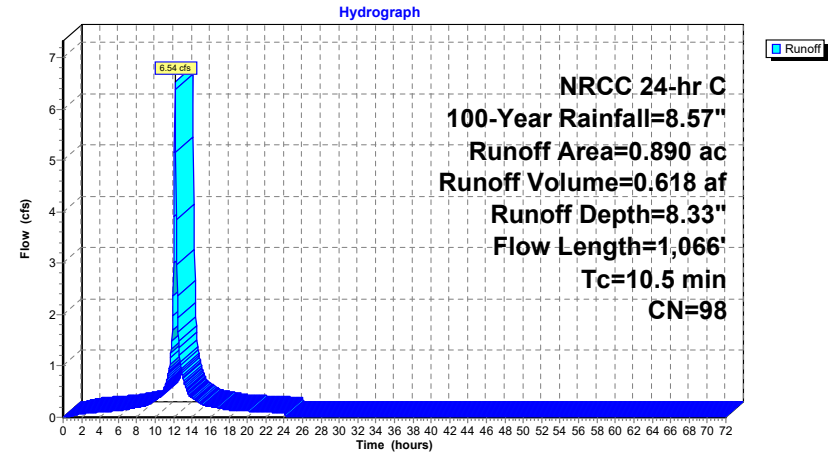
Runoff = 6.54 cfs @ 12.18 hrs, Volume= 0.618 af, Depth= 8.33"
 Routed to Link 13L : Route 9 Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
* 0.890	98	Impervious
0.890		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	10	0.0275	0.05		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
0.2	67	0.0784	4.51		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
3.8	340	0.0088	1.51		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.5	311	0.0451	3.42		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.4	338	0.0621	4.01		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
10.5	1,066	Total			

Subcatchment 5S: Route 9W Undisturbed Imp.



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 85

Hydrograph for Subcatchment 5S: Route 9W Undisturbed Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	8.33	0.00
1.00	0.10	0.01	0.03	53.00	8.57	8.33	0.00
2.00	0.21	0.08	0.07	54.00	8.57	8.33	0.00
3.00	0.33	0.17	0.09	55.00	8.57	8.33	0.00
4.00	0.45	0.28	0.10	56.00	8.57	8.33	0.00
5.00	0.59	0.40	0.12	57.00	8.57	8.33	0.00
6.00	0.74	0.54	0.13	58.00	8.57	8.33	0.00
7.00	0.91	0.70	0.16	59.00	8.57	8.33	0.00
8.00	1.11	0.90	0.19	60.00	8.57	8.33	0.00
9.00	1.36	1.14	0.23	61.00	8.57	8.33	0.00
10.00	1.69	1.47	0.33	62.00	8.57	8.33	0.00
11.00	2.21	1.98	0.57	63.00	8.57	8.33	0.00
12.00	4.08	3.85	3.00	64.00	8.57	8.33	0.00
13.00	6.36	6.12	0.78	65.00	8.57	8.33	0.00
14.00	6.88	6.64	0.38	66.00	8.57	8.33	0.00
15.00	7.21	6.97	0.26	67.00	8.57	8.33	0.00
16.00	7.46	7.22	0.21	68.00	8.57	8.33	0.00
17.00	7.66	7.42	0.18	69.00	8.57	8.33	0.00
18.00	7.83	7.60	0.14	70.00	8.57	8.33	0.00
19.00	7.98	7.74	0.13	71.00	8.57	8.33	0.00
20.00	8.12	7.88	0.12	72.00	8.57	8.33	0.00
21.00	8.24	8.00	0.11				
22.00	8.36	8.12	0.10				
23.00	8.47	8.23	0.09				
24.00	8.57	8.33	0.09				
25.00	8.57	8.33	0.00				
26.00	8.57	8.33	0.00				
27.00	8.57	8.33	0.00				
28.00	8.57	8.33	0.00				
29.00	8.57	8.33	0.00				
30.00	8.57	8.33	0.00				
31.00	8.57	8.33	0.00				
32.00	8.57	8.33	0.00				
33.00	8.57	8.33	0.00				
34.00	8.57	8.33	0.00				
35.00	8.57	8.33	0.00				
36.00	8.57	8.33	0.00				
37.00	8.57	8.33	0.00				
38.00	8.57	8.33	0.00				
39.00	8.57	8.33	0.00				
40.00	8.57	8.33	0.00				
41.00	8.57	8.33	0.00				
42.00	8.57	8.33	0.00				
43.00	8.57	8.33	0.00				
44.00	8.57	8.33	0.00				
45.00	8.57	8.33	0.00				
46.00	8.57	8.33	0.00				
47.00	8.57	8.33	0.00				
48.00	8.57	8.33	0.00				
49.00	8.57	8.33	0.00				
50.00	8.57	8.33	0.00				
51.00	8.57	8.33	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 86

Summary for Subcatchment 6S: Moodna Creek Undisturbed Imp.

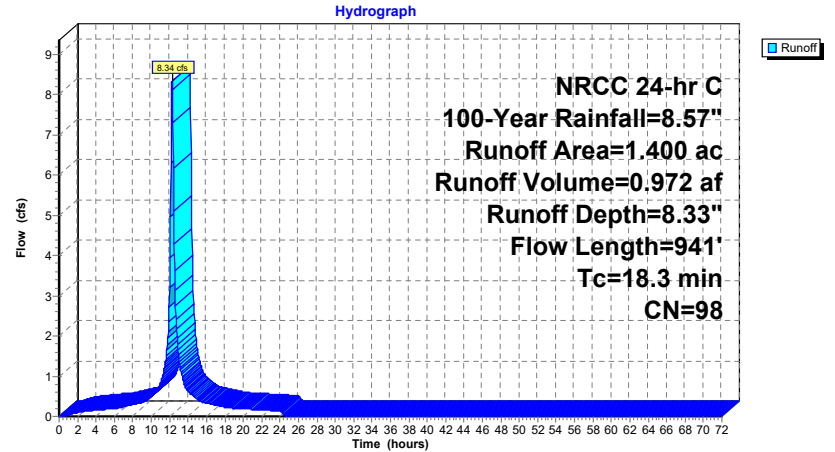
Runoff = 8.34 cfs @ 12.26 hrs, Volume= 0.972 af, Depth= 8.33"
 Routed to Link 11L : Moodna Creek Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
* 1.400	98	Impervious
1.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0950	0.12		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	244	0.0471	3.49		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
1.5	206	0.0194	2.24		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	391	0.0562	3.82		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
18.3	941	Total			

Subcatchment 6S: Moodna Creek Undisturbed Imp.



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 87

Hydrograph for Subcatchment 6S: Moodna Creek Undisturbed Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	8.33	0.00
1.00	0.10	0.01	0.03	53.00	8.57	8.33	0.00
2.00	0.21	0.08	0.10	54.00	8.57	8.33	0.00
3.00	0.33	0.17	0.13	55.00	8.57	8.33	0.00
4.00	0.45	0.28	0.16	56.00	8.57	8.33	0.00
5.00	0.59	0.40	0.18	57.00	8.57	8.33	0.00
6.00	0.74	0.54	0.20	58.00	8.57	8.33	0.00
7.00	0.91	0.70	0.24	59.00	8.57	8.33	0.00
8.00	1.11	0.90	0.30	60.00	8.57	8.33	0.00
9.00	1.36	1.14	0.35	61.00	8.57	8.33	0.00
10.00	1.69	1.47	0.50	62.00	8.57	8.33	0.00
11.00	2.21	1.98	0.82	63.00	8.57	8.33	0.00
12.00	4.08	3.85	3.22	64.00	8.57	8.33	0.00
13.00	6.36	6.12	1.43	65.00	8.57	8.33	0.00
14.00	6.88	6.64	0.62	66.00	8.57	8.33	0.00
15.00	7.21	6.97	0.43	67.00	8.57	8.33	0.00
16.00	7.46	7.22	0.33	68.00	8.57	8.33	0.00
17.00	7.66	7.42	0.28	69.00	8.57	8.33	0.00
18.00	7.83	7.60	0.23	70.00	8.57	8.33	0.00
19.00	7.98	7.74	0.20	71.00	8.57	8.33	0.00
20.00	8.12	7.88	0.19	72.00	8.57	8.33	0.00
21.00	8.24	8.00	0.18				
22.00	8.36	8.12	0.16				
23.00	8.47	8.23	0.15				
24.00	8.57	8.33	0.14				
25.00	8.57	8.33	0.00				
26.00	8.57	8.33	0.00				
27.00	8.57	8.33	0.00				
28.00	8.57	8.33	0.00				
29.00	8.57	8.33	0.00				
30.00	8.57	8.33	0.00				
31.00	8.57	8.33	0.00				
32.00	8.57	8.33	0.00				
33.00	8.57	8.33	0.00				
34.00	8.57	8.33	0.00				
35.00	8.57	8.33	0.00				
36.00	8.57	8.33	0.00				
37.00	8.57	8.33	0.00				
38.00	8.57	8.33	0.00				
39.00	8.57	8.33	0.00				
40.00	8.57	8.33	0.00				
41.00	8.57	8.33	0.00				
42.00	8.57	8.33	0.00				
43.00	8.57	8.33	0.00				
44.00	8.57	8.33	0.00				
45.00	8.57	8.33	0.00				
46.00	8.57	8.33	0.00				
47.00	8.57	8.33	0.00				
48.00	8.57	8.33	0.00				
49.00	8.57	8.33	0.00				
50.00	8.57	8.33	0.00				
51.00	8.57	8.33	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 88

Summary for Subcatchment 7S: Moodna Creek Perv.

Runoff = 319.99 cfs @ 12.55 hrs, Volume= 48.870 af, Depth= 5.78"
 Routed to Link 10L : Moodna Creek Disturbed

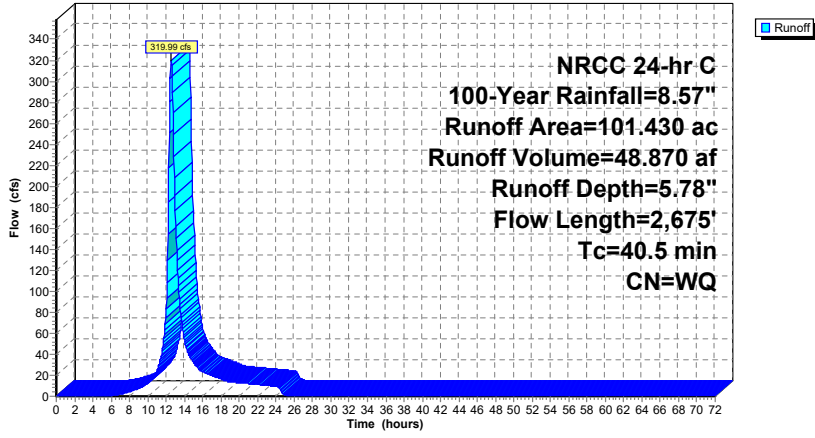
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
99.260	77	Woods, Good, HSG D
2.170	70	Woods, Good, HSG C
101.430		Weighted Average
101.430		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0360	0.08		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	262	0.0541	3.74		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
6.4	699	0.0129	1.83		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	302	0.0331	2.93		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.2	315	0.0706	4.28		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
1.5	428	0.0864	4.73		Shallow Concentrated Flow, FG Unpaved Kv= 16.1 fps
7.7	481	0.0042	1.04		Shallow Concentrated Flow, GH Unpaved Kv= 16.1 fps
0.3	88	0.0684	4.21		Shallow Concentrated Flow, HI Unpaved Kv= 16.1 fps
40.5	2,675	Total			

Subcatchment 7S: Moodna Creek Perv.

Hydrograph



Hydrograph for Subcatchment 7S: Moodna Creek Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	5.80	0.00
1.00	0.10	0.00	0.00	53.00	8.57	5.80	0.00
2.00	0.21	0.00	0.00	54.00	8.57	5.80	0.00
3.00	0.33	0.00	0.00	55.00	8.57	5.80	0.00
4.00	0.45	0.00	0.00	56.00	8.57	5.80	0.00
5.00	0.59	0.00	0.00	57.00	8.57	5.80	0.00
6.00	0.74	0.01	0.48	58.00	8.57	5.80	0.00
7.00	0.91	0.03	2.03	59.00	8.57	5.80	0.00
8.00	1.11	0.08	4.40	60.00	8.57	5.80	0.00
9.00	1.36	0.15	7.51	61.00	8.57	5.80	0.00
10.00	1.69	0.29	13.09	62.00	8.57	5.80	0.00
11.00	2.21	0.57	24.47	63.00	8.57	5.80	0.00
12.00	4.08	1.88	82.95	64.00	8.57	5.80	0.00
13.00	6.36	3.80	176.06	65.00	8.57	5.80	0.00
14.00	6.88	4.26	53.18	66.00	8.57	5.80	0.00
15.00	7.21	4.56	32.31	67.00	8.57	5.80	0.00
16.00	7.46	4.78	23.37	68.00	8.57	5.80	0.00
17.00	7.66	4.97	19.73	69.00	8.57	5.80	0.00
18.00	7.83	5.12	16.33	70.00	8.57	5.80	0.00
19.00	7.98	5.26	13.83	71.00	8.57	5.80	0.00
20.00	8.12	5.38	12.91	72.00	8.57	5.80	0.00
21.00	8.24	5.50	12.06				
22.00	8.36	5.61	11.21				
23.00	8.47	5.71	10.35				
24.00	8.57	5.80	9.49				
25.00	8.57	5.80	0.98				
26.00	8.57	5.80	0.01				
27.00	8.57	5.80	0.00				
28.00	8.57	5.80	0.00				
29.00	8.57	5.80	0.00				
30.00	8.57	5.80	0.00				
31.00	8.57	5.80	0.00				
32.00	8.57	5.80	0.00				
33.00	8.57	5.80	0.00				
34.00	8.57	5.80	0.00				
35.00	8.57	5.80	0.00				
36.00	8.57	5.80	0.00				
37.00	8.57	5.80	0.00				
38.00	8.57	5.80	0.00				
39.00	8.57	5.80	0.00				
40.00	8.57	5.80	0.00				
41.00	8.57	5.80	0.00				
42.00	8.57	5.80	0.00				
43.00	8.57	5.80	0.00				
44.00	8.57	5.80	0.00				
45.00	8.57	5.80	0.00				
46.00	8.57	5.80	0.00				
47.00	8.57	5.80	0.00				
48.00	8.57	5.80	0.00				
49.00	8.57	5.80	0.00				
50.00	8.57	5.80	0.00				
51.00	8.57	5.80	0.00				

2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023
Page 91

Summary for Subcatchment 8S: Route 9W Perv.

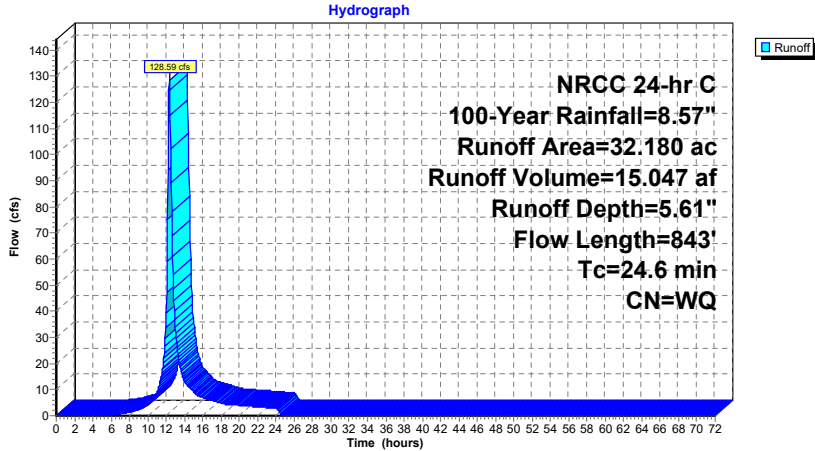
Runoff = 128.59 cfs @ 12.35 hrs, Volume= 15.047 af, Depth= 5.61"
Routed to Link 12L : Route 9 Distubred Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
7.210	70	Woods, Good, HSG C
24.970	77	Woods, Good, HSG D
32.180		Weighted Average
32.180		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	73	0.0550	0.09		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
11.1	770	0.0052	1.16		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
24.6	843				Total

Subcatchment 8S: Route 9W Perv.



2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023
Page 92

Hydrograph for Subcatchment 8S: Route 9W Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	5.56	0.00
1.00	0.10	0.00	0.00	53.00	8.57	5.56	0.00
2.00	0.21	0.00	0.00	54.00	8.57	5.56	0.00
3.00	0.33	0.00	0.00	55.00	8.57	5.56	0.00
4.00	0.45	0.00	0.00	56.00	8.57	5.56	0.00
5.00	0.59	0.00	0.00	57.00	8.57	5.56	0.00
6.00	0.74	0.00	0.19	58.00	8.57	5.56	0.00
7.00	0.91	0.02	0.63	59.00	8.57	5.56	0.00
8.00	1.11	0.05	1.39	60.00	8.57	5.56	0.00
9.00	1.36	0.12	2.38	61.00	8.57	5.56	0.00
10.00	1.69	0.24	4.42	62.00	8.57	5.56	0.00
11.00	2.21	0.49	8.85	63.00	8.57	5.56	0.00
12.00	4.08	1.73	39.34	64.00	8.57	5.56	0.00
13.00	6.36	3.59	33.95	65.00	8.57	5.56	0.00
14.00	6.88	4.04	13.22	66.00	8.57	5.56	0.00
15.00	7.21	4.34	9.15	67.00	8.57	5.56	0.00
16.00	7.46	4.55	6.97	68.00	8.57	5.56	0.00
17.00	7.66	4.74	5.92	69.00	8.57	5.56	0.00
18.00	7.83	4.89	4.85	70.00	8.57	5.56	0.00
19.00	7.98	5.02	4.24	71.00	8.57	5.56	0.00
20.00	8.12	5.15	3.98	72.00	8.57	5.56	0.00
21.00	8.24	5.26	3.71				
22.00	8.36	5.37	3.45				
23.00	8.47	5.47	3.18				
24.00	8.57	5.56	2.91				
25.00	8.57	5.56	0.03				
26.00	8.57	5.56	0.00				
27.00	8.57	5.56	0.00				
28.00	8.57	5.56	0.00				
29.00	8.57	5.56	0.00				
30.00	8.57	5.56	0.00				
31.00	8.57	5.56	0.00				
32.00	8.57	5.56	0.00				
33.00	8.57	5.56	0.00				
34.00	8.57	5.56	0.00				
35.00	8.57	5.56	0.00				
36.00	8.57	5.56	0.00				
37.00	8.57	5.56	0.00				
38.00	8.57	5.56	0.00				
39.00	8.57	5.56	0.00				
40.00	8.57	5.56	0.00				
41.00	8.57	5.56	0.00				
42.00	8.57	5.56	0.00				
43.00	8.57	5.56	0.00				
44.00	8.57	5.56	0.00				
45.00	8.57	5.56	0.00				
46.00	8.57	5.56	0.00				
47.00	8.57	5.56	0.00				
48.00	8.57	5.56	0.00				
49.00	8.57	5.56	0.00				
50.00	8.57	5.56	0.00				
51.00	8.57	5.56	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 93

Summary for Subcatchment 9S: Route 9W Undisturbed Perv.

Runoff = 97.03 cfs @ 12.18 hrs, Volume= 7.889 af, Depth= 5.56"
 Routed to Link 13L : Route 9 Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
4.940	70	Woods, Good, HSG C
12.100	77	Woods, Good, HSG D
17.040		Weighted Average
17.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	10	0.0275	0.05		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
0.2	67	0.0784	4.51		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
3.8	340	0.0088	1.51		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.5	311	0.0451	3.42		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.4	338	0.0621	4.01		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
10.5	1,066	Total			

2023-07-Existing

Prepared by Dynamic Engineering

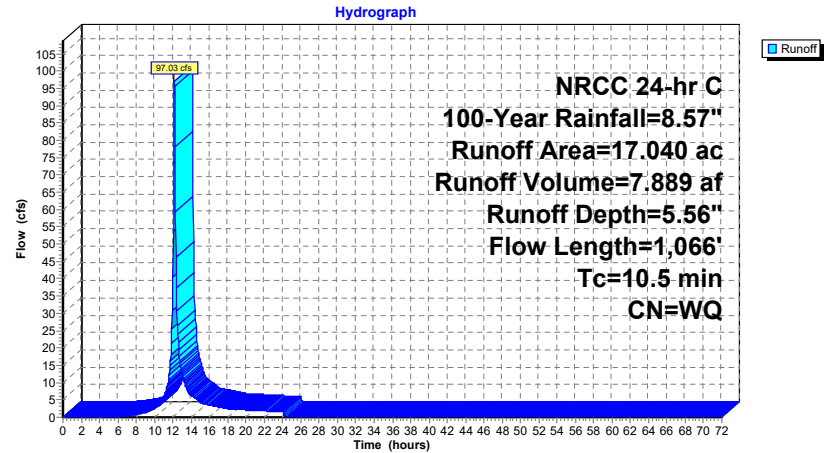
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 94

Subcatchment 9S: Route 9W Undisturbed Perv.



2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 95

Hydrograph for Subcatchment 9S: Route 9W Undisturbed Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	5.56	0.00
1.00	0.10	0.00	0.00	53.00	8.57	5.56	0.00
2.00	0.21	0.00	0.00	54.00	8.57	5.56	0.00
3.00	0.33	0.00	0.00	55.00	8.57	5.56	0.00
4.00	0.45	0.00	0.00	56.00	8.57	5.56	0.00
5.00	0.59	0.00	0.00	57.00	8.57	5.56	0.00
6.00	0.74	0.00	0.13	58.00	8.57	5.56	0.00
7.00	0.91	0.02	0.37	59.00	8.57	5.56	0.00
8.00	1.11	0.05	0.80	60.00	8.57	5.56	0.00
9.00	1.36	0.12	1.34	61.00	8.57	5.56	0.00
10.00	1.69	0.24	2.60	62.00	8.57	5.56	0.00
11.00	2.21	0.49	5.66	63.00	8.57	5.56	0.00
12.00	4.08	1.73	40.32	64.00	8.57	5.56	0.00
13.00	6.36	3.59	12.87	65.00	8.57	5.56	0.00
14.00	6.88	4.04	6.32	66.00	8.57	5.56	0.00
15.00	7.21	4.34	4.40	67.00	8.57	5.56	0.00
16.00	7.46	4.55	3.55	68.00	8.57	5.56	0.00
17.00	7.66	4.74	3.00	69.00	8.57	5.56	0.00
18.00	7.83	4.89	2.43	70.00	8.57	5.56	0.00
19.00	7.98	5.02	2.20	71.00	8.57	5.56	0.00
20.00	8.12	5.15	2.07	72.00	8.57	5.56	0.00
21.00	8.24	5.26	1.93				
22.00	8.36	5.37	1.79				
23.00	8.47	5.47	1.65				
24.00	8.57	5.56	1.50				
25.00	8.57	5.56	0.00				
26.00	8.57	5.56	0.00				
27.00	8.57	5.56	0.00				
28.00	8.57	5.56	0.00				
29.00	8.57	5.56	0.00				
30.00	8.57	5.56	0.00				
31.00	8.57	5.56	0.00				
32.00	8.57	5.56	0.00				
33.00	8.57	5.56	0.00				
34.00	8.57	5.56	0.00				
35.00	8.57	5.56	0.00				
36.00	8.57	5.56	0.00				
37.00	8.57	5.56	0.00				
38.00	8.57	5.56	0.00				
39.00	8.57	5.56	0.00				
40.00	8.57	5.56	0.00				
41.00	8.57	5.56	0.00				
42.00	8.57	5.56	0.00				
43.00	8.57	5.56	0.00				
44.00	8.57	5.56	0.00				
45.00	8.57	5.56	0.00				
46.00	8.57	5.56	0.00				
47.00	8.57	5.56	0.00				
48.00	8.57	5.56	0.00				
49.00	8.57	5.56	0.00				
50.00	8.57	5.56	0.00				
51.00	8.57	5.56	0.00				

2023-07-Existing

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 96

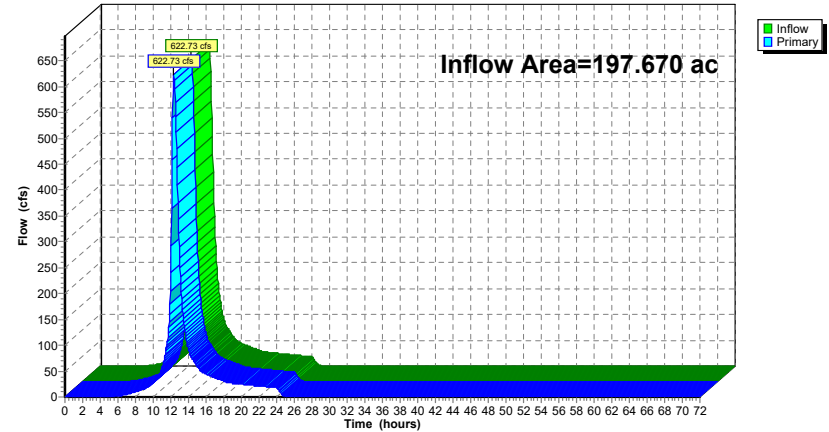
Summary for Link 3L: Existing Total

Inflow Area = 197.670 ac, 3.21% Impervious, Inflow Depth = 5.81" for 100-Year event
 Inflow = 622.73 cfs @ 12.34 hrs, Volume= 95.767 af
 Primary = 622.73 cfs @ 12.34 hrs, Volume= 95.767 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 3L: Existing Total

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 97

Hydrograph for Link 3L: Existing Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.10	0.00	0.10	53.00	0.00	0.00	0.00
2.00	0.41	0.00	0.41	54.00	0.00	0.00	0.00
3.00	0.59	0.00	0.59	55.00	0.00	0.00	0.00
4.00	0.71	0.00	0.71	56.00	0.00	0.00	0.00
5.00	0.80	0.00	0.80	57.00	0.00	0.00	0.00
6.00	2.04	0.00	2.04	58.00	0.00	0.00	0.00
7.00	5.17	0.00	5.17	59.00	0.00	0.00	0.00
8.00	10.02	0.00	10.02	60.00	0.00	0.00	0.00
9.00	16.24	0.00	16.24	61.00	0.00	0.00	0.00
10.00	28.65	0.00	28.65	62.00	0.00	0.00	0.00
11.00	55.34	0.00	55.34	63.00	0.00	0.00	0.00
12.00	240.55	0.00	240.55	64.00	0.00	0.00	0.00
13.00	269.24	0.00	269.24	65.00	0.00	0.00	0.00
14.00	92.13	0.00	92.13	66.00	0.00	0.00	0.00
15.00	59.22	0.00	59.22	67.00	0.00	0.00	0.00
16.00	44.25	0.00	44.25	68.00	0.00	0.00	0.00
17.00	37.40	0.00	37.40	69.00	0.00	0.00	0.00
18.00	30.76	0.00	30.76	70.00	0.00	0.00	0.00
19.00	26.60	0.00	26.60	71.00	0.00	0.00	0.00
20.00	24.88	0.00	24.88	72.00	0.00	0.00	0.00
21.00	23.23	0.00	23.23				
22.00	21.57	0.00	21.57				
23.00	19.89	0.00	19.89				
24.00	18.21	0.00	18.21				
25.00	1.04	0.00	1.04				
26.00	0.02	0.00	0.02				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 98

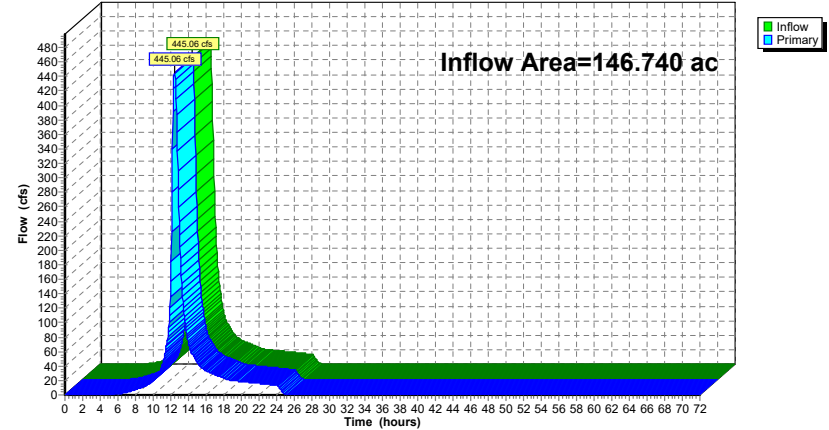
Summary for Link 4L: POA#1 Moodna Creek

Inflow Area = 146.740 ac, 3.16% Impervious, Inflow Depth = 5.86" for 100-Year event
 Inflow = 445.06 cfs @ 12.41 hrs, Volume= 71.644 af
 Primary = 445.06 cfs @ 12.41 hrs, Volume= 71.644 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 3L : Existing Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 4L: POA#1 Moodna Creek

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 99

Hydrograph for Link 4L: POA#1 Moodna Creek

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.06	0.00	0.06	53.00	0.00	0.00	0.00
2.00	0.29	0.00	0.29	54.00	0.00	0.00	0.00
3.00	0.42	0.00	0.42	55.00	0.00	0.00	0.00
4.00	0.51	0.00	0.51	56.00	0.00	0.00	0.00
5.00	0.58	0.00	0.58	57.00	0.00	0.00	0.00
6.00	1.48	0.00	1.48	58.00	0.00	0.00	0.00
7.00	3.87	0.00	3.87	59.00	0.00	0.00	0.00
8.00	7.47	0.00	7.47	60.00	0.00	0.00	0.00
9.00	12.09	0.00	12.09	61.00	0.00	0.00	0.00
10.00	21.01	0.00	21.01	62.00	0.00	0.00	0.00
11.00	39.80	0.00	39.80	63.00	0.00	0.00	0.00
12.00	156.38	0.00	156.38	64.00	0.00	0.00	0.00
13.00	220.62	0.00	220.62	65.00	0.00	0.00	0.00
14.00	71.83	0.00	71.83	66.00	0.00	0.00	0.00
15.00	45.16	0.00	45.16	67.00	0.00	0.00	0.00
16.00	33.32	0.00	33.32	68.00	0.00	0.00	0.00
17.00	28.15	0.00	28.15	69.00	0.00	0.00	0.00
18.00	23.20	0.00	23.20	70.00	0.00	0.00	0.00
19.00	19.91	0.00	19.91	71.00	0.00	0.00	0.00
20.00	18.60	0.00	18.60	72.00	0.00	0.00	0.00
21.00	17.37	0.00	17.37				
22.00	16.14	0.00	16.14				
23.00	14.89	0.00	14.89				
24.00	13.63	0.00	13.63				
25.00	1.02	0.00	1.02				
26.00	0.02	0.00	0.02				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 100

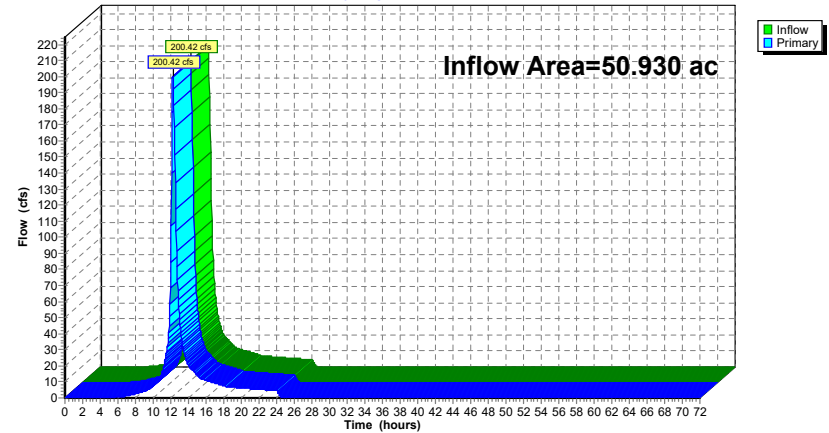
Summary for Link 5L: POA#2 Route 9 Total

Inflow Area = 50.930 ac, 3.36% Impervious, Inflow Depth = 5.68" for 100-Year event
 Inflow = 200.42 cfs @ 12.23 hrs, Volume= 24.123 af
 Primary = 200.42 cfs @ 12.23 hrs, Volume= 24.123 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 3L : Existing Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 5L: POA#2 Route 9 Total

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 101

Hydrograph for Link 5L: POA#2 Route 9 Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.04	0.00	0.04	53.00	0.00	0.00	0.00
2.00	0.12	0.00	0.12	54.00	0.00	0.00	0.00
3.00	0.17	0.00	0.17	55.00	0.00	0.00	0.00
4.00	0.20	0.00	0.20	56.00	0.00	0.00	0.00
5.00	0.22	0.00	0.22	57.00	0.00	0.00	0.00
6.00	0.57	0.00	0.57	58.00	0.00	0.00	0.00
7.00	1.31	0.00	1.31	59.00	0.00	0.00	0.00
8.00	2.55	0.00	2.55	60.00	0.00	0.00	0.00
9.00	4.15	0.00	4.15	61.00	0.00	0.00	0.00
10.00	7.64	0.00	7.64	62.00	0.00	0.00	0.00
11.00	15.54	0.00	15.54	63.00	0.00	0.00	0.00
12.00	84.17	0.00	84.17	64.00	0.00	0.00	0.00
13.00	48.63	0.00	48.63	65.00	0.00	0.00	0.00
14.00	20.30	0.00	20.30	66.00	0.00	0.00	0.00
15.00	14.07	0.00	14.07	67.00	0.00	0.00	0.00
16.00	10.93	0.00	10.93	68.00	0.00	0.00	0.00
17.00	9.26	0.00	9.26	69.00	0.00	0.00	0.00
18.00	7.56	0.00	7.56	70.00	0.00	0.00	0.00
19.00	6.69	0.00	6.69	71.00	0.00	0.00	0.00
20.00	6.28	0.00	6.28	72.00	0.00	0.00	0.00
21.00	5.86	0.00	5.86				
22.00	5.44	0.00	5.44				
23.00	5.01	0.00	5.01				
24.00	4.58	0.00	4.58				
25.00	0.03	0.00	0.03				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

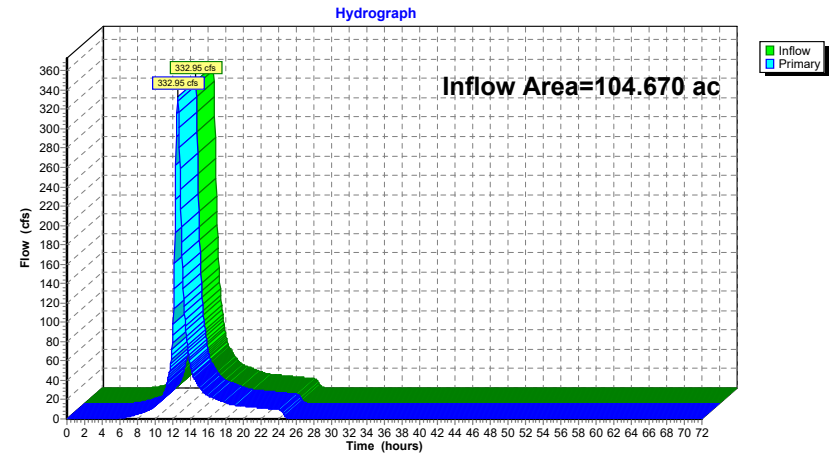
Page 102

Summary for Link 10L: Moodna Creek Disturbed

Inflow Area = 104.670 ac, 3.10% Impervious, Inflow Depth = 5.86" for 100-Year event
 Inflow = 332.95 cfs @ 12.55 hrs, Volume= 51.119 af
 Primary = 332.95 cfs @ 12.55 hrs, Volume= 51.119 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : POA#1 Moodna Creek

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 10L: Moodna Creek Disturbed



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 103

Hydrograph for Link 10L: Moodna Creek Disturbed

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.02	0.00	0.02	53.00	0.00	0.00	0.00
2.00	0.19	0.00	0.19	54.00	0.00	0.00	0.00
3.00	0.29	0.00	0.29	55.00	0.00	0.00	0.00
4.00	0.35	0.00	0.35	56.00	0.00	0.00	0.00
5.00	0.40	0.00	0.40	57.00	0.00	0.00	0.00
6.00	0.92	0.00	0.92	58.00	0.00	0.00	0.00
7.00	2.55	0.00	2.55	59.00	0.00	0.00	0.00
8.00	5.05	0.00	5.05	60.00	0.00	0.00	0.00
9.00	8.28	0.00	8.28	61.00	0.00	0.00	0.00
10.00	14.12	0.00	14.12	62.00	0.00	0.00	0.00
11.00	26.00	0.00	26.00	63.00	0.00	0.00	0.00
12.00	87.00	0.00	87.00	64.00	0.00	0.00	0.00
13.00	182.82	0.00	182.82	65.00	0.00	0.00	0.00
14.00	55.10	0.00	55.10	66.00	0.00	0.00	0.00
15.00	33.46	0.00	33.46	67.00	0.00	0.00	0.00
16.00	24.20	0.00	24.20	68.00	0.00	0.00	0.00
17.00	20.42	0.00	20.42	69.00	0.00	0.00	0.00
18.00	16.90	0.00	16.90	70.00	0.00	0.00	0.00
19.00	14.31	0.00	14.31	71.00	0.00	0.00	0.00
20.00	13.36	0.00	13.36	72.00	0.00	0.00	0.00
21.00	12.48	0.00	12.48				
22.00	11.60	0.00	11.60				
23.00	10.71	0.00	10.71				
24.00	9.82	0.00	9.82				
25.00	1.02	0.00	1.02				
26.00	0.02	0.00	0.02				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

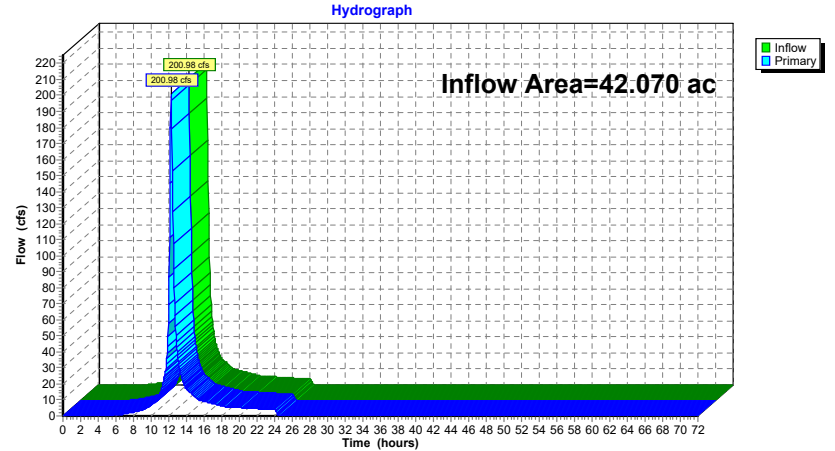
Page 104

Summary for Link 11L: Moodna Creek Undisturbed Total

Inflow Area = 42.070 ac, 3.33% Impervious, Inflow Depth = 5.85" for 100-Year event
 Inflow = 200.98 cfs @ 12.27 hrs, Volume= 20.525 af
 Primary = 200.98 cfs @ 12.27 hrs, Volume= 20.525 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 4L : POA#1 Moodna Creek

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 11L: Moodna Creek Undisturbed Total



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 105

Hydrograph for Link 11L: Moodna Creek Undisturbed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.03	0.00	0.03	53.00	0.00	0.00	0.00
2.00	0.10	0.00	0.10	54.00	0.00	0.00	0.00
3.00	0.13	0.00	0.13	55.00	0.00	0.00	0.00
4.00	0.16	0.00	0.16	56.00	0.00	0.00	0.00
5.00	0.18	0.00	0.18	57.00	0.00	0.00	0.00
6.00	0.55	0.00	0.55	58.00	0.00	0.00	0.00
7.00	1.32	0.00	1.32	59.00	0.00	0.00	0.00
8.00	2.43	0.00	2.43	60.00	0.00	0.00	0.00
9.00	3.81	0.00	3.81	61.00	0.00	0.00	0.00
10.00	6.90	0.00	6.90	62.00	0.00	0.00	0.00
11.00	13.80	0.00	13.80	63.00	0.00	0.00	0.00
12.00	69.39	0.00	69.39	64.00	0.00	0.00	0.00
13.00	37.80	0.00	37.80	65.00	0.00	0.00	0.00
14.00	16.73	0.00	16.73	66.00	0.00	0.00	0.00
15.00	11.70	0.00	11.70	67.00	0.00	0.00	0.00
16.00	9.13	0.00	9.13	68.00	0.00	0.00	0.00
17.00	7.73	0.00	7.73	69.00	0.00	0.00	0.00
18.00	6.30	0.00	6.30	70.00	0.00	0.00	0.00
19.00	5.60	0.00	5.60	71.00	0.00	0.00	0.00
20.00	5.24	0.00	5.24	72.00	0.00	0.00	0.00
21.00	4.89	0.00	4.89				
22.00	4.54	0.00	4.54				
23.00	4.18	0.00	4.18				
24.00	3.82	0.00	3.82				
25.00	0.00	0.00	0.00				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

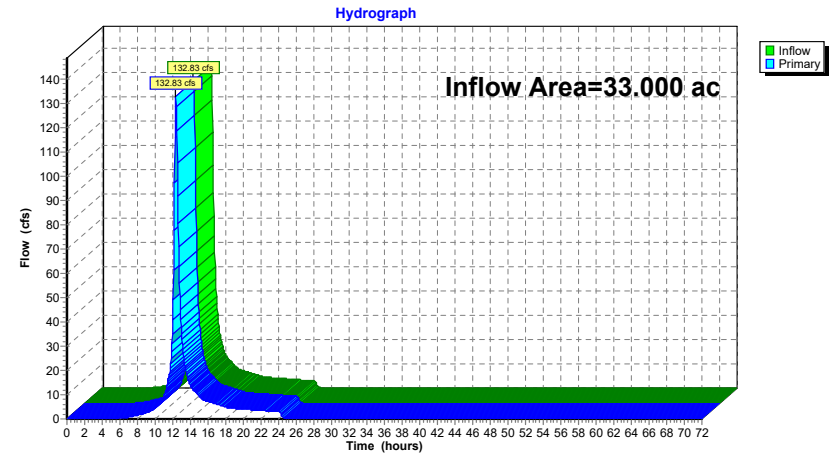
Page 106

Summary for Link 12L: Route 9 Distubred Total

Inflow Area = 33.000 ac, 2.48% Impervious, Inflow Depth = 5.68" for 100-Year event
 Inflow = 132.83 cfs @ 12.35 hrs, Volume= 15.616 af
 Primary = 132.83 cfs @ 12.35 hrs, Volume= 15.616 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 5L : POA#2 Route 9 Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 12L: Route 9 Distubred Total



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 107

Hydrograph for Link 12L: Route 9 Disturbed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.01	0.00	0.01	53.00	0.00	0.00	0.00
2.00	0.06	0.00	0.06	54.00	0.00	0.00	0.00
3.00	0.08	0.00	0.08	55.00	0.00	0.00	0.00
4.00	0.09	0.00	0.09	56.00	0.00	0.00	0.00
5.00	0.10	0.00	0.10	57.00	0.00	0.00	0.00
6.00	0.31	0.00	0.31	58.00	0.00	0.00	0.00
7.00	0.77	0.00	0.77	59.00	0.00	0.00	0.00
8.00	1.56	0.00	1.56	60.00	0.00	0.00	0.00
9.00	2.58	0.00	2.58	61.00	0.00	0.00	0.00
10.00	4.70	0.00	4.70	62.00	0.00	0.00	0.00
11.00	9.30	0.00	9.30	63.00	0.00	0.00	0.00
12.00	40.85	0.00	40.85	64.00	0.00	0.00	0.00
13.00	34.97	0.00	34.97	65.00	0.00	0.00	0.00
14.00	13.60	0.00	13.60	66.00	0.00	0.00	0.00
15.00	9.41	0.00	9.41	67.00	0.00	0.00	0.00
16.00	7.17	0.00	7.17	68.00	0.00	0.00	0.00
17.00	6.08	0.00	6.08	69.00	0.00	0.00	0.00
18.00	4.99	0.00	4.99	70.00	0.00	0.00	0.00
19.00	4.36	0.00	4.36	71.00	0.00	0.00	0.00
20.00	4.09	0.00	4.09	72.00	0.00	0.00	0.00
21.00	3.82	0.00	3.82				
22.00	3.55	0.00	3.55				
23.00	3.27	0.00	3.27				
24.00	2.99	0.00	2.99				
25.00	0.03	0.00	0.03				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 108

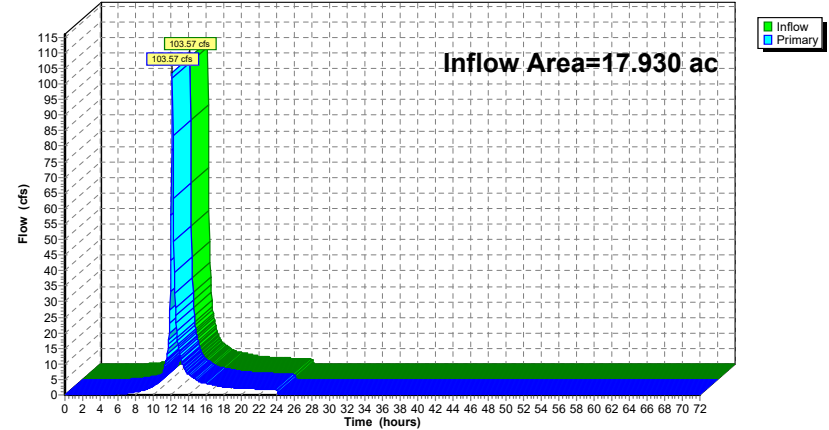
Summary for Link 13L: Route 9 Undisturbed Total

Inflow Area = 17.930 ac, 4.96% Impervious, Inflow Depth = 5.69" for 100-Year event
 Inflow = 103.57 cfs @ 12.18 hrs, Volume= 8.507 af
 Primary = 103.57 cfs @ 12.18 hrs, Volume= 8.507 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 5L : POA#2 Route 9 Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 13L: Route 9 Undisturbed Total

Hydrograph



2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 109

Hydrograph for Link 13L: Route 9 Undisturbed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.03	0.00	0.03	53.00	0.00	0.00	0.00
2.00	0.07	0.00	0.07	54.00	0.00	0.00	0.00
3.00	0.09	0.00	0.09	55.00	0.00	0.00	0.00
4.00	0.10	0.00	0.10	56.00	0.00	0.00	0.00
5.00	0.12	0.00	0.12	57.00	0.00	0.00	0.00
6.00	0.26	0.00	0.26	58.00	0.00	0.00	0.00
7.00	0.53	0.00	0.53	59.00	0.00	0.00	0.00
8.00	0.99	0.00	0.99	60.00	0.00	0.00	0.00
9.00	1.57	0.00	1.57	61.00	0.00	0.00	0.00
10.00	2.93	0.00	2.93	62.00	0.00	0.00	0.00
11.00	6.24	0.00	6.24	63.00	0.00	0.00	0.00
12.00	43.32	0.00	43.32	64.00	0.00	0.00	0.00
13.00	13.66	0.00	13.66	65.00	0.00	0.00	0.00
14.00	6.70	0.00	6.70	66.00	0.00	0.00	0.00
15.00	4.66	0.00	4.66	67.00	0.00	0.00	0.00
16.00	3.76	0.00	3.76	68.00	0.00	0.00	0.00
17.00	3.17	0.00	3.17	69.00	0.00	0.00	0.00
18.00	2.57	0.00	2.57	70.00	0.00	0.00	0.00
19.00	2.33	0.00	2.33	71.00	0.00	0.00	0.00
20.00	2.19	0.00	2.19	72.00	0.00	0.00	0.00
21.00	2.04	0.00	2.04				
22.00	1.89	0.00	1.89				
23.00	1.74	0.00	1.74				
24.00	1.59	0.00	1.59				
25.00	0.00	0.00	0.00				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Table of Contents

Printed 10/24/2023

TABLE OF CONTENTS

Project Reports

- 1 Routing Diagram
- 2 Project Notes
- 3 Rainfall Events Listing
- 4 Area Listing (all nodes)
- 5 Soil Listing (all nodes)
- 6 Ground Covers (all nodes)
- 7 Notes Listing (all nodes)

1-Year Event

- 8 Node Listing
- 9 Subcat 1S: Moodna Creek Imp.
- 12 Subcat 2S: Route 9W Imp.
- 14 Subcat 4S: Moodna Creek Undisturbed Perv.
- 16 Subcat 5S: Route 9W Undisturbed Imp.
- 18 Subcat 6S: Moodna Creek Undisturbed Imp.
- 20 Subcat 7S: Moodna Creek Perv.
- 23 Subcat 8S: Route 9W Perv.
- 25 Subcat 9S: Route 9W Undisturbed Perv.
- 28 Link 3L: Existing Total
- 30 Link 4L: POA#1 Moodna Creek
- 32 Link 5L: POA#2 Route 9 Total
- 34 Link 10L: Moodna Creek Disturbed
- 36 Link 11L: Moodna Creek Undisturbed Total
- 38 Link 12L: Route 9 Distubred Total
- 40 Link 13L: Route 9 Undisturbed Total

10-Year Event

- 42 Node Listing
- 43 Subcat 1S: Moodna Creek Imp.
- 46 Subcat 2S: Route 9W Imp.
- 48 Subcat 4S: Moodna Creek Undisturbed Perv.
- 50 Subcat 5S: Route 9W Undisturbed Imp.
- 52 Subcat 6S: Moodna Creek Undisturbed Imp.
- 54 Subcat 7S: Moodna Creek Perv.
- 57 Subcat 8S: Route 9W Perv.
- 59 Subcat 9S: Route 9W Undisturbed Perv.
- 62 Link 3L: Existing Total
- 64 Link 4L: POA#1 Moodna Creek
- 66 Link 5L: POA#2 Route 9 Total
- 68 Link 10L: Moodna Creek Disturbed
- 70 Link 11L: Moodna Creek Undisturbed Total
- 72 Link 12L: Route 9 Distubred Total
- 74 Link 13L: Route 9 Undisturbed Total

2023-07-Existing

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Table of Contents

Printed 10/24/2023

100-Year Event

- 76 Node Listing
- 77 Subcat 1S: Moodna Creek Imp.
- 80 Subcat 2S: Route 9W Imp.
- 82 Subcat 4S: Moodna Creek Undisturbed Perv.
- 84 Subcat 5S: Route 9W Undisturbed Imp.
- 86 Subcat 6S: Moodna Creek Undisturbed Imp.
- 88 Subcat 7S: Moodna Creek Perv.
- 91 Subcat 8S: Route 9W Perv.
- 93 Subcat 9S: Route 9W Undisturbed Perv.
- 96 Link 3L: Existing Total
- 98 Link 4L: POA#1 Moodna Creek
- 100 Link 5L: POA#2 Route 9 Total
- 102 Link 10L: Moodna Creek Disturbed
- 104 Link 11L: Moodna Creek Undisturbed Total
- 106 Link 12L: Route 9 Disturbed Total
- 108 Link 13L: Route 9 Undisturbed Total

2023-09 Proposed

Prepared by Dynamic Engineering

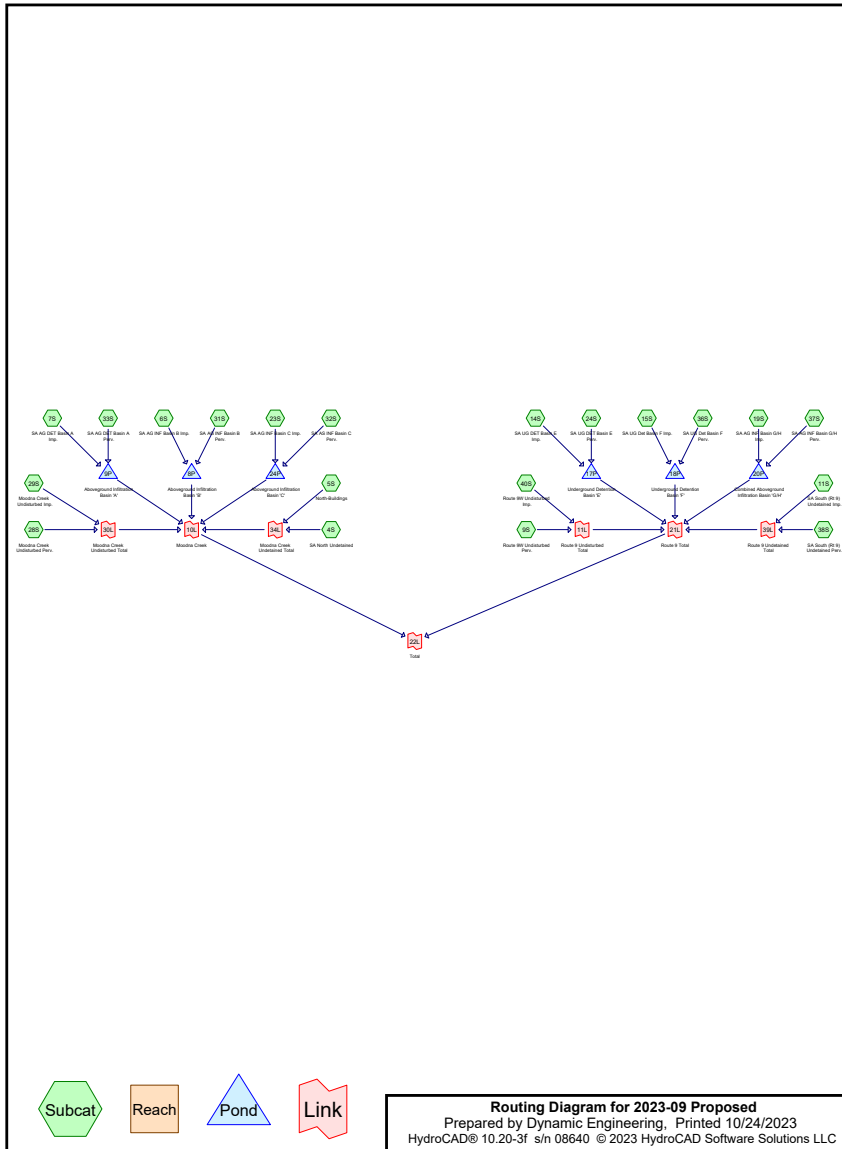
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Printed 10/24/2023

Page 2

Project Notes

Rainfall events imported from "NRCS-Rain.txt" for 7083 NY Orange



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Printed 10/24/2023

Page 3

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	NRCC 24-hr	C	Default	24.00	1	2.64	2
2	10-Year	NRCC 24-hr	C	Default	24.00	1	4.80	2
3	100-Year	NRCC 24-hr	C	Default	24.00	1	8.57	2

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Printed 10/24/2023

Page 4

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.220	74	>75% Grass cover, Good, HSG C (4S, 33S, 36S, 37S, 38S)
53.780	80	>75% Grass cover, Good, HSG D (4S, 24S, 31S, 32S, 33S, 36S, 37S, 38S)
4.160	98	Building A North Half (7S)
4.160	98	Building A South Half (6S)
3.340	98	Building B (5S)
8.645	98	Building C North (6S)
8.645	98	Building C South (23S)
21.395	98	Impervious (6S, 15S, 19S, 29S, 40S)
21.935	98	Paved parking, HSG D (7S, 14S, 23S)
10.680	98	Roofs, HSG D (11S, 14S)
6.410	70	Woods, Good, HSG C (9S, 28S)
51.300	77	Woods, Good, HSG D (9S, 28S)
197.670	86	TOTAL AREA

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Printed 10/24/2023

Page 5

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
9.630	HSG C	4S, 9S, 28S, 33S, 36S, 37S, 38S
137.695	HSG D	4S, 7S, 9S, 11S, 14S, 23S, 24S, 28S, 31S, 32S, 33S, 36S, 37S, 38S
50.345	Other	5S, 6S, 7S, 15S, 19S, 23S, 29S, 40S
197.670	TOTAL AREA	

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Printed 10/24/2023

Page 6

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	3.220	53.780	0.000	57.000	>75% Grass cover, Good	4S, 24S, 31S, 32S, 33S, 36S, 37S, 38S
0.000	0.000	0.000	0.000	4.160	4.160	Building A North Half	7S
0.000	0.000	0.000	0.000	4.160	4.160	Building A South Half	6S
0.000	0.000	0.000	0.000	3.340	3.340	Building B	5S
0.000	0.000	0.000	0.000	8.645	8.645	Building C North	6S
0.000	0.000	0.000	0.000	8.645	8.645	Building C South	23S
0.000	0.000	0.000	0.000	21.395	21.395	Impervious	6S, 15S, 19S, 29S, 40S
0.000	0.000	0.000	21.935	0.000	21.935	Paved parking	7S, 14S, 23S
0.000	0.000	0.000	10.680	0.000	10.680	Roofs	11S, 14S
0.000	0.000	6.410	51.300	0.000	57.710	Woods, Good	9S, 28S
0.000	0.000	9.630	137.695	50.345	197.670	TOTAL AREA	

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Printed 10/24/2023
Page 7

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	5S	0.00	0.00	15.0	0.0050	0.012	0.0	15.0	0.0	
2	5S	0.00	0.00	108.0	0.0050	0.012	0.0	18.0	0.0	
3	5S	0.00	0.00	162.0	0.0050	0.012	0.0	24.0	0.0	
4	5S	0.00	0.00	1,374.0	0.0050	0.012	0.0	36.0	0.0	
5	5S	0.00	0.00	535.0	0.0050	0.012	0.0	48.0	0.0	
6	6S	0.00	0.00	902.0	0.0050	0.012	0.0	18.0	0.0	
7	6S	0.00	0.00	282.0	0.0596	0.012	0.0	18.0	0.0	
8	6S	0.00	0.00	360.0	0.0115	0.012	0.0	18.0	0.0	
9	6S	0.00	0.00	449.0	0.0200	0.012	0.0	18.0	0.0	
10	6S	0.00	0.00	826.0	0.0400	0.012	0.0	18.0	0.0	
11	7S	0.00	0.00	2,772.0	0.0050	0.012	0.0	18.0	0.0	
12	15S	0.00	0.00	63.0	0.0050	0.013	0.0	15.0	0.0	
13	15S	0.00	0.00	1,105.0	0.0050	0.013	0.0	18.0	0.0	
14	19S	0.00	0.00	327.0	0.0142	0.012	0.0	18.0	0.0	
15	19S	0.00	0.00	335.0	0.0468	0.012	0.0	18.0	0.0	
16	19S	0.00	0.00	370.0	0.0504	0.012	0.0	18.0	0.0	
17	19S	0.00	0.00	141.0	0.0348	0.012	0.0	18.0	0.0	
18	19S	0.00	0.00	989.0	0.0050	0.013	0.0	18.0	0.0	
19	23S	0.00	0.00	100.0	0.0050	0.012	0.0	15.0	0.0	
20	23S	0.00	0.00	886.0	0.0050	0.012	0.0	18.0	0.0	
21	23S	0.00	0.00	342.0	0.0050	0.012	0.0	36.0	0.0	
22	23S	0.00	0.00	545.0	0.0050	0.012	0.0	42.0	0.0	
23	23S	0.00	0.00	37.0	0.0050	0.012	0.0	48.0	0.0	
24	23S	0.00	0.00	10.0	0.0400	0.012	0.0	54.0	0.0	
25	23S	0.00	0.00	106.0	0.0400	0.012	0.0	60.0	0.0	
26	31S	0.00	0.00	902.0	0.0050	0.012	0.0	18.0	0.0	
27	31S	0.00	0.00	282.0	0.0596	0.012	0.0	18.0	0.0	
28	31S	0.00	0.00	360.0	0.0115	0.012	0.0	18.0	0.0	
29	31S	0.00	0.00	449.0	0.0200	0.012	0.0	18.0	0.0	
30	31S	0.00	0.00	826.0	0.0400	0.012	0.0	18.0	0.0	
31	32S	0.00	0.00	100.0	0.0050	0.012	0.0	15.0	0.0	
32	32S	0.00	0.00	886.0	0.0050	0.012	0.0	18.0	0.0	
33	32S	0.00	0.00	342.0	0.0050	0.012	0.0	36.0	0.0	
34	32S	0.00	0.00	545.0	0.0050	0.012	0.0	42.0	0.0	
35	32S	0.00	0.00	37.0	0.0050	0.012	0.0	48.0	0.0	
36	32S	0.00	0.00	10.0	0.0400	0.012	0.0	54.0	0.0	
37	32S	0.00	0.00	106.0	0.0400	0.012	0.0	60.0	0.0	
38	33S	0.00	0.00	2,772.0	0.0050	0.012	0.0	18.0	0.0	
39	36S	0.00	0.00	63.0	0.0050	0.013	0.0	15.0	0.0	
40	36S	0.00	0.00	1,105.0	0.0050	0.013	0.0	18.0	0.0	
41	37S	0.00	0.00	327.0	0.0142	0.012	0.0	18.0	0.0	

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Printed 10/24/2023
Page 8

Pipe Listing (all nodes) (continued)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
42	37S	0.00	0.00	335.0	0.0468	0.012	0.0	18.0	0.0	
43	37S	0.00	0.00	370.0	0.0504	0.012	0.0	18.0	0.0	
44	37S	0.00	0.00	141.0	0.0348	0.012	0.0	18.0	0.0	
45	37S	0.00	0.00	989.0	0.0050	0.013	0.0	18.0	0.0	
46	8P	142.00	141.72	55.0	0.0051	0.013	0.0	30.0	0.0	
47	9P	193.06	189.00	58.0	0.0700	0.013	0.0	36.0	0.0	
48	17P	216.00	215.00	22.0	0.0455	0.013	0.0	24.0	0.0	
49	18P	190.00	188.41	186.0	0.0085	0.013	0.0	18.0	0.0	
50	20P	137.50	137.20	60.0	0.0050	0.013	0.0	15.0	0.0	
51	24P	154.20	153.70	100.0	0.0050	0.013	0.0	18.0	0.0	

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Printed 10/24/2023
Page 9

Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	Rainfall events imported from "NRCS-Rain.txt" for 7083 NY Orange
2	14S	Calculated TC path = 5.7 mins. Minimum TC of 6 mins used.

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 10

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

- Subcatchment4S: SA North Undetained** Runoff Area=23.610 ac 0.00% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=WQ Runoff=28.30 cfs 1.940 af
- Subcatchment5S: North-Buildings** Runoff Area=3.340 ac 100.00% Impervious Runoff Depth=2.41"
Flow Length=2,657' Tc=9.5 min CN=98 Runoff=7.72 cfs 0.671 af
- Subcatchment6S: SA AG INF Basin B** Runoff Area=23.070 ac 100.00% Impervious Runoff Depth=2.41"
Flow Length=3,078' Tc=9.2 min CN=WQ Runoff=54.06 cfs 4.633 af
- Subcatchment7S: SA AG DET Basin A** Runoff Area=13.630 ac 100.00% Impervious Runoff Depth=2.41"
Flow Length=3,025' Tc=19.6 min CN=WQ Runoff=23.81 cfs 2.737 af
- Subcatchment9S: Route 9W Undisturbed** Runoff Area=17.040 ac 0.00% Impervious Runoff Depth=0.74"
Flow Length=1,066' Tc=10.5 min CN=WQ Runoff=12.26 cfs 1.052 af
- Subcatchment11S: SA South (Rt 9)** Runoff Area=7.540 ac 100.00% Impervious Runoff Depth=2.41"
Flow Length=762' Tc=29.9 min CN=98 Runoff=10.75 cfs 1.514 af
- Subcatchment14S: SA UG DET Basin E** Runoff Area=3.960 ac 100.00% Impervious Runoff Depth=2.41"
Tc=6.0 min CN=WQ Runoff=10.25 cfs 0.795 af
- Subcatchment15S: SA UG Det Basin F** Runoff Area=3.510 ac 100.00% Impervious Runoff Depth=2.41"
Flow Length=1,606' Tc=8.2 min CN=98 Runoff=8.55 cfs 0.705 af
- Subcatchment19S: SA AG INF Basin G/H** Runoff Area=5.330 ac 100.00% Impervious Runoff Depth=2.41"
Flow Length=2,565' Tc=9.4 min CN=98 Runoff=12.36 cfs 1.070 af
- Subcatchment23S: SA AG INF Basin C** Runoff Area=20.290 ac 100.00% Impervious Runoff Depth=2.41"
Flow Length=2,126' Tc=11.2 min CN=WQ Runoff=44.44 cfs 4.075 af
- Subcatchment24S: SA UG DET Basin E** Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=0.99"
Tc=0.0 min CN=80 Runoff=0.10 cfs 0.006 af
- Subcatchment28S: Moodna Creek** Runoff Area=40.670 ac 0.00% Impervious Runoff Depth=0.82"
Flow Length=941' Tc=18.3 min CN=WQ Runoff=26.00 cfs 2.774 af
- Subcatchment29S: Moodna Creek** Runoff Area=1.400 ac 100.00% Impervious Runoff Depth=2.41"
Flow Length=941' Tc=18.3 min CN=98 Runoff=2.52 cfs 0.281 af
- Subcatchment31S: SA AG INF Basin B Perv.** Runoff Area=5.920 ac 0.00% Impervious Runoff Depth=0.99"
Flow Length=3,078' Tc=9.2 min CN=80 Runoff=6.28 cfs 0.487 af
- Subcatchment32S: SA AS INF Basin C Perv.** Runoff Area=7.750 ac 0.00% Impervious Runoff Depth=0.99"
Flow Length=2,126' Tc=11.2 min CN=80 Runoff=7.67 cfs 0.637 af
- Subcatchment33S: SA AG DET Basin A** Runoff Area=3.870 ac 0.00% Impervious Runoff Depth=0.98"
Flow Length=3,025' Tc=19.6 min CN=WQ Runoff=2.96 cfs 0.316 af

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 11

Subcatchment36S: SA UG Det Basin F Perv. Runoff Area=0.400 ac 0.00% Impervious Runoff Depth=0.75"
Flow Length=1,606' Tc=8.2 min CN=WQ Runoff=0.32 cfs 0.025 af

Subcatchment37S: SA AG INF Basin G/H Runoff Area=12.440 ac 0.00% Impervious Runoff Depth=0.94"
Flow Length=2,565' Tc=9.4 min CN=WQ Runoff=12.28 cfs 0.971 af

Subcatchment38S: SA South (Rt 9) Runoff Area=2.940 ac 0.00% Impervious Runoff Depth=0.92"
Flow Length=762' Tc=29.9 min CN=WQ Runoff=1.68 cfs 0.226 af

Subcatchment40S: Route 9W Runoff Area=0.890 ac 100.00% Impervious Runoff Depth=2.41"
Flow Length=1,066' Tc=10.5 min CN=98 Runoff=1.98 cfs 0.179 af

Pond 8P: AbovegroundInfiltration Basin Peak Elev=143.73' Storage=91,490 cf Inflow=60.32 cfs 5.120 af
Discarded=4.65 cfs 5.120 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=4.65 cfs 5.120 af

Pond 9P: AbovegroundInfiltration Basin Peak Elev=197.50' Storage=83,329 cf Inflow=26.75 cfs 3.053 af
Discarded=0.85 cfs 2.897 af Primary=0.40 cfs 0.156 af Secondary=0.00 cfs 0.000 af Outflow=1.25 cfs 3.053 af

Pond 17P: Underground Detention Basin 'E' Peak Elev=221.23' Storage=0.499 af Inflow=10.30 cfs 0.801 af
Outflow=0.94 cfs 0.567 af

Pond 18P: Underground Detention Basin 'F' Peak Elev=190.99' Storage=0.219 af Inflow=8.87 cfs 0.730 af
Outflow=2.64 cfs 0.730 af

Pond 20P: Combined Aboveground Peak Elev=137.59' Storage=5,807 cf Inflow=24.61 cfs 2.041 af
Discarded=15.85 cfs 2.041 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=15.85 cfs 2.041 af

Pond 24P: AbovegroundInfiltration Basin Peak Elev=154.95' Storage=39,196 cf Inflow=52.08 cfs 4.712 af
Discarded=15.36 cfs 4.712 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=15.36 cfs 4.712 af

Link 10L: Moodna Creek Inflow=53.91 cfs 5.822 af
Primary=53.91 cfs 5.822 af

Link 11L: Route 9 Undisturbed Total Inflow=14.22 cfs 1.231 af
Primary=14.22 cfs 1.231 af

Link 21L: Route 9 Total Inflow=25.61 cfs 4.268 af
Primary=25.61 cfs 4.268 af

Link 22L: Total Inflow=77.70 cfs 10.090 af
Primary=77.70 cfs 10.090 af

Link 30L: Moodna Creek Undisturbed Total Inflow=28.48 cfs 3.055 af
Primary=28.48 cfs 3.055 af

Link 34L: Moodna Creek Undetained Total Inflow=35.79 cfs 2.611 af
Primary=35.79 cfs 2.611 af

Link 39L: Route 9 Undetained Total Inflow=12.41 cfs 1.740 af
Primary=12.41 cfs 1.740 af

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 12

Total Runoff Area = 197.670 ac Runoff Volume = 25.095 af Average Runoff Depth = 1.52"
58.03% Pervious = 114.710 ac 41.97% Impervious = 82.960 ac

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 13

Summary for Subcatchment 4S: SA North Undetained

Runoff = 28.30 cfs @ 12.14 hrs, Volume= 1.940 af, Depth= 0.99"
 Routed to Link 34L : Moodna Creek Undetained Total

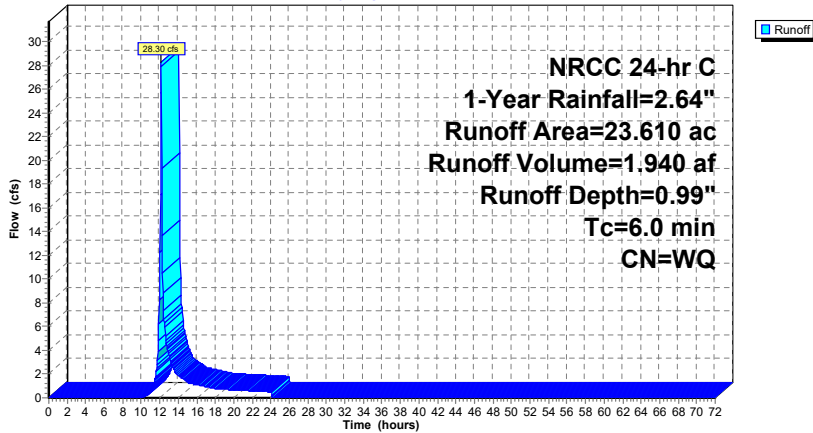
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.060	74	>75% Grass cover, Good, HSG C
23.550	80	>75% Grass cover, Good, HSG D
23.610		Weighted Average
23.610		100.00% Pervious Area

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

Subcatchment 4S: SA North Undetained

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 14

Hydrograph for Subcatchment 4S: SA North Undetained

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	0.99	0.00
1.00	0.03	0.00	0.00	53.00	2.64	0.99	0.00
2.00	0.06	0.00	0.00	54.00	2.64	0.99	0.00
3.00	0.10	0.00	0.00	55.00	2.64	0.99	0.00
4.00	0.14	0.00	0.00	56.00	2.64	0.99	0.00
5.00	0.18	0.00	0.00	57.00	2.64	0.99	0.00
6.00	0.23	0.00	0.00	58.00	2.64	0.99	0.00
7.00	0.28	0.00	0.00	59.00	2.64	0.99	0.00
8.00	0.34	0.00	0.00	60.00	2.64	0.99	0.00
9.00	0.42	0.00	0.00	61.00	2.64	0.99	0.00
10.00	0.52	0.00	0.02	62.00	2.64	0.99	0.00
11.00	0.68	0.01	0.58	63.00	2.64	0.99	0.00
12.00	1.26	0.18	12.24	64.00	2.64	0.99	0.00
13.00	1.96	0.54	3.56	65.00	2.64	0.99	0.00
14.00	2.12	0.64	1.90	66.00	2.64	0.99	0.00
15.00	2.22	0.70	1.33	67.00	2.64	0.99	0.00
16.00	2.30	0.75	1.11	68.00	2.64	0.99	0.00
17.00	2.36	0.79	0.95	69.00	2.64	0.99	0.00
18.00	2.41	0.83	0.77	70.00	2.64	0.99	0.00
19.00	2.46	0.86	0.71	71.00	2.64	0.99	0.00
20.00	2.50	0.89	0.67	72.00	2.64	0.99	0.00
21.00	2.54	0.92	0.63				
22.00	2.58	0.94	0.58				
23.00	2.61	0.97	0.54				
24.00	2.64	0.99	0.50				
25.00	2.64	0.99	0.00				
26.00	2.64	0.99	0.00				
27.00	2.64	0.99	0.00				
28.00	2.64	0.99	0.00				
29.00	2.64	0.99	0.00				
30.00	2.64	0.99	0.00				
31.00	2.64	0.99	0.00				
32.00	2.64	0.99	0.00				
33.00	2.64	0.99	0.00				
34.00	2.64	0.99	0.00				
35.00	2.64	0.99	0.00				
36.00	2.64	0.99	0.00				
37.00	2.64	0.99	0.00				
38.00	2.64	0.99	0.00				
39.00	2.64	0.99	0.00				
40.00	2.64	0.99	0.00				
41.00	2.64	0.99	0.00				
42.00	2.64	0.99	0.00				
43.00	2.64	0.99	0.00				
44.00	2.64	0.99	0.00				
45.00	2.64	0.99	0.00				
46.00	2.64	0.99	0.00				
47.00	2.64	0.99	0.00				
48.00	2.64	0.99	0.00				
49.00	2.64	0.99	0.00				
50.00	2.64	0.99	0.00				
51.00	2.64	0.99	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 15

Summary for Subcatchment 5S: North-Buildings

[47] Hint: Peak is 156% of capacity of segment #3

Runoff = 7.72 cfs @ 12.16 hrs, Volume= 0.671 af, Depth= 2.41"
Routed to Link 34L : Moodna Creek Undetained Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
* 3.340	98	Building B
3.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	100	0.0100	0.86		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
2.2	267	0.0100	2.03		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
0.1	15	0.0050	4.03	4.95	Pipe Channel, CD 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.4	108	0.0050	4.55	8.05	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.5	162	0.0050	5.52	17.33	Pipe Channel, EF 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
3.2	1,374	0.0050	7.23	51.09	Pipe Channel, FG 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
1.0	535	0.0050	8.76	110.04	Pipe Channel, GH 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012
0.2	96	0.3300	6.86	56.94	Channel Flow, HI Area= 8.3 sf Perim= 20.1' r= 0.41' n= 0.069 Riprap, 6-inch
9.5	2,657	Total			

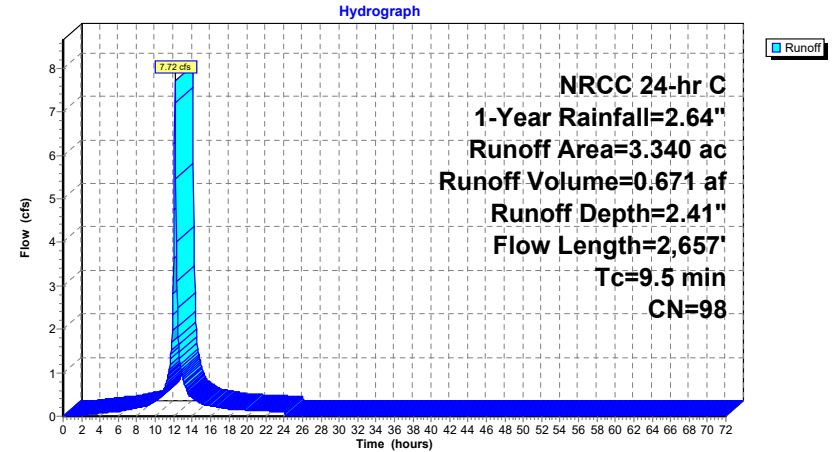
2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 16

Subcatchment 5S: North-Buildings



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 17

Hydrograph for Subcatchment 5S: North-Buildings

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	2.41	0.00
1.00	0.03	0.00	0.00	53.00	2.64	2.41	0.00
2.00	0.06	0.00	0.02	54.00	2.64	2.41	0.00
3.00	0.10	0.01	0.05	55.00	2.64	2.41	0.00
4.00	0.14	0.03	0.07	56.00	2.64	2.41	0.00
5.00	0.18	0.06	0.09	57.00	2.64	2.41	0.00
6.00	0.23	0.09	0.11	58.00	2.64	2.41	0.00
7.00	0.28	0.13	0.15	59.00	2.64	2.41	0.00
8.00	0.34	0.18	0.19	60.00	2.64	2.41	0.00
9.00	0.42	0.25	0.23	61.00	2.64	2.41	0.00
10.00	0.52	0.34	0.36	62.00	2.64	2.41	0.00
11.00	0.68	0.49	0.63	63.00	2.64	2.41	0.00
12.00	1.26	1.04	3.62	64.00	2.64	2.41	0.00
13.00	1.96	1.73	0.88	65.00	2.64	2.41	0.00
14.00	2.12	1.89	0.43	66.00	2.64	2.41	0.00
15.00	2.22	1.99	0.30	67.00	2.64	2.41	0.00
16.00	2.30	2.07	0.24	68.00	2.64	2.41	0.00
17.00	2.36	2.13	0.20	69.00	2.64	2.41	0.00
18.00	2.41	2.18	0.16	70.00	2.64	2.41	0.00
19.00	2.46	2.23	0.15	71.00	2.64	2.41	0.00
20.00	2.50	2.27	0.14	72.00	2.64	2.41	0.00
21.00	2.54	2.31	0.13				
22.00	2.58	2.35	0.12				
23.00	2.61	2.38	0.11				
24.00	2.64	2.41	0.10				
25.00	2.64	2.41	0.00				
26.00	2.64	2.41	0.00				
27.00	2.64	2.41	0.00				
28.00	2.64	2.41	0.00				
29.00	2.64	2.41	0.00				
30.00	2.64	2.41	0.00				
31.00	2.64	2.41	0.00				
32.00	2.64	2.41	0.00				
33.00	2.64	2.41	0.00				
34.00	2.64	2.41	0.00				
35.00	2.64	2.41	0.00				
36.00	2.64	2.41	0.00				
37.00	2.64	2.41	0.00				
38.00	2.64	2.41	0.00				
39.00	2.64	2.41	0.00				
40.00	2.64	2.41	0.00				
41.00	2.64	2.41	0.00				
42.00	2.64	2.41	0.00				
43.00	2.64	2.41	0.00				
44.00	2.64	2.41	0.00				
45.00	2.64	2.41	0.00				
46.00	2.64	2.41	0.00				
47.00	2.64	2.41	0.00				
48.00	2.64	2.41	0.00				
49.00	2.64	2.41	0.00				
50.00	2.64	2.41	0.00				
51.00	2.64	2.41	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 18

Summary for Subcatchment 6S: SA AG INF Basin B Imp.

- [47] Hint: Peak is 672% of capacity of segment #3
- [47] Hint: Peak is 195% of capacity of segment #4
- [47] Hint: Peak is 443% of capacity of segment #5
- [47] Hint: Peak is 336% of capacity of segment #6
- [47] Hint: Peak is 238% of capacity of segment #7

Runoff = 54.06 cfs @ 12.16 hrs, Volume= 4.633 af, Depth= 2.41"
 Routed to Pond 8P : Aboveground Infiltration Basin 'B'

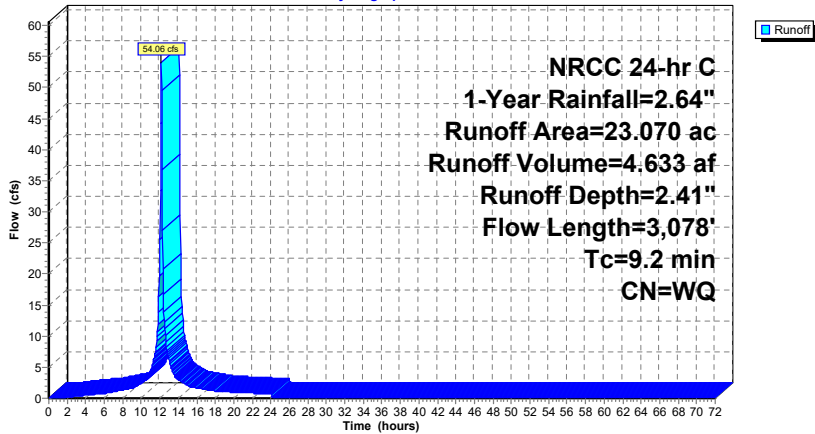
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
* 10.265	98	Impervious
* 8.645	98	Building C North
* 4.160	98	Building A South Half
<hr/>		
23.070		Weighted Average
23.070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0145	1.00		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
1.1	159	0.0145	2.44		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
3.3	902	0.0050	4.55	8.05	Pipe Channel, CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.3	282	0.0596	15.72	27.78	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.9	360	0.0115	6.91	12.20	Pipe Channel, EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	449	0.0200	9.11	16.09	Pipe Channel, FG 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
1.1	826	0.0400	12.88	22.76	Pipe Channel, GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
<hr/>					
9.2	3,078	Total			

Subcatchment 6S: SA AG INF Basin B Imp.

Hydrograph



Hydrograph for Subcatchment 6S: SA AG INF Basin B Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	2.41	0.00
1.00	0.03	0.00	0.00	53.00	2.64	2.41	0.00
2.00	0.06	0.00	0.13	54.00	2.64	2.41	0.00
3.00	0.10	0.01	0.33	55.00	2.64	2.41	0.00
4.00	0.14	0.03	0.49	56.00	2.64	2.41	0.00
5.00	0.18	0.06	0.64	57.00	2.64	2.41	0.00
6.00	0.23	0.09	0.77	58.00	2.64	2.41	0.00
7.00	0.28	0.13	1.03	59.00	2.64	2.41	0.00
8.00	0.34	0.18	1.32	60.00	2.64	2.41	0.00
9.00	0.42	0.25	1.61	61.00	2.64	2.41	0.00
10.00	0.52	0.34	2.47	62.00	2.64	2.41	0.00
11.00	0.68	0.49	4.39	63.00	2.64	2.41	0.00
12.00	1.26	1.04	25.52	64.00	2.64	2.41	0.00
13.00	1.96	1.73	6.08	65.00	2.64	2.41	0.00
14.00	2.12	1.89	2.97	66.00	2.64	2.41	0.00
15.00	2.22	1.99	2.04	67.00	2.64	2.41	0.00
16.00	2.30	2.07	1.65	68.00	2.64	2.41	0.00
17.00	2.36	2.13	1.38	69.00	2.64	2.41	0.00
18.00	2.41	2.18	1.12	70.00	2.64	2.41	0.00
19.00	2.46	2.23	1.01	71.00	2.64	2.41	0.00
20.00	2.50	2.27	0.95	72.00	2.64	2.41	0.00
21.00	2.54	2.31	0.88				
22.00	2.58	2.35	0.82				
23.00	2.61	2.38	0.75				
24.00	2.64	2.41	0.69				
25.00	2.64	2.41	0.00				
26.00	2.64	2.41	0.00				
27.00	2.64	2.41	0.00				
28.00	2.64	2.41	0.00				
29.00	2.64	2.41	0.00				
30.00	2.64	2.41	0.00				
31.00	2.64	2.41	0.00				
32.00	2.64	2.41	0.00				
33.00	2.64	2.41	0.00				
34.00	2.64	2.41	0.00				
35.00	2.64	2.41	0.00				
36.00	2.64	2.41	0.00				
37.00	2.64	2.41	0.00				
38.00	2.64	2.41	0.00				
39.00	2.64	2.41	0.00				
40.00	2.64	2.41	0.00				
41.00	2.64	2.41	0.00				
42.00	2.64	2.41	0.00				
43.00	2.64	2.41	0.00				
44.00	2.64	2.41	0.00				
45.00	2.64	2.41	0.00				
46.00	2.64	2.41	0.00				
47.00	2.64	2.41	0.00				
48.00	2.64	2.41	0.00				
49.00	2.64	2.41	0.00				
50.00	2.64	2.41	0.00				
51.00	2.64	2.41	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 21

Summary for Subcatchment 7S: SA AG DET Basin A Imp.

[47] Hint: Peak is 296% of capacity of segment #4

Runoff = 23.81 cfs @ 12.28 hrs, Volume= 2.737 af, Depth= 2.41"
Routed to Pond 9P : Aboveground Infiltration Basin 'A'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
9.470	98	Paved parking, HSG D
* 4.160	98	Building A North Half
13.630		Weighted Average
13.630		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	80	0.0326	0.16		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19"
0.5	20	0.0150	0.74		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 2.19"
0.9	153	0.0206	2.91		Shallow Concentrated Flow, CD Paved Kv= 20.3 fps
10.1	2,772	0.0050	4.55	8.05	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
19.6	3,025	Total			

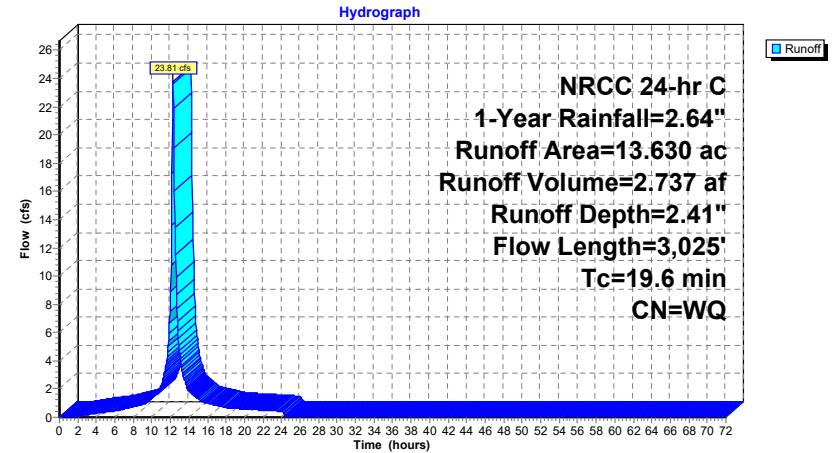
2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 22

Subcatchment 7S: SA AG DET Basin A Imp.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 23

Hydrograph for Subcatchment 7S: SA AG DET Basin A Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	2.41	0.00
1.00	0.03	0.00	0.00	53.00	2.64	2.41	0.00
2.00	0.06	0.00	0.05	54.00	2.64	2.41	0.00
3.00	0.10	0.01	0.17	55.00	2.64	2.41	0.00
4.00	0.14	0.03	0.28	56.00	2.64	2.41	0.00
5.00	0.18	0.06	0.36	57.00	2.64	2.41	0.00
6.00	0.23	0.09	0.44	58.00	2.64	2.41	0.00
7.00	0.28	0.13	0.58	59.00	2.64	2.41	0.00
8.00	0.34	0.18	0.75	60.00	2.64	2.41	0.00
9.00	0.42	0.25	0.93	61.00	2.64	2.41	0.00
10.00	0.52	0.34	1.37	62.00	2.64	2.41	0.00
11.00	0.68	0.49	2.29	63.00	2.64	2.41	0.00
12.00	1.26	1.04	8.88	64.00	2.64	2.41	0.00
13.00	1.96	1.73	4.42	65.00	2.64	2.41	0.00
14.00	2.12	1.89	1.87	66.00	2.64	2.41	0.00
15.00	2.22	1.99	1.30	67.00	2.64	2.41	0.00
16.00	2.30	2.07	1.00	68.00	2.64	2.41	0.00
17.00	2.36	2.13	0.84	69.00	2.64	2.41	0.00
18.00	2.41	2.18	0.69	70.00	2.64	2.41	0.00
19.00	2.46	2.23	0.61	71.00	2.64	2.41	0.00
20.00	2.50	2.27	0.57	72.00	2.64	2.41	0.00
21.00	2.54	2.31	0.53				
22.00	2.58	2.35	0.49				
23.00	2.61	2.38	0.45				
24.00	2.64	2.41	0.41				
25.00	2.64	2.41	0.00				
26.00	2.64	2.41	0.00				
27.00	2.64	2.41	0.00				
28.00	2.64	2.41	0.00				
29.00	2.64	2.41	0.00				
30.00	2.64	2.41	0.00				
31.00	2.64	2.41	0.00				
32.00	2.64	2.41	0.00				
33.00	2.64	2.41	0.00				
34.00	2.64	2.41	0.00				
35.00	2.64	2.41	0.00				
36.00	2.64	2.41	0.00				
37.00	2.64	2.41	0.00				
38.00	2.64	2.41	0.00				
39.00	2.64	2.41	0.00				
40.00	2.64	2.41	0.00				
41.00	2.64	2.41	0.00				
42.00	2.64	2.41	0.00				
43.00	2.64	2.41	0.00				
44.00	2.64	2.41	0.00				
45.00	2.64	2.41	0.00				
46.00	2.64	2.41	0.00				
47.00	2.64	2.41	0.00				
48.00	2.64	2.41	0.00				
49.00	2.64	2.41	0.00				
50.00	2.64	2.41	0.00				
51.00	2.64	2.41	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 24

Summary for Subcatchment 9S: Route 9W Undisturbed Perv.

Runoff = 12.26 cfs @ 12.19 hrs, Volume= 1.052 af, Depth= 0.74"
 Routed to Link 11L : Route 9 Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
4.940	70	Woods, Good, HSG C
12.100	77	Woods, Good, HSG D
17.040		Weighted Average
17.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	10	0.0275	0.05		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
0.2	67	0.0784	4.51		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
3.8	340	0.0088	1.51		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.5	311	0.0451	3.42		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.4	338	0.0621	4.01		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
10.5	1,066	Total			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

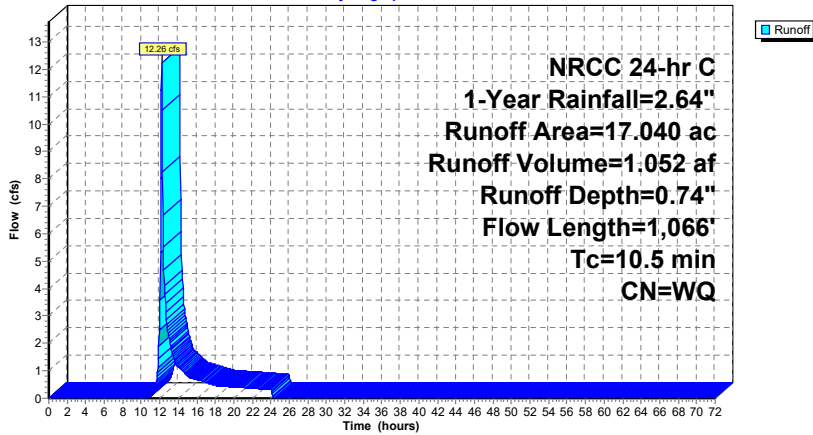
NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 25

Subcatchment 9S: Route 9W Undisturbed Perv.

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 26

Hydrograph for Subcatchment 9S: Route 9W Undisturbed Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	0.73	0.00
1.00	0.03	0.00	0.00	53.00	2.64	0.73	0.00
2.00	0.06	0.00	0.00	54.00	2.64	0.73	0.00
3.00	0.10	0.00	0.00	55.00	2.64	0.73	0.00
4.00	0.14	0.00	0.00	56.00	2.64	0.73	0.00
5.00	0.18	0.00	0.00	57.00	2.64	0.73	0.00
6.00	0.23	0.00	0.00	58.00	2.64	0.73	0.00
7.00	0.28	0.00	0.00	59.00	2.64	0.73	0.00
8.00	0.34	0.00	0.00	60.00	2.64	0.73	0.00
9.00	0.42	0.00	0.00	61.00	2.64	0.73	0.00
10.00	0.52	0.00	0.00	62.00	2.64	0.73	0.00
11.00	0.68	0.00	0.08	63.00	2.64	0.73	0.00
12.00	1.26	0.09	3.58	64.00	2.64	0.73	0.00
13.00	1.96	0.36	2.18	65.00	2.64	0.73	0.00
14.00	2.12	0.44	1.14	66.00	2.64	0.73	0.00
15.00	2.22	0.49	0.82	67.00	2.64	0.73	0.00
16.00	2.30	0.54	0.67	68.00	2.64	0.73	0.00
17.00	2.36	0.57	0.58	69.00	2.64	0.73	0.00
18.00	2.41	0.60	0.47	70.00	2.64	0.73	0.00
19.00	2.46	0.63	0.43	71.00	2.64	0.73	0.00
20.00	2.50	0.65	0.41	72.00	2.64	0.73	0.00
21.00	2.54	0.67	0.39				
22.00	2.58	0.70	0.36				
23.00	2.61	0.72	0.33				
24.00	2.64	0.73	0.31				
25.00	2.64	0.73	0.00				
26.00	2.64	0.73	0.00				
27.00	2.64	0.73	0.00				
28.00	2.64	0.73	0.00				
29.00	2.64	0.73	0.00				
30.00	2.64	0.73	0.00				
31.00	2.64	0.73	0.00				
32.00	2.64	0.73	0.00				
33.00	2.64	0.73	0.00				
34.00	2.64	0.73	0.00				
35.00	2.64	0.73	0.00				
36.00	2.64	0.73	0.00				
37.00	2.64	0.73	0.00				
38.00	2.64	0.73	0.00				
39.00	2.64	0.73	0.00				
40.00	2.64	0.73	0.00				
41.00	2.64	0.73	0.00				
42.00	2.64	0.73	0.00				
43.00	2.64	0.73	0.00				
44.00	2.64	0.73	0.00				
45.00	2.64	0.73	0.00				
46.00	2.64	0.73	0.00				
47.00	2.64	0.73	0.00				
48.00	2.64	0.73	0.00				
49.00	2.64	0.73	0.00				
50.00	2.64	0.73	0.00				
51.00	2.64	0.73	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 27

Summary for Subcatchment 11S: SA South (Rt 9) Undetained Imp.

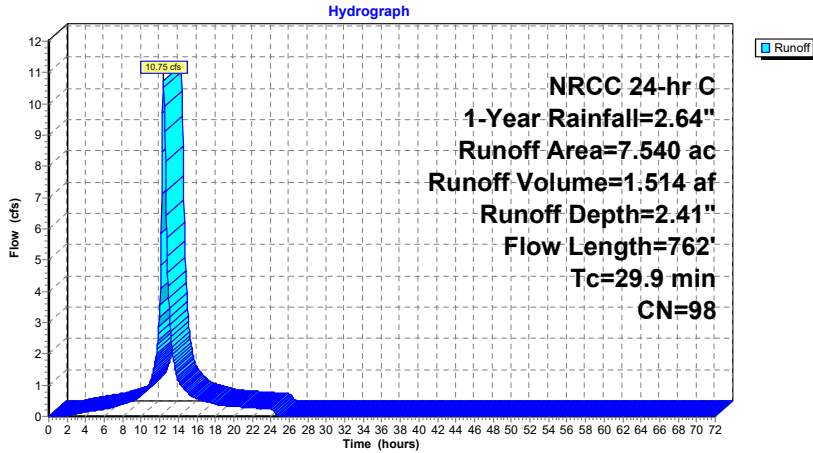
Runoff = 10.75 cfs @ 12.40 hrs, Volume= 1.514 af, Depth= 2.41"
Routed to Link 39L : Route 9 Undetained Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
7.540	98	Roofs, HSG D
7.540		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	85	0.0162	0.13		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19" Using McCuen-Spiess flow length
2.2	83	0.0162	0.64		Shallow Concentrated Flow, BC Woodland Kv= 5.0 fps
6.4	195	0.0103	0.51		Shallow Concentrated Flow, CD Woodland Kv= 5.0 fps
10.0	399	0.0177	0.67		Shallow Concentrated Flow, DE Woodland Kv= 5.0 fps
29.9	762				Total

Subcatchment 11S: SA South (Rt 9) Undetained Imp.



2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 28

Hydrograph for Subcatchment 11S: SA South (Rt 9) Undetained Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	2.41	0.00
1.00	0.03	0.00	0.00	53.00	2.64	2.41	0.00
2.00	0.06	0.00	0.02	54.00	2.64	2.41	0.00
3.00	0.10	0.01	0.09	55.00	2.64	2.41	0.00
4.00	0.14	0.03	0.14	56.00	2.64	2.41	0.00
5.00	0.18	0.06	0.19	57.00	2.64	2.41	0.00
6.00	0.23	0.09	0.24	58.00	2.64	2.41	0.00
7.00	0.28	0.13	0.31	59.00	2.64	2.41	0.00
8.00	0.34	0.18	0.40	60.00	2.64	2.41	0.00
9.00	0.42	0.25	0.50	61.00	2.64	2.41	0.00
10.00	0.52	0.34	0.71	62.00	2.64	2.41	0.00
11.00	0.68	0.49	1.13	63.00	2.64	2.41	0.00
12.00	1.26	1.04	3.56	64.00	2.64	2.41	0.00
13.00	1.96	1.73	3.44	65.00	2.64	2.41	0.00
14.00	2.12	1.89	1.15	66.00	2.64	2.41	0.00
15.00	2.22	1.99	0.76	67.00	2.64	2.41	0.00
16.00	2.30	2.07	0.57	68.00	2.64	2.41	0.00
17.00	2.36	2.13	0.48	69.00	2.64	2.41	0.00
18.00	2.41	2.18	0.39	70.00	2.64	2.41	0.00
19.00	2.46	2.23	0.34	71.00	2.64	2.41	0.00
20.00	2.50	2.27	0.32	72.00	2.64	2.41	0.00
21.00	2.54	2.31	0.30				
22.00	2.58	2.35	0.27				
23.00	2.61	2.38	0.25				
24.00	2.64	2.41	0.23				
25.00	2.64	2.41	0.01				
26.00	2.64	2.41	0.00				
27.00	2.64	2.41	0.00				
28.00	2.64	2.41	0.00				
29.00	2.64	2.41	0.00				
30.00	2.64	2.41	0.00				
31.00	2.64	2.41	0.00				
32.00	2.64	2.41	0.00				
33.00	2.64	2.41	0.00				
34.00	2.64	2.41	0.00				
35.00	2.64	2.41	0.00				
36.00	2.64	2.41	0.00				
37.00	2.64	2.41	0.00				
38.00	2.64	2.41	0.00				
39.00	2.64	2.41	0.00				
40.00	2.64	2.41	0.00				
41.00	2.64	2.41	0.00				
42.00	2.64	2.41	0.00				
43.00	2.64	2.41	0.00				
44.00	2.64	2.41	0.00				
45.00	2.64	2.41	0.00				
46.00	2.64	2.41	0.00				
47.00	2.64	2.41	0.00				
48.00	2.64	2.41	0.00				
49.00	2.64	2.41	0.00				
50.00	2.64	2.41	0.00				
51.00	2.64	2.41	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 29

Summary for Subcatchment 14S: SA UG DET Basin E Imp.

Calculated TC path = 5.7 mins. Minimum TC of 6 mins used.

Runoff = 10.25 cfs @ 12.13 hrs, Volume= 0.795 af, Depth= 2.41"
Routed to Pond 17P : Underground Detention Basin 'E'

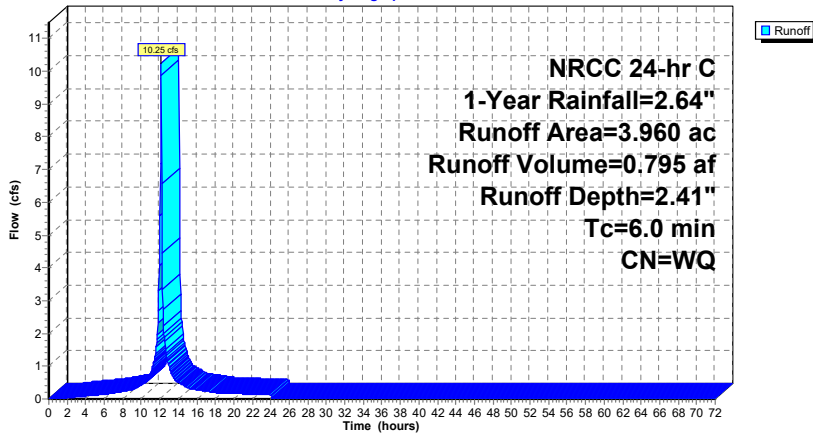
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
3.140	98	Roofs, HSG D
0.820	98	Paved parking, HSG D
3.960		Weighted Average
3.960		100.00% Impervious Area

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

Subcatchment 14S: SA UG DET Basin E Imp.

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 30

Hydrograph for Subcatchment 14S: SA UG DET Basin E Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	2.41	0.00
1.00	0.03	0.00	0.00	53.00	2.64	2.41	0.00
2.00	0.06	0.00	0.02	54.00	2.64	2.41	0.00
3.00	0.10	0.01	0.06	55.00	2.64	2.41	0.00
4.00	0.14	0.03	0.09	56.00	2.64	2.41	0.00
5.00	0.18	0.06	0.11	57.00	2.64	2.41	0.00
6.00	0.23	0.09	0.13	58.00	2.64	2.41	0.00
7.00	0.28	0.13	0.18	59.00	2.64	2.41	0.00
8.00	0.34	0.18	0.23	60.00	2.64	2.41	0.00
9.00	0.42	0.25	0.28	61.00	2.64	2.41	0.00
10.00	0.52	0.34	0.43	62.00	2.64	2.41	0.00
11.00	0.68	0.49	0.78	63.00	2.64	2.41	0.00
12.00	1.26	1.04	5.59	64.00	2.64	2.41	0.00
13.00	1.96	1.73	0.99	65.00	2.64	2.41	0.00
14.00	2.12	1.89	0.50	66.00	2.64	2.41	0.00
15.00	2.22	1.99	0.34	67.00	2.64	2.41	0.00
16.00	2.30	2.07	0.28	68.00	2.64	2.41	0.00
17.00	2.36	2.13	0.24	69.00	2.64	2.41	0.00
18.00	2.41	2.18	0.19	70.00	2.64	2.41	0.00
19.00	2.46	2.23	0.17	71.00	2.64	2.41	0.00
20.00	2.50	2.27	0.16	72.00	2.64	2.41	0.00
21.00	2.54	2.31	0.15				
22.00	2.58	2.35	0.14				
23.00	2.61	2.38	0.13				
24.00	2.64	2.41	0.12				
25.00	2.64	2.41	0.00				
26.00	2.64	2.41	0.00				
27.00	2.64	2.41	0.00				
28.00	2.64	2.41	0.00				
29.00	2.64	2.41	0.00				
30.00	2.64	2.41	0.00				
31.00	2.64	2.41	0.00				
32.00	2.64	2.41	0.00				
33.00	2.64	2.41	0.00				
34.00	2.64	2.41	0.00				
35.00	2.64	2.41	0.00				
36.00	2.64	2.41	0.00				
37.00	2.64	2.41	0.00				
38.00	2.64	2.41	0.00				
39.00	2.64	2.41	0.00				
40.00	2.64	2.41	0.00				
41.00	2.64	2.41	0.00				
42.00	2.64	2.41	0.00				
43.00	2.64	2.41	0.00				
44.00	2.64	2.41	0.00				
45.00	2.64	2.41	0.00				
46.00	2.64	2.41	0.00				
47.00	2.64	2.41	0.00				
48.00	2.64	2.41	0.00				
49.00	2.64	2.41	0.00				
50.00	2.64	2.41	0.00				
51.00	2.64	2.41	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 31

Summary for Subcatchment 15S: SA UG Det Basin F Imp.

[47] Hint: Peak is 187% of capacity of segment #3
[47] Hint: Peak is 115% of capacity of segment #4

Runoff = 8.55 cfs @ 12.15 hrs, Volume= 0.705 af, Depth= 2.41"
Routed to Pond 18P : Underground Detention Basin 'F'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
* 3.510	98	Impervious
3.510		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0195	1.13		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
2.0	338	0.0194	2.83		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
0.3	63	0.0050	3.72	4.57	Pipe Channel, RCP_Round 15" 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
4.4	1,105	0.0050	4.20	7.43	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
8.2	1,606	Total			

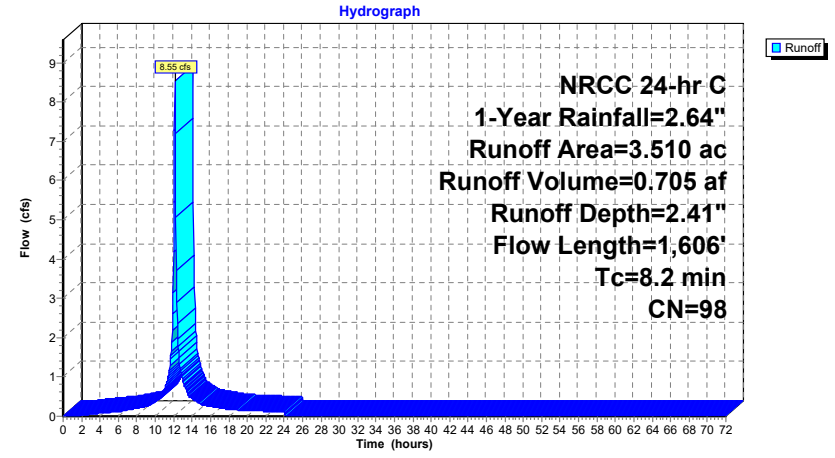
2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 32

Subcatchment 15S: SA UG Det Basin F Imp.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 33

Hydrograph for Subcatchment 15S: SA UG Det Basin F Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	2.41	0.00
1.00	0.03	0.00	0.00	53.00	2.64	2.41	0.00
2.00	0.06	0.00	0.02	54.00	2.64	2.41	0.00
3.00	0.10	0.01	0.05	55.00	2.64	2.41	0.00
4.00	0.14	0.03	0.08	56.00	2.64	2.41	0.00
5.00	0.18	0.06	0.10	57.00	2.64	2.41	0.00
6.00	0.23	0.09	0.12	58.00	2.64	2.41	0.00
7.00	0.28	0.13	0.16	59.00	2.64	2.41	0.00
8.00	0.34	0.18	0.20	60.00	2.64	2.41	0.00
9.00	0.42	0.25	0.25	61.00	2.64	2.41	0.00
10.00	0.52	0.34	0.38	62.00	2.64	2.41	0.00
11.00	0.68	0.49	0.68	63.00	2.64	2.41	0.00
12.00	1.26	1.04	4.17	64.00	2.64	2.41	0.00
13.00	1.96	1.73	0.91	65.00	2.64	2.41	0.00
14.00	2.12	1.89	0.45	66.00	2.64	2.41	0.00
15.00	2.22	1.99	0.31	67.00	2.64	2.41	0.00
16.00	2.30	2.07	0.25	68.00	2.64	2.41	0.00
17.00	2.36	2.13	0.21	69.00	2.64	2.41	0.00
18.00	2.41	2.18	0.17	70.00	2.64	2.41	0.00
19.00	2.46	2.23	0.15	71.00	2.64	2.41	0.00
20.00	2.50	2.27	0.14	72.00	2.64	2.41	0.00
21.00	2.54	2.31	0.13				
22.00	2.58	2.35	0.12				
23.00	2.61	2.38	0.11				
24.00	2.64	2.41	0.10				
25.00	2.64	2.41	0.00				
26.00	2.64	2.41	0.00				
27.00	2.64	2.41	0.00				
28.00	2.64	2.41	0.00				
29.00	2.64	2.41	0.00				
30.00	2.64	2.41	0.00				
31.00	2.64	2.41	0.00				
32.00	2.64	2.41	0.00				
33.00	2.64	2.41	0.00				
34.00	2.64	2.41	0.00				
35.00	2.64	2.41	0.00				
36.00	2.64	2.41	0.00				
37.00	2.64	2.41	0.00				
38.00	2.64	2.41	0.00				
39.00	2.64	2.41	0.00				
40.00	2.64	2.41	0.00				
41.00	2.64	2.41	0.00				
42.00	2.64	2.41	0.00				
43.00	2.64	2.41	0.00				
44.00	2.64	2.41	0.00				
45.00	2.64	2.41	0.00				
46.00	2.64	2.41	0.00				
47.00	2.64	2.41	0.00				
48.00	2.64	2.41	0.00				
49.00	2.64	2.41	0.00				
50.00	2.64	2.41	0.00				
51.00	2.64	2.41	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 34

Summary for Subcatchment 19S: SA AG INF Basin G/H Imp.

[47] Hint: Peak is 166% of capacity of segment #7

Runoff = 12.36 cfs @ 12.16 hrs, Volume= 1.070 af, Depth= 2.41"
 Routed to Pond 20P : Combined Aboveground Infiltration Basin 'G/H'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
* 5.330	98	Impervious
5.330		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0142	0.99		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
2.1	303	0.0142	2.42		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
0.7	327	0.0142	7.67	13.56	Pipe Channel, CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	335	0.0468	13.93	24.62	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	370	0.0504	14.46	25.55	Pipe Channel, EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.2	141	0.0348	12.01	21.23	Pipe Channel, FG 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
3.9	989	0.0050	4.20	7.43	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
9.4	2,565	Total			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

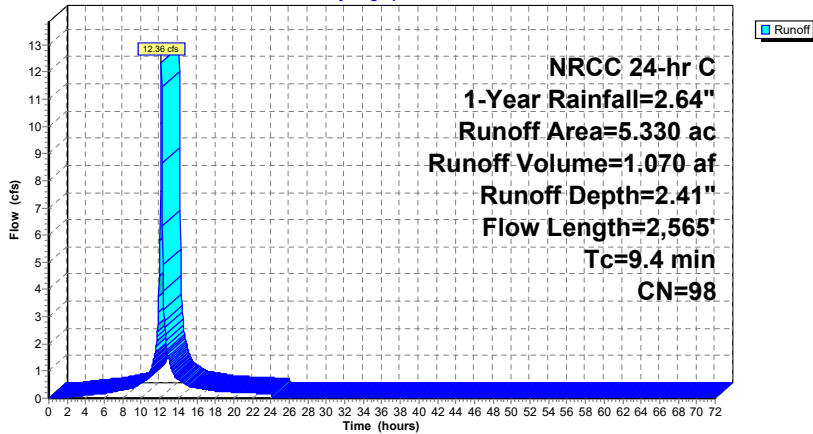
NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 35

Subcatchment 19S: SA AG INF Basin G/H Imp.

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 36

Hydrograph for Subcatchment 19S: SA AG INF Basin G/H Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	2.41	0.00
1.00	0.03	0.00	0.00	53.00	2.64	2.41	0.00
2.00	0.06	0.00	0.03	54.00	2.64	2.41	0.00
3.00	0.10	0.01	0.08	55.00	2.64	2.41	0.00
4.00	0.14	0.03	0.11	56.00	2.64	2.41	0.00
5.00	0.18	0.06	0.15	57.00	2.64	2.41	0.00
6.00	0.23	0.09	0.18	58.00	2.64	2.41	0.00
7.00	0.28	0.13	0.24	59.00	2.64	2.41	0.00
8.00	0.34	0.18	0.30	60.00	2.64	2.41	0.00
9.00	0.42	0.25	0.37	61.00	2.64	2.41	0.00
10.00	0.52	0.34	0.57	62.00	2.64	2.41	0.00
11.00	0.68	0.49	1.01	63.00	2.64	2.41	0.00
12.00	1.26	1.04	5.82	64.00	2.64	2.41	0.00
13.00	1.96	1.73	1.41	65.00	2.64	2.41	0.00
14.00	2.12	1.89	0.69	66.00	2.64	2.41	0.00
15.00	2.22	1.99	0.47	67.00	2.64	2.41	0.00
16.00	2.30	2.07	0.38	68.00	2.64	2.41	0.00
17.00	2.36	2.13	0.32	69.00	2.64	2.41	0.00
18.00	2.41	2.18	0.26	70.00	2.64	2.41	0.00
19.00	2.46	2.23	0.23	71.00	2.64	2.41	0.00
20.00	2.50	2.27	0.22	72.00	2.64	2.41	0.00
21.00	2.54	2.31	0.20				
22.00	2.58	2.35	0.19				
23.00	2.61	2.38	0.17				
24.00	2.64	2.41	0.16				
25.00	2.64	2.41	0.00				
26.00	2.64	2.41	0.00				
27.00	2.64	2.41	0.00				
28.00	2.64	2.41	0.00				
29.00	2.64	2.41	0.00				
30.00	2.64	2.41	0.00				
31.00	2.64	2.41	0.00				
32.00	2.64	2.41	0.00				
33.00	2.64	2.41	0.00				
34.00	2.64	2.41	0.00				
35.00	2.64	2.41	0.00				
36.00	2.64	2.41	0.00				
37.00	2.64	2.41	0.00				
38.00	2.64	2.41	0.00				
39.00	2.64	2.41	0.00				
40.00	2.64	2.41	0.00				
41.00	2.64	2.41	0.00				
42.00	2.64	2.41	0.00				
43.00	2.64	2.41	0.00				
44.00	2.64	2.41	0.00				
45.00	2.64	2.41	0.00				
46.00	2.64	2.41	0.00				
47.00	2.64	2.41	0.00				
48.00	2.64	2.41	0.00				
49.00	2.64	2.41	0.00				
50.00	2.64	2.41	0.00				
51.00	2.64	2.41	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 37

Summary for Subcatchment 23S: SA AG INF Basin C Imp.

[47] Hint: Peak is 898% of capacity of segment #3

[47] Hint: Peak is 552% of capacity of segment #4

Runoff = 44.44 cfs @ 12.18 hrs, Volume= 4.075 af, Depth= 2.41"
 Routed to Pond 24P : Aboveground Infiltration Basin 'C'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
11.645	98	Paved parking, HSG D
* 8.645	98	Building C South
20.290		Weighted Average
20.290		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	60	0.0663	0.21		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19"
0.6	40	0.0325	1.15		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 2.19"
0.4	100	0.0050	4.03	4.95	Pipe Channel, CD 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
3.2	886	0.0050	4.55	8.05	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	342	0.0050	7.23	51.09	Pipe Channel, EF 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
1.1	545	0.0050	8.01	77.07	Pipe Channel, FG 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.012
0.1	37	0.0050	8.76	110.04	Pipe Channel, GH 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012
0.0	10	0.0400	26.79	426.07	Pipe Channel, HI 54.0" Round Area= 15.9 sf Perim= 14.1' r= 1.13' n= 0.012
0.1	106	0.0400	28.74	564.29	Pipe Channel, IJ 60.0" Round Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.012

11.2 2,126 Total

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

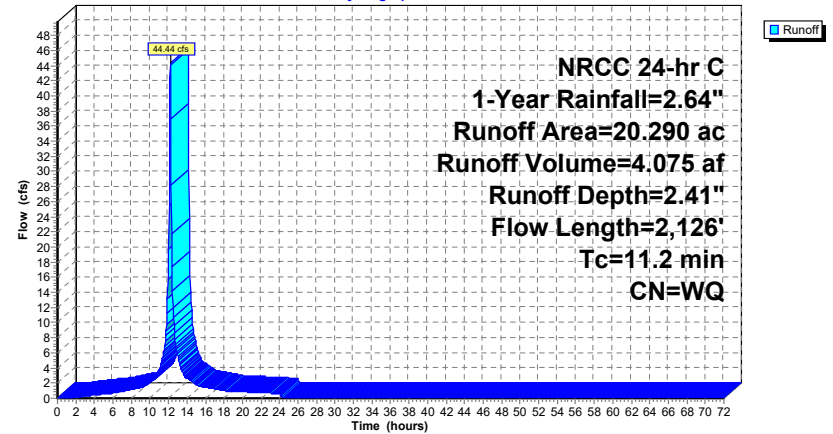
NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 38

Subcatchment 23S: SA AG INF Basin C Imp.

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 39

Hydrograph for Subcatchment 23S: SA AG INF Basin C Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	2.41	0.00
1.00	0.03	0.00	0.00	53.00	2.64	2.41	0.00
2.00	0.06	0.00	0.11	54.00	2.64	2.41	0.00
3.00	0.10	0.01	0.28	55.00	2.64	2.41	0.00
4.00	0.14	0.03	0.43	56.00	2.64	2.41	0.00
5.00	0.18	0.06	0.56	57.00	2.64	2.41	0.00
6.00	0.23	0.09	0.67	58.00	2.64	2.41	0.00
7.00	0.28	0.13	0.90	59.00	2.64	2.41	0.00
8.00	0.34	0.18	1.15	60.00	2.64	2.41	0.00
9.00	0.42	0.25	1.41	61.00	2.64	2.41	0.00
10.00	0.52	0.34	2.15	62.00	2.64	2.41	0.00
11.00	0.68	0.49	3.77	63.00	2.64	2.41	0.00
12.00	1.26	1.04	19.74	64.00	2.64	2.41	0.00
13.00	1.96	1.73	5.51	65.00	2.64	2.41	0.00
14.00	2.12	1.89	2.64	66.00	2.64	2.41	0.00
15.00	2.22	1.99	1.82	67.00	2.64	2.41	0.00
16.00	2.30	2.07	1.46	68.00	2.64	2.41	0.00
17.00	2.36	2.13	1.22	69.00	2.64	2.41	0.00
18.00	2.41	2.18	0.99	70.00	2.64	2.41	0.00
19.00	2.46	2.23	0.89	71.00	2.64	2.41	0.00
20.00	2.50	2.27	0.84	72.00	2.64	2.41	0.00
21.00	2.54	2.31	0.78				
22.00	2.58	2.35	0.72				
23.00	2.61	2.38	0.66				
24.00	2.64	2.41	0.60				
25.00	2.64	2.41	0.00				
26.00	2.64	2.41	0.00				
27.00	2.64	2.41	0.00				
28.00	2.64	2.41	0.00				
29.00	2.64	2.41	0.00				
30.00	2.64	2.41	0.00				
31.00	2.64	2.41	0.00				
32.00	2.64	2.41	0.00				
33.00	2.64	2.41	0.00				
34.00	2.64	2.41	0.00				
35.00	2.64	2.41	0.00				
36.00	2.64	2.41	0.00				
37.00	2.64	2.41	0.00				
38.00	2.64	2.41	0.00				
39.00	2.64	2.41	0.00				
40.00	2.64	2.41	0.00				
41.00	2.64	2.41	0.00				
42.00	2.64	2.41	0.00				
43.00	2.64	2.41	0.00				
44.00	2.64	2.41	0.00				
45.00	2.64	2.41	0.00				
46.00	2.64	2.41	0.00				
47.00	2.64	2.41	0.00				
48.00	2.64	2.41	0.00				
49.00	2.64	2.41	0.00				
50.00	2.64	2.41	0.00				
51.00	2.64	2.41	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 40

Summary for Subcatchment 24S: SA UG DET Basin E Perv.

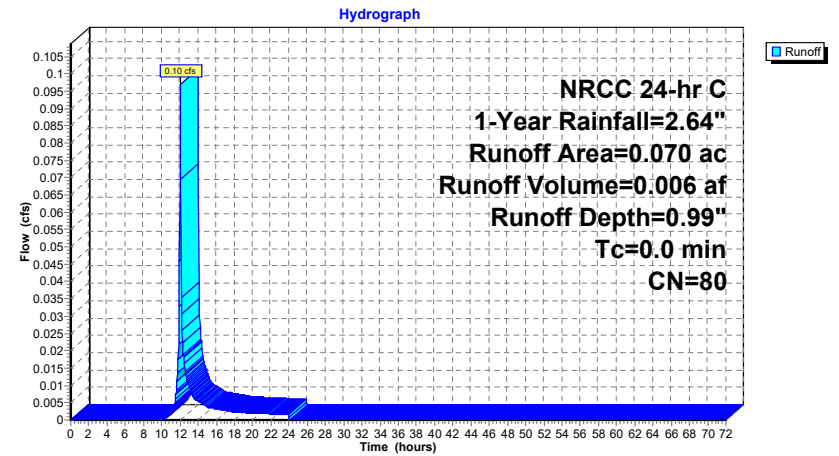
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.10 cfs @ 12.05 hrs, Volume= 0.006 af, Depth= 0.99"
 Routed to Pond 17P : Underground Detention Basin 'E'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.070	80	>75% Grass cover, Good, HSG D
0.070		100.00% Pervious Area

Subcatchment 24S: SA UG DET Basin E Perv.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 41

Hydrograph for Subcatchment 24S: SA UG DET Basin E Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	0.99	0.00
1.00	0.03	0.00	0.00	53.00	2.64	0.99	0.00
2.00	0.06	0.00	0.00	54.00	2.64	0.99	0.00
3.00	0.10	0.00	0.00	55.00	2.64	0.99	0.00
4.00	0.14	0.00	0.00	56.00	2.64	0.99	0.00
5.00	0.18	0.00	0.00	57.00	2.64	0.99	0.00
6.00	0.23	0.00	0.00	58.00	2.64	0.99	0.00
7.00	0.28	0.00	0.00	59.00	2.64	0.99	0.00
8.00	0.34	0.00	0.00	60.00	2.64	0.99	0.00
9.00	0.42	0.00	0.00	61.00	2.64	0.99	0.00
10.00	0.52	0.00	0.00	62.00	2.64	0.99	0.00
11.00	0.68	0.01	0.00	63.00	2.64	0.99	0.00
12.00	1.26	0.18	0.07	64.00	2.64	0.99	0.00
13.00	1.96	0.54	0.01	65.00	2.64	0.99	0.00
14.00	2.12	0.64	0.01	66.00	2.64	0.99	0.00
15.00	2.22	0.70	0.00	67.00	2.64	0.99	0.00
16.00	2.30	0.75	0.00	68.00	2.64	0.99	0.00
17.00	2.36	0.79	0.00	69.00	2.64	0.99	0.00
18.00	2.41	0.83	0.00	70.00	2.64	0.99	0.00
19.00	2.46	0.86	0.00	71.00	2.64	0.99	0.00
20.00	2.50	0.89	0.00	72.00	2.64	0.99	0.00
21.00	2.54	0.92	0.00				
22.00	2.58	0.94	0.00				
23.00	2.61	0.97	0.00				
24.00	2.64	0.99	0.00				
25.00	2.64	0.99	0.00				
26.00	2.64	0.99	0.00				
27.00	2.64	0.99	0.00				
28.00	2.64	0.99	0.00				
29.00	2.64	0.99	0.00				
30.00	2.64	0.99	0.00				
31.00	2.64	0.99	0.00				
32.00	2.64	0.99	0.00				
33.00	2.64	0.99	0.00				
34.00	2.64	0.99	0.00				
35.00	2.64	0.99	0.00				
36.00	2.64	0.99	0.00				
37.00	2.64	0.99	0.00				
38.00	2.64	0.99	0.00				
39.00	2.64	0.99	0.00				
40.00	2.64	0.99	0.00				
41.00	2.64	0.99	0.00				
42.00	2.64	0.99	0.00				
43.00	2.64	0.99	0.00				
44.00	2.64	0.99	0.00				
45.00	2.64	0.99	0.00				
46.00	2.64	0.99	0.00				
47.00	2.64	0.99	0.00				
48.00	2.64	0.99	0.00				
49.00	2.64	0.99	0.00				
50.00	2.64	0.99	0.00				
51.00	2.64	0.99	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 42

Summary for Subcatchment 28S: Moodna Creek Undisturbed Perv.

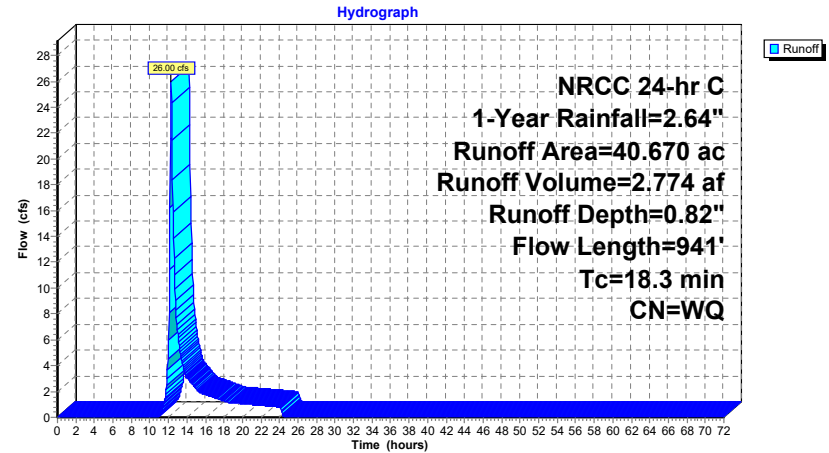
Runoff = 26.00 cfs @ 12.29 hrs, Volume= 2.774 af, Depth= 0.82"
 Routed to Link 30L : Moodna Creek Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
39.200	77	Woods, Good, HSG D
1.470	70	Woods, Good, HSG C
40.670		Weighted Average
40.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0950	0.12		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	244	0.0471	3.49		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
1.5	206	0.0194	2.24		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	391	0.0562	3.82		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
18.3	941	Total			

Subcatchment 28S: Moodna Creek Undisturbed Perv.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 43

Hydrograph for Subcatchment 28S: Moodna Creek Undisturbed Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	0.83	0.00
1.00	0.03	0.00	0.00	53.00	2.64	0.83	0.00
2.00	0.06	0.00	0.00	54.00	2.64	0.83	0.00
3.00	0.10	0.00	0.00	55.00	2.64	0.83	0.00
4.00	0.14	0.00	0.00	56.00	2.64	0.83	0.00
5.00	0.18	0.00	0.00	57.00	2.64	0.83	0.00
6.00	0.23	0.00	0.00	58.00	2.64	0.83	0.00
7.00	0.28	0.00	0.00	59.00	2.64	0.83	0.00
8.00	0.34	0.00	0.00	60.00	2.64	0.83	0.00
9.00	0.42	0.00	0.00	61.00	2.64	0.83	0.00
10.00	0.52	0.00	0.00	62.00	2.64	0.83	0.00
11.00	0.68	0.00	0.15	63.00	2.64	0.83	0.00
12.00	1.26	0.12	5.95	64.00	2.64	0.83	0.00
13.00	1.96	0.43	6.43	65.00	2.64	0.83	0.00
14.00	2.12	0.51	3.05	66.00	2.64	0.83	0.00
15.00	2.22	0.57	2.20	67.00	2.64	0.83	0.00
16.00	2.30	0.62	1.75	68.00	2.64	0.83	0.00
17.00	2.36	0.65	1.50	69.00	2.64	0.83	0.00
18.00	2.41	0.69	1.24	70.00	2.64	0.83	0.00
19.00	2.46	0.71	1.11	71.00	2.64	0.83	0.00
20.00	2.50	0.74	1.05	72.00	2.64	0.83	0.00
21.00	2.54	0.77	0.99				
22.00	2.58	0.79	0.92				
23.00	2.61	0.81	0.86				
24.00	2.64	0.83	0.79				
25.00	2.64	0.83	0.00				
26.00	2.64	0.83	0.00				
27.00	2.64	0.83	0.00				
28.00	2.64	0.83	0.00				
29.00	2.64	0.83	0.00				
30.00	2.64	0.83	0.00				
31.00	2.64	0.83	0.00				
32.00	2.64	0.83	0.00				
33.00	2.64	0.83	0.00				
34.00	2.64	0.83	0.00				
35.00	2.64	0.83	0.00				
36.00	2.64	0.83	0.00				
37.00	2.64	0.83	0.00				
38.00	2.64	0.83	0.00				
39.00	2.64	0.83	0.00				
40.00	2.64	0.83	0.00				
41.00	2.64	0.83	0.00				
42.00	2.64	0.83	0.00				
43.00	2.64	0.83	0.00				
44.00	2.64	0.83	0.00				
45.00	2.64	0.83	0.00				
46.00	2.64	0.83	0.00				
47.00	2.64	0.83	0.00				
48.00	2.64	0.83	0.00				
49.00	2.64	0.83	0.00				
50.00	2.64	0.83	0.00				
51.00	2.64	0.83	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 44

Summary for Subcatchment 29S: Moodna Creek Undisturbed Imp.

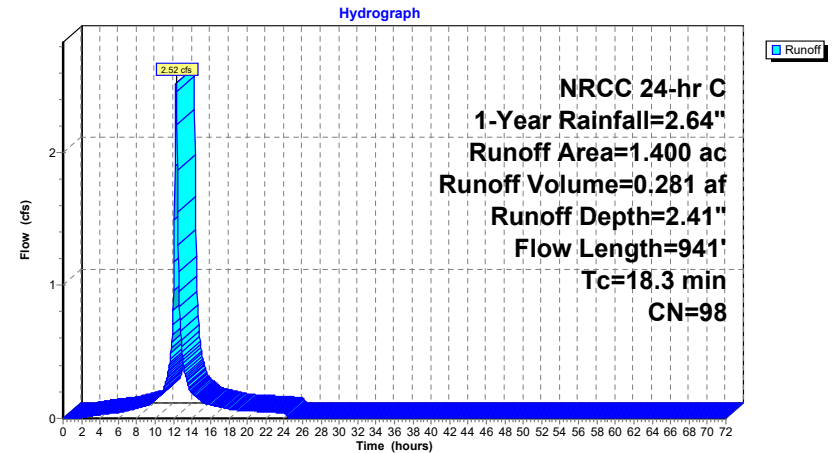
Runoff = 2.52 cfs @ 12.26 hrs, Volume= 0.281 af, Depth= 2.41"
 Routed to Link 30L : Moodna Creek Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
* 1.400	98	Impervious
1.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0950	0.12		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	244	0.0471	3.49		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
1.5	206	0.0194	2.24		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	391	0.0562	3.82		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
18.3	941	Total			

Subcatchment 29S: Moodna Creek Undisturbed Imp.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 45

Hydrograph for Subcatchment 29S: Moodna Creek Undisturbed Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	2.41	0.00
1.00	0.03	0.00	0.00	53.00	2.64	2.41	0.00
2.00	0.06	0.00	0.01	54.00	2.64	2.41	0.00
3.00	0.10	0.01	0.02	55.00	2.64	2.41	0.00
4.00	0.14	0.03	0.03	56.00	2.64	2.41	0.00
5.00	0.18	0.06	0.04	57.00	2.64	2.41	0.00
6.00	0.23	0.09	0.05	58.00	2.64	2.41	0.00
7.00	0.28	0.13	0.06	59.00	2.64	2.41	0.00
8.00	0.34	0.18	0.08	60.00	2.64	2.41	0.00
9.00	0.42	0.25	0.10	61.00	2.64	2.41	0.00
10.00	0.52	0.34	0.14	62.00	2.64	2.41	0.00
11.00	0.68	0.49	0.24	63.00	2.64	2.41	0.00
12.00	1.26	1.04	0.96	64.00	2.64	2.41	0.00
13.00	1.96	1.73	0.44	65.00	2.64	2.41	0.00
14.00	2.12	1.89	0.19	66.00	2.64	2.41	0.00
15.00	2.22	1.99	0.13	67.00	2.64	2.41	0.00
16.00	2.30	2.07	0.10	68.00	2.64	2.41	0.00
17.00	2.36	2.13	0.09	69.00	2.64	2.41	0.00
18.00	2.41	2.18	0.07	70.00	2.64	2.41	0.00
19.00	2.46	2.23	0.06	71.00	2.64	2.41	0.00
20.00	2.50	2.27	0.06	72.00	2.64	2.41	0.00
21.00	2.54	2.31	0.05				
22.00	2.58	2.35	0.05				
23.00	2.61	2.38	0.05				
24.00	2.64	2.41	0.04				
25.00	2.64	2.41	0.00				
26.00	2.64	2.41	0.00				
27.00	2.64	2.41	0.00				
28.00	2.64	2.41	0.00				
29.00	2.64	2.41	0.00				
30.00	2.64	2.41	0.00				
31.00	2.64	2.41	0.00				
32.00	2.64	2.41	0.00				
33.00	2.64	2.41	0.00				
34.00	2.64	2.41	0.00				
35.00	2.64	2.41	0.00				
36.00	2.64	2.41	0.00				
37.00	2.64	2.41	0.00				
38.00	2.64	2.41	0.00				
39.00	2.64	2.41	0.00				
40.00	2.64	2.41	0.00				
41.00	2.64	2.41	0.00				
42.00	2.64	2.41	0.00				
43.00	2.64	2.41	0.00				
44.00	2.64	2.41	0.00				
45.00	2.64	2.41	0.00				
46.00	2.64	2.41	0.00				
47.00	2.64	2.41	0.00				
48.00	2.64	2.41	0.00				
49.00	2.64	2.41	0.00				
50.00	2.64	2.41	0.00				
51.00	2.64	2.41	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 46

Summary for Subcatchment 31S: SA AG INF Basin B Perv.

Runoff = 6.28 cfs @ 12.17 hrs, Volume= 0.487 af, Depth= 0.99"
 Routed to Pond 8P : Aboveground Infiltration Basin 'B'

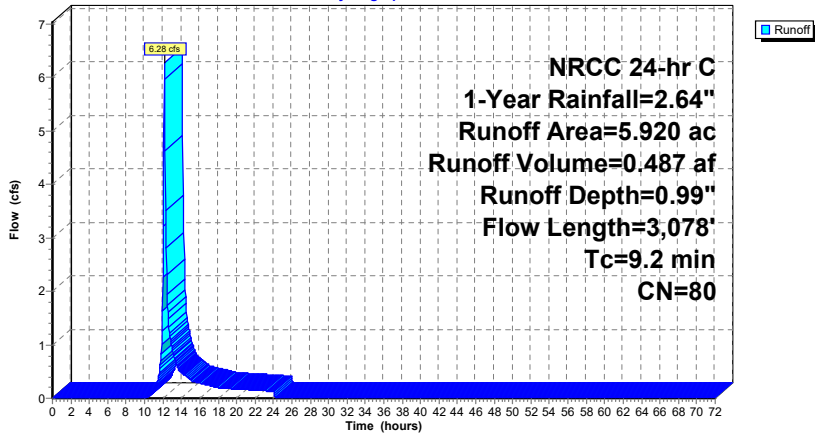
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
5.920	80	>75% Grass cover, Good, HSG D
5.920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0145	1.00		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
1.1	159	0.0145	2.44		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
3.3	902	0.0050	4.55	8.05	Pipe Channel, CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.3	282	0.0596	15.72	27.78	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.9	360	0.0115	6.91	12.20	Pipe Channel, EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	449	0.0200	9.11	16.09	Pipe Channel, FG 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
1.1	826	0.0400	12.88	22.76	Pipe Channel, GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
9.2	3,078	Total			

Subcatchment 31S: SA AG INF Basin B Perv.

Hydrograph



Hydrograph for Subcatchment 31S: SA AG INF Basin B Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	0.99	0.00
1.00	0.03	0.00	0.00	53.00	2.64	0.99	0.00
2.00	0.06	0.00	0.00	54.00	2.64	0.99	0.00
3.00	0.10	0.00	0.00	55.00	2.64	0.99	0.00
4.00	0.14	0.00	0.00	56.00	2.64	0.99	0.00
5.00	0.18	0.00	0.00	57.00	2.64	0.99	0.00
6.00	0.23	0.00	0.00	58.00	2.64	0.99	0.00
7.00	0.28	0.00	0.00	59.00	2.64	0.99	0.00
8.00	0.34	0.00	0.00	60.00	2.64	0.99	0.00
9.00	0.42	0.00	0.00	61.00	2.64	0.99	0.00
10.00	0.52	0.00	0.00	62.00	2.64	0.99	0.00
11.00	0.68	0.01	0.13	63.00	2.64	0.99	0.00
12.00	1.26	0.18	2.27	64.00	2.64	0.99	0.00
13.00	1.96	0.54	0.93	65.00	2.64	0.99	0.00
14.00	2.12	0.64	0.48	66.00	2.64	0.99	0.00
15.00	2.22	0.70	0.34	67.00	2.64	0.99	0.00
16.00	2.30	0.75	0.28	68.00	2.64	0.99	0.00
17.00	2.36	0.79	0.24	69.00	2.64	0.99	0.00
18.00	2.41	0.83	0.20	70.00	2.64	0.99	0.00
19.00	2.46	0.86	0.18	71.00	2.64	0.99	0.00
20.00	2.50	0.89	0.17	72.00	2.64	0.99	0.00
21.00	2.54	0.92	0.16				
22.00	2.58	0.94	0.15				
23.00	2.61	0.97	0.14				
24.00	2.64	0.99	0.13				
25.00	2.64	0.99	0.00				
26.00	2.64	0.99	0.00				
27.00	2.64	0.99	0.00				
28.00	2.64	0.99	0.00				
29.00	2.64	0.99	0.00				
30.00	2.64	0.99	0.00				
31.00	2.64	0.99	0.00				
32.00	2.64	0.99	0.00				
33.00	2.64	0.99	0.00				
34.00	2.64	0.99	0.00				
35.00	2.64	0.99	0.00				
36.00	2.64	0.99	0.00				
37.00	2.64	0.99	0.00				
38.00	2.64	0.99	0.00				
39.00	2.64	0.99	0.00				
40.00	2.64	0.99	0.00				
41.00	2.64	0.99	0.00				
42.00	2.64	0.99	0.00				
43.00	2.64	0.99	0.00				
44.00	2.64	0.99	0.00				
45.00	2.64	0.99	0.00				
46.00	2.64	0.99	0.00				
47.00	2.64	0.99	0.00				
48.00	2.64	0.99	0.00				
49.00	2.64	0.99	0.00				
50.00	2.64	0.99	0.00				
51.00	2.64	0.99	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 49

Summary for Subcatchment 32S: SA AS INF Basin C Perv.

[47] Hint: Peak is 155% of capacity of segment #3

Runoff = 7.67 cfs @ 12.20 hrs, Volume= 0.637 af, Depth= 0.99"
Routed to Pond 24P : Aboveground Infiltration Basin 'C'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
7.750	80	>75% Grass cover, Good, HSG D
7.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	60	0.0663	0.21		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19"
0.6	40	0.0325	1.15		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 2.19"
0.4	100	0.0050	4.03	4.95	Pipe Channel, CD 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
3.2	886	0.0050	4.55	8.05	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	342	0.0050	7.23	51.09	Pipe Channel, EF 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
1.1	545	0.0050	8.01	77.07	Pipe Channel, FG 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.012
0.1	37	0.0050	8.76	110.04	Pipe Channel, GH 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012
0.0	10	0.0400	26.79	426.07	Pipe Channel, HI 54.0" Round Area= 15.9 sf Perim= 14.1' r= 1.13' n= 0.012
0.1	106	0.0400	28.74	564.29	Pipe Channel, IJ 60.0" Round Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.012
11.2	2,126	Total			

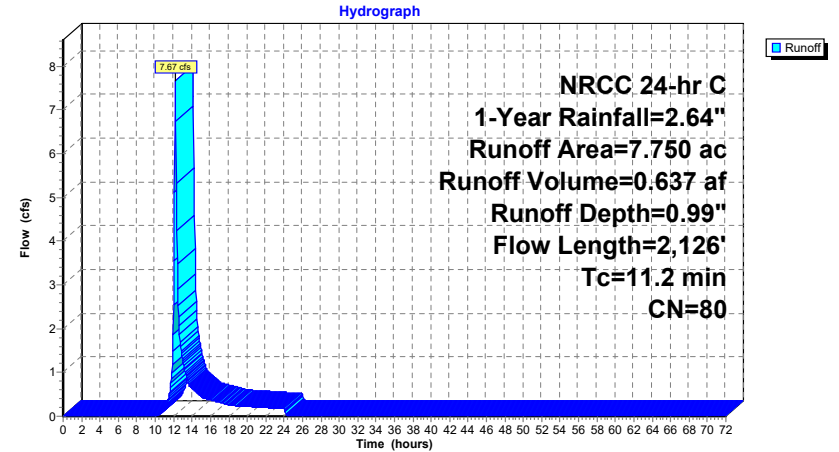
2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 50

Subcatchment 32S: SA AS INF Basin C Perv.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 51

Hydrograph for Subcatchment 32S: SA AS INF Basin C Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	0.99	0.00
1.00	0.03	0.00	0.00	53.00	2.64	0.99	0.00
2.00	0.06	0.00	0.00	54.00	2.64	0.99	0.00
3.00	0.10	0.00	0.00	55.00	2.64	0.99	0.00
4.00	0.14	0.00	0.00	56.00	2.64	0.99	0.00
5.00	0.18	0.00	0.00	57.00	2.64	0.99	0.00
6.00	0.23	0.00	0.00	58.00	2.64	0.99	0.00
7.00	0.28	0.00	0.00	59.00	2.64	0.99	0.00
8.00	0.34	0.00	0.00	60.00	2.64	0.99	0.00
9.00	0.42	0.00	0.00	61.00	2.64	0.99	0.00
10.00	0.52	0.00	0.00	62.00	2.64	0.99	0.00
11.00	0.68	0.01	0.16	63.00	2.64	0.99	0.00
12.00	1.26	0.18	2.53	64.00	2.64	0.99	0.00
13.00	1.96	0.54	1.26	65.00	2.64	0.99	0.00
14.00	2.12	0.64	0.64	66.00	2.64	0.99	0.00
15.00	2.22	0.70	0.45	67.00	2.64	0.99	0.00
16.00	2.30	0.75	0.37	68.00	2.64	0.99	0.00
17.00	2.36	0.79	0.32	69.00	2.64	0.99	0.00
18.00	2.41	0.83	0.26	70.00	2.64	0.99	0.00
19.00	2.46	0.86	0.24	71.00	2.64	0.99	0.00
20.00	2.50	0.89	0.22	72.00	2.64	0.99	0.00
21.00	2.54	0.92	0.21				
22.00	2.58	0.94	0.19				
23.00	2.61	0.97	0.18				
24.00	2.64	0.99	0.16				
25.00	2.64	0.99	0.00				
26.00	2.64	0.99	0.00				
27.00	2.64	0.99	0.00				
28.00	2.64	0.99	0.00				
29.00	2.64	0.99	0.00				
30.00	2.64	0.99	0.00				
31.00	2.64	0.99	0.00				
32.00	2.64	0.99	0.00				
33.00	2.64	0.99	0.00				
34.00	2.64	0.99	0.00				
35.00	2.64	0.99	0.00				
36.00	2.64	0.99	0.00				
37.00	2.64	0.99	0.00				
38.00	2.64	0.99	0.00				
39.00	2.64	0.99	0.00				
40.00	2.64	0.99	0.00				
41.00	2.64	0.99	0.00				
42.00	2.64	0.99	0.00				
43.00	2.64	0.99	0.00				
44.00	2.64	0.99	0.00				
45.00	2.64	0.99	0.00				
46.00	2.64	0.99	0.00				
47.00	2.64	0.99	0.00				
48.00	2.64	0.99	0.00				
49.00	2.64	0.99	0.00				
50.00	2.64	0.99	0.00				
51.00	2.64	0.99	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 52

Summary for Subcatchment 33S: SA AG DET Basin A Perv.

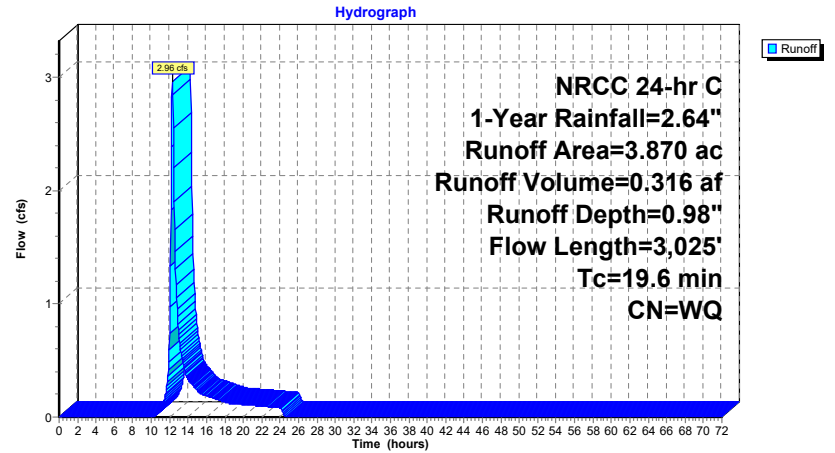
Runoff = 2.96 cfs @ 12.30 hrs, Volume= 0.316 af, Depth= 0.98"
 Routed to Pond 9P : Aboveground Infiltration Basin 'A'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.090	74	>75% Grass cover, Good, HSG C
3.780	80	>75% Grass cover, Good, HSG D
3.870		Weighted Average
3.870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	80	0.0326	0.16		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19"
0.5	20	0.0150	0.74		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 2.19"
0.9	153	0.0206	2.91		Shallow Concentrated Flow, CD Paved Kv= 20.3 fps
10.1	2,772	0.0050	4.55	8.05	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
19.6	3,025	Total			

Subcatchment 33S: SA AG DET Basin A Perv.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 53

Hydrograph for Subcatchment 33S: SA AG DET Basin A Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	0.99	0.00
1.00	0.03	0.00	0.00	53.00	2.64	0.99	0.00
2.00	0.06	0.00	0.00	54.00	2.64	0.99	0.00
3.00	0.10	0.00	0.00	55.00	2.64	0.99	0.00
4.00	0.14	0.00	0.00	56.00	2.64	0.99	0.00
5.00	0.18	0.00	0.00	57.00	2.64	0.99	0.00
6.00	0.23	0.00	0.00	58.00	2.64	0.99	0.00
7.00	0.28	0.00	0.00	59.00	2.64	0.99	0.00
8.00	0.34	0.00	0.00	60.00	2.64	0.99	0.00
9.00	0.42	0.00	0.00	61.00	2.64	0.99	0.00
10.00	0.52	0.00	0.00	62.00	2.64	0.99	0.00
11.00	0.68	0.01	0.06	63.00	2.64	0.99	0.00
12.00	1.26	0.18	0.74	64.00	2.64	0.99	0.00
13.00	1.96	0.54	0.73	65.00	2.64	0.99	0.00
14.00	2.12	0.64	0.33	66.00	2.64	0.99	0.00
15.00	2.22	0.70	0.24	67.00	2.64	0.99	0.00
16.00	2.30	0.75	0.19	68.00	2.64	0.99	0.00
17.00	2.36	0.79	0.16	69.00	2.64	0.99	0.00
18.00	2.41	0.83	0.13	70.00	2.64	0.99	0.00
19.00	2.46	0.86	0.12	71.00	2.64	0.99	0.00
20.00	2.50	0.89	0.11	72.00	2.64	0.99	0.00
21.00	2.54	0.92	0.10				
22.00	2.58	0.94	0.10				
23.00	2.61	0.97	0.09				
24.00	2.64	0.99	0.08				
25.00	2.64	0.99	0.00				
26.00	2.64	0.99	0.00				
27.00	2.64	0.99	0.00				
28.00	2.64	0.99	0.00				
29.00	2.64	0.99	0.00				
30.00	2.64	0.99	0.00				
31.00	2.64	0.99	0.00				
32.00	2.64	0.99	0.00				
33.00	2.64	0.99	0.00				
34.00	2.64	0.99	0.00				
35.00	2.64	0.99	0.00				
36.00	2.64	0.99	0.00				
37.00	2.64	0.99	0.00				
38.00	2.64	0.99	0.00				
39.00	2.64	0.99	0.00				
40.00	2.64	0.99	0.00				
41.00	2.64	0.99	0.00				
42.00	2.64	0.99	0.00				
43.00	2.64	0.99	0.00				
44.00	2.64	0.99	0.00				
45.00	2.64	0.99	0.00				
46.00	2.64	0.99	0.00				
47.00	2.64	0.99	0.00				
48.00	2.64	0.99	0.00				
49.00	2.64	0.99	0.00				
50.00	2.64	0.99	0.00				
51.00	2.64	0.99	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 54

Summary for Subcatchment 36S: SA UG Det Basin F Perv.

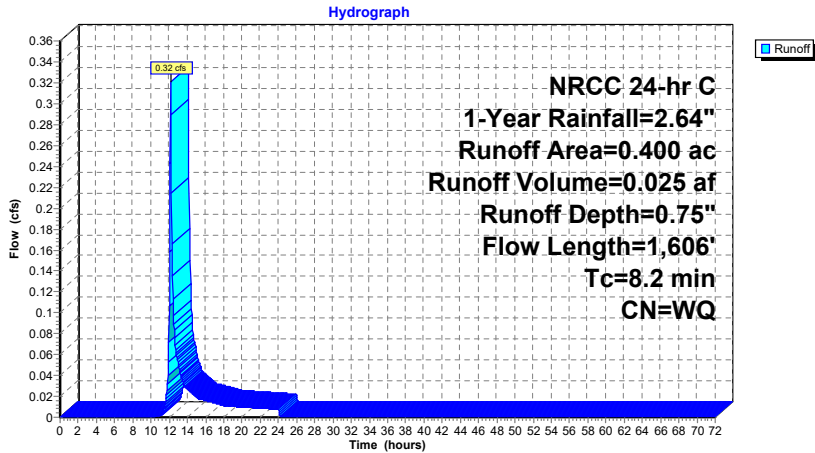
Runoff = 0.32 cfs @ 12.16 hrs, Volume= 0.025 af, Depth= 0.75"
 Routed to Pond 18P : Underground Detention Basin 'F'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.320	74	>75% Grass cover, Good, HSG C
0.080	80	>75% Grass cover, Good, HSG D
0.400		Weighted Average
0.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0195	1.13		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
2.0	338	0.0194	2.83		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
0.3	63	0.0050	3.72	4.57	Pipe Channel, RCP_Round 15" 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
4.4	1,105	0.0050	4.20	7.43	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
8.2	1,606	Total			

Subcatchment 36S: SA UG Det Basin F Perv.



Hydrograph for Subcatchment 36S: SA UG Det Basin F Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	0.73	0.00
1.00	0.03	0.00	0.00	53.00	2.64	0.73	0.00
2.00	0.06	0.00	0.00	54.00	2.64	0.73	0.00
3.00	0.10	0.00	0.00	55.00	2.64	0.73	0.00
4.00	0.14	0.00	0.00	56.00	2.64	0.73	0.00
5.00	0.18	0.00	0.00	57.00	2.64	0.73	0.00
6.00	0.23	0.00	0.00	58.00	2.64	0.73	0.00
7.00	0.28	0.00	0.00	59.00	2.64	0.73	0.00
8.00	0.34	0.00	0.00	60.00	2.64	0.73	0.00
9.00	0.42	0.00	0.00	61.00	2.64	0.73	0.00
10.00	0.52	0.00	0.00	62.00	2.64	0.73	0.00
11.00	0.68	0.00	0.00	63.00	2.64	0.73	0.00
12.00	1.26	0.09	0.11	64.00	2.64	0.73	0.00
13.00	1.96	0.36	0.05	65.00	2.64	0.73	0.00
14.00	2.12	0.44	0.03	66.00	2.64	0.73	0.00
15.00	2.22	0.49	0.02	67.00	2.64	0.73	0.00
16.00	2.30	0.54	0.02	68.00	2.64	0.73	0.00
17.00	2.36	0.57	0.01	69.00	2.64	0.73	0.00
18.00	2.41	0.60	0.01	70.00	2.64	0.73	0.00
19.00	2.46	0.63	0.01	71.00	2.64	0.73	0.00
20.00	2.50	0.65	0.01	72.00	2.64	0.73	0.00
21.00	2.54	0.67	0.01				
22.00	2.58	0.70	0.01				
23.00	2.61	0.72	0.01				
24.00	2.64	0.73	0.01				
25.00	2.64	0.73	0.00				
26.00	2.64	0.73	0.00				
27.00	2.64	0.73	0.00				
28.00	2.64	0.73	0.00				
29.00	2.64	0.73	0.00				
30.00	2.64	0.73	0.00				
31.00	2.64	0.73	0.00				
32.00	2.64	0.73	0.00				
33.00	2.64	0.73	0.00				
34.00	2.64	0.73	0.00				
35.00	2.64	0.73	0.00				
36.00	2.64	0.73	0.00				
37.00	2.64	0.73	0.00				
38.00	2.64	0.73	0.00				
39.00	2.64	0.73	0.00				
40.00	2.64	0.73	0.00				
41.00	2.64	0.73	0.00				
42.00	2.64	0.73	0.00				
43.00	2.64	0.73	0.00				
44.00	2.64	0.73	0.00				
45.00	2.64	0.73	0.00				
46.00	2.64	0.73	0.00				
47.00	2.64	0.73	0.00				
48.00	2.64	0.73	0.00				
49.00	2.64	0.73	0.00				
50.00	2.64	0.73	0.00				
51.00	2.64	0.73	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 57

Summary for Subcatchment 37S: SA AG INF Basin G/H Perv.

[47] Hint: Peak is 165% of capacity of segment #7

Runoff = 12.28 cfs @ 12.17 hrs, Volume= 0.971 af, Depth= 0.94"
 Routed to Pond 20P : Combined Aboveground Infiltration Basin 'G/H'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
2.100	74	>75% Grass cover, Good, HSG C
10.340	80	>75% Grass cover, Good, HSG D
12.440		Weighted Average
12.440		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0142	0.99		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
2.1	303	0.0142	2.42		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
0.7	327	0.0142	7.67	13.56	Pipe Channel, CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	335	0.0468	13.93	24.62	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	370	0.0504	14.46	25.55	Pipe Channel, EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.2	141	0.0348	12.01	21.23	Pipe Channel, FG 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
3.9	989	0.0050	4.20	7.43	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
9.4	2,565	Total			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

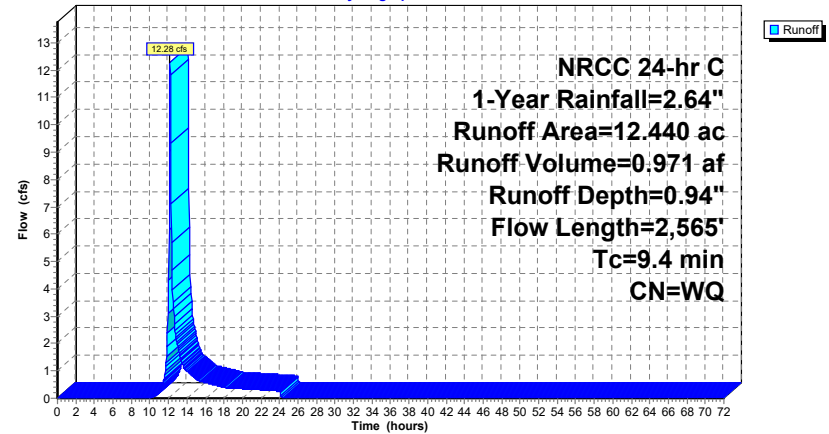
NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 58

Subcatchment 37S: SA AG INF Basin G/H Perv.

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 59

Hydrograph for Subcatchment 37S: SA AG INF Basin G/H Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	0.93	0.00
1.00	0.03	0.00	0.00	53.00	2.64	0.93	0.00
2.00	0.06	0.00	0.00	54.00	2.64	0.93	0.00
3.00	0.10	0.00	0.00	55.00	2.64	0.93	0.00
4.00	0.14	0.00	0.00	56.00	2.64	0.93	0.00
5.00	0.18	0.00	0.00	57.00	2.64	0.93	0.00
6.00	0.23	0.00	0.00	58.00	2.64	0.93	0.00
7.00	0.28	0.00	0.00	59.00	2.64	0.93	0.00
8.00	0.34	0.00	0.00	60.00	2.64	0.93	0.00
9.00	0.42	0.00	0.00	61.00	2.64	0.93	0.00
10.00	0.52	0.00	0.01	62.00	2.64	0.93	0.00
11.00	0.68	0.01	0.23	63.00	2.64	0.93	0.00
12.00	1.26	0.16	4.33	64.00	2.64	0.93	0.00
13.00	1.96	0.50	1.89	65.00	2.64	0.93	0.00
14.00	2.12	0.59	0.98	66.00	2.64	0.93	0.00
15.00	2.22	0.66	0.69	67.00	2.64	0.93	0.00
16.00	2.30	0.70	0.57	68.00	2.64	0.93	0.00
17.00	2.36	0.75	0.49	69.00	2.64	0.93	0.00
18.00	2.41	0.78	0.40	70.00	2.64	0.93	0.00
19.00	2.46	0.81	0.36	71.00	2.64	0.93	0.00
20.00	2.50	0.84	0.34	72.00	2.64	0.93	0.00
21.00	2.54	0.86	0.32				
22.00	2.58	0.89	0.30				
23.00	2.61	0.91	0.28				
24.00	2.64	0.93	0.26				
25.00	2.64	0.93	0.00				
26.00	2.64	0.93	0.00				
27.00	2.64	0.93	0.00				
28.00	2.64	0.93	0.00				
29.00	2.64	0.93	0.00				
30.00	2.64	0.93	0.00				
31.00	2.64	0.93	0.00				
32.00	2.64	0.93	0.00				
33.00	2.64	0.93	0.00				
34.00	2.64	0.93	0.00				
35.00	2.64	0.93	0.00				
36.00	2.64	0.93	0.00				
37.00	2.64	0.93	0.00				
38.00	2.64	0.93	0.00				
39.00	2.64	0.93	0.00				
40.00	2.64	0.93	0.00				
41.00	2.64	0.93	0.00				
42.00	2.64	0.93	0.00				
43.00	2.64	0.93	0.00				
44.00	2.64	0.93	0.00				
45.00	2.64	0.93	0.00				
46.00	2.64	0.93	0.00				
47.00	2.64	0.93	0.00				
48.00	2.64	0.93	0.00				
49.00	2.64	0.93	0.00				
50.00	2.64	0.93	0.00				
51.00	2.64	0.93	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 60

Summary for Subcatchment 38S: SA South (Rt 9) Undetained Perv.

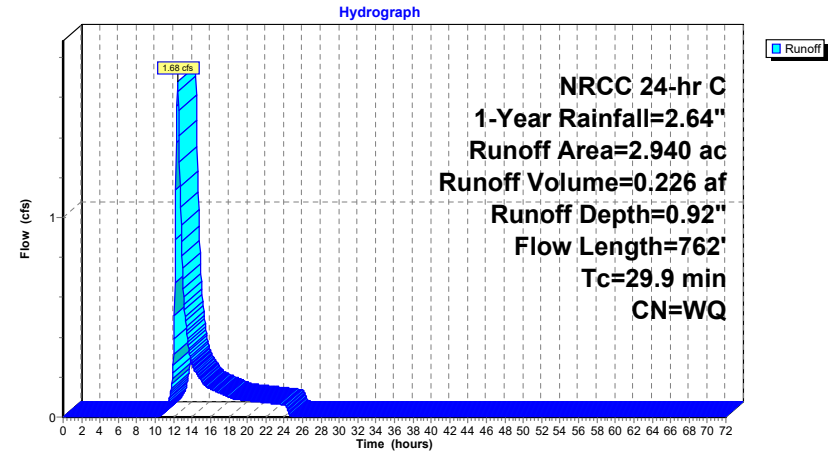
Runoff = 1.68 cfs @ 12.44 hrs, Volume= 0.226 af, Depth= 0.92"
 Routed to Link 39L : Route 9 Undetained Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
0.650	74	>75% Grass cover, Good, HSG C
2.290	80	>75% Grass cover, Good, HSG D
2.940		Weighted Average
2.940		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	85	0.0162	0.13		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19" Using McCuen-Spiess flow length
2.2	83	0.0162	0.64		Shallow Concentrated Flow, BC Woodland Kv= 5.0 fps
6.4	195	0.0103	0.51		Shallow Concentrated Flow, CD Woodland Kv= 5.0 fps
10.0	399	0.0177	0.67		Shallow Concentrated Flow, DE Woodland Kv= 5.0 fps
29.9	762	Total			

Subcatchment 38S: SA South (Rt 9) Undetained Perv.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 61

Hydrograph for Subcatchment 38S: SA South (Rt 9) Undetained Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	0.93	0.00
1.00	0.03	0.00	0.00	53.00	2.64	0.93	0.00
2.00	0.06	0.00	0.00	54.00	2.64	0.93	0.00
3.00	0.10	0.00	0.00	55.00	2.64	0.93	0.00
4.00	0.14	0.00	0.00	56.00	2.64	0.93	0.00
5.00	0.18	0.00	0.00	57.00	2.64	0.93	0.00
6.00	0.23	0.00	0.00	58.00	2.64	0.93	0.00
7.00	0.28	0.00	0.00	59.00	2.64	0.93	0.00
8.00	0.34	0.00	0.00	60.00	2.64	0.93	0.00
9.00	0.42	0.00	0.00	61.00	2.64	0.93	0.00
10.00	0.52	0.00	0.00	62.00	2.64	0.93	0.00
11.00	0.68	0.01	0.03	63.00	2.64	0.93	0.00
12.00	1.26	0.16	0.31	64.00	2.64	0.93	0.00
13.00	1.96	0.50	0.69	65.00	2.64	0.93	0.00
14.00	2.12	0.59	0.26	66.00	2.64	0.93	0.00
15.00	2.22	0.66	0.18	67.00	2.64	0.93	0.00
16.00	2.30	0.70	0.14	68.00	2.64	0.93	0.00
17.00	2.36	0.75	0.12	69.00	2.64	0.93	0.00
18.00	2.41	0.78	0.10	70.00	2.64	0.93	0.00
19.00	2.46	0.81	0.09	71.00	2.64	0.93	0.00
20.00	2.50	0.84	0.08	72.00	2.64	0.93	0.00
21.00	2.54	0.86	0.08				
22.00	2.58	0.89	0.07				
23.00	2.61	0.91	0.07				
24.00	2.64	0.93	0.06				
25.00	2.64	0.93	0.00				
26.00	2.64	0.93	0.00				
27.00	2.64	0.93	0.00				
28.00	2.64	0.93	0.00				
29.00	2.64	0.93	0.00				
30.00	2.64	0.93	0.00				
31.00	2.64	0.93	0.00				
32.00	2.64	0.93	0.00				
33.00	2.64	0.93	0.00				
34.00	2.64	0.93	0.00				
35.00	2.64	0.93	0.00				
36.00	2.64	0.93	0.00				
37.00	2.64	0.93	0.00				
38.00	2.64	0.93	0.00				
39.00	2.64	0.93	0.00				
40.00	2.64	0.93	0.00				
41.00	2.64	0.93	0.00				
42.00	2.64	0.93	0.00				
43.00	2.64	0.93	0.00				
44.00	2.64	0.93	0.00				
45.00	2.64	0.93	0.00				
46.00	2.64	0.93	0.00				
47.00	2.64	0.93	0.00				
48.00	2.64	0.93	0.00				
49.00	2.64	0.93	0.00				
50.00	2.64	0.93	0.00				
51.00	2.64	0.93	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 62

Summary for Subcatchment 40S: Route 9W Undisturbed Imp.

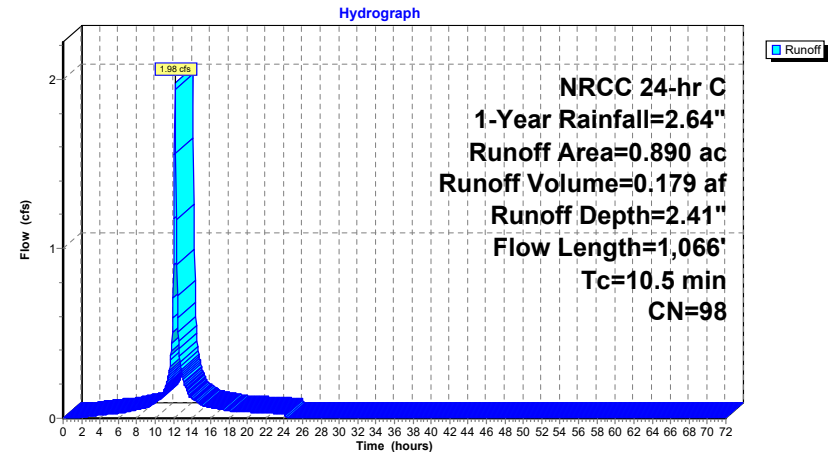
Runoff = 1.98 cfs @ 12.18 hrs, Volume= 0.179 af, Depth= 2.41"
 Routed to Link 11L : Route 9 Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 1-Year Rainfall=2.64"

Area (ac)	CN	Description
* 0.890	98	Impervious
0.890		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	10	0.0275	0.05		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
0.2	67	0.0784	4.51		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
3.8	340	0.0088	1.51		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.5	311	0.0451	3.42		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.4	338	0.0621	4.01		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
10.5	1,066	Total			

Subcatchment 40S: Route 9W Undisturbed Imp.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 63

Hydrograph for Subcatchment 40S: Route 9W Undisturbed Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	2.64	2.41	0.00
1.00	0.03	0.00	0.00	53.00	2.64	2.41	0.00
2.00	0.06	0.00	0.00	54.00	2.64	2.41	0.00
3.00	0.10	0.01	0.01	55.00	2.64	2.41	0.00
4.00	0.14	0.03	0.02	56.00	2.64	2.41	0.00
5.00	0.18	0.06	0.02	57.00	2.64	2.41	0.00
6.00	0.23	0.09	0.03	58.00	2.64	2.41	0.00
7.00	0.28	0.13	0.04	59.00	2.64	2.41	0.00
8.00	0.34	0.18	0.05	60.00	2.64	2.41	0.00
9.00	0.42	0.25	0.06	61.00	2.64	2.41	0.00
10.00	0.52	0.34	0.09	62.00	2.64	2.41	0.00
11.00	0.68	0.49	0.17	63.00	2.64	2.41	0.00
12.00	1.26	1.04	0.90	64.00	2.64	2.41	0.00
13.00	1.96	1.73	0.24	65.00	2.64	2.41	0.00
14.00	2.12	1.89	0.12	66.00	2.64	2.41	0.00
15.00	2.22	1.99	0.08	67.00	2.64	2.41	0.00
16.00	2.30	2.07	0.06	68.00	2.64	2.41	0.00
17.00	2.36	2.13	0.05	69.00	2.64	2.41	0.00
18.00	2.41	2.18	0.04	70.00	2.64	2.41	0.00
19.00	2.46	2.23	0.04	71.00	2.64	2.41	0.00
20.00	2.50	2.27	0.04	72.00	2.64	2.41	0.00
21.00	2.54	2.31	0.03				
22.00	2.58	2.35	0.03				
23.00	2.61	2.38	0.03				
24.00	2.64	2.41	0.03				
25.00	2.64	2.41	0.00				
26.00	2.64	2.41	0.00				
27.00	2.64	2.41	0.00				
28.00	2.64	2.41	0.00				
29.00	2.64	2.41	0.00				
30.00	2.64	2.41	0.00				
31.00	2.64	2.41	0.00				
32.00	2.64	2.41	0.00				
33.00	2.64	2.41	0.00				
34.00	2.64	2.41	0.00				
35.00	2.64	2.41	0.00				
36.00	2.64	2.41	0.00				
37.00	2.64	2.41	0.00				
38.00	2.64	2.41	0.00				
39.00	2.64	2.41	0.00				
40.00	2.64	2.41	0.00				
41.00	2.64	2.41	0.00				
42.00	2.64	2.41	0.00				
43.00	2.64	2.41	0.00				
44.00	2.64	2.41	0.00				
45.00	2.64	2.41	0.00				
46.00	2.64	2.41	0.00				
47.00	2.64	2.41	0.00				
48.00	2.64	2.41	0.00				
49.00	2.64	2.41	0.00				
50.00	2.64	2.41	0.00				
51.00	2.64	2.41	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 64

Summary for Pond 8P: Aboveground Infiltration Basin 'B'

Inflow Area = 28.990 ac, 79.58% Impervious, Inflow Depth = 2.12" for 1-Year event
 Inflow = 60.32 cfs @ 12.16 hrs, Volume= 5.120 af
 Outflow = 4.65 cfs @ 13.47 hrs, Volume= 5.120 af, Atten= 92%, Lag= 78.5 min
 Discarded = 4.65 cfs @ 13.47 hrs, Volume= 5.120 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 10L : Moodna Creek
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 143.73' @ 13.47 hrs Surf.Area= 56,018 sf Storage= 91,490 cf

Plug-Flow detention time= 171.2 min calculated for 5.117 af (100% of inflow)
 Center-of-Mass det. time= 171.1 min (946.9 - 775.7)

Volume	Invert	Avail.Storage	Storage Description
#1	142.00'	436,638 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
142.00	50,059	0	0
143.00	53,496	51,778	51,778
144.00	56,974	55,235	107,013
145.00	60,523	58,749	165,761
146.00	64,103	62,313	228,074
147.00	67,754	65,929	294,003
148.00	71,216	69,485	363,488
149.00	75,085	73,151	436,638

Device	Routing	Invert	Outlet Devices
#1	Primary	142.00'	30.0" Round Culvert L= 55.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 142.00' / 141.72' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Discarded	142.00'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 133.70'
#3	Device 1	144.15'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	144.90'	2.5' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#5	Device 1	148.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	148.50'	40.0' long x 10.0' breadth 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

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 65

Discarded OutFlow Max=4.65 cfs @ 13.47 hrs HW=143.73' (Free Discharge)
 ↳2=Exfiltration (Controls 4.65 cfs)

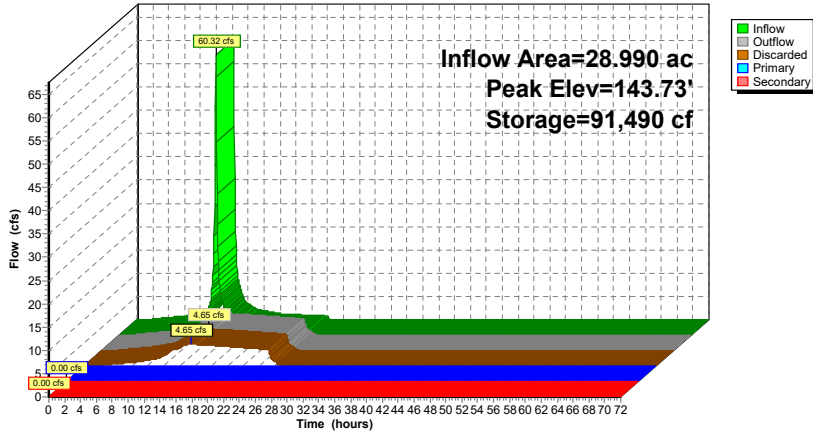
Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=142.00' (Free Discharge)
 ↳1=Culvert (Controls 0.00 cfs)

- ↳3=Orifice/Grate (Controls 0.00 cfs)
- ↳4=Sharp-Crested Rectangular Weir(Controls 0.00 cfs)
- ↳5=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=142.00' (Free Discharge)
 ↳6=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

Pond 8P: Aboveground Infiltration Basin 'B'

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

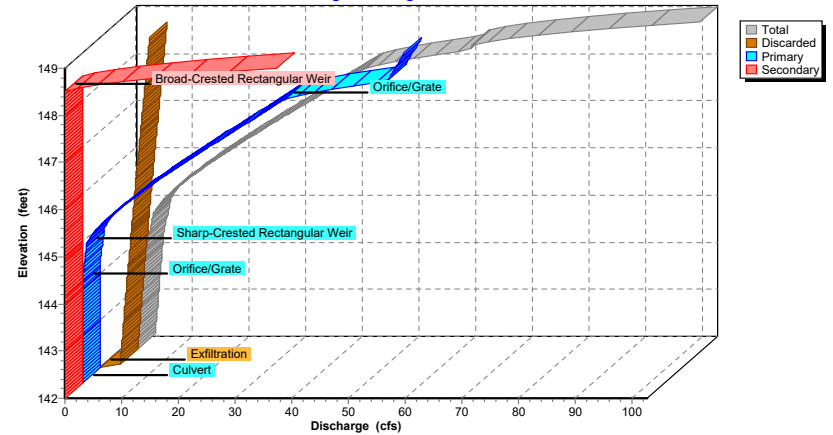
NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 66

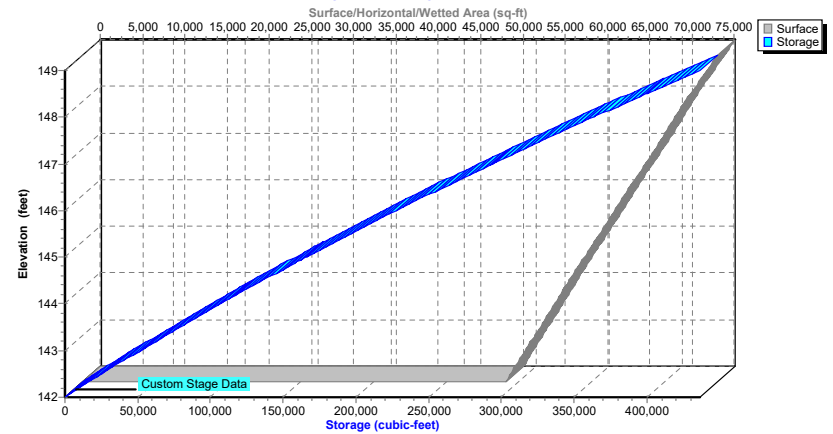
Pond 8P: Aboveground Infiltration Basin 'B'

Stage-Discharge



Pond 8P: Aboveground Infiltration Basin 'B'

Stage-Area-Storage



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 67

Hydrograph for Pond 8P: Aboveground Infiltration Basin 'B'

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	142.00	0.00	0.00	0.00	0.00
2.50	0.23	174	142.00	0.17	0.17	0.00	0.00
5.00	0.64	598	142.01	0.60	0.60	0.00	0.00
7.50	1.17	1,088	142.02	1.09	1.09	0.00	0.00
10.00	2.48	2,218	142.04	2.22	2.22	0.00	0.00
12.50	13.93	80,896	143.54	4.52	4.52	0.00	0.00
15.00	2.38	83,993	143.59	4.56	4.56	0.00	0.00
17.50	1.47	60,989	143.17	4.26	4.26	0.00	0.00
20.00	1.12	35,218	142.69	3.93	3.93	0.00	0.00
22.50	0.92	10,457	142.21	3.61	3.61	0.00	0.00
25.00	0.00	42	142.00	0.04	0.04	0.00	0.00
27.50	0.00	0	142.00	0.00	0.00	0.00	0.00
30.00	0.00	0	142.00	0.00	0.00	0.00	0.00
32.50	0.00	0	142.00	0.00	0.00	0.00	0.00
35.00	0.00	0	142.00	0.00	0.00	0.00	0.00
37.50	0.00	0	142.00	0.00	0.00	0.00	0.00
40.00	0.00	0	142.00	0.00	0.00	0.00	0.00
42.50	0.00	0	142.00	0.00	0.00	0.00	0.00
45.00	0.00	0	142.00	0.00	0.00	0.00	0.00
47.50	0.00	0	142.00	0.00	0.00	0.00	0.00
50.00	0.00	0	142.00	0.00	0.00	0.00	0.00
52.50	0.00	0	142.00	0.00	0.00	0.00	0.00
55.00	0.00	0	142.00	0.00	0.00	0.00	0.00
57.50	0.00	0	142.00	0.00	0.00	0.00	0.00
60.00	0.00	0	142.00	0.00	0.00	0.00	0.00
62.50	0.00	0	142.00	0.00	0.00	0.00	0.00
65.00	0.00	0	142.00	0.00	0.00	0.00	0.00
67.50	0.00	0	142.00	0.00	0.00	0.00	0.00
70.00	0.00	0	142.00	0.00	0.00	0.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 68

Stage-Discharge for Pond 8P: Aboveground Infiltration Basin 'B'

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
142.00	0.00	0.00	0.00	0.00
142.20	3.61	3.61	0.00	0.00
142.40	3.74	3.74	0.00	0.00
142.60	3.88	3.88	0.00	0.00
142.80	4.01	4.01	0.00	0.00
143.00	4.15	4.15	0.00	0.00
143.20	4.28	4.28	0.00	0.00
143.40	4.42	4.42	0.00	0.00
143.60	4.56	4.56	0.00	0.00
143.80	4.70	4.70	0.00	0.00
144.00	4.85	4.85	0.00	0.00
144.20	5.00	4.99	0.01	0.00
144.40	5.30	5.13	0.17	0.00
144.60	5.70	5.28	0.43	0.00
144.80	6.02	5.43	0.60	0.00
145.00	6.56	5.57	0.99	0.00
145.20	7.88	5.72	2.16	0.00
145.40	9.59	5.87	3.72	0.00
145.60	11.58	6.02	5.56	0.00
145.80	13.77	6.17	7.60	0.00
146.00	16.12	6.33	9.80	0.00
146.20	18.60	6.48	12.13	0.00
146.40	21.19	6.63	14.55	0.00
146.60	23.85	6.79	17.06	0.00
146.80	26.57	6.95	19.62	0.00
147.00	29.33	7.10	22.22	0.00
147.20	32.11	7.26	24.85	0.00
147.40	34.90	7.41	27.49	0.00
147.60	37.70	7.57	30.13	0.00
147.80	40.48	7.73	32.75	0.00
148.00	43.23	7.88	35.35	0.00
148.20	50.64	8.05	42.59	0.00
148.40	61.85	8.21	53.64	0.00
148.60	66.20	8.38	54.67	3.15
148.80	80.82	8.55	55.68	16.60
149.00	102.58	8.71	56.68	37.19

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 69

Stage-Area-Storage for Pond 8P: Aboveground Infiltration Basin 'B'

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
142.00	50,059	0	147.20	68,446	307,623
142.10	50,403	5,023	147.30	68,793	314,484
142.20	50,746	10,081	147.40	69,139	321,381
142.30	51,090	15,172	147.50	69,485	328,312
142.40	51,434	20,299	147.60	69,831	335,278
142.50	51,778	25,459	147.70	70,177	342,278
142.60	52,121	30,654	147.80	70,524	349,314
142.70	52,465	35,883	147.90	70,870	356,383
142.80	52,809	41,147	148.00	71,216	363,488
142.90	53,152	46,445	148.10	71,603	370,628
143.00	53,496	51,778	148.20	71,990	377,808
143.10	53,844	57,144	148.30	72,377	385,026
143.20	54,192	62,546	148.40	72,764	392,283
143.30	54,539	67,983	148.50	73,151	399,579
143.40	54,887	73,454	148.60	73,537	406,914
143.50	55,235	78,960	148.70	73,924	414,287
143.60	55,583	84,501	148.80	74,311	421,698
143.70	55,931	90,077	148.90	74,698	429,149
143.80	56,278	95,687	149.00	75,085	436,638
143.90	56,626	101,332			
144.00	56,974	107,013			
144.10	57,329	112,728			
144.20	57,684	118,478			
144.30	58,039	124,264			
144.40	58,394	130,086			
144.50	58,749	135,943			
144.60	59,103	141,836			
144.70	59,458	147,764			
144.80	59,813	153,727			
144.90	60,168	159,726			
145.00	60,523	165,761			
145.10	60,881	171,831			
145.20	61,239	177,937			
145.30	61,597	184,079			
145.40	61,955	190,257			
145.50	62,313	196,470			
145.60	62,671	202,719			
145.70	63,029	209,004			
145.80	63,387	215,325			
145.90	63,745	221,682			
146.00	64,103	228,074			
146.10	64,468	234,503			
146.20	64,833	240,968			
146.30	65,198	247,469			
146.40	65,563	254,007			
146.50	65,929	260,582			
146.60	66,294	267,193			
146.70	66,659	273,841			
146.80	67,024	280,525			
146.90	67,389	287,245			
147.00	67,754	294,003			
147.10	68,100	300,795			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 70

Summary for Pond 9P: Aboveground Infiltration Basin 'A'

Inflow Area = 17.500 ac, 77.89% Impervious, Inflow Depth = 2.09" for 1-Year event
 Inflow = 26.75 cfs @ 12.28 hrs, Volume= 3.053 af
 Outflow = 1.25 cfs @ 15.65 hrs, Volume= 3.053 af, Atten= 95%, Lag= 202.0 min
 Discarded = 0.85 cfs @ 15.65 hrs, Volume= 2.897 af
 Primary = 0.40 cfs @ 15.65 hrs, Volume= 0.156 af
 Routed to Link 10L : Moodna Creek
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 197.50' @ 15.65 hrs Surf.Area= 36,833 sf Storage= 83,329 cf

Plug-Flow detention time= 942.3 min calculated for 3.051 af (100% of inflow)
 Center-of-Mass det. time= 943.1 min (1,729.3 - 786.3)

Volume	Invert	Avail.Storage	Storage Description
#1	195.00'	184,484 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
195.00	29,984	0	0
196.00	32,723	31,354	31,354
197.00	35,439	34,081	65,435
198.00	38,254	36,847	102,281
199.00	41,092	39,673	141,954
200.00	43,968	42,530	184,484

Device	Routing	Invert	Outlet Devices
#1	Primary	193.06'	36.0" Round Culvert L= 58.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 193.06' / 189.00' S= 0.0700 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Device 1	197.05'	2.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	197.40'	3.5' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Device 1	198.50'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Secondary	199.50'	40.0' long x 10.0' breadth 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
#6	Discarded	195.00'	0.750 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 188.30'

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 71

Discarded OutFlow Max=0.85 cfs @ 15.65 hrs HW=197.50' (Free Discharge)
↳6=Exfiltration (Controls 0.85 cfs)

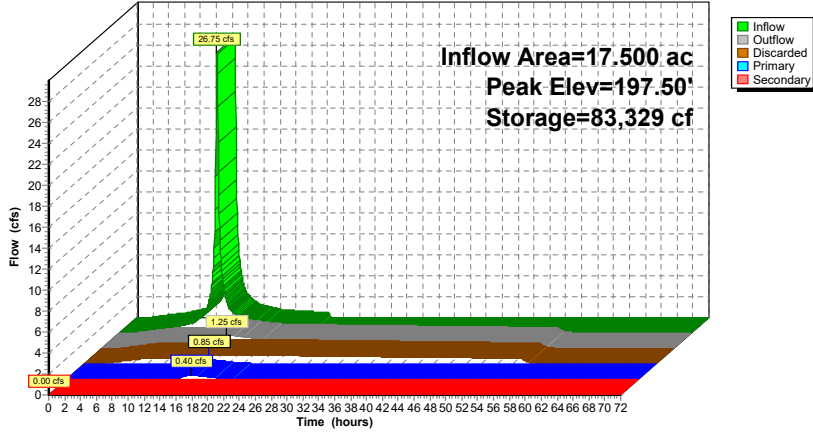
Primary OutFlow Max=0.40 cfs @ 15.65 hrs HW=197.50' (Free Discharge)

- ↳1=Culvert (Passes 0.06 cfs of 58.31 cfs potential flow)
- ↳2=Orifice/Gate (Orifice Controls 0.06 cfs @ 2.90 fps)
- ↳4=Orifice/Gate (Controls 0.00 cfs)
- ↳3=Sharp-Crested Rectangular Weir(Weir Controls 0.33 cfs @ 1.01 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=195.00' (Free Discharge)
↳5=Broad-Crested Rectangular Weir(Controls 0.00 cfs)

Pond 9P: Aboveground Infiltration Basin 'A'

Hydrograph



2023-09 Proposed

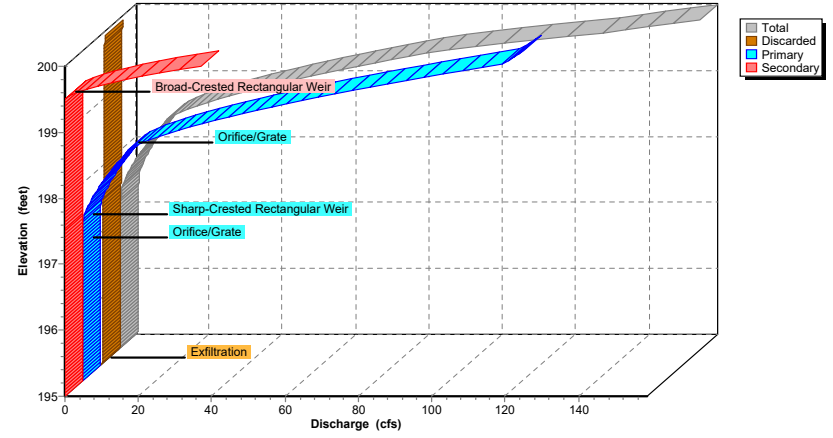
Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 72

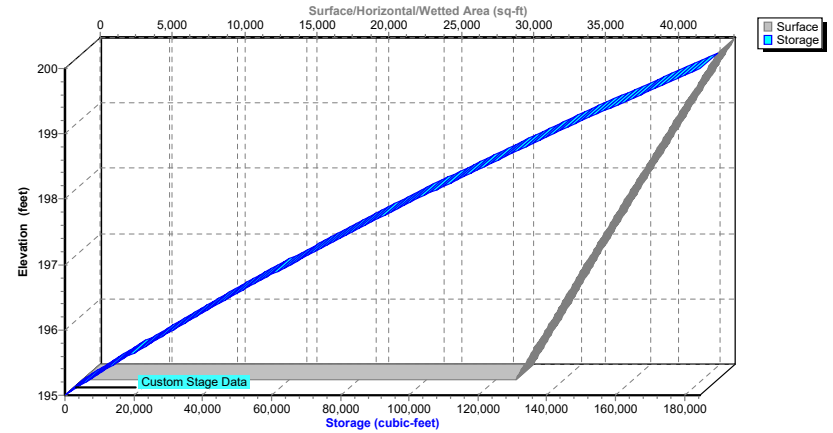
Pond 9P: Aboveground Infiltration Basin 'A'

Stage-Discharge



Pond 9P: Aboveground Infiltration Basin 'A'

Stage-Area-Storage



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 73

Hydrograph for Pond 9P: Aboveground Infiltration Basin 'A'

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	195.00	0.00	0.00	0.00	0.00
2.50	0.12	138	195.00	0.05	0.05	0.00	0.00
5.00	0.36	835	195.03	0.29	0.29	0.00	0.00
7.50	0.66	1,566	195.05	0.53	0.53	0.00	0.00
10.00	1.37	5,085	195.17	0.54	0.54	0.00	0.00
12.50	15.37	57,535	196.78	0.75	0.75	0.00	0.00
15.00	1.53	83,054	197.49	1.22	0.85	0.37	0.00
17.50	0.91	82,460	197.47	1.14	0.85	0.29	0.00
20.00	0.68	80,148	197.41	0.92	0.84	0.08	0.00
22.50	0.56	77,726	197.34	0.88	0.83	0.05	0.00
25.00	0.00	73,314	197.22	0.84	0.81	0.03	0.00
27.50	0.00	66,021	197.02	0.79	0.79	0.00	0.00
30.00	0.00	59,074	196.82	0.76	0.76	0.00	0.00
32.50	0.00	52,365	196.63	0.73	0.73	0.00	0.00
35.00	0.00	45,889	196.44	0.71	0.71	0.00	0.00
37.50	0.00	39,639	196.25	0.68	0.68	0.00	0.00
40.00	0.00	33,609	196.07	0.66	0.66	0.00	0.00
42.50	0.00	27,793	195.89	0.63	0.63	0.00	0.00
45.00	0.00	22,184	195.72	0.61	0.61	0.00	0.00
47.50	0.00	16,776	195.55	0.59	0.59	0.00	0.00
50.00	0.00	11,564	195.38	0.57	0.57	0.00	0.00
52.50	0.00	6,542	195.22	0.55	0.55	0.00	0.00
55.00	0.00	1,703	195.06	0.53	0.53	0.00	0.00
57.50	0.00	73	195.00	0.03	0.03	0.00	0.00
60.00	0.00	3	195.00	0.00	0.00	0.00	0.00
62.50	0.00	0	195.00	0.00	0.00	0.00	0.00
65.00	0.00	0	195.00	0.00	0.00	0.00	0.00
67.50	0.00	0	195.00	0.00	0.00	0.00	0.00
70.00	0.00	0	195.00	0.00	0.00	0.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 74

Stage-Discharge for Pond 9P: Aboveground Infiltration Basin 'A'

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
195.00	0.00	0.00	0.00	0.00
195.10	0.53	0.53	0.00	0.00
195.20	0.55	0.55	0.00	0.00
195.30	0.56	0.56	0.00	0.00
195.40	0.57	0.57	0.00	0.00
195.50	0.58	0.58	0.00	0.00
195.60	0.60	0.60	0.00	0.00
195.70	0.61	0.61	0.00	0.00
195.80	0.62	0.62	0.00	0.00
195.90	0.64	0.64	0.00	0.00
196.00	0.65	0.65	0.00	0.00
196.10	0.66	0.66	0.00	0.00
196.20	0.68	0.68	0.00	0.00
196.30	0.69	0.69	0.00	0.00
196.40	0.70	0.70	0.00	0.00
196.50	0.72	0.72	0.00	0.00
196.60	0.73	0.73	0.00	0.00
196.70	0.74	0.74	0.00	0.00
196.80	0.76	0.76	0.00	0.00
196.90	0.77	0.77	0.00	0.00
197.00	0.78	0.78	0.00	0.00
197.10	0.80	0.80	0.00	0.00
197.20	0.84	0.81	0.03	0.00
197.30	0.87	0.83	0.04	0.00
197.40	0.89	0.84	0.05	0.00
197.50	1.28	0.85	0.42	0.00
197.60	1.95	0.87	1.08	0.00
197.70	2.81	0.88	1.93	0.00
197.80	3.81	0.90	2.91	0.00
197.90	4.93	0.91	4.02	0.00
198.00	6.16	0.92	5.23	0.00
198.10	7.48	0.94	6.54	0.00
198.20	8.88	0.95	7.92	0.00
198.30	10.35	0.97	9.38	0.00
198.40	11.89	0.98	10.91	0.00
198.50	13.49	1.00	12.50	0.00
198.60	16.81	1.01	15.79	0.00
198.70	21.54	1.03	20.52	0.00
198.80	27.22	1.04	26.17	0.00
198.90	33.66	1.06	32.60	0.00
199.00	40.76	1.07	39.69	0.00
199.10	48.45	1.09	47.37	0.00
199.20	56.69	1.10	55.59	0.00
199.30	65.43	1.12	64.31	0.00
199.40	74.63	1.13	73.50	0.00
199.50	84.28	1.15	83.13	0.00
199.60	97.49	1.16	93.18	3.15
199.70	113.71	1.18	103.62	8.91
199.80	132.23	1.19	114.44	16.60
199.90	144.54	1.21	117.43	25.91
200.00	158.65	1.22	120.24	37.19

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 75

Stage-Area-Storage for Pond 9P: Aboveground Infiltration Basin 'A'

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
195.00	29,984	0	197.60	37,128	87,205
195.05	30,121	1,503	197.65	37,269	89,065
195.10	30,258	3,012	197.70	37,409	90,931
195.15	30,395	4,528	197.75	37,550	92,805
195.20	30,532	6,052	197.80	37,691	94,687
195.25	30,669	7,582	197.85	37,832	96,575
195.30	30,806	9,118	197.90	37,973	98,470
195.35	30,943	10,662	197.95	38,113	100,372
195.40	31,080	12,213	198.00	38,254	102,281
195.45	31,217	13,770	198.05	38,396	104,197
195.50	31,354	15,334	198.10	38,538	106,121
195.55	31,490	16,905	198.15	38,680	108,051
195.60	31,627	18,483	198.20	38,822	109,989
195.65	31,764	20,068	198.25	38,964	111,933
195.70	31,901	21,660	198.30	39,105	113,885
195.75	32,038	23,258	198.35	39,247	115,844
195.80	32,175	24,864	198.40	39,389	117,810
195.85	32,312	26,476	198.45	39,531	119,783
195.90	32,449	28,095	198.50	39,673	121,763
195.95	32,586	29,721	198.55	39,815	123,750
196.00	32,723	31,354	198.60	39,957	125,744
196.05	32,859	32,993	198.65	40,099	127,746
196.10	32,995	34,639	198.70	40,241	129,754
196.15	33,130	36,293	198.75	40,383	131,770
196.20	33,266	37,952	198.80	40,524	133,792
196.25	33,402	39,619	198.85	40,666	135,822
196.30	33,538	41,293	198.90	40,808	137,859
196.35	33,674	42,973	198.95	40,950	139,903
196.40	33,809	44,660	199.00	41,092	141,954
196.45	33,945	46,354	199.05	41,236	144,012
196.50	34,081	48,055	199.10	41,380	146,078
196.55	34,217	49,762	199.15	41,523	148,150
196.60	34,353	51,476	199.20	41,667	150,230
196.65	34,488	53,197	199.25	41,811	152,317
196.70	34,624	54,925	199.30	41,955	154,411
196.75	34,760	56,660	199.35	42,099	156,512
196.80	34,896	58,401	199.40	42,242	158,621
196.85	35,032	60,149	199.45	42,386	160,737
196.90	35,167	61,904	199.50	42,530	162,860
196.95	35,303	63,666	199.55	42,674	164,990
197.00	35,439	65,435	199.60	42,818	167,127
197.05	35,580	67,210	199.65	42,961	169,271
197.10	35,720	68,992	199.70	43,105	171,423
197.15	35,861	70,782	199.75	43,249	173,582
197.20	36,002	72,579	199.80	43,393	175,748
197.25	36,143	74,382	199.85	43,537	177,921
197.30	36,284	76,193	199.90	43,680	180,102
197.35	36,424	78,011	199.95	43,824	182,289
197.40	36,565	79,835	200.00	43,968	184,484
197.45	36,706	81,667			
197.50	36,847	83,506			
197.55	36,987	85,352			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 76

Summary for Pond 17P: Underground Detention Basin 'E'

Inflow Area = 4.030 ac, 98.26% Impervious, Inflow Depth = 2.39" for 1-Year event
 Inflow = 10.30 cfs @ 12.13 hrs, Volume= 0.801 af
 Outflow = 0.94 cfs @ 13.07 hrs, Volume= 0.567 af, Atten= 91%, Lag= 56.4 min
 Primary = 0.94 cfs @ 13.07 hrs, Volume= 0.567 af
 Routed to Link 21L : Route 9 Total

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 221.23' @ 13.07 hrs Surf.Area= 0.286 ac Storage= 0.499 af

Plug-Flow detention time= 389.5 min calculated for 0.567 af (71% of inflow)
 Center-of-Mass det. time= 290.5 min (1,054.2 - 763.7)

Volume	Invert	Avail.Storage	Storage Description
#1	218.50'	0.398 af	38.92'W x 320.00'L x 6.00'H Prisma 1.715 af Overall - 0.721 af Embedded = 0.994 af x 40.0% Voids
#2	219.00'	0.721 af	60.0" Round HDPE_Round 60"x 5 Inside #1 L= 320.0'
			1.119 af Total Available Storage

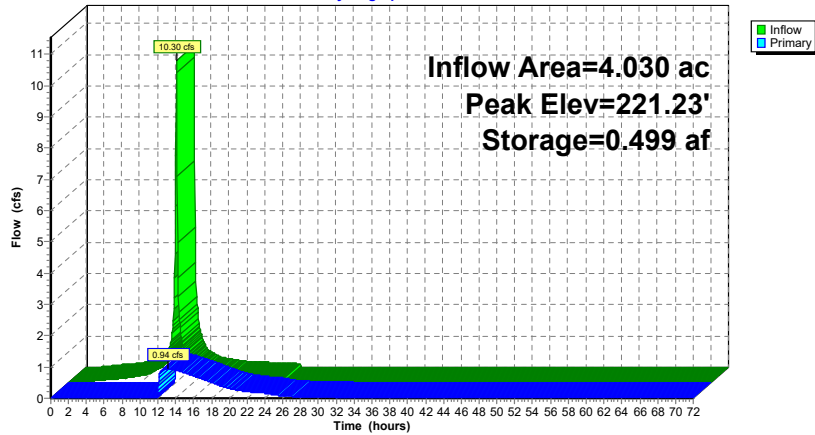
Device	Routing	Invert	Outlet Devices
#1	Primary	216.00'	24.0" Round Culvert L= 22.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 216.00' / 215.00' S= 0.0455 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	220.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	222.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.94 cfs @ 13.07 hrs HW=221.23' (Free Discharge)

- 1=Culvert (Passes 0.94 cfs of 31.11 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.94 cfs @ 4.77 fps)
- 3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

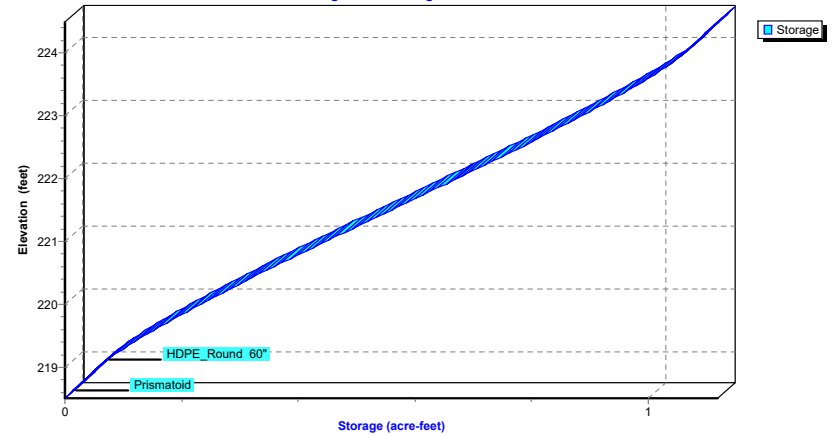
Pond 17P: Underground Detention Basin 'E'

Hydrograph



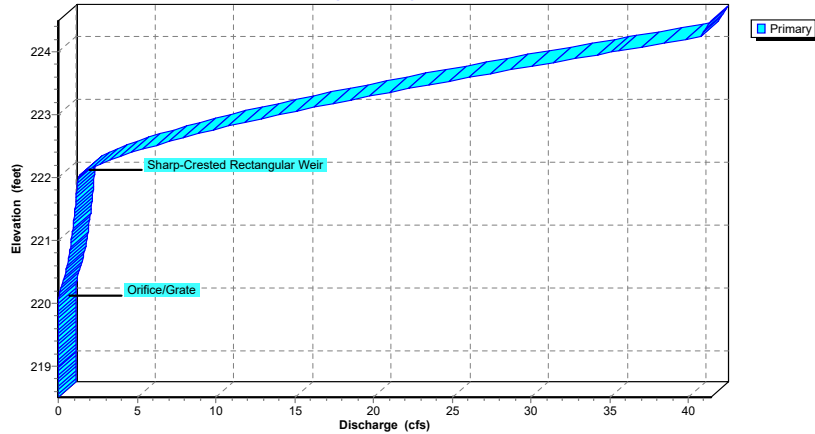
Pond 17P: Underground Detention Basin 'E'

Stage-Area-Storage



Pond 17P: Underground Detention Basin 'E'

Stage-Discharge



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 79

Hydrograph for Pond 17P: Underground Detention Basin 'E'

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	218.50	0.00
2.50	0.04	0.002	218.52	0.00
5.00	0.11	0.018	218.66	0.00
7.50	0.20	0.049	218.93	0.00
10.00	0.43	0.108	219.33	0.00
12.50	1.89	0.482	221.15	0.90
15.00	0.35	0.444	220.98	0.81
17.50	0.21	0.359	220.60	0.56
20.00	0.16	0.308	220.36	0.31
22.50	0.14	0.289	220.27	0.19
25.00	0.00	0.273	220.19	0.11
27.50	0.00	0.258	220.12	0.05
30.00	0.00	0.251	220.09	0.03
32.50	0.00	0.247	220.07	0.02
35.00	0.00	0.245	220.06	0.01
37.50	0.00	0.243	220.05	0.01
40.00	0.00	0.241	220.04	0.01
42.50	0.00	0.240	220.03	0.01
45.00	0.00	0.239	220.03	0.00
47.50	0.00	0.238	220.02	0.00
50.00	0.00	0.237	220.02	0.00
52.50	0.00	0.236	220.01	0.00
55.00	0.00	0.236	220.01	0.00
57.50	0.00	0.235	220.01	0.00
60.00	0.00	0.235	220.01	0.00
62.50	0.00	0.235	220.01	0.00
65.00	0.00	0.234	220.01	0.00
67.50	0.00	0.234	220.00	0.00
70.00	0.00	0.234	220.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 80

Stage-Discharge for Pond 17P: Underground Detention Basin 'E'

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
218.50	0.00	221.10	0.87	223.70	28.28
218.55	0.00	221.15	0.90	223.75	29.40
218.60	0.00	221.20	0.92	223.80	30.53
218.65	0.00	221.25	0.95	223.85	31.66
218.70	0.00	221.30	0.97	223.90	32.81
218.75	0.00	221.35	0.99	223.95	33.96
218.80	0.00	221.40	1.01	224.00	35.13
218.85	0.00	221.45	1.04	224.05	36.30
218.90	0.00	221.50	1.06	224.10	37.48
218.95	0.00	221.55	1.08	224.15	38.67
219.00	0.00	221.60	1.10	224.20	39.87
219.05	0.00	221.65	1.12	224.25	40.73
219.10	0.00	221.70	1.14	224.30	40.87
219.15	0.00	221.75	1.16	224.35	41.01
219.20	0.00	221.80	1.18	224.40	41.15
219.25	0.00	221.85	1.20	224.45	41.29
219.30	0.00	221.90	1.21	224.50	41.43
219.35	0.00	221.95	1.23		
219.40	0.00	222.00	1.25		
219.45	0.00	222.05	1.41		
219.50	0.00	222.10	1.70		
219.55	0.00	222.15	2.06		
219.60	0.00	222.20	2.48		
219.65	0.00	222.25	2.95		
219.70	0.00	222.30	3.47		
219.75	0.00	222.35	4.03		
219.80	0.00	222.40	4.63		
219.85	0.00	222.45	5.26		
219.90	0.00	222.50	5.93		
219.95	0.00	222.55	6.62		
220.00	0.00	222.60	7.35		
220.05	0.01	222.65	8.10		
220.10	0.03	222.70	8.87		
220.15	0.07	222.75	9.67		
220.20	0.11	222.80	10.49		
220.25	0.17	222.85	11.34		
220.30	0.23	222.90	12.20		
220.35	0.30	222.95	13.09		
220.40	0.36	223.00	13.99		
220.45	0.43	223.05	14.92		
220.50	0.47	223.10	15.86		
220.55	0.52	223.15	16.81		
220.60	0.56	223.20	17.79		
220.65	0.60	223.25	18.77		
220.70	0.63	223.30	19.78		
220.75	0.67	223.35	20.80		
220.80	0.70	223.40	21.83		
220.85	0.73	223.45	22.87		
220.90	0.76	223.50	23.93		
220.95	0.79	223.55	25.00		
221.00	0.82	223.60	26.08		
221.05	0.85	223.65	27.18		

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 81

Stage-Area-Storage for Pond 17P: Underground Detention Basin 'E'

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
218.50	0.000	221.10	0.470	223.70	1.017
218.55	0.006	221.15	0.481	223.75	1.025
218.60	0.011	221.20	0.492	223.80	1.033
218.65	0.017	221.25	0.503	223.85	1.041
218.70	0.023	221.30	0.515	223.90	1.048
218.75	0.029	221.35	0.526	223.95	1.055
218.80	0.034	221.40	0.537	224.00	1.062
218.85	0.040	221.45	0.548	224.05	1.067
218.90	0.046	221.50	0.559	224.10	1.073
218.95	0.051	221.55	0.571	224.15	1.079
219.00	0.057	221.60	0.582	224.20	1.085
219.05	0.064	221.65	0.593	224.25	1.090
219.10	0.071	221.70	0.604	224.30	1.096
219.15	0.078	221.75	0.616	224.35	1.102
219.20	0.086	221.80	0.627	224.40	1.107
219.25	0.094	221.85	0.638	224.45	1.113
219.30	0.102	221.90	0.649	224.50	1.119
219.35	0.111	221.95	0.660		
219.40	0.119	222.00	0.671		
219.45	0.128	222.05	0.682		
219.50	0.137	222.10	0.694		
219.55	0.146	222.15	0.705		
219.60	0.155	222.20	0.716		
219.65	0.165	222.25	0.727		
219.70	0.174	222.30	0.738		
219.75	0.184	222.35	0.748		
219.80	0.193	222.40	0.759		
219.85	0.203	222.45	0.770		
219.90	0.213	222.50	0.781		
219.95	0.223	222.55	0.792		
220.00	0.233	222.60	0.802		
220.05	0.243	222.65	0.813		
220.10	0.254	222.70	0.824		
220.15	0.264	222.75	0.834		
220.20	0.274	222.80	0.845		
220.25	0.285	222.85	0.855		
220.30	0.295	222.90	0.865		
220.35	0.306	222.95	0.876		
220.40	0.316	223.00	0.886		
220.45	0.327	223.05	0.896		
220.50	0.338	223.10	0.906		
220.55	0.349	223.15	0.916		
220.60	0.360	223.20	0.926		
220.65	0.370	223.25	0.935		
220.70	0.381	223.30	0.945		
220.75	0.392	223.35	0.954		
220.80	0.403	223.40	0.964		
220.85	0.414	223.45	0.973		
220.90	0.425	223.50	0.982		
220.95	0.436	223.55	0.991		
221.00	0.448	223.60	1.000		
221.05	0.459	223.65	1.008		

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 82

Summary for Pond 18P: Underground Detention Basin 'F'

Inflow Area = 3.910 ac, 89.77% Impervious, Inflow Depth = 2.24" for 1-Year event
 Inflow = 8.87 cfs @ 12.15 hrs, Volume= 0.730 af
 Outflow = 2.64 cfs @ 12.39 hrs, Volume= 0.730 af, Atten= 70%, Lag= 14.2 min
 Primary = 2.64 cfs @ 12.39 hrs, Volume= 0.730 af
 Routed to Link 21L : Route 9 Total

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 190.99' @ 12.39 hrs Surf.Area= 0.318 ac Storage= 0.219 af

Plug-Flow detention time= 71.6 min calculated for 0.730 af (100% of inflow)
 Center-of-Mass det. time= 70.9 min (840.1 - 769.2)

Volume	Invert	Avail.Storage	Storage Description
#1	190.00'	1.569 af	60.0" Round RCP_Round 60" x 15 L= 232.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	190.00'	18.0" Round RCP_Round 18" L= 186.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 190.00' / 188.41' S= 0.0085 ' / Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	190.00'	12.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	193.50'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=2.65 cfs @ 12.39 hrs HW=190.99' (Free Discharge)

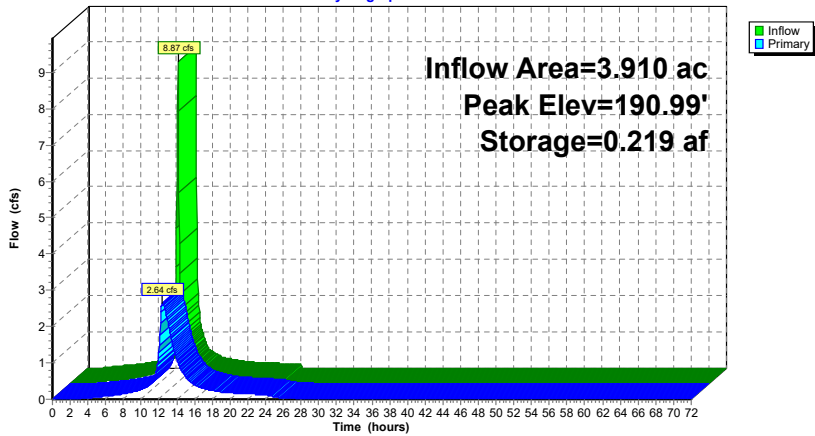
1=RCP_Round 18" (Passes 2.65 cfs of 4.16 cfs potential flow)

2=Orifice/Grate (Orifice Controls 2.65 cfs @ 3.38 fps)

3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

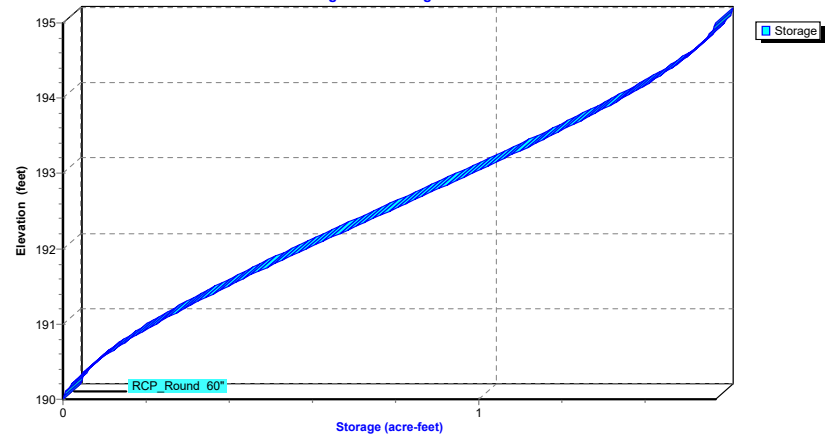
Pond 18P: Underground Detention Basin 'F'

Hydrograph



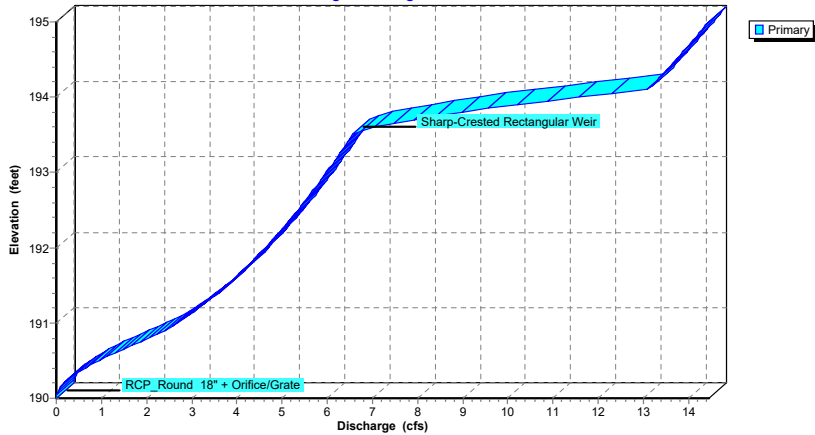
Pond 18P: Underground Detention Basin 'F'

Stage-Area-Storage



Pond 18P: Underground Detention Basin 'F'

Stage-Discharge



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 85

Hydrograph for Pond 18P: Underground Detention Basin 'F'

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	190.00	0.00
2.50	0.04	0.001	190.03	0.01
5.00	0.10	0.009	190.12	0.06
7.50	0.18	0.017	190.17	0.13
10.00	0.38	0.030	190.25	0.27
12.50	1.86	0.215	190.97	2.61
15.00	0.33	0.058	190.39	0.62
17.50	0.20	0.030	190.25	0.27
20.00	0.15	0.021	190.20	0.17
22.50	0.13	0.018	190.18	0.14
25.00	0.00	0.010	190.12	0.06
27.50	0.00	0.003	190.06	0.01
30.00	0.00	0.001	190.03	0.01
32.50	0.00	0.001	190.01	0.00
35.00	0.00	0.000	190.01	0.00
37.50	0.00	0.000	190.00	0.00
40.00	0.00	0.000	190.00	0.00
42.50	0.00	0.000	190.00	0.00
45.00	0.00	0.000	190.00	0.00
47.50	0.00	0.000	190.00	0.00
50.00	0.00	0.000	190.00	0.00
52.50	0.00	0.000	190.00	0.00
55.00	0.00	0.000	190.00	0.00
57.50	0.00	0.000	190.00	0.00
60.00	0.00	0.000	190.00	0.00
62.50	0.00	0.000	190.00	0.00
65.00	0.00	0.000	190.00	0.00
67.50	0.00	0.000	190.00	0.00
70.00	0.00	0.000	190.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 86

Stage-Discharge for Pond 18P: Underground Detention Basin 'F'

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
190.00	0.00	192.60	5.48
190.05	0.01	192.65	5.55
190.10	0.04	192.70	5.61
190.15	0.10	192.75	5.67
190.20	0.17	192.80	5.74
190.25	0.26	192.85	5.80
190.30	0.37	192.90	5.86
190.35	0.49	192.95	5.92
190.40	0.63	193.00	5.98
190.45	0.78	193.05	6.04
190.50	0.95	193.10	6.10
190.55	1.12	193.15	6.16
190.60	1.30	193.20	6.21
190.65	1.48	193.25	6.27
190.70	1.67	193.30	6.33
190.75	1.86	193.35	6.38
190.80	2.05	193.40	6.44
190.85	2.23	193.45	6.50
190.90	2.40	193.50	6.55
190.95	2.56	193.55	6.75
191.00	2.67	193.60	7.07
191.05	2.80	193.65	7.47
191.10	2.93	193.70	7.92
191.15	3.05	193.75	8.43
191.20	3.16	193.80	8.99
191.25	3.28	193.85	9.58
191.30	3.38	193.90	10.22
191.35	3.49	193.95	10.88
191.40	3.59	194.00	11.58
191.45	3.69	194.05	12.31
191.50	3.78	194.10	13.07
191.55	3.88	194.15	13.19
191.60	3.97	194.20	13.27
191.65	4.06	194.25	13.34
191.70	4.14	194.30	13.42
191.75	4.23	194.35	13.50
191.80	4.31	194.40	13.57
191.85	4.39	194.45	13.65
191.90	4.47	194.50	13.72
191.95	4.55	194.55	13.80
192.00	4.63	194.60	13.87
192.05	4.71	194.65	13.95
192.10	4.78	194.70	14.02
192.15	4.86	194.75	14.09
192.20	4.93	194.80	14.16
192.25	5.00	194.85	14.24
192.30	5.07	194.90	14.31
192.35	5.14	194.95	14.38
192.40	5.21	195.00	14.45
192.45	5.28		
192.50	5.35		
192.55	5.41		

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 87

Stage-Area-Storage for Pond 18P: Underground Detention Basin 'F'

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
190.00	0.000	192.60	0.824
190.05	0.003	192.65	0.844
190.10	0.007	192.70	0.864
190.15	0.014	192.75	0.884
190.20	0.021	192.80	0.904
190.25	0.029	192.85	0.924
190.30	0.038	192.90	0.943
190.35	0.048	192.95	0.963
190.40	0.059	193.00	0.983
190.45	0.070	193.05	1.002
190.50	0.082	193.10	1.022
190.55	0.094	193.15	1.041
190.60	0.107	193.20	1.060
190.65	0.120	193.25	1.079
190.70	0.133	193.30	1.098
190.75	0.148	193.35	1.117
190.80	0.162	193.40	1.136
190.85	0.177	193.45	1.154
190.90	0.192	193.50	1.173
190.95	0.208	193.55	1.191
191.00	0.223	193.60	1.209
191.05	0.239	193.65	1.227
191.10	0.256	193.70	1.245
191.15	0.273	193.75	1.262
191.20	0.289	193.80	1.279
191.25	0.307	193.85	1.296
191.30	0.324	193.90	1.313
191.35	0.342	193.95	1.329
191.40	0.360	194.00	1.345
191.45	0.378	194.05	1.361
191.50	0.396	194.10	1.377
191.55	0.414	194.15	1.392
191.60	0.433	194.20	1.407
191.65	0.451	194.25	1.421
191.70	0.470	194.30	1.435
191.75	0.489	194.35	1.449
191.80	0.508	194.40	1.462
191.85	0.528	194.45	1.475
191.90	0.547	194.50	1.487
191.95	0.566	194.55	1.499
192.00	0.586	194.60	1.510
192.05	0.606	194.65	1.520
192.10	0.625	194.70	1.530
192.15	0.645	194.75	1.539
192.20	0.665	194.80	1.548
192.25	0.685	194.85	1.555
192.30	0.705	194.90	1.561
192.35	0.724	194.95	1.566
192.40	0.744	195.00	1.569
192.45	0.764		
192.50	0.784		
192.55	0.804		

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 88

Summary for Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Inflow Area = 17.770 ac, 29.99% Impervious, Inflow Depth = 1.38" for 1-Year event
 Inflow = 24.61 cfs @ 12.17 hrs, Volume= 2.041 af
 Outflow = 15.85 cfs @ 12.27 hrs, Volume= 2.041 af, Atten= 36%, Lag= 6.4 min
 Discarded = 15.85 cfs @ 12.27 hrs, Volume= 2.041 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 21L : Route 9 Total
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 137.59' @ 12.27 hrs Surf.Area= 67,043 sf Storage= 5,807 cf

Plug-Flow detention time= 3.0 min calculated for 2.040 af (100% of inflow)
 Center-of-Mass det. time= 3.0 min (819.3 - 816.3)

Volume	Invert	Avail.Storage	Storage Description
#1	137.50'	307,536 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
137.50	66,608	0	0
138.00	69,110	33,930	33,930
139.00	74,414	71,762	105,692
140.00	100,841	87,628	193,319
141.00	127,593	114,217	307,536

Device	Routing	Invert	Outlet Devices
#1	Primary	137.50'	15.0" Round Culvert L= 60.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 137.50' / 137.20' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Primary	138.45'	2.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	139.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Discarded	137.50'	10,000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 133.50'
#5	Primary	140.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	140.50'	40.0' long (Profile 9) Broad-Crested Rectangular Weir Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.55 3.55 3.57 3.60 3.66

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 89

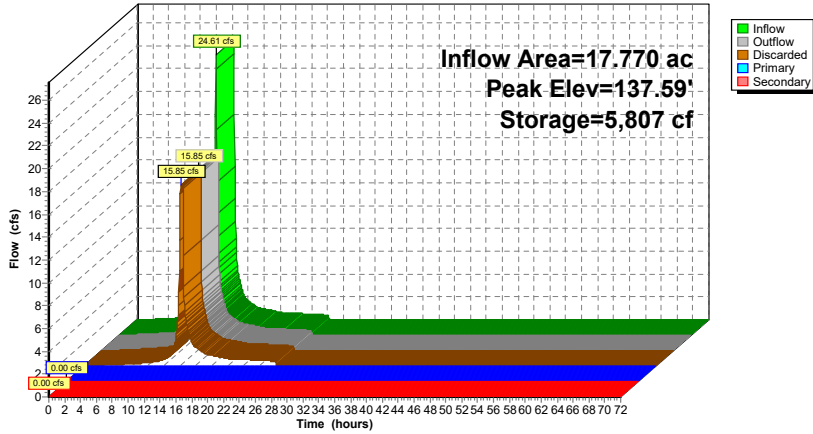
Discarded OutFlow Max=15.85 cfs @ 12.27 hrs HW=137.59' (Free Discharge)
↳4=Exfiltration (Controls 15.85 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=137.50' (Free Discharge)
↳1=Culvert (Controls 0.00 cfs)
↳3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
↳2=Orifice/Grate (Controls 0.00 cfs)
↳5=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=137.50' (Free Discharge)
↳6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Hydrograph



2023-09 Proposed

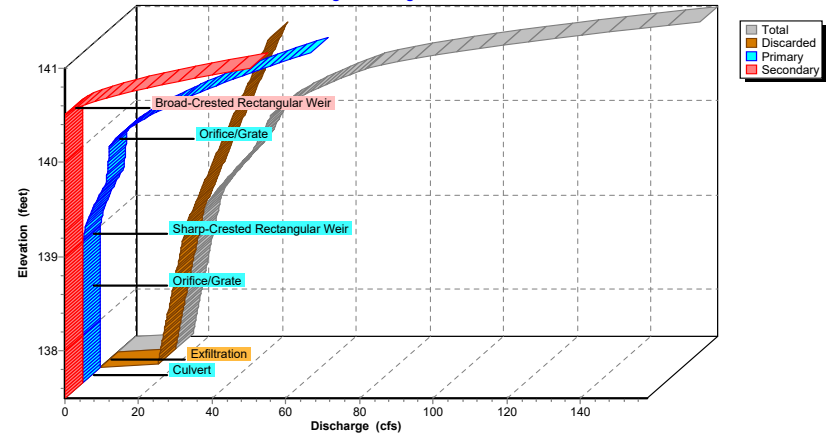
Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 90

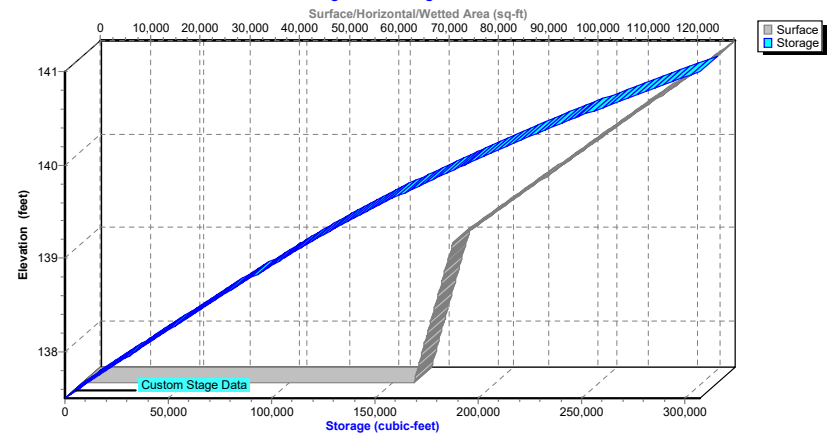
Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Stage-Discharge



Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Stage-Area-Storage



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 91

Hydrograph for Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	137.50	0.00	0.00	0.00	0.00
2.50	0.05	8	137.50	0.05	0.05	0.00	0.00
5.00	0.15	22	137.50	0.15	0.15	0.00	0.00
7.50	0.27	40	137.50	0.27	0.27	0.00	0.00
10.00	0.58	85	137.50	0.57	0.57	0.00	0.00
12.50	6.37	1,445	137.52	9.66	9.66	0.00	0.00
15.00	1.17	178	137.50	1.19	1.19	0.00	0.00
17.50	0.73	111	137.50	0.74	0.74	0.00	0.00
20.00	0.56	85	137.50	0.57	0.57	0.00	0.00
22.50	0.47	71	137.50	0.47	0.47	0.00	0.00
25.00	0.00	0	137.50	0.00	0.00	0.00	0.00
27.50	0.00	0	137.50	0.00	0.00	0.00	0.00
30.00	0.00	0	137.50	0.00	0.00	0.00	0.00
32.50	0.00	0	137.50	0.00	0.00	0.00	0.00
35.00	0.00	0	137.50	0.00	0.00	0.00	0.00
37.50	0.00	0	137.50	0.00	0.00	0.00	0.00
40.00	0.00	0	137.50	0.00	0.00	0.00	0.00
42.50	0.00	0	137.50	0.00	0.00	0.00	0.00
45.00	0.00	0	137.50	0.00	0.00	0.00	0.00
47.50	0.00	0	137.50	0.00	0.00	0.00	0.00
50.00	0.00	0	137.50	0.00	0.00	0.00	0.00
52.50	0.00	0	137.50	0.00	0.00	0.00	0.00
55.00	0.00	0	137.50	0.00	0.00	0.00	0.00
57.50	0.00	0	137.50	0.00	0.00	0.00	0.00
60.00	0.00	0	137.50	0.00	0.00	0.00	0.00
62.50	0.00	0	137.50	0.00	0.00	0.00	0.00
65.00	0.00	0	137.50	0.00	0.00	0.00	0.00
67.50	0.00	0	137.50	0.00	0.00	0.00	0.00
70.00	0.00	0	137.50	0.00	0.00	0.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 92

Stage-Discharge for Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
137.50	0.00	0.00	0.00	0.00
137.60	15.92	15.92	0.00	0.00
137.70	16.43	16.43	0.00	0.00
137.80	16.93	16.93	0.00	0.00
137.90	17.44	17.44	0.00	0.00
138.00	17.96	17.96	0.00	0.00
138.10	18.48	18.48	0.00	0.00
138.20	19.01	19.01	0.00	0.00
138.30	19.53	19.53	0.00	0.00
138.40	20.06	20.06	0.00	0.00
138.50	20.60	20.60	0.00	0.00
138.60	21.16	21.13	0.03	0.00
138.70	21.71	21.67	0.04	0.00
138.80	22.26	22.21	0.05	0.00
138.90	22.82	22.75	0.06	0.00
139.00	23.37	23.30	0.07	0.00
139.10	24.83	24.34	0.49	0.00
139.20	26.63	25.39	1.24	0.00
139.30	28.66	26.45	2.21	0.00
139.40	30.86	27.52	3.34	0.00
139.50	33.21	28.60	4.61	0.00
139.60	35.70	29.69	6.01	0.00
139.70	37.37	30.79	6.58	0.00
139.80	38.74	31.91	6.84	0.00
139.90	40.11	33.03	7.09	0.00
140.00	41.49	34.16	7.33	0.00
140.10	44.52	35.31	9.22	0.00
140.20	48.93	36.46	12.47	0.00
140.30	54.23	37.63	16.60	0.00
140.40	60.26	38.80	21.46	0.00
140.50	66.92	39.99	26.93	0.00
140.60	78.62	41.18	32.95	4.49
140.70	94.56	42.38	39.47	12.70
140.80	113.39	43.60	46.46	23.33
140.90	134.62	44.81	53.89	35.92
141.00	157.97	46.04	61.72	50.20

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 93

Stage-Area-Storage for Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
137.50	66,608	0	140.10	103,516	203,537
137.55	66,858	3,337	140.15	104,854	208,746
137.60	67,108	6,686	140.20	106,191	214,022
137.65	67,359	10,047	140.25	107,529	219,365
137.70	67,609	13,422	140.30	108,867	224,775
137.75	67,859	16,808	140.35	110,204	230,252
137.80	68,109	20,208	140.40	111,542	235,796
137.85	68,359	23,619	140.45	112,879	241,406
137.90	68,610	27,044	140.50	114,217	247,084
137.95	68,860	30,480	140.55	115,555	252,828
138.00	69,110	33,930	140.60	116,892	258,639
138.05	69,375	37,392	140.65	118,230	264,517
138.10	69,640	40,867	140.70	119,567	270,462
138.15	69,906	44,356	140.75	120,905	276,474
138.20	70,171	47,858	140.80	122,243	282,552
138.25	70,436	51,373	140.85	123,580	288,698
138.30	70,701	54,901	140.90	124,918	294,910
138.35	70,966	58,443	140.95	126,255	301,190
138.40	71,232	61,998	141.00	127,593	307,536
138.45	71,497	65,566			
138.50	71,762	69,148			
138.55	72,027	72,742			
138.60	72,292	76,350			
138.65	72,558	79,971			
138.70	72,823	83,606			
138.75	73,088	87,254			
138.80	73,353	90,915			
138.85	73,618	94,589			
138.90	73,884	98,277			
138.95	74,149	101,977			
139.00	74,414	105,692			
139.05	75,735	109,445			
139.10	77,057	113,265			
139.15	78,378	117,151			
139.20	79,699	121,103			
139.25	81,021	125,121			
139.30	82,342	129,205			
139.35	83,663	133,355			
139.40	84,985	137,571			
139.45	86,306	141,854			
139.50	87,628	146,202			
139.55	88,949	150,616			
139.60	90,270	155,097			
139.65	91,592	159,643			
139.70	92,913	164,256			
139.75	94,234	168,935			
139.80	95,556	173,679			
139.85	96,877	178,490			
139.90	98,198	183,367			
139.95	99,520	188,310			
140.00	100,841	193,319			
140.05	102,179	198,394			

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 94

Summary for Pond 24P: Aboveground Infiltration Basin 'C'

Inflow Area = 28.040 ac, 72.36% Impervious, Inflow Depth = 2.02" for 1-Year event
 Inflow = 52.08 cfs @ 12.19 hrs, Volume= 4.712 af
 Outflow = 15.36 cfs @ 12.49 hrs, Volume= 4.712 af, Atten= 70%, Lag= 18.0 min
 Discarded = 15.36 cfs @ 12.49 hrs, Volume= 4.712 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 10L : Moodna Creek
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 154.95' @ 12.49 hrs Surf.Area= 53,358 sf Storage= 39,196 cf

Plug-Flow detention time= 15.8 min calculated for 4.712 af (100% of inflow)
 Center-of-Mass det. time= 15.7 min (797.4 - 781.7)

Volume	Invert	Avail.Storage	Storage Description
#1	154.20'	433,782 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
154.20	51,101	0	0
155.00	53,507	41,843	41,843
156.00	56,463	54,985	96,828
157.00	59,503	57,983	154,811
158.00	62,689	61,096	215,907
159.00	65,878	64,284	280,191
160.00	69,125	67,502	347,692
161.00	73,120	71,123	418,815
161.20	76,551	14,967	433,782

Device	Routing	Invert	Outlet Devices
#1	Primary	154.20'	18.0" Round 18" Round RCP L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 154.20' / 153.70' S= 0.0050 /' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	156.10'	12.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	160.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Discarded	154.20'	10,000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 151.20'
#5	Secondary	160.50'	40.0' long x 10.0' breadth 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

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 95

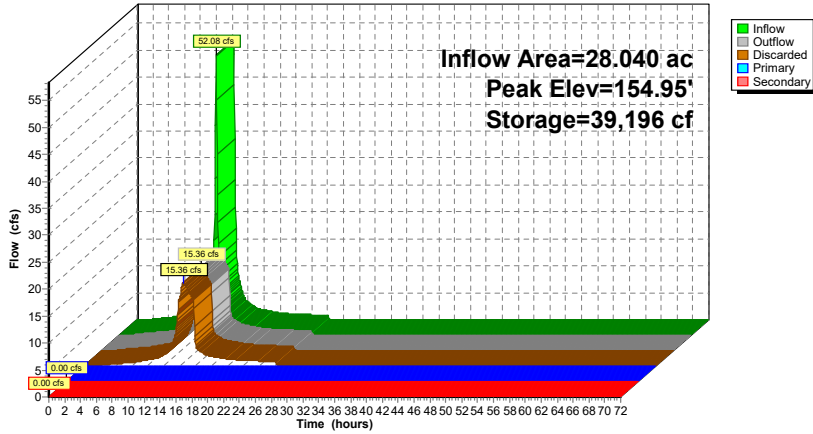
Discarded OutFlow Max=15.36 cfs @ 12.49 hrs HW=154.95' (Free Discharge)
↳4=Exfiltration (Controls 15.36 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=154.20' (Free Discharge)
↳1=18" Round RCP (Controls 0.00 cfs)
↳2=Orifice/Grate (Controls 0.00 cfs)
↳3=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=154.20' (Free Discharge)
↳5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 24P: Aboveground Infiltration Basin 'C'

Hydrograph



2023-09 Proposed

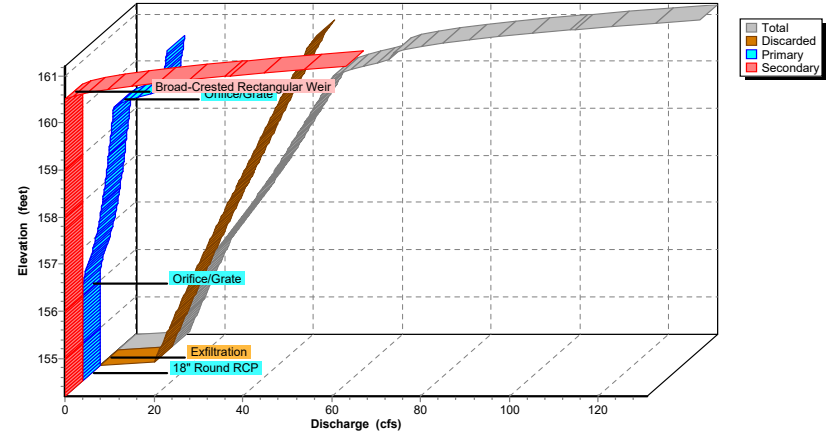
Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023
Page 96

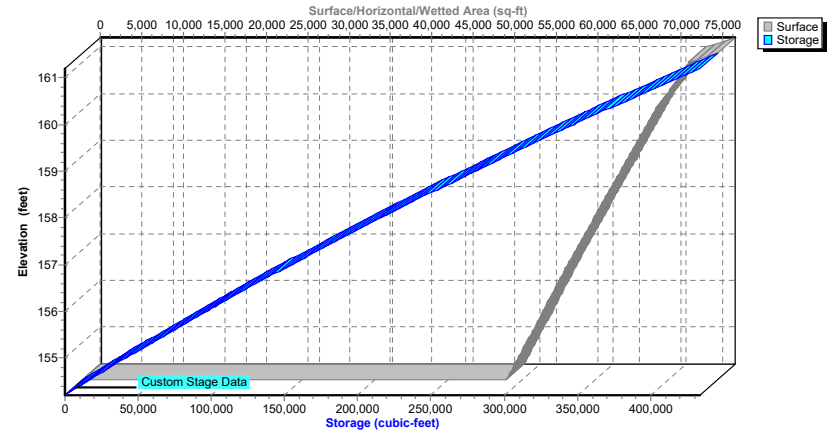
Pond 24P: Aboveground Infiltration Basin 'C'

Stage-Discharge



Pond 24P: Aboveground Infiltration Basin 'C'

Stage-Area-Storage



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 97

Hydrograph for Pond 24P: Aboveground Infiltration Basin 'C'

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	154.20	0.00	0.00	0.00	0.00
2.50	0.20	54	154.20	0.18	0.18	0.00	0.00
5.00	0.56	162	154.20	0.55	0.55	0.00	0.00
7.50	1.02	295	154.21	1.00	1.00	0.00	0.00
10.00	2.15	615	154.21	2.08	2.08	0.00	0.00
12.50	14.54	39,183	154.95	15.36	15.36	0.00	0.00
15.00	2.28	695	154.21	2.36	2.36	0.00	0.00
17.50	1.39	419	154.21	1.42	1.42	0.00	0.00
20.00	1.06	314	154.21	1.06	1.06	0.00	0.00
22.50	0.88	260	154.21	0.88	0.88	0.00	0.00
25.00	0.00	0	154.20	0.00	0.00	0.00	0.00
27.50	0.00	0	154.20	0.00	0.00	0.00	0.00
30.00	0.00	0	154.20	0.00	0.00	0.00	0.00
32.50	0.00	0	154.20	0.00	0.00	0.00	0.00
35.00	0.00	0	154.20	0.00	0.00	0.00	0.00
37.50	0.00	0	154.20	0.00	0.00	0.00	0.00
40.00	0.00	0	154.20	0.00	0.00	0.00	0.00
42.50	0.00	0	154.20	0.00	0.00	0.00	0.00
45.00	0.00	0	154.20	0.00	0.00	0.00	0.00
47.50	0.00	0	154.20	0.00	0.00	0.00	0.00
50.00	0.00	0	154.20	0.00	0.00	0.00	0.00
52.50	0.00	0	154.20	0.00	0.00	0.00	0.00
55.00	0.00	0	154.20	0.00	0.00	0.00	0.00
57.50	0.00	0	154.20	0.00	0.00	0.00	0.00
60.00	0.00	0	154.20	0.00	0.00	0.00	0.00
62.50	0.00	0	154.20	0.00	0.00	0.00	0.00
65.00	0.00	0	154.20	0.00	0.00	0.00	0.00
67.50	0.00	0	154.20	0.00	0.00	0.00	0.00
70.00	0.00	0	154.20	0.00	0.00	0.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 98

Stage-Discharge for Pond 24P: Aboveground Infiltration Basin 'C'

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
154.20	0.00	0.00	0.00	0.00
154.40	12.76	12.76	0.00	0.00
154.60	13.70	13.70	0.00	0.00
154.80	14.65	14.65	0.00	0.00
155.00	15.60	15.60	0.00	0.00
155.20	16.56	16.56	0.00	0.00
155.40	17.53	17.53	0.00	0.00
155.60	18.50	18.50	0.00	0.00
155.80	19.48	19.48	0.00	0.00
156.00	20.47	20.47	0.00	0.00
156.20	21.51	21.46	0.04	0.00
156.40	22.84	22.47	0.37	0.00
156.60	24.42	23.47	0.95	0.00
156.80	26.16	24.48	1.67	0.00
157.00	27.91	25.50	2.40	0.00
157.20	29.46	26.53	2.93	0.00
157.40	30.95	27.56	3.38	0.00
157.60	32.38	28.60	3.78	0.00
157.80	33.79	29.64	4.14	0.00
158.00	35.17	30.69	4.47	0.00
158.20	36.53	31.74	4.78	0.00
158.40	37.87	32.80	5.07	0.00
158.60	39.21	33.86	5.35	0.00
158.80	40.53	34.92	5.61	0.00
159.00	41.85	35.99	5.86	0.00
159.20	43.16	37.06	6.10	0.00
159.40	44.47	38.14	6.33	0.00
159.60	45.77	39.22	6.55	0.00
159.80	47.07	40.31	6.76	0.00
160.00	48.37	41.40	6.97	0.00
160.20	54.38	42.53	11.85	0.00
160.40	61.38	43.66	17.72	0.00
160.60	66.00	44.79	18.06	3.15
160.80	80.92	45.93	18.39	16.60
161.00	102.99	47.08	18.72	37.19
161.20	131.01	48.84	19.04	63.13

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 99

Stage-Area-Storage for Pond 24P: Aboveground Infiltration Basin 'C'

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
154.20	51,101	0	159.40	67,177	306,802
154.30	51,402	5,125	159.50	67,502	313,536
154.40	51,702	10,280	159.60	67,826	320,302
154.50	52,003	15,466	159.70	68,151	327,101
154.60	52,304	20,681	159.80	68,476	333,932
154.70	52,605	25,926	159.90	68,800	340,796
154.80	52,905	31,202	160.00	69,125	347,692
154.90	53,206	36,508	160.10	69,524	354,625
155.00	53,507	41,843	160.20	69,924	361,597
155.10	53,803	47,209	160.30	70,323	368,609
155.20	54,098	52,604	160.40	70,723	375,662
155.30	54,394	58,028	160.50	71,123	382,754
155.40	54,689	63,482	160.60	71,522	389,886
155.50	54,985	68,966	160.70	71,921	397,058
155.60	55,281	74,479	160.80	72,321	404,271
155.70	55,576	80,022	160.90	72,720	411,523
155.80	55,872	85,595	161.00	73,120	418,815
155.90	56,167	91,197	161.10	74,836	426,212
156.00	56,463	96,828	161.20	76,551	433,782
156.10	56,767	102,490			
156.20	57,071	108,182			
156.30	57,375	113,904			
156.40	57,679	119,657			
156.50	57,983	125,440			
156.60	58,287	131,253			
156.70	58,591	137,097			
156.80	58,895	142,971			
156.90	59,199	148,876			
157.00	59,503	154,811			
157.10	59,822	160,777			
157.20	60,140	166,776			
157.30	60,459	172,805			
157.40	60,777	178,867			
157.50	61,096	184,961			
157.60	61,415	191,086			
157.70	61,733	197,244			
157.80	62,052	203,433			
157.90	62,370	209,654			
158.00	62,689	215,907			
158.10	63,008	222,192			
158.20	63,327	228,509			
158.30	63,646	234,857			
158.40	63,965	241,238			
158.50	64,284	247,650			
158.60	64,602	254,095			
158.70	64,921	260,571			
158.80	65,240	267,079			
158.90	65,559	273,619			
159.00	65,878	280,191			
159.10	66,203	286,795			
159.20	66,527	293,431			
159.30	66,852	300,100			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

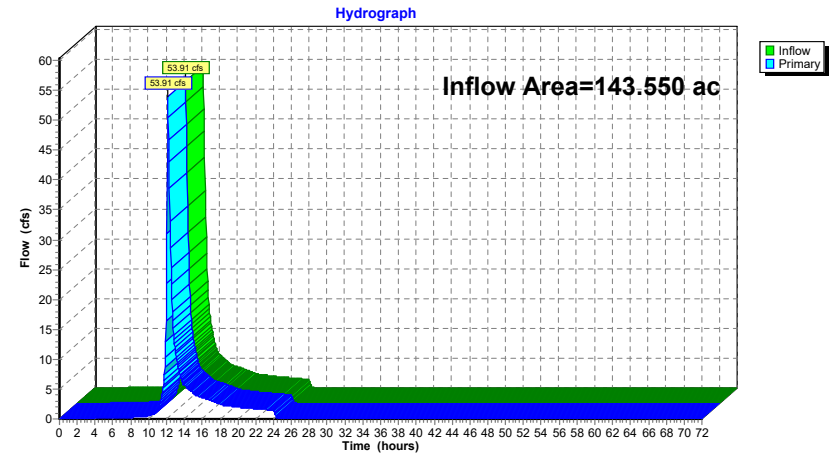
Page 100

Summary for Link 10L: Moodna Creek

Inflow Area = 143.550 ac, 43.00% Impervious, Inflow Depth = 0.49" for 1-Year event
 Inflow = 53.91 cfs @ 12.16 hrs, Volume= 5.822 af
 Primary = 53.91 cfs @ 12.16 hrs, Volume= 5.822 af, Atten=0%, Lag= 0.0 min
 Routed to Link 22L : Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 10L: Moodna Creek



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 101

Hydrograph for Link 10L: Moodna Creek

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.02	0.00	0.02	54.00	0.00	0.00	0.00
3.00	0.07	0.00	0.07	55.00	0.00	0.00	0.00
4.00	0.10	0.00	0.10	56.00	0.00	0.00	0.00
5.00	0.13	0.00	0.13	57.00	0.00	0.00	0.00
6.00	0.16	0.00	0.16	58.00	0.00	0.00	0.00
7.00	0.21	0.00	0.21	59.00	0.00	0.00	0.00
8.00	0.27	0.00	0.27	60.00	0.00	0.00	0.00
9.00	0.33	0.00	0.33	61.00	0.00	0.00	0.00
10.00	0.52	0.00	0.52	62.00	0.00	0.00	0.00
11.00	1.60	0.00	1.60	63.00	0.00	0.00	0.00
12.00	22.78	0.00	22.78	64.00	0.00	0.00	0.00
13.00	11.33	0.00	11.33	65.00	0.00	0.00	0.00
14.00	5.66	0.00	5.66	66.00	0.00	0.00	0.00
15.00	4.32	0.00	4.32	67.00	0.00	0.00	0.00
16.00	3.60	0.00	3.60	68.00	0.00	0.00	0.00
17.00	3.07	0.00	3.07	69.00	0.00	0.00	0.00
18.00	2.48	0.00	2.48	70.00	0.00	0.00	0.00
19.00	2.18	0.00	2.18	71.00	0.00	0.00	0.00
20.00	2.00	0.00	2.00	72.00	0.00	0.00	0.00
21.00	1.85	0.00	1.85				
22.00	1.73	0.00	1.73				
23.00	1.60	0.00	1.60				
24.00	1.47	0.00	1.47				
25.00	0.03	0.00	0.03				
26.00	0.01	0.00	0.01				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

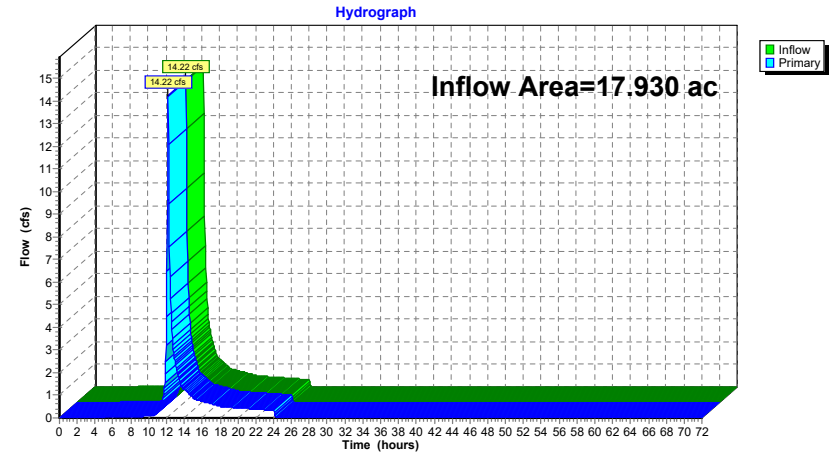
Page 102

Summary for Link 11L: Route 9 Undisturbed Total

Inflow Area = 17.930 ac, 4.96% Impervious, Inflow Depth = 0.82" for 1-Year event
 Inflow = 14.22 cfs @ 12.19 hrs, Volume= 1.231 af
 Primary = 14.22 cfs @ 12.19 hrs, Volume= 1.231 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 21L : Route 9 Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 11L: Route 9 Undisturbed Total



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 103

Hydrograph for Link 11L: Route 9 Undisturbed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.00	0.00	0.00	54.00	0.00	0.00	0.00
3.00	0.01	0.00	0.01	55.00	0.00	0.00	0.00
4.00	0.02	0.00	0.02	56.00	0.00	0.00	0.00
5.00	0.02	0.00	0.02	57.00	0.00	0.00	0.00
6.00	0.03	0.00	0.03	58.00	0.00	0.00	0.00
7.00	0.04	0.00	0.04	59.00	0.00	0.00	0.00
8.00	0.05	0.00	0.05	60.00	0.00	0.00	0.00
9.00	0.06	0.00	0.06	61.00	0.00	0.00	0.00
10.00	0.09	0.00	0.09	62.00	0.00	0.00	0.00
11.00	0.25	0.00	0.25	63.00	0.00	0.00	0.00
12.00	4.48	0.00	4.48	64.00	0.00	0.00	0.00
13.00	2.42	0.00	2.42	65.00	0.00	0.00	0.00
14.00	1.25	0.00	1.25	66.00	0.00	0.00	0.00
15.00	0.90	0.00	0.90	67.00	0.00	0.00	0.00
16.00	0.74	0.00	0.74	68.00	0.00	0.00	0.00
17.00	0.63	0.00	0.63	69.00	0.00	0.00	0.00
18.00	0.52	0.00	0.52	70.00	0.00	0.00	0.00
19.00	0.47	0.00	0.47	71.00	0.00	0.00	0.00
20.00	0.45	0.00	0.45	72.00	0.00	0.00	0.00
21.00	0.42	0.00	0.42				
22.00	0.39	0.00	0.39				
23.00	0.36	0.00	0.36				
24.00	0.33	0.00	0.33				
25.00	0.00	0.00	0.00				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

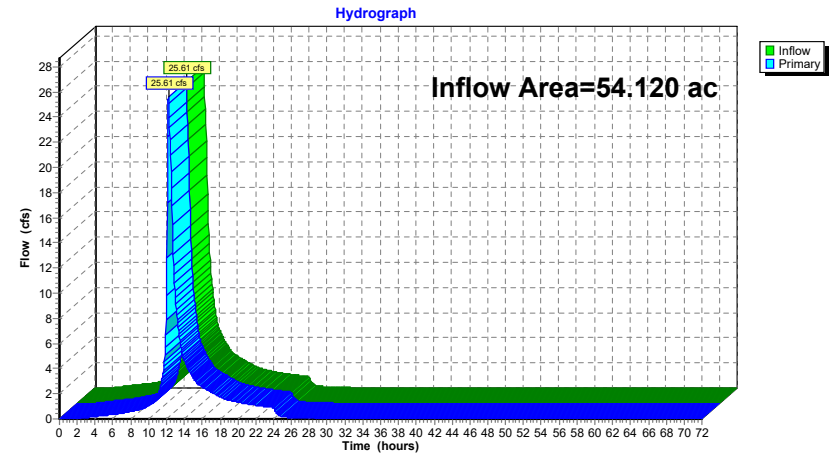
Page 104

Summary for Link 21L: Route 9 Total

Inflow Area = 54.120 ac, 39.23% Impervious, Inflow Depth = 0.95" for 1-Year event
 Inflow = 25.61 cfs @ 12.22 hrs, Volume= 4.268 af
 Primary = 25.61 cfs @ 12.22 hrs, Volume= 4.268 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 22L : Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 21L: Route 9 Total



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 105

Hydrograph for Link 21L: Route 9 Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.03	0.00	0.03	54.00	0.00	0.00	0.00
3.00	0.11	0.00	0.11	55.00	0.00	0.00	0.00
4.00	0.20	0.00	0.20	56.00	0.00	0.00	0.00
5.00	0.28	0.00	0.28	57.00	0.00	0.00	0.00
6.00	0.35	0.00	0.35	58.00	0.00	0.00	0.00
7.00	0.46	0.00	0.46	59.00	0.00	0.00	0.00
8.00	0.60	0.00	0.60	60.00	0.00	0.00	0.00
9.00	0.75	0.00	0.75	61.00	0.00	0.00	0.00
10.00	1.08	0.00	1.08	62.00	0.00	0.00	0.00
11.00	1.82	0.00	1.82	63.00	0.00	0.00	0.00
12.00	9.86	0.00	9.86	64.00	0.00	0.00	0.00
13.00	9.62	0.00	9.62	65.00	0.00	0.00	0.00
14.00	4.65	0.00	4.65	66.00	0.00	0.00	0.00
15.00	3.27	0.00	3.27	67.00	0.00	0.00	0.00
16.00	2.55	0.00	2.55	68.00	0.00	0.00	0.00
17.00	2.14	0.00	2.14	69.00	0.00	0.00	0.00
18.00	1.75	0.00	1.75	70.00	0.00	0.00	0.00
19.00	1.50	0.00	1.50	71.00	0.00	0.00	0.00
20.00	1.33	0.00	1.33	72.00	0.00	0.00	0.00
21.00	1.20	0.00	1.20				
22.00	1.09	0.00	1.09				
23.00	1.00	0.00	1.00				
24.00	0.91	0.00	0.91				
25.00	0.18	0.00	0.18				
26.00	0.11	0.00	0.11				
27.00	0.07	0.00	0.07				
28.00	0.05	0.00	0.05				
29.00	0.04	0.00	0.04				
30.00	0.03	0.00	0.03				
31.00	0.03	0.00	0.03				
32.00	0.02	0.00	0.02				
33.00	0.02	0.00	0.02				
34.00	0.01	0.00	0.01				
35.00	0.01	0.00	0.01				
36.00	0.01	0.00	0.01				
37.00	0.01	0.00	0.01				
38.00	0.01	0.00	0.01				
39.00	0.01	0.00	0.01				
40.00	0.01	0.00	0.01				
41.00	0.01	0.00	0.01				
42.00	0.01	0.00	0.01				
43.00	0.01	0.00	0.01				
44.00	0.01	0.00	0.01				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 106

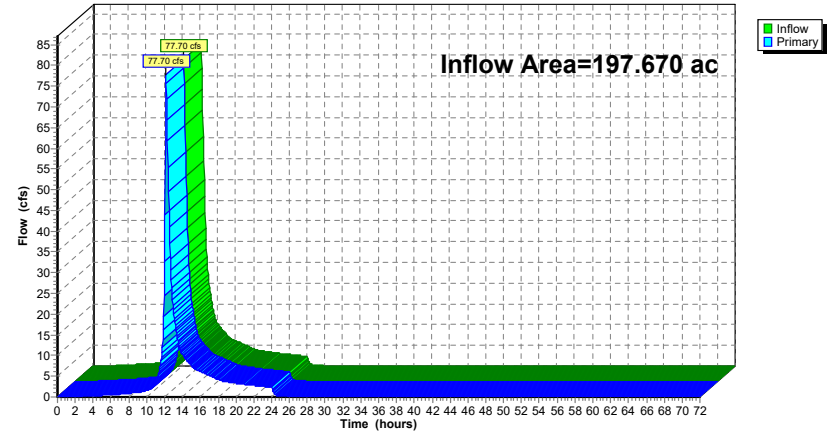
Summary for Link 22L: Total

Inflow Area = 197.670 ac, 41.97% Impervious, Inflow Depth = 0.61" for 1-Year event
 Inflow = 77.70 cfs @ 12.17 hrs, Volume= 10.090 af
 Primary = 77.70 cfs @ 12.17 hrs, Volume= 10.090 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 22L: Total

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 107

Hydrograph for Link 22L: Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.05	0.00	0.05	54.00	0.00	0.00	0.00
3.00	0.18	0.00	0.18	55.00	0.00	0.00	0.00
4.00	0.30	0.00	0.30	56.00	0.00	0.00	0.00
5.00	0.41	0.00	0.41	57.00	0.00	0.00	0.00
6.00	0.51	0.00	0.51	58.00	0.00	0.00	0.00
7.00	0.67	0.00	0.67	59.00	0.00	0.00	0.00
8.00	0.87	0.00	0.87	60.00	0.00	0.00	0.00
9.00	1.08	0.00	1.08	61.00	0.00	0.00	0.00
10.00	1.60	0.00	1.60	62.00	0.00	0.00	0.00
11.00	3.43	0.00	3.43	63.00	0.00	0.00	0.00
12.00	32.64	0.00	32.64	64.00	0.00	0.00	0.00
13.00	20.95	0.00	20.95	65.00	0.00	0.00	0.00
14.00	10.31	0.00	10.31	66.00	0.00	0.00	0.00
15.00	7.59	0.00	7.59	67.00	0.00	0.00	0.00
16.00	6.15	0.00	6.15	68.00	0.00	0.00	0.00
17.00	5.21	0.00	5.21	69.00	0.00	0.00	0.00
18.00	4.23	0.00	4.23	70.00	0.00	0.00	0.00
19.00	3.67	0.00	3.67	71.00	0.00	0.00	0.00
20.00	3.33	0.00	3.33	72.00	0.00	0.00	0.00
21.00	3.05	0.00	3.05				
22.00	2.82	0.00	2.82				
23.00	2.60	0.00	2.60				
24.00	2.38	0.00	2.38				
25.00	0.21	0.00	0.21				
26.00	0.12	0.00	0.12				
27.00	0.07	0.00	0.07				
28.00	0.05	0.00	0.05				
29.00	0.04	0.00	0.04				
30.00	0.03	0.00	0.03				
31.00	0.03	0.00	0.03				
32.00	0.02	0.00	0.02				
33.00	0.02	0.00	0.02				
34.00	0.01	0.00	0.01				
35.00	0.01	0.00	0.01				
36.00	0.01	0.00	0.01				
37.00	0.01	0.00	0.01				
38.00	0.01	0.00	0.01				
39.00	0.01	0.00	0.01				
40.00	0.01	0.00	0.01				
41.00	0.01	0.00	0.01				
42.00	0.01	0.00	0.01				
43.00	0.01	0.00	0.01				
44.00	0.01	0.00	0.01				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

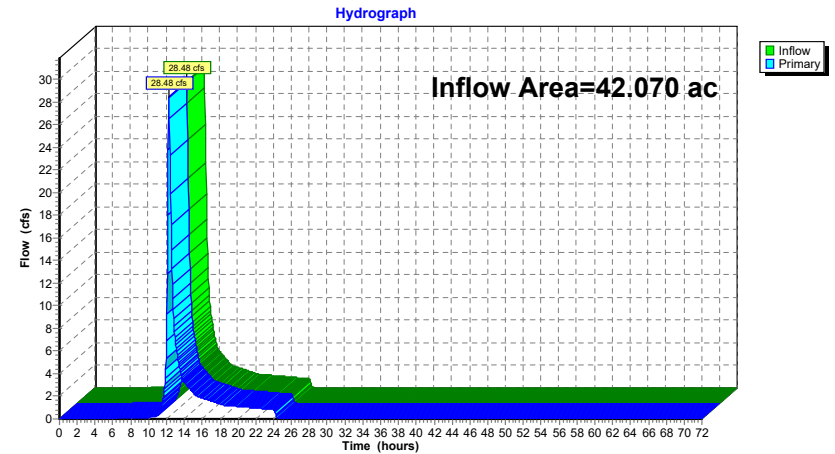
Page 108

Summary for Link 30L: Moodna Creek Undisturbed Total

Inflow Area = 42.070 ac, 3.33% Impervious, Inflow Depth = 0.87" for 1-Year event
 Inflow = 28.48 cfs @ 12.29 hrs, Volume= 3.055 af
 Primary = 28.48 cfs @ 12.29 hrs, Volume= 3.055 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 10L : Moodna Creek

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 30L: Moodna Creek Undisturbed Total



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 109

Hydrograph for Link 30L: Moodna Creek Undisturbed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.01	0.00	0.01	54.00	0.00	0.00	0.00
3.00	0.02	0.00	0.02	55.00	0.00	0.00	0.00
4.00	0.03	0.00	0.03	56.00	0.00	0.00	0.00
5.00	0.04	0.00	0.04	57.00	0.00	0.00	0.00
6.00	0.05	0.00	0.05	58.00	0.00	0.00	0.00
7.00	0.06	0.00	0.06	59.00	0.00	0.00	0.00
8.00	0.08	0.00	0.08	60.00	0.00	0.00	0.00
9.00	0.10	0.00	0.10	61.00	0.00	0.00	0.00
10.00	0.14	0.00	0.14	62.00	0.00	0.00	0.00
11.00	0.39	0.00	0.39	63.00	0.00	0.00	0.00
12.00	6.92	0.00	6.92	64.00	0.00	0.00	0.00
13.00	6.87	0.00	6.87	65.00	0.00	0.00	0.00
14.00	3.24	0.00	3.24	66.00	0.00	0.00	0.00
15.00	2.33	0.00	2.33	67.00	0.00	0.00	0.00
16.00	1.85	0.00	1.85	68.00	0.00	0.00	0.00
17.00	1.59	0.00	1.59	69.00	0.00	0.00	0.00
18.00	1.31	0.00	1.31	70.00	0.00	0.00	0.00
19.00	1.18	0.00	1.18	71.00	0.00	0.00	0.00
20.00	1.11	0.00	1.11	72.00	0.00	0.00	0.00
21.00	1.04	0.00	1.04				
22.00	0.97	0.00	0.97				
23.00	0.90	0.00	0.90				
24.00	0.83	0.00	0.83				
25.00	0.00	0.00	0.00				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

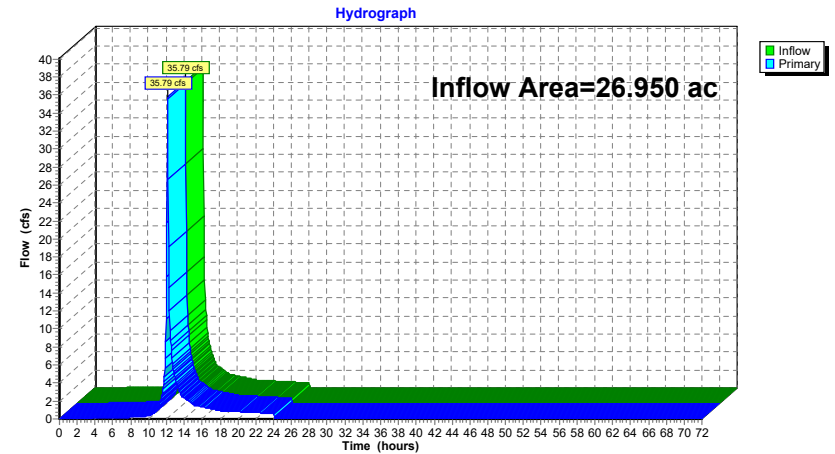
Page 110

Summary for Link 34L: Moodna Creek Undetained Total

Inflow Area = 26.950 ac, 12.39% Impervious, Inflow Depth = 1.16" for 1-Year event
 Inflow = 35.79 cfs @ 12.14 hrs, Volume= 2.611 af
 Primary = 35.79 cfs @ 12.14 hrs, Volume= 2.611 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 10L : Moodna Creek

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 34L: Moodna Creek Undetained Total



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 111

Hydrograph for Link 34L: Moodna Creek Undetained Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.02	0.00	0.02	54.00	0.00	0.00	0.00
3.00	0.05	0.00	0.05	55.00	0.00	0.00	0.00
4.00	0.07	0.00	0.07	56.00	0.00	0.00	0.00
5.00	0.09	0.00	0.09	57.00	0.00	0.00	0.00
6.00	0.11	0.00	0.11	58.00	0.00	0.00	0.00
7.00	0.15	0.00	0.15	59.00	0.00	0.00	0.00
8.00	0.19	0.00	0.19	60.00	0.00	0.00	0.00
9.00	0.23	0.00	0.23	61.00	0.00	0.00	0.00
10.00	0.38	0.00	0.38	62.00	0.00	0.00	0.00
11.00	1.22	0.00	1.22	63.00	0.00	0.00	0.00
12.00	15.86	0.00	15.86	64.00	0.00	0.00	0.00
13.00	4.44	0.00	4.44	65.00	0.00	0.00	0.00
14.00	2.33	0.00	2.33	66.00	0.00	0.00	0.00
15.00	1.63	0.00	1.63	67.00	0.00	0.00	0.00
16.00	1.35	0.00	1.35	68.00	0.00	0.00	0.00
17.00	1.15	0.00	1.15	69.00	0.00	0.00	0.00
18.00	0.93	0.00	0.93	70.00	0.00	0.00	0.00
19.00	0.86	0.00	0.86	71.00	0.00	0.00	0.00
20.00	0.81	0.00	0.81	72.00	0.00	0.00	0.00
21.00	0.76	0.00	0.76				
22.00	0.70	0.00	0.70				
23.00	0.65	0.00	0.65				
24.00	0.60	0.00	0.60				
25.00	0.00	0.00	0.00				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

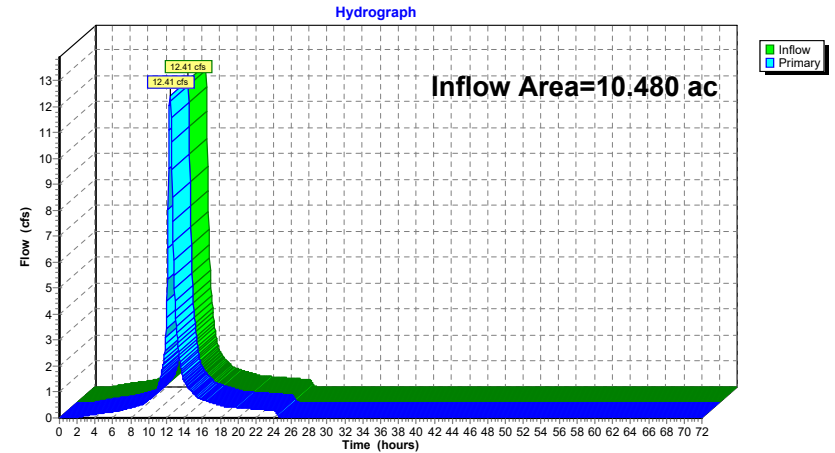
Page 112

Summary for Link 39L: Route 9 Undetained Total

Inflow Area = 10.480 ac, 71.95% Impervious, Inflow Depth = 1.99" for 1-Year event
 Inflow = 12.41 cfs @ 12.41 hrs, Volume= 1.740 af
 Primary = 12.41 cfs @ 12.41 hrs, Volume= 1.740 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 21L : Route 9 Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 39L: Route 9 Undetained Total



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 1-Year Rainfall=2.64"

Printed 10/24/2023

Page 113

Hydrograph for Link 39L: Route 9 Undetained Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.02	0.00	0.02	54.00	0.00	0.00	0.00
3.00	0.09	0.00	0.09	55.00	0.00	0.00	0.00
4.00	0.14	0.00	0.14	56.00	0.00	0.00	0.00
5.00	0.19	0.00	0.19	57.00	0.00	0.00	0.00
6.00	0.24	0.00	0.24	58.00	0.00	0.00	0.00
7.00	0.31	0.00	0.31	59.00	0.00	0.00	0.00
8.00	0.40	0.00	0.40	60.00	0.00	0.00	0.00
9.00	0.50	0.00	0.50	61.00	0.00	0.00	0.00
10.00	0.71	0.00	0.71	62.00	0.00	0.00	0.00
11.00	1.16	0.00	1.16	63.00	0.00	0.00	0.00
12.00	3.87	0.00	3.87	64.00	0.00	0.00	0.00
13.00	4.13	0.00	4.13	65.00	0.00	0.00	0.00
14.00	1.41	0.00	1.41	66.00	0.00	0.00	0.00
15.00	0.95	0.00	0.95	67.00	0.00	0.00	0.00
16.00	0.71	0.00	0.71	68.00	0.00	0.00	0.00
17.00	0.60	0.00	0.60	69.00	0.00	0.00	0.00
18.00	0.49	0.00	0.49	70.00	0.00	0.00	0.00
19.00	0.43	0.00	0.43	71.00	0.00	0.00	0.00
20.00	0.40	0.00	0.40	72.00	0.00	0.00	0.00
21.00	0.37	0.00	0.37				
22.00	0.35	0.00	0.35				
23.00	0.32	0.00	0.32				
24.00	0.29	0.00	0.29				
25.00	0.01	0.00	0.01				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 114

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

- Subcatchment4S: SA North Undetained** Runoff Area=23.610 ac 0.00% Impervious Runoff Depth=2.72"
Tc=6.0 min CN=WQ Runoff=78.34 cfs 5.347 af
- Subcatchment5S: North-Buildings** Runoff Area=3.340 ac 100.00% Impervious Runoff Depth=4.56"
Flow Length=2,657' Tc=9.5 min CN=98 Runoff=14.22 cfs 1.270 af
- Subcatchment6S: SA AG INF Basin B** Runoff Area=23.070 ac 100.00% Impervious Runoff Depth=4.56"
Flow Length=3,078' Tc=9.2 min CN=WQ Runoff=99.53 cfs 8.773 af
- Subcatchment7S: SA AG DET Basin A** Runoff Area=13.630 ac 100.00% Impervious Runoff Depth=4.56"
Flow Length=3,025' Tc=19.6 min CN=WQ Runoff=43.86 cfs 5.183 af
- Subcatchment9S: Route 9W Undisturbed** Runoff Area=17.040 ac 0.00% Impervious Runoff Depth=2.29"
Flow Length=1,066' Tc=10.5 min CN=WQ Runoff=40.50 cfs 3.255 af
- Subcatchment11S: SA South (Rt 9)** Runoff Area=7.540 ac 100.00% Impervious Runoff Depth=4.56"
Flow Length=762' Tc=29.9 min CN=98 Runoff=19.82 cfs 2.867 af
- Subcatchment14S: SA UG DET Basin E** Runoff Area=3.960 ac 100.00% Impervious Runoff Depth=4.56"
Tc=6.0 min CN=WQ Runoff=18.86 cfs 1.506 af
- Subcatchment15S: SA UG Det Basin F** Runoff Area=3.510 ac 100.00% Impervious Runoff Depth=4.56"
Flow Length=1,606' Tc=8.2 min CN=98 Runoff=15.74 cfs 1.335 af
- Subcatchment19S: SA AG INF Basin G/H** Runoff Area=5.330 ac 100.00% Impervious Runoff Depth=4.56"
Flow Length=2,565' Tc=9.4 min CN=98 Runoff=22.76 cfs 2.027 af
- Subcatchment23S: SA AG INF Basin C** Runoff Area=20.290 ac 100.00% Impervious Runoff Depth=4.56"
Flow Length=2,126' Tc=11.2 min CN=WQ Runoff=81.83 cfs 7.716 af
- Subcatchment24S: SA UG DET Basin E** Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=2.72"
Tc=0.0 min CN=80 Runoff=0.27 cfs 0.016 af
- Subcatchment28S: Moodna Creek** Runoff Area=40.670 ac 0.00% Impervious Runoff Depth=2.44"
Flow Length=941' Tc=18.3 min CN=WQ Runoff=81.92 cfs 8.256 af
- Subcatchment29S: Moodna Creek** Runoff Area=1.400 ac 100.00% Impervious Runoff Depth=4.56"
Flow Length=941' Tc=18.3 min CN=98 Runoff=4.65 cfs 0.532 af
- Subcatchment31S: SA AG INF Basin B Perv.** Runoff Area=5.920 ac 0.00% Impervious Runoff Depth=2.72"
Flow Length=3,078' Tc=9.2 min CN=80 Runoff=17.59 cfs 1.341 af
- Subcatchment32S: SA AS INF Basin C Perv.** Runoff Area=7.750 ac 0.00% Impervious Runoff Depth=2.72"
Flow Length=2,126' Tc=11.2 min CN=80 Runoff=21.50 cfs 1.756 af
- Subcatchment33S: SA AG DET Basin A** Runoff Area=3.870 ac 0.00% Impervious Runoff Depth=2.71"
Flow Length=3,025' Tc=19.6 min CN=WQ Runoff=8.42 cfs 0.873 af

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 115

Subcatchment36S: SA UG Det Basin F Perv. Runoff Area=0.400 ac 0.00% Impervious Runoff Depth=2.31"
Flow Length=1,606' Tc=8.2 min CN=WQ Runoff=1.05 cfs 0.077 af

Subcatchment37S: SA AG INF Basin G/H Runoff Area=12.440 ac 0.00% Impervious Runoff Depth=2.63"
Flow Length=2,565' Tc=9.4 min CN=WQ Runoff=35.39 cfs 2.729 af

Subcatchment38S: SA South (Rt 9) Runoff Area=2.940 ac 0.00% Impervious Runoff Depth=2.61"
Flow Length=762' Tc=29.9 min CN=WQ Runoff=4.97 cfs 0.638 af

Subcatchment40S: Route 9W Runoff Area=0.890 ac 100.00% Impervious Runoff Depth=4.56"
Flow Length=1,066' Tc=10.5 min CN=98 Runoff=3.65 cfs 0.338 af

Pond 8P: AbovegroundInfiltration Peak Elev=145.53' Storage=198,487 cf Inflow=117.10 cfs 10.115 af
Discarded=5.97 cfs 8.978 af Primary=4.91 cfs 1.137 af Secondary=0.00 cfs 0.000 af Outflow=10.88 cfs 10.115 af

Pond 9P: AbovegroundInfiltration Basin Peak Elev=198.61' Storage=125,958 cf Inflow=52.26 cfs 6.056 af
Discarded=1.01 cfs 3.215 af Primary=16.03 cfs 2.841 af Secondary=0.00 cfs 0.000 af Outflow=17.05 cfs 6.056 af

Pond 17P: Underground Detention Basin 'E'Peak Elev=222.51' Storage=0.783 af Inflow=18.99 cfs 1.522 af
Outflow=6.05 cfs 1.288 af

Pond 18P: Underground Detention Basin 'F'Peak Elev=191.60' Storage=0.432 af Inflow=16.80 cfs 1.412 af
Outflow=3.96 cfs 1.412 af

Pond 20P: Combined Aboveground Peak Elev=138.02' Storage=35,320 cf Inflow=58.12 cfs 4.756 af
Discarded=18.06 cfs 4.756 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=18.06 cfs 4.756 af

Pond 24P: AbovegroundInfiltration Peak Elev=156.19' Storage=107,629 cf Inflow=103.30 cfs 9.472 af
Discarded=21.42 cfs 9.471 af Primary=0.04 cfs 0.001 af Secondary=0.00 cfs 0.000 af Outflow=21.46 cfs 9.472 af

Link 10L: Moodna Creek Inflow=151.30 cfs 19.385 af
Primary=151.30 cfs 19.385 af

Link 11L: Route 9 Undisturbed Total Inflow=44.14 cfs 3.593 af
Primary=44.14 cfs 3.593 af

Link 21L: Route 9 Total Inflow=68.14 cfs 9.799 af
Primary=68.14 cfs 9.799 af

Link 22L: Total Inflow=215.05 cfs 29.183 af
Primary=215.05 cfs 29.183 af

Link 30L: Moodna Creek Undisturbed Total Inflow=86.54 cfs 8.789 af
Primary=86.54 cfs 8.789 af

Link 34L: Moodna Creek Undetained Total Inflow=91.98 cfs 6.617 af
Primary=91.98 cfs 6.617 af

Link 39L: Route 9 Undetained Total Inflow=24.78 cfs 3.506 af
Primary=24.78 cfs 3.506 af

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 116

Total Runoff Area = 197.670 ac Runoff Volume = 55.838 af Average Runoff Depth = 3.39"
58.03% Pervious = 114.710 ac 41.97% Impervious = 82.960 ac

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 117

Summary for Subcatchment 4S: SA North Undetained

Runoff = 78.34 cfs @ 12.13 hrs, Volume= 5.347 af, Depth= 2.72"
Routed to Link 34L : Moodna Creek Undetained Total

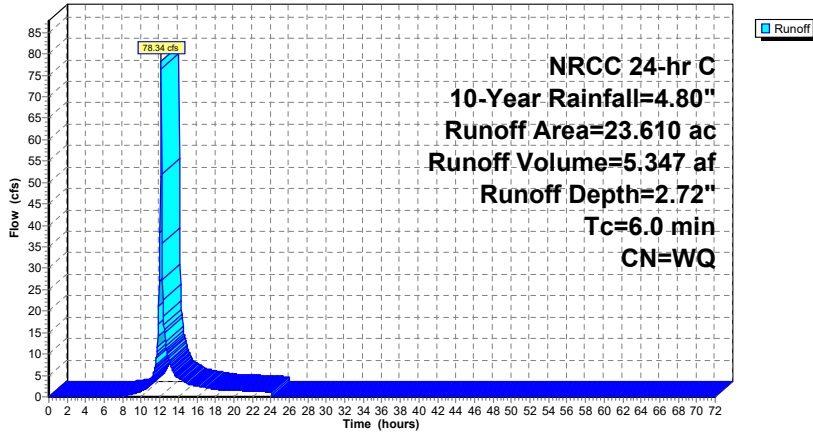
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
0.060	74	>75% Grass cover, Good, HSG C
23.550	80	>75% Grass cover, Good, HSG D
23.610		Weighted Average
23.610		100.00% Pervious Area

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

Subcatchment 4S: SA North Undetained

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 118

Hydrograph for Subcatchment 4S: SA North Undetained

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	2.72	0.00
1.00	0.06	0.00	0.00	53.00	4.80	2.72	0.00
2.00	0.12	0.00	0.00	54.00	4.80	2.72	0.00
3.00	0.18	0.00	0.00	55.00	4.80	2.72	0.00
4.00	0.25	0.00	0.00	56.00	4.80	2.72	0.00
5.00	0.33	0.00	0.00	57.00	4.80	2.72	0.00
6.00	0.41	0.00	0.00	58.00	4.80	2.72	0.00
7.00	0.51	0.00	0.00	59.00	4.80	2.72	0.00
8.00	0.62	0.01	0.25	60.00	4.80	2.72	0.00
9.00	0.76	0.02	0.60	61.00	4.80	2.72	0.00
10.00	0.95	0.07	1.40	62.00	4.80	2.72	0.00
11.00	1.24	0.17	3.53	63.00	4.80	2.72	0.00
12.00	2.29	0.74	38.31	64.00	4.80	2.72	0.00
13.00	3.56	1.69	8.62	65.00	4.80	2.72	0.00
14.00	3.85	1.92	4.48	66.00	4.80	2.72	0.00
15.00	4.04	2.07	3.09	67.00	4.80	2.72	0.00
16.00	4.18	2.19	2.56	68.00	4.80	2.72	0.00
17.00	4.29	2.29	2.16	69.00	4.80	2.72	0.00
18.00	4.39	2.37	1.75	70.00	4.80	2.72	0.00
19.00	4.47	2.44	1.61	71.00	4.80	2.72	0.00
20.00	4.55	2.50	1.51	72.00	4.80	2.72	0.00
21.00	4.62	2.56	1.41				
22.00	4.68	2.62	1.30				
23.00	4.74	2.67	1.21				
24.00	4.80	2.72	1.11				
25.00	4.80	2.72	0.00				
26.00	4.80	2.72	0.00				
27.00	4.80	2.72	0.00				
28.00	4.80	2.72	0.00				
29.00	4.80	2.72	0.00				
30.00	4.80	2.72	0.00				
31.00	4.80	2.72	0.00				
32.00	4.80	2.72	0.00				
33.00	4.80	2.72	0.00				
34.00	4.80	2.72	0.00				
35.00	4.80	2.72	0.00				
36.00	4.80	2.72	0.00				
37.00	4.80	2.72	0.00				
38.00	4.80	2.72	0.00				
39.00	4.80	2.72	0.00				
40.00	4.80	2.72	0.00				
41.00	4.80	2.72	0.00				
42.00	4.80	2.72	0.00				
43.00	4.80	2.72	0.00				
44.00	4.80	2.72	0.00				
45.00	4.80	2.72	0.00				
46.00	4.80	2.72	0.00				
47.00	4.80	2.72	0.00				
48.00	4.80	2.72	0.00				
49.00	4.80	2.72	0.00				
50.00	4.80	2.72	0.00				
51.00	4.80	2.72	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 119

Summary for Subcatchment 5S: North-Buildings

[47] Hint: Peak is 287% of capacity of segment #3

[47] Hint: Peak is 177% of capacity of segment #4

Runoff = 14.22 cfs @ 12.16 hrs, Volume= 1.270 af, Depth= 4.56"
Routed to Link 34L : Moodna Creek Undetained Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
* 3.340	98	Building B
3.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	100	0.0100	0.86		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
2.2	267	0.0100	2.03		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
0.1	15	0.0050	4.03	4.95	Pipe Channel, CD 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.4	108	0.0050	4.55	8.05	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.5	162	0.0050	5.52	17.33	Pipe Channel, EF 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
3.2	1,374	0.0050	7.23	51.09	Pipe Channel, FG 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
1.0	535	0.0050	8.76	110.04	Pipe Channel, GH 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012
0.2	96	0.3300	6.86	56.94	Channel Flow, HI Area= 8.3 sf Perim= 20.1' r= 0.41' n= 0.069 Riprap, 6-inch
9.5	2,657	Total			

2023-09 Proposed

Prepared by Dynamic Engineering

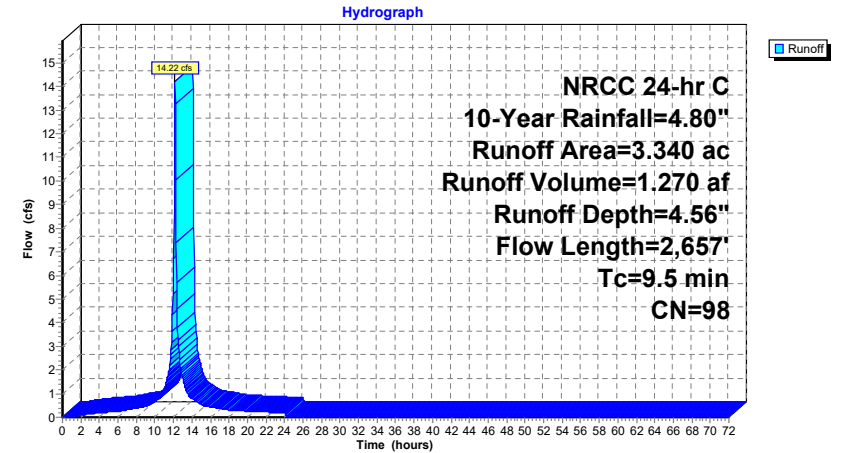
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 120

Subcatchment 5S: North-Buildings



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 121

Hydrograph for Subcatchment 5S: North-Buildings

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	4.56	0.00
1.00	0.06	0.00	0.01	53.00	4.80	4.56	0.00
2.00	0.12	0.02	0.09	54.00	4.80	4.56	0.00
3.00	0.18	0.06	0.14	55.00	4.80	4.56	0.00
4.00	0.25	0.11	0.18	56.00	4.80	4.56	0.00
5.00	0.33	0.17	0.22	57.00	4.80	4.56	0.00
6.00	0.41	0.24	0.24	58.00	4.80	4.56	0.00
7.00	0.51	0.32	0.31	59.00	4.80	4.56	0.00
8.00	0.62	0.43	0.39	60.00	4.80	4.56	0.00
9.00	0.76	0.56	0.46	61.00	4.80	4.56	0.00
10.00	0.95	0.74	0.69	62.00	4.80	4.56	0.00
11.00	1.24	1.02	1.20	63.00	4.80	4.56	0.00
12.00	2.29	2.06	6.71	64.00	4.80	4.56	0.00
13.00	3.56	3.33	1.62	65.00	4.80	4.56	0.00
14.00	3.85	3.62	0.79	66.00	4.80	4.56	0.00
15.00	4.04	3.80	0.54	67.00	4.80	4.56	0.00
16.00	4.18	3.94	0.44	68.00	4.80	4.56	0.00
17.00	4.29	4.06	0.37	69.00	4.80	4.56	0.00
18.00	4.39	4.15	0.30	70.00	4.80	4.56	0.00
19.00	4.47	4.23	0.27	71.00	4.80	4.56	0.00
20.00	4.55	4.31	0.25	72.00	4.80	4.56	0.00
21.00	4.62	4.38	0.23				
22.00	4.68	4.45	0.22				
23.00	4.74	4.51	0.20				
24.00	4.80	4.56	0.18				
25.00	4.80	4.56	0.00				
26.00	4.80	4.56	0.00				
27.00	4.80	4.56	0.00				
28.00	4.80	4.56	0.00				
29.00	4.80	4.56	0.00				
30.00	4.80	4.56	0.00				
31.00	4.80	4.56	0.00				
32.00	4.80	4.56	0.00				
33.00	4.80	4.56	0.00				
34.00	4.80	4.56	0.00				
35.00	4.80	4.56	0.00				
36.00	4.80	4.56	0.00				
37.00	4.80	4.56	0.00				
38.00	4.80	4.56	0.00				
39.00	4.80	4.56	0.00				
40.00	4.80	4.56	0.00				
41.00	4.80	4.56	0.00				
42.00	4.80	4.56	0.00				
43.00	4.80	4.56	0.00				
44.00	4.80	4.56	0.00				
45.00	4.80	4.56	0.00				
46.00	4.80	4.56	0.00				
47.00	4.80	4.56	0.00				
48.00	4.80	4.56	0.00				
49.00	4.80	4.56	0.00				
50.00	4.80	4.56	0.00				
51.00	4.80	4.56	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 122

Summary for Subcatchment 6S: SA AG INF Basin B Imp.

[47] Hint: Peak is 1237% of capacity of segment #3

[47] Hint: Peak is 358% of capacity of segment #4

[47] Hint: Peak is 816% of capacity of segment #5

[47] Hint: Peak is 618% of capacity of segment #6

[47] Hint: Peak is 437% of capacity of segment #7

Runoff = 99.53 cfs @ 12.16 hrs, Volume= 8.773 af, Depth= 4.56"
Routed to Pond 8P : Aboveground Infiltration Basin 'B'

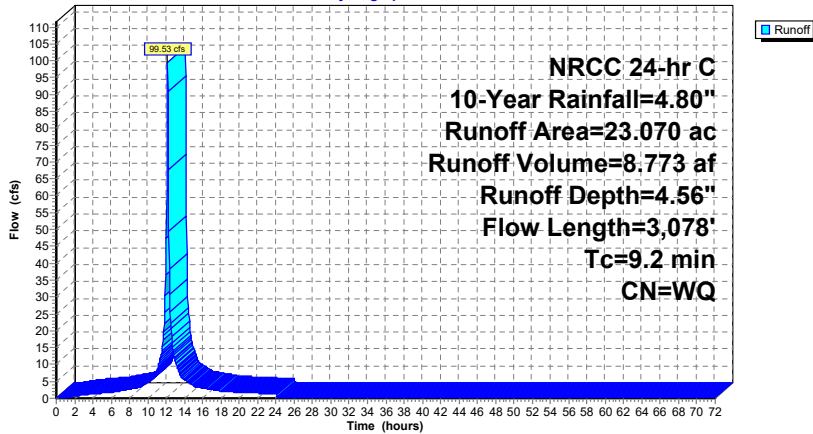
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
* 10.265	98	Impervious
* 8.645	98	Building C North
* 4.160	98	Building A South Half
23.070		Weighted Average
23.070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0145	1.00		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
1.1	159	0.0145	2.44		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
3.3	902	0.0050	4.55	8.05	Pipe Channel, CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.3	282	0.0596	15.72	27.78	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.9	360	0.0115	6.91	12.20	Pipe Channel, EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	449	0.0200	9.11	16.09	Pipe Channel, FG 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
1.1	826	0.0400	12.88	22.76	Pipe Channel, GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
9.2	3,078	Total			

Subcatchment 6S: SA AG INF Basin B Imp.

Hydrograph



Hydrograph for Subcatchment 6S: SA AG INF Basin B Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	4.56	0.00
1.00	0.06	0.00	0.08	53.00	4.80	4.56	0.00
2.00	0.12	0.02	0.63	54.00	4.80	4.56	0.00
3.00	0.18	0.06	1.00	55.00	4.80	4.56	0.00
4.00	0.25	0.11	1.27	56.00	4.80	4.56	0.00
5.00	0.33	0.17	1.50	57.00	4.80	4.56	0.00
6.00	0.41	0.24	1.69	58.00	4.80	4.56	0.00
7.00	0.51	0.32	2.17	59.00	4.80	4.56	0.00
8.00	0.62	0.43	2.68	60.00	4.80	4.56	0.00
9.00	0.76	0.56	3.20	61.00	4.80	4.56	0.00
10.00	0.95	0.74	4.78	62.00	4.80	4.56	0.00
11.00	1.24	1.02	8.31	63.00	4.80	4.56	0.00
12.00	2.29	2.06	47.25	64.00	4.80	4.56	0.00
13.00	3.56	3.33	11.12	65.00	4.80	4.56	0.00
14.00	3.85	3.62	5.43	66.00	4.80	4.56	0.00
15.00	4.04	3.80	3.73	67.00	4.80	4.56	0.00
16.00	4.18	3.94	3.01	68.00	4.80	4.56	0.00
17.00	4.29	4.06	2.53	69.00	4.80	4.56	0.00
18.00	4.39	4.15	2.04	70.00	4.80	4.56	0.00
19.00	4.47	4.23	1.85	71.00	4.80	4.56	0.00
20.00	4.55	4.31	1.73	72.00	4.80	4.56	0.00
21.00	4.62	4.38	1.61				
22.00	4.68	4.45	1.49				
23.00	4.74	4.51	1.37				
24.00	4.80	4.56	1.25				
25.00	4.80	4.56	0.00				
26.00	4.80	4.56	0.00				
27.00	4.80	4.56	0.00				
28.00	4.80	4.56	0.00				
29.00	4.80	4.56	0.00				
30.00	4.80	4.56	0.00				
31.00	4.80	4.56	0.00				
32.00	4.80	4.56	0.00				
33.00	4.80	4.56	0.00				
34.00	4.80	4.56	0.00				
35.00	4.80	4.56	0.00				
36.00	4.80	4.56	0.00				
37.00	4.80	4.56	0.00				
38.00	4.80	4.56	0.00				
39.00	4.80	4.56	0.00				
40.00	4.80	4.56	0.00				
41.00	4.80	4.56	0.00				
42.00	4.80	4.56	0.00				
43.00	4.80	4.56	0.00				
44.00	4.80	4.56	0.00				
45.00	4.80	4.56	0.00				
46.00	4.80	4.56	0.00				
47.00	4.80	4.56	0.00				
48.00	4.80	4.56	0.00				
49.00	4.80	4.56	0.00				
50.00	4.80	4.56	0.00				
51.00	4.80	4.56	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 125

Summary for Subcatchment 7S: SA AG DET Basin A Imp.

[47] Hint: Peak is 545% of capacity of segment #4

Runoff = 43.86 cfs @ 12.28 hrs, Volume= 5.183 af, Depth= 4.56"
 Routed to Pond 9P : Aboveground Infiltration Basin 'A'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
9.470	98	Paved parking, HSG D
* 4.160	98	Building A North Half
13.630		Weighted Average
13.630		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	80	0.0326	0.16		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19"
0.5	20	0.0150	0.74		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 2.19"
0.9	153	0.0206	2.91		Shallow Concentrated Flow, CD Paved Kv= 20.3 fps
10.1	2,772	0.0050	4.55	8.05	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
19.6	3,025	Total			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

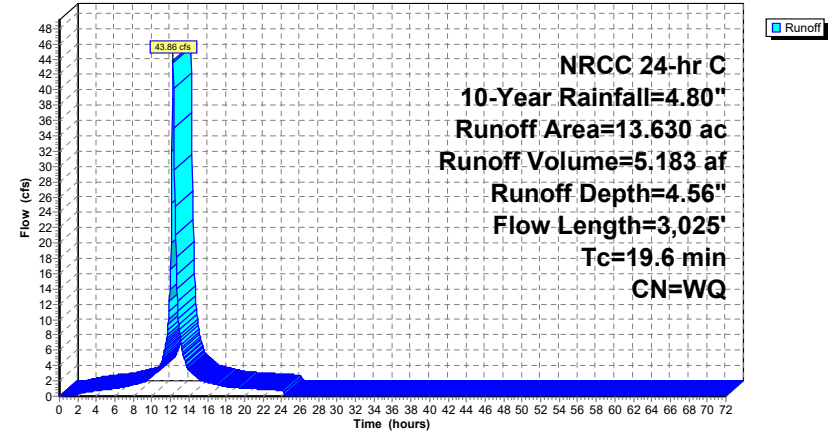
NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 126

Subcatchment 7S: SA AG DET Basin A Imp.

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 127

Hydrograph for Subcatchment 7S: SA AG DET Basin A Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	4.56	0.00
1.00	0.06	0.00	0.01	53.00	4.80	4.56	0.00
2.00	0.12	0.02	0.33	54.00	4.80	4.56	0.00
3.00	0.18	0.06	0.56	55.00	4.80	4.56	0.00
4.00	0.25	0.11	0.73	56.00	4.80	4.56	0.00
5.00	0.33	0.17	0.86	57.00	4.80	4.56	0.00
6.00	0.41	0.24	0.98	58.00	4.80	4.56	0.00
7.00	0.51	0.32	1.23	59.00	4.80	4.56	0.00
8.00	0.62	0.43	1.53	60.00	4.80	4.56	0.00
9.00	0.76	0.56	1.84	61.00	4.80	4.56	0.00
10.00	0.95	0.74	2.66	62.00	4.80	4.56	0.00
11.00	1.24	1.02	4.35	63.00	4.80	4.56	0.00
12.00	2.29	2.06	16.51	64.00	4.80	4.56	0.00
13.00	3.56	3.33	8.09	65.00	4.80	4.56	0.00
14.00	3.85	3.62	3.42	66.00	4.80	4.56	0.00
15.00	4.04	3.80	2.37	67.00	4.80	4.56	0.00
16.00	4.18	3.94	1.83	68.00	4.80	4.56	0.00
17.00	4.29	4.06	1.54	69.00	4.80	4.56	0.00
18.00	4.39	4.15	1.25	70.00	4.80	4.56	0.00
19.00	4.47	4.23	1.11	71.00	4.80	4.56	0.00
20.00	4.55	4.31	1.03	72.00	4.80	4.56	0.00
21.00	4.62	4.38	0.96				
22.00	4.68	4.45	0.89				
23.00	4.74	4.51	0.82				
24.00	4.80	4.56	0.75				
25.00	4.80	4.56	0.00				
26.00	4.80	4.56	0.00				
27.00	4.80	4.56	0.00				
28.00	4.80	4.56	0.00				
29.00	4.80	4.56	0.00				
30.00	4.80	4.56	0.00				
31.00	4.80	4.56	0.00				
32.00	4.80	4.56	0.00				
33.00	4.80	4.56	0.00				
34.00	4.80	4.56	0.00				
35.00	4.80	4.56	0.00				
36.00	4.80	4.56	0.00				
37.00	4.80	4.56	0.00				
38.00	4.80	4.56	0.00				
39.00	4.80	4.56	0.00				
40.00	4.80	4.56	0.00				
41.00	4.80	4.56	0.00				
42.00	4.80	4.56	0.00				
43.00	4.80	4.56	0.00				
44.00	4.80	4.56	0.00				
45.00	4.80	4.56	0.00				
46.00	4.80	4.56	0.00				
47.00	4.80	4.56	0.00				
48.00	4.80	4.56	0.00				
49.00	4.80	4.56	0.00				
50.00	4.80	4.56	0.00				
51.00	4.80	4.56	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 128

Summary for Subcatchment 9S: Route 9W Undisturbed Perv.

Runoff = 40.50 cfs @ 12.18 hrs, Volume= 3.255 af, Depth= 2.29"
 Routed to Link 11L : Route 9 Undisturbed Total

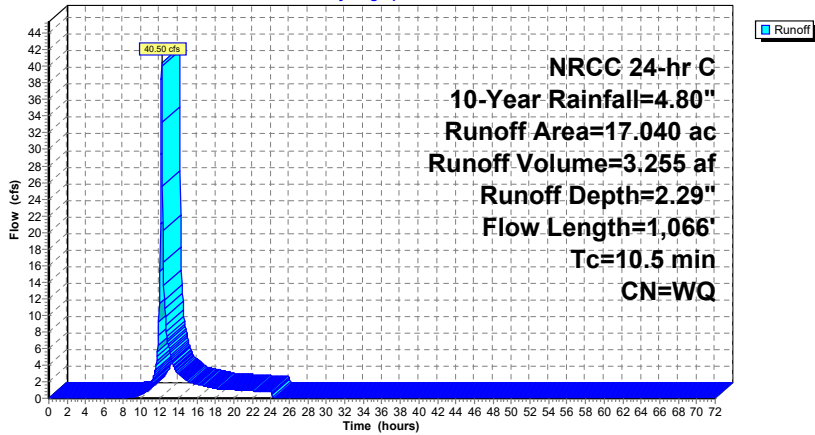
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
4.940	70	Woods, Good, HSG C
12.100	77	Woods, Good, HSG D
17.040		Weighted Average
17.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	10	0.0275	0.05		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
0.2	67	0.0784	4.51		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
3.8	340	0.0088	1.51		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.5	311	0.0451	3.42		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.4	338	0.0621	4.01		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
10.5	1,066	Total			

Subcatchment 9S: Route 9W Undisturbed Perv.

Hydrograph



Hydrograph for Subcatchment 9S: Route 9W Undisturbed Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	2.29	0.00
1.00	0.06	0.00	0.00	53.00	4.80	2.29	0.00
2.00	0.12	0.00	0.00	54.00	4.80	2.29	0.00
3.00	0.18	0.00	0.00	55.00	4.80	2.29	0.00
4.00	0.25	0.00	0.00	56.00	4.80	2.29	0.00
5.00	0.33	0.00	0.00	57.00	4.80	2.29	0.00
6.00	0.41	0.00	0.00	58.00	4.80	2.29	0.00
7.00	0.51	0.00	0.00	59.00	4.80	2.29	0.00
8.00	0.62	0.00	0.01	60.00	4.80	2.29	0.00
9.00	0.76	0.00	0.15	61.00	4.80	2.29	0.00
10.00	0.95	0.02	0.50	62.00	4.80	2.29	0.00
11.00	1.24	0.08	1.56	63.00	4.80	2.29	0.00
12.00	2.29	0.53	15.26	64.00	4.80	2.29	0.00
13.00	3.56	1.35	5.93	65.00	4.80	2.29	0.00
14.00	3.85	1.56	2.97	66.00	4.80	2.29	0.00
15.00	4.04	1.70	2.09	67.00	4.80	2.29	0.00
16.00	4.18	1.80	1.70	68.00	4.80	2.29	0.00
17.00	4.29	1.89	1.44	69.00	4.80	2.29	0.00
18.00	4.39	1.96	1.18	70.00	4.80	2.29	0.00
19.00	4.47	2.03	1.07	71.00	4.80	2.29	0.00
20.00	4.55	2.09	1.01	72.00	4.80	2.29	0.00
21.00	4.62	2.14	0.94				
22.00	4.68	2.20	0.87				
23.00	4.74	2.24	0.81				
24.00	4.80	2.29	0.74				
25.00	4.80	2.29	0.00				
26.00	4.80	2.29	0.00				
27.00	4.80	2.29	0.00				
28.00	4.80	2.29	0.00				
29.00	4.80	2.29	0.00				
30.00	4.80	2.29	0.00				
31.00	4.80	2.29	0.00				
32.00	4.80	2.29	0.00				
33.00	4.80	2.29	0.00				
34.00	4.80	2.29	0.00				
35.00	4.80	2.29	0.00				
36.00	4.80	2.29	0.00				
37.00	4.80	2.29	0.00				
38.00	4.80	2.29	0.00				
39.00	4.80	2.29	0.00				
40.00	4.80	2.29	0.00				
41.00	4.80	2.29	0.00				
42.00	4.80	2.29	0.00				
43.00	4.80	2.29	0.00				
44.00	4.80	2.29	0.00				
45.00	4.80	2.29	0.00				
46.00	4.80	2.29	0.00				
47.00	4.80	2.29	0.00				
48.00	4.80	2.29	0.00				
49.00	4.80	2.29	0.00				
50.00	4.80	2.29	0.00				
51.00	4.80	2.29	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 131

Summary for Subcatchment 11S: SA South (Rt 9) Undetained Imp.

Runoff = 19.82 cfs @ 12.40 hrs, Volume= 2.867 af, Depth= 4.56"
 Routed to Link 39L : Route 9 Undetained Total

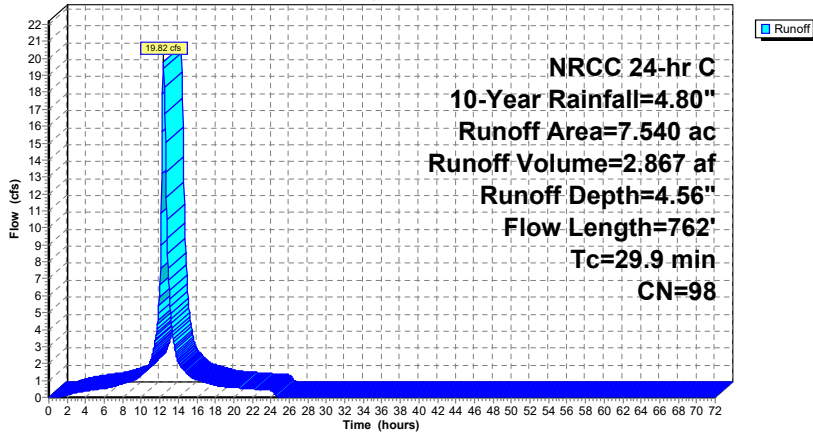
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
7.540	98	Roofs, HSG D
7.540		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	85	0.0162	0.13		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19" Using McCuen-Spiess flow length
2.2	83	0.0162	0.64		Shallow Concentrated Flow, BC Woodland Kv= 5.0 fps
6.4	195	0.0103	0.51		Shallow Concentrated Flow, CD Woodland Kv= 5.0 fps
10.0	399	0.0177	0.67		Shallow Concentrated Flow, DE Woodland Kv= 5.0 fps
29.9	762	Total			

Subcatchment 11S: SA South (Rt 9) Undetained Imp.

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 132

Hydrograph for Subcatchment 11S: SA South (Rt 9) Undetained Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	4.56	0.00
1.00	0.06	0.00	0.00	53.00	4.80	4.56	0.00
2.00	0.12	0.02	0.16	54.00	4.80	4.56	0.00
3.00	0.18	0.06	0.29	55.00	4.80	4.56	0.00
4.00	0.25	0.11	0.39	56.00	4.80	4.56	0.00
5.00	0.33	0.17	0.47	57.00	4.80	4.56	0.00
6.00	0.41	0.24	0.53	58.00	4.80	4.56	0.00
7.00	0.51	0.32	0.65	59.00	4.80	4.56	0.00
8.00	0.62	0.43	0.82	60.00	4.80	4.56	0.00
9.00	0.76	0.56	0.99	61.00	4.80	4.56	0.00
10.00	0.95	0.74	1.39	62.00	4.80	4.56	0.00
11.00	1.24	1.02	2.15	63.00	4.80	4.56	0.00
12.00	2.29	2.06	6.64	64.00	4.80	4.56	0.00
13.00	3.56	3.33	6.32	65.00	4.80	4.56	0.00
14.00	3.85	3.62	2.09	66.00	4.80	4.56	0.00
15.00	4.04	3.80	1.40	67.00	4.80	4.56	0.00
16.00	4.18	3.94	1.04	68.00	4.80	4.56	0.00
17.00	4.29	4.06	0.88	69.00	4.80	4.56	0.00
18.00	4.39	4.15	0.72	70.00	4.80	4.56	0.00
19.00	4.47	4.23	0.62	71.00	4.80	4.56	0.00
20.00	4.55	4.31	0.58	72.00	4.80	4.56	0.00
21.00	4.62	4.38	0.54				
22.00	4.68	4.45	0.50				
23.00	4.74	4.51	0.46				
24.00	4.80	4.56	0.42				
25.00	4.80	4.56	0.01				
26.00	4.80	4.56	0.00				
27.00	4.80	4.56	0.00				
28.00	4.80	4.56	0.00				
29.00	4.80	4.56	0.00				
30.00	4.80	4.56	0.00				
31.00	4.80	4.56	0.00				
32.00	4.80	4.56	0.00				
33.00	4.80	4.56	0.00				
34.00	4.80	4.56	0.00				
35.00	4.80	4.56	0.00				
36.00	4.80	4.56	0.00				
37.00	4.80	4.56	0.00				
38.00	4.80	4.56	0.00				
39.00	4.80	4.56	0.00				
40.00	4.80	4.56	0.00				
41.00	4.80	4.56	0.00				
42.00	4.80	4.56	0.00				
43.00	4.80	4.56	0.00				
44.00	4.80	4.56	0.00				
45.00	4.80	4.56	0.00				
46.00	4.80	4.56	0.00				
47.00	4.80	4.56	0.00				
48.00	4.80	4.56	0.00				
49.00	4.80	4.56	0.00				
50.00	4.80	4.56	0.00				
51.00	4.80	4.56	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 133

Summary for Subcatchment 14S: SA UG DET Basin E Imp.

Calculated TC path = 5.7 mins. Minimum TC of 6 mins used.

Runoff = 18.86 cfs @ 12.13 hrs, Volume= 1.506 af, Depth= 4.56"
Routed to Pond 17P : Underground Detention Basin 'E'

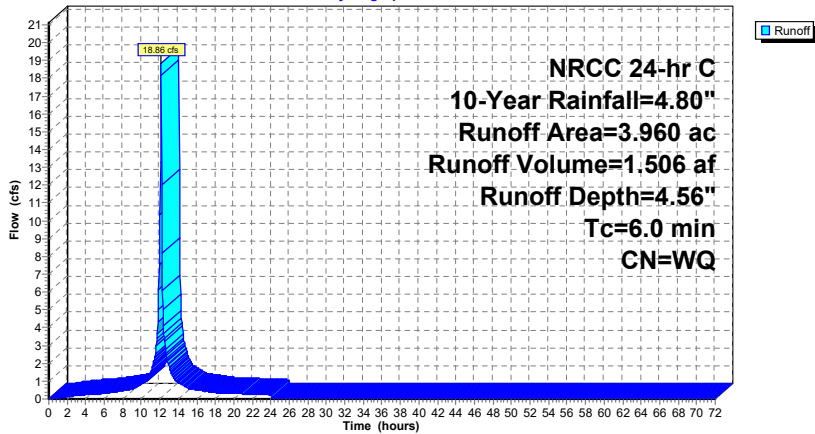
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
3.140	98	Roofs, HSG D
0.820	98	Paved parking, HSG D
3.960		Weighted Average
3.960		100.00% Impervious Area

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

Subcatchment 14S: SA UG DET Basin E Imp.

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 134

Hydrograph for Subcatchment 14S: SA UG DET Basin E Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	4.56	0.00
1.00	0.06	0.00	0.02	53.00	4.80	4.56	0.00
2.00	0.12	0.02	0.11	54.00	4.80	4.56	0.00
3.00	0.18	0.06	0.17	55.00	4.80	4.56	0.00
4.00	0.25	0.11	0.22	56.00	4.80	4.56	0.00
5.00	0.33	0.17	0.26	57.00	4.80	4.56	0.00
6.00	0.41	0.24	0.29	58.00	4.80	4.56	0.00
7.00	0.51	0.32	0.38	59.00	4.80	4.56	0.00
8.00	0.62	0.43	0.46	60.00	4.80	4.56	0.00
9.00	0.76	0.56	0.55	61.00	4.80	4.56	0.00
10.00	0.95	0.74	0.84	62.00	4.80	4.56	0.00
11.00	1.24	1.02	1.48	63.00	4.80	4.56	0.00
12.00	2.29	2.06	10.34	64.00	4.80	4.56	0.00
13.00	3.56	3.33	1.81	65.00	4.80	4.56	0.00
14.00	3.85	3.62	0.92	66.00	4.80	4.56	0.00
15.00	4.04	3.80	0.62	67.00	4.80	4.56	0.00
16.00	4.18	3.94	0.51	68.00	4.80	4.56	0.00
17.00	4.29	4.06	0.43	69.00	4.80	4.56	0.00
18.00	4.39	4.15	0.35	70.00	4.80	4.56	0.00
19.00	4.47	4.23	0.32	71.00	4.80	4.56	0.00
20.00	4.55	4.31	0.30	72.00	4.80	4.56	0.00
21.00	4.62	4.38	0.28				
22.00	4.68	4.45	0.25				
23.00	4.74	4.51	0.23				
24.00	4.80	4.56	0.21				
25.00	4.80	4.56	0.00				
26.00	4.80	4.56	0.00				
27.00	4.80	4.56	0.00				
28.00	4.80	4.56	0.00				
29.00	4.80	4.56	0.00				
30.00	4.80	4.56	0.00				
31.00	4.80	4.56	0.00				
32.00	4.80	4.56	0.00				
33.00	4.80	4.56	0.00				
34.00	4.80	4.56	0.00				
35.00	4.80	4.56	0.00				
36.00	4.80	4.56	0.00				
37.00	4.80	4.56	0.00				
38.00	4.80	4.56	0.00				
39.00	4.80	4.56	0.00				
40.00	4.80	4.56	0.00				
41.00	4.80	4.56	0.00				
42.00	4.80	4.56	0.00				
43.00	4.80	4.56	0.00				
44.00	4.80	4.56	0.00				
45.00	4.80	4.56	0.00				
46.00	4.80	4.56	0.00				
47.00	4.80	4.56	0.00				
48.00	4.80	4.56	0.00				
49.00	4.80	4.56	0.00				
50.00	4.80	4.56	0.00				
51.00	4.80	4.56	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 135

Summary for Subcatchment 15S: SA UG Det Basin F Imp.

[47] Hint: Peak is 345% of capacity of segment #3
[47] Hint: Peak is 212% of capacity of segment #4

Runoff = 15.74 cfs @ 12.15 hrs, Volume= 1.335 af, Depth= 4.56"
Routed to Pond 18P : Underground Detention Basin 'F'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
* 3.510	98	Impervious
3.510		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0195	1.13		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
2.0	338	0.0194	2.83		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
0.3	63	0.0050	3.72	4.57	Pipe Channel, RCP_Round 15" 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
4.4	1,105	0.0050	4.20	7.43	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
8.2	1,606	Total			

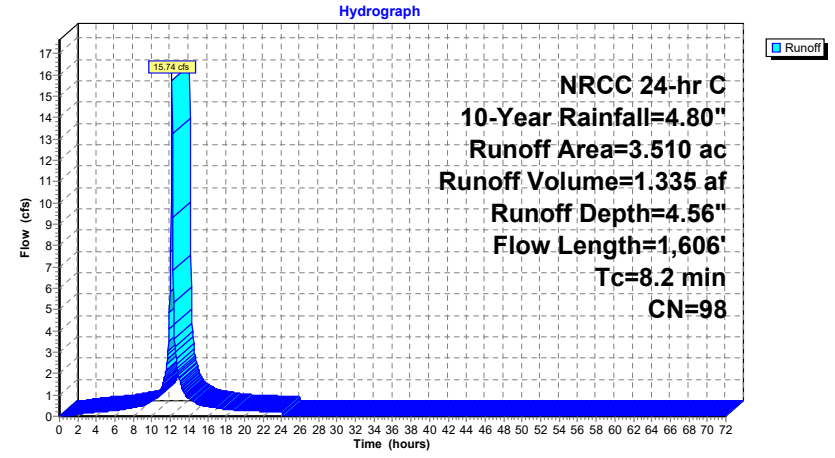
2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 136

Subcatchment 15S: SA UG Det Basin F Imp.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 137

Hydrograph for Subcatchment 15S: SA UG Det Basin F Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	4.56	0.00
1.00	0.06	0.00	0.01	53.00	4.80	4.56	0.00
2.00	0.12	0.02	0.10	54.00	4.80	4.56	0.00
3.00	0.18	0.06	0.15	55.00	4.80	4.56	0.00
4.00	0.25	0.11	0.19	56.00	4.80	4.56	0.00
5.00	0.33	0.17	0.23	57.00	4.80	4.56	0.00
6.00	0.41	0.24	0.26	58.00	4.80	4.56	0.00
7.00	0.51	0.32	0.33	59.00	4.80	4.56	0.00
8.00	0.62	0.43	0.41	60.00	4.80	4.56	0.00
9.00	0.76	0.56	0.49	61.00	4.80	4.56	0.00
10.00	0.95	0.74	0.73	62.00	4.80	4.56	0.00
11.00	1.24	1.02	1.28	63.00	4.80	4.56	0.00
12.00	2.29	2.06	7.73	64.00	4.80	4.56	0.00
13.00	3.56	3.33	1.67	65.00	4.80	4.56	0.00
14.00	3.85	3.62	0.82	66.00	4.80	4.56	0.00
15.00	4.04	3.80	0.56	67.00	4.80	4.56	0.00
16.00	4.18	3.94	0.46	68.00	4.80	4.56	0.00
17.00	4.29	4.06	0.38	69.00	4.80	4.56	0.00
18.00	4.39	4.15	0.31	70.00	4.80	4.56	0.00
19.00	4.47	4.23	0.28	71.00	4.80	4.56	0.00
20.00	4.55	4.31	0.26	72.00	4.80	4.56	0.00
21.00	4.62	4.38	0.24				
22.00	4.68	4.45	0.23				
23.00	4.74	4.51	0.21				
24.00	4.80	4.56	0.19				
25.00	4.80	4.56	0.00				
26.00	4.80	4.56	0.00				
27.00	4.80	4.56	0.00				
28.00	4.80	4.56	0.00				
29.00	4.80	4.56	0.00				
30.00	4.80	4.56	0.00				
31.00	4.80	4.56	0.00				
32.00	4.80	4.56	0.00				
33.00	4.80	4.56	0.00				
34.00	4.80	4.56	0.00				
35.00	4.80	4.56	0.00				
36.00	4.80	4.56	0.00				
37.00	4.80	4.56	0.00				
38.00	4.80	4.56	0.00				
39.00	4.80	4.56	0.00				
40.00	4.80	4.56	0.00				
41.00	4.80	4.56	0.00				
42.00	4.80	4.56	0.00				
43.00	4.80	4.56	0.00				
44.00	4.80	4.56	0.00				
45.00	4.80	4.56	0.00				
46.00	4.80	4.56	0.00				
47.00	4.80	4.56	0.00				
48.00	4.80	4.56	0.00				
49.00	4.80	4.56	0.00				
50.00	4.80	4.56	0.00				
51.00	4.80	4.56	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 138

Summary for Subcatchment 19S: SA AG INF Basin G/H Imp.

[47] Hint: Peak is 168% of capacity of segment #3

[47] Hint: Peak is 107% of capacity of segment #6

[47] Hint: Peak is 306% of capacity of segment #7

Runoff = 22.76 cfs @ 12.16 hrs, Volume= 2.027 af, Depth= 4.56"
Routed to Pond 20P : Combined Aboveground Infiltration Basin 'G/H'

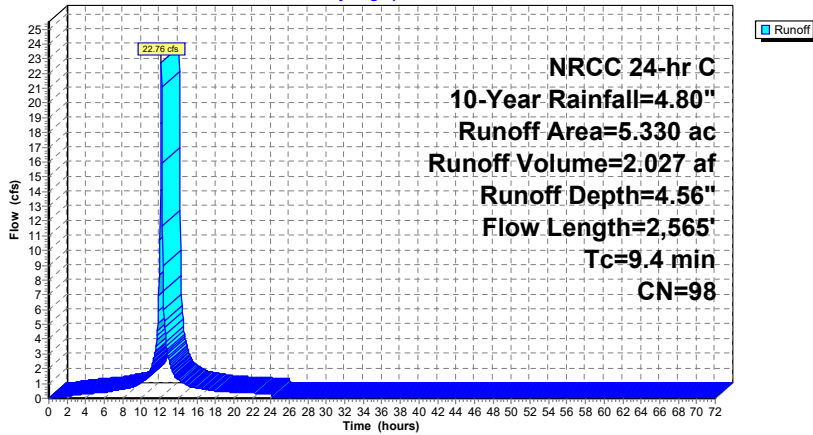
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
5.330	98	Impervious
5.330		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0142	0.99		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
2.1	303	0.0142	2.42		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
0.7	327	0.0142	7.67	13.56	Pipe Channel, CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	335	0.0468	13.93	24.62	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	370	0.0504	14.46	25.55	Pipe Channel, EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.2	141	0.0348	12.01	21.23	Pipe Channel, FG 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
3.9	989	0.0050	4.20	7.43	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
9.4	2,565				Total

Subcatchment 19S: SA AG INF Basin G/H Imp.

Hydrograph



Hydrograph for Subcatchment 19S: SA AG INF Basin G/H Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	4.56	0.00
1.00	0.06	0.00	0.02	53.00	4.80	4.56	0.00
2.00	0.12	0.02	0.14	54.00	4.80	4.56	0.00
3.00	0.18	0.06	0.23	55.00	4.80	4.56	0.00
4.00	0.25	0.11	0.29	56.00	4.80	4.56	0.00
5.00	0.33	0.17	0.35	57.00	4.80	4.56	0.00
6.00	0.41	0.24	0.39	58.00	4.80	4.56	0.00
7.00	0.51	0.32	0.50	59.00	4.80	4.56	0.00
8.00	0.62	0.43	0.62	60.00	4.80	4.56	0.00
9.00	0.76	0.56	0.74	61.00	4.80	4.56	0.00
10.00	0.95	0.74	1.10	62.00	4.80	4.56	0.00
11.00	1.24	1.02	1.92	63.00	4.80	4.56	0.00
12.00	2.29	2.06	10.78	64.00	4.80	4.56	0.00
13.00	3.56	3.33	2.58	65.00	4.80	4.56	0.00
14.00	3.85	3.62	1.26	66.00	4.80	4.56	0.00
15.00	4.04	3.80	0.86	67.00	4.80	4.56	0.00
16.00	4.18	3.94	0.70	68.00	4.80	4.56	0.00
17.00	4.29	4.06	0.58	69.00	4.80	4.56	0.00
18.00	4.39	4.15	0.47	70.00	4.80	4.56	0.00
19.00	4.47	4.23	0.43	71.00	4.80	4.56	0.00
20.00	4.55	4.31	0.40	72.00	4.80	4.56	0.00
21.00	4.62	4.38	0.37				
22.00	4.68	4.45	0.34				
23.00	4.74	4.51	0.32				
24.00	4.80	4.56	0.29				
25.00	4.80	4.56	0.00				
26.00	4.80	4.56	0.00				
27.00	4.80	4.56	0.00				
28.00	4.80	4.56	0.00				
29.00	4.80	4.56	0.00				
30.00	4.80	4.56	0.00				
31.00	4.80	4.56	0.00				
32.00	4.80	4.56	0.00				
33.00	4.80	4.56	0.00				
34.00	4.80	4.56	0.00				
35.00	4.80	4.56	0.00				
36.00	4.80	4.56	0.00				
37.00	4.80	4.56	0.00				
38.00	4.80	4.56	0.00				
39.00	4.80	4.56	0.00				
40.00	4.80	4.56	0.00				
41.00	4.80	4.56	0.00				
42.00	4.80	4.56	0.00				
43.00	4.80	4.56	0.00				
44.00	4.80	4.56	0.00				
45.00	4.80	4.56	0.00				
46.00	4.80	4.56	0.00				
47.00	4.80	4.56	0.00				
48.00	4.80	4.56	0.00				
49.00	4.80	4.56	0.00				
50.00	4.80	4.56	0.00				
51.00	4.80	4.56	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 141

Summary for Subcatchment 23S: SA AG INF Basin C Imp.

- [47] Hint: Peak is 1654% of capacity of segment #3
- [47] Hint: Peak is 1017% of capacity of segment #4
- [47] Hint: Peak is 160% of capacity of segment #5
- [47] Hint: Peak is 106% of capacity of segment #6

Runoff = 81.83 cfs @ 12.18 hrs, Volume= 7.716 af, Depth= 4.56"
Routed to Pond 24P : Aboveground Infiltration Basin 'C'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
11.645	98	Paved parking, HSG D
* 8.645	98	Building C South
20.290		Weighted Average
20.290		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	60	0.0663	0.21		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19"
0.6	40	0.0325	1.15		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 2.19"
0.4	100	0.0050	4.03	4.95	Pipe Channel, CD 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
3.2	886	0.0050	4.55	8.05	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	342	0.0050	7.23	51.09	Pipe Channel, EF 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
1.1	545	0.0050	8.01	77.07	Pipe Channel, FG 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.012
0.1	37	0.0050	8.76	110.04	Pipe Channel, GH 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012
0.0	10	0.0400	26.79	426.07	Pipe Channel, HI 54.0" Round Area= 15.9 sf Perim= 14.1' r= 1.13' n= 0.012
0.1	106	0.0400	28.74	564.29	Pipe Channel, IJ 60.0" Round Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.012
11.2	2,126	Total			

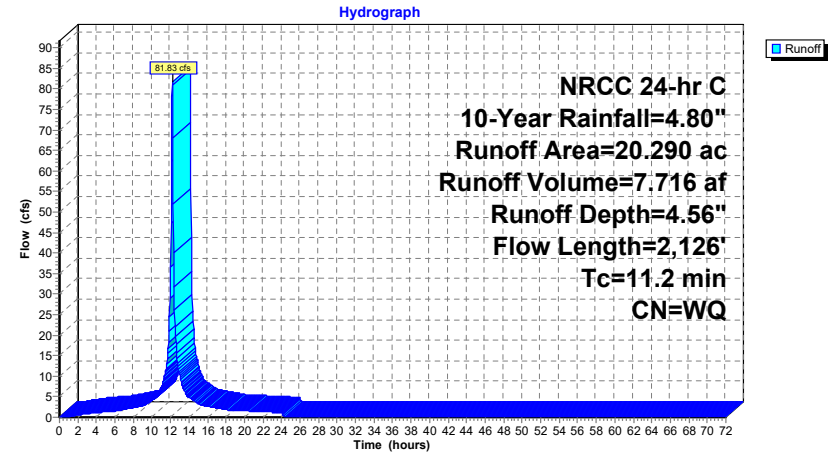
2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 142

Subcatchment 23S: SA AG INF Basin C Imp.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 143

Hydrograph for Subcatchment 23S: SA AG INF Basin C Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	4.56	0.00
1.00	0.06	0.00	0.06	53.00	4.80	4.56	0.00
2.00	0.12	0.02	0.54	54.00	4.80	4.56	0.00
3.00	0.18	0.06	0.87	55.00	4.80	4.56	0.00
4.00	0.25	0.11	1.11	56.00	4.80	4.56	0.00
5.00	0.33	0.17	1.31	57.00	4.80	4.56	0.00
6.00	0.41	0.24	1.48	58.00	4.80	4.56	0.00
7.00	0.51	0.32	1.89	59.00	4.80	4.56	0.00
8.00	0.62	0.43	2.34	60.00	4.80	4.56	0.00
9.00	0.76	0.56	2.80	61.00	4.80	4.56	0.00
10.00	0.95	0.74	4.16	62.00	4.80	4.56	0.00
11.00	1.24	1.02	7.14	63.00	4.80	4.56	0.00
12.00	2.29	2.06	36.58	64.00	4.80	4.56	0.00
13.00	3.56	3.33	10.09	65.00	4.80	4.56	0.00
14.00	3.85	3.62	4.83	66.00	4.80	4.56	0.00
15.00	4.04	3.80	3.33	67.00	4.80	4.56	0.00
16.00	4.18	3.94	2.66	68.00	4.80	4.56	0.00
17.00	4.29	4.06	2.24	69.00	4.80	4.56	0.00
18.00	4.39	4.15	1.81	70.00	4.80	4.56	0.00
19.00	4.47	4.23	1.63	71.00	4.80	4.56	0.00
20.00	4.55	4.31	1.53	72.00	4.80	4.56	0.00
21.00	4.62	4.38	1.42				
22.00	4.68	4.45	1.31				
23.00	4.74	4.51	1.21				
24.00	4.80	4.56	1.10				
25.00	4.80	4.56	0.00				
26.00	4.80	4.56	0.00				
27.00	4.80	4.56	0.00				
28.00	4.80	4.56	0.00				
29.00	4.80	4.56	0.00				
30.00	4.80	4.56	0.00				
31.00	4.80	4.56	0.00				
32.00	4.80	4.56	0.00				
33.00	4.80	4.56	0.00				
34.00	4.80	4.56	0.00				
35.00	4.80	4.56	0.00				
36.00	4.80	4.56	0.00				
37.00	4.80	4.56	0.00				
38.00	4.80	4.56	0.00				
39.00	4.80	4.56	0.00				
40.00	4.80	4.56	0.00				
41.00	4.80	4.56	0.00				
42.00	4.80	4.56	0.00				
43.00	4.80	4.56	0.00				
44.00	4.80	4.56	0.00				
45.00	4.80	4.56	0.00				
46.00	4.80	4.56	0.00				
47.00	4.80	4.56	0.00				
48.00	4.80	4.56	0.00				
49.00	4.80	4.56	0.00				
50.00	4.80	4.56	0.00				
51.00	4.80	4.56	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 144

Summary for Subcatchment 24S: SA UG DET Basin E Perv.

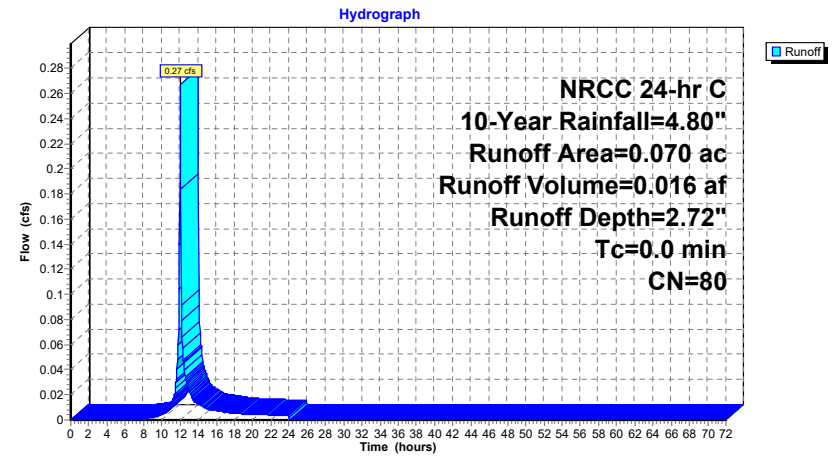
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.27 cfs @ 12.05 hrs, Volume= 0.016 af, Depth= 2.72"
 Routed to Pond 17P : Underground Detention Basin 'E'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
0.070	80	>75% Grass cover, Good, HSG D
0.070		100.00% Pervious Area

Subcatchment 24S: SA UG DET Basin E Perv.



2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 145

Hydrograph for Subcatchment 24S: SA UG DET Basin E Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	2.72	0.00
1.00	0.06	0.00	0.00	53.00	4.80	2.72	0.00
2.00	0.12	0.00	0.00	54.00	4.80	2.72	0.00
3.00	0.18	0.00	0.00	55.00	4.80	2.72	0.00
4.00	0.25	0.00	0.00	56.00	4.80	2.72	0.00
5.00	0.33	0.00	0.00	57.00	4.80	2.72	0.00
6.00	0.41	0.00	0.00	58.00	4.80	2.72	0.00
7.00	0.51	0.00	0.00	59.00	4.80	2.72	0.00
8.00	0.62	0.01	0.00	60.00	4.80	2.72	0.00
9.00	0.76	0.02	0.00	61.00	4.80	2.72	0.00
10.00	0.95	0.07	0.00	62.00	4.80	2.72	0.00
11.00	1.24	0.17	0.01	63.00	4.80	2.72	0.00
12.00	2.29	0.74	0.20	64.00	4.80	2.72	0.00
13.00	3.56	1.69	0.02	65.00	4.80	2.72	0.00
14.00	3.85	1.92	0.01	66.00	4.80	2.72	0.00
15.00	4.04	2.07	0.01	67.00	4.80	2.72	0.00
16.00	4.18	2.19	0.01	68.00	4.80	2.72	0.00
17.00	4.29	2.29	0.01	69.00	4.80	2.72	0.00
18.00	4.39	2.37	0.01	70.00	4.80	2.72	0.00
19.00	4.47	2.44	0.00	71.00	4.80	2.72	0.00
20.00	4.55	2.50	0.00	72.00	4.80	2.72	0.00
21.00	4.62	2.56	0.00				
22.00	4.68	2.62	0.00				
23.00	4.74	2.67	0.00				
24.00	4.80	2.72	0.00				
25.00	4.80	2.72	0.00				
26.00	4.80	2.72	0.00				
27.00	4.80	2.72	0.00				
28.00	4.80	2.72	0.00				
29.00	4.80	2.72	0.00				
30.00	4.80	2.72	0.00				
31.00	4.80	2.72	0.00				
32.00	4.80	2.72	0.00				
33.00	4.80	2.72	0.00				
34.00	4.80	2.72	0.00				
35.00	4.80	2.72	0.00				
36.00	4.80	2.72	0.00				
37.00	4.80	2.72	0.00				
38.00	4.80	2.72	0.00				
39.00	4.80	2.72	0.00				
40.00	4.80	2.72	0.00				
41.00	4.80	2.72	0.00				
42.00	4.80	2.72	0.00				
43.00	4.80	2.72	0.00				
44.00	4.80	2.72	0.00				
45.00	4.80	2.72	0.00				
46.00	4.80	2.72	0.00				
47.00	4.80	2.72	0.00				
48.00	4.80	2.72	0.00				
49.00	4.80	2.72	0.00				
50.00	4.80	2.72	0.00				
51.00	4.80	2.72	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 146

Summary for Subcatchment 28S: Moodna Creek Undisturbed Perv.

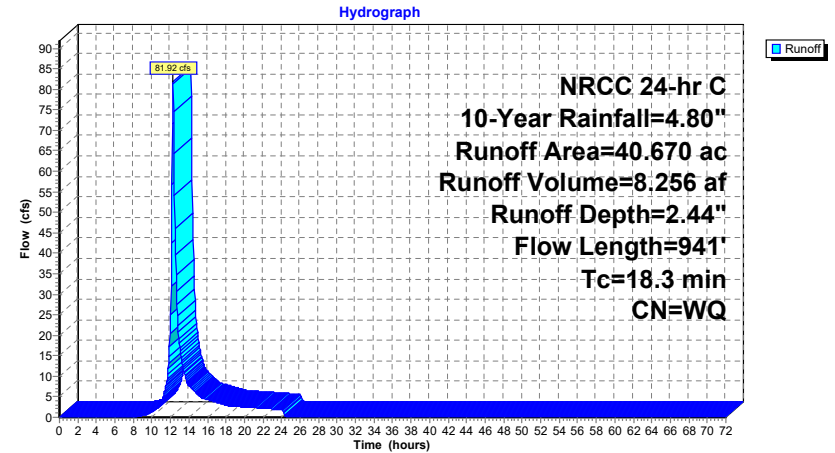
Runoff = 81.92 cfs @ 12.28 hrs, Volume= 8.256 af, Depth= 2.44"
Routed to Link 30L : Moodna Creek Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
39.200	77	Woods, Good, HSG D
1.470	70	Woods, Good, HSG C
40.670		Weighted Average
40.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0950	0.12		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	244	0.0471	3.49		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
1.5	206	0.0194	2.24		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	391	0.0562	3.82		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
18.3	941				Total

Subcatchment 28S: Moodna Creek Undisturbed Perv.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 147

Hydrograph for Subcatchment 28S: Moodna Creek Undisturbed Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	2.46	0.00
1.00	0.06	0.00	0.00	53.00	4.80	2.46	0.00
2.00	0.12	0.00	0.00	54.00	4.80	2.46	0.00
3.00	0.18	0.00	0.00	55.00	4.80	2.46	0.00
4.00	0.25	0.00	0.00	56.00	4.80	2.46	0.00
5.00	0.33	0.00	0.00	57.00	4.80	2.46	0.00
6.00	0.41	0.00	0.00	58.00	4.80	2.46	0.00
7.00	0.51	0.00	0.00	59.00	4.80	2.46	0.00
8.00	0.62	0.00	0.01	60.00	4.80	2.46	0.00
9.00	0.76	0.01	0.43	61.00	4.80	2.46	0.00
10.00	0.95	0.04	1.37	62.00	4.80	2.46	0.00
11.00	1.24	0.11	3.75	63.00	4.80	2.46	0.00
12.00	2.29	0.61	25.14	64.00	4.80	2.46	0.00
13.00	3.56	1.48	17.00	65.00	4.80	2.46	0.00
14.00	3.85	1.70	7.71	66.00	4.80	2.46	0.00
15.00	4.04	1.84	5.45	67.00	4.80	2.46	0.00
16.00	4.18	1.95	4.28	68.00	4.80	2.46	0.00
17.00	4.29	2.04	3.65	69.00	4.80	2.46	0.00
18.00	4.39	2.12	2.99	70.00	4.80	2.46	0.00
19.00	4.47	2.19	2.66	71.00	4.80	2.46	0.00
20.00	4.55	2.25	2.50	72.00	4.80	2.46	0.00
21.00	4.62	2.31	2.34				
22.00	4.68	2.36	2.18				
23.00	4.74	2.41	2.01				
24.00	4.80	2.46	1.84				
25.00	4.80	2.46	0.00				
26.00	4.80	2.46	0.00				
27.00	4.80	2.46	0.00				
28.00	4.80	2.46	0.00				
29.00	4.80	2.46	0.00				
30.00	4.80	2.46	0.00				
31.00	4.80	2.46	0.00				
32.00	4.80	2.46	0.00				
33.00	4.80	2.46	0.00				
34.00	4.80	2.46	0.00				
35.00	4.80	2.46	0.00				
36.00	4.80	2.46	0.00				
37.00	4.80	2.46	0.00				
38.00	4.80	2.46	0.00				
39.00	4.80	2.46	0.00				
40.00	4.80	2.46	0.00				
41.00	4.80	2.46	0.00				
42.00	4.80	2.46	0.00				
43.00	4.80	2.46	0.00				
44.00	4.80	2.46	0.00				
45.00	4.80	2.46	0.00				
46.00	4.80	2.46	0.00				
47.00	4.80	2.46	0.00				
48.00	4.80	2.46	0.00				
49.00	4.80	2.46	0.00				
50.00	4.80	2.46	0.00				
51.00	4.80	2.46	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 148

Summary for Subcatchment 29S: Moodna Creek Undisturbed Imp.

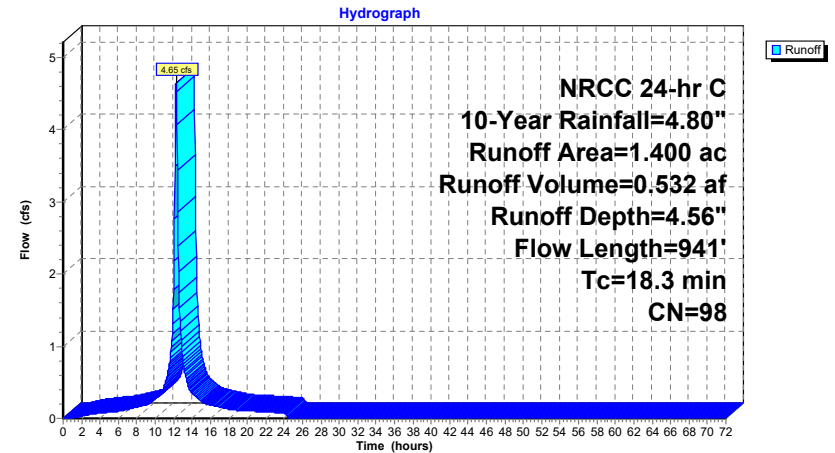
Runoff = 4.65 cfs @ 12.26 hrs, Volume= 0.532 af, Depth= 4.56"
 Routed to Link 30L : Moodna Creek Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
* 1.400	98	Impervious
1.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0950	0.12		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	244	0.0471	3.49		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
1.5	206	0.0194	2.24		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	391	0.0562	3.82		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
18.3	941	Total			

Subcatchment 29S: Moodna Creek Undisturbed Imp.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 149

Hydrograph for Subcatchment 29S: Moodna Creek Undisturbed Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	4.56	0.00
1.00	0.06	0.00	0.00	53.00	4.80	4.56	0.00
2.00	0.12	0.02	0.03	54.00	4.80	4.56	0.00
3.00	0.18	0.06	0.06	55.00	4.80	4.56	0.00
4.00	0.25	0.11	0.08	56.00	4.80	4.56	0.00
5.00	0.33	0.17	0.09	57.00	4.80	4.56	0.00
6.00	0.41	0.24	0.10	58.00	4.80	4.56	0.00
7.00	0.51	0.32	0.13	59.00	4.80	4.56	0.00
8.00	0.62	0.43	0.16	60.00	4.80	4.56	0.00
9.00	0.76	0.56	0.19	61.00	4.80	4.56	0.00
10.00	0.95	0.74	0.28	62.00	4.80	4.56	0.00
11.00	1.24	1.02	0.45	63.00	4.80	4.56	0.00
12.00	2.29	2.06	1.79	64.00	4.80	4.56	0.00
13.00	3.56	3.33	0.80	65.00	4.80	4.56	0.00
14.00	3.85	3.62	0.35	66.00	4.80	4.56	0.00
15.00	4.04	3.80	0.24	67.00	4.80	4.56	0.00
16.00	4.18	3.94	0.19	68.00	4.80	4.56	0.00
17.00	4.29	4.06	0.16	69.00	4.80	4.56	0.00
18.00	4.39	4.15	0.13	70.00	4.80	4.56	0.00
19.00	4.47	4.23	0.11	71.00	4.80	4.56	0.00
20.00	4.55	4.31	0.11	72.00	4.80	4.56	0.00
21.00	4.62	4.38	0.10				
22.00	4.68	4.45	0.09				
23.00	4.74	4.51	0.08				
24.00	4.80	4.56	0.08				
25.00	4.80	4.56	0.00				
26.00	4.80	4.56	0.00				
27.00	4.80	4.56	0.00				
28.00	4.80	4.56	0.00				
29.00	4.80	4.56	0.00				
30.00	4.80	4.56	0.00				
31.00	4.80	4.56	0.00				
32.00	4.80	4.56	0.00				
33.00	4.80	4.56	0.00				
34.00	4.80	4.56	0.00				
35.00	4.80	4.56	0.00				
36.00	4.80	4.56	0.00				
37.00	4.80	4.56	0.00				
38.00	4.80	4.56	0.00				
39.00	4.80	4.56	0.00				
40.00	4.80	4.56	0.00				
41.00	4.80	4.56	0.00				
42.00	4.80	4.56	0.00				
43.00	4.80	4.56	0.00				
44.00	4.80	4.56	0.00				
45.00	4.80	4.56	0.00				
46.00	4.80	4.56	0.00				
47.00	4.80	4.56	0.00				
48.00	4.80	4.56	0.00				
49.00	4.80	4.56	0.00				
50.00	4.80	4.56	0.00				
51.00	4.80	4.56	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 150

Summary for Subcatchment 31S: SA AG INF Basin B Perv.

[47] Hint: Peak is 219% of capacity of segment #3

[47] Hint: Peak is 144% of capacity of segment #5

[47] Hint: Peak is 109% of capacity of segment #6

Runoff = 17.59 cfs @ 12.16 hrs, Volume= 1.341 af, Depth= 2.72"
Routed to Pond 8P : Aboveground Infiltration Basin 'B'

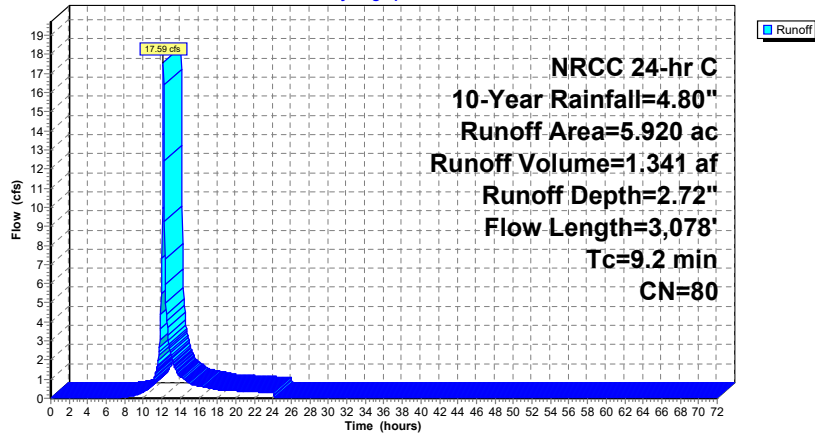
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
5.920	80	>75% Grass cover, Good, HSG D
5.920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0145	1.00		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
1.1	159	0.0145	2.44		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
3.3	902	0.0050	4.55	8.05	Pipe Channel, CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.3	282	0.0596	15.72	27.78	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.9	360	0.0115	6.91	12.20	Pipe Channel, EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	449	0.0200	9.11	16.09	Pipe Channel, FG 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
1.1	826	0.0400	12.88	22.76	Pipe Channel, GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
9.2	3,078	Total			

Subcatchment 31S: SA AG INF Basin B Perv.

Hydrograph



Hydrograph for Subcatchment 31S: SA AG INF Basin B Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	2.72	0.00
1.00	0.06	0.00	0.00	53.00	4.80	2.72	0.00
2.00	0.12	0.00	0.00	54.00	4.80	2.72	0.00
3.00	0.18	0.00	0.00	55.00	4.80	2.72	0.00
4.00	0.25	0.00	0.00	56.00	4.80	2.72	0.00
5.00	0.33	0.00	0.00	57.00	4.80	2.72	0.00
6.00	0.41	0.00	0.00	58.00	4.80	2.72	0.00
7.00	0.51	0.00	0.00	59.00	4.80	2.72	0.00
8.00	0.62	0.01	0.06	60.00	4.80	2.72	0.00
9.00	0.76	0.02	0.14	61.00	4.80	2.72	0.00
10.00	0.95	0.07	0.34	62.00	4.80	2.72	0.00
11.00	1.24	0.17	0.84	63.00	4.80	2.72	0.00
12.00	2.29	0.74	7.33	64.00	4.80	2.72	0.00
13.00	3.56	1.69	2.27	65.00	4.80	2.72	0.00
14.00	3.85	1.92	1.14	66.00	4.80	2.72	0.00
15.00	4.04	2.07	0.79	67.00	4.80	2.72	0.00
16.00	4.18	2.19	0.65	68.00	4.80	2.72	0.00
17.00	4.29	2.29	0.55	69.00	4.80	2.72	0.00
18.00	4.39	2.37	0.44	70.00	4.80	2.72	0.00
19.00	4.47	2.44	0.40	71.00	4.80	2.72	0.00
20.00	4.55	2.50	0.38	72.00	4.80	2.72	0.00
21.00	4.62	2.56	0.36				
22.00	4.68	2.62	0.33				
23.00	4.74	2.67	0.30				
24.00	4.80	2.72	0.28				
25.00	4.80	2.72	0.00				
26.00	4.80	2.72	0.00				
27.00	4.80	2.72	0.00				
28.00	4.80	2.72	0.00				
29.00	4.80	2.72	0.00				
30.00	4.80	2.72	0.00				
31.00	4.80	2.72	0.00				
32.00	4.80	2.72	0.00				
33.00	4.80	2.72	0.00				
34.00	4.80	2.72	0.00				
35.00	4.80	2.72	0.00				
36.00	4.80	2.72	0.00				
37.00	4.80	2.72	0.00				
38.00	4.80	2.72	0.00				
39.00	4.80	2.72	0.00				
40.00	4.80	2.72	0.00				
41.00	4.80	2.72	0.00				
42.00	4.80	2.72	0.00				
43.00	4.80	2.72	0.00				
44.00	4.80	2.72	0.00				
45.00	4.80	2.72	0.00				
46.00	4.80	2.72	0.00				
47.00	4.80	2.72	0.00				
48.00	4.80	2.72	0.00				
49.00	4.80	2.72	0.00				
50.00	4.80	2.72	0.00				
51.00	4.80	2.72	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 153

Summary for Subcatchment 32S: SA AS INF Basin C Perv.

[47] Hint: Peak is 434% of capacity of segment #3

[47] Hint: Peak is 267% of capacity of segment #4

Runoff = 21.50 cfs @ 12.19 hrs, Volume= 1.756 af, Depth= 2.72"
 Routed to Pond 24P : Aboveground Infiltration Basin 'C'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
7.750	80	>75% Grass cover, Good, HSG D
7.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	60	0.0663	0.21		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19"
0.6	40	0.0325	1.15		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 2.19"
0.4	100	0.0050	4.03	4.95	Pipe Channel, CD 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
3.2	886	0.0050	4.55	8.05	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	342	0.0050	7.23	51.09	Pipe Channel, EF 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
1.1	545	0.0050	8.01	77.07	Pipe Channel, FG 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.012
0.1	37	0.0050	8.76	110.04	Pipe Channel, GH 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012
0.0	10	0.0400	26.79	426.07	Pipe Channel, HI 54.0" Round Area= 15.9 sf Perim= 14.1' r= 1.13' n= 0.012
0.1	106	0.0400	28.74	564.29	Pipe Channel, IJ 60.0" Round Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.012
11.2	2,126	Total			

2023-09 Proposed

Prepared by Dynamic Engineering

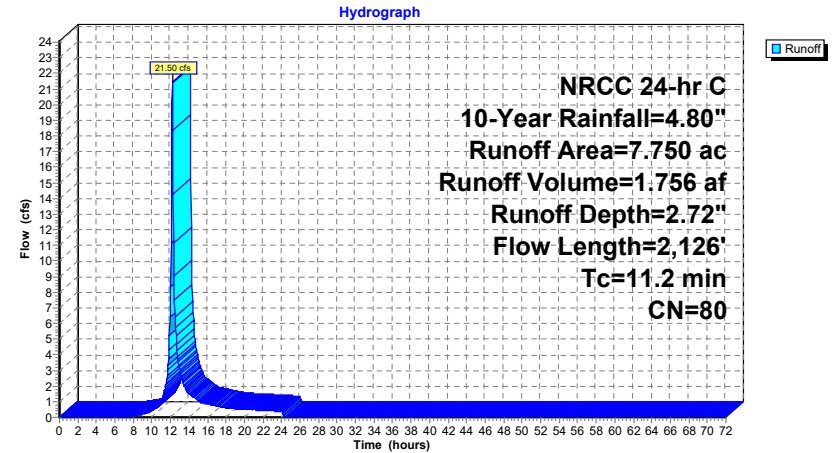
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 154

Subcatchment 32S: SA AS INF Basin C Perv.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 155

Hydrograph for Subcatchment 32S: SA AS INF Basin C Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	2.72	0.00
1.00	0.06	0.00	0.00	53.00	4.80	2.72	0.00
2.00	0.12	0.00	0.00	54.00	4.80	2.72	0.00
3.00	0.18	0.00	0.00	55.00	4.80	2.72	0.00
4.00	0.25	0.00	0.00	56.00	4.80	2.72	0.00
5.00	0.33	0.00	0.00	57.00	4.80	2.72	0.00
6.00	0.41	0.00	0.00	58.00	4.80	2.72	0.00
7.00	0.51	0.00	0.00	59.00	4.80	2.72	0.00
8.00	0.62	0.01	0.07	60.00	4.80	2.72	0.00
9.00	0.76	0.02	0.19	61.00	4.80	2.72	0.00
10.00	0.95	0.07	0.43	62.00	4.80	2.72	0.00
11.00	1.24	0.17	1.06	63.00	4.80	2.72	0.00
12.00	2.29	0.74	8.31	64.00	4.80	2.72	0.00
13.00	3.56	1.69	3.06	65.00	4.80	2.72	0.00
14.00	3.85	1.92	1.51	66.00	4.80	2.72	0.00
15.00	4.04	2.07	1.05	67.00	4.80	2.72	0.00
16.00	4.18	2.19	0.85	68.00	4.80	2.72	0.00
17.00	4.29	2.29	0.72	69.00	4.80	2.72	0.00
18.00	4.39	2.37	0.59	70.00	4.80	2.72	0.00
19.00	4.47	2.44	0.53	71.00	4.80	2.72	0.00
20.00	4.55	2.50	0.50	72.00	4.80	2.72	0.00
21.00	4.62	2.56	0.47				
22.00	4.68	2.62	0.43				
23.00	4.74	2.67	0.40				
24.00	4.80	2.72	0.36				
25.00	4.80	2.72	0.00				
26.00	4.80	2.72	0.00				
27.00	4.80	2.72	0.00				
28.00	4.80	2.72	0.00				
29.00	4.80	2.72	0.00				
30.00	4.80	2.72	0.00				
31.00	4.80	2.72	0.00				
32.00	4.80	2.72	0.00				
33.00	4.80	2.72	0.00				
34.00	4.80	2.72	0.00				
35.00	4.80	2.72	0.00				
36.00	4.80	2.72	0.00				
37.00	4.80	2.72	0.00				
38.00	4.80	2.72	0.00				
39.00	4.80	2.72	0.00				
40.00	4.80	2.72	0.00				
41.00	4.80	2.72	0.00				
42.00	4.80	2.72	0.00				
43.00	4.80	2.72	0.00				
44.00	4.80	2.72	0.00				
45.00	4.80	2.72	0.00				
46.00	4.80	2.72	0.00				
47.00	4.80	2.72	0.00				
48.00	4.80	2.72	0.00				
49.00	4.80	2.72	0.00				
50.00	4.80	2.72	0.00				
51.00	4.80	2.72	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 156

Summary for Subcatchment 33S: SA AG DET Basin A Perv.

[47] Hint: Peak is 105% of capacity of segment #4

Runoff = 8.42 cfs @ 12.29 hrs, Volume= 0.873 af, Depth= 2.71"
 Routed to Pond 9P : Aboveground Infiltration Basin 'A'

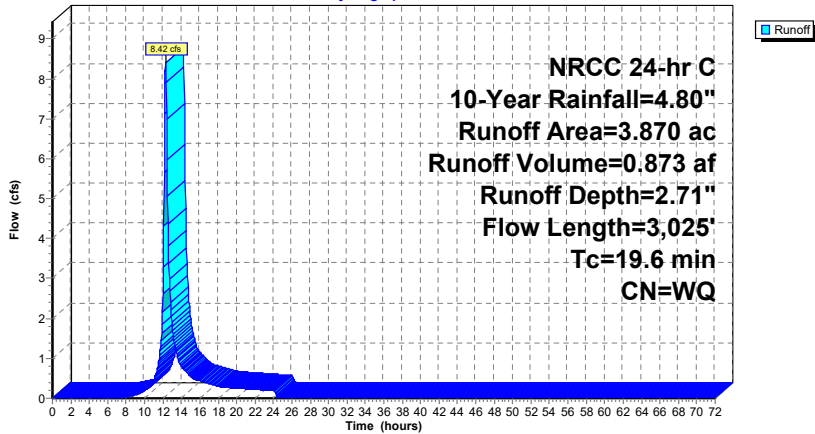
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
0.090	74	>75% Grass cover, Good, HSG C
3.780	80	>75% Grass cover, Good, HSG D
3.870		Weighted Average
3.870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	80	0.0326	0.16		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19"
0.5	20	0.0150	0.74		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 2.19"
0.9	153	0.0206	2.91		Shallow Concentrated Flow, CD Paved Kv= 20.3 fps
10.1	2,772	0.0050	4.55	8.05	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
19.6	3,025	Total			

Subcatchment 33S: SA AG DET Basin A Perv.

Hydrograph



Hydrograph for Subcatchment 33S: SA AG DET Basin A Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	2.72	0.00
1.00	0.06	0.00	0.00	53.00	4.80	2.72	0.00
2.00	0.12	0.00	0.00	54.00	4.80	2.72	0.00
3.00	0.18	0.00	0.00	55.00	4.80	2.72	0.00
4.00	0.25	0.00	0.00	56.00	4.80	2.72	0.00
5.00	0.33	0.00	0.00	57.00	4.80	2.72	0.00
6.00	0.41	0.00	0.00	58.00	4.80	2.72	0.00
7.00	0.51	0.00	0.00	59.00	4.80	2.72	0.00
8.00	0.62	0.01	0.03	60.00	4.80	2.72	0.00
9.00	0.76	0.02	0.08	61.00	4.80	2.72	0.00
10.00	0.95	0.07	0.19	62.00	4.80	2.72	0.00
11.00	1.24	0.17	0.46	63.00	4.80	2.72	0.00
12.00	2.29	0.74	2.62	64.00	4.80	2.72	0.00
13.00	3.56	1.69	1.80	65.00	4.80	2.72	0.00
14.00	3.85	1.92	0.79	66.00	4.80	2.72	0.00
15.00	4.04	2.07	0.55	67.00	4.80	2.72	0.00
16.00	4.18	2.19	0.43	68.00	4.80	2.72	0.00
17.00	4.29	2.29	0.37	69.00	4.80	2.72	0.00
18.00	4.39	2.37	0.30	70.00	4.80	2.72	0.00
19.00	4.47	2.44	0.27	71.00	4.80	2.72	0.00
20.00	4.55	2.50	0.25	72.00	4.80	2.72	0.00
21.00	4.62	2.56	0.23				
22.00	4.68	2.62	0.22				
23.00	4.74	2.67	0.20				
24.00	4.80	2.72	0.18				
25.00	4.80	2.72	0.00				
26.00	4.80	2.72	0.00				
27.00	4.80	2.72	0.00				
28.00	4.80	2.72	0.00				
29.00	4.80	2.72	0.00				
30.00	4.80	2.72	0.00				
31.00	4.80	2.72	0.00				
32.00	4.80	2.72	0.00				
33.00	4.80	2.72	0.00				
34.00	4.80	2.72	0.00				
35.00	4.80	2.72	0.00				
36.00	4.80	2.72	0.00				
37.00	4.80	2.72	0.00				
38.00	4.80	2.72	0.00				
39.00	4.80	2.72	0.00				
40.00	4.80	2.72	0.00				
41.00	4.80	2.72	0.00				
42.00	4.80	2.72	0.00				
43.00	4.80	2.72	0.00				
44.00	4.80	2.72	0.00				
45.00	4.80	2.72	0.00				
46.00	4.80	2.72	0.00				
47.00	4.80	2.72	0.00				
48.00	4.80	2.72	0.00				
49.00	4.80	2.72	0.00				
50.00	4.80	2.72	0.00				
51.00	4.80	2.72	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 159

Summary for Subcatchment 36S: SA UG Det Basin F Perv.

Runoff = 1.05 cfs @ 12.15 hrs, Volume= 0.077 af, Depth= 2.31"
 Routed to Pond 18P : Underground Detention Basin 'F'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
0.320	74	>75% Grass cover, Good, HSG C
0.080	80	>75% Grass cover, Good, HSG D
0.400		Weighted Average
0.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0195	1.13		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
2.0	338	0.0194	2.83		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
0.3	63	0.0050	3.72	4.57	Pipe Channel, RCP_Round 15" 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
4.4	1,105	0.0050	4.20	7.43	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
8.2	1,606	Total			

2023-09 Proposed

Prepared by Dynamic Engineering

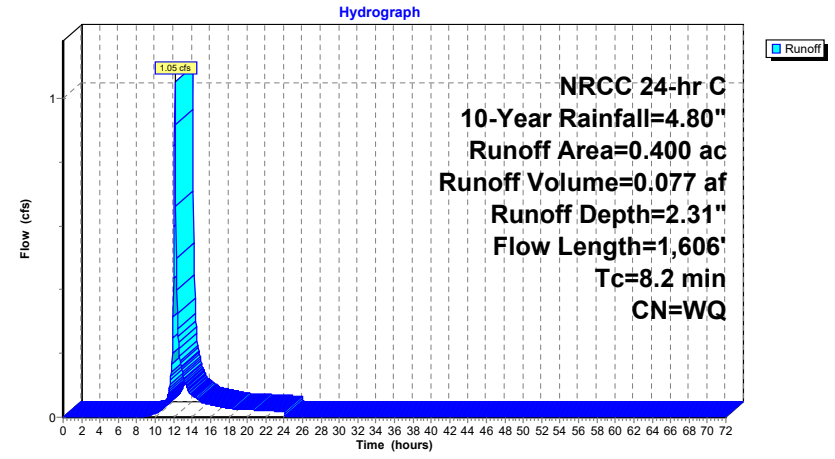
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 160

Subcatchment 36S: SA UG Det Basin F Perv.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 161

Hydrograph for Subcatchment 36S: SA UG Det Basin F Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	2.29	0.00
1.00	0.06	0.00	0.00	53.00	4.80	2.29	0.00
2.00	0.12	0.00	0.00	54.00	4.80	2.29	0.00
3.00	0.18	0.00	0.00	55.00	4.80	2.29	0.00
4.00	0.25	0.00	0.00	56.00	4.80	2.29	0.00
5.00	0.33	0.00	0.00	57.00	4.80	2.29	0.00
6.00	0.41	0.00	0.00	58.00	4.80	2.29	0.00
7.00	0.51	0.00	0.00	59.00	4.80	2.29	0.00
8.00	0.62	0.00	0.00	60.00	4.80	2.29	0.00
9.00	0.76	0.00	0.00	61.00	4.80	2.29	0.00
10.00	0.95	0.02	0.01	62.00	4.80	2.29	0.00
11.00	1.24	0.08	0.04	63.00	4.80	2.29	0.00
12.00	2.29	0.53	0.44	64.00	4.80	2.29	0.00
13.00	3.56	1.35	0.14	65.00	4.80	2.29	0.00
14.00	3.85	1.56	0.07	66.00	4.80	2.29	0.00
15.00	4.04	1.70	0.05	67.00	4.80	2.29	0.00
16.00	4.18	1.80	0.04	68.00	4.80	2.29	0.00
17.00	4.29	1.89	0.03	69.00	4.80	2.29	0.00
18.00	4.39	1.96	0.03	70.00	4.80	2.29	0.00
19.00	4.47	2.03	0.03	71.00	4.80	2.29	0.00
20.00	4.55	2.09	0.02	72.00	4.80	2.29	0.00
21.00	4.62	2.14	0.02				
22.00	4.68	2.20	0.02				
23.00	4.74	2.24	0.02				
24.00	4.80	2.29	0.02				
25.00	4.80	2.29	0.00				
26.00	4.80	2.29	0.00				
27.00	4.80	2.29	0.00				
28.00	4.80	2.29	0.00				
29.00	4.80	2.29	0.00				
30.00	4.80	2.29	0.00				
31.00	4.80	2.29	0.00				
32.00	4.80	2.29	0.00				
33.00	4.80	2.29	0.00				
34.00	4.80	2.29	0.00				
35.00	4.80	2.29	0.00				
36.00	4.80	2.29	0.00				
37.00	4.80	2.29	0.00				
38.00	4.80	2.29	0.00				
39.00	4.80	2.29	0.00				
40.00	4.80	2.29	0.00				
41.00	4.80	2.29	0.00				
42.00	4.80	2.29	0.00				
43.00	4.80	2.29	0.00				
44.00	4.80	2.29	0.00				
45.00	4.80	2.29	0.00				
46.00	4.80	2.29	0.00				
47.00	4.80	2.29	0.00				
48.00	4.80	2.29	0.00				
49.00	4.80	2.29	0.00				
50.00	4.80	2.29	0.00				
51.00	4.80	2.29	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 162

Summary for Subcatchment 37S: SA AG INF Basin G/H Perv.

[47] Hint: Peak is 261% of capacity of segment #3

[47] Hint: Peak is 144% of capacity of segment #4

[47] Hint: Peak is 139% of capacity of segment #5

[47] Hint: Peak is 167% of capacity of segment #6

[47] Hint: Peak is 476% of capacity of segment #7

Runoff = 35.39 cfs @ 12.17 hrs, Volume= 2.729 af, Depth= 2.63"
 Routed to Pond 20P : Combined Aboveground Infiltration Basin 'G/H'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
2.100	74	>75% Grass cover, Good, HSG C
10.340	80	>75% Grass cover, Good, HSG D
12.440		Weighted Average
12.440		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0142	0.99		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
2.1	303	0.0142	2.42		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
0.7	327	0.0142	7.67	13.56	Pipe Channel, CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	335	0.0468	13.93	24.62	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	370	0.0504	14.46	25.55	Pipe Channel, EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.2	141	0.0348	12.01	21.23	Pipe Channel, FG 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
3.9	989	0.0050	4.20	7.43	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
9.4	2,565	Total			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

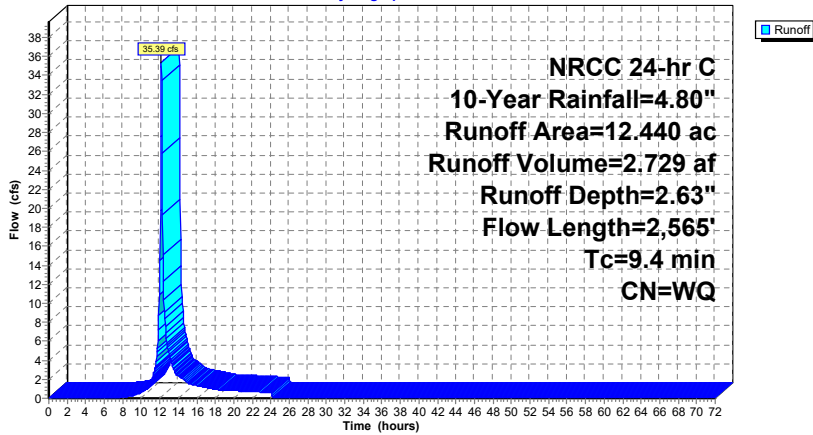
NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 163

Subcatchment 37S: SA AG INF Basin G/H Perv.

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 164

Hydrograph for Subcatchment 37S: SA AG INF Basin G/H Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	2.63	0.00
1.00	0.06	0.00	0.00	53.00	4.80	2.63	0.00
2.00	0.12	0.00	0.00	54.00	4.80	2.63	0.00
3.00	0.18	0.00	0.00	55.00	4.80	2.63	0.00
4.00	0.25	0.00	0.00	56.00	4.80	2.63	0.00
5.00	0.33	0.00	0.00	57.00	4.80	2.63	0.00
6.00	0.41	0.00	0.00	58.00	4.80	2.63	0.00
7.00	0.51	0.00	0.00	59.00	4.80	2.63	0.00
8.00	0.62	0.00	0.10	60.00	4.80	2.63	0.00
9.00	0.76	0.02	0.26	61.00	4.80	2.63	0.00
10.00	0.95	0.06	0.64	62.00	4.80	2.63	0.00
11.00	1.24	0.15	1.63	63.00	4.80	2.63	0.00
12.00	2.29	0.70	14.57	64.00	4.80	2.63	0.00
13.00	3.56	1.61	4.68	65.00	4.80	2.63	0.00
14.00	3.85	1.84	2.35	66.00	4.80	2.63	0.00
15.00	4.04	2.00	1.64	67.00	4.80	2.63	0.00
16.00	4.18	2.11	1.34	68.00	4.80	2.63	0.00
17.00	4.29	2.20	1.13	69.00	4.80	2.63	0.00
18.00	4.39	2.28	0.92	70.00	4.80	2.63	0.00
19.00	4.47	2.35	0.84	71.00	4.80	2.63	0.00
20.00	4.55	2.42	0.79	72.00	4.80	2.63	0.00
21.00	4.62	2.48	0.73				
22.00	4.68	2.53	0.68				
23.00	4.74	2.58	0.63				
24.00	4.80	2.63	0.58				
25.00	4.80	2.63	0.00				
26.00	4.80	2.63	0.00				
27.00	4.80	2.63	0.00				
28.00	4.80	2.63	0.00				
29.00	4.80	2.63	0.00				
30.00	4.80	2.63	0.00				
31.00	4.80	2.63	0.00				
32.00	4.80	2.63	0.00				
33.00	4.80	2.63	0.00				
34.00	4.80	2.63	0.00				
35.00	4.80	2.63	0.00				
36.00	4.80	2.63	0.00				
37.00	4.80	2.63	0.00				
38.00	4.80	2.63	0.00				
39.00	4.80	2.63	0.00				
40.00	4.80	2.63	0.00				
41.00	4.80	2.63	0.00				
42.00	4.80	2.63	0.00				
43.00	4.80	2.63	0.00				
44.00	4.80	2.63	0.00				
45.00	4.80	2.63	0.00				
46.00	4.80	2.63	0.00				
47.00	4.80	2.63	0.00				
48.00	4.80	2.63	0.00				
49.00	4.80	2.63	0.00				
50.00	4.80	2.63	0.00				
51.00	4.80	2.63	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 165

Summary for Subcatchment 38S: SA South (Rt 9) Undetained Perv.

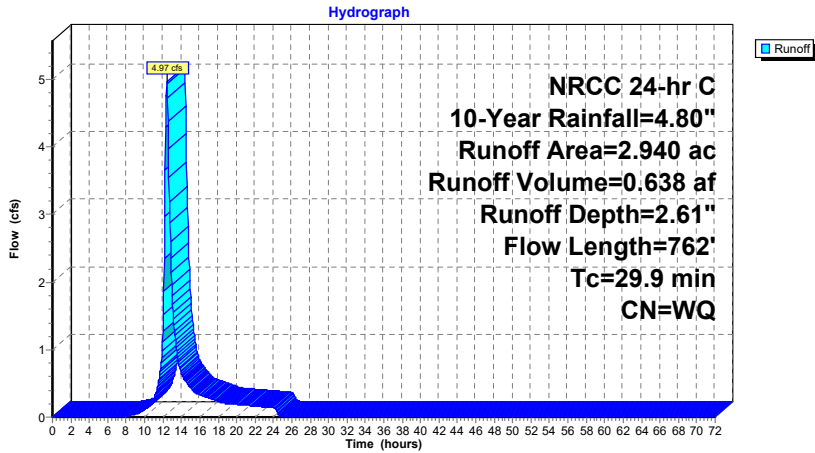
Runoff = 4.97 cfs @ 12.42 hrs, Volume= 0.638 af, Depth= 2.61"
Routed to Link 39L : Route 9 Undetained Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
0.650	74	>75% Grass cover, Good, HSG C
2.290	80	>75% Grass cover, Good, HSG D
2.940		Weighted Average
2.940		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	85	0.0162	0.13		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19" Using McCuen-Spiess flow length
2.2	83	0.0162	0.64		Shallow Concentrated Flow, BC Woodland Kv= 5.0 fps
6.4	195	0.0103	0.51		Shallow Concentrated Flow, CD Woodland Kv= 5.0 fps
10.0	399	0.0177	0.67		Shallow Concentrated Flow, DE Woodland Kv= 5.0 fps
29.9	762				Total

Subcatchment 38S: SA South (Rt 9) Undetained Perv.



2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 166

Hydrograph for Subcatchment 38S: SA South (Rt 9) Undetained Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	2.63	0.00
1.00	0.06	0.00	0.00	53.00	4.80	2.63	0.00
2.00	0.12	0.00	0.00	54.00	4.80	2.63	0.00
3.00	0.18	0.00	0.00	55.00	4.80	2.63	0.00
4.00	0.25	0.00	0.00	56.00	4.80	2.63	0.00
5.00	0.33	0.00	0.00	57.00	4.80	2.63	0.00
6.00	0.41	0.00	0.00	58.00	4.80	2.63	0.00
7.00	0.51	0.00	0.00	59.00	4.80	2.63	0.00
8.00	0.62	0.00	0.01	60.00	4.80	2.63	0.00
9.00	0.76	0.02	0.05	61.00	4.80	2.63	0.00
10.00	0.95	0.06	0.11	62.00	4.80	2.63	0.00
11.00	1.24	0.15	0.27	63.00	4.80	2.63	0.00
12.00	2.29	0.70	1.28	64.00	4.80	2.63	0.00
13.00	3.56	1.61	1.80	65.00	4.80	2.63	0.00
14.00	3.85	1.84	0.64	66.00	4.80	2.63	0.00
15.00	4.04	2.00	0.44	67.00	4.80	2.63	0.00
16.00	4.18	2.11	0.33	68.00	4.80	2.63	0.00
17.00	4.29	2.20	0.28	69.00	4.80	2.63	0.00
18.00	4.39	2.28	0.23	70.00	4.80	2.63	0.00
19.00	4.47	2.35	0.20	71.00	4.80	2.63	0.00
20.00	4.55	2.42	0.19	72.00	4.80	2.63	0.00
21.00	4.62	2.48	0.18				
22.00	4.68	2.53	0.16				
23.00	4.74	2.58	0.15				
24.00	4.80	2.63	0.14				
25.00	4.80	2.63	0.00				
26.00	4.80	2.63	0.00				
27.00	4.80	2.63	0.00				
28.00	4.80	2.63	0.00				
29.00	4.80	2.63	0.00				
30.00	4.80	2.63	0.00				
31.00	4.80	2.63	0.00				
32.00	4.80	2.63	0.00				
33.00	4.80	2.63	0.00				
34.00	4.80	2.63	0.00				
35.00	4.80	2.63	0.00				
36.00	4.80	2.63	0.00				
37.00	4.80	2.63	0.00				
38.00	4.80	2.63	0.00				
39.00	4.80	2.63	0.00				
40.00	4.80	2.63	0.00				
41.00	4.80	2.63	0.00				
42.00	4.80	2.63	0.00				
43.00	4.80	2.63	0.00				
44.00	4.80	2.63	0.00				
45.00	4.80	2.63	0.00				
46.00	4.80	2.63	0.00				
47.00	4.80	2.63	0.00				
48.00	4.80	2.63	0.00				
49.00	4.80	2.63	0.00				
50.00	4.80	2.63	0.00				
51.00	4.80	2.63	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 167

Summary for Subcatchment 40S: Route 9W Undisturbed Imp.

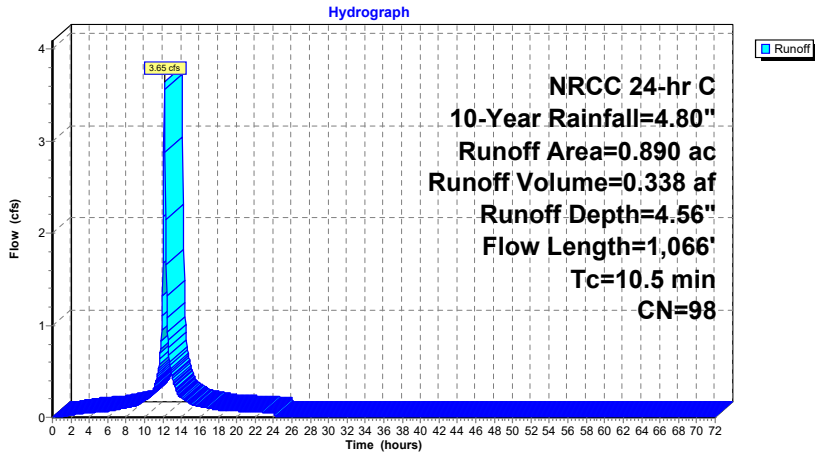
Runoff = 3.65 cfs @ 12.18 hrs, Volume= 0.338 af, Depth= 4.56"
Routed to Link 11L : Route 9 Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 10-Year Rainfall=4.80"

Area (ac)	CN	Description
* 0.890	98	Impervious
0.890		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	10	0.0275	0.05		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
0.2	67	0.0784	4.51		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
3.8	340	0.0088	1.51		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.5	311	0.0451	3.42		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.4	338	0.0621	4.01		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
10.5	1,066				Total

Subcatchment 40S: Route 9W Undisturbed Imp.



2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 168

Hydrograph for Subcatchment 40S: Route 9W Undisturbed Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	4.80	4.56	0.00
1.00	0.06	0.00	0.00	53.00	4.80	4.56	0.00
2.00	0.12	0.02	0.02	54.00	4.80	4.56	0.00
3.00	0.18	0.06	0.04	55.00	4.80	4.56	0.00
4.00	0.25	0.11	0.05	56.00	4.80	4.56	0.00
5.00	0.33	0.17	0.06	57.00	4.80	4.56	0.00
6.00	0.41	0.24	0.06	58.00	4.80	4.56	0.00
7.00	0.51	0.32	0.08	59.00	4.80	4.56	0.00
8.00	0.62	0.43	0.10	60.00	4.80	4.56	0.00
9.00	0.76	0.56	0.12	61.00	4.80	4.56	0.00
10.00	0.95	0.74	0.18	62.00	4.80	4.56	0.00
11.00	1.24	1.02	0.32	63.00	4.80	4.56	0.00
12.00	2.29	2.06	1.67	64.00	4.80	4.56	0.00
13.00	3.56	3.33	0.44	65.00	4.80	4.56	0.00
14.00	3.85	3.62	0.21	66.00	4.80	4.56	0.00
15.00	4.04	3.80	0.15	67.00	4.80	4.56	0.00
16.00	4.18	3.94	0.12	68.00	4.80	4.56	0.00
17.00	4.29	4.06	0.10	69.00	4.80	4.56	0.00
18.00	4.39	4.15	0.08	70.00	4.80	4.56	0.00
19.00	4.47	4.23	0.07	71.00	4.80	4.56	0.00
20.00	4.55	4.31	0.07	72.00	4.80	4.56	0.00
21.00	4.62	4.38	0.06				
22.00	4.68	4.45	0.06				
23.00	4.74	4.51	0.05				
24.00	4.80	4.56	0.05				
25.00	4.80	4.56	0.00				
26.00	4.80	4.56	0.00				
27.00	4.80	4.56	0.00				
28.00	4.80	4.56	0.00				
29.00	4.80	4.56	0.00				
30.00	4.80	4.56	0.00				
31.00	4.80	4.56	0.00				
32.00	4.80	4.56	0.00				
33.00	4.80	4.56	0.00				
34.00	4.80	4.56	0.00				
35.00	4.80	4.56	0.00				
36.00	4.80	4.56	0.00				
37.00	4.80	4.56	0.00				
38.00	4.80	4.56	0.00				
39.00	4.80	4.56	0.00				
40.00	4.80	4.56	0.00				
41.00	4.80	4.56	0.00				
42.00	4.80	4.56	0.00				
43.00	4.80	4.56	0.00				
44.00	4.80	4.56	0.00				
45.00	4.80	4.56	0.00				
46.00	4.80	4.56	0.00				
47.00	4.80	4.56	0.00				
48.00	4.80	4.56	0.00				
49.00	4.80	4.56	0.00				
50.00	4.80	4.56	0.00				
51.00	4.80	4.56	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 169

Summary for Pond 8P: Aboveground Infiltration Basin 'B'

Inflow Area = 28.990 ac, 79.58% Impervious, Inflow Depth = 4.19" for 10-Year event
 Inflow = 117.10 cfs @ 12.16 hrs, Volume= 10.115 af
 Outflow = 10.88 cfs @ 13.21 hrs, Volume= 10.115 af, Atten= 91%, Lag= 63.1 min
 Discarded = 5.97 cfs @ 13.21 hrs, Volume= 8.978 af
 Primary = 4.91 cfs @ 13.21 hrs, Volume= 1.137 af
 Routed to Link 10L : Moodna Creek
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 145.53' @ 13.21 hrs Surf.Area= 62,429 sf Storage= 198,487 cf

Plug-Flow detention time= 270.3 min calculated for 10.108 af (100% of inflow)
 Center-of-Mass det. time= 270.4 min (1,034.4 - 764.0)

Volume	Invert	Avail.Storage	Storage Description
#1	142.00'	436,638 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
142.00	50,059	0	0
143.00	53,496	51,778	51,778
144.00	56,974	55,235	107,013
145.00	60,523	58,749	165,761
146.00	64,103	62,313	228,074
147.00	67,754	65,929	294,003
148.00	71,216	69,485	363,488
149.00	75,085	73,151	436,638

Device	Routing	Invert	Outlet Devices
#1	Primary	142.00'	30.0" Round Culvert L= 55.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 142.00' / 141.72' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Discarded	142.00'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 133.70'
#3	Device 1	144.15'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	144.90'	2.5' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#5	Device 1	148.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	148.50'	40.0' long x 10.0' breadth 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

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 170

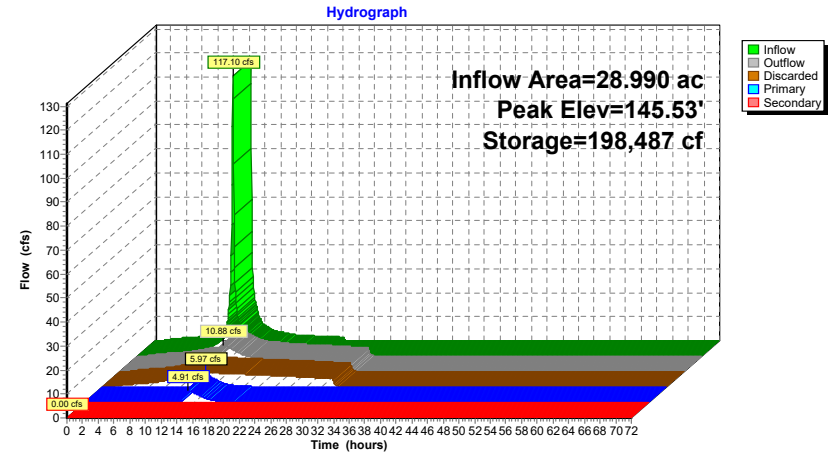
Discarded OutFlow Max=5.97 cfs @ 13.21 hrs HW=145.53' (Free Discharge)
 ↳2=Exfiltration (Controls 5.97 cfs)

Primary OutFlow Max=4.91 cfs @ 13.21 hrs HW=145.53' (Free Discharge)

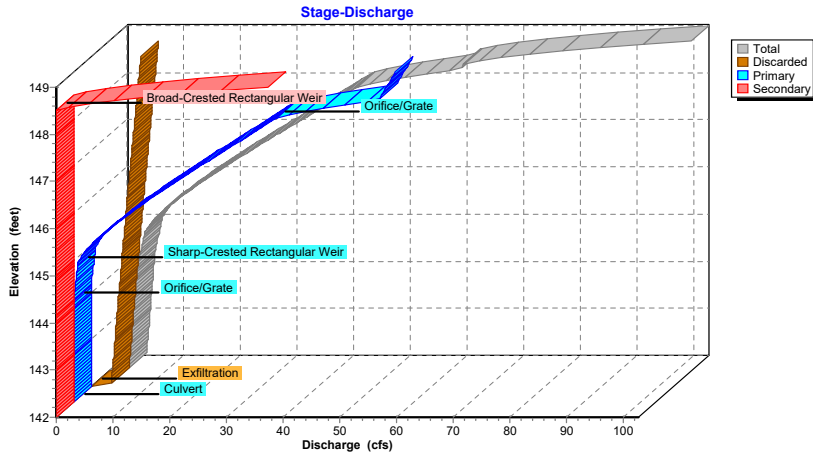
- ↳1=Culvert (Passes 4.91 cfs of 31.84 cfs potential flow)
- ↳3=Orifice/Grate (Orifice Controls 1.01 cfs @ 5.12 fps)
- ↳4=Sharp-Crested Rectangular Weir (Weir Controls 3.90 cfs @ 2.60 fps)
- ↳5=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=142.00' (Free Discharge)
 ↳6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

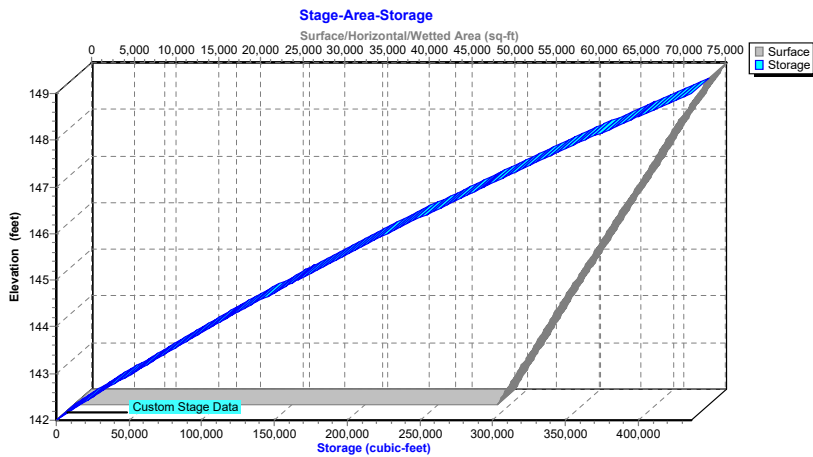
Pond 8P: Aboveground Infiltration Basin 'B'



Pond 8P: Aboveground Infiltration Basin 'B'



Pond 8P: Aboveground Infiltration Basin 'B'



Hydrograph for Pond 8P: Aboveground Infiltration Basin 'B'

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	142.00	0.00	0.00	0.00	0.00
2.50	0.83	715	142.01	0.72	0.72	0.00	0.00
5.00	1.50	1,432	142.03	1.44	1.44	0.00	0.00
7.50	2.44	2,285	142.05	2.29	2.29	0.00	0.00
10.00	5.12	5,739	142.11	3.55	3.55	0.00	0.00
12.50	26.74	182,691	145.28	8.51	5.78	2.73	0.00
15.00	4.53	179,666	145.23	8.10	5.74	2.36	0.00
17.50	2.78	151,245	144.76	5.96	5.40	0.57	0.00
20.00	2.11	122,586	144.27	5.09	5.04	0.05	0.00
22.50	1.74	96,032	143.81	4.71	4.71	0.00	0.00
25.00	0.00	64,875	143.24	4.31	4.31	0.00	0.00
27.50	0.00	28,201	142.55	3.84	3.84	0.00	0.00
30.00	0.00	351	142.01	0.35	0.35	0.00	0.00
32.50	0.00	0	142.00	0.00	0.00	0.00	0.00
35.00	0.00	0	142.00	0.00	0.00	0.00	0.00
37.50	0.00	0	142.00	0.00	0.00	0.00	0.00
40.00	0.00	0	142.00	0.00	0.00	0.00	0.00
42.50	0.00	0	142.00	0.00	0.00	0.00	0.00
45.00	0.00	0	142.00	0.00	0.00	0.00	0.00
47.50	0.00	0	142.00	0.00	0.00	0.00	0.00
50.00	0.00	0	142.00	0.00	0.00	0.00	0.00
52.50	0.00	0	142.00	0.00	0.00	0.00	0.00
55.00	0.00	0	142.00	0.00	0.00	0.00	0.00
57.50	0.00	0	142.00	0.00	0.00	0.00	0.00
60.00	0.00	0	142.00	0.00	0.00	0.00	0.00
62.50	0.00	0	142.00	0.00	0.00	0.00	0.00
65.00	0.00	0	142.00	0.00	0.00	0.00	0.00
67.50	0.00	0	142.00	0.00	0.00	0.00	0.00
70.00	0.00	0	142.00	0.00	0.00	0.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 173

Stage-Discharge for Pond 8P: Aboveground Infiltration Basin 'B'

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
142.00	0.00	0.00	0.00	0.00
142.20	3.61	3.61	0.00	0.00
142.40	3.74	3.74	0.00	0.00
142.60	3.88	3.88	0.00	0.00
142.80	4.01	4.01	0.00	0.00
143.00	4.15	4.15	0.00	0.00
143.20	4.28	4.28	0.00	0.00
143.40	4.42	4.42	0.00	0.00
143.60	4.56	4.56	0.00	0.00
143.80	4.70	4.70	0.00	0.00
144.00	4.85	4.85	0.00	0.00
144.20	5.00	4.99	0.01	0.00
144.40	5.30	5.13	0.17	0.00
144.60	5.70	5.28	0.43	0.00
144.80	6.02	5.43	0.60	0.00
145.00	6.56	5.57	0.99	0.00
145.20	7.88	5.72	2.16	0.00
145.40	9.59	5.87	3.72	0.00
145.60	11.58	6.02	5.56	0.00
145.80	13.77	6.17	7.60	0.00
146.00	16.12	6.33	9.80	0.00
146.20	18.60	6.48	12.13	0.00
146.40	21.19	6.63	14.55	0.00
146.60	23.85	6.79	17.06	0.00
146.80	26.57	6.95	19.62	0.00
147.00	29.33	7.10	22.22	0.00
147.20	32.11	7.26	24.85	0.00
147.40	34.90	7.41	27.49	0.00
147.60	37.70	7.57	30.13	0.00
147.80	40.48	7.73	32.75	0.00
148.00	43.23	7.88	35.35	0.00
148.20	50.64	8.05	42.59	0.00
148.40	61.85	8.21	53.64	0.00
148.60	66.20	8.38	54.67	3.15
148.80	80.82	8.55	55.68	16.60
149.00	102.58	8.71	56.68	37.19

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 174

Stage-Area-Storage for Pond 8P: Aboveground Infiltration Basin 'B'

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
142.00	50,059	0	147.20	68,446	307,623
142.10	50,403	5,023	147.30	68,793	314,484
142.20	50,746	10,081	147.40	69,139	321,381
142.30	51,090	15,172	147.50	69,485	328,312
142.40	51,434	20,299	147.60	69,831	335,278
142.50	51,778	25,459	147.70	70,177	342,278
142.60	52,121	30,654	147.80	70,524	349,314
142.70	52,465	35,883	147.90	70,870	356,383
142.80	52,809	41,147	148.00	71,216	363,488
142.90	53,152	46,445	148.10	71,603	370,628
143.00	53,496	51,778	148.20	71,990	377,808
143.10	53,844	57,144	148.30	72,377	385,026
143.20	54,192	62,546	148.40	72,764	392,283
143.30	54,539	67,983	148.50	73,151	399,579
143.40	54,887	73,454	148.60	73,537	406,914
143.50	55,235	78,960	148.70	73,924	414,287
143.60	55,583	84,501	148.80	74,311	421,698
143.70	55,931	90,077	148.90	74,698	429,149
143.80	56,278	95,687	149.00	75,085	436,638
143.90	56,626	101,332			
144.00	56,974	107,013			
144.10	57,329	112,728			
144.20	57,684	118,478			
144.30	58,039	124,264			
144.40	58,394	130,086			
144.50	58,749	135,943			
144.60	59,103	141,836			
144.70	59,458	147,764			
144.80	59,813	153,727			
144.90	60,168	159,726			
145.00	60,523	165,761			
145.10	60,881	171,831			
145.20	61,239	177,937			
145.30	61,597	184,079			
145.40	61,955	190,257			
145.50	62,313	196,470			
145.60	62,671	202,719			
145.70	63,029	209,004			
145.80	63,387	215,325			
145.90	63,745	221,682			
146.00	64,103	228,074			
146.10	64,468	234,503			
146.20	64,833	240,968			
146.30	65,198	247,469			
146.40	65,563	254,007			
146.50	65,929	260,582			
146.60	66,294	267,193			
146.70	66,659	273,841			
146.80	67,024	280,525			
146.90	67,389	287,245			
147.00	67,754	294,003			
147.10	68,100	300,795			

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 175

Summary for Pond 9P: Aboveground Infiltration Basin 'A'

Inflow Area = 17.500 ac, 77.89% Impervious, Inflow Depth = 4.15" for 10-Year event
 Inflow = 52.26 cfs @ 12.28 hrs, Volume= 6.056 af
 Outflow = 17.05 cfs @ 12.70 hrs, Volume= 6.056 af, Atten= 67%, Lag= 25.4 min
 Discarded = 1.01 cfs @ 12.70 hrs, Volume= 3.215 af
 Primary = 16.03 cfs @ 12.70 hrs, Volume= 2.841 af
 Routed to Link 10L : Moodna Creek
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 198.61' @ 12.70 hrs Surf.Area= 39,972 sf Storage= 125,958 cf

Plug-Flow detention time= 568.2 min calculated for 6.052 af (100% of inflow)
 Center-of-Mass det. time= 569.2 min (1,343.9 - 774.7)

Volume	Invert	Avail.Storage	Storage Description
#1	195.00'	184,484 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
195.00	29,984	0	0
196.00	32,723	31,354	31,354
197.00	35,439	34,081	65,435
198.00	38,254	36,847	102,281
199.00	41,092	39,673	141,954
200.00	43,968	42,530	184,484

Device	Routing	Invert	Outlet Devices
#1	Primary	193.06'	36.0" Round Culvert L= 58.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 193.06' / 189.00' S= 0.0700 1" Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Device 1	197.05'	2.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	197.40'	3.5' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Device 1	198.50'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Secondary	199.50'	40.0' long x 10.0' breadth 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
#6	Discarded	195.00'	0.750 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 188.30'

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

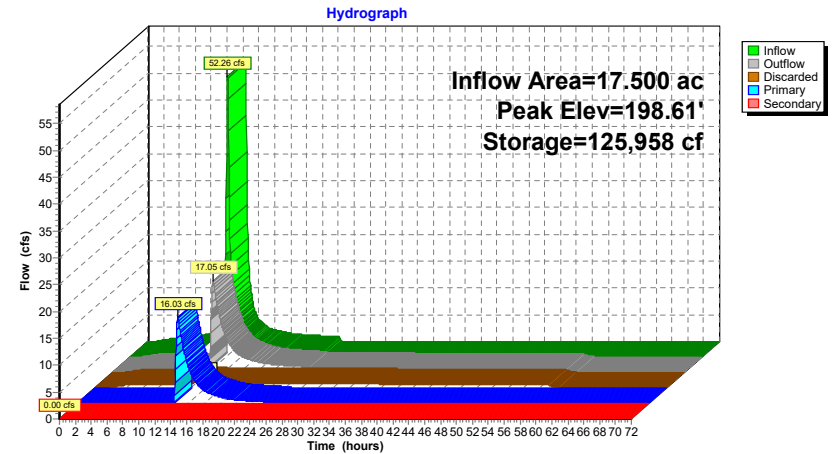
Printed 10/24/2023
Page 176

Discarded OutFlow Max=1.01 cfs @ 12.70 hrs HW=198.61' (Free Discharge)
 ↳6=Exfiltration (Controls 1.01 cfs)

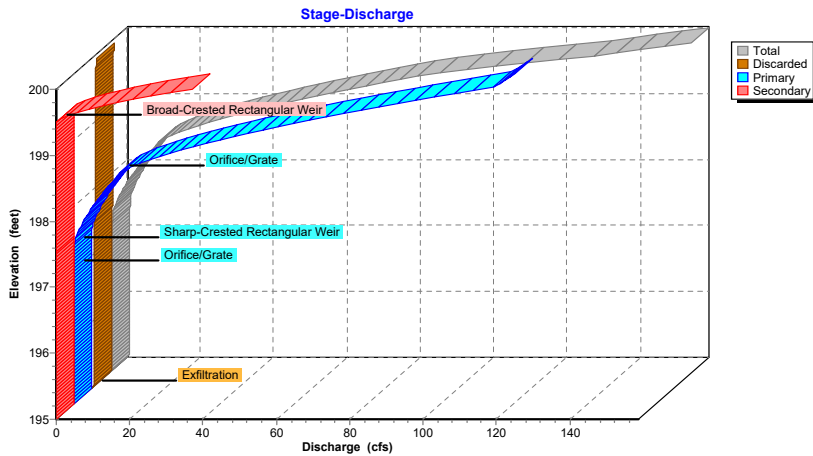
Primary OutFlow Max=16.01 cfs @ 12.70 hrs HW=198.61' (Free Discharge)
 ↳1=Culvert (Passes 1.91 cfs of 68.45 cfs potential flow)
 ↳2=Orifice/Grate (Orifice Controls 0.13 cfs @ 5.84 fps)
 ↳4=Orifice/Grate (Weir Controls 1.78 cfs @ 1.06 fps)
 ↳3=Sharp-Crested Rectangular Weir (Weir Controls 14.10 cfs @ 3.59 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=195.00' (Free Discharge)
 ↳5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

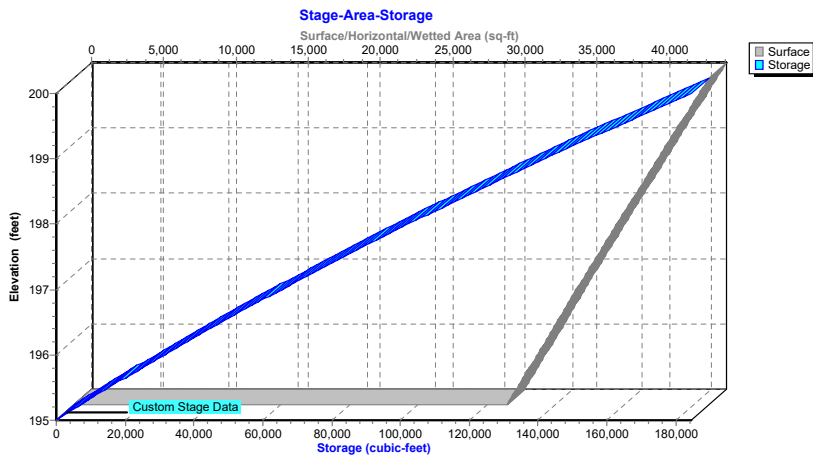
Pond 9P: Aboveground Infiltration Basin 'A'



Pond 9P: Aboveground Infiltration Basin 'A'



Pond 9P: Aboveground Infiltration Basin 'A'



Hydrograph for Pond 9P: Aboveground Infiltration Basin 'A'

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	195.00	0.00	0.00	0.00	0.00
2.50	0.45	756	195.03	0.26	0.26	0.00	0.00
5.00	0.86	2,660	195.09	0.53	0.53	0.00	0.00
7.50	1.39	7,398	195.24	0.55	0.55	0.00	0.00
10.00	2.86	19,535	195.63	0.60	0.60	0.00	0.00
12.50	29.82	121,028	198.48	13.19	0.99	12.20	0.00
15.00	2.92	97,880	197.88	4.75	0.91	3.85	0.00
17.50	1.73	88,783	197.64	2.30	0.87	1.42	0.00
20.00	1.29	85,056	197.54	1.54	0.86	0.68	0.00
22.50	1.07	83,245	197.49	1.24	0.85	0.39	0.00
25.00	0.00	79,658	197.40	0.89	0.84	0.05	0.00
27.50	0.00	71,887	197.18	0.83	0.81	0.02	0.00
30.00	0.00	64,689	196.98	0.78	0.78	0.00	0.00
32.50	0.00	57,787	196.78	0.75	0.75	0.00	0.00
35.00	0.00	51,123	196.59	0.73	0.73	0.00	0.00
37.50	0.00	44,690	196.40	0.70	0.70	0.00	0.00
40.00	0.00	38,483	196.22	0.68	0.68	0.00	0.00
42.50	0.00	32,493	196.03	0.65	0.65	0.00	0.00
45.00	0.00	26,716	195.86	0.63	0.63	0.00	0.00
47.50	0.00	21,146	195.68	0.61	0.61	0.00	0.00
50.00	0.00	15,776	195.51	0.59	0.59	0.00	0.00
52.50	0.00	10,600	195.35	0.56	0.56	0.00	0.00
55.00	0.00	5,613	195.19	0.54	0.54	0.00	0.00
57.50	0.00	946	195.03	0.33	0.33	0.00	0.00
60.00	0.00	40	195.00	0.01	0.01	0.00	0.00
62.50	0.00	2	195.00	0.00	0.00	0.00	0.00
65.00	0.00	0	195.00	0.00	0.00	0.00	0.00
67.50	0.00	0	195.00	0.00	0.00	0.00	0.00
70.00	0.00	0	195.00	0.00	0.00	0.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 179

Stage-Discharge for Pond 9P: Aboveground Infiltration Basin 'A'

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
195.00	0.00	0.00	0.00	0.00
195.10	0.53	0.53	0.00	0.00
195.20	0.55	0.55	0.00	0.00
195.30	0.56	0.56	0.00	0.00
195.40	0.57	0.57	0.00	0.00
195.50	0.58	0.58	0.00	0.00
195.60	0.60	0.60	0.00	0.00
195.70	0.61	0.61	0.00	0.00
195.80	0.62	0.62	0.00	0.00
195.90	0.64	0.64	0.00	0.00
196.00	0.65	0.65	0.00	0.00
196.10	0.66	0.66	0.00	0.00
196.20	0.68	0.68	0.00	0.00
196.30	0.69	0.69	0.00	0.00
196.40	0.70	0.70	0.00	0.00
196.50	0.72	0.72	0.00	0.00
196.60	0.73	0.73	0.00	0.00
196.70	0.74	0.74	0.00	0.00
196.80	0.76	0.76	0.00	0.00
196.90	0.77	0.77	0.00	0.00
197.00	0.78	0.78	0.00	0.00
197.10	0.80	0.80	0.00	0.00
197.20	0.84	0.81	0.03	0.00
197.30	0.87	0.83	0.04	0.00
197.40	0.89	0.84	0.05	0.00
197.50	1.28	0.85	0.42	0.00
197.60	1.95	0.87	1.08	0.00
197.70	2.81	0.88	1.93	0.00
197.80	3.81	0.90	2.91	0.00
197.90	4.93	0.91	4.02	0.00
198.00	6.16	0.92	5.23	0.00
198.10	7.48	0.94	6.54	0.00
198.20	8.88	0.95	7.92	0.00
198.30	10.35	0.97	9.38	0.00
198.40	11.89	0.98	10.91	0.00
198.50	13.49	1.00	12.50	0.00
198.60	16.81	1.01	15.79	0.00
198.70	21.54	1.03	20.52	0.00
198.80	27.22	1.04	26.17	0.00
198.90	33.66	1.06	32.60	0.00
199.00	40.76	1.07	39.69	0.00
199.10	48.45	1.09	47.37	0.00
199.20	56.69	1.10	55.59	0.00
199.30	65.43	1.12	64.31	0.00
199.40	74.63	1.13	73.50	0.00
199.50	84.28	1.15	83.13	0.00
199.60	97.49	1.16	93.18	3.15
199.70	113.71	1.18	103.62	8.91
199.80	132.23	1.19	114.44	16.60
199.90	144.54	1.21	117.43	25.91
200.00	158.65	1.22	120.24	37.19

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 180

Stage-Area-Storage for Pond 9P: Aboveground Infiltration Basin 'A'

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
195.00	29,984	0	197.60	37,128	87,205
195.05	30,121	1,503	197.65	37,269	89,065
195.10	30,258	3,012	197.70	37,409	90,931
195.15	30,395	4,528	197.75	37,550	92,805
195.20	30,532	6,052	197.80	37,691	94,687
195.25	30,669	7,582	197.85	37,832	96,575
195.30	30,806	9,118	197.90	37,973	98,470
195.35	30,943	10,662	197.95	38,113	100,372
195.40	31,080	12,213	198.00	38,254	102,281
195.45	31,217	13,770	198.05	38,396	104,197
195.50	31,354	15,334	198.10	38,538	106,121
195.55	31,490	16,905	198.15	38,680	108,051
195.60	31,627	18,483	198.20	38,822	109,989
195.65	31,764	20,068	198.25	38,964	111,933
195.70	31,901	21,660	198.30	39,105	113,885
195.75	32,038	23,258	198.35	39,247	115,844
195.80	32,175	24,864	198.40	39,389	117,810
195.85	32,312	26,476	198.45	39,531	119,783
195.90	32,449	28,095	198.50	39,673	121,763
195.95	32,586	29,721	198.55	39,815	123,750
196.00	32,723	31,354	198.60	39,957	125,744
196.05	32,859	32,993	198.65	40,099	127,746
196.10	32,995	34,639	198.70	40,241	129,754
196.15	33,130	36,293	198.75	40,383	131,770
196.20	33,266	37,952	198.80	40,524	133,792
196.25	33,402	39,619	198.85	40,666	135,822
196.30	33,538	41,293	198.90	40,808	137,859
196.35	33,674	42,973	198.95	40,950	139,903
196.40	33,809	44,660	199.00	41,092	141,954
196.45	33,945	46,354	199.05	41,236	144,012
196.50	34,081	48,055	199.10	41,380	146,078
196.55	34,217	49,762	199.15	41,523	148,150
196.60	34,353	51,476	199.20	41,667	150,230
196.65	34,488	53,197	199.25	41,811	152,317
196.70	34,624	54,925	199.30	41,955	154,411
196.75	34,760	56,660	199.35	42,099	156,512
196.80	34,896	58,401	199.40	42,242	158,621
196.85	35,032	60,149	199.45	42,386	160,737
196.90	35,167	61,904	199.50	42,530	162,860
196.95	35,303	63,666	199.55	42,674	164,990
197.00	35,439	65,435	199.60	42,818	167,127
197.05	35,580	67,210	199.65	42,961	169,271
197.10	35,720	68,992	199.70	43,105	171,423
197.15	35,861	70,782	199.75	43,249	173,582
197.20	36,002	72,579	199.80	43,393	175,748
197.25	36,143	74,382	199.85	43,537	177,921
197.30	36,284	76,193	199.90	43,680	180,102
197.35	36,424	78,011	199.95	43,824	182,289
197.40	36,565	79,835	200.00	43,968	184,484
197.45	36,706	81,667			
197.50	36,847	83,506			
197.55	36,987	85,352			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 181

Summary for Pond 17P: Underground Detention Basin 'E'

Inflow Area = 4.030 ac, 98.26% Impervious, Inflow Depth = 4.53" for 10-Year event
 Inflow = 18.99 cfs @ 12.13 hrs, Volume= 1.522 af
 Outflow = 6.05 cfs @ 12.31 hrs, Volume= 1.288 af, Atten= 68%, Lag= 11.3 min
 Primary = 6.05 cfs @ 12.31 hrs, Volume= 1.288 af
 Routed to Link 21L : Route 9 Total

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 222.51' @ 12.31 hrs Surf.Area= 0.286 ac Storage= 0.783 af

Plug-Flow detention time= 315.6 min calculated for 1.287 af (85% of inflow)
 Center-of-Mass det. time= 245.4 min (996.2 - 750.9)

Volume	Invert	Avail.Storage	Storage Description
#1	218.50'	0.398 af	38.92'W x 320.00'L x 6.00'H Prismatoid 1.715 af Overall - 0.721 af Embedded = 0.994 af x 40.0% Voids
#2	219.00'	0.721 af	60.0" Round HDPE_Round 60"x 5 Inside #1 L= 320.0'
		1.119 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	216.00'	24.0" Round Culvert L= 22.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 216.00' / 215.00' S= 0.0455 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	220.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	222.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=6.01 cfs @ 12.31 hrs HW=222.51' (Free Discharge)
 1=Culvert (Passes 6.01 cfs of 35.49 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 1.42 cfs @ 7.23 fps)
 3=Sharp-Crested Rectangular Weir (Weir Controls 4.59 cfs @ 2.33 fps)

2023-09 Proposed

Prepared by Dynamic Engineering

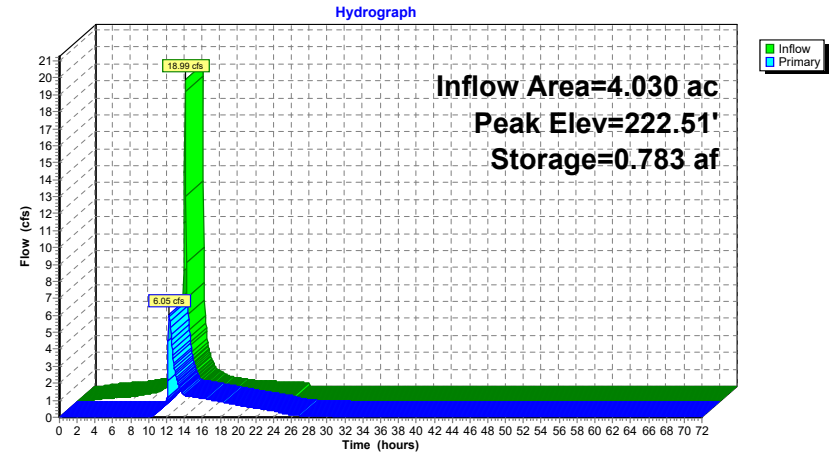
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

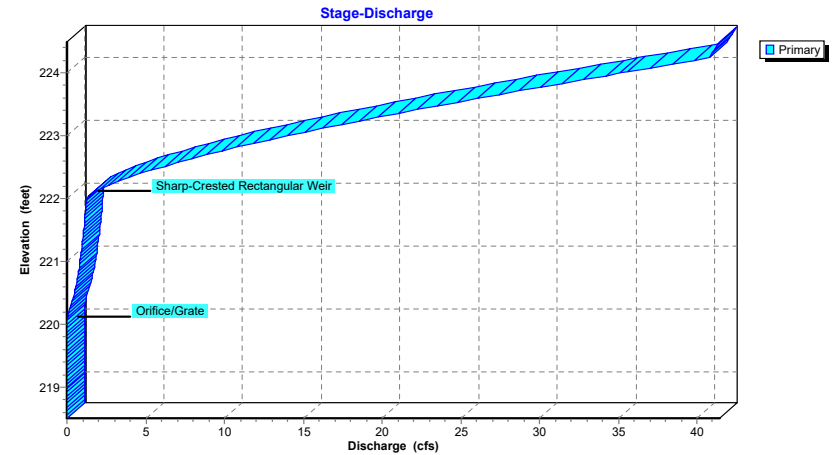
Printed 10/24/2023

Page 182

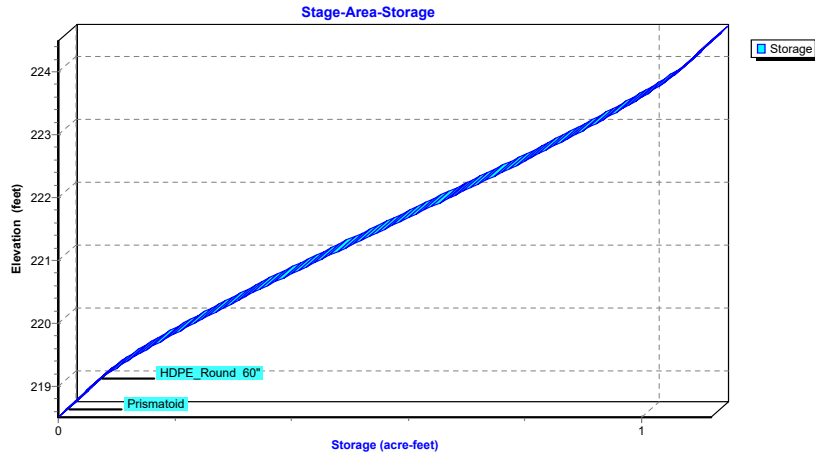
Pond 17P: Underground Detention Basin 'E'



Pond 17P: Underground Detention Basin 'E'



Pond 17P: Underground Detention Basin 'E'



Hydrograph for Pond 17P: Underground Detention Basin 'E'

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	218.50	0.00
2.50	0.15	0.011	218.60	0.00
5.00	0.26	0.054	218.97	0.00
7.50	0.42	0.121	219.41	0.00
10.00	0.84	0.238	220.03	0.00
12.50	3.47	0.764	222.42	4.89
15.00	0.63	0.638	221.85	1.20
17.50	0.39	0.517	221.31	0.97
20.00	0.30	0.410	220.83	0.72
22.50	0.25	0.342	220.52	0.49
25.00	0.00	0.295	220.30	0.23
27.50	0.00	0.267	220.16	0.08
30.00	0.00	0.256	220.11	0.04
32.50	0.00	0.250	220.08	0.02
35.00	0.00	0.246	220.06	0.01
37.50	0.00	0.244	220.05	0.01
40.00	0.00	0.242	220.04	0.01
42.50	0.00	0.240	220.04	0.01
45.00	0.00	0.239	220.03	0.01
47.50	0.00	0.238	220.02	0.00
50.00	0.00	0.237	220.02	0.00
52.50	0.00	0.237	220.02	0.00
55.00	0.00	0.236	220.01	0.00
57.50	0.00	0.236	220.01	0.00
60.00	0.00	0.235	220.01	0.00
62.50	0.00	0.235	220.01	0.00
65.00	0.00	0.235	220.01	0.00
67.50	0.00	0.234	220.01	0.00
70.00	0.00	0.234	220.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 185

Stage-Discharge for Pond 17P: Underground Detention Basin 'E'

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
218.50	0.00	221.10	0.87	223.70	28.28
218.55	0.00	221.15	0.90	223.75	29.40
218.60	0.00	221.20	0.92	223.80	30.53
218.65	0.00	221.25	0.95	223.85	31.66
218.70	0.00	221.30	0.97	223.90	32.81
218.75	0.00	221.35	0.99	223.95	33.96
218.80	0.00	221.40	1.01	224.00	35.13
218.85	0.00	221.45	1.04	224.05	36.30
218.90	0.00	221.50	1.06	224.10	37.48
218.95	0.00	221.55	1.08	224.15	38.67
219.00	0.00	221.60	1.10	224.20	39.87
219.05	0.00	221.65	1.12	224.25	40.73
219.10	0.00	221.70	1.14	224.30	40.87
219.15	0.00	221.75	1.16	224.35	41.01
219.20	0.00	221.80	1.18	224.40	41.15
219.25	0.00	221.85	1.20	224.45	41.29
219.30	0.00	221.90	1.21	224.50	41.43
219.35	0.00	221.95	1.23		
219.40	0.00	222.00	1.25		
219.45	0.00	222.05	1.41		
219.50	0.00	222.10	1.70		
219.55	0.00	222.15	2.06		
219.60	0.00	222.20	2.48		
219.65	0.00	222.25	2.95		
219.70	0.00	222.30	3.47		
219.75	0.00	222.35	4.03		
219.80	0.00	222.40	4.63		
219.85	0.00	222.45	5.26		
219.90	0.00	222.50	5.93		
219.95	0.00	222.55	6.62		
220.00	0.00	222.60	7.35		
220.05	0.01	222.65	8.10		
220.10	0.03	222.70	8.87		
220.15	0.07	222.75	9.67		
220.20	0.11	222.80	10.49		
220.25	0.17	222.85	11.34		
220.30	0.23	222.90	12.20		
220.35	0.30	222.95	13.09		
220.40	0.36	223.00	13.99		
220.45	0.43	223.05	14.92		
220.50	0.47	223.10	15.86		
220.55	0.52	223.15	16.81		
220.60	0.56	223.20	17.79		
220.65	0.60	223.25	18.77		
220.70	0.63	223.30	19.78		
220.75	0.67	223.35	20.80		
220.80	0.70	223.40	21.83		
220.85	0.73	223.45	22.87		
220.90	0.76	223.50	23.93		
220.95	0.79	223.55	25.00		
221.00	0.82	223.60	26.08		
221.05	0.85	223.65	27.18		

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 186

Stage-Area-Storage for Pond 17P: Underground Detention Basin 'E'

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
218.50	0.000	221.10	0.470	223.70	1.017
218.55	0.006	221.15	0.481	223.75	1.025
218.60	0.011	221.20	0.492	223.80	1.033
218.65	0.017	221.25	0.503	223.85	1.041
218.70	0.023	221.30	0.515	223.90	1.048
218.75	0.029	221.35	0.526	223.95	1.055
218.80	0.034	221.40	0.537	224.00	1.062
218.85	0.040	221.45	0.548	224.05	1.067
218.90	0.046	221.50	0.559	224.10	1.073
218.95	0.051	221.55	0.571	224.15	1.079
219.00	0.057	221.60	0.582	224.20	1.085
219.05	0.064	221.65	0.593	224.25	1.090
219.10	0.071	221.70	0.604	224.30	1.096
219.15	0.078	221.75	0.616	224.35	1.102
219.20	0.086	221.80	0.627	224.40	1.107
219.25	0.094	221.85	0.638	224.45	1.113
219.30	0.102	221.90	0.649	224.50	1.119
219.35	0.111	221.95	0.660		
219.40	0.119	222.00	0.671		
219.45	0.128	222.05	0.682		
219.50	0.137	222.10	0.694		
219.55	0.146	222.15	0.705		
219.60	0.155	222.20	0.716		
219.65	0.165	222.25	0.727		
219.70	0.174	222.30	0.738		
219.75	0.184	222.35	0.748		
219.80	0.193	222.40	0.759		
219.85	0.203	222.45	0.770		
219.90	0.213	222.50	0.781		
219.95	0.223	222.55	0.792		
220.00	0.233	222.60	0.802		
220.05	0.243	222.65	0.813		
220.10	0.254	222.70	0.824		
220.15	0.264	222.75	0.834		
220.20	0.274	222.80	0.845		
220.25	0.285	222.85	0.855		
220.30	0.295	222.90	0.865		
220.35	0.306	222.95	0.876		
220.40	0.316	223.00	0.886		
220.45	0.327	223.05	0.896		
220.50	0.338	223.10	0.906		
220.55	0.349	223.15	0.916		
220.60	0.360	223.20	0.926		
220.65	0.370	223.25	0.935		
220.70	0.381	223.30	0.945		
220.75	0.392	223.35	0.954		
220.80	0.403	223.40	0.964		
220.85	0.414	223.45	0.973		
220.90	0.425	223.50	0.982		
220.95	0.436	223.55	0.991		
221.00	0.448	223.60	1.000		
221.05	0.459	223.65	1.008		

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 187

Summary for Pond 18P: Underground Detention Basin 'F'

Inflow Area = 3.910 ac, 89.77% Impervious, Inflow Depth = 4.33" for 10-Year event
 Inflow = 16.80 cfs @ 12.15 hrs, Volume= 1.412 af
 Outflow = 3.96 cfs @ 12.45 hrs, Volume= 1.412 af, Atten= 76%, Lag= 18.1 min
 Primary = 3.96 cfs @ 12.45 hrs, Volume= 1.412 af
 Routed to Link 21L : Route 9 Total

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 191.60' @ 12.45 hrs Surf.Area= 0.373 ac Storage= 0.432 af

Plug-Flow detention time= 71.3 min calculated for 1.412 af (100% of inflow)
 Center-of-Mass det. time= 70.6 min (828.0 - 757.4)

Volume	Invert	Avail.Storage	Storage Description
#1	190.00'	1.569 af	60.0" Round RCP_Round 60"x 15 L= 232.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	190.00'	18.0" Round RCP_Round 18" L= 186.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 190.00' / 188.41' S= 0.0085'/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	190.00'	12.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	193.50'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=3.96 cfs @ 12.45 hrs HW=191.60' (Free Discharge)

1=RCP_Round 18" (Passes 3.96 cfs of 7.84 cfs potential flow)

2=Orifice/Grate (Orifice Controls 3.96 cfs @ 5.05 fps)

3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

2023-09 Proposed

Prepared by Dynamic Engineering

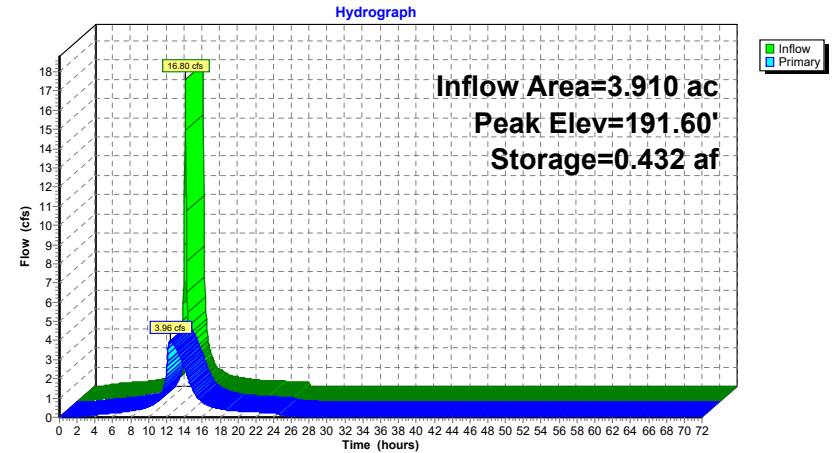
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

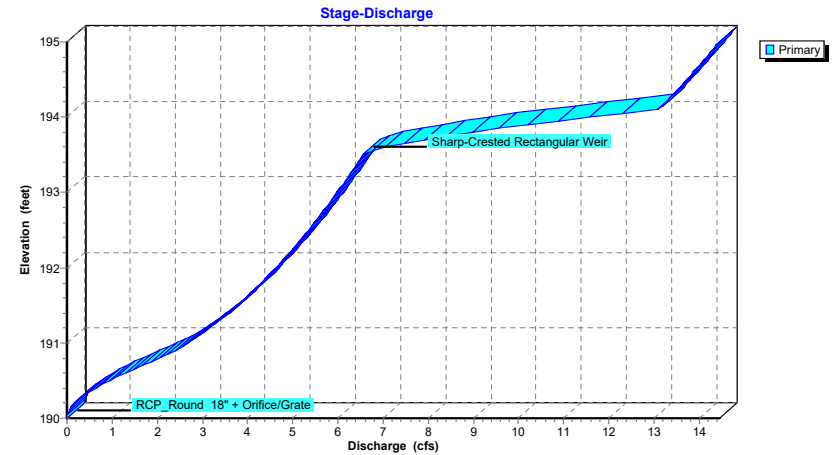
Printed 10/24/2023

Page 188

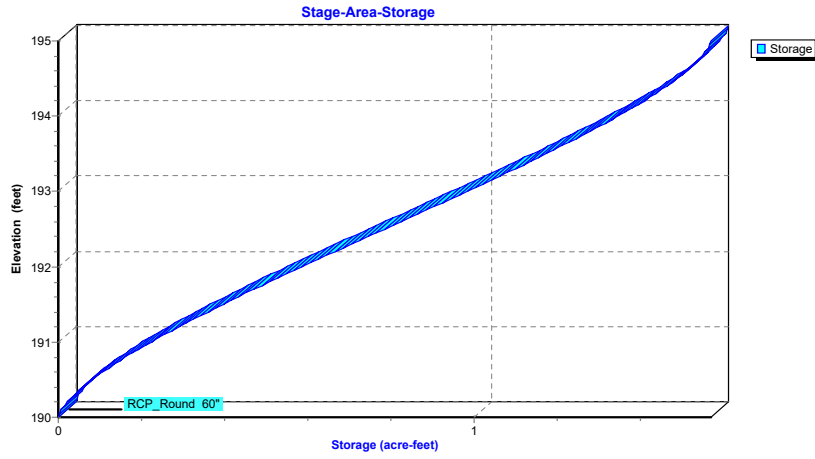
Pond 18P: Underground Detention Basin 'F'



Pond 18P: Underground Detention Basin 'F'



Pond 18P: Underground Detention Basin 'F'



Hydrograph for Pond 18P: Underground Detention Basin 'F'

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	190.00	0.00
2.50	0.13	0.008	190.10	0.04
5.00	0.23	0.022	190.20	0.18
7.50	0.37	0.033	190.27	0.30
10.00	0.74	0.053	190.37	0.56
12.50	3.49	0.431	191.60	3.96
15.00	0.61	0.113	190.62	1.39
17.50	0.38	0.048	190.35	0.49
20.00	0.29	0.034	190.28	0.32
22.50	0.24	0.029	190.25	0.26
25.00	0.00	0.015	190.16	0.11
27.50	0.00	0.004	190.07	0.02
30.00	0.00	0.002	190.03	0.01
32.50	0.00	0.001	190.01	0.00
35.00	0.00	0.000	190.01	0.00
37.50	0.00	0.000	190.00	0.00
40.00	0.00	0.000	190.00	0.00
42.50	0.00	0.000	190.00	0.00
45.00	0.00	0.000	190.00	0.00
47.50	0.00	0.000	190.00	0.00
50.00	0.00	0.000	190.00	0.00
52.50	0.00	0.000	190.00	0.00
55.00	0.00	0.000	190.00	0.00
57.50	0.00	0.000	190.00	0.00
60.00	0.00	0.000	190.00	0.00
62.50	0.00	0.000	190.00	0.00
65.00	0.00	0.000	190.00	0.00
67.50	0.00	0.000	190.00	0.00
70.00	0.00	0.000	190.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 191

Stage-Discharge for Pond 18P: Underground Detention Basin 'F'

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
190.00	0.00	192.60	5.48
190.05	0.01	192.65	5.55
190.10	0.04	192.70	5.61
190.15	0.10	192.75	5.67
190.20	0.17	192.80	5.74
190.25	0.26	192.85	5.80
190.30	0.37	192.90	5.86
190.35	0.49	192.95	5.92
190.40	0.63	193.00	5.98
190.45	0.78	193.05	6.04
190.50	0.95	193.10	6.10
190.55	1.12	193.15	6.16
190.60	1.30	193.20	6.21
190.65	1.48	193.25	6.27
190.70	1.67	193.30	6.33
190.75	1.86	193.35	6.38
190.80	2.05	193.40	6.44
190.85	2.23	193.45	6.50
190.90	2.40	193.50	6.55
190.95	2.56	193.55	6.75
191.00	2.67	193.60	7.07
191.05	2.80	193.65	7.47
191.10	2.93	193.70	7.92
191.15	3.05	193.75	8.43
191.20	3.16	193.80	8.99
191.25	3.28	193.85	9.58
191.30	3.38	193.90	10.22
191.35	3.49	193.95	10.88
191.40	3.59	194.00	11.58
191.45	3.69	194.05	12.31
191.50	3.78	194.10	13.07
191.55	3.88	194.15	13.19
191.60	3.97	194.20	13.27
191.65	4.06	194.25	13.34
191.70	4.14	194.30	13.42
191.75	4.23	194.35	13.50
191.80	4.31	194.40	13.57
191.85	4.39	194.45	13.65
191.90	4.47	194.50	13.72
191.95	4.55	194.55	13.80
192.00	4.63	194.60	13.87
192.05	4.71	194.65	13.95
192.10	4.78	194.70	14.02
192.15	4.86	194.75	14.09
192.20	4.93	194.80	14.16
192.25	5.00	194.85	14.24
192.30	5.07	194.90	14.31
192.35	5.14	194.95	14.38
192.40	5.21	195.00	14.45
192.45	5.28		
192.50	5.35		
192.55	5.41		

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 192

Stage-Area-Storage for Pond 18P: Underground Detention Basin 'F'

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
190.00	0.000	192.60	0.824
190.05	0.003	192.65	0.844
190.10	0.007	192.70	0.864
190.15	0.014	192.75	0.884
190.20	0.021	192.80	0.904
190.25	0.029	192.85	0.924
190.30	0.038	192.90	0.943
190.35	0.048	192.95	0.963
190.40	0.059	193.00	0.983
190.45	0.070	193.05	1.002
190.50	0.082	193.10	1.022
190.55	0.094	193.15	1.041
190.60	0.107	193.20	1.060
190.65	0.120	193.25	1.079
190.70	0.133	193.30	1.098
190.75	0.148	193.35	1.117
190.80	0.162	193.40	1.136
190.85	0.177	193.45	1.154
190.90	0.192	193.50	1.173
190.95	0.208	193.55	1.191
191.00	0.223	193.60	1.209
191.05	0.239	193.65	1.227
191.10	0.256	193.70	1.245
191.15	0.273	193.75	1.262
191.20	0.289	193.80	1.279
191.25	0.307	193.85	1.296
191.30	0.324	193.90	1.313
191.35	0.342	193.95	1.329
191.40	0.360	194.00	1.345
191.45	0.378	194.05	1.361
191.50	0.396	194.10	1.377
191.55	0.414	194.15	1.392
191.60	0.433	194.20	1.407
191.65	0.451	194.25	1.421
191.70	0.470	194.30	1.435
191.75	0.489	194.35	1.449
191.80	0.508	194.40	1.462
191.85	0.528	194.45	1.475
191.90	0.547	194.50	1.487
191.95	0.566	194.55	1.499
192.00	0.586	194.60	1.510
192.05	0.606	194.65	1.520
192.10	0.625	194.70	1.530
192.15	0.645	194.75	1.539
192.20	0.665	194.80	1.548
192.25	0.685	194.85	1.555
192.30	0.705	194.90	1.561
192.35	0.724	194.95	1.566
192.40	0.744	195.00	1.569
192.45	0.764		
192.50	0.784		
192.55	0.804		

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 193

Summary for Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Inflow Area = 17.770 ac, 29.99% Impervious, Inflow Depth = 3.21" for 10-Year event
 Inflow = 58.12 cfs @ 12.16 hrs, Volume= 4.756 af
 Outflow = 18.06 cfs @ 12.42 hrs, Volume= 4.756 af, Atten= 69%, Lag= 15.5 min
 Discarded = 18.06 cfs @ 12.42 hrs, Volume= 4.756 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Routed to Link 21L : Route 9 Total
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 138.02' @ 12.42 hrs Surf.Area= 69,217 sf Storage= 35,320 cf

Plug-Flow detention time= 10.7 min calculated for 4.753 af (100% of inflow)
 Center-of-Mass det. time= 10.7 min (812.9 - 802.1)

Volume	Invert	Avail.Storage	Storage Description
#1	137.50'	307,536 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
137.50	66,608	0	0
138.00	69,110	33,930	33,930
139.00	74,414	71,762	105,692
140.00	100,841	87,628	193,319
141.00	127,593	114,217	307,536

Device	Routing	Invert	Outlet Devices
#1	Primary	137.50'	15.0" Round Culvert L= 60.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 137.50' / 137.20' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Primary	138.45'	2.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	139.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Discarded	137.50'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 133.50'
#5	Primary	140.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	140.50'	40.0' long (Profile 9) Broad-Crested Rectangular Weir Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.55 3.55 3.57 3.60 3.66

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

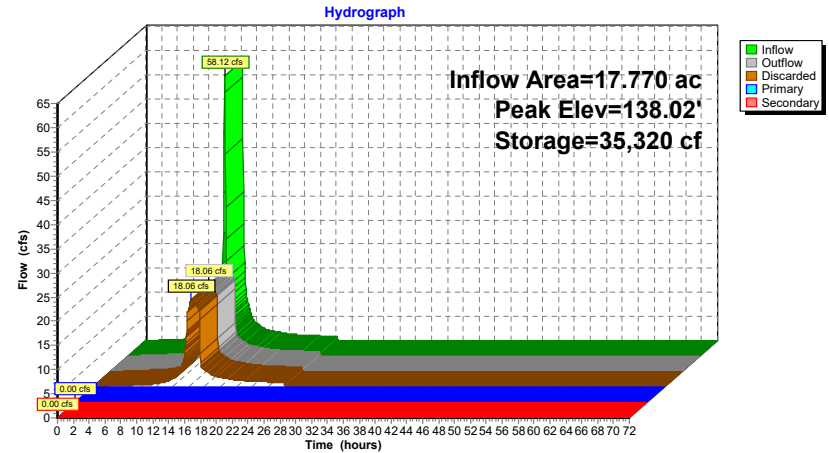
Printed 10/24/2023
Page 194

Discarded OutFlow Max=18.06 cfs @ 12.42 hrs HW=138.02' (Free Discharge)
 ↳4=Exfiltration (Controls 18.06 cfs)

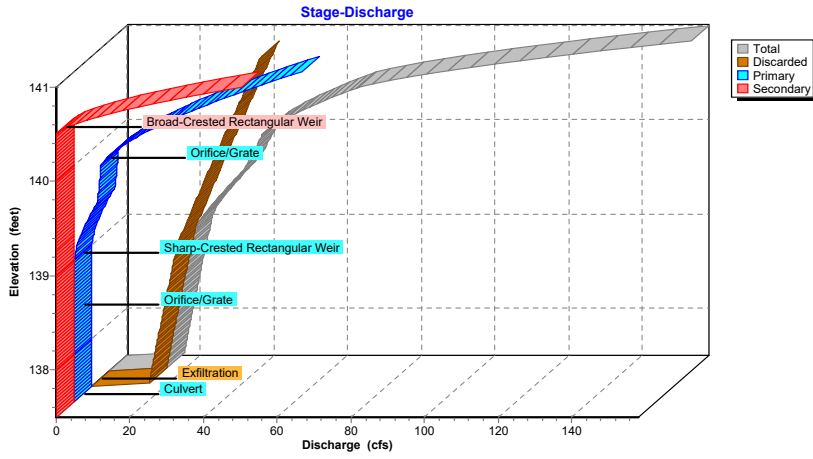
Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=137.50' (Free Discharge)
 ↳1=Culvert (Controls 0.00 cfs)
 ↳3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
 ↳2=Orifice/Grate (Controls 0.00 cfs)
 ↳5=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=137.50' (Free Discharge)
 ↳6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

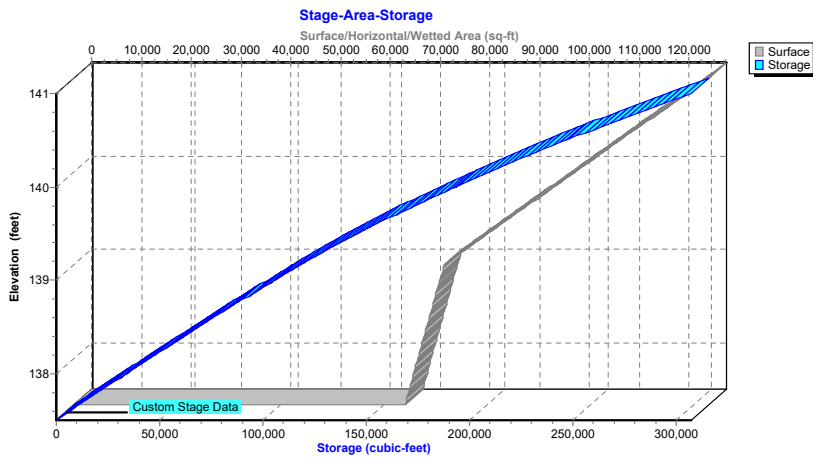
Pond 20P: Combined Aboveground Infiltration Basin 'G/H'



Pond 20P: Combined Aboveground Infiltration Basin 'G/H'



Pond 20P: Combined Aboveground Infiltration Basin 'G/H'



Hydrograph for Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	137.50	0.00	0.00	0.00	0.00
2.50	0.19	28	137.50	0.19	0.19	0.00	0.00
5.00	0.35	52	137.50	0.34	0.34	0.00	0.00
7.50	0.60	89	137.50	0.59	0.59	0.00	0.00
10.00	1.74	255	137.50	1.71	1.71	0.00	0.00
12.50	14.30	34,718	138.01	18.02	18.02	0.00	0.00
15.00	2.50	382	137.51	2.55	2.55	0.00	0.00
17.50	1.55	234	137.50	1.57	1.57	0.00	0.00
20.00	1.19	178	137.50	1.19	1.19	0.00	0.00
22.50	0.98	148	137.50	0.99	0.99	0.00	0.00
25.00	0.00	0	137.50	0.00	0.00	0.00	0.00
27.50	0.00	0	137.50	0.00	0.00	0.00	0.00
30.00	0.00	0	137.50	0.00	0.00	0.00	0.00
32.50	0.00	0	137.50	0.00	0.00	0.00	0.00
35.00	0.00	0	137.50	0.00	0.00	0.00	0.00
37.50	0.00	0	137.50	0.00	0.00	0.00	0.00
40.00	0.00	0	137.50	0.00	0.00	0.00	0.00
42.50	0.00	0	137.50	0.00	0.00	0.00	0.00
45.00	0.00	0	137.50	0.00	0.00	0.00	0.00
47.50	0.00	0	137.50	0.00	0.00	0.00	0.00
50.00	0.00	0	137.50	0.00	0.00	0.00	0.00
52.50	0.00	0	137.50	0.00	0.00	0.00	0.00
55.00	0.00	0	137.50	0.00	0.00	0.00	0.00
57.50	0.00	0	137.50	0.00	0.00	0.00	0.00
60.00	0.00	0	137.50	0.00	0.00	0.00	0.00
62.50	0.00	0	137.50	0.00	0.00	0.00	0.00
65.00	0.00	0	137.50	0.00	0.00	0.00	0.00
67.50	0.00	0	137.50	0.00	0.00	0.00	0.00
70.00	0.00	0	137.50	0.00	0.00	0.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 197

Stage-Discharge for Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
137.50	0.00	0.00	0.00	0.00
137.60	15.92	15.92	0.00	0.00
137.70	16.43	16.43	0.00	0.00
137.80	16.93	16.93	0.00	0.00
137.90	17.44	17.44	0.00	0.00
138.00	17.96	17.96	0.00	0.00
138.10	18.48	18.48	0.00	0.00
138.20	19.01	19.01	0.00	0.00
138.30	19.53	19.53	0.00	0.00
138.40	20.06	20.06	0.00	0.00
138.50	20.60	20.60	0.00	0.00
138.60	21.16	21.13	0.03	0.00
138.70	21.71	21.67	0.04	0.00
138.80	22.26	22.21	0.05	0.00
138.90	22.82	22.75	0.06	0.00
139.00	23.37	23.30	0.07	0.00
139.10	24.83	24.34	0.49	0.00
139.20	26.63	25.39	1.24	0.00
139.30	28.66	26.45	2.21	0.00
139.40	30.86	27.52	3.34	0.00
139.50	33.21	28.60	4.61	0.00
139.60	35.70	29.69	6.01	0.00
139.70	37.37	30.79	6.58	0.00
139.80	38.74	31.91	6.84	0.00
139.90	40.11	33.03	7.09	0.00
140.00	41.49	34.16	7.33	0.00
140.10	44.52	35.31	9.22	0.00
140.20	48.93	36.46	12.47	0.00
140.30	54.23	37.63	16.60	0.00
140.40	60.26	38.80	21.46	0.00
140.50	66.92	39.99	26.93	0.00
140.60	78.62	41.18	32.95	4.49
140.70	94.56	42.38	39.47	12.70
140.80	113.39	43.60	46.46	23.33
140.90	134.62	44.81	53.89	35.92
141.00	157.97	46.04	61.72	50.20

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 198

Stage-Area-Storage for Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
137.50	66,608	0	140.10	103,516	203,537
137.55	66,858	3,337	140.15	104,854	208,746
137.60	67,108	6,686	140.20	106,191	214,022
137.65	67,359	10,047	140.25	107,529	219,365
137.70	67,609	13,422	140.30	108,867	224,775
137.75	67,859	16,808	140.35	110,204	230,252
137.80	68,109	20,208	140.40	111,542	235,796
137.85	68,359	23,619	140.45	112,879	241,406
137.90	68,610	27,044	140.50	114,217	247,084
137.95	68,860	30,480	140.55	115,555	252,828
138.00	69,110	33,930	140.60	116,892	258,639
138.05	69,375	37,392	140.65	118,230	264,517
138.10	69,640	40,867	140.70	119,567	270,462
138.15	69,906	44,356	140.75	120,905	276,474
138.20	70,171	47,858	140.80	122,243	282,552
138.25	70,436	51,373	140.85	123,580	288,698
138.30	70,701	54,901	140.90	124,918	294,910
138.35	70,966	58,443	140.95	126,255	301,190
138.40	71,232	61,998	141.00	127,593	307,536
138.45	71,497	65,566			
138.50	71,762	69,148			
138.55	72,027	72,742			
138.60	72,292	76,350			
138.65	72,558	79,971			
138.70	72,823	83,606			
138.75	73,088	87,254			
138.80	73,353	90,915			
138.85	73,618	94,589			
138.90	73,884	98,277			
138.95	74,149	101,977			
139.00	74,414	105,692			
139.05	75,735	109,445			
139.10	77,057	113,265			
139.15	78,378	117,151			
139.20	79,699	121,103			
139.25	81,021	125,121			
139.30	82,342	129,205			
139.35	83,663	133,355			
139.40	84,985	137,571			
139.45	86,306	141,854			
139.50	87,628	146,202			
139.55	88,949	150,616			
139.60	90,270	155,097			
139.65	91,592	159,643			
139.70	92,913	164,256			
139.75	94,234	168,935			
139.80	95,556	173,679			
139.85	96,877	178,490			
139.90	98,198	183,367			
139.95	99,520	188,310			
140.00	100,841	193,319			
140.05	102,179	198,394			

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023
Page 199

Summary for Pond 24P: Aboveground Infiltration Basin 'C'

Inflow Area = 28.040 ac, 72.36% Impervious, Inflow Depth = 4.05" for 10-Year event
 Inflow = 103.30 cfs @ 12.19 hrs, Volume= 9.472 af
 Outflow = 21.46 cfs @ 12.63 hrs, Volume= 9.472 af, Atten= 79%, Lag= 26.6 min
 Discarded = 21.42 cfs @ 12.63 hrs, Volume= 9.471 af
 Primary = 0.04 cfs @ 12.63 hrs, Volume= 0.001 af
 Routed to Link 10L : Moodna Creek
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 156.19' @ 12.63 hrs Surf.Area= 57,042 sf Storage= 107,629 cf

Plug-Flow detention time= 35.4 min calculated for 9.466 af (100% of inflow)
 Center-of-Mass det. time= 35.4 min (805.6 - 770.2)

Volume	Invert	Avail.Storage	Storage Description
#1	154.20'	433,782 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
154.20	51,101	0	0
155.00	53,507	41,843	41,843
156.00	56,463	54,985	96,828
157.00	59,503	57,983	154,811
158.00	62,689	61,096	215,907
159.00	65,878	64,284	280,191
160.00	69,125	67,502	347,692
161.00	73,120	71,123	418,815
161.20	76,551	14,967	433,782

Device	Routing	Invert	Outlet Devices
#1	Primary	154.20'	18.0" Round 18" Round RCP L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 154.20' / 153.70' S= 0.0050 '/ Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	156.10'	12.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	160.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Discarded	154.20'	10.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 151.20'
#5	Secondary	160.50'	40.0' long x 10.0' breadth 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

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

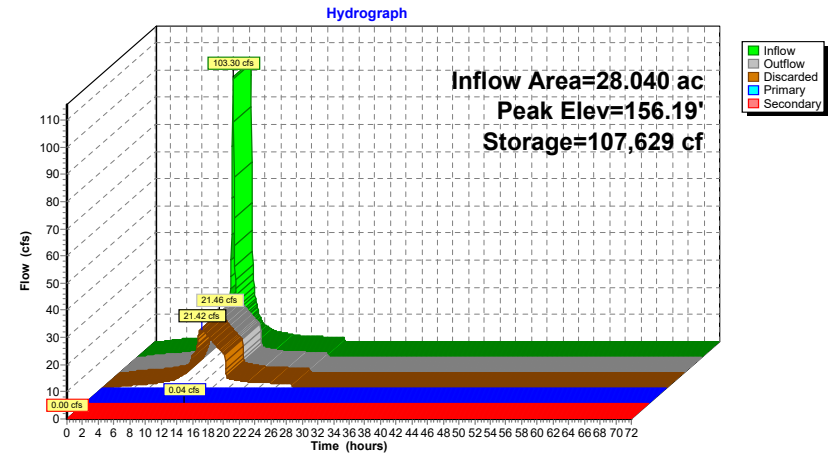
Printed 10/24/2023
Page 200

Discarded OutFlow Max=21.41 cfs @ 12.63 hrs HW=156.19' (Free Discharge)
 ↳4=Exfiltration (Controls 21.41 cfs)

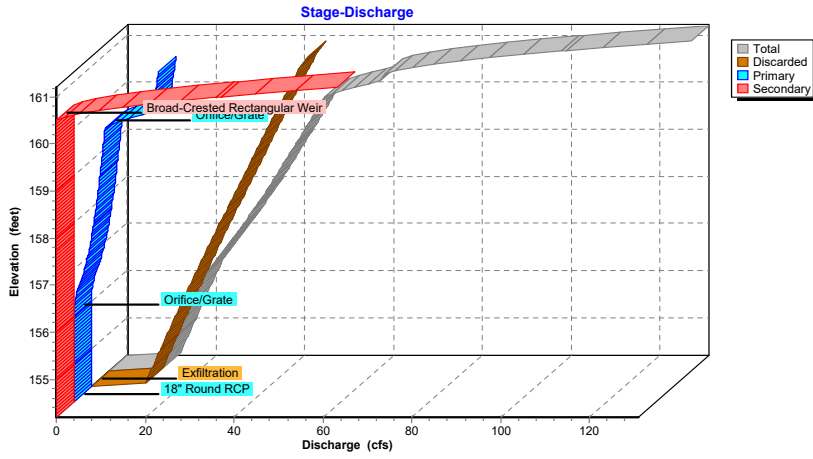
Primary OutFlow Max=0.04 cfs @ 12.63 hrs HW=156.19' (Free Discharge)
 ↳1=18" Round RCP (Passes 0.04 cfs of 7.89 cfs potential flow)
 ↳2=Orifice/Grate (Orifice Controls 0.04 cfs @ 1.02 fps)
 ↳3=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=154.20' (Free Discharge)
 ↳5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

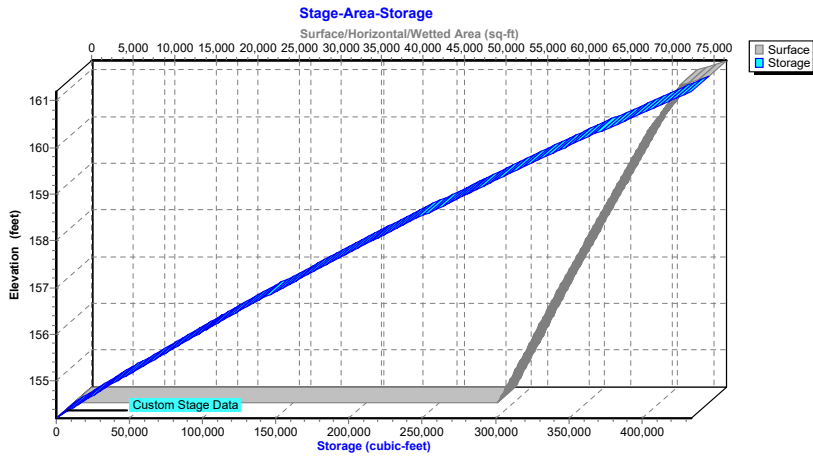
Pond 24P: Aboveground Infiltration Basin 'C'



Pond 24P: Aboveground Infiltration Basin 'C'



Pond 24P: Aboveground Infiltration Basin 'C'



Hydrograph for Pond 24P: Aboveground Infiltration Basin 'C'

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	154.20	0.00	0.00	0.00	0.00
2.50	0.72	204	154.20	0.69	0.69	0.00	0.00
5.00	1.31	382	154.21	1.30	1.30	0.00	0.00
7.50	2.14	620	154.21	2.10	2.10	0.00	0.00
10.00	4.59	1,311	154.23	4.45	4.45	0.00	0.00
12.50	28.45	106,082	156.16	21.30	21.28	0.02	0.00
15.00	4.38	25,703	154.70	14.15	14.15	0.00	0.00
17.50	2.67	803	154.22	2.72	2.72	0.00	0.00
20.00	2.03	601	154.21	2.04	2.04	0.00	0.00
22.50	1.67	498	154.21	1.69	1.69	0.00	0.00
25.00	0.00	0	154.20	0.00	0.00	0.00	0.00
27.50	0.00	0	154.20	0.00	0.00	0.00	0.00
30.00	0.00	0	154.20	0.00	0.00	0.00	0.00
32.50	0.00	0	154.20	0.00	0.00	0.00	0.00
35.00	0.00	0	154.20	0.00	0.00	0.00	0.00
37.50	0.00	0	154.20	0.00	0.00	0.00	0.00
40.00	0.00	0	154.20	0.00	0.00	0.00	0.00
42.50	0.00	0	154.20	0.00	0.00	0.00	0.00
45.00	0.00	0	154.20	0.00	0.00	0.00	0.00
47.50	0.00	0	154.20	0.00	0.00	0.00	0.00
50.00	0.00	0	154.20	0.00	0.00	0.00	0.00
52.50	0.00	0	154.20	0.00	0.00	0.00	0.00
55.00	0.00	0	154.20	0.00	0.00	0.00	0.00
57.50	0.00	0	154.20	0.00	0.00	0.00	0.00
60.00	0.00	0	154.20	0.00	0.00	0.00	0.00
62.50	0.00	0	154.20	0.00	0.00	0.00	0.00
65.00	0.00	0	154.20	0.00	0.00	0.00	0.00
67.50	0.00	0	154.20	0.00	0.00	0.00	0.00
70.00	0.00	0	154.20	0.00	0.00	0.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 203

Stage-Discharge for Pond 24P: Aboveground Infiltration Basin 'C'

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
154.20	0.00	0.00	0.00	0.00
154.40	12.76	12.76	0.00	0.00
154.60	13.70	13.70	0.00	0.00
154.80	14.65	14.65	0.00	0.00
155.00	15.60	15.60	0.00	0.00
155.20	16.56	16.56	0.00	0.00
155.40	17.53	17.53	0.00	0.00
155.60	18.50	18.50	0.00	0.00
155.80	19.48	19.48	0.00	0.00
156.00	20.47	20.47	0.00	0.00
156.20	21.51	21.46	0.04	0.00
156.40	22.84	22.47	0.37	0.00
156.60	24.42	23.47	0.95	0.00
156.80	26.16	24.48	1.67	0.00
157.00	27.91	25.50	2.40	0.00
157.20	29.46	26.53	2.93	0.00
157.40	30.95	27.56	3.38	0.00
157.60	32.38	28.60	3.78	0.00
157.80	33.79	29.64	4.14	0.00
158.00	35.17	30.69	4.47	0.00
158.20	36.53	31.74	4.78	0.00
158.40	37.87	32.80	5.07	0.00
158.60	39.21	33.86	5.35	0.00
158.80	40.53	34.92	5.61	0.00
159.00	41.85	35.99	5.86	0.00
159.20	43.16	37.06	6.10	0.00
159.40	44.47	38.14	6.33	0.00
159.60	45.77	39.22	6.55	0.00
159.80	47.07	40.31	6.76	0.00
160.00	48.37	41.40	6.97	0.00
160.20	54.38	42.53	11.85	0.00
160.40	61.38	43.66	17.72	0.00
160.60	66.00	44.79	18.06	3.15
160.80	80.92	45.93	18.39	16.60
161.00	102.99	47.08	18.72	37.19
161.20	131.01	48.84	19.04	63.13

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 204

Stage-Area-Storage for Pond 24P: Aboveground Infiltration Basin 'C'

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
154.20	51,101	0	159.40	67,177	306,802
154.30	51,402	5,125	159.50	67,502	313,536
154.40	51,702	10,280	159.60	67,826	320,302
154.50	52,003	15,466	159.70	68,151	327,101
154.60	52,304	20,681	159.80	68,476	333,932
154.70	52,605	25,926	159.90	68,800	340,796
154.80	52,905	31,202	160.00	69,125	347,692
154.90	53,206	36,508	160.10	69,524	354,625
155.00	53,507	41,843	160.20	69,924	361,597
155.10	53,803	47,209	160.30	70,323	368,609
155.20	54,098	52,604	160.40	70,723	375,662
155.30	54,394	58,028	160.50	71,123	382,754
155.40	54,689	63,482	160.60	71,522	389,886
155.50	54,985	68,966	160.70	71,921	397,058
155.60	55,281	74,479	160.80	72,321	404,271
155.70	55,576	80,022	160.90	72,720	411,523
155.80	55,872	85,595	161.00	73,120	418,815
155.90	56,167	91,197	161.10	74,836	426,212
156.00	56,463	96,828	161.20	76,551	433,782
156.10	56,767	102,490			
156.20	57,071	108,182			
156.30	57,375	113,904			
156.40	57,679	119,657			
156.50	57,983	125,440			
156.60	58,287	131,253			
156.70	58,591	137,097			
156.80	58,895	142,971			
156.90	59,199	148,876			
157.00	59,503	154,811			
157.10	59,822	160,777			
157.20	60,140	166,776			
157.30	60,459	172,805			
157.40	60,777	178,867			
157.50	61,096	184,961			
157.60	61,415	191,086			
157.70	61,733	197,244			
157.80	62,052	203,433			
157.90	62,370	209,654			
158.00	62,689	215,907			
158.10	63,008	222,192			
158.20	63,327	228,509			
158.30	63,646	234,857			
158.40	63,965	241,238			
158.50	64,284	247,650			
158.60	64,602	254,095			
158.70	64,921	260,571			
158.80	65,240	267,079			
158.90	65,559	273,619			
159.00	65,878	280,191			
159.10	66,203	286,795			
159.20	66,527	293,431			
159.30	66,852	300,100			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 205

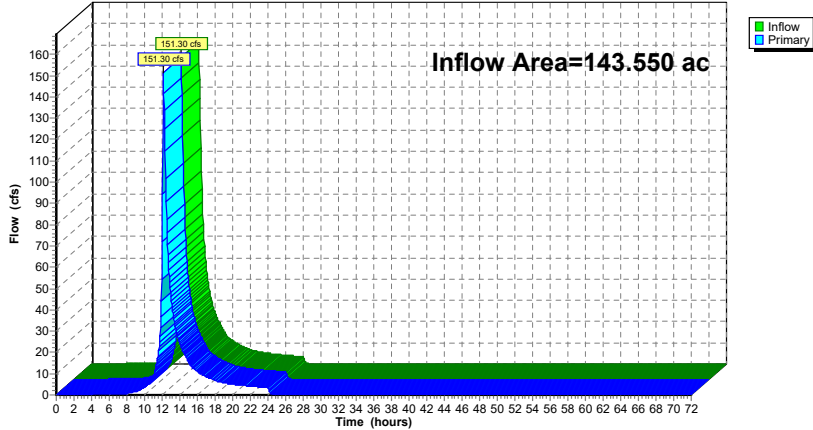
Summary for Link 10L: Moodna Creek

Inflow Area = 143.550 ac, 43.00% Impervious, Inflow Depth = 1.62" for 10-Year event
 Inflow = 151.30 cfs @ 12.16 hrs, Volume= 19.385 af
 Primary = 151.30 cfs @ 12.16 hrs, Volume= 19.385 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 22L : Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 10L: Moodna Creek

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 206

Hydrograph for Link 10L: Moodna Creek

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.01	0.00	0.01	53.00	0.00	0.00	0.00
2.00	0.13	0.00	0.13	54.00	0.00	0.00	0.00
3.00	0.20	0.00	0.20	55.00	0.00	0.00	0.00
4.00	0.26	0.00	0.26	56.00	0.00	0.00	0.00
5.00	0.31	0.00	0.31	57.00	0.00	0.00	0.00
6.00	0.35	0.00	0.35	58.00	0.00	0.00	0.00
7.00	0.44	0.00	0.44	59.00	0.00	0.00	0.00
8.00	0.80	0.00	0.80	60.00	0.00	0.00	0.00
9.00	1.68	0.00	1.68	61.00	0.00	0.00	0.00
10.00	3.73	0.00	3.73	62.00	0.00	0.00	0.00
11.00	8.93	0.00	8.93	63.00	0.00	0.00	0.00
12.00	71.95	0.00	71.95	64.00	0.00	0.00	0.00
13.00	45.93	0.00	45.93	65.00	0.00	0.00	0.00
14.00	24.10	0.00	24.10	66.00	0.00	0.00	0.00
15.00	15.53	0.00	15.53	67.00	0.00	0.00	0.00
16.00	10.98	0.00	10.98	68.00	0.00	0.00	0.00
17.00	8.64	0.00	8.64	69.00	0.00	0.00	0.00
18.00	6.86	0.00	6.86	70.00	0.00	0.00	0.00
19.00	5.77	0.00	5.77	71.00	0.00	0.00	0.00
20.00	5.09	0.00	5.09	72.00	0.00	0.00	0.00
21.00	4.62	0.00	4.62				
22.00	4.22	0.00	4.22				
23.00	3.84	0.00	3.84				
24.00	3.47	0.00	3.47				
25.00	0.05	0.00	0.05				
26.00	0.04	0.00	0.04				
27.00	0.03	0.00	0.03				
28.00	0.01	0.00	0.01				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 207

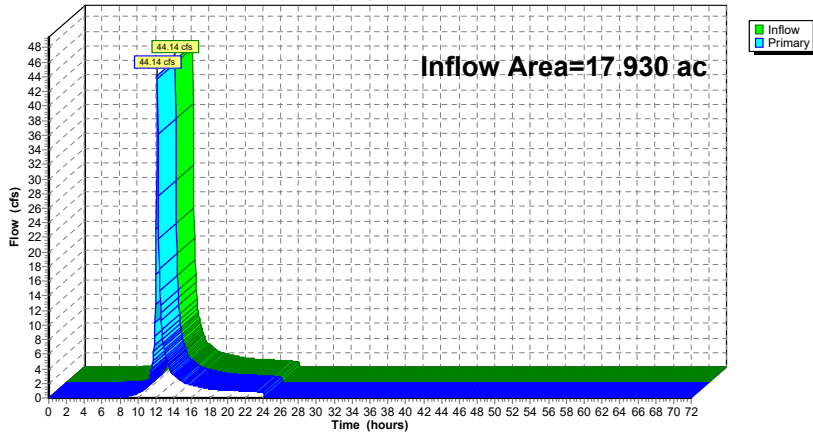
Summary for Link 11L: Route 9 Undisturbed Total

Inflow Area = 17.930 ac, 4.96% Impervious, Inflow Depth = 2.40" for 10-Year event
 Inflow = 44.14 cfs @ 12.18 hrs, Volume= 3.593 af
 Primary = 44.14 cfs @ 12.18 hrs, Volume= 3.593 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 21L : Route 9 Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 11L: Route 9 Undisturbed Total

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 208

Hydrograph for Link 11L: Route 9 Undisturbed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.02	0.00	0.02	54.00	0.00	0.00	0.00
3.00	0.04	0.00	0.04	55.00	0.00	0.00	0.00
4.00	0.05	0.00	0.05	56.00	0.00	0.00	0.00
5.00	0.06	0.00	0.06	57.00	0.00	0.00	0.00
6.00	0.06	0.00	0.06	58.00	0.00	0.00	0.00
7.00	0.08	0.00	0.08	59.00	0.00	0.00	0.00
8.00	0.11	0.00	0.11	60.00	0.00	0.00	0.00
9.00	0.28	0.00	0.28	61.00	0.00	0.00	0.00
10.00	0.68	0.00	0.68	62.00	0.00	0.00	0.00
11.00	1.87	0.00	1.87	63.00	0.00	0.00	0.00
12.00	16.93	0.00	16.93	64.00	0.00	0.00	0.00
13.00	6.37	0.00	6.37	65.00	0.00	0.00	0.00
14.00	3.18	0.00	3.18	66.00	0.00	0.00	0.00
15.00	2.24	0.00	2.24	67.00	0.00	0.00	0.00
16.00	1.82	0.00	1.82	68.00	0.00	0.00	0.00
17.00	1.54	0.00	1.54	69.00	0.00	0.00	0.00
18.00	1.25	0.00	1.25	70.00	0.00	0.00	0.00
19.00	1.14	0.00	1.14	71.00	0.00	0.00	0.00
20.00	1.07	0.00	1.07	72.00	0.00	0.00	0.00
21.00	1.00	0.00	1.00				
22.00	0.93	0.00	0.93				
23.00	0.86	0.00	0.86				
24.00	0.79	0.00	0.79				
25.00	0.00	0.00	0.00				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 209

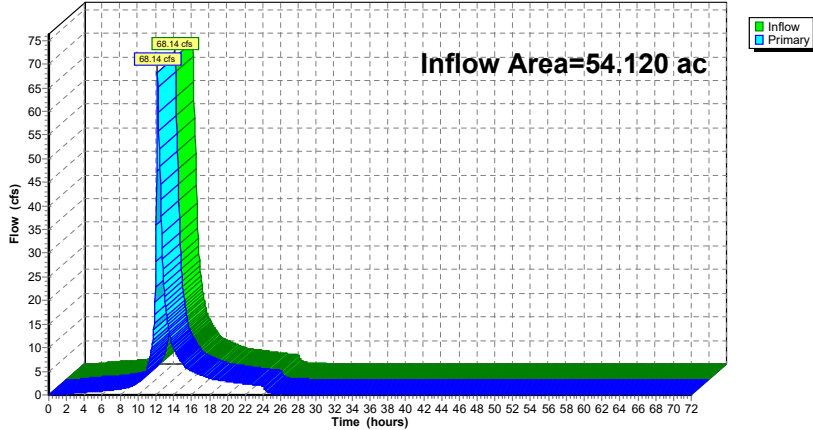
Summary for Link 21L: Route 9 Total

Inflow Area = 54.120 ac, 39.23% Impervious, Inflow Depth = 2.17" for 10-Year event
 Inflow = 68.14 cfs @ 12.21 hrs, Volume= 9.799 af
 Primary = 68.14 cfs @ 12.21 hrs, Volume= 9.799 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 22L : Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 21L: Route 9 Total

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 210

Hydrograph for Link 21L: Route 9 Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.01	0.00	0.01	53.00	0.00	0.00	0.00
2.00	0.20	0.00	0.20	54.00	0.00	0.00	0.00
3.00	0.40	0.00	0.40	55.00	0.00	0.00	0.00
4.00	0.57	0.00	0.57	56.00	0.00	0.00	0.00
5.00	0.70	0.00	0.70	57.00	0.00	0.00	0.00
6.00	0.81	0.00	0.81	58.00	0.00	0.00	0.00
7.00	1.00	0.00	1.00	59.00	0.00	0.00	0.00
8.00	1.28	0.00	1.28	60.00	0.00	0.00	0.00
9.00	1.73	0.00	1.73	61.00	0.00	0.00	0.00
10.00	2.74	0.00	2.74	62.00	0.00	0.00	0.00
11.00	5.50	0.00	5.50	63.00	0.00	0.00	0.00
12.00	28.25	0.00	28.25	64.00	0.00	0.00	0.00
13.00	20.73	0.00	20.73	65.00	0.00	0.00	0.00
14.00	9.82	0.00	9.82	66.00	0.00	0.00	0.00
15.00	6.66	0.00	6.66	67.00	0.00	0.00	0.00
16.00	5.10	0.00	5.10	68.00	0.00	0.00	0.00
17.00	4.28	0.00	4.28	69.00	0.00	0.00	0.00
18.00	3.57	0.00	3.57	70.00	0.00	0.00	0.00
19.00	3.14	0.00	3.14	71.00	0.00	0.00	0.00
20.00	2.88	0.00	2.88	72.00	0.00	0.00	0.00
21.00	2.64	0.00	2.64				
22.00	2.40	0.00	2.40				
23.00	2.17	0.00	2.17				
24.00	1.95	0.00	1.95				
25.00	0.35	0.00	0.35				
26.00	0.19	0.00	0.19				
27.00	0.12	0.00	0.12				
28.00	0.08	0.00	0.08				
29.00	0.06	0.00	0.06				
30.00	0.04	0.00	0.04				
31.00	0.04	0.00	0.04				
32.00	0.03	0.00	0.03				
33.00	0.02	0.00	0.02				
34.00	0.02	0.00	0.02				
35.00	0.01	0.00	0.01				
36.00	0.01	0.00	0.01				
37.00	0.01	0.00	0.01				
38.00	0.01	0.00	0.01				
39.00	0.01	0.00	0.01				
40.00	0.01	0.00	0.01				
41.00	0.01	0.00	0.01				
42.00	0.01	0.00	0.01				
43.00	0.01	0.00	0.01				
44.00	0.01	0.00	0.01				
45.00	0.01	0.00	0.01				
46.00	0.01	0.00	0.01				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 211

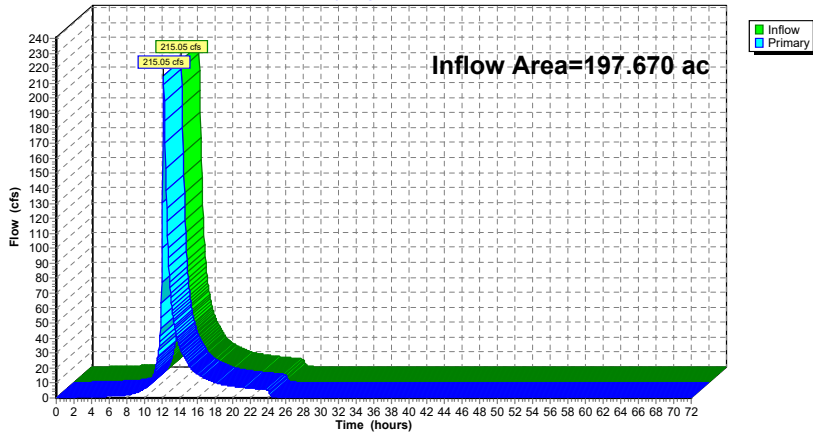
Summary for Link 22L: Total

Inflow Area = 197.670 ac, 41.97% Impervious, Inflow Depth = 1.77" for 10-Year event
 Inflow = 215.05 cfs @ 12.17 hrs, Volume= 29.183 af
 Primary = 215.05 cfs @ 12.17 hrs, Volume= 29.183 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 22L: Total

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 212

Hydrograph for Link 22L: Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.02	0.00	0.02	53.00	0.00	0.00	0.00
2.00	0.33	0.00	0.33	54.00	0.00	0.00	0.00
3.00	0.60	0.00	0.60	55.00	0.00	0.00	0.00
4.00	0.83	0.00	0.83	56.00	0.00	0.00	0.00
5.00	1.01	0.00	1.01	57.00	0.00	0.00	0.00
6.00	1.16	0.00	1.16	58.00	0.00	0.00	0.00
7.00	1.45	0.00	1.45	59.00	0.00	0.00	0.00
8.00	2.08	0.00	2.08	60.00	0.00	0.00	0.00
9.00	3.41	0.00	3.41	61.00	0.00	0.00	0.00
10.00	6.48	0.00	6.48	62.00	0.00	0.00	0.00
11.00	14.43	0.00	14.43	63.00	0.00	0.00	0.00
12.00	100.20	0.00	100.20	64.00	0.00	0.00	0.00
13.00	66.66	0.00	66.66	65.00	0.00	0.00	0.00
14.00	33.91	0.00	33.91	66.00	0.00	0.00	0.00
15.00	22.18	0.00	22.18	67.00	0.00	0.00	0.00
16.00	16.08	0.00	16.08	68.00	0.00	0.00	0.00
17.00	12.92	0.00	12.92	69.00	0.00	0.00	0.00
18.00	10.42	0.00	10.42	70.00	0.00	0.00	0.00
19.00	8.91	0.00	8.91	71.00	0.00	0.00	0.00
20.00	7.97	0.00	7.97	72.00	0.00	0.00	0.00
21.00	7.26	0.00	7.26				
22.00	6.62	0.00	6.62				
23.00	6.02	0.00	6.02				
24.00	5.41	0.00	5.41				
25.00	0.40	0.00	0.40				
26.00	0.24	0.00	0.24				
27.00	0.15	0.00	0.15				
28.00	0.10	0.00	0.10				
29.00	0.06	0.00	0.06				
30.00	0.04	0.00	0.04				
31.00	0.04	0.00	0.04				
32.00	0.03	0.00	0.03				
33.00	0.02	0.00	0.02				
34.00	0.02	0.00	0.02				
35.00	0.01	0.00	0.01				
36.00	0.01	0.00	0.01				
37.00	0.01	0.00	0.01				
38.00	0.01	0.00	0.01				
39.00	0.01	0.00	0.01				
40.00	0.01	0.00	0.01				
41.00	0.01	0.00	0.01				
42.00	0.01	0.00	0.01				
43.00	0.01	0.00	0.01				
44.00	0.01	0.00	0.01				
45.00	0.01	0.00	0.01				
46.00	0.01	0.00	0.01				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 213

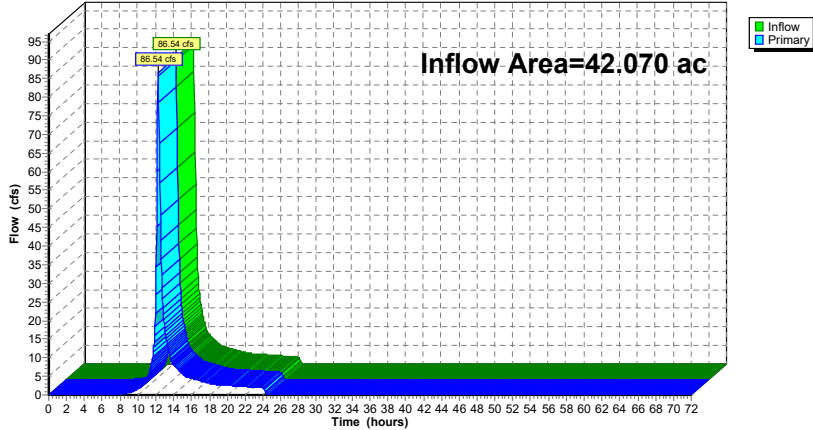
Summary for Link 30L: Moodna Creek Undisturbed Total

Inflow Area = 42.070 ac, 3.33% Impervious, Inflow Depth = 2.51" for 10-Year event
 Inflow = 86.54 cfs @ 12.28 hrs, Volume= 8.789 af
 Primary = 86.54 cfs @ 12.28 hrs, Volume= 8.789 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 10L : Moodna Creek

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 30L: Moodna Creek Undisturbed Total

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 214

Hydrograph for Link 30L: Moodna Creek Undisturbed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.03	0.00	0.03	54.00	0.00	0.00	0.00
3.00	0.06	0.00	0.06	55.00	0.00	0.00	0.00
4.00	0.08	0.00	0.08	56.00	0.00	0.00	0.00
5.00	0.09	0.00	0.09	57.00	0.00	0.00	0.00
6.00	0.10	0.00	0.10	58.00	0.00	0.00	0.00
7.00	0.13	0.00	0.13	59.00	0.00	0.00	0.00
8.00	0.17	0.00	0.17	60.00	0.00	0.00	0.00
9.00	0.62	0.00	0.62	61.00	0.00	0.00	0.00
10.00	1.65	0.00	1.65	62.00	0.00	0.00	0.00
11.00	4.21	0.00	4.21	63.00	0.00	0.00	0.00
12.00	26.93	0.00	26.93	64.00	0.00	0.00	0.00
13.00	17.81	0.00	17.81	65.00	0.00	0.00	0.00
14.00	8.06	0.00	8.06	66.00	0.00	0.00	0.00
15.00	5.69	0.00	5.69	67.00	0.00	0.00	0.00
16.00	4.47	0.00	4.47	68.00	0.00	0.00	0.00
17.00	3.80	0.00	3.80	69.00	0.00	0.00	0.00
18.00	3.12	0.00	3.12	70.00	0.00	0.00	0.00
19.00	2.77	0.00	2.77	71.00	0.00	0.00	0.00
20.00	2.61	0.00	2.61	72.00	0.00	0.00	0.00
21.00	2.44	0.00	2.44				
22.00	2.27	0.00	2.27				
23.00	2.09	0.00	2.09				
24.00	1.91	0.00	1.91				
25.00	0.00	0.00	0.00				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 215

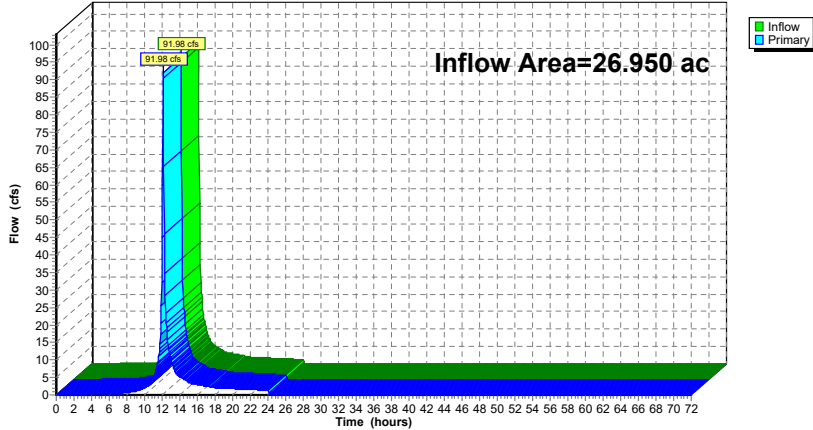
Summary for Link 34L: Moodna Creek Undetained Total

Inflow Area = 26.950 ac, 12.39% Impervious, Inflow Depth = 2.95" for 10-Year event
 Inflow = 91.98 cfs @ 12.13 hrs, Volume= 6.617 af
 Primary = 91.98 cfs @ 12.13 hrs, Volume= 6.617 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 10L : Moodna Creek

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 34L: Moodna Creek Undetained Total

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 216

Hydrograph for Link 34L: Moodna Creek Undetained Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.01	0.00	0.01	53.00	0.00	0.00	0.00
2.00	0.09	0.00	0.09	54.00	0.00	0.00	0.00
3.00	0.14	0.00	0.14	55.00	0.00	0.00	0.00
4.00	0.18	0.00	0.18	56.00	0.00	0.00	0.00
5.00	0.22	0.00	0.22	57.00	0.00	0.00	0.00
6.00	0.24	0.00	0.24	58.00	0.00	0.00	0.00
7.00	0.31	0.00	0.31	59.00	0.00	0.00	0.00
8.00	0.64	0.00	0.64	60.00	0.00	0.00	0.00
9.00	1.06	0.00	1.06	61.00	0.00	0.00	0.00
10.00	2.09	0.00	2.09	62.00	0.00	0.00	0.00
11.00	4.73	0.00	4.73	63.00	0.00	0.00	0.00
12.00	45.02	0.00	45.02	64.00	0.00	0.00	0.00
13.00	10.23	0.00	10.23	65.00	0.00	0.00	0.00
14.00	5.26	0.00	5.26	66.00	0.00	0.00	0.00
15.00	3.63	0.00	3.63	67.00	0.00	0.00	0.00
16.00	2.99	0.00	2.99	68.00	0.00	0.00	0.00
17.00	2.53	0.00	2.53	69.00	0.00	0.00	0.00
18.00	2.05	0.00	2.05	70.00	0.00	0.00	0.00
19.00	1.88	0.00	1.88	71.00	0.00	0.00	0.00
20.00	1.76	0.00	1.76	72.00	0.00	0.00	0.00
21.00	1.64	0.00	1.64				
22.00	1.52	0.00	1.52				
23.00	1.40	0.00	1.40				
24.00	1.29	0.00	1.29				
25.00	0.00	0.00	0.00				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 217

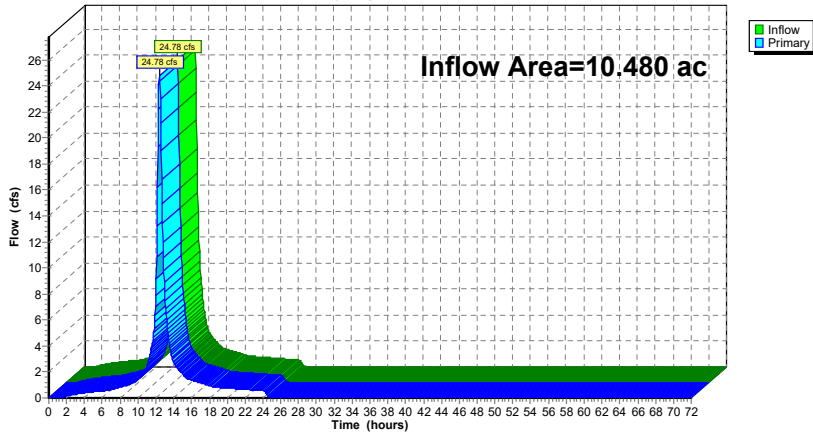
Summary for Link 39L: Route 9 Undetained Total

Inflow Area = 10.480 ac, 71.95% Impervious, Inflow Depth = 4.01" for 10-Year event
 Inflow = 24.78 cfs @ 12.41 hrs, Volume= 3.506 af
 Primary = 24.78 cfs @ 12.41 hrs, Volume= 3.506 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 21L : Route 9 Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 39L: Route 9 Undetained Total

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 10-Year Rainfall=4.80"

Printed 10/24/2023

Page 218

Hydrograph for Link 39L: Route 9 Undetained Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00
2.00	0.16	0.00	0.16	54.00	0.00	0.00	0.00
3.00	0.29	0.00	0.29	55.00	0.00	0.00	0.00
4.00	0.39	0.00	0.39	56.00	0.00	0.00	0.00
5.00	0.47	0.00	0.47	57.00	0.00	0.00	0.00
6.00	0.53	0.00	0.53	58.00	0.00	0.00	0.00
7.00	0.65	0.00	0.65	59.00	0.00	0.00	0.00
8.00	0.84	0.00	0.84	60.00	0.00	0.00	0.00
9.00	1.04	0.00	1.04	61.00	0.00	0.00	0.00
10.00	1.50	0.00	1.50	62.00	0.00	0.00	0.00
11.00	2.42	0.00	2.42	63.00	0.00	0.00	0.00
12.00	7.92	0.00	7.92	64.00	0.00	0.00	0.00
13.00	8.12	0.00	8.12	65.00	0.00	0.00	0.00
14.00	2.74	0.00	2.74	66.00	0.00	0.00	0.00
15.00	1.84	0.00	1.84	67.00	0.00	0.00	0.00
16.00	1.37	0.00	1.37	68.00	0.00	0.00	0.00
17.00	1.16	0.00	1.16	69.00	0.00	0.00	0.00
18.00	0.95	0.00	0.95	70.00	0.00	0.00	0.00
19.00	0.82	0.00	0.82	71.00	0.00	0.00	0.00
20.00	0.77	0.00	0.77	72.00	0.00	0.00	0.00
21.00	0.72	0.00	0.72				
22.00	0.66	0.00	0.66				
23.00	0.61	0.00	0.61				
24.00	0.56	0.00	0.56				
25.00	0.02	0.00	0.02				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 219

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment4S: SA North Undetained	Runoff Area=23.610 ac 0.00% Impervious Runoff Depth=6.16" Tc=6.0 min CN=WQ Runoff=171.77 cfs 12.119 af
Subcatchment5S: North-Buildings	Runoff Area=3.340 ac 100.00% Impervious Runoff Depth=8.33" Flow Length=2,657' Tc=9.5 min CN=98 Runoff=25.50 cfs 2.318 af
Subcatchment6S: SA AG INF Basin B	Runoff Area=23.070 ac 100.00% Impervious Runoff Depth=8.33" Flow Length=3,078' Tc=9.2 min CN=WQ Runoff=178.44 cfs 16.014 af
Subcatchment7S: SA AG DET Basin A	Runoff Area=13.630 ac 100.00% Impervious Runoff Depth=8.33" Flow Length=3,025' Tc=19.6 min CN=WQ Runoff=78.67 cfs 9.461 af
Subcatchment9S: Route 9W Undisturbed	Runoff Area=17.040 ac 0.00% Impervious Runoff Depth=5.56" Flow Length=1,066' Tc=10.5 min CN=WQ Runoff=97.03 cfs 7.889 af
Subcatchment11S: SA South (Rt 9)	Runoff Area=7.540 ac 100.00% Impervious Runoff Depth=8.33" Flow Length=762' Tc=29.9 min CN=98 Runoff=35.54 cfs 5.234 af
Subcatchment14S: SA UG DET Basin E	Runoff Area=3.960 ac 100.00% Impervious Runoff Depth=8.33" Tc=6.0 min CN=WQ Runoff=33.81 cfs 2.749 af
Subcatchment15S: SA UG Det Basin F	Runoff Area=3.510 ac 100.00% Impervious Runoff Depth=8.33" Flow Length=1,606' Tc=8.2 min CN=98 Runoff=28.23 cfs 2.436 af
Subcatchment19S: SA AG INF Basin G/H	Runoff Area=5.330 ac 100.00% Impervious Runoff Depth=8.33" Flow Length=2,565' Tc=9.4 min CN=98 Runoff=40.80 cfs 3.700 af
Subcatchment23S: SA AG INF Basin C	Runoff Area=20.290 ac 100.00% Impervious Runoff Depth=8.33" Flow Length=2,126' Tc=11.2 min CN=WQ Runoff=146.71 cfs 14.084 af
Subcatchment24S: SA UG DET Basin E	Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=6.16" Tc=0.0 min CN=80 Runoff=0.59 cfs 0.036 af
Subcatchment28S: Moodna Creek	Runoff Area=40.670 ac 0.00% Impervious Runoff Depth=5.77" Flow Length=941' Tc=18.3 min CN=WQ Runoff=192.64 cfs 19.553 af
Subcatchment29S: Moodna Creek	Runoff Area=1.400 ac 100.00% Impervious Runoff Depth=8.33" Flow Length=941' Tc=18.3 min CN=98 Runoff=8.34 cfs 0.972 af
Subcatchment31S: SA AG INF Basin B Perv.	Runoff Area=5.920 ac 0.00% Impervious Runoff Depth=6.16" Flow Length=3,078' Tc=9.2 min CN=80 Runoff=38.80 cfs 3.040 af
Subcatchment32S: SA AS INF Basin C Perv.	Runoff Area=7.750 ac 0.00% Impervious Runoff Depth=6.16" Flow Length=2,126' Tc=11.2 min CN=80 Runoff=47.44 cfs 3.979 af
Subcatchment33S: SA AG DET Basin A	Runoff Area=3.870 ac 0.00% Impervious Runoff Depth=6.14" Flow Length=3,025' Tc=19.6 min CN=WQ Runoff=18.73 cfs 1.982 af

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 220

Subcatchment36S: SA UG Det Basin F Perv.	Runoff Area=0.400 ac 0.00% Impervious Runoff Depth=5.58" Flow Length=1,606' Tc=8.2 min CN=WQ Runoff=2.51 cfs 0.186 af
Subcatchment37S: SA AG INF Basin G/H	Runoff Area=12.440 ac 0.00% Impervious Runoff Depth=6.04" Flow Length=2,565' Tc=9.4 min CN=WQ Runoff=79.28 cfs 6.261 af
Subcatchment38S: SA South (Rt 9)	Runoff Area=2.940 ac 0.00% Impervious Runoff Depth=6.00" Flow Length=762' Tc=29.9 min CN=WQ Runoff=11.32 cfs 1.470 af
Subcatchment40S: Route 9W	Runoff Area=0.890 ac 100.00% Impervious Runoff Depth=8.33" Flow Length=1,066' Tc=10.5 min CN=98 Runoff=6.54 cfs 0.618 af
Pond 8P: Aboveground Infiltration	Peak Elev=147.86' Storage=353,575 cf Inflow=217.23 cfs 19.054 af Discarded=7.77 cfs 11.680 af Primary=33.54 cfs 7.374 af Secondary=0.00 cfs 0.000 af Outflow=41.31 cfs 19.054 af
Pond 9P: Aboveground Infiltration	Peak Elev=199.46' Storage=160,983 cf Inflow=97.38 cfs 11.443 af Discarded=1.14 cfs 3.426 af Primary=78.83 cfs 8.017 af Secondary=0.00 cfs 0.000 af Outflow=79.97 cfs 11.443 af
Pond 17P: Underground Detention Basin 'E'	Peak Elev=223.54' Storage=0.989 af Inflow=34.08 cfs 2.785 af Outflow=24.78 cfs 2.551 af
Pond 18P: Underground Detention Basin 'F'	Peak Elev=192.69' Storage=0.859 af Inflow=30.74 cfs 2.623 af Outflow=5.59 cfs 2.623 af
Pond 20P: Combined Aboveground	Peak Elev=139.06' Storage=110,285 cf Inflow=120.07 cfs 9.961 af Discarded=23.93 cfs 9.948 af Primary=0.28 cfs 0.012 af Secondary=0.00 cfs 0.000 af Outflow=24.21 cfs 9.961 af
Pond 24P: Aboveground Infiltration	Peak Elev=158.40' Storage=241,394 cf Inflow=194.13 cfs 18.064 af Discarded=32.81 cfs 17.284 af Primary=5.08 cfs 0.780 af Secondary=0.00 cfs 0.000 af Outflow=37.89 cfs 18.064 af
Link 10L: Moodna Creek	Inflow=382.84 cfs 51.133 af Primary=382.84 cfs 51.133 af
Link 11L: Route 9 Undisturbed Total	Inflow=103.57 cfs 8.507 af Primary=103.57 cfs 8.507 af
Link 21L: Route 9 Total	Inflow=162.74 cfs 20.397 af Primary=162.74 cfs 20.397 af
Link 22L: Total	Inflow=544.19 cfs 71.530 af Primary=544.19 cfs 71.530 af
Link 30L: Moodna Creek Undisturbed Total	Inflow=200.98 cfs 20.525 af Primary=200.98 cfs 20.525 af
Link 34L: Moodna Creek Undetained Total	Inflow=196.04 cfs 14.437 af Primary=196.04 cfs 14.437 af
Link 39L: Route 9 Undetained Total	Inflow=46.85 cfs 6.704 af Primary=46.85 cfs 6.704 af

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 221

**Total Runoff Area = 197.670 ac Runoff Volume = 114.101 af Average Runoff Depth = 6.93"
58.03% Pervious = 114.710 ac 41.97% Impervious = 82.960 ac**

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 222

Summary for Subcatchment 4S: SA North Undetained

Runoff = 171.77 cfs @ 12.13 hrs, Volume= 12.119 af, Depth= 6.16"
Routed to Link 34L : Moodna Creek Undetained Total

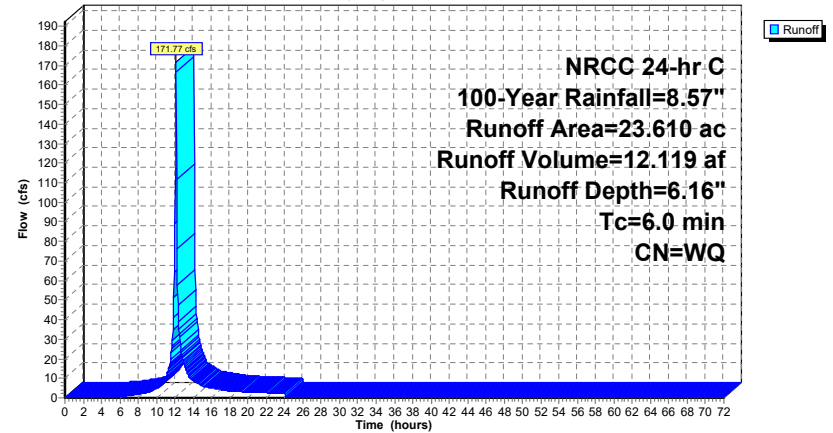
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
0.060	74	>75% Grass cover, Good, HSG C
23.550	80	>75% Grass cover, Good, HSG D
23.610		Weighted Average
23.610		100.00% Pervious Area

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

Subcatchment 4S: SA North Undetained

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 223

Hydrograph for Subcatchment 4S: SA North Undetained

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	6.16	0.00
1.00	0.10	0.00	0.00	53.00	8.57	6.16	0.00
2.00	0.21	0.00	0.00	54.00	8.57	6.16	0.00
3.00	0.33	0.00	0.00	55.00	8.57	6.16	0.00
4.00	0.45	0.00	0.00	56.00	8.57	6.16	0.00
5.00	0.59	0.00	0.19	57.00	8.57	6.16	0.00
6.00	0.74	0.02	0.55	58.00	8.57	6.16	0.00
7.00	0.91	0.06	1.11	59.00	8.57	6.16	0.00
8.00	1.11	0.12	1.84	60.00	8.57	6.16	0.00
9.00	1.36	0.22	2.71	61.00	8.57	6.16	0.00
10.00	1.69	0.39	4.91	62.00	8.57	6.16	0.00
11.00	2.21	0.69	10.27	63.00	8.57	6.16	0.00
12.00	4.08	2.11	89.14	64.00	8.57	6.16	0.00
13.00	6.36	4.11	17.59	65.00	8.57	6.16	0.00
14.00	6.88	4.58	9.01	66.00	8.57	6.16	0.00
15.00	7.21	4.89	6.17	67.00	8.57	6.16	0.00
16.00	7.46	5.12	5.08	68.00	8.57	6.16	0.00
17.00	7.66	5.31	4.27	69.00	8.57	6.16	0.00
18.00	7.83	5.47	3.46	70.00	8.57	6.16	0.00
19.00	7.98	5.61	3.16	71.00	8.57	6.16	0.00
20.00	8.12	5.73	2.96	72.00	8.57	6.16	0.00
21.00	8.24	5.85	2.76				
22.00	8.36	5.97	2.55				
23.00	8.47	6.07	2.35				
24.00	8.57	6.16	2.16				
25.00	8.57	6.16	0.00				
26.00	8.57	6.16	0.00				
27.00	8.57	6.16	0.00				
28.00	8.57	6.16	0.00				
29.00	8.57	6.16	0.00				
30.00	8.57	6.16	0.00				
31.00	8.57	6.16	0.00				
32.00	8.57	6.16	0.00				
33.00	8.57	6.16	0.00				
34.00	8.57	6.16	0.00				
35.00	8.57	6.16	0.00				
36.00	8.57	6.16	0.00				
37.00	8.57	6.16	0.00				
38.00	8.57	6.16	0.00				
39.00	8.57	6.16	0.00				
40.00	8.57	6.16	0.00				
41.00	8.57	6.16	0.00				
42.00	8.57	6.16	0.00				
43.00	8.57	6.16	0.00				
44.00	8.57	6.16	0.00				
45.00	8.57	6.16	0.00				
46.00	8.57	6.16	0.00				
47.00	8.57	6.16	0.00				
48.00	8.57	6.16	0.00				
49.00	8.57	6.16	0.00				
50.00	8.57	6.16	0.00				
51.00	8.57	6.16	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 224

Summary for Subcatchment 5S: North-Buildings

[47] Hint: Peak is 515% of capacity of segment #3

[47] Hint: Peak is 317% of capacity of segment #4

[47] Hint: Peak is 147% of capacity of segment #5

Runoff = 25.50 cfs @ 12.16 hrs, Volume= 2.318 af, Depth= 8.33"
Routed to Link 34L : Moodna Creek Undetained Total

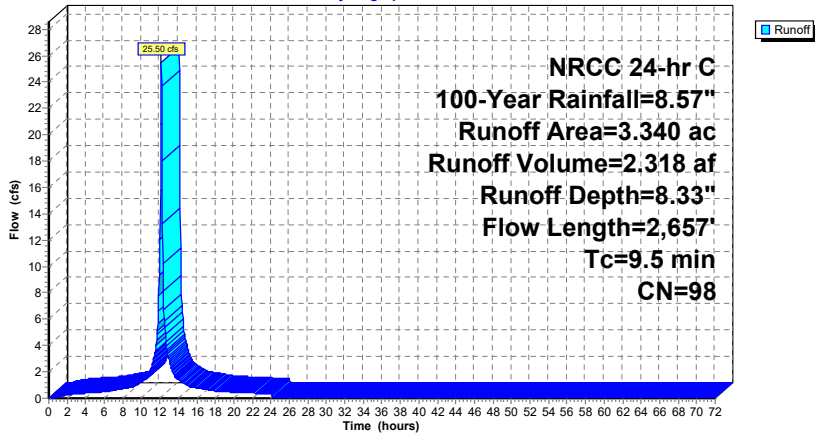
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
3.340	98	Building B
3.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	100	0.0100	0.86		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
2.2	267	0.0100	2.03		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
0.1	15	0.0050	4.03	4.95	Pipe Channel, CD 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
0.4	108	0.0050	4.55	8.05	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.5	162	0.0050	5.52	17.33	Pipe Channel, EF 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
3.2	1,374	0.0050	7.23	51.09	Pipe Channel, FG 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
1.0	535	0.0050	8.76	110.04	Pipe Channel, GH 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012
0.2	96	0.3300	6.86	56.94	Channel Flow, HI Area= 8.3 sf Perim= 20.1' r= 0.41' n= 0.069 Riprap, 6-inch
9.5	2,657	Total			

Subcatchment 5S: North-Buildings

Hydrograph



Hydrograph for Subcatchment 5S: North-Buildings

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	8.33	0.00
1.00	0.10	0.01	0.11	53.00	8.57	8.33	0.00
2.00	0.21	0.08	0.25	54.00	8.57	8.33	0.00
3.00	0.33	0.17	0.33	55.00	8.57	8.33	0.00
4.00	0.45	0.28	0.39	56.00	8.57	8.33	0.00
5.00	0.59	0.40	0.44	57.00	8.57	8.33	0.00
6.00	0.74	0.54	0.47	58.00	8.57	8.33	0.00
7.00	0.91	0.70	0.60	59.00	8.57	8.33	0.00
8.00	1.11	0.90	0.72	60.00	8.57	8.33	0.00
9.00	1.36	1.14	0.85	61.00	8.57	8.33	0.00
10.00	1.69	1.47	1.26	62.00	8.57	8.33	0.00
11.00	2.21	1.98	2.17	63.00	8.57	8.33	0.00
12.00	4.08	3.85	12.06	64.00	8.57	8.33	0.00
13.00	6.36	6.12	2.89	65.00	8.57	8.33	0.00
14.00	6.88	6.64	1.41	66.00	8.57	8.33	0.00
15.00	7.21	6.97	0.97	67.00	8.57	8.33	0.00
16.00	7.46	7.22	0.78	68.00	8.57	8.33	0.00
17.00	7.66	7.42	0.65	69.00	8.57	8.33	0.00
18.00	7.83	7.60	0.53	70.00	8.57	8.33	0.00
19.00	7.98	7.74	0.48	71.00	8.57	8.33	0.00
20.00	8.12	7.88	0.45	72.00	8.57	8.33	0.00
21.00	8.24	8.00	0.42				
22.00	8.36	8.12	0.39				
23.00	8.47	8.23	0.35				
24.00	8.57	8.33	0.32				
25.00	8.57	8.33	0.00				
26.00	8.57	8.33	0.00				
27.00	8.57	8.33	0.00				
28.00	8.57	8.33	0.00				
29.00	8.57	8.33	0.00				
30.00	8.57	8.33	0.00				
31.00	8.57	8.33	0.00				
32.00	8.57	8.33	0.00				
33.00	8.57	8.33	0.00				
34.00	8.57	8.33	0.00				
35.00	8.57	8.33	0.00				
36.00	8.57	8.33	0.00				
37.00	8.57	8.33	0.00				
38.00	8.57	8.33	0.00				
39.00	8.57	8.33	0.00				
40.00	8.57	8.33	0.00				
41.00	8.57	8.33	0.00				
42.00	8.57	8.33	0.00				
43.00	8.57	8.33	0.00				
44.00	8.57	8.33	0.00				
45.00	8.57	8.33	0.00				
46.00	8.57	8.33	0.00				
47.00	8.57	8.33	0.00				
48.00	8.57	8.33	0.00				
49.00	8.57	8.33	0.00				
50.00	8.57	8.33	0.00				
51.00	8.57	8.33	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 227

Summary for Subcatchment 6S: SA AG INF Basin B Imp.

[47] Hint: Peak is 2218% of capacity of segment #3

[47] Hint: Peak is 642% of capacity of segment #4

[47] Hint: Peak is 1462% of capacity of segment #5

[47] Hint: Peak is 1109% of capacity of segment #6

[47] Hint: Peak is 784% of capacity of segment #7

Runoff = 178.44 cfs @ 12.16 hrs, Volume= 16.014 af, Depth= 8.33"
Routed to Pond 8P : Aboveground Infiltration Basin 'B'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
* 10.265	98	Impervious
* 8.645	98	Building C North
* 4.160	98	Building A South Half
23.070		Weighted Average
23.070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0145	1.00		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
1.1	159	0.0145	2.44		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
3.3	902	0.0050	4.55	8.05	Pipe Channel, CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.3	282	0.0596	15.72	27.78	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.9	360	0.0115	6.91	12.20	Pipe Channel, EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	449	0.0200	9.11	16.09	Pipe Channel, FG 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
1.1	826	0.0400	12.88	22.76	Pipe Channel, GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
9.2	3,078	Total			

2023-09 Proposed

Prepared by Dynamic Engineering

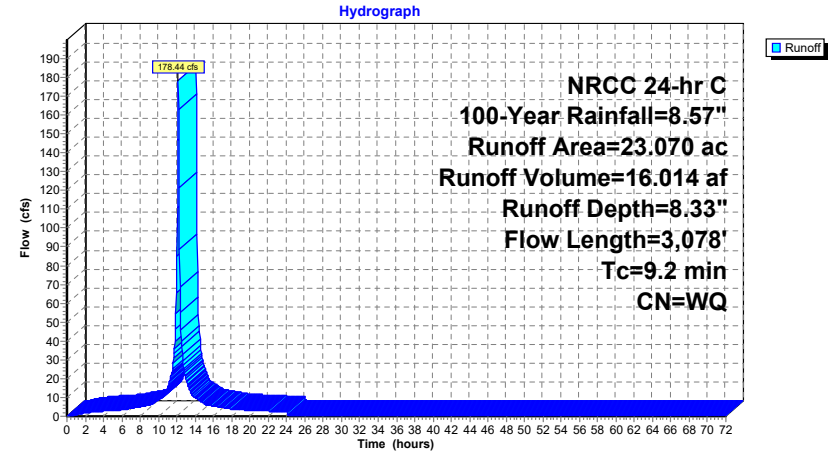
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 228

Subcatchment 6S: SA AG INF Basin B Imp.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 229

Hydrograph for Subcatchment 6S: SA AG INF Basin B Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	8.33	0.00
1.00	0.10	0.01	0.76	53.00	8.57	8.33	0.00
2.00	0.21	0.08	1.74	54.00	8.57	8.33	0.00
3.00	0.33	0.17	2.29	55.00	8.57	8.33	0.00
4.00	0.45	0.28	2.69	56.00	8.57	8.33	0.00
5.00	0.59	0.40	3.01	57.00	8.57	8.33	0.00
6.00	0.74	0.54	3.28	58.00	8.57	8.33	0.00
7.00	0.91	0.70	4.12	59.00	8.57	8.33	0.00
8.00	1.11	0.90	5.01	60.00	8.57	8.33	0.00
9.00	1.36	1.14	5.90	61.00	8.57	8.33	0.00
10.00	1.69	1.47	8.74	62.00	8.57	8.33	0.00
11.00	2.21	1.98	15.07	63.00	8.57	8.33	0.00
12.00	4.08	3.85	84.90	64.00	8.57	8.33	0.00
13.00	6.36	6.12	19.90	65.00	8.57	8.33	0.00
14.00	6.88	6.64	9.72	66.00	8.57	8.33	0.00
15.00	7.21	6.97	6.67	67.00	8.57	8.33	0.00
16.00	7.46	7.22	5.39	68.00	8.57	8.33	0.00
17.00	7.66	7.42	4.52	69.00	8.57	8.33	0.00
18.00	7.83	7.60	3.65	70.00	8.57	8.33	0.00
19.00	7.98	7.74	3.31	71.00	8.57	8.33	0.00
20.00	8.12	7.88	3.10	72.00	8.57	8.33	0.00
21.00	8.24	8.00	2.88				
22.00	8.36	8.12	2.66				
23.00	8.47	8.23	2.45				
24.00	8.57	8.33	2.23				
25.00	8.57	8.33	0.00				
26.00	8.57	8.33	0.00				
27.00	8.57	8.33	0.00				
28.00	8.57	8.33	0.00				
29.00	8.57	8.33	0.00				
30.00	8.57	8.33	0.00				
31.00	8.57	8.33	0.00				
32.00	8.57	8.33	0.00				
33.00	8.57	8.33	0.00				
34.00	8.57	8.33	0.00				
35.00	8.57	8.33	0.00				
36.00	8.57	8.33	0.00				
37.00	8.57	8.33	0.00				
38.00	8.57	8.33	0.00				
39.00	8.57	8.33	0.00				
40.00	8.57	8.33	0.00				
41.00	8.57	8.33	0.00				
42.00	8.57	8.33	0.00				
43.00	8.57	8.33	0.00				
44.00	8.57	8.33	0.00				
45.00	8.57	8.33	0.00				
46.00	8.57	8.33	0.00				
47.00	8.57	8.33	0.00				
48.00	8.57	8.33	0.00				
49.00	8.57	8.33	0.00				
50.00	8.57	8.33	0.00				
51.00	8.57	8.33	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 230

Summary for Subcatchment 7S: SA AG DET Basin A Imp.

[47] Hint: Peak is 978% of capacity of segment #4

Runoff = 78.67 cfs @ 12.28 hrs, Volume= 9.461 af, Depth= 8.33"
 Routed to Pond 9P : Aboveground Infiltration Basin 'A'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
9.470	98	Paved parking, HSG D
* 4.160	98	Building A North Half
13.630		Weighted Average
13.630		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	80	0.0326	0.16		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19"
0.5	20	0.0150	0.74		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 2.19"
0.9	153	0.0206	2.91		Shallow Concentrated Flow, CD Paved Kv= 20.3 fps
10.1	2,772	0.0050	4.55	8.05	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
19.6	3,025	Total			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

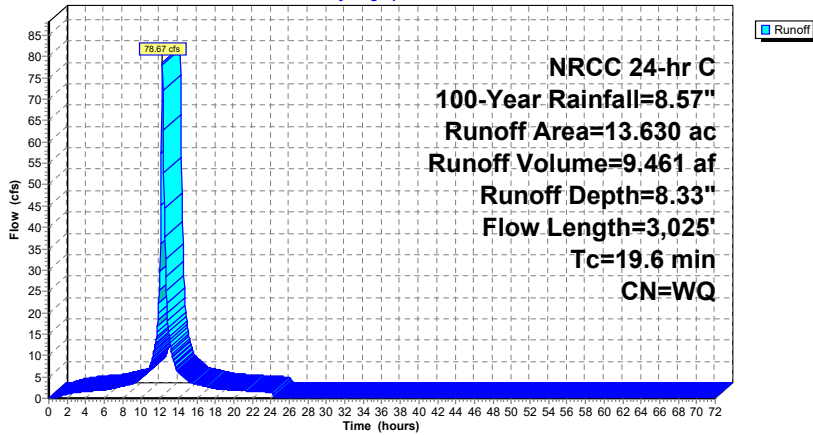
NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 231

Subcatchment 7S: SA AG DET Basin A Imp.

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 232

Hydrograph for Subcatchment 7S: SA AG DET Basin A Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	8.33	0.00
1.00	0.10	0.01	0.31	53.00	8.57	8.33	0.00
2.00	0.21	0.08	0.96	54.00	8.57	8.33	0.00
3.00	0.33	0.17	1.31	55.00	8.57	8.33	0.00
4.00	0.45	0.28	1.55	56.00	8.57	8.33	0.00
5.00	0.59	0.40	1.74	57.00	8.57	8.33	0.00
6.00	0.74	0.54	1.91	58.00	8.57	8.33	0.00
7.00	0.91	0.70	2.35	59.00	8.57	8.33	0.00
8.00	1.11	0.90	2.87	60.00	8.57	8.33	0.00
9.00	1.36	1.14	3.40	61.00	8.57	8.33	0.00
10.00	1.69	1.47	4.88	62.00	8.57	8.33	0.00
11.00	2.21	1.98	7.89	63.00	8.57	8.33	0.00
12.00	4.08	3.85	29.70	64.00	8.57	8.33	0.00
13.00	6.36	6.12	14.48	65.00	8.57	8.33	0.00
14.00	6.88	6.64	6.11	66.00	8.57	8.33	0.00
15.00	7.21	6.97	4.23	67.00	8.57	8.33	0.00
16.00	7.46	7.22	3.27	68.00	8.57	8.33	0.00
17.00	7.66	7.42	2.75	69.00	8.57	8.33	0.00
18.00	7.83	7.60	2.24	70.00	8.57	8.33	0.00
19.00	7.98	7.74	1.98	71.00	8.57	8.33	0.00
20.00	8.12	7.88	1.85	72.00	8.57	8.33	0.00
21.00	8.24	8.00	1.72				
22.00	8.36	8.12	1.60				
23.00	8.47	8.23	1.47				
24.00	8.57	8.33	1.34				
25.00	8.57	8.33	0.00				
26.00	8.57	8.33	0.00				
27.00	8.57	8.33	0.00				
28.00	8.57	8.33	0.00				
29.00	8.57	8.33	0.00				
30.00	8.57	8.33	0.00				
31.00	8.57	8.33	0.00				
32.00	8.57	8.33	0.00				
33.00	8.57	8.33	0.00				
34.00	8.57	8.33	0.00				
35.00	8.57	8.33	0.00				
36.00	8.57	8.33	0.00				
37.00	8.57	8.33	0.00				
38.00	8.57	8.33	0.00				
39.00	8.57	8.33	0.00				
40.00	8.57	8.33	0.00				
41.00	8.57	8.33	0.00				
42.00	8.57	8.33	0.00				
43.00	8.57	8.33	0.00				
44.00	8.57	8.33	0.00				
45.00	8.57	8.33	0.00				
46.00	8.57	8.33	0.00				
47.00	8.57	8.33	0.00				
48.00	8.57	8.33	0.00				
49.00	8.57	8.33	0.00				
50.00	8.57	8.33	0.00				
51.00	8.57	8.33	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 233

Summary for Subcatchment 9S: Route 9W Undisturbed Perv.

Runoff = 97.03 cfs @ 12.18 hrs, Volume= 7.889 af, Depth= 5.56"
 Routed to Link 11L : Route 9 Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
4.940	70	Woods, Good, HSG C
12.100	77	Woods, Good, HSG D
17.040		Weighted Average
17.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	10	0.0275	0.05		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
0.2	67	0.0784	4.51		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
3.8	340	0.0088	1.51		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.5	311	0.0451	3.42		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.4	338	0.0621	4.01		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
10.5	1,066	Total			

2023-09 Proposed

Prepared by Dynamic Engineering

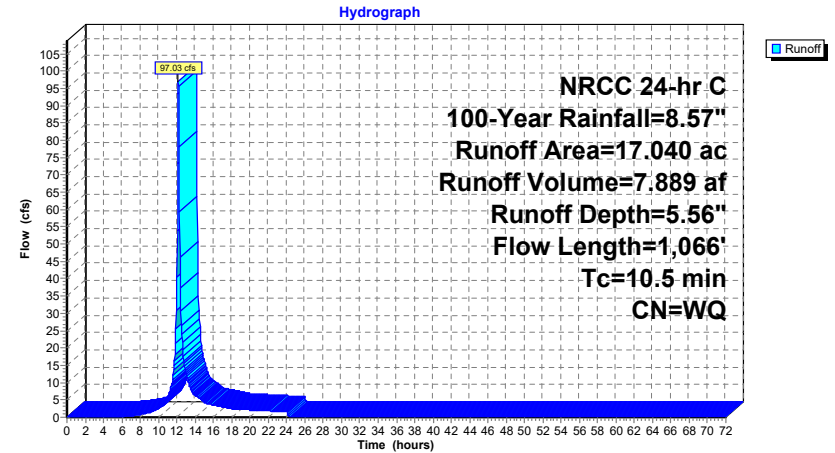
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 234

Subcatchment 9S: Route 9W Undisturbed Perv.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 235

Hydrograph for Subcatchment 9S: Route 9W Undisturbed Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	5.56	0.00
1.00	0.10	0.00	0.00	53.00	8.57	5.56	0.00
2.00	0.21	0.00	0.00	54.00	8.57	5.56	0.00
3.00	0.33	0.00	0.00	55.00	8.57	5.56	0.00
4.00	0.45	0.00	0.00	56.00	8.57	5.56	0.00
5.00	0.59	0.00	0.00	57.00	8.57	5.56	0.00
6.00	0.74	0.00	0.13	58.00	8.57	5.56	0.00
7.00	0.91	0.02	0.37	59.00	8.57	5.56	0.00
8.00	1.11	0.05	0.80	60.00	8.57	5.56	0.00
9.00	1.36	0.12	1.34	61.00	8.57	5.56	0.00
10.00	1.69	0.24	2.60	62.00	8.57	5.56	0.00
11.00	2.21	0.49	5.66	63.00	8.57	5.56	0.00
12.00	4.08	1.73	40.32	64.00	8.57	5.56	0.00
13.00	6.36	3.59	12.87	65.00	8.57	5.56	0.00
14.00	6.88	4.04	6.32	66.00	8.57	5.56	0.00
15.00	7.21	4.34	4.40	67.00	8.57	5.56	0.00
16.00	7.46	4.55	3.55	68.00	8.57	5.56	0.00
17.00	7.66	4.74	3.00	69.00	8.57	5.56	0.00
18.00	7.83	4.89	2.43	70.00	8.57	5.56	0.00
19.00	7.98	5.02	2.20	71.00	8.57	5.56	0.00
20.00	8.12	5.15	2.07	72.00	8.57	5.56	0.00
21.00	8.24	5.26	1.93				
22.00	8.36	5.37	1.79				
23.00	8.47	5.47	1.65				
24.00	8.57	5.56	1.50				
25.00	8.57	5.56	0.00				
26.00	8.57	5.56	0.00				
27.00	8.57	5.56	0.00				
28.00	8.57	5.56	0.00				
29.00	8.57	5.56	0.00				
30.00	8.57	5.56	0.00				
31.00	8.57	5.56	0.00				
32.00	8.57	5.56	0.00				
33.00	8.57	5.56	0.00				
34.00	8.57	5.56	0.00				
35.00	8.57	5.56	0.00				
36.00	8.57	5.56	0.00				
37.00	8.57	5.56	0.00				
38.00	8.57	5.56	0.00				
39.00	8.57	5.56	0.00				
40.00	8.57	5.56	0.00				
41.00	8.57	5.56	0.00				
42.00	8.57	5.56	0.00				
43.00	8.57	5.56	0.00				
44.00	8.57	5.56	0.00				
45.00	8.57	5.56	0.00				
46.00	8.57	5.56	0.00				
47.00	8.57	5.56	0.00				
48.00	8.57	5.56	0.00				
49.00	8.57	5.56	0.00				
50.00	8.57	5.56	0.00				
51.00	8.57	5.56	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 236

Summary for Subcatchment 11S: SA South (Rt 9) Undetained Imp.

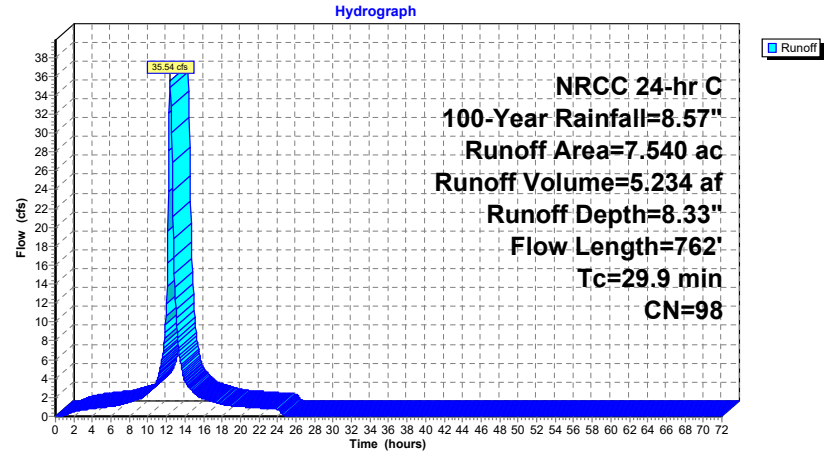
Runoff = 35.54 cfs @ 12.40 hrs, Volume= 5.234 af, Depth= 8.33"
 Routed to Link 39L : Route 9 Undetained Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
7.540	98	Roofs, HSG D
7.540		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	85	0.0162	0.13		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19" Using McCuen-Spiess flow length
2.2	83	0.0162	0.64		Shallow Concentrated Flow, BC Woodland Kv= 5.0 fps
6.4	195	0.0103	0.51		Shallow Concentrated Flow, CD Woodland Kv= 5.0 fps
10.0	399	0.0177	0.67		Shallow Concentrated Flow, DE Woodland Kv= 5.0 fps
29.9	762	Total			

Subcatchment 11S: SA South (Rt 9) Undetained Imp.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 237

Hydrograph for Subcatchment 11S: SA South (Rt 9) Undetained Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	8.33	0.00
1.00	0.10	0.01	0.10	53.00	8.57	8.33	0.00
2.00	0.21	0.08	0.49	54.00	8.57	8.33	0.00
3.00	0.33	0.17	0.70	55.00	8.57	8.33	0.00
4.00	0.45	0.28	0.84	56.00	8.57	8.33	0.00
5.00	0.59	0.40	0.95	57.00	8.57	8.33	0.00
6.00	0.74	0.54	1.04	58.00	8.57	8.33	0.00
7.00	0.91	0.70	1.25	59.00	8.57	8.33	0.00
8.00	1.11	0.90	1.54	60.00	8.57	8.33	0.00
9.00	1.36	1.14	1.83	61.00	8.57	8.33	0.00
10.00	1.69	1.47	2.54	62.00	8.57	8.33	0.00
11.00	2.21	1.98	3.91	63.00	8.57	8.33	0.00
12.00	4.08	3.85	11.95	64.00	8.57	8.33	0.00
13.00	6.36	6.12	11.31	65.00	8.57	8.33	0.00
14.00	6.88	6.64	3.75	66.00	8.57	8.33	0.00
15.00	7.21	6.97	2.50	67.00	8.57	8.33	0.00
16.00	7.46	7.22	1.86	68.00	8.57	8.33	0.00
17.00	7.66	7.42	1.57	69.00	8.57	8.33	0.00
18.00	7.83	7.60	1.28	70.00	8.57	8.33	0.00
19.00	7.98	7.74	1.11	71.00	8.57	8.33	0.00
20.00	8.12	7.88	1.03	72.00	8.57	8.33	0.00
21.00	8.24	8.00	0.96				
22.00	8.36	8.12	0.89				
23.00	8.47	8.23	0.82				
24.00	8.57	8.33	0.75				
25.00	8.57	8.33	0.02				
26.00	8.57	8.33	0.00				
27.00	8.57	8.33	0.00				
28.00	8.57	8.33	0.00				
29.00	8.57	8.33	0.00				
30.00	8.57	8.33	0.00				
31.00	8.57	8.33	0.00				
32.00	8.57	8.33	0.00				
33.00	8.57	8.33	0.00				
34.00	8.57	8.33	0.00				
35.00	8.57	8.33	0.00				
36.00	8.57	8.33	0.00				
37.00	8.57	8.33	0.00				
38.00	8.57	8.33	0.00				
39.00	8.57	8.33	0.00				
40.00	8.57	8.33	0.00				
41.00	8.57	8.33	0.00				
42.00	8.57	8.33	0.00				
43.00	8.57	8.33	0.00				
44.00	8.57	8.33	0.00				
45.00	8.57	8.33	0.00				
46.00	8.57	8.33	0.00				
47.00	8.57	8.33	0.00				
48.00	8.57	8.33	0.00				
49.00	8.57	8.33	0.00				
50.00	8.57	8.33	0.00				
51.00	8.57	8.33	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 238

Summary for Subcatchment 14S: SA UG DET Basin E Imp.

Calculated TC path = 5.7 mins. Minimum TC of 6 mins used.

Runoff = 33.81 cfs @ 12.13 hrs, Volume= 2.749 af, Depth= 8.33"
Routed to Pond 17P : Underground Detention Basin 'E'

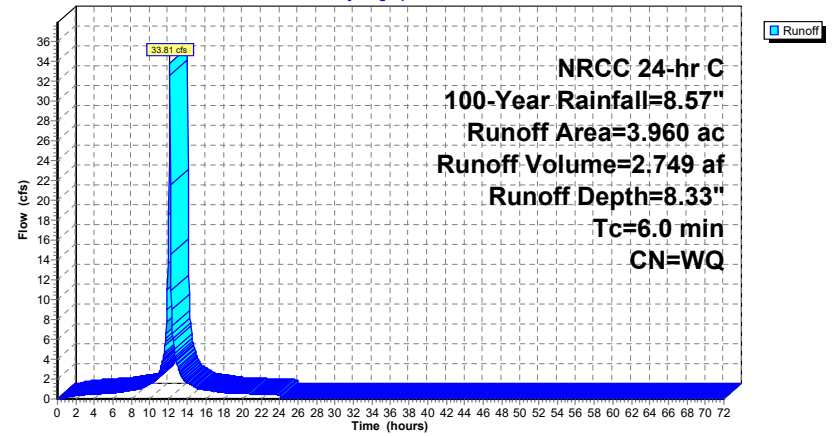
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
3.140	98	Roofs, HSG D
0.820	98	Paved parking, HSG D
3.960		Weighted Average
3.960		100.00% Impervious Area

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

Subcatchment 14S: SA UG DET Basin E Imp.

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 239

Hydrograph for Subcatchment 14S: SA UG DET Basin E Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	8.33	0.00
1.00	0.10	0.01	0.14	53.00	8.57	8.33	0.00
2.00	0.21	0.08	0.31	54.00	8.57	8.33	0.00
3.00	0.33	0.17	0.40	55.00	8.57	8.33	0.00
4.00	0.45	0.28	0.46	56.00	8.57	8.33	0.00
5.00	0.59	0.40	0.52	57.00	8.57	8.33	0.00
6.00	0.74	0.54	0.57	58.00	8.57	8.33	0.00
7.00	0.91	0.70	0.71	59.00	8.57	8.33	0.00
8.00	1.11	0.90	0.87	60.00	8.57	8.33	0.00
9.00	1.36	1.14	1.02	61.00	8.57	8.33	0.00
10.00	1.69	1.47	1.53	62.00	8.57	8.33	0.00
11.00	2.21	1.98	2.69	63.00	8.57	8.33	0.00
12.00	4.08	3.85	18.57	64.00	8.57	8.33	0.00
13.00	6.36	6.12	3.24	65.00	8.57	8.33	0.00
14.00	6.88	6.64	1.64	66.00	8.57	8.33	0.00
15.00	7.21	6.97	1.12	67.00	8.57	8.33	0.00
16.00	7.46	7.22	0.92	68.00	8.57	8.33	0.00
17.00	7.66	7.42	0.77	69.00	8.57	8.33	0.00
18.00	7.83	7.60	0.62	70.00	8.57	8.33	0.00
19.00	7.98	7.74	0.57	71.00	8.57	8.33	0.00
20.00	8.12	7.88	0.53	72.00	8.57	8.33	0.00
21.00	8.24	8.00	0.49				
22.00	8.36	8.12	0.45				
23.00	8.47	8.23	0.42				
24.00	8.57	8.33	0.38				
25.00	8.57	8.33	0.00				
26.00	8.57	8.33	0.00				
27.00	8.57	8.33	0.00				
28.00	8.57	8.33	0.00				
29.00	8.57	8.33	0.00				
30.00	8.57	8.33	0.00				
31.00	8.57	8.33	0.00				
32.00	8.57	8.33	0.00				
33.00	8.57	8.33	0.00				
34.00	8.57	8.33	0.00				
35.00	8.57	8.33	0.00				
36.00	8.57	8.33	0.00				
37.00	8.57	8.33	0.00				
38.00	8.57	8.33	0.00				
39.00	8.57	8.33	0.00				
40.00	8.57	8.33	0.00				
41.00	8.57	8.33	0.00				
42.00	8.57	8.33	0.00				
43.00	8.57	8.33	0.00				
44.00	8.57	8.33	0.00				
45.00	8.57	8.33	0.00				
46.00	8.57	8.33	0.00				
47.00	8.57	8.33	0.00				
48.00	8.57	8.33	0.00				
49.00	8.57	8.33	0.00				
50.00	8.57	8.33	0.00				
51.00	8.57	8.33	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 240

Summary for Subcatchment 15S: SA UG Det Basin F Imp.

[47] Hint: Peak is 618% of capacity of segment #3

[47] Hint: Peak is 380% of capacity of segment #4

Runoff = 28.23 cfs @ 12.15 hrs, Volume= 2.436 af, Depth= 8.33"
 Routed to Pond 18P : Underground Detention Basin 'F'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
* 3.510	98	Impervious
3.510		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0195	1.13		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
2.0	338	0.0194	2.83		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
0.3	63	0.0050	3.72	4.57	Pipe Channel, RCP_Round 15" 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
4.4	1,105	0.0050	4.20	7.43	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
8.2	1,606	Total			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

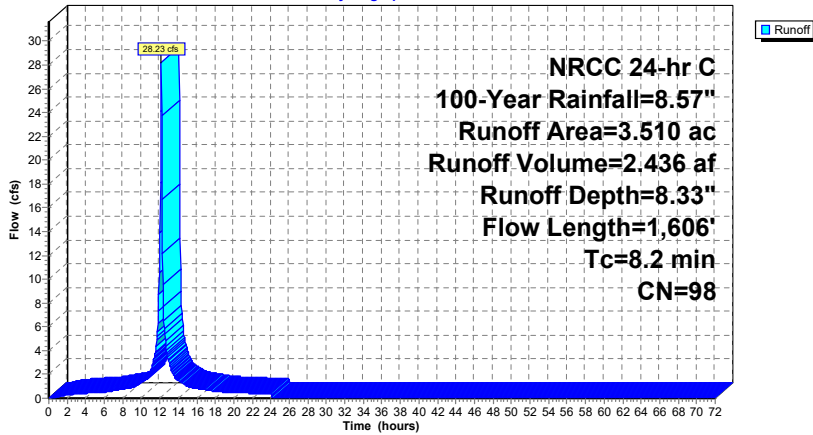
NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 241

Subcatchment 15S: SA UG Det Basin F Imp.

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 242

Hydrograph for Subcatchment 15S: SA UG Det Basin F Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	8.33	0.00
1.00	0.10	0.01	0.12	53.00	8.57	8.33	0.00
2.00	0.21	0.08	0.27	54.00	8.57	8.33	0.00
3.00	0.33	0.17	0.35	55.00	8.57	8.33	0.00
4.00	0.45	0.28	0.41	56.00	8.57	8.33	0.00
5.00	0.59	0.40	0.46	57.00	8.57	8.33	0.00
6.00	0.74	0.54	0.50	58.00	8.57	8.33	0.00
7.00	0.91	0.70	0.63	59.00	8.57	8.33	0.00
8.00	1.11	0.90	0.76	60.00	8.57	8.33	0.00
9.00	1.36	1.14	0.90	61.00	8.57	8.33	0.00
10.00	1.69	1.47	1.34	62.00	8.57	8.33	0.00
11.00	2.21	1.98	2.32	63.00	8.57	8.33	0.00
12.00	4.08	3.85	13.88	64.00	8.57	8.33	0.00
13.00	6.36	6.12	2.98	65.00	8.57	8.33	0.00
14.00	6.88	6.64	1.47	66.00	8.57	8.33	0.00
15.00	7.21	6.97	1.01	67.00	8.57	8.33	0.00
16.00	7.46	7.22	0.82	68.00	8.57	8.33	0.00
17.00	7.66	7.42	0.69	69.00	8.57	8.33	0.00
18.00	7.83	7.60	0.55	70.00	8.57	8.33	0.00
19.00	7.98	7.74	0.50	71.00	8.57	8.33	0.00
20.00	8.12	7.88	0.47	72.00	8.57	8.33	0.00
21.00	8.24	8.00	0.44				
22.00	8.36	8.12	0.40				
23.00	8.47	8.23	0.37				
24.00	8.57	8.33	0.34				
25.00	8.57	8.33	0.00				
26.00	8.57	8.33	0.00				
27.00	8.57	8.33	0.00				
28.00	8.57	8.33	0.00				
29.00	8.57	8.33	0.00				
30.00	8.57	8.33	0.00				
31.00	8.57	8.33	0.00				
32.00	8.57	8.33	0.00				
33.00	8.57	8.33	0.00				
34.00	8.57	8.33	0.00				
35.00	8.57	8.33	0.00				
36.00	8.57	8.33	0.00				
37.00	8.57	8.33	0.00				
38.00	8.57	8.33	0.00				
39.00	8.57	8.33	0.00				
40.00	8.57	8.33	0.00				
41.00	8.57	8.33	0.00				
42.00	8.57	8.33	0.00				
43.00	8.57	8.33	0.00				
44.00	8.57	8.33	0.00				
45.00	8.57	8.33	0.00				
46.00	8.57	8.33	0.00				
47.00	8.57	8.33	0.00				
48.00	8.57	8.33	0.00				
49.00	8.57	8.33	0.00				
50.00	8.57	8.33	0.00				
51.00	8.57	8.33	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 243

Summary for Subcatchment 19S: SA AG INF Basin G/H Imp.

[47] Hint: Peak is 301% of capacity of segment #3

[47] Hint: Peak is 166% of capacity of segment #4

[47] Hint: Peak is 160% of capacity of segment #5

[47] Hint: Peak is 192% of capacity of segment #6

[47] Hint: Peak is 549% of capacity of segment #7

Runoff = 40.80 cfs @ 12.16 hrs, Volume= 3.700 af, Depth= 8.33"
 Routed to Pond 20P : Combined Aboveground Infiltration Basin 'G/H'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
* 5.330	98	Impervious
5.330		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0142	0.99		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
2.1	303	0.0142	2.42		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
0.7	327	0.0142	7.67	13.56	Pipe Channel, CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	335	0.0468	13.93	24.62	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	370	0.0504	14.46	25.55	Pipe Channel, EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.2	141	0.0348	12.01	21.23	Pipe Channel, FG 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
3.9	989	0.0050	4.20	7.43	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
9.4	2,565	Total			

2023-09 Proposed

Prepared by Dynamic Engineering

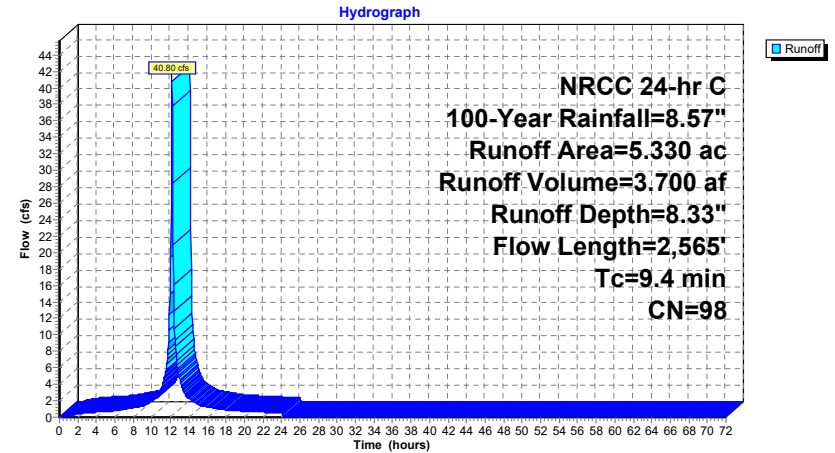
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 244

Subcatchment 19S: SA AG INF Basin G/H Imp.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 245

Hydrograph for Subcatchment 19S: SA AG INF Basin G/H Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	8.33	0.00
1.00	0.10	0.01	0.18	53.00	8.57	8.33	0.00
2.00	0.21	0.08	0.40	54.00	8.57	8.33	0.00
3.00	0.33	0.17	0.53	55.00	8.57	8.33	0.00
4.00	0.45	0.28	0.62	56.00	8.57	8.33	0.00
5.00	0.59	0.40	0.69	57.00	8.57	8.33	0.00
6.00	0.74	0.54	0.76	58.00	8.57	8.33	0.00
7.00	0.91	0.70	0.95	59.00	8.57	8.33	0.00
8.00	1.11	0.90	1.16	60.00	8.57	8.33	0.00
9.00	1.36	1.14	1.36	61.00	8.57	8.33	0.00
10.00	1.69	1.47	2.02	62.00	8.57	8.33	0.00
11.00	2.21	1.98	3.48	63.00	8.57	8.33	0.00
12.00	4.08	3.85	19.37	64.00	8.57	8.33	0.00
13.00	6.36	6.12	4.61	65.00	8.57	8.33	0.00
14.00	6.88	6.64	2.25	66.00	8.57	8.33	0.00
15.00	7.21	6.97	1.54	67.00	8.57	8.33	0.00
16.00	7.46	7.22	1.25	68.00	8.57	8.33	0.00
17.00	7.66	7.42	1.04	69.00	8.57	8.33	0.00
18.00	7.83	7.60	0.84	70.00	8.57	8.33	0.00
19.00	7.98	7.74	0.76	71.00	8.57	8.33	0.00
20.00	8.12	7.88	0.72	72.00	8.57	8.33	0.00
21.00	8.24	8.00	0.67				
22.00	8.36	8.12	0.62				
23.00	8.47	8.23	0.57				
24.00	8.57	8.33	0.52				
25.00	8.57	8.33	0.00				
26.00	8.57	8.33	0.00				
27.00	8.57	8.33	0.00				
28.00	8.57	8.33	0.00				
29.00	8.57	8.33	0.00				
30.00	8.57	8.33	0.00				
31.00	8.57	8.33	0.00				
32.00	8.57	8.33	0.00				
33.00	8.57	8.33	0.00				
34.00	8.57	8.33	0.00				
35.00	8.57	8.33	0.00				
36.00	8.57	8.33	0.00				
37.00	8.57	8.33	0.00				
38.00	8.57	8.33	0.00				
39.00	8.57	8.33	0.00				
40.00	8.57	8.33	0.00				
41.00	8.57	8.33	0.00				
42.00	8.57	8.33	0.00				
43.00	8.57	8.33	0.00				
44.00	8.57	8.33	0.00				
45.00	8.57	8.33	0.00				
46.00	8.57	8.33	0.00				
47.00	8.57	8.33	0.00				
48.00	8.57	8.33	0.00				
49.00	8.57	8.33	0.00				
50.00	8.57	8.33	0.00				
51.00	8.57	8.33	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 246

Summary for Subcatchment 23S: SA AG INF Basin C Imp.

- [47] Hint: Peak is 2965% of capacity of segment #3
- [47] Hint: Peak is 1823% of capacity of segment #4
- [47] Hint: Peak is 287% of capacity of segment #5
- [47] Hint: Peak is 190% of capacity of segment #6
- [47] Hint: Peak is 133% of capacity of segment #7

Runoff = 146.71 cfs @ 12.18 hrs, Volume= 14.084 af, Depth= 8.33"
 Routed to Pond 24P : Aboveground Infiltration Basin 'C'

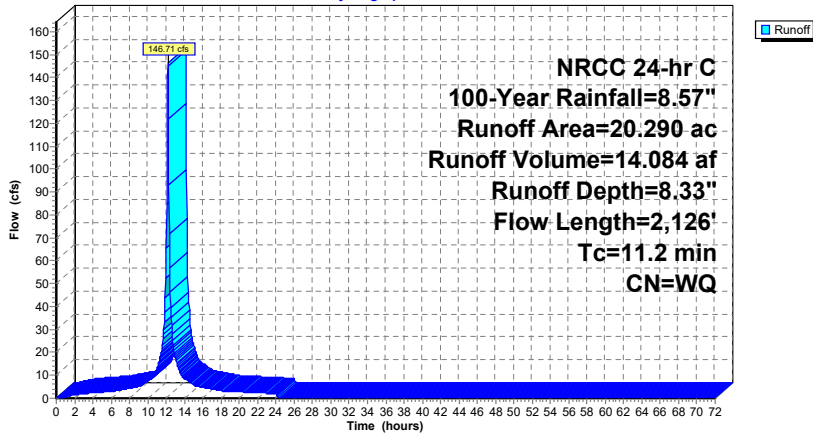
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
11.645	98	Paved parking, HSG D
* 8.645	98	Building C South
20.290		Weighted Average
20.290		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	60	0.0663	0.21		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19"
0.6	40	0.0325	1.15		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 2.19"
0.4	100	0.0050	4.03	4.95	Pipe Channel, CD 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
3.2	886	0.0050	4.55	8.05	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	342	0.0050	7.23	51.09	Pipe Channel, EF 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
1.1	545	0.0050	8.01	77.07	Pipe Channel, FG 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.012
0.1	37	0.0050	8.76	110.04	Pipe Channel, GH 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012
0.0	10	0.0400	26.79	426.07	Pipe Channel, HI 54.0" Round Area= 15.9 sf Perim= 14.1' r= 1.13' n= 0.012
0.1	106	0.0400	28.74	564.29	Pipe Channel, IJ 60.0" Round Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.012
11.2	2,126	Total			

Subcatchment 23S: SA AG INF Basin C Imp.

Hydrograph



Hydrograph for Subcatchment 23S: SA AG INF Basin C Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	8.33	0.00
1.00	0.10	0.01	0.63	53.00	8.57	8.33	0.00
2.00	0.21	0.08	1.51	54.00	8.57	8.33	0.00
3.00	0.33	0.17	2.00	55.00	8.57	8.33	0.00
4.00	0.45	0.28	2.35	56.00	8.57	8.33	0.00
5.00	0.59	0.40	2.64	57.00	8.57	8.33	0.00
6.00	0.74	0.54	2.88	58.00	8.57	8.33	0.00
7.00	0.91	0.70	3.60	59.00	8.57	8.33	0.00
8.00	1.11	0.90	4.38	60.00	8.57	8.33	0.00
9.00	1.36	1.14	5.16	61.00	8.57	8.33	0.00
10.00	1.69	1.47	7.61	62.00	8.57	8.33	0.00
11.00	2.21	1.98	12.95	63.00	8.57	8.33	0.00
12.00	4.08	3.85	65.74	64.00	8.57	8.33	0.00
13.00	6.36	6.12	18.06	65.00	8.57	8.33	0.00
14.00	6.88	6.64	8.63	66.00	8.57	8.33	0.00
15.00	7.21	6.97	5.95	67.00	8.57	8.33	0.00
16.00	7.46	7.22	4.76	68.00	8.57	8.33	0.00
17.00	7.66	7.42	4.00	69.00	8.57	8.33	0.00
18.00	7.83	7.60	3.24	70.00	8.57	8.33	0.00
19.00	7.98	7.74	2.92	71.00	8.57	8.33	0.00
20.00	8.12	7.88	2.73	72.00	8.57	8.33	0.00
21.00	8.24	8.00	2.54				
22.00	8.36	8.12	2.35				
23.00	8.47	8.23	2.16				
24.00	8.57	8.33	1.97				
25.00	8.57	8.33	0.00				
26.00	8.57	8.33	0.00				
27.00	8.57	8.33	0.00				
28.00	8.57	8.33	0.00				
29.00	8.57	8.33	0.00				
30.00	8.57	8.33	0.00				
31.00	8.57	8.33	0.00				
32.00	8.57	8.33	0.00				
33.00	8.57	8.33	0.00				
34.00	8.57	8.33	0.00				
35.00	8.57	8.33	0.00				
36.00	8.57	8.33	0.00				
37.00	8.57	8.33	0.00				
38.00	8.57	8.33	0.00				
39.00	8.57	8.33	0.00				
40.00	8.57	8.33	0.00				
41.00	8.57	8.33	0.00				
42.00	8.57	8.33	0.00				
43.00	8.57	8.33	0.00				
44.00	8.57	8.33	0.00				
45.00	8.57	8.33	0.00				
46.00	8.57	8.33	0.00				
47.00	8.57	8.33	0.00				
48.00	8.57	8.33	0.00				
49.00	8.57	8.33	0.00				
50.00	8.57	8.33	0.00				
51.00	8.57	8.33	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 249

Summary for Subcatchment 24S: SA UG DET Basin E Perv.

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

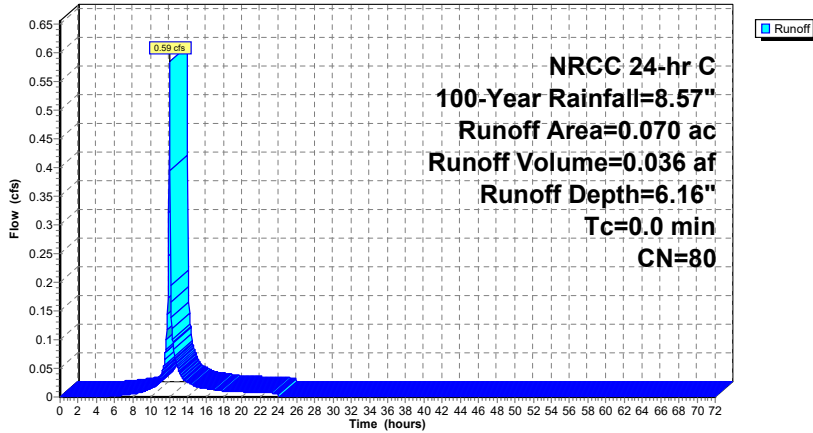
Runoff = 0.59 cfs @ 12.05 hrs, Volume= 0.036 af, Depth= 6.16"
 Routed to Pond 17P : Underground Detention Basin 'E'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
0.070	80	>75% Grass cover, Good, HSG D
0.070		100.00% Pervious Area

Subcatchment 24S: SA UG DET Basin E Perv.

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 250

Hydrograph for Subcatchment 24S: SA UG DET Basin E Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	6.16	0.00
1.00	0.10	0.00	0.00	53.00	8.57	6.16	0.00
2.00	0.21	0.00	0.00	54.00	8.57	6.16	0.00
3.00	0.33	0.00	0.00	55.00	8.57	6.16	0.00
4.00	0.45	0.00	0.00	56.00	8.57	6.16	0.00
5.00	0.59	0.00	0.00	57.00	8.57	6.16	0.00
6.00	0.74	0.02	0.00	58.00	8.57	6.16	0.00
7.00	0.91	0.06	0.00	59.00	8.57	6.16	0.00
8.00	1.11	0.12	0.01	60.00	8.57	6.16	0.00
9.00	1.36	0.22	0.01	61.00	8.57	6.16	0.00
10.00	1.69	0.39	0.02	62.00	8.57	6.16	0.00
11.00	2.21	0.69	0.03	63.00	8.57	6.16	0.00
12.00	4.08	2.11	0.45	64.00	8.57	6.16	0.00
13.00	6.36	4.11	0.05	65.00	8.57	6.16	0.00
14.00	6.88	4.58	0.03	66.00	8.57	6.16	0.00
15.00	7.21	4.89	0.02	67.00	8.57	6.16	0.00
16.00	7.46	5.12	0.01	68.00	8.57	6.16	0.00
17.00	7.66	5.31	0.01	69.00	8.57	6.16	0.00
18.00	7.83	5.47	0.01	70.00	8.57	6.16	0.00
19.00	7.98	5.61	0.01	71.00	8.57	6.16	0.00
20.00	8.12	5.73	0.01	72.00	8.57	6.16	0.00
21.00	8.24	5.85	0.01				
22.00	8.36	5.97	0.01				
23.00	8.47	6.07	0.01				
24.00	8.57	6.16	0.00				
25.00	8.57	6.16	0.00				
26.00	8.57	6.16	0.00				
27.00	8.57	6.16	0.00				
28.00	8.57	6.16	0.00				
29.00	8.57	6.16	0.00				
30.00	8.57	6.16	0.00				
31.00	8.57	6.16	0.00				
32.00	8.57	6.16	0.00				
33.00	8.57	6.16	0.00				
34.00	8.57	6.16	0.00				
35.00	8.57	6.16	0.00				
36.00	8.57	6.16	0.00				
37.00	8.57	6.16	0.00				
38.00	8.57	6.16	0.00				
39.00	8.57	6.16	0.00				
40.00	8.57	6.16	0.00				
41.00	8.57	6.16	0.00				
42.00	8.57	6.16	0.00				
43.00	8.57	6.16	0.00				
44.00	8.57	6.16	0.00				
45.00	8.57	6.16	0.00				
46.00	8.57	6.16	0.00				
47.00	8.57	6.16	0.00				
48.00	8.57	6.16	0.00				
49.00	8.57	6.16	0.00				
50.00	8.57	6.16	0.00				
51.00	8.57	6.16	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023
Page 251

Summary for Subcatchment 28S: Moodna Creek Undisturbed Perv.

Runoff = 192.64 cfs @ 12.27 hrs, Volume= 19.553 af, Depth= 5.77"
Routed to Link 30L : Moodna Creek Undisturbed Total

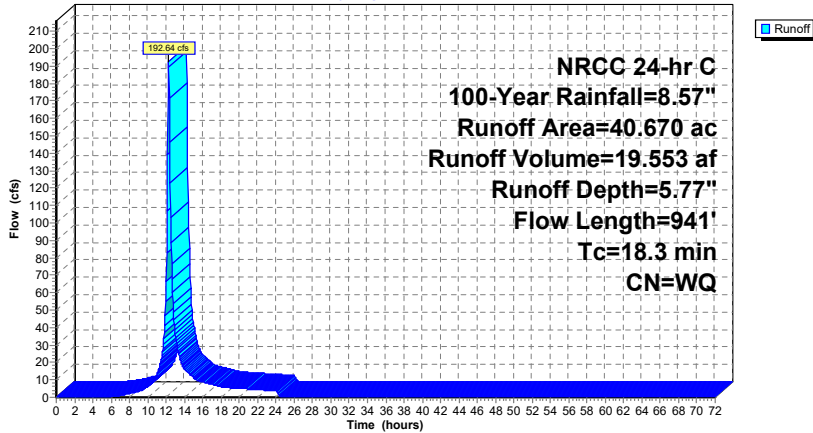
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
39.200	77	Woods, Good, HSG D
1.470	70	Woods, Good, HSG C
40.670		Weighted Average
40.670		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0950	0.12		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	244	0.0471	3.49		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
1.5	206	0.0194	2.24		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	391	0.0562	3.82		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
18.3	941				Total

Subcatchment 28S: Moodna Creek Undisturbed Perv.

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023
Page 252

Hydrograph for Subcatchment 28S: Moodna Creek Undisturbed Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	5.80	0.00
1.00	0.10	0.00	0.00	53.00	8.57	5.80	0.00
2.00	0.21	0.00	0.00	54.00	8.57	5.80	0.00
3.00	0.33	0.00	0.00	55.00	8.57	5.80	0.00
4.00	0.45	0.00	0.00	56.00	8.57	5.80	0.00
5.00	0.59	0.00	0.00	57.00	8.57	5.80	0.00
6.00	0.74	0.01	0.36	58.00	8.57	5.80	0.00
7.00	0.91	0.03	1.08	59.00	8.57	5.80	0.00
8.00	1.11	0.08	2.13	60.00	8.57	5.80	0.00
9.00	1.36	0.15	3.46	61.00	8.57	5.80	0.00
10.00	1.69	0.29	6.39	62.00	8.57	5.80	0.00
11.00	2.21	0.57	12.98	63.00	8.57	5.80	0.00
12.00	4.08	1.88	66.17	64.00	8.57	5.80	0.00
13.00	6.36	3.80	36.36	65.00	8.57	5.80	0.00
14.00	6.88	4.26	16.11	66.00	8.57	5.80	0.00
15.00	7.21	4.56	11.27	67.00	8.57	5.80	0.00
16.00	7.46	4.78	8.79	68.00	8.57	5.80	0.00
17.00	7.66	4.97	7.44	69.00	8.57	5.80	0.00
18.00	7.83	5.12	6.07	70.00	8.57	5.80	0.00
19.00	7.98	5.26	5.39	71.00	8.57	5.80	0.00
20.00	8.12	5.38	5.06	72.00	8.57	5.80	0.00
21.00	8.24	5.50	4.72				
22.00	8.36	5.61	4.38				
23.00	8.47	5.71	4.03				
24.00	8.57	5.80	3.68				
25.00	8.57	5.80	0.00				
26.00	8.57	5.80	0.00				
27.00	8.57	5.80	0.00				
28.00	8.57	5.80	0.00				
29.00	8.57	5.80	0.00				
30.00	8.57	5.80	0.00				
31.00	8.57	5.80	0.00				
32.00	8.57	5.80	0.00				
33.00	8.57	5.80	0.00				
34.00	8.57	5.80	0.00				
35.00	8.57	5.80	0.00				
36.00	8.57	5.80	0.00				
37.00	8.57	5.80	0.00				
38.00	8.57	5.80	0.00				
39.00	8.57	5.80	0.00				
40.00	8.57	5.80	0.00				
41.00	8.57	5.80	0.00				
42.00	8.57	5.80	0.00				
43.00	8.57	5.80	0.00				
44.00	8.57	5.80	0.00				
45.00	8.57	5.80	0.00				
46.00	8.57	5.80	0.00				
47.00	8.57	5.80	0.00				
48.00	8.57	5.80	0.00				
49.00	8.57	5.80	0.00				
50.00	8.57	5.80	0.00				
51.00	8.57	5.80	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023
Page 253

Summary for Subcatchment 29S: Moodna Creek Undisturbed Imp.

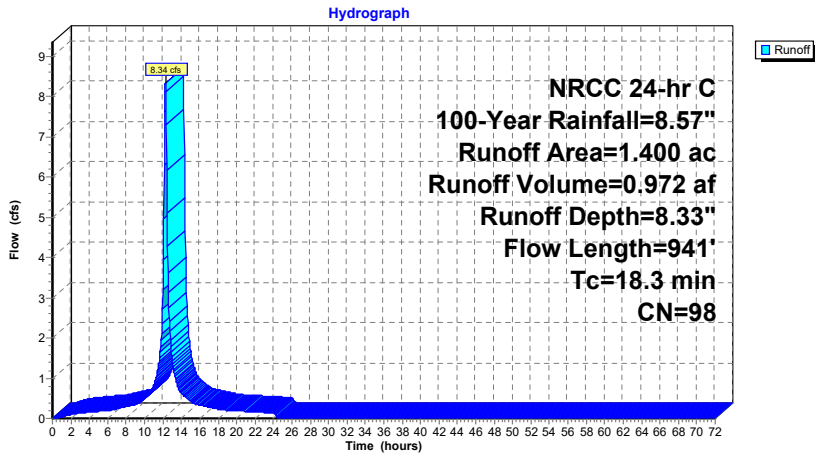
Runoff = 8.34 cfs @ 12.26 hrs, Volume= 0.972 af, Depth= 8.33"
Routed to Link 30L : Moodna Creek Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
* 1.400	98	Impervious
1.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.9	100	0.0950	0.12		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
1.2	244	0.0471	3.49		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
1.5	206	0.0194	2.24		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.7	391	0.0562	3.82		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
18.3	941				Total

Subcatchment 29S: Moodna Creek Undisturbed Imp.



2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023
Page 254

Hydrograph for Subcatchment 29S: Moodna Creek Undisturbed Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	8.33	0.00
1.00	0.10	0.01	0.03	53.00	8.57	8.33	0.00
2.00	0.21	0.08	0.10	54.00	8.57	8.33	0.00
3.00	0.33	0.17	0.13	55.00	8.57	8.33	0.00
4.00	0.45	0.28	0.16	56.00	8.57	8.33	0.00
5.00	0.59	0.40	0.18	57.00	8.57	8.33	0.00
6.00	0.74	0.54	0.20	58.00	8.57	8.33	0.00
7.00	0.91	0.70	0.24	59.00	8.57	8.33	0.00
8.00	1.11	0.90	0.30	60.00	8.57	8.33	0.00
9.00	1.36	1.14	0.35	61.00	8.57	8.33	0.00
10.00	1.69	1.47	0.50	62.00	8.57	8.33	0.00
11.00	2.21	1.98	0.82	63.00	8.57	8.33	0.00
12.00	4.08	3.85	3.22	64.00	8.57	8.33	0.00
13.00	6.36	6.12	1.43	65.00	8.57	8.33	0.00
14.00	6.88	6.64	0.62	66.00	8.57	8.33	0.00
15.00	7.21	6.97	0.43	67.00	8.57	8.33	0.00
16.00	7.46	7.22	0.33	68.00	8.57	8.33	0.00
17.00	7.66	7.42	0.28	69.00	8.57	8.33	0.00
18.00	7.83	7.60	0.23	70.00	8.57	8.33	0.00
19.00	7.98	7.74	0.20	71.00	8.57	8.33	0.00
20.00	8.12	7.88	0.19	72.00	8.57	8.33	0.00
21.00	8.24	8.00	0.18				
22.00	8.36	8.12	0.16				
23.00	8.47	8.23	0.15				
24.00	8.57	8.33	0.14				
25.00	8.57	8.33	0.00				
26.00	8.57	8.33	0.00				
27.00	8.57	8.33	0.00				
28.00	8.57	8.33	0.00				
29.00	8.57	8.33	0.00				
30.00	8.57	8.33	0.00				
31.00	8.57	8.33	0.00				
32.00	8.57	8.33	0.00				
33.00	8.57	8.33	0.00				
34.00	8.57	8.33	0.00				
35.00	8.57	8.33	0.00				
36.00	8.57	8.33	0.00				
37.00	8.57	8.33	0.00				
38.00	8.57	8.33	0.00				
39.00	8.57	8.33	0.00				
40.00	8.57	8.33	0.00				
41.00	8.57	8.33	0.00				
42.00	8.57	8.33	0.00				
43.00	8.57	8.33	0.00				
44.00	8.57	8.33	0.00				
45.00	8.57	8.33	0.00				
46.00	8.57	8.33	0.00				
47.00	8.57	8.33	0.00				
48.00	8.57	8.33	0.00				
49.00	8.57	8.33	0.00				
50.00	8.57	8.33	0.00				
51.00	8.57	8.33	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 255

Summary for Subcatchment 31S: SA AG INF Basin B Perv.

[47] Hint: Peak is 482% of capacity of segment #3

[47] Hint: Peak is 140% of capacity of segment #4

[47] Hint: Peak is 318% of capacity of segment #5

[47] Hint: Peak is 241% of capacity of segment #6

[47] Hint: Peak is 170% of capacity of segment #7

Runoff = 38.80 cfs @ 12.16 hrs, Volume= 3.040 af, Depth= 6.16"
Routed to Pond 8P : Aboveground Infiltration Basin 'B'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
5.920	80	>75% Grass cover, Good, HSG D
5.920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0145	1.00		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
1.1	159	0.0145	2.44		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
3.3	902	0.0050	4.55	8.05	Pipe Channel, CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.3	282	0.0596	15.72	27.78	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.9	360	0.0115	6.91	12.20	Pipe Channel, EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	449	0.0200	9.11	16.09	Pipe Channel, FG 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
1.1	826	0.0400	12.88	22.76	Pipe Channel, GH 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
9.2	3,078	Total			

2023-09 Proposed

Prepared by Dynamic Engineering

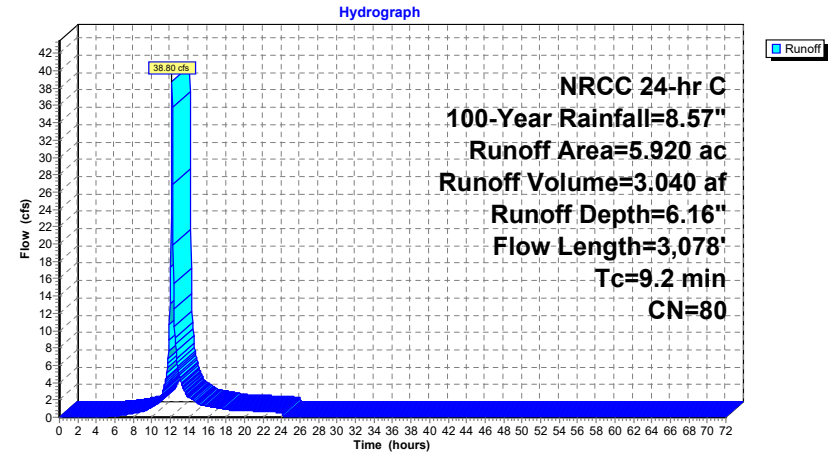
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 256

Subcatchment 31S: SA AG INF Basin B Perv.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 257

Hydrograph for Subcatchment 31S: SA AG INF Basin B Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	6.16	0.00
1.00	0.10	0.00	0.00	53.00	8.57	6.16	0.00
2.00	0.21	0.00	0.00	54.00	8.57	6.16	0.00
3.00	0.33	0.00	0.00	55.00	8.57	6.16	0.00
4.00	0.45	0.00	0.00	56.00	8.57	6.16	0.00
5.00	0.59	0.00	0.04	57.00	8.57	6.16	0.00
6.00	0.74	0.02	0.13	58.00	8.57	6.16	0.00
7.00	0.91	0.06	0.27	59.00	8.57	6.16	0.00
8.00	1.11	0.12	0.45	60.00	8.57	6.16	0.00
9.00	1.36	0.22	0.67	61.00	8.57	6.16	0.00
10.00	1.69	0.39	1.20	62.00	8.57	6.16	0.00
11.00	2.21	0.69	2.46	63.00	8.57	6.16	0.00
12.00	4.08	2.11	17.30	64.00	8.57	6.16	0.00
13.00	6.36	4.11	4.64	65.00	8.57	6.16	0.00
14.00	6.88	4.58	2.30	66.00	8.57	6.16	0.00
15.00	7.21	4.89	1.59	67.00	8.57	6.16	0.00
16.00	7.46	5.12	1.29	68.00	8.57	6.16	0.00
17.00	7.66	5.31	1.08	69.00	8.57	6.16	0.00
18.00	7.83	5.47	0.88	70.00	8.57	6.16	0.00
19.00	7.98	5.61	0.80	71.00	8.57	6.16	0.00
20.00	8.12	5.73	0.75	72.00	8.57	6.16	0.00
21.00	8.24	5.85	0.70				
22.00	8.36	5.97	0.64				
23.00	8.47	6.07	0.59				
24.00	8.57	6.16	0.54				
25.00	8.57	6.16	0.00				
26.00	8.57	6.16	0.00				
27.00	8.57	6.16	0.00				
28.00	8.57	6.16	0.00				
29.00	8.57	6.16	0.00				
30.00	8.57	6.16	0.00				
31.00	8.57	6.16	0.00				
32.00	8.57	6.16	0.00				
33.00	8.57	6.16	0.00				
34.00	8.57	6.16	0.00				
35.00	8.57	6.16	0.00				
36.00	8.57	6.16	0.00				
37.00	8.57	6.16	0.00				
38.00	8.57	6.16	0.00				
39.00	8.57	6.16	0.00				
40.00	8.57	6.16	0.00				
41.00	8.57	6.16	0.00				
42.00	8.57	6.16	0.00				
43.00	8.57	6.16	0.00				
44.00	8.57	6.16	0.00				
45.00	8.57	6.16	0.00				
46.00	8.57	6.16	0.00				
47.00	8.57	6.16	0.00				
48.00	8.57	6.16	0.00				
49.00	8.57	6.16	0.00				
50.00	8.57	6.16	0.00				
51.00	8.57	6.16	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 258

Summary for Subcatchment 32S: SA AS INF Basin C Perv.

[47] Hint: Peak is 959% of capacity of segment #3

[47] Hint: Peak is 590% of capacity of segment #4

Runoff = 47.44 cfs @ 12.19 hrs, Volume= 3.979 af, Depth= 6.16"
 Routed to Pond 24P : Aboveground Infiltration Basin 'C'

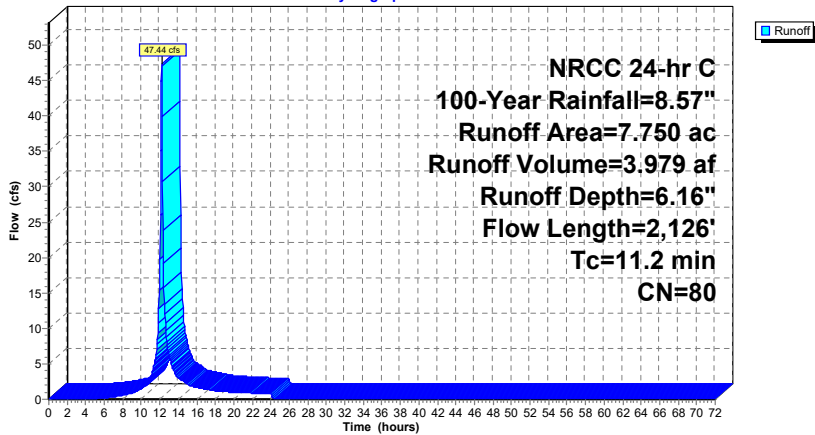
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
7.750	80	>75% Grass cover, Good, HSG D
7.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	60	0.0663	0.21		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19"
0.6	40	0.0325	1.15		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 2.19"
0.4	100	0.0050	4.03	4.95	Pipe Channel, CD 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.012
3.2	886	0.0050	4.55	8.05	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.8	342	0.0050	7.23	51.09	Pipe Channel, EF 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012
1.1	545	0.0050	8.01	77.07	Pipe Channel, FG 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.012
0.1	37	0.0050	8.76	110.04	Pipe Channel, GH 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.012
0.0	10	0.0400	26.79	426.07	Pipe Channel, HI 54.0" Round Area= 15.9 sf Perim= 14.1' r= 1.13' n= 0.012
0.1	106	0.0400	28.74	564.29	Pipe Channel, IJ 60.0" Round Area= 19.6 sf Perim= 15.7' r= 1.25' n= 0.012
11.2	2,126	Total			

Subcatchment 32S: SA AS INF Basin C Perv.

Hydrograph



Hydrograph for Subcatchment 32S: SA AS INF Basin C Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	6.16	0.00
1.00	0.10	0.00	0.00	53.00	8.57	6.16	0.00
2.00	0.21	0.00	0.00	54.00	8.57	6.16	0.00
3.00	0.33	0.00	0.00	55.00	8.57	6.16	0.00
4.00	0.45	0.00	0.00	56.00	8.57	6.16	0.00
5.00	0.59	0.00	0.05	57.00	8.57	6.16	0.00
6.00	0.74	0.02	0.17	58.00	8.57	6.16	0.00
7.00	0.91	0.06	0.35	59.00	8.57	6.16	0.00
8.00	1.11	0.12	0.58	60.00	8.57	6.16	0.00
9.00	1.36	0.22	0.87	61.00	8.57	6.16	0.00
10.00	1.69	0.39	1.54	62.00	8.57	6.16	0.00
11.00	2.21	0.69	3.13	63.00	8.57	6.16	0.00
12.00	4.08	2.11	19.77	64.00	8.57	6.16	0.00
13.00	6.36	4.11	6.26	65.00	8.57	6.16	0.00
14.00	6.88	4.58	3.03	66.00	8.57	6.16	0.00
15.00	7.21	4.89	2.11	67.00	8.57	6.16	0.00
16.00	7.46	5.12	1.69	68.00	8.57	6.16	0.00
17.00	7.66	5.31	1.43	69.00	8.57	6.16	0.00
18.00	7.83	5.47	1.16	70.00	8.57	6.16	0.00
19.00	7.98	5.61	1.04	71.00	8.57	6.16	0.00
20.00	8.12	5.73	0.98	72.00	8.57	6.16	0.00
21.00	8.24	5.85	0.91				
22.00	8.36	5.97	0.85				
23.00	8.47	6.07	0.78				
24.00	8.57	6.16	0.71				
25.00	8.57	6.16	0.00				
26.00	8.57	6.16	0.00				
27.00	8.57	6.16	0.00				
28.00	8.57	6.16	0.00				
29.00	8.57	6.16	0.00				
30.00	8.57	6.16	0.00				
31.00	8.57	6.16	0.00				
32.00	8.57	6.16	0.00				
33.00	8.57	6.16	0.00				
34.00	8.57	6.16	0.00				
35.00	8.57	6.16	0.00				
36.00	8.57	6.16	0.00				
37.00	8.57	6.16	0.00				
38.00	8.57	6.16	0.00				
39.00	8.57	6.16	0.00				
40.00	8.57	6.16	0.00				
41.00	8.57	6.16	0.00				
42.00	8.57	6.16	0.00				
43.00	8.57	6.16	0.00				
44.00	8.57	6.16	0.00				
45.00	8.57	6.16	0.00				
46.00	8.57	6.16	0.00				
47.00	8.57	6.16	0.00				
48.00	8.57	6.16	0.00				
49.00	8.57	6.16	0.00				
50.00	8.57	6.16	0.00				
51.00	8.57	6.16	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 261

Summary for Subcatchment 33S: SA AG DET Basin A Perv.

[47] Hint: Peak is 233% of capacity of segment #4

Runoff = 18.73 cfs @ 12.28 hrs, Volume= 1.982 af, Depth= 6.14"
 Routed to Pond 9P : Aboveground Infiltration Basin 'A'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
0.090	74	>75% Grass cover, Good, HSG C
3.780	80	>75% Grass cover, Good, HSG D
3.870		Weighted Average
3.870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	80	0.0326	0.16		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19"
0.5	20	0.0150	0.74		Sheet Flow, BC Smooth surfaces n= 0.011 P2= 2.19"
0.9	153	0.0206	2.91		Shallow Concentrated Flow, CD Paved Kv= 20.3 fps
10.1	2,772	0.0050	4.55	8.05	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
19.6	3,025	Total			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

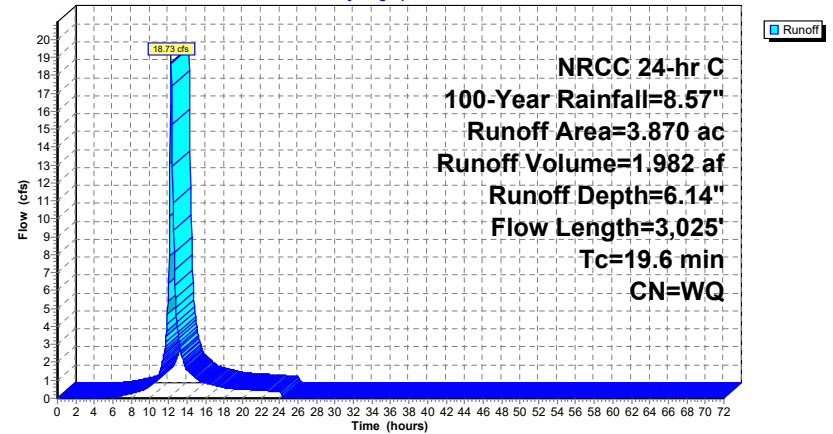
NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 262

Subcatchment 33S: SA AG DET Basin A Perv.

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 263

Hydrograph for Subcatchment 33S: SA AG DET Basin A Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	6.16	0.00
1.00	0.10	0.00	0.00	53.00	8.57	6.16	0.00
2.00	0.21	0.00	0.00	54.00	8.57	6.16	0.00
3.00	0.33	0.00	0.00	55.00	8.57	6.16	0.00
4.00	0.45	0.00	0.00	56.00	8.57	6.16	0.00
5.00	0.59	0.00	0.02	57.00	8.57	6.16	0.00
6.00	0.74	0.02	0.08	58.00	8.57	6.16	0.00
7.00	0.91	0.06	0.16	59.00	8.57	6.16	0.00
8.00	1.11	0.12	0.27	60.00	8.57	6.16	0.00
9.00	1.36	0.22	0.41	61.00	8.57	6.16	0.00
10.00	1.69	0.39	0.71	62.00	8.57	6.16	0.00
11.00	2.21	0.69	1.38	63.00	8.57	6.16	0.00
12.00	4.08	2.11	6.42	64.00	8.57	6.16	0.00
13.00	6.36	4.11	3.71	65.00	8.57	6.16	0.00
14.00	6.88	4.58	1.59	66.00	8.57	6.16	0.00
15.00	7.21	4.89	1.11	67.00	8.57	6.16	0.00
16.00	7.46	5.12	0.86	68.00	8.57	6.16	0.00
17.00	7.66	5.31	0.73	69.00	8.57	6.16	0.00
18.00	7.83	5.47	0.59	70.00	8.57	6.16	0.00
19.00	7.98	5.61	0.53	71.00	8.57	6.16	0.00
20.00	8.12	5.73	0.49	72.00	8.57	6.16	0.00
21.00	8.24	5.85	0.46				
22.00	8.36	5.97	0.43				
23.00	8.47	6.07	0.39				
24.00	8.57	6.16	0.36				
25.00	8.57	6.16	0.00				
26.00	8.57	6.16	0.00				
27.00	8.57	6.16	0.00				
28.00	8.57	6.16	0.00				
29.00	8.57	6.16	0.00				
30.00	8.57	6.16	0.00				
31.00	8.57	6.16	0.00				
32.00	8.57	6.16	0.00				
33.00	8.57	6.16	0.00				
34.00	8.57	6.16	0.00				
35.00	8.57	6.16	0.00				
36.00	8.57	6.16	0.00				
37.00	8.57	6.16	0.00				
38.00	8.57	6.16	0.00				
39.00	8.57	6.16	0.00				
40.00	8.57	6.16	0.00				
41.00	8.57	6.16	0.00				
42.00	8.57	6.16	0.00				
43.00	8.57	6.16	0.00				
44.00	8.57	6.16	0.00				
45.00	8.57	6.16	0.00				
46.00	8.57	6.16	0.00				
47.00	8.57	6.16	0.00				
48.00	8.57	6.16	0.00				
49.00	8.57	6.16	0.00				
50.00	8.57	6.16	0.00				
51.00	8.57	6.16	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 264

Summary for Subcatchment 36S: SA UG Det Basin F Perv.

Runoff = 2.51 cfs @ 12.15 hrs, Volume= 0.186 af, Depth= 5.58"
 Routed to Pond 18P : Underground Detention Basin 'F'

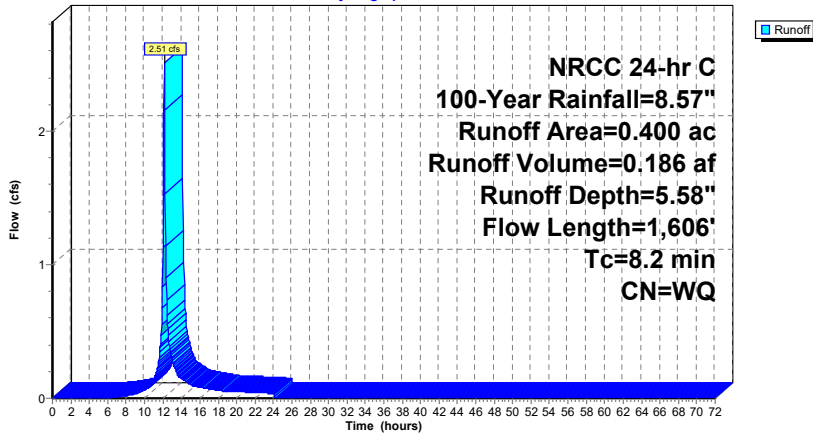
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
0.320	74	>75% Grass cover, Good, HSG C
0.080	80	>75% Grass cover, Good, HSG D
0.400		Weighted Average
0.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0195	1.13		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
2.0	338	0.0194	2.83		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
0.3	63	0.0050	3.72	4.57	Pipe Channel, RCP_Round 15" 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
4.4	1,105	0.0050	4.20	7.43	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
8.2	1,606	Total			

Subcatchment 36S: SA UG Det Basin F Perv.

Hydrograph



Hydrograph for Subcatchment 36S: SA UG Det Basin F Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	5.56	0.00
1.00	0.10	0.00	0.00	53.00	8.57	5.56	0.00
2.00	0.21	0.00	0.00	54.00	8.57	5.56	0.00
3.00	0.33	0.00	0.00	55.00	8.57	5.56	0.00
4.00	0.45	0.00	0.00	56.00	8.57	5.56	0.00
5.00	0.59	0.00	0.00	57.00	8.57	5.56	0.00
6.00	0.74	0.00	0.00	58.00	8.57	5.56	0.00
7.00	0.91	0.02	0.01	59.00	8.57	5.56	0.00
8.00	1.11	0.05	0.02	60.00	8.57	5.56	0.00
9.00	1.36	0.12	0.03	61.00	8.57	5.56	0.00
10.00	1.69	0.24	0.06	62.00	8.57	5.56	0.00
11.00	2.21	0.49	0.14	63.00	8.57	5.56	0.00
12.00	4.08	1.73	1.13	64.00	8.57	5.56	0.00
13.00	6.36	3.59	0.29	65.00	8.57	5.56	0.00
14.00	6.88	4.04	0.15	66.00	8.57	5.56	0.00
15.00	7.21	4.34	0.10	67.00	8.57	5.56	0.00
16.00	7.46	4.55	0.08	68.00	8.57	5.56	0.00
17.00	7.66	4.74	0.07	69.00	8.57	5.56	0.00
18.00	7.83	4.89	0.06	70.00	8.57	5.56	0.00
19.00	7.98	5.02	0.05	71.00	8.57	5.56	0.00
20.00	8.12	5.15	0.05	72.00	8.57	5.56	0.00
21.00	8.24	5.26	0.05				
22.00	8.36	5.37	0.04				
23.00	8.47	5.47	0.04				
24.00	8.57	5.56	0.04				
25.00	8.57	5.56	0.00				
26.00	8.57	5.56	0.00				
27.00	8.57	5.56	0.00				
28.00	8.57	5.56	0.00				
29.00	8.57	5.56	0.00				
30.00	8.57	5.56	0.00				
31.00	8.57	5.56	0.00				
32.00	8.57	5.56	0.00				
33.00	8.57	5.56	0.00				
34.00	8.57	5.56	0.00				
35.00	8.57	5.56	0.00				
36.00	8.57	5.56	0.00				
37.00	8.57	5.56	0.00				
38.00	8.57	5.56	0.00				
39.00	8.57	5.56	0.00				
40.00	8.57	5.56	0.00				
41.00	8.57	5.56	0.00				
42.00	8.57	5.56	0.00				
43.00	8.57	5.56	0.00				
44.00	8.57	5.56	0.00				
45.00	8.57	5.56	0.00				
46.00	8.57	5.56	0.00				
47.00	8.57	5.56	0.00				
48.00	8.57	5.56	0.00				
49.00	8.57	5.56	0.00				
50.00	8.57	5.56	0.00				
51.00	8.57	5.56	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023
Page 267

Summary for Subcatchment 37S: SA AG INF Basin G/H Perv.

- [47] Hint: Peak is 585% of capacity of segment #3
- [47] Hint: Peak is 322% of capacity of segment #4
- [47] Hint: Peak is 310% of capacity of segment #5
- [47] Hint: Peak is 373% of capacity of segment #6
- [47] Hint: Peak is 1067% of capacity of segment #7

Runoff = 79.28 cfs @ 12.16 hrs, Volume= 6.261 af, Depth= 6.04"
Routed to Pond 20P : Combined Aboveground Infiltration Basin 'G/H'

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
2.100	74	>75% Grass cover, Good, HSG C
10.340	80	>75% Grass cover, Good, HSG D
12.440		Weighted Average
12.440		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	100	0.0142	0.99		Sheet Flow, AB Smooth surfaces n= 0.011 P2= 2.19"
2.1	303	0.0142	2.42		Shallow Concentrated Flow, BC Paved Kv= 20.3 fps
0.7	327	0.0142	7.67	13.56	Pipe Channel, CD 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	335	0.0468	13.93	24.62	Pipe Channel, DE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.4	370	0.0504	14.46	25.55	Pipe Channel, EF 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
0.2	141	0.0348	12.01	21.23	Pipe Channel, FG 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.012
3.9	989	0.0050	4.20	7.43	Pipe Channel, RCP_Round 18" 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013
9.4	2,565	Total			

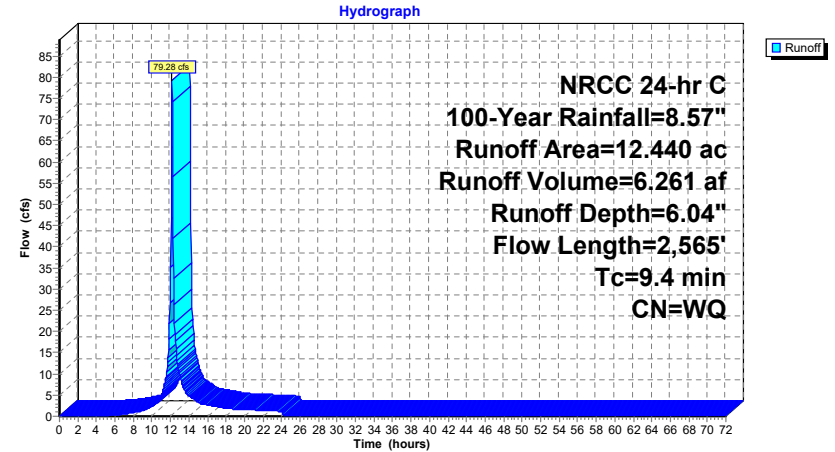
2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023
Page 268

Subcatchment 37S: SA AG INF Basin G/H Perv.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 269

Hydrograph for Subcatchment 37S: SA AG INF Basin G/H Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	6.04	0.00
1.00	0.10	0.00	0.00	53.00	8.57	6.04	0.00
2.00	0.21	0.00	0.00	54.00	8.57	6.04	0.00
3.00	0.33	0.00	0.00	55.00	8.57	6.04	0.00
4.00	0.45	0.00	0.00	56.00	8.57	6.04	0.00
5.00	0.59	0.00	0.08	57.00	8.57	6.04	0.00
6.00	0.74	0.01	0.24	58.00	8.57	6.04	0.00
7.00	0.91	0.05	0.51	59.00	8.57	6.04	0.00
8.00	1.11	0.10	0.87	60.00	8.57	6.04	0.00
9.00	1.36	0.20	1.32	61.00	8.57	6.04	0.00
10.00	1.69	0.35	2.39	62.00	8.57	6.04	0.00
11.00	2.21	0.65	4.96	63.00	8.57	6.04	0.00
12.00	4.08	2.03	35.07	64.00	8.57	6.04	0.00
13.00	6.36	4.00	9.68	65.00	8.57	6.04	0.00
14.00	6.88	4.47	4.78	66.00	8.57	6.04	0.00
15.00	7.21	4.78	3.31	67.00	8.57	6.04	0.00
16.00	7.46	5.00	2.68	68.00	8.57	6.04	0.00
17.00	7.66	5.20	2.26	69.00	8.57	6.04	0.00
18.00	7.83	5.35	1.83	70.00	8.57	6.04	0.00
19.00	7.98	5.49	1.66	71.00	8.57	6.04	0.00
20.00	8.12	5.62	1.56	72.00	8.57	6.04	0.00
21.00	8.24	5.74	1.45				
22.00	8.36	5.85	1.34				
23.00	8.47	5.95	1.24				
24.00	8.57	6.04	1.13				
25.00	8.57	6.04	0.00				
26.00	8.57	6.04	0.00				
27.00	8.57	6.04	0.00				
28.00	8.57	6.04	0.00				
29.00	8.57	6.04	0.00				
30.00	8.57	6.04	0.00				
31.00	8.57	6.04	0.00				
32.00	8.57	6.04	0.00				
33.00	8.57	6.04	0.00				
34.00	8.57	6.04	0.00				
35.00	8.57	6.04	0.00				
36.00	8.57	6.04	0.00				
37.00	8.57	6.04	0.00				
38.00	8.57	6.04	0.00				
39.00	8.57	6.04	0.00				
40.00	8.57	6.04	0.00				
41.00	8.57	6.04	0.00				
42.00	8.57	6.04	0.00				
43.00	8.57	6.04	0.00				
44.00	8.57	6.04	0.00				
45.00	8.57	6.04	0.00				
46.00	8.57	6.04	0.00				
47.00	8.57	6.04	0.00				
48.00	8.57	6.04	0.00				
49.00	8.57	6.04	0.00				
50.00	8.57	6.04	0.00				
51.00	8.57	6.04	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 270

Summary for Subcatchment 38S: SA South (Rt 9) Undetained Perv.

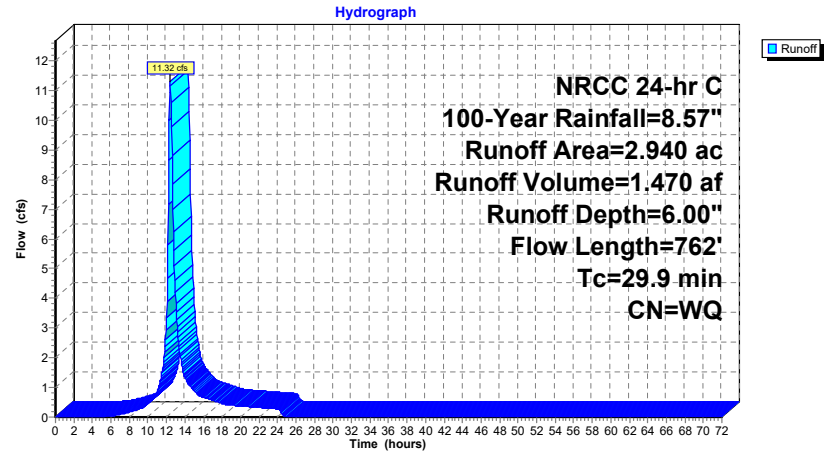
Runoff = 11.32 cfs @ 12.41 hrs, Volume= 1.470 af, Depth= 6.00"
Routed to Link 39L : Route 9 Undetained Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
0.650	74	>75% Grass cover, Good, HSG C
2.290	80	>75% Grass cover, Good, HSG D
2.940		Weighted Average
2.940		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	85	0.0162	0.13		Sheet Flow, AB Grass: Short n= 0.150 P2= 2.19" Using McCuen-Spiess flow length
2.2	83	0.0162	0.64		Shallow Concentrated Flow, BC Woodland Kv= 5.0 fps
6.4	195	0.0103	0.51		Shallow Concentrated Flow, CD Woodland Kv= 5.0 fps
10.0	399	0.0177	0.67		Shallow Concentrated Flow, DE Woodland Kv= 5.0 fps
29.9	762	Total			

Subcatchment 38S: SA South (Rt 9) Undetained Perv.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 271

Hydrograph for Subcatchment 38S: SA South (Rt 9) Undetained Perv.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	6.04	0.00
1.00	0.10	0.00	0.00	53.00	8.57	6.04	0.00
2.00	0.21	0.00	0.00	54.00	8.57	6.04	0.00
3.00	0.33	0.00	0.00	55.00	8.57	6.04	0.00
4.00	0.45	0.00	0.00	56.00	8.57	6.04	0.00
5.00	0.59	0.00	0.01	57.00	8.57	6.04	0.00
6.00	0.74	0.01	0.04	58.00	8.57	6.04	0.00
7.00	0.91	0.05	0.09	59.00	8.57	6.04	0.00
8.00	1.11	0.10	0.17	60.00	8.57	6.04	0.00
9.00	1.36	0.20	0.27	61.00	8.57	6.04	0.00
10.00	1.69	0.35	0.47	62.00	8.57	6.04	0.00
11.00	2.21	0.65	0.87	63.00	8.57	6.04	0.00
12.00	4.08	2.03	3.33	64.00	8.57	6.04	0.00
13.00	6.36	4.00	3.85	65.00	8.57	6.04	0.00
14.00	6.88	4.47	1.32	66.00	8.57	6.04	0.00
15.00	7.21	4.78	0.89	67.00	8.57	6.04	0.00
16.00	7.46	5.00	0.66	68.00	8.57	6.04	0.00
17.00	7.66	5.20	0.56	69.00	8.57	6.04	0.00
18.00	7.83	5.35	0.46	70.00	8.57	6.04	0.00
19.00	7.98	5.49	0.40	71.00	8.57	6.04	0.00
20.00	8.12	5.62	0.37	72.00	8.57	6.04	0.00
21.00	8.24	5.74	0.35				
22.00	8.36	5.85	0.32				
23.00	8.47	5.95	0.30				
24.00	8.57	6.04	0.27				
25.00	8.57	6.04	0.01				
26.00	8.57	6.04	0.00				
27.00	8.57	6.04	0.00				
28.00	8.57	6.04	0.00				
29.00	8.57	6.04	0.00				
30.00	8.57	6.04	0.00				
31.00	8.57	6.04	0.00				
32.00	8.57	6.04	0.00				
33.00	8.57	6.04	0.00				
34.00	8.57	6.04	0.00				
35.00	8.57	6.04	0.00				
36.00	8.57	6.04	0.00				
37.00	8.57	6.04	0.00				
38.00	8.57	6.04	0.00				
39.00	8.57	6.04	0.00				
40.00	8.57	6.04	0.00				
41.00	8.57	6.04	0.00				
42.00	8.57	6.04	0.00				
43.00	8.57	6.04	0.00				
44.00	8.57	6.04	0.00				
45.00	8.57	6.04	0.00				
46.00	8.57	6.04	0.00				
47.00	8.57	6.04	0.00				
48.00	8.57	6.04	0.00				
49.00	8.57	6.04	0.00				
50.00	8.57	6.04	0.00				
51.00	8.57	6.04	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 272

Summary for Subcatchment 40S: Route 9W Undisturbed Imp.

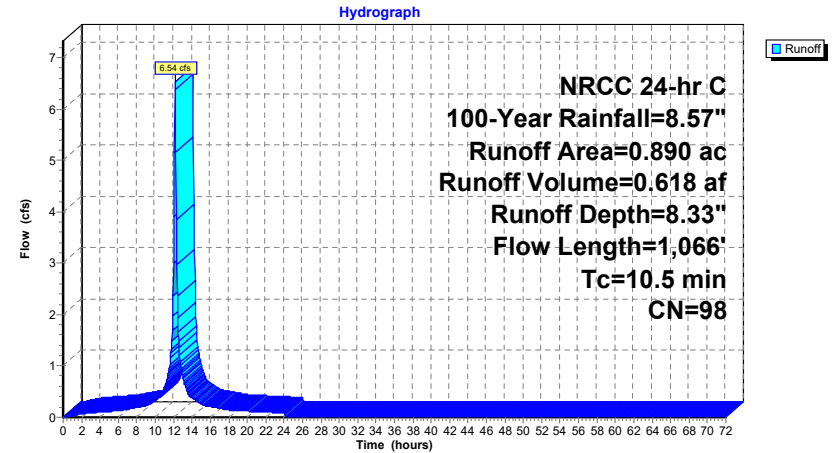
Runoff = 6.54 cfs @ 12.18 hrs, Volume= 0.618 af, Depth= 8.33"
Routed to Link 11L : Route 9 Undisturbed Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
NRCC 24-hr C 100-Year Rainfall=8.57"

Area (ac)	CN	Description
* 0.890	98	Impervious
0.890		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	10	0.0275	0.05		Sheet Flow, AB Woods: Light underbrush n= 0.400 P2= 2.19"
0.2	67	0.0784	4.51		Shallow Concentrated Flow, BC Unpaved Kv= 16.1 fps
3.8	340	0.0088	1.51		Shallow Concentrated Flow, CD Unpaved Kv= 16.1 fps
1.5	311	0.0451	3.42		Shallow Concentrated Flow, DE Unpaved Kv= 16.1 fps
1.4	338	0.0621	4.01		Shallow Concentrated Flow, EF Unpaved Kv= 16.1 fps
10.5	1,066	Total			

Subcatchment 40S: Route 9W Undisturbed Imp.



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 273

Hydrograph for Subcatchment 40S: Route 9W Undisturbed Imp.

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	52.00	8.57	8.33	0.00
1.00	0.10	0.01	0.03	53.00	8.57	8.33	0.00
2.00	0.21	0.08	0.07	54.00	8.57	8.33	0.00
3.00	0.33	0.17	0.09	55.00	8.57	8.33	0.00
4.00	0.45	0.28	0.10	56.00	8.57	8.33	0.00
5.00	0.59	0.40	0.12	57.00	8.57	8.33	0.00
6.00	0.74	0.54	0.13	58.00	8.57	8.33	0.00
7.00	0.91	0.70	0.16	59.00	8.57	8.33	0.00
8.00	1.11	0.90	0.19	60.00	8.57	8.33	0.00
9.00	1.36	1.14	0.23	61.00	8.57	8.33	0.00
10.00	1.69	1.47	0.33	62.00	8.57	8.33	0.00
11.00	2.21	1.98	0.57	63.00	8.57	8.33	0.00
12.00	4.08	3.85	3.00	64.00	8.57	8.33	0.00
13.00	6.36	6.12	0.78	65.00	8.57	8.33	0.00
14.00	6.88	6.64	0.38	66.00	8.57	8.33	0.00
15.00	7.21	6.97	0.26	67.00	8.57	8.33	0.00
16.00	7.46	7.22	0.21	68.00	8.57	8.33	0.00
17.00	7.66	7.42	0.18	69.00	8.57	8.33	0.00
18.00	7.83	7.60	0.14	70.00	8.57	8.33	0.00
19.00	7.98	7.74	0.13	71.00	8.57	8.33	0.00
20.00	8.12	7.88	0.12	72.00	8.57	8.33	0.00
21.00	8.24	8.00	0.11				
22.00	8.36	8.12	0.10				
23.00	8.47	8.23	0.09				
24.00	8.57	8.33	0.09				
25.00	8.57	8.33	0.00				
26.00	8.57	8.33	0.00				
27.00	8.57	8.33	0.00				
28.00	8.57	8.33	0.00				
29.00	8.57	8.33	0.00				
30.00	8.57	8.33	0.00				
31.00	8.57	8.33	0.00				
32.00	8.57	8.33	0.00				
33.00	8.57	8.33	0.00				
34.00	8.57	8.33	0.00				
35.00	8.57	8.33	0.00				
36.00	8.57	8.33	0.00				
37.00	8.57	8.33	0.00				
38.00	8.57	8.33	0.00				
39.00	8.57	8.33	0.00				
40.00	8.57	8.33	0.00				
41.00	8.57	8.33	0.00				
42.00	8.57	8.33	0.00				
43.00	8.57	8.33	0.00				
44.00	8.57	8.33	0.00				
45.00	8.57	8.33	0.00				
46.00	8.57	8.33	0.00				
47.00	8.57	8.33	0.00				
48.00	8.57	8.33	0.00				
49.00	8.57	8.33	0.00				
50.00	8.57	8.33	0.00				
51.00	8.57	8.33	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 274

Summary for Pond 8P: Aboveground Infiltration Basin 'B'

Inflow Area = 28.990 ac, 79.58% Impervious, Inflow Depth = 7.89" for 100-Year event
 Inflow = 217.23 cfs @ 12.16 hrs, Volume= 19,054 af
 Outflow = 41.31 cfs @ 12.59 hrs, Volume= 19,054 af, Atten= 81%, Lag= 26.0 min
 Discarded = 7.77 cfs @ 12.59 hrs, Volume= 11,680 af
 Primary = 33.54 cfs @ 12.59 hrs, Volume= 7,374 af
 Routed to Link 10L : Moodna Creek
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 147.86' @ 12.59 hrs Surf.Area= 70,732 sf Storage= 353,575 cf

Plug-Flow detention time= 223.7 min calculated for 19,041 af (100% of inflow)
 Center-of-Mass det. time= 223.9 min (978.6 - 754.7)

Volume	Invert	Avail.Storage	Storage Description
#1	142.00'	436,638 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
142.00	50,059	0	0
143.00	53,496	51,778	51,778
144.00	56,974	55,235	107,013
145.00	60,523	58,749	165,761
146.00	64,103	62,313	228,074
147.00	67,754	65,929	294,003
148.00	71,216	69,485	363,488
149.00	75,085	73,151	436,638

Device	Routing	Invert	Outlet Devices
#1	Primary	142.00'	30.0" Round Culvert L= 55.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 142.00' / 141.72' S= 0.0051 '/' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Discarded	142.00'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 133.70'
#3	Device 1	144.15'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Device 1	144.90'	2.5' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#5	Device 1	148.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	148.50'	40.0' long x 10.0' breadth 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

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 275

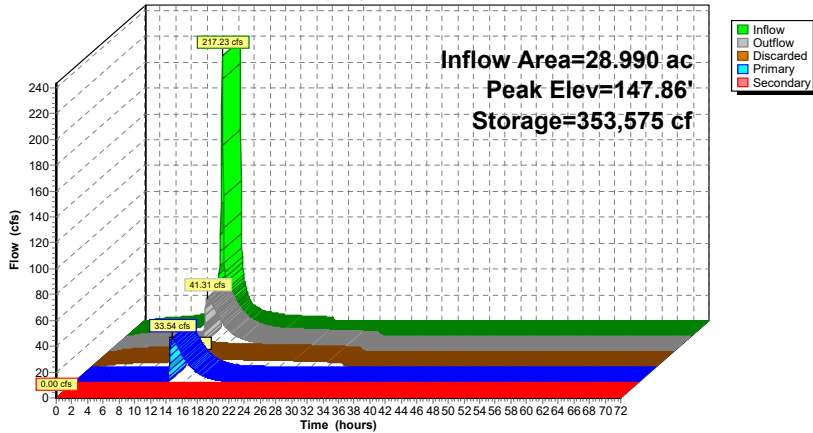
Discarded OutFlow Max=7.77 cfs @ 12.59 hrs HW=147.86' (Free Discharge)
 ↳ 2=Exfiltration (Controls 7.77 cfs)

Primary OutFlow Max=33.53 cfs @ 12.59 hrs HW=147.86' (Free Discharge)
 ↳ 1=Culvert (Passes 33.53 cfs of 50.75 cfs potential flow)
 ↳ 3=Orifice/Grate (Orifice Controls 1.76 cfs @ 8.96 fps)
 ↳ 4=Sharp-Crested Rectangular Weir (Weir Controls 31.77 cfs @ 5.63 fps)
 ↳ 5=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=142.00' (Free Discharge)
 ↳ 6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 8P: Aboveground Infiltration Basin 'B'

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

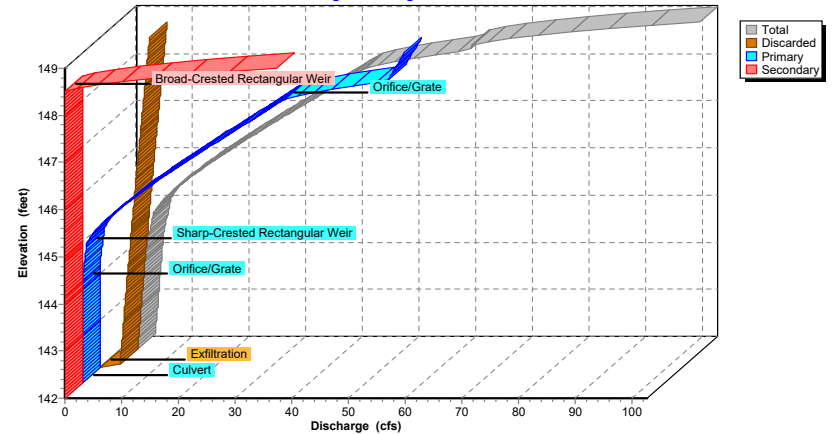
NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 276

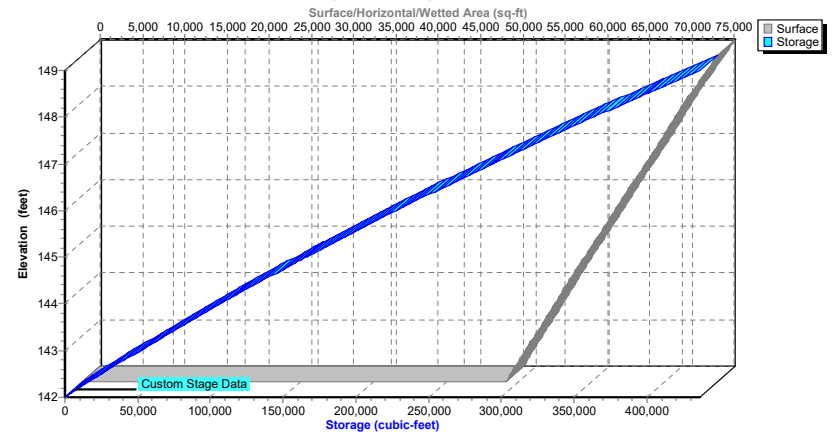
Pond 8P: Aboveground Infiltration Basin 'B'

Stage-Discharge



Pond 8P: Aboveground Infiltration Basin 'B'

Stage-Area-Storage



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 277

Hydrograph for Pond 8P: Aboveground Infiltration Basin 'B'

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	142.00	0.00	0.00	0.00	0.00
2.50	2.05	1,868	142.04	1.87	1.87	0.00	0.00
5.00	3.05	2,932	142.06	2.94	2.94	0.00	0.00
7.50	4.91	6,683	142.13	3.56	3.56	0.00	0.00
10.00	9.94	33,695	142.66	3.91	3.91	0.00	0.00
12.50	49.16	352,211	147.84	41.04	7.76	33.28	0.00
15.00	8.26	238,294	146.16	18.08	6.45	11.64	0.00
17.50	5.06	184,596	145.31	8.77	5.80	2.97	0.00
20.00	3.84	158,791	144.88	6.15	5.49	0.66	0.00
22.50	3.17	137,498	144.53	5.56	5.23	0.33	0.00
25.00	0.00	108,172	144.02	4.86	4.86	0.00	0.00
27.50	0.00	66,812	143.28	4.34	4.34	0.00	0.00
30.00	0.00	29,928	142.59	3.87	3.87	0.00	0.00
32.50	0.00	551	142.01	0.55	0.55	0.00	0.00
35.00	0.00	0	142.00	0.00	0.00	0.00	0.00
37.50	0.00	0	142.00	0.00	0.00	0.00	0.00
40.00	0.00	0	142.00	0.00	0.00	0.00	0.00
42.50	0.00	0	142.00	0.00	0.00	0.00	0.00
45.00	0.00	0	142.00	0.00	0.00	0.00	0.00
47.50	0.00	0	142.00	0.00	0.00	0.00	0.00
50.00	0.00	0	142.00	0.00	0.00	0.00	0.00
52.50	0.00	0	142.00	0.00	0.00	0.00	0.00
55.00	0.00	0	142.00	0.00	0.00	0.00	0.00
57.50	0.00	0	142.00	0.00	0.00	0.00	0.00
60.00	0.00	0	142.00	0.00	0.00	0.00	0.00
62.50	0.00	0	142.00	0.00	0.00	0.00	0.00
65.00	0.00	0	142.00	0.00	0.00	0.00	0.00
67.50	0.00	0	142.00	0.00	0.00	0.00	0.00
70.00	0.00	0	142.00	0.00	0.00	0.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 278

Stage-Discharge for Pond 8P: Aboveground Infiltration Basin 'B'

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
142.00	0.00	0.00	0.00	0.00
142.20	3.61	3.61	0.00	0.00
142.40	3.74	3.74	0.00	0.00
142.60	3.88	3.88	0.00	0.00
142.80	4.01	4.01	0.00	0.00
143.00	4.15	4.15	0.00	0.00
143.20	4.28	4.28	0.00	0.00
143.40	4.42	4.42	0.00	0.00
143.60	4.56	4.56	0.00	0.00
143.80	4.70	4.70	0.00	0.00
144.00	4.85	4.85	0.00	0.00
144.20	5.00	4.99	0.01	0.00
144.40	5.30	5.13	0.17	0.00
144.60	5.70	5.28	0.43	0.00
144.80	6.02	5.43	0.60	0.00
145.00	6.56	5.57	0.99	0.00
145.20	7.88	5.72	2.16	0.00
145.40	9.59	5.87	3.72	0.00
145.60	11.58	6.02	5.56	0.00
145.80	13.77	6.17	7.60	0.00
146.00	16.12	6.33	9.80	0.00
146.20	18.60	6.48	12.13	0.00
146.40	21.19	6.63	14.55	0.00
146.60	23.85	6.79	17.06	0.00
146.80	26.57	6.95	19.62	0.00
147.00	29.33	7.10	22.22	0.00
147.20	32.11	7.26	24.85	0.00
147.40	34.90	7.41	27.49	0.00
147.60	37.70	7.57	30.13	0.00
147.80	40.48	7.73	32.75	0.00
148.00	43.23	7.88	35.35	0.00
148.20	50.64	8.05	42.59	0.00
148.40	61.85	8.21	53.64	0.00
148.60	66.20	8.38	54.67	3.15
148.80	80.82	8.55	55.68	16.60
149.00	102.58	8.71	56.68	37.19

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 279

Stage-Area-Storage for Pond 8P: Aboveground Infiltration Basin 'B'

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
142.00	50,059	0	147.20	68,446	307,623
142.10	50,403	5,023	147.30	68,793	314,484
142.20	50,746	10,081	147.40	69,139	321,381
142.30	51,090	15,172	147.50	69,485	328,312
142.40	51,434	20,299	147.60	69,831	335,278
142.50	51,778	25,459	147.70	70,177	342,278
142.60	52,121	30,654	147.80	70,524	349,314
142.70	52,465	35,883	147.90	70,870	356,383
142.80	52,809	41,147	148.00	71,216	363,488
142.90	53,152	46,445	148.10	71,603	370,628
143.00	53,496	51,778	148.20	71,990	377,808
143.10	53,844	57,144	148.30	72,377	385,026
143.20	54,192	62,546	148.40	72,764	392,283
143.30	54,539	67,983	148.50	73,151	399,579
143.40	54,887	73,454	148.60	73,537	406,914
143.50	55,235	78,960	148.70	73,924	414,287
143.60	55,583	84,501	148.80	74,311	421,698
143.70	55,931	90,077	148.90	74,698	429,149
143.80	56,278	95,687	149.00	75,085	436,638
143.90	56,626	101,332			
144.00	56,974	107,013			
144.10	57,329	112,728			
144.20	57,684	118,478			
144.30	58,039	124,264			
144.40	58,394	130,086			
144.50	58,749	135,943			
144.60	59,103	141,836			
144.70	59,458	147,764			
144.80	59,813	153,727			
144.90	60,168	159,726			
145.00	60,523	165,761			
145.10	60,881	171,831			
145.20	61,239	177,937			
145.30	61,597	184,079			
145.40	61,955	190,257			
145.50	62,313	196,470			
145.60	62,671	202,719			
145.70	63,029	209,004			
145.80	63,387	215,325			
145.90	63,745	221,682			
146.00	64,103	228,074			
146.10	64,468	234,503			
146.20	64,833	240,968			
146.30	65,198	247,469			
146.40	65,563	254,007			
146.50	65,929	260,582			
146.60	66,294	267,193			
146.70	66,659	273,841			
146.80	67,024	280,525			
146.90	67,389	287,245			
147.00	67,754	294,003			
147.10	68,100	300,795			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 280

Summary for Pond 9P: Aboveground Infiltration Basin 'A'

Inflow Area = 17.500 ac, 77.89% Impervious, Inflow Depth = 7.85" for 100-Year event
 Inflow = 97.38 cfs @ 12.28 hrs, Volume= 11.443 af
 Outflow = 79.97 cfs @ 12.40 hrs, Volume= 11.443 af, Atten= 18%, Lag= 7.0 min
 Discarded = 1.14 cfs @ 12.40 hrs, Volume= 3.426 af
 Primary = 78.83 cfs @ 12.40 hrs, Volume= 8.017 af
 Routed to Link 10L : Moodna Creek
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 199.46' @ 12.40 hrs Surf.Area= 42,403 sf Storage= 160,983 cf

Plug-Flow detention time= 346.6 min calculated for 11.435 af (100% of inflow)
 Center-of-Mass det. time= 347.8 min (1,113.1 - 765.2)

Volume	Invert	Avail.Storage	Storage Description
#1	195.00'	184,484 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
195.00	29,984	0	0
196.00	32,723	31,354	31,354
197.00	35,439	34,081	65,435
198.00	38,254	36,847	102,281
199.00	41,092	39,673	141,954
200.00	43,968	42,530	184,484

Device	Routing	Invert	Outlet Devices
#1	Primary	193.06'	36.0" Round Culvert L= 58.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 193.06' / 189.00' S= 0.0700 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Device 1	197.05'	2.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	197.40'	3.5' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Device 1	198.50'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#5	Secondary	199.50'	40.0' long x 10.0' breadth 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
#6	Discarded	195.00'	0.750 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 188.30'

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023
Page 281

Discarded OutFlow Max=1.14 cfs @ 12.40 hrs HW=199.45' (Free Discharge)
6=Exfiltration (Controls 1.14 cfs)

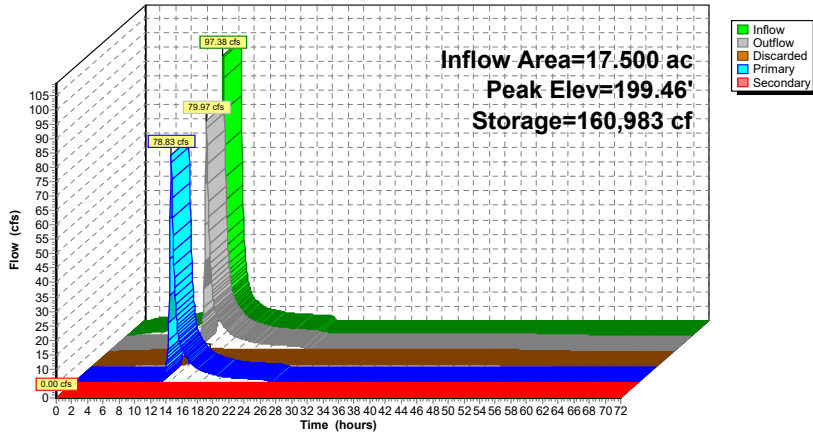
Primary OutFlow Max=78.64 cfs @ 12.40 hrs HW=199.45' (Free Discharge)

- 1=Culvert (Passes 48.91 cfs of 75.29 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.16 cfs @ 7.33 fps)
- 4=Orifice/Grate (Weir Controls 48.75 cfs @ 3.19 fps)
- 3=Sharp-Crested Rectangular Weir (Weir Controls 29.74 cfs @ 4.69 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=195.00' (Free Discharge)
5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 9P: Aboveground Infiltration Basin 'A'

Hydrograph



2023-09 Proposed

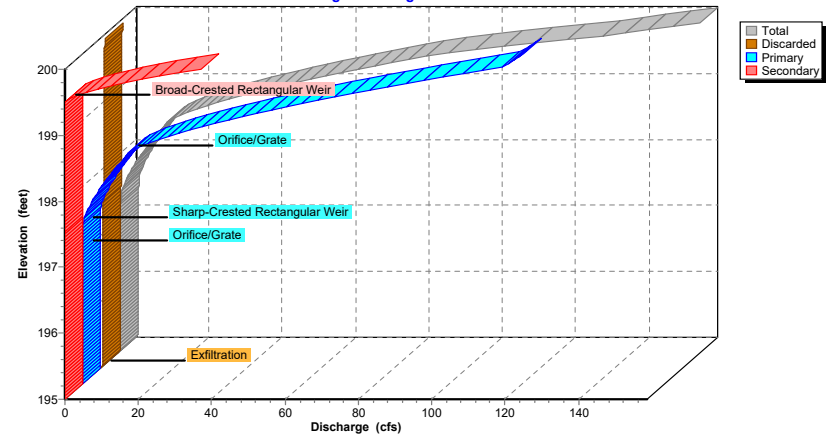
Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023
Page 282

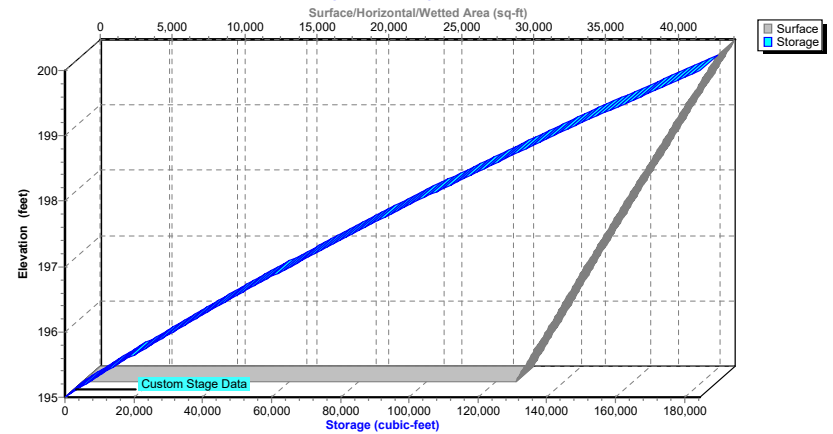
Pond 9P: Aboveground Infiltration Basin 'A'

Stage-Discharge



Pond 9P: Aboveground Infiltration Basin 'A'

Stage-Area-Storage



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 283

Hydrograph for Pond 9P: Aboveground Infiltration Basin 'A'

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	195.00	0.00	0.00	0.00	0.00
2.50	1.16	2,516	195.08	0.53	0.53	0.00	0.00
5.00	1.76	10,938	195.36	0.57	0.57	0.00	0.00
7.50	2.82	25,127	195.81	0.62	0.62	0.00	0.00
10.00	5.59	53,402	196.66	0.74	0.74	0.00	0.00
12.50	55.25	157,257	199.37	71.62	1.13	70.49	0.00
15.00	5.34	106,445	198.11	7.59	0.94	6.65	0.00
17.50	3.16	94,974	197.81	3.89	0.90	3.00	0.00
20.00	2.34	90,216	197.68	2.64	0.88	1.76	0.00
22.50	1.94	88,107	197.62	2.15	0.87	1.28	0.00
25.00	0.00	83,042	197.49	1.22	0.85	0.36	0.00
27.50	0.00	74,698	197.26	0.86	0.82	0.04	0.00
30.00	0.00	67,303	197.05	0.79	0.79	0.00	0.00
32.50	0.00	60,312	196.85	0.76	0.76	0.00	0.00
35.00	0.00	53,560	196.66	0.74	0.74	0.00	0.00
37.50	0.00	47,043	196.47	0.71	0.71	0.00	0.00
40.00	0.00	40,753	196.28	0.69	0.69	0.00	0.00
42.50	0.00	34,683	196.10	0.66	0.66	0.00	0.00
45.00	0.00	28,829	195.92	0.64	0.64	0.00	0.00
47.50	0.00	23,182	195.75	0.62	0.62	0.00	0.00
50.00	0.00	17,739	195.58	0.59	0.59	0.00	0.00
52.50	0.00	12,492	195.41	0.57	0.57	0.00	0.00
55.00	0.00	7,436	195.25	0.55	0.55	0.00	0.00
57.50	0.00	2,564	195.09	0.53	0.53	0.00	0.00
60.00	0.00	129	195.00	0.05	0.05	0.00	0.00
62.50	0.00	6	195.00	0.00	0.00	0.00	0.00
65.00	0.00	0	195.00	0.00	0.00	0.00	0.00
67.50	0.00	0	195.00	0.00	0.00	0.00	0.00
70.00	0.00	0	195.00	0.00	0.00	0.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 284

Stage-Discharge for Pond 9P: Aboveground Infiltration Basin 'A'

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
195.00	0.00	0.00	0.00	0.00
195.10	0.53	0.53	0.00	0.00
195.20	0.55	0.55	0.00	0.00
195.30	0.56	0.56	0.00	0.00
195.40	0.57	0.57	0.00	0.00
195.50	0.58	0.58	0.00	0.00
195.60	0.60	0.60	0.00	0.00
195.70	0.61	0.61	0.00	0.00
195.80	0.62	0.62	0.00	0.00
195.90	0.64	0.64	0.00	0.00
196.00	0.65	0.65	0.00	0.00
196.10	0.66	0.66	0.00	0.00
196.20	0.68	0.68	0.00	0.00
196.30	0.69	0.69	0.00	0.00
196.40	0.70	0.70	0.00	0.00
196.50	0.72	0.72	0.00	0.00
196.60	0.73	0.73	0.00	0.00
196.70	0.74	0.74	0.00	0.00
196.80	0.76	0.76	0.00	0.00
196.90	0.77	0.77	0.00	0.00
197.00	0.78	0.78	0.00	0.00
197.10	0.80	0.80	0.00	0.00
197.20	0.84	0.81	0.03	0.00
197.30	0.87	0.83	0.04	0.00
197.40	0.89	0.84	0.05	0.00
197.50	1.28	0.85	0.42	0.00
197.60	1.95	0.87	1.08	0.00
197.70	2.81	0.88	1.93	0.00
197.80	3.81	0.90	2.91	0.00
197.90	4.93	0.91	4.02	0.00
198.00	6.16	0.92	5.23	0.00
198.10	7.48	0.94	6.54	0.00
198.20	8.88	0.95	7.92	0.00
198.30	10.35	0.97	9.38	0.00
198.40	11.89	0.98	10.91	0.00
198.50	13.49	1.00	12.50	0.00
198.60	16.81	1.01	15.79	0.00
198.70	21.54	1.03	20.52	0.00
198.80	27.22	1.04	26.17	0.00
198.90	33.66	1.06	32.60	0.00
199.00	40.76	1.07	39.69	0.00
199.10	48.45	1.09	47.37	0.00
199.20	56.69	1.10	55.59	0.00
199.30	65.43	1.12	64.31	0.00
199.40	74.63	1.13	73.50	0.00
199.50	84.28	1.15	83.13	0.00
199.60	97.49	1.16	93.18	3.15
199.70	113.71	1.18	103.62	8.91
199.80	132.23	1.19	114.44	16.60
199.90	144.54	1.21	117.43	25.91
200.00	158.65	1.22	120.24	37.19

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 285

Stage-Area-Storage for Pond 9P: Aboveground Infiltration Basin 'A'

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
195.00	29,984	0	197.60	37,128	87,205
195.05	30,121	1,503	197.65	37,269	89,065
195.10	30,258	3,012	197.70	37,409	90,931
195.15	30,395	4,528	197.75	37,550	92,805
195.20	30,532	6,052	197.80	37,691	94,687
195.25	30,669	7,582	197.85	37,832	96,575
195.30	30,806	9,118	197.90	37,973	98,470
195.35	30,943	10,662	197.95	38,113	100,372
195.40	31,080	12,213	198.00	38,254	102,281
195.45	31,217	13,770	198.05	38,396	104,197
195.50	31,354	15,334	198.10	38,538	106,121
195.55	31,490	16,905	198.15	38,680	108,051
195.60	31,627	18,483	198.20	38,822	109,989
195.65	31,764	20,068	198.25	38,964	111,933
195.70	31,901	21,660	198.30	39,105	113,885
195.75	32,038	23,258	198.35	39,247	115,844
195.80	32,175	24,864	198.40	39,389	117,810
195.85	32,312	26,476	198.45	39,531	119,783
195.90	32,449	28,095	198.50	39,673	121,763
195.95	32,586	29,721	198.55	39,815	123,750
196.00	32,723	31,354	198.60	39,957	125,744
196.05	32,859	32,993	198.65	40,099	127,746
196.10	32,995	34,639	198.70	40,241	129,754
196.15	33,130	36,293	198.75	40,383	131,770
196.20	33,266	37,952	198.80	40,524	133,792
196.25	33,402	39,619	198.85	40,666	135,822
196.30	33,538	41,293	198.90	40,808	137,859
196.35	33,674	42,973	198.95	40,950	139,903
196.40	33,809	44,660	199.00	41,092	141,954
196.45	33,945	46,354	199.05	41,236	144,012
196.50	34,081	48,055	199.10	41,380	146,078
196.55	34,217	49,762	199.15	41,523	148,150
196.60	34,353	51,476	199.20	41,667	150,230
196.65	34,488	53,197	199.25	41,811	152,317
196.70	34,624	54,925	199.30	41,955	154,411
196.75	34,760	56,660	199.35	42,099	156,512
196.80	34,896	58,401	199.40	42,242	158,621
196.85	35,032	60,149	199.45	42,386	160,737
196.90	35,167	61,904	199.50	42,530	162,860
196.95	35,303	63,666	199.55	42,674	164,990
197.00	35,439	65,435	199.60	42,818	167,127
197.05	35,580	67,210	199.65	42,961	169,271
197.10	35,720	68,992	199.70	43,105	171,423
197.15	35,861	70,782	199.75	43,249	173,582
197.20	36,002	72,579	199.80	43,393	175,748
197.25	36,143	74,382	199.85	43,537	177,921
197.30	36,284	76,193	199.90	43,680	180,102
197.35	36,424	78,011	199.95	43,824	182,289
197.40	36,565	79,835	200.00	43,968	184,484
197.45	36,706	81,667			
197.50	36,847	83,506			
197.55	36,987	85,352			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 286

Summary for Pond 17P: Underground Detention Basin 'E'

Inflow Area = 4.030 ac, 98.26% Impervious, Inflow Depth = 8.29" for 100-Year event
 Inflow = 34.08 cfs @ 12.13 hrs, Volume= 2.785 af
 Outflow = 24.78 cfs @ 12.19 hrs, Volume= 2.551 af, Atten= 27%, Lag= 4.1 min
 Primary = 24.78 cfs @ 12.19 hrs, Volume= 2.551 af
 Routed to Link 21L : Route 9 Total

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 223.54' @ 12.19 hrs Surf.Area= 0.286 ac Storage= 0.989 af

Plug-Flow detention time= 226.7 min calculated for 2.551 af (92% of inflow)
 Center-of-Mass det. time= 179.2 min (921.2 - 742.0)

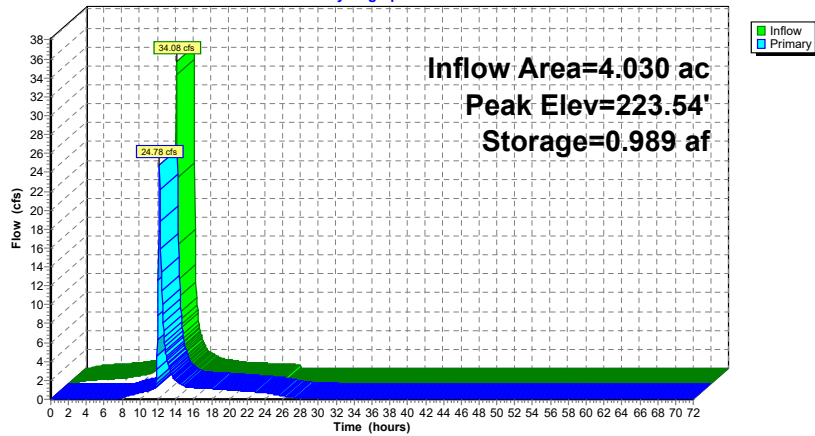
Volume	Invert	Avail.Storage	Storage Description
#1	218.50'	0.398 af	38.92'W x 320.00'L x 6.00'H Prismaoid 1.715 af Overall - 0.721 af Embedded = 0.994 af x 40.0% Voids
#2	219.00'	0.721 af	60.0" Round HDPE_Round 60"x 5 Inside #1 L= 320.0'
			1.119 af Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	216.00'	24.0" Round Culvert L= 22.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 216.00' / 215.00' S= 0.0455 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	220.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	222.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=24.57 cfs @ 12.19 hrs HW=223.53' (Free Discharge)
 1=Culvert (Passes 24.57 cfs of 38.65 cfs potential flow)
 2=Orifice/Grate (Orifice Controls 1.71 cfs @ 8.72 fps)
 3=Sharp-Crested Rectangular Weir (Weir Controls 22.86 cfs @ 4.04 fps)

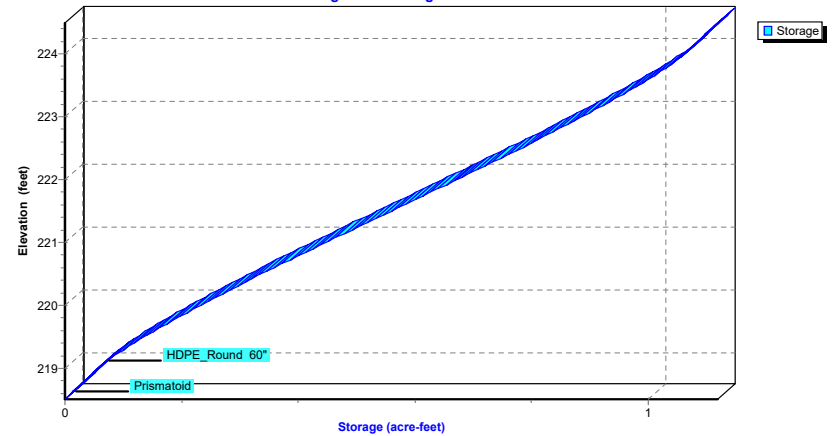
Pond 17P: Underground Detention Basin 'E'

Hydrograph



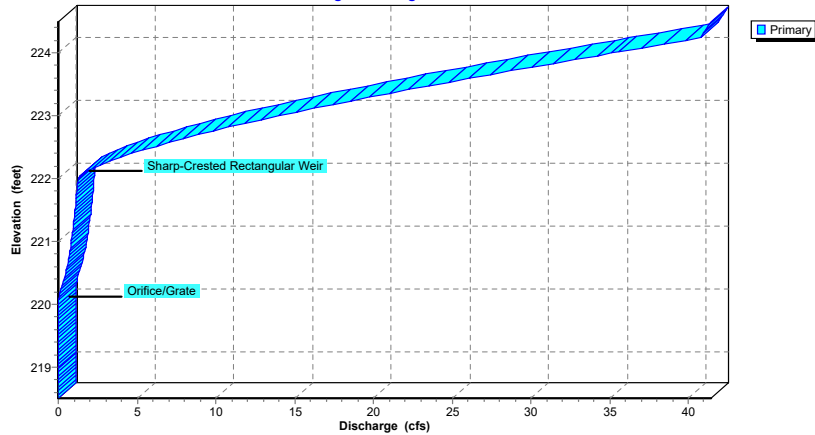
Pond 17P: Underground Detention Basin 'E'

Stage-Area-Storage



Pond 17P: Underground Detention Basin 'E'

Stage-Discharge



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 289

Hydrograph for Pond 17P: Underground Detention Basin 'E'

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	218.50	0.00
2.50	0.36	0.036	218.82	0.00
5.00	0.52	0.128	219.45	0.00
7.50	0.79	0.257	220.11	0.04
10.00	1.54	0.396	220.76	0.68
12.50	6.22	0.839	222.77	10.04
15.00	1.13	0.681	222.04	1.39
17.50	0.70	0.613	221.74	1.15
20.00	0.54	0.516	221.31	0.97
22.50	0.44	0.436	220.95	0.79
25.00	0.00	0.349	220.55	0.52
27.50	0.00	0.284	220.24	0.16
30.00	0.00	0.263	220.14	0.06
32.50	0.00	0.254	220.10	0.03
35.00	0.00	0.248	220.07	0.02
37.50	0.00	0.245	220.06	0.01
40.00	0.00	0.243	220.05	0.01
42.50	0.00	0.242	220.04	0.01
45.00	0.00	0.240	220.03	0.01
47.50	0.00	0.239	220.03	0.01
50.00	0.00	0.238	220.02	0.00
52.50	0.00	0.237	220.02	0.00
55.00	0.00	0.236	220.02	0.00
57.50	0.00	0.236	220.01	0.00
60.00	0.00	0.235	220.01	0.00
62.50	0.00	0.235	220.01	0.00
65.00	0.00	0.235	220.01	0.00
67.50	0.00	0.234	220.01	0.00
70.00	0.00	0.234	220.01	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 290

Stage-Discharge for Pond 17P: Underground Detention Basin 'E'

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
218.50	0.00	221.10	0.87	223.70	28.28
218.55	0.00	221.15	0.90	223.75	29.40
218.60	0.00	221.20	0.92	223.80	30.53
218.65	0.00	221.25	0.95	223.85	31.66
218.70	0.00	221.30	0.97	223.90	32.81
218.75	0.00	221.35	0.99	223.95	33.96
218.80	0.00	221.40	1.01	224.00	35.13
218.85	0.00	221.45	1.04	224.05	36.30
218.90	0.00	221.50	1.06	224.10	37.48
218.95	0.00	221.55	1.08	224.15	38.67
219.00	0.00	221.60	1.10	224.20	39.87
219.05	0.00	221.65	1.12	224.25	40.73
219.10	0.00	221.70	1.14	224.30	40.87
219.15	0.00	221.75	1.16	224.35	41.01
219.20	0.00	221.80	1.18	224.40	41.15
219.25	0.00	221.85	1.20	224.45	41.29
219.30	0.00	221.90	1.21	224.50	41.43
219.35	0.00	221.95	1.23		
219.40	0.00	222.00	1.25		
219.45	0.00	222.05	1.41		
219.50	0.00	222.10	1.70		
219.55	0.00	222.15	2.06		
219.60	0.00	222.20	2.48		
219.65	0.00	222.25	2.95		
219.70	0.00	222.30	3.47		
219.75	0.00	222.35	4.03		
219.80	0.00	222.40	4.63		
219.85	0.00	222.45	5.26		
219.90	0.00	222.50	5.93		
219.95	0.00	222.55	6.62		
220.00	0.00	222.60	7.35		
220.05	0.01	222.65	8.10		
220.10	0.03	222.70	8.87		
220.15	0.07	222.75	9.67		
220.20	0.11	222.80	10.49		
220.25	0.17	222.85	11.34		
220.30	0.23	222.90	12.20		
220.35	0.30	222.95	13.09		
220.40	0.36	223.00	13.99		
220.45	0.43	223.05	14.92		
220.50	0.47	223.10	15.86		
220.55	0.52	223.15	16.81		
220.60	0.56	223.20	17.79		
220.65	0.60	223.25	18.77		
220.70	0.63	223.30	19.78		
220.75	0.67	223.35	20.80		
220.80	0.70	223.40	21.83		
220.85	0.73	223.45	22.87		
220.90	0.76	223.50	23.93		
220.95	0.79	223.55	25.00		
221.00	0.82	223.60	26.08		
221.05	0.85	223.65	27.18		

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 291

Stage-Area-Storage for Pond 17P: Underground Detention Basin 'E'

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
218.50	0.000	221.10	0.470	223.70	1.017
218.55	0.006	221.15	0.481	223.75	1.025
218.60	0.011	221.20	0.492	223.80	1.033
218.65	0.017	221.25	0.503	223.85	1.041
218.70	0.023	221.30	0.515	223.90	1.048
218.75	0.029	221.35	0.526	223.95	1.055
218.80	0.034	221.40	0.537	224.00	1.062
218.85	0.040	221.45	0.548	224.05	1.067
218.90	0.046	221.50	0.559	224.10	1.073
218.95	0.051	221.55	0.571	224.15	1.079
219.00	0.057	221.60	0.582	224.20	1.085
219.05	0.064	221.65	0.593	224.25	1.090
219.10	0.071	221.70	0.604	224.30	1.096
219.15	0.078	221.75	0.616	224.35	1.102
219.20	0.086	221.80	0.627	224.40	1.107
219.25	0.094	221.85	0.638	224.45	1.113
219.30	0.102	221.90	0.649	224.50	1.119
219.35	0.111	221.95	0.660		
219.40	0.119	222.00	0.671		
219.45	0.128	222.05	0.682		
219.50	0.137	222.10	0.694		
219.55	0.146	222.15	0.705		
219.60	0.155	222.20	0.716		
219.65	0.165	222.25	0.727		
219.70	0.174	222.30	0.738		
219.75	0.184	222.35	0.748		
219.80	0.193	222.40	0.759		
219.85	0.203	222.45	0.770		
219.90	0.213	222.50	0.781		
219.95	0.223	222.55	0.792		
220.00	0.233	222.60	0.802		
220.05	0.243	222.65	0.813		
220.10	0.254	222.70	0.824		
220.15	0.264	222.75	0.834		
220.20	0.274	222.80	0.845		
220.25	0.285	222.85	0.855		
220.30	0.295	222.90	0.865		
220.35	0.306	222.95	0.876		
220.40	0.316	223.00	0.886		
220.45	0.327	223.05	0.896		
220.50	0.338	223.10	0.906		
220.55	0.349	223.15	0.916		
220.60	0.360	223.20	0.926		
220.65	0.370	223.25	0.935		
220.70	0.381	223.30	0.945		
220.75	0.392	223.35	0.954		
220.80	0.403	223.40	0.964		
220.85	0.414	223.45	0.973		
220.90	0.425	223.50	0.982		
220.95	0.436	223.55	0.991		
221.00	0.448	223.60	1.000		
221.05	0.459	223.65	1.008		

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 292

Summary for Pond 18P: Underground Detention Basin 'F'

Inflow Area = 3.910 ac, 89.77% Impervious, Inflow Depth = 8.05" for 100-Year event
 Inflow = 30.74 cfs @ 12.15 hrs, Volume= 2.623 af
 Outflow = 5.59 cfs @ 12.58 hrs, Volume= 2.623 af, Atten= 82%, Lag= 25.7 min
 Primary = 5.59 cfs @ 12.58 hrs, Volume= 2.623 af
 Routed to Link 21L : Route 9 Total

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 192.69' @ 12.58 hrs Surf.Area= 0.398 ac Storage= 0.859 af

Plug-Flow detention time= 80.9 min calculated for 2.623 af (100% of inflow)
 Center-of-Mass det. time= 80.1 min (828.8 - 748.7)

Volume	Invert	Avail.Storage	Storage Description
#1	190.00'	1.569 af	60.0" Round RCP_Round 60" x 15 L= 232.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	190.00'	18.0" Round RCP_Round 18" L= 186.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 190.00' / 188.41' S= 0.0085 ' / Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	190.00'	12.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	193.50'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

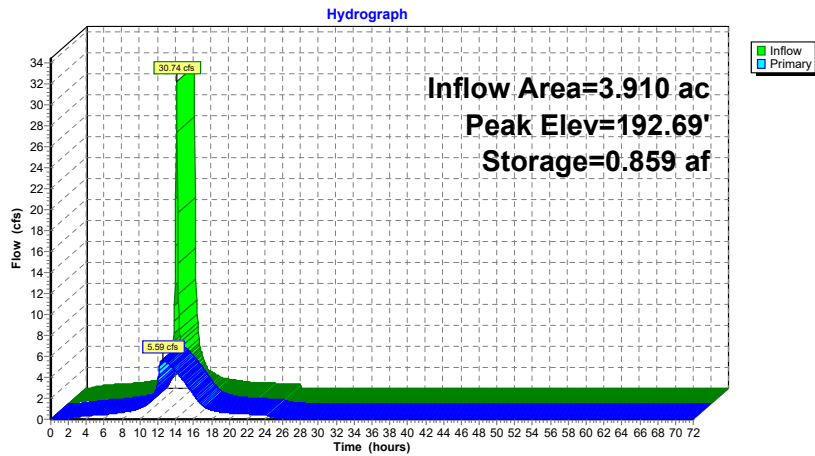
Primary OutFlow Max=5.59 cfs @ 12.58 hrs HW=192.69' (Free Discharge)

1=RCP_Round 18" (Passes 5.59 cfs of 10.67 cfs potential flow)

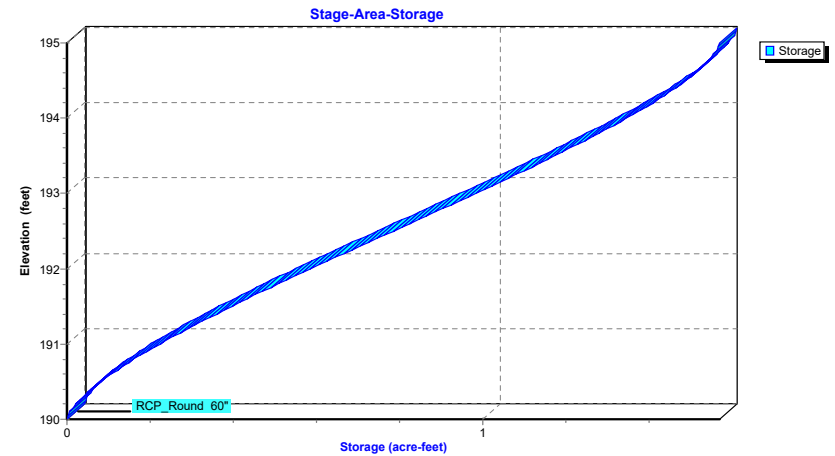
2=Orifice/Grate (Orifice Controls 5.59 cfs @ 7.12 fps)

3=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

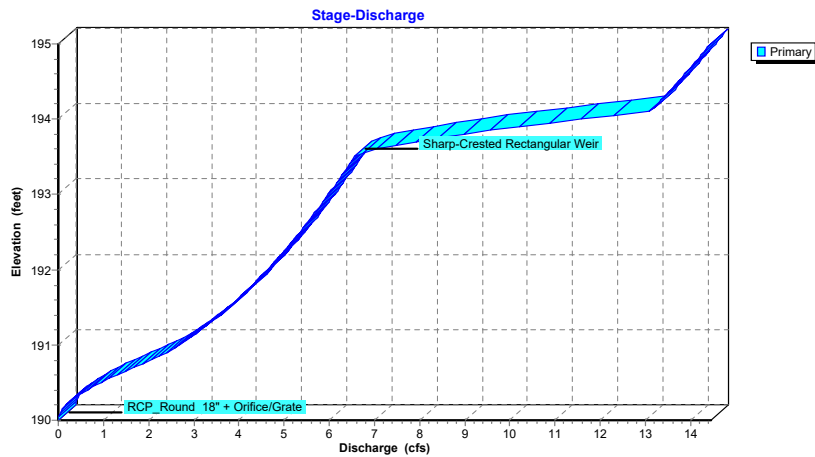
Pond 18P: Underground Detention Basin 'F'



Pond 18P: Underground Detention Basin 'F'



Pond 18P: Underground Detention Basin 'F'



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 295

Hydrograph for Pond 18P: Underground Detention Basin 'F'

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	190.00	0.00
2.50	0.31	0.021	190.20	0.17
5.00	0.46	0.041	190.31	0.40
7.50	0.71	0.056	190.39	0.59
10.00	1.40	0.091	190.54	1.07
12.50	6.36	0.856	192.68	5.58
15.00	1.11	0.351	191.38	3.54
17.50	0.68	0.090	190.53	1.06
20.00	0.52	0.055	190.38	0.58
22.50	0.43	0.046	190.34	0.46
25.00	0.00	0.022	190.20	0.18
27.50	0.00	0.005	190.08	0.03
30.00	0.00	0.002	190.04	0.01
32.50	0.00	0.001	190.02	0.00
35.00	0.00	0.000	190.01	0.00
37.50	0.00	0.000	190.00	0.00
40.00	0.00	0.000	190.00	0.00
42.50	0.00	0.000	190.00	0.00
45.00	0.00	0.000	190.00	0.00
47.50	0.00	0.000	190.00	0.00
50.00	0.00	0.000	190.00	0.00
52.50	0.00	0.000	190.00	0.00
55.00	0.00	0.000	190.00	0.00
57.50	0.00	0.000	190.00	0.00
60.00	0.00	0.000	190.00	0.00
62.50	0.00	0.000	190.00	0.00
65.00	0.00	0.000	190.00	0.00
67.50	0.00	0.000	190.00	0.00
70.00	0.00	0.000	190.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 296

Stage-Discharge for Pond 18P: Underground Detention Basin 'F'

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
190.00	0.00	192.60	5.48
190.05	0.01	192.65	5.55
190.10	0.04	192.70	5.61
190.15	0.10	192.75	5.67
190.20	0.17	192.80	5.74
190.25	0.26	192.85	5.80
190.30	0.37	192.90	5.86
190.35	0.49	192.95	5.92
190.40	0.63	193.00	5.98
190.45	0.78	193.05	6.04
190.50	0.95	193.10	6.10
190.55	1.12	193.15	6.16
190.60	1.30	193.20	6.21
190.65	1.48	193.25	6.27
190.70	1.67	193.30	6.33
190.75	1.86	193.35	6.38
190.80	2.05	193.40	6.44
190.85	2.23	193.45	6.50
190.90	2.40	193.50	6.55
190.95	2.56	193.55	6.75
191.00	2.67	193.60	7.07
191.05	2.80	193.65	7.47
191.10	2.93	193.70	7.92
191.15	3.05	193.75	8.43
191.20	3.16	193.80	8.99
191.25	3.28	193.85	9.58
191.30	3.38	193.90	10.22
191.35	3.49	193.95	10.88
191.40	3.59	194.00	11.58
191.45	3.69	194.05	12.31
191.50	3.78	194.10	13.07
191.55	3.88	194.15	13.19
191.60	3.97	194.20	13.27
191.65	4.06	194.25	13.34
191.70	4.14	194.30	13.42
191.75	4.23	194.35	13.50
191.80	4.31	194.40	13.57
191.85	4.39	194.45	13.65
191.90	4.47	194.50	13.72
191.95	4.55	194.55	13.80
192.00	4.63	194.60	13.87
192.05	4.71	194.65	13.95
192.10	4.78	194.70	14.02
192.15	4.86	194.75	14.09
192.20	4.93	194.80	14.16
192.25	5.00	194.85	14.24
192.30	5.07	194.90	14.31
192.35	5.14	194.95	14.38
192.40	5.21	195.00	14.45
192.45	5.28		
192.50	5.35		
192.55	5.41		

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 297

Stage-Area-Storage for Pond 18P: Underground Detention Basin 'F'

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
190.00	0.000	192.60	0.824
190.05	0.003	192.65	0.844
190.10	0.007	192.70	0.864
190.15	0.014	192.75	0.884
190.20	0.021	192.80	0.904
190.25	0.029	192.85	0.924
190.30	0.038	192.90	0.943
190.35	0.048	192.95	0.963
190.40	0.059	193.00	0.983
190.45	0.070	193.05	1.002
190.50	0.082	193.10	1.022
190.55	0.094	193.15	1.041
190.60	0.107	193.20	1.060
190.65	0.120	193.25	1.079
190.70	0.133	193.30	1.098
190.75	0.148	193.35	1.117
190.80	0.162	193.40	1.136
190.85	0.177	193.45	1.154
190.90	0.192	193.50	1.173
190.95	0.208	193.55	1.191
191.00	0.223	193.60	1.209
191.05	0.239	193.65	1.227
191.10	0.256	193.70	1.245
191.15	0.273	193.75	1.262
191.20	0.289	193.80	1.279
191.25	0.307	193.85	1.296
191.30	0.324	193.90	1.313
191.35	0.342	193.95	1.329
191.40	0.360	194.00	1.345
191.45	0.378	194.05	1.361
191.50	0.396	194.10	1.377
191.55	0.414	194.15	1.392
191.60	0.433	194.20	1.407
191.65	0.451	194.25	1.421
191.70	0.470	194.30	1.435
191.75	0.489	194.35	1.449
191.80	0.508	194.40	1.462
191.85	0.528	194.45	1.475
191.90	0.547	194.50	1.487
191.95	0.566	194.55	1.499
192.00	0.586	194.60	1.510
192.05	0.606	194.65	1.520
192.10	0.625	194.70	1.530
192.15	0.645	194.75	1.539
192.20	0.665	194.80	1.548
192.25	0.685	194.85	1.555
192.30	0.705	194.90	1.561
192.35	0.724	194.95	1.566
192.40	0.744	195.00	1.569
192.45	0.764		
192.50	0.784		
192.55	0.804		

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 298

Summary for Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Inflow Area = 17.770 ac, 29.99% Impervious, Inflow Depth = 6.73" for 100-Year event
 Inflow = 120.07 cfs @ 12.16 hrs, Volume= 9.961 af
 Outflow = 24.21 cfs @ 12.59 hrs, Volume= 9.961 af, Atten= 80%, Lag= 25.5 min
 Discarded = 23.93 cfs @ 12.59 hrs, Volume= 9.948 af
 Primary = 0.28 cfs @ 12.59 hrs, Volume= 0.012 af
 Routed to Link 21L : Route 9 Total
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 139.06' @ 12.59 hrs Surf.Area= 76,028 sf Storage= 110,285 cf

Plug-Flow detention time= 30.8 min calculated for 9.961 af (100% of inflow)
 Center-of-Mass det. time= 30.8 min (817.9 - 787.1)

Volume	Invert	Avail.Storage	Storage Description
#1	137.50'	307,536 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
137.50	66,608	0	0
138.00	69,110	33,930	33,930
139.00	74,414	71,762	105,692
140.00	100,841	87,628	193,319
141.00	127,593	114,217	307,536

Device	Routing	Invert	Outlet Devices
#1	Primary	137.50'	15.0" Round Culvert L= 60.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 137.50' / 137.20' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Primary	138.45'	2.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	139.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
#4	Discarded	137.50'	10,000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 133.50'
#5	Primary	140.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Secondary	140.50'	40.0' long (Profile 9) Broad-Crested Rectangular Weir Head (feet) 1.97 2.46 2.95 3.94 4.92 Coef. (English) 3.55 3.55 3.57 3.60 3.66

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023
Page 299

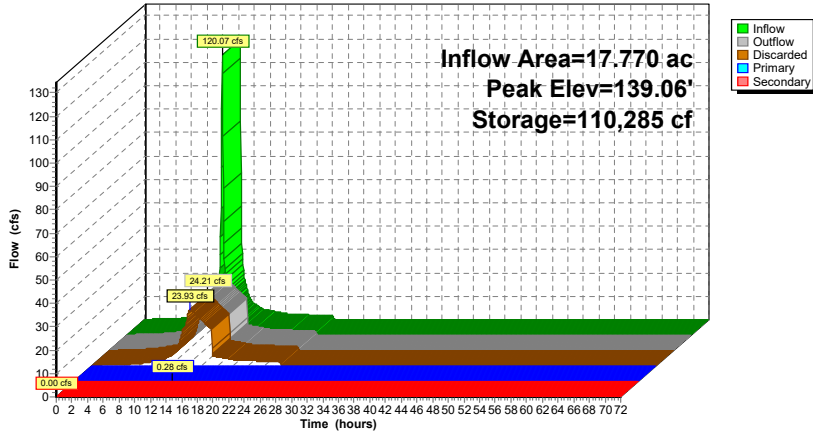
Discarded OutFlow Max=23.93 cfs @ 12.59 hrs HW=139.06' (Free Discharge)
 ↳4=Exfiltration (Controls 23.93 cfs)

Primary OutFlow Max=0.27 cfs @ 12.59 hrs HW=139.06' (Free Discharge)
 ↳1=Culvert (Passes 0.19 cfs of 4.90 cfs potential flow)
 ↳3=Sharp-Crested Rectangular Weir (Weir Controls 0.19 cfs @ 0.80 fps)
 ↳2=Orifice/Grate (Orifice Controls 0.08 cfs @ 3.50 fps)
 ↳5=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=137.50' (Free Discharge)
 ↳6=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Hydrograph



2023-09 Proposed

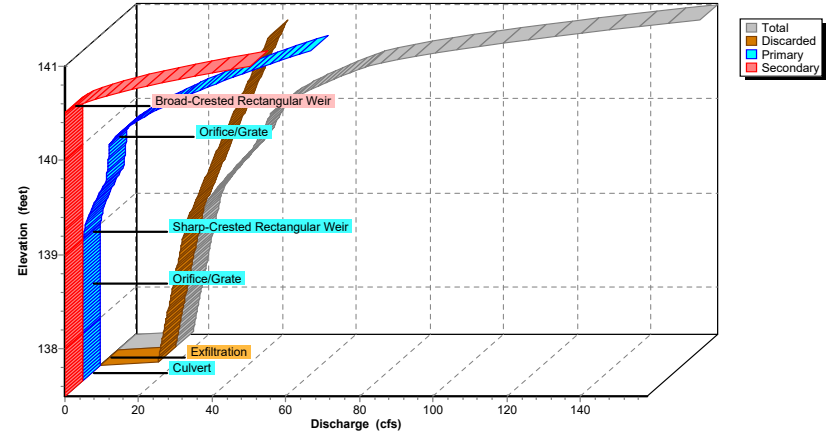
Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023
Page 300

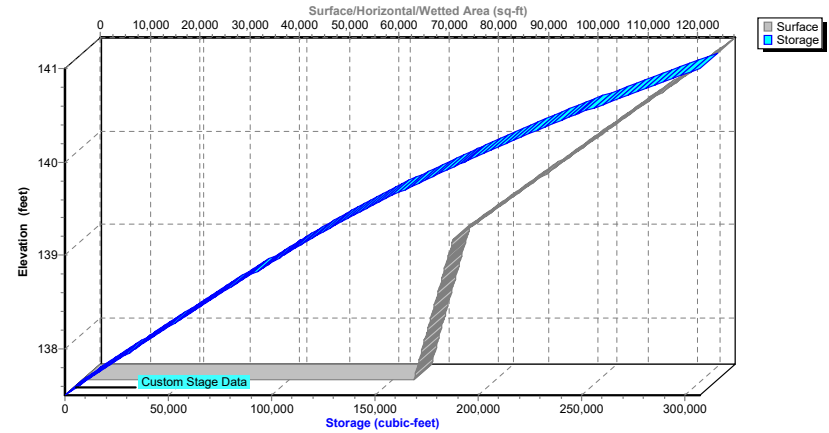
Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Stage-Discharge



Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Stage-Area-Storage



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 301

Hydrograph for Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	137.50	0.00	0.00	0.00	0.00
2.50	0.47	70	137.50	0.47	0.47	0.00	0.00
5.00	0.77	114	137.50	0.76	0.76	0.00	0.00
7.50	1.73	256	137.50	1.71	1.71	0.00	0.00
10.00	4.41	648	137.51	4.33	4.33	0.00	0.00
12.50	28.53	109,577	139.05	24.07	23.83	0.23	0.00
15.00	4.85	14,873	137.72	16.53	16.53	0.00	0.00
17.50	2.99	451	137.51	3.01	3.01	0.00	0.00
20.00	2.27	341	137.51	2.28	2.28	0.00	0.00
22.50	1.88	282	137.50	1.89	1.89	0.00	0.00
25.00	0.00	0	137.50	0.00	0.00	0.00	0.00
27.50	0.00	0	137.50	0.00	0.00	0.00	0.00
30.00	0.00	0	137.50	0.00	0.00	0.00	0.00
32.50	0.00	0	137.50	0.00	0.00	0.00	0.00
35.00	0.00	0	137.50	0.00	0.00	0.00	0.00
37.50	0.00	0	137.50	0.00	0.00	0.00	0.00
40.00	0.00	0	137.50	0.00	0.00	0.00	0.00
42.50	0.00	0	137.50	0.00	0.00	0.00	0.00
45.00	0.00	0	137.50	0.00	0.00	0.00	0.00
47.50	0.00	0	137.50	0.00	0.00	0.00	0.00
50.00	0.00	0	137.50	0.00	0.00	0.00	0.00
52.50	0.00	0	137.50	0.00	0.00	0.00	0.00
55.00	0.00	0	137.50	0.00	0.00	0.00	0.00
57.50	0.00	0	137.50	0.00	0.00	0.00	0.00
60.00	0.00	0	137.50	0.00	0.00	0.00	0.00
62.50	0.00	0	137.50	0.00	0.00	0.00	0.00
65.00	0.00	0	137.50	0.00	0.00	0.00	0.00
67.50	0.00	0	137.50	0.00	0.00	0.00	0.00
70.00	0.00	0	137.50	0.00	0.00	0.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 302

Stage-Discharge for Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
137.50	0.00	0.00	0.00	0.00
137.60	15.92	15.92	0.00	0.00
137.70	16.43	16.43	0.00	0.00
137.80	16.93	16.93	0.00	0.00
137.90	17.44	17.44	0.00	0.00
138.00	17.96	17.96	0.00	0.00
138.10	18.48	18.48	0.00	0.00
138.20	19.01	19.01	0.00	0.00
138.30	19.53	19.53	0.00	0.00
138.40	20.06	20.06	0.00	0.00
138.50	20.60	20.60	0.00	0.00
138.60	21.16	21.13	0.03	0.00
138.70	21.71	21.67	0.04	0.00
138.80	22.26	22.21	0.05	0.00
138.90	22.82	22.75	0.06	0.00
139.00	23.37	23.30	0.07	0.00
139.10	24.83	24.34	0.49	0.00
139.20	26.63	25.39	1.24	0.00
139.30	28.66	26.45	2.21	0.00
139.40	30.86	27.52	3.34	0.00
139.50	33.21	28.60	4.61	0.00
139.60	35.70	29.69	6.01	0.00
139.70	37.37	30.79	6.58	0.00
139.80	38.74	31.91	6.84	0.00
139.90	40.11	33.03	7.09	0.00
140.00	41.49	34.16	7.33	0.00
140.10	44.52	35.31	9.22	0.00
140.20	48.93	36.46	12.47	0.00
140.30	54.23	37.63	16.60	0.00
140.40	60.26	38.80	21.46	0.00
140.50	66.92	39.99	26.93	0.00
140.60	78.62	41.18	32.95	4.49
140.70	94.56	42.38	39.47	12.70
140.80	113.39	43.60	46.46	23.33
140.90	134.62	44.81	53.89	35.92
141.00	157.97	46.04	61.72	50.20

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 303

Stage-Area-Storage for Pond 20P: Combined Aboveground Infiltration Basin 'G/H'

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
137.50	66,608	0	140.10	103,516	203,537
137.55	66,858	3,337	140.15	104,854	208,746
137.60	67,108	6,686	140.20	106,191	214,022
137.65	67,359	10,047	140.25	107,529	219,365
137.70	67,609	13,422	140.30	108,867	224,775
137.75	67,859	16,808	140.35	110,204	230,252
137.80	68,109	20,208	140.40	111,542	235,796
137.85	68,359	23,619	140.45	112,879	241,406
137.90	68,610	27,044	140.50	114,217	247,084
137.95	68,860	30,480	140.55	115,555	252,828
138.00	69,110	33,930	140.60	116,892	258,639
138.05	69,375	37,392	140.65	118,230	264,517
138.10	69,640	40,867	140.70	119,567	270,462
138.15	69,906	44,356	140.75	120,905	276,474
138.20	70,171	47,858	140.80	122,243	282,552
138.25	70,436	51,373	140.85	123,580	288,698
138.30	70,701	54,901	140.90	124,918	294,910
138.35	70,966	58,443	140.95	126,255	301,190
138.40	71,232	61,998	141.00	127,593	307,536
138.45	71,497	65,566			
138.50	71,762	69,148			
138.55	72,027	72,742			
138.60	72,292	76,350			
138.65	72,558	79,971			
138.70	72,823	83,606			
138.75	73,088	87,254			
138.80	73,353	90,915			
138.85	73,618	94,589			
138.90	73,884	98,277			
138.95	74,149	101,977			
139.00	74,414	105,692			
139.05	75,735	109,445			
139.10	77,057	113,265			
139.15	78,378	117,151			
139.20	79,699	121,103			
139.25	81,021	125,121			
139.30	82,342	129,205			
139.35	83,663	133,355			
139.40	84,985	137,571			
139.45	86,306	141,854			
139.50	87,628	146,202			
139.55	88,949	150,616			
139.60	90,270	155,097			
139.65	91,592	159,643			
139.70	92,913	164,256			
139.75	94,234	168,935			
139.80	95,556	173,679			
139.85	96,877	178,490			
139.90	98,198	183,367			
139.95	99,520	188,310			
140.00	100,841	193,319			
140.05	102,179	198,394			

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 304

Summary for Pond 24P: Aboveground Infiltration Basin 'C'

Inflow Area = 28.040 ac, 72.36% Impervious, Inflow Depth = 7.73" for 100-Year event
 Inflow = 194.13 cfs @ 12.18 hrs, Volume= 18.064 af
 Outflow = 37.89 cfs @ 12.65 hrs, Volume= 18.064 af, Atten= 80%, Lag= 28.0 min
 Discarded = 32.81 cfs @ 12.65 hrs, Volume= 17.284 af
 Primary = 5.08 cfs @ 12.65 hrs, Volume= 0.780 af
 Routed to Link 10L : Moodna Creek
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
 Peak Elev= 158.40' @ 12.65 hrs Surf.Area= 63,972 sf Storage= 241,394 cf

Plug-Flow detention time= 56.4 min calculated for 18.064 af (100% of inflow)
 Center-of-Mass det. time= 56.4 min (816.9 - 760.5)

Volume	Invert	Avail.Storage	Storage Description
#1	154.20'	433,782 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
154.20	51,101	0	0
155.00	53,507	41,843	41,843
156.00	56,463	54,985	96,828
157.00	59,503	57,983	154,811
158.00	62,689	61,096	215,907
159.00	65,878	64,284	280,191
160.00	69,125	67,502	347,692
161.00	73,120	71,123	418,815
161.20	76,551	14,967	433,782

Device	Routing	Invert	Outlet Devices
#1	Primary	154.20'	18.0" Round 18" Round RCP L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 154.20' / 153.70' S= 0.0050 /' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	156.10'	12.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	160.00'	48.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Discarded	154.20'	10,000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 151.20'
#5	Secondary	160.50'	40.0' long x 10.0' breadth 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

2023-09 Proposed

Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023
Page 305

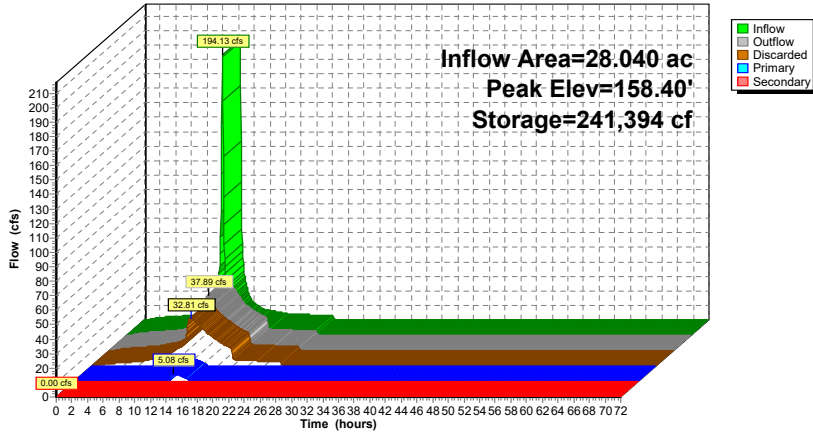
Discarded OutFlow Max=32.81 cfs @ 12.65 hrs HW=158.40' (Free Discharge)
↳4=Exfiltration (Controls 32.81 cfs)

Primary OutFlow Max=5.08 cfs @ 12.65 hrs HW=158.40' (Free Discharge)
↳1=18" Round RCP (Passes 5.08 cfs of 13.91 cfs potential flow)
↳2=Orifice/Grate (Orifice Controls 5.08 cfs @ 6.46 fps)
↳3=Orifice/Grate (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=154.20' (Free Discharge)
↳5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 24P: Aboveground Infiltration Basin 'C'

Hydrograph



2023-09 Proposed

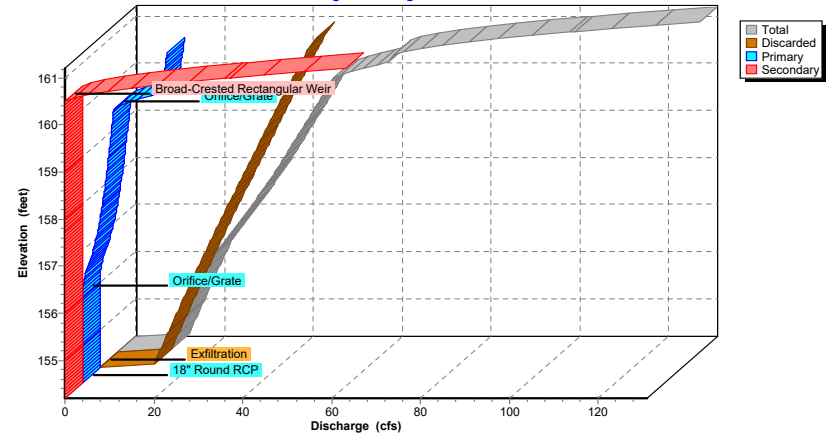
Prepared by Dynamic Engineering
HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023
Page 306

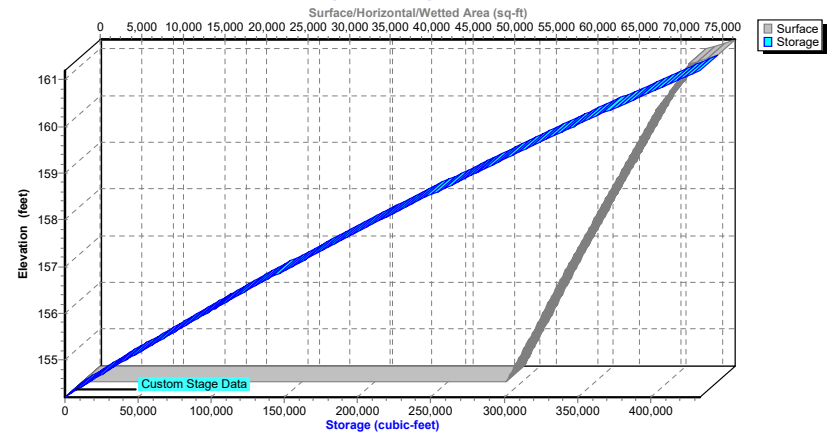
Pond 24P: Aboveground Infiltration Basin 'C'

Stage-Discharge



Pond 24P: Aboveground Infiltration Basin 'C'

Stage-Area-Storage



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 307

Hydrograph for Pond 24P: Aboveground Infiltration Basin 'C'

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	154.20	0.00	0.00	0.00	0.00
2.50	1.79	515	154.21	1.74	1.74	0.00	0.00
5.00	2.69	784	154.22	2.66	2.66	0.00	0.00
7.50	4.45	1,287	154.23	4.36	4.36	0.00	0.00
10.00	9.15	2,615	154.25	8.87	8.87	0.00	0.00
12.50	52.89	237,508	158.34	37.48	32.49	4.99	0.00
15.00	8.06	112,245	156.27	21.95	21.82	0.13	0.00
17.50	4.90	14,318	154.48	13.12	13.12	0.00	0.00
20.00	3.71	1,100	154.22	3.73	3.73	0.00	0.00
22.50	3.06	910	154.22	3.09	3.09	0.00	0.00
25.00	0.00	0	154.20	0.00	0.00	0.00	0.00
27.50	0.00	0	154.20	0.00	0.00	0.00	0.00
30.00	0.00	0	154.20	0.00	0.00	0.00	0.00
32.50	0.00	0	154.20	0.00	0.00	0.00	0.00
35.00	0.00	0	154.20	0.00	0.00	0.00	0.00
37.50	0.00	0	154.20	0.00	0.00	0.00	0.00
40.00	0.00	0	154.20	0.00	0.00	0.00	0.00
42.50	0.00	0	154.20	0.00	0.00	0.00	0.00
45.00	0.00	0	154.20	0.00	0.00	0.00	0.00
47.50	0.00	0	154.20	0.00	0.00	0.00	0.00
50.00	0.00	0	154.20	0.00	0.00	0.00	0.00
52.50	0.00	0	154.20	0.00	0.00	0.00	0.00
55.00	0.00	0	154.20	0.00	0.00	0.00	0.00
57.50	0.00	0	154.20	0.00	0.00	0.00	0.00
60.00	0.00	0	154.20	0.00	0.00	0.00	0.00
62.50	0.00	0	154.20	0.00	0.00	0.00	0.00
65.00	0.00	0	154.20	0.00	0.00	0.00	0.00
67.50	0.00	0	154.20	0.00	0.00	0.00	0.00
70.00	0.00	0	154.20	0.00	0.00	0.00	0.00

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 308

Stage-Discharge for Pond 24P: Aboveground Infiltration Basin 'C'

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Secondary (cfs)
154.20	0.00	0.00	0.00	0.00
154.40	12.76	12.76	0.00	0.00
154.60	13.70	13.70	0.00	0.00
154.80	14.65	14.65	0.00	0.00
155.00	15.60	15.60	0.00	0.00
155.20	16.56	16.56	0.00	0.00
155.40	17.53	17.53	0.00	0.00
155.60	18.50	18.50	0.00	0.00
155.80	19.48	19.48	0.00	0.00
156.00	20.47	20.47	0.00	0.00
156.20	21.51	21.46	0.04	0.00
156.40	22.84	22.47	0.37	0.00
156.60	24.42	23.47	0.95	0.00
156.80	26.16	24.48	1.67	0.00
157.00	27.91	25.50	2.40	0.00
157.20	29.46	26.53	2.93	0.00
157.40	30.95	27.56	3.38	0.00
157.60	32.38	28.60	3.78	0.00
157.80	33.79	29.64	4.14	0.00
158.00	35.17	30.69	4.47	0.00
158.20	36.53	31.74	4.78	0.00
158.40	37.87	32.80	5.07	0.00
158.60	39.21	33.86	5.35	0.00
158.80	40.53	34.92	5.61	0.00
159.00	41.85	35.99	5.86	0.00
159.20	43.16	37.06	6.10	0.00
159.40	44.47	38.14	6.33	0.00
159.60	45.77	39.22	6.55	0.00
159.80	47.07	40.31	6.76	0.00
160.00	48.37	41.40	6.97	0.00
160.20	54.38	42.53	11.85	0.00
160.40	61.38	43.66	17.72	0.00
160.60	66.00	44.79	18.06	3.15
160.80	80.92	45.93	18.39	16.60
161.00	102.99	47.08	18.72	37.19
161.20	131.01	48.84	19.04	63.13

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 309

Stage-Area-Storage for Pond 24P: Aboveground Infiltration Basin 'C'

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
154.20	51,101	0	159.40	67,177	306,802
154.30	51,402	5,125	159.50	67,502	313,536
154.40	51,702	10,280	159.60	67,826	320,302
154.50	52,003	15,466	159.70	68,151	327,101
154.60	52,304	20,681	159.80	68,476	333,932
154.70	52,605	25,926	159.90	68,800	340,796
154.80	52,905	31,202	160.00	69,125	347,692
154.90	53,206	36,508	160.10	69,524	354,625
155.00	53,507	41,843	160.20	69,924	361,597
155.10	53,803	47,209	160.30	70,323	368,609
155.20	54,098	52,604	160.40	70,723	375,662
155.30	54,394	58,028	160.50	71,123	382,754
155.40	54,689	63,482	160.60	71,522	389,886
155.50	54,985	68,966	160.70	71,921	397,058
155.60	55,281	74,479	160.80	72,321	404,271
155.70	55,576	80,022	160.90	72,720	411,523
155.80	55,872	85,595	161.00	73,120	418,815
155.90	56,167	91,197	161.10	74,836	426,212
156.00	56,463	96,828	161.20	76,551	433,782
156.10	56,767	102,490			
156.20	57,071	108,182			
156.30	57,375	113,904			
156.40	57,679	119,657			
156.50	57,983	125,440			
156.60	58,287	131,253			
156.70	58,591	137,097			
156.80	58,895	142,971			
156.90	59,199	148,876			
157.00	59,503	154,811			
157.10	59,822	160,777			
157.20	60,140	166,776			
157.30	60,459	172,805			
157.40	60,777	178,867			
157.50	61,096	184,961			
157.60	61,415	191,086			
157.70	61,733	197,244			
157.80	62,052	203,433			
157.90	62,370	209,654			
158.00	62,689	215,907			
158.10	63,008	222,192			
158.20	63,327	228,509			
158.30	63,646	234,857			
158.40	63,965	241,238			
158.50	64,284	247,650			
158.60	64,602	254,095			
158.70	64,921	260,571			
158.80	65,240	267,079			
158.90	65,559	273,619			
159.00	65,878	280,191			
159.10	66,203	286,795			
159.20	66,527	293,431			
159.30	66,852	300,100			

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 310

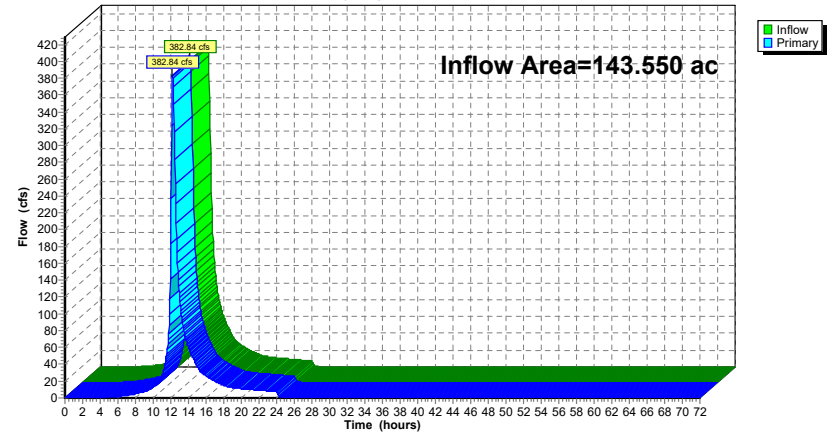
Summary for Link 10L: Moodna Creek

Inflow Area = 143.550 ac, 43.00% Impervious, Inflow Depth = 4.27" for 100-Year event
 Inflow = 382.84 cfs @ 12.15 hrs, Volume= 51.133 af
 Primary = 382.84 cfs @ 12.15 hrs, Volume= 51.133 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 22L : Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 10L: Moodna Creek

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 311

Hydrograph for Link 10L: Moodna Creek

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.14	0.00	0.14	53.00	0.00	0.00	0.00
2.00	0.35	0.00	0.35	54.00	0.00	0.00	0.00
3.00	0.47	0.00	0.47	55.00	0.00	0.00	0.00
4.00	0.55	0.00	0.55	56.00	0.00	0.00	0.00
5.00	0.81	0.00	0.81	57.00	0.00	0.00	0.00
6.00	1.58	0.00	1.58	58.00	0.00	0.00	0.00
7.00	3.02	0.00	3.02	59.00	0.00	0.00	0.00
8.00	4.99	0.00	4.99	60.00	0.00	0.00	0.00
9.00	7.38	0.00	7.38	61.00	0.00	0.00	0.00
10.00	13.07	0.00	13.07	62.00	0.00	0.00	0.00
11.00	26.28	0.00	26.28	63.00	0.00	0.00	0.00
12.00	184.18	0.00	184.18	64.00	0.00	0.00	0.00
13.00	118.97	0.00	118.97	65.00	0.00	0.00	0.00
14.00	60.36	0.00	60.36	66.00	0.00	0.00	0.00
15.00	37.26	0.00	37.26	67.00	0.00	0.00	0.00
16.00	26.16	0.00	26.16	68.00	0.00	0.00	0.00
17.00	19.97	0.00	19.97	69.00	0.00	0.00	0.00
18.00	15.13	0.00	15.13	70.00	0.00	0.00	0.00
19.00	12.44	0.00	12.44	71.00	0.00	0.00	0.00
20.00	11.07	0.00	11.07	72.00	0.00	0.00	0.00
21.00	10.16	0.00	10.16				
22.00	9.26	0.00	9.26				
23.00	8.32	0.00	8.32				
24.00	7.41	0.00	7.41				
25.00	0.36	0.00	0.36				
26.00	0.05	0.00	0.05				
27.00	0.04	0.00	0.04				
28.00	0.03	0.00	0.03				
29.00	0.01	0.00	0.01				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

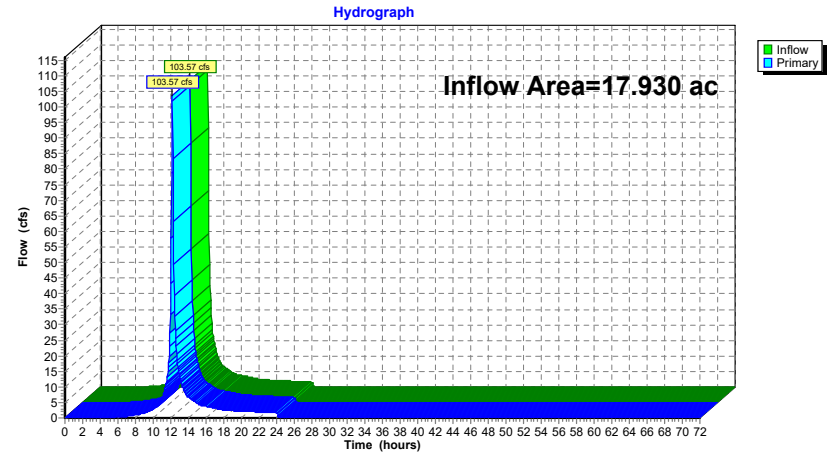
Page 312

Summary for Link 11L: Route 9 Undisturbed Total

Inflow Area = 17.930 ac, 4.96% Impervious, Inflow Depth = 5.69" for 100-Year event
 Inflow = 103.57 cfs @ 12.18 hrs, Volume= 8.507 af
 Primary = 103.57 cfs @ 12.18 hrs, Volume= 8.507 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 21L : Route 9 Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 11L: Route 9 Undisturbed Total



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 313

Hydrograph for Link 11L: Route 9 Undisturbed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.03	0.00	0.03	53.00	0.00	0.00	0.00
2.00	0.07	0.00	0.07	54.00	0.00	0.00	0.00
3.00	0.09	0.00	0.09	55.00	0.00	0.00	0.00
4.00	0.10	0.00	0.10	56.00	0.00	0.00	0.00
5.00	0.12	0.00	0.12	57.00	0.00	0.00	0.00
6.00	0.26	0.00	0.26	58.00	0.00	0.00	0.00
7.00	0.53	0.00	0.53	59.00	0.00	0.00	0.00
8.00	0.99	0.00	0.99	60.00	0.00	0.00	0.00
9.00	1.57	0.00	1.57	61.00	0.00	0.00	0.00
10.00	2.93	0.00	2.93	62.00	0.00	0.00	0.00
11.00	6.24	0.00	6.24	63.00	0.00	0.00	0.00
12.00	43.32	0.00	43.32	64.00	0.00	0.00	0.00
13.00	13.66	0.00	13.66	65.00	0.00	0.00	0.00
14.00	6.70	0.00	6.70	66.00	0.00	0.00	0.00
15.00	4.66	0.00	4.66	67.00	0.00	0.00	0.00
16.00	3.76	0.00	3.76	68.00	0.00	0.00	0.00
17.00	3.17	0.00	3.17	69.00	0.00	0.00	0.00
18.00	2.57	0.00	2.57	70.00	0.00	0.00	0.00
19.00	2.33	0.00	2.33	71.00	0.00	0.00	0.00
20.00	2.19	0.00	2.19	72.00	0.00	0.00	0.00
21.00	2.04	0.00	2.04				
22.00	1.89	0.00	1.89				
23.00	1.74	0.00	1.74				
24.00	1.59	0.00	1.59				
25.00	0.00	0.00	0.00				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

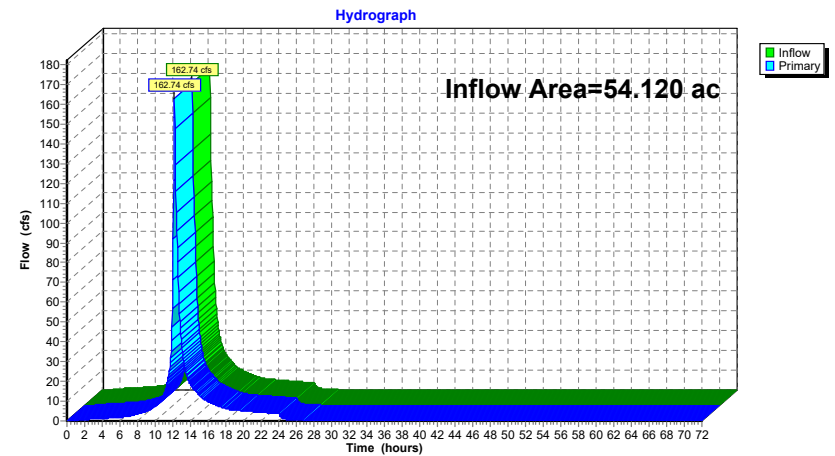
Page 314

Summary for Link 21L: Route 9 Total

Inflow Area = 54.120 ac, 39.23% Impervious, Inflow Depth = 4.52" for 100-Year event
 Inflow = 162.74 cfs @ 12.19 hrs, Volume= 20.397 af
 Primary = 162.74 cfs @ 12.19 hrs, Volume= 20.397 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 22L : Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 21L: Route 9 Total



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 315

Hydrograph for Link 21L: Route 9 Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.14	0.00	0.14	53.00	0.00	0.00	0.00
2.00	0.66	0.00	0.66	54.00	0.00	0.00	0.00
3.00	1.01	0.00	1.01	55.00	0.00	0.00	0.00
4.00	1.27	0.00	1.27	56.00	0.00	0.00	0.00
5.00	1.47	0.00	1.47	57.00	0.00	0.00	0.00
6.00	1.79	0.00	1.79	58.00	0.00	0.00	0.00
7.00	2.41	0.00	2.41	59.00	0.00	0.00	0.00
8.00	3.55	0.00	3.55	60.00	0.00	0.00	0.00
9.00	4.95	0.00	4.95	61.00	0.00	0.00	0.00
10.00	7.70	0.00	7.70	62.00	0.00	0.00	0.00
11.00	13.56	0.00	13.56	63.00	0.00	0.00	0.00
12.00	71.08	0.00	71.08	64.00	0.00	0.00	0.00
13.00	38.65	0.00	38.65	65.00	0.00	0.00	0.00
14.00	18.34	0.00	18.34	66.00	0.00	0.00	0.00
15.00	12.98	0.00	12.98	67.00	0.00	0.00	0.00
16.00	9.87	0.00	9.87	68.00	0.00	0.00	0.00
17.00	7.82	0.00	7.82	69.00	0.00	0.00	0.00
18.00	6.32	0.00	6.32	70.00	0.00	0.00	0.00
19.00	5.55	0.00	5.55	71.00	0.00	0.00	0.00
20.00	5.15	0.00	5.15	72.00	0.00	0.00	0.00
21.00	4.78	0.00	4.78				
22.00	4.42	0.00	4.42				
23.00	4.06	0.00	4.06				
24.00	3.71	0.00	3.71				
25.00	0.72	0.00	0.72				
26.00	0.42	0.00	0.42				
27.00	0.25	0.00	0.25				
28.00	0.15	0.00	0.15				
29.00	0.10	0.00	0.10				
30.00	0.07	0.00	0.07				
31.00	0.05	0.00	0.05				
32.00	0.04	0.00	0.04				
33.00	0.03	0.00	0.03				
34.00	0.03	0.00	0.03				
35.00	0.02	0.00	0.02				
36.00	0.02	0.00	0.02				
37.00	0.01	0.00	0.01				
38.00	0.01	0.00	0.01				
39.00	0.01	0.00	0.01				
40.00	0.01	0.00	0.01				
41.00	0.01	0.00	0.01				
42.00	0.01	0.00	0.01				
43.00	0.01	0.00	0.01				
44.00	0.01	0.00	0.01				
45.00	0.01	0.00	0.01				
46.00	0.01	0.00	0.01				
47.00	0.01	0.00	0.01				
48.00	0.01	0.00	0.01				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 316

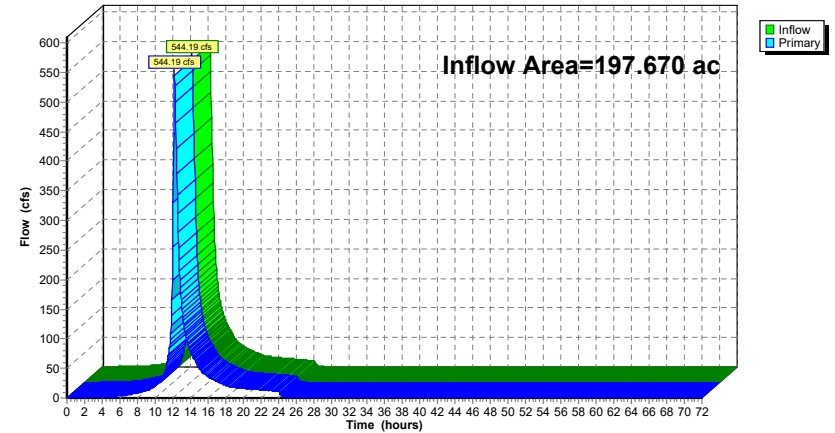
Summary for Link 22L: Total

Inflow Area = 197.670 ac, 41.97% Impervious, Inflow Depth = 4.34" for 100-Year event
 Inflow = 544.19 cfs @ 12.19 hrs, Volume= 71.530 af
 Primary = 544.19 cfs @ 12.19 hrs, Volume= 71.530 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 22L: Total

Hydrograph



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 317

Hydrograph for Link 22L: Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.28	0.00	0.28	53.00	0.00	0.00	0.00
2.00	1.01	0.00	1.01	54.00	0.00	0.00	0.00
3.00	1.48	0.00	1.48	55.00	0.00	0.00	0.00
4.00	1.82	0.00	1.82	56.00	0.00	0.00	0.00
5.00	2.28	0.00	2.28	57.00	0.00	0.00	0.00
6.00	3.38	0.00	3.38	58.00	0.00	0.00	0.00
7.00	5.44	0.00	5.44	59.00	0.00	0.00	0.00
8.00	8.54	0.00	8.54	60.00	0.00	0.00	0.00
9.00	12.33	0.00	12.33	61.00	0.00	0.00	0.00
10.00	20.76	0.00	20.76	62.00	0.00	0.00	0.00
11.00	39.84	0.00	39.84	63.00	0.00	0.00	0.00
12.00	255.26	0.00	255.26	64.00	0.00	0.00	0.00
13.00	157.62	0.00	157.62	65.00	0.00	0.00	0.00
14.00	78.70	0.00	78.70	66.00	0.00	0.00	0.00
15.00	50.23	0.00	50.23	67.00	0.00	0.00	0.00
16.00	36.03	0.00	36.03	68.00	0.00	0.00	0.00
17.00	27.78	0.00	27.78	69.00	0.00	0.00	0.00
18.00	21.45	0.00	21.45	70.00	0.00	0.00	0.00
19.00	17.99	0.00	17.99	71.00	0.00	0.00	0.00
20.00	16.22	0.00	16.22	72.00	0.00	0.00	0.00
21.00	14.94	0.00	14.94				
22.00	13.68	0.00	13.68				
23.00	12.38	0.00	12.38				
24.00	11.11	0.00	11.11				
25.00	1.09	0.00	1.09				
26.00	0.48	0.00	0.48				
27.00	0.29	0.00	0.29				
28.00	0.18	0.00	0.18				
29.00	0.11	0.00	0.11				
30.00	0.07	0.00	0.07				
31.00	0.05	0.00	0.05				
32.00	0.04	0.00	0.04				
33.00	0.03	0.00	0.03				
34.00	0.03	0.00	0.03				
35.00	0.02	0.00	0.02				
36.00	0.02	0.00	0.02				
37.00	0.01	0.00	0.01				
38.00	0.01	0.00	0.01				
39.00	0.01	0.00	0.01				
40.00	0.01	0.00	0.01				
41.00	0.01	0.00	0.01				
42.00	0.01	0.00	0.01				
43.00	0.01	0.00	0.01				
44.00	0.01	0.00	0.01				
45.00	0.01	0.00	0.01				
46.00	0.01	0.00	0.01				
47.00	0.01	0.00	0.01				
48.00	0.01	0.00	0.01				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

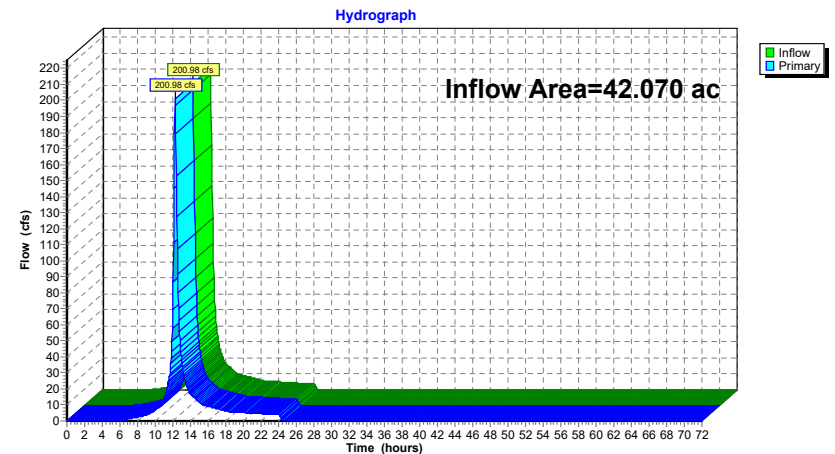
Page 318

Summary for Link 30L: Moodna Creek Undisturbed Total

Inflow Area = 42.070 ac, 3.33% Impervious, Inflow Depth = 5.85" for 100-Year event
 Inflow = 200.98 cfs @ 12.27 hrs, Volume= 20.525 af
 Primary = 200.98 cfs @ 12.27 hrs, Volume= 20.525 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 10L : Moodna Creek

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 30L: Moodna Creek Undisturbed Total



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 319

Hydrograph for Link 30L: Moodna Creek Undisturbed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.03	0.00	0.03	53.00	0.00	0.00	0.00
2.00	0.10	0.00	0.10	54.00	0.00	0.00	0.00
3.00	0.13	0.00	0.13	55.00	0.00	0.00	0.00
4.00	0.16	0.00	0.16	56.00	0.00	0.00	0.00
5.00	0.18	0.00	0.18	57.00	0.00	0.00	0.00
6.00	0.55	0.00	0.55	58.00	0.00	0.00	0.00
7.00	1.32	0.00	1.32	59.00	0.00	0.00	0.00
8.00	2.43	0.00	2.43	60.00	0.00	0.00	0.00
9.00	3.81	0.00	3.81	61.00	0.00	0.00	0.00
10.00	6.90	0.00	6.90	62.00	0.00	0.00	0.00
11.00	13.80	0.00	13.80	63.00	0.00	0.00	0.00
12.00	69.39	0.00	69.39	64.00	0.00	0.00	0.00
13.00	37.80	0.00	37.80	65.00	0.00	0.00	0.00
14.00	16.73	0.00	16.73	66.00	0.00	0.00	0.00
15.00	11.70	0.00	11.70	67.00	0.00	0.00	0.00
16.00	9.13	0.00	9.13	68.00	0.00	0.00	0.00
17.00	7.73	0.00	7.73	69.00	0.00	0.00	0.00
18.00	6.30	0.00	6.30	70.00	0.00	0.00	0.00
19.00	5.60	0.00	5.60	71.00	0.00	0.00	0.00
20.00	5.24	0.00	5.24	72.00	0.00	0.00	0.00
21.00	4.89	0.00	4.89				
22.00	4.54	0.00	4.54				
23.00	4.18	0.00	4.18				
24.00	3.82	0.00	3.82				
25.00	0.00	0.00	0.00				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

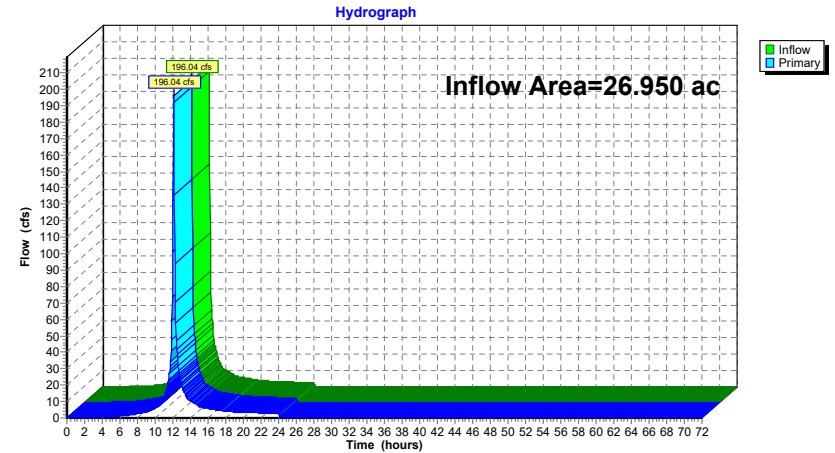
Page 320

Summary for Link 34L: Moodna Creek Undetained Total

Inflow Area = 26.950 ac, 12.39% Impervious, Inflow Depth = 6.43" for 100-Year event
 Inflow = 196.04 cfs @ 12.13 hrs, Volume= 14.437 af
 Primary = 196.04 cfs @ 12.13 hrs, Volume= 14.437 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 10L : Moodna Creek

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 34L: Moodna Creek Undetained Total



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 321

Hydrograph for Link 34L: Moodna Creek Undetained Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.11	0.00	0.11	53.00	0.00	0.00	0.00
2.00	0.25	0.00	0.25	54.00	0.00	0.00	0.00
3.00	0.33	0.00	0.33	55.00	0.00	0.00	0.00
4.00	0.39	0.00	0.39	56.00	0.00	0.00	0.00
5.00	0.63	0.00	0.63	57.00	0.00	0.00	0.00
6.00	1.03	0.00	1.03	58.00	0.00	0.00	0.00
7.00	1.70	0.00	1.70	59.00	0.00	0.00	0.00
8.00	2.56	0.00	2.56	60.00	0.00	0.00	0.00
9.00	3.57	0.00	3.57	61.00	0.00	0.00	0.00
10.00	6.17	0.00	6.17	62.00	0.00	0.00	0.00
11.00	12.44	0.00	12.44	63.00	0.00	0.00	0.00
12.00	101.20	0.00	101.20	64.00	0.00	0.00	0.00
13.00	20.49	0.00	20.49	65.00	0.00	0.00	0.00
14.00	10.42	0.00	10.42	66.00	0.00	0.00	0.00
15.00	7.14	0.00	7.14	67.00	0.00	0.00	0.00
16.00	5.86	0.00	5.86	68.00	0.00	0.00	0.00
17.00	4.93	0.00	4.93	69.00	0.00	0.00	0.00
18.00	3.99	0.00	3.99	70.00	0.00	0.00	0.00
19.00	3.64	0.00	3.64	71.00	0.00	0.00	0.00
20.00	3.41	0.00	3.41	72.00	0.00	0.00	0.00
21.00	3.18	0.00	3.18				
22.00	2.94	0.00	2.94				
23.00	2.71	0.00	2.71				
24.00	2.48	0.00	2.48				
25.00	0.00	0.00	0.00				
26.00	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
28.00	0.00	0.00	0.00				
29.00	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
31.00	0.00	0.00	0.00				
32.00	0.00	0.00	0.00				
33.00	0.00	0.00	0.00				
34.00	0.00	0.00	0.00				
35.00	0.00	0.00	0.00				
36.00	0.00	0.00	0.00				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

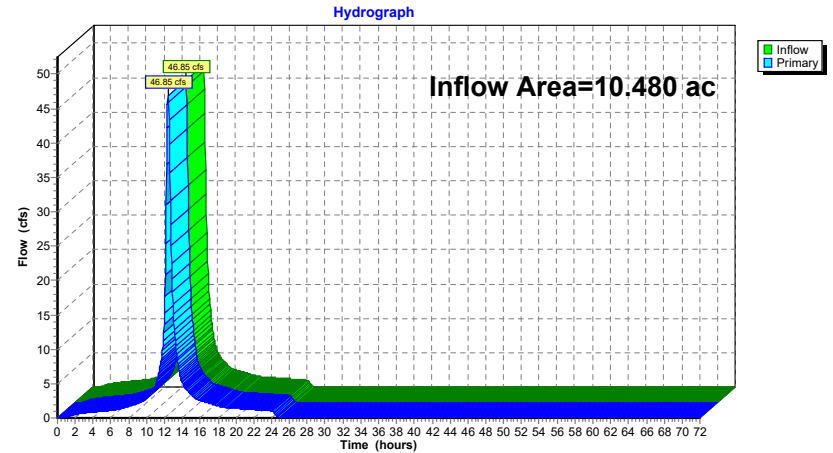
Page 322

Summary for Link 39L: Route 9 Undetained Total

Inflow Area = 10.480 ac, 71.95% Impervious, Inflow Depth = 7.68" for 100-Year event
 Inflow = 46.85 cfs @ 12.40 hrs, Volume= 6.704 af
 Primary = 46.85 cfs @ 12.40 hrs, Volume= 6.704 af, Atten= 0%, Lag= 0.0 min
 Routed to Link 21L : Route 9 Total

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 39L: Route 9 Undetained Total



2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

NRCC 24-hr C 100-Year Rainfall=8.57"

Printed 10/24/2023

Page 323

Hydrograph for Link 39L: Route 9 Undetained Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	52.00	0.00	0.00	0.00
1.00	0.10	0.00	0.10	53.00	0.00	0.00	0.00
2.00	0.49	0.00	0.49	54.00	0.00	0.00	0.00
3.00	0.70	0.00	0.70	55.00	0.00	0.00	0.00
4.00	0.84	0.00	0.84	56.00	0.00	0.00	0.00
5.00	0.96	0.00	0.96	57.00	0.00	0.00	0.00
6.00	1.08	0.00	1.08	58.00	0.00	0.00	0.00
7.00	1.35	0.00	1.35	59.00	0.00	0.00	0.00
8.00	1.72	0.00	1.72	60.00	0.00	0.00	0.00
9.00	2.11	0.00	2.11	61.00	0.00	0.00	0.00
10.00	3.01	0.00	3.01	62.00	0.00	0.00	0.00
11.00	4.78	0.00	4.78	63.00	0.00	0.00	0.00
12.00	15.28	0.00	15.28	64.00	0.00	0.00	0.00
13.00	15.15	0.00	15.15	65.00	0.00	0.00	0.00
14.00	5.07	0.00	5.07	66.00	0.00	0.00	0.00
15.00	3.39	0.00	3.39	67.00	0.00	0.00	0.00
16.00	2.52	0.00	2.52	68.00	0.00	0.00	0.00
17.00	2.13	0.00	2.13	69.00	0.00	0.00	0.00
18.00	1.75	0.00	1.75	70.00	0.00	0.00	0.00
19.00	1.51	0.00	1.51	71.00	0.00	0.00	0.00
20.00	1.41	0.00	1.41	72.00	0.00	0.00	0.00
21.00	1.31	0.00	1.31				
22.00	1.22	0.00	1.22				
23.00	1.12	0.00	1.12				
24.00	1.03	0.00	1.03				
25.00	0.93	0.00	0.93				
26.00	0.84	0.00	0.84				
27.00	0.75	0.00	0.75				
28.00	0.66	0.00	0.66				
29.00	0.57	0.00	0.57				
30.00	0.49	0.00	0.49				
31.00	0.41	0.00	0.41				
32.00	0.33	0.00	0.33				
33.00	0.25	0.00	0.25				
34.00	0.17	0.00	0.17				
35.00	0.09	0.00	0.09				
36.00	0.01	0.00	0.01				
37.00	0.00	0.00	0.00				
38.00	0.00	0.00	0.00				
39.00	0.00	0.00	0.00				
40.00	0.00	0.00	0.00				
41.00	0.00	0.00	0.00				
42.00	0.00	0.00	0.00				
43.00	0.00	0.00	0.00				
44.00	0.00	0.00	0.00				
45.00	0.00	0.00	0.00				
46.00	0.00	0.00	0.00				
47.00	0.00	0.00	0.00				
48.00	0.00	0.00	0.00				
49.00	0.00	0.00	0.00				
50.00	0.00	0.00	0.00				
51.00	0.00	0.00	0.00				

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Table of Contents

Printed 10/24/2023

TABLE OF CONTENTS

Project Reports

- 1 Routing Diagram
- 2 Project Notes
- 3 Rainfall Events Listing (selected events)
- 4 Area Listing (all nodes)
- 5 Soil Listing (all nodes)
- 6 Ground Covers (all nodes)
- 7 Pipe Listing (all nodes)
- 9 Notes Listing (all nodes)

1-Year Event

- 10 Node Listing
- 13 Subcat 4S: SA North Undetained
- 15 Subcat 5S: North-Buildings
- 18 Subcat 6S: SA AG INF Basin B Imp.
- 21 Subcat 7S: SA AG DET Basin A Imp.
- 24 Subcat 9S: Route 9W Undisturbed Perv.
- 27 Subcat 11S: SA South (Rt 9) Undetained Imp.
- 29 Subcat 14S: SA UG DET Basin E Imp.
- 31 Subcat 15S: SA UG Det Basin F Imp.
- 34 Subcat 19S: SA AG INF Basin G/H Imp.
- 37 Subcat 23S: SA AG INF Basin C Imp.
- 40 Subcat 24S: SA UG DET Basin E Perv.
- 42 Subcat 28S: Moodna Creek Undisturbed Perv.
- 44 Subcat 29S: Moodna Creek Undisturbed Imp.
- 46 Subcat 31S: SA AG INF Basin B Perv.
- 49 Subcat 32S: SA AS INF Basin C Perv.
- 52 Subcat 33S: SA AG DET Basin A Perv.
- 54 Subcat 36S: SA UG Det Basin F Perv.
- 57 Subcat 37S: SA AG INF Basin G/H Perv.
- 60 Subcat 38S: SA South (Rt 9) Undetained Perv.
- 62 Subcat 40S: Route 9W Undisturbed Imp.
- 64 Pond 8P: Aboveground Infiltration Basin 'B'
- 70 Pond 9P: Aboveground Infiltration Basin 'A'
- 76 Pond 17P: Underground Detention Basin 'E'
- 82 Pond 18P: Underground Detention Basin 'F'
- 88 Pond 20P: Combined Aboveground Infiltration Basin 'G/H'
- 94 Pond 24P: Aboveground Infiltration Basin 'C'
- 100 Link 10L: Moodna Creek
- 102 Link 11L: Route 9 Undisturbed Total
- 104 Link 21L: Route 9 Total
- 106 Link 22L: Total
- 108 Link 30L: Moodna Creek Undisturbed Total
- 110 Link 34L: Moodna Creek Undetained Total
- 112 Link 39L: Route 9 Undetained Total

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Table of Contents

Printed 10/24/2023

10-Year Event

114	Node Listing
117	Subcat 4S: SA North Undetained
119	Subcat 5S: North-Buildings
122	Subcat 6S: SA AG INF Basin B Imp.
125	Subcat 7S: SA AG DET Basin A Imp.
128	Subcat 9S: Route 9W Undisturbed Perv.
131	Subcat 11S: SA South (Rt 9) Undetained Imp.
133	Subcat 14S: SA UG DET Basin E Imp.
135	Subcat 15S: SA UG Det Basin F Imp.
138	Subcat 19S: SA AG INF Basin G/H Imp.
141	Subcat 23S: SA AG INF Basin C Imp.
144	Subcat 24S: SA UG DET Basin E Perv.
146	Subcat 28S: Moodna Creek Undisturbed Perv.
148	Subcat 29S: Moodna Creek Undisturbed Imp.
150	Subcat 31S: SA AG INF Basin B Perv.
153	Subcat 32S: SA AS INF Basin C Perv.
156	Subcat 33S: SA AG DET Basin A Perv.
159	Subcat 36S: SA UG Det Basin F Perv.
162	Subcat 37S: SA AG INF Basin G/H Perv.
165	Subcat 38S: SA South (Rt 9) Undetained Perv.
167	Subcat 40S: Route 9W Undisturbed Imp.
169	Pond 8P: Aboveground Infiltration Basin 'B'
175	Pond 9P: Aboveground Infiltration Basin 'A'
181	Pond 17P: Underground Detention Basin 'E'
187	Pond 18P: Underground Detention Basin 'F'
193	Pond 20P: Combined Aboveground Infiltration Basin 'G/H'
199	Pond 24P: Aboveground Infiltration Basin 'C'
205	Link 10L: Moodna Creek
207	Link 11L: Route 9 Undisturbed Total
209	Link 21L: Route 9 Total
211	Link 22L: Total
213	Link 30L: Moodna Creek Undisturbed Total
215	Link 34L: Moodna Creek Undetained Total
217	Link 39L: Route 9 Undetained Total

100-Year Event

219	Node Listing
222	Subcat 4S: SA North Undetained
224	Subcat 5S: North-Buildings
227	Subcat 6S: SA AG INF Basin B Imp.
230	Subcat 7S: SA AG DET Basin A Imp.
233	Subcat 9S: Route 9W Undisturbed Perv.
236	Subcat 11S: SA South (Rt 9) Undetained Imp.
238	Subcat 14S: SA UG DET Basin E Imp.
240	Subcat 15S: SA UG Det Basin F Imp.
243	Subcat 19S: SA AG INF Basin G/H Imp.
246	Subcat 23S: SA AG INF Basin C Imp.

2023-09 Proposed

Prepared by Dynamic Engineering

HydroCAD® 10.20-3f s/n 08640 © 2023 HydroCAD Software Solutions LLC

Table of Contents

Printed 10/24/2023

249	Subcat 24S: SA UG DET Basin E Perv.
251	Subcat 28S: Moodna Creek Undisturbed Perv.
253	Subcat 29S: Moodna Creek Undisturbed Imp.
255	Subcat 31S: SA AG INF Basin B Perv.
258	Subcat 32S: SA AS INF Basin C Perv.
261	Subcat 33S: SA AG DET Basin A Perv.
264	Subcat 36S: SA UG Det Basin F Perv.
267	Subcat 37S: SA AG INF Basin G/H Perv.
270	Subcat 38S: SA South (Rt 9) Undetained Perv.
272	Subcat 40S: Route 9W Undisturbed Imp.
274	Pond 8P: Aboveground Infiltration Basin 'B'
280	Pond 9P: Aboveground Infiltration Basin 'A'
286	Pond 17P: Underground Detention Basin 'E'
292	Pond 18P: Underground Detention Basin 'F'
298	Pond 20P: Combined Aboveground Infiltration Basin 'G/H'
304	Pond 24P: Aboveground Infiltration Basin 'C'
310	Link 10L: Moodna Creek
312	Link 11L: Route 9 Undisturbed Total
314	Link 21L: Route 9 Total
316	Link 22L: Total
318	Link 30L: Moodna Creek Undisturbed Total
320	Link 34L: Moodna Creek Undetained Total
322	Link 39L: Route 9 Undetained Total

**STORMWATER COLLECTION SYSTEM CALCULATIONS
(PIPESIZING)**



Stormwater Collection System Calculations

Project: Proposed Self-Storage Facility
 Job #: 2803-99-006
 Location: Clarkstown, NY
 Design Storm: 25 Year

Computed By: TJB
 Checked By: RDM
 Date: 10/10/2022

NOTES:
 1) Design method used is Rational Method, unless otherwise noted.
 2) Refer to Weighted Runoff Coefficient table for calculation of incremental areas and C values

PIPE SECTION		SUBCATCHMENT AREA	INCREMENTAL		CUMULATIVE	TIME OF CONCENTRATION			I	PEAK RUNOFF		PIPING INPUT			PIPING DATA		
FROM	TO	Area (Acres)	"C"	A x C Ac	A x C (acres)	Tc to Inlet (min)	Tc in Pipe (min.)	Final Tc (min)	(In/Hr)	Q to Inlet (CFS)	Q cum. for Pipe (CFS)	Dia. (In)	Length (Ft)	Man. "n"	Slope (ft/ft)	Pipe Capacity (cfs)	Pipe Velocity (fps)
F-170	F-160	0.18	0.95	0.17	0.17	10.00	0.67	10.00	5.71	0.97	0.97	15	150.0	0.013	0.0050	4.57	3.73
F-160	F-150	0.28	0.95	0.27	0.44	10.00	1.01	10.67	5.58	1.51	2.46	15	227.0	0.013	0.0050	4.57	3.73
F-150	F-140	0.29	0.89	0.26	1.04	10.00	0.56	11.68	5.34	1.39	5.55	18	154.0	0.012	0.0050	8.04	4.55
F-140	F-130	0.60	0.92	0.55	1.59	10.00	0.60	12.24	5.22	2.87	8.30	24	200.0	0.012	0.0050	17.33	5.52
F-151	F-150	0.36	0.94	0.34	0.34	10.00	0.28	10.00	5.71	1.94	1.94	15	63.0	0.013	0.0050	4.57	3.73
F-130	F-120	0.62	0.91	0.56	2.15	10.00	0.60	12.84	5.13	2.87	11.02	24	200.0	0.012	0.0050	17.33	5.52
F-120	F-110	0.62	0.91	0.56	2.71	10.00	0.60	13.44	5.03	2.82	13.63	24	200.0	0.012	0.0050	17.33	5.52
F-110	BASIN F	0.55	0.86	0.47	3.18	10.00	0.46	14.04	4.87	2.29	15.49	24	151.0	0.012	0.0050	17.33	5.52
II-310	I-310	0.42	0.95	0.40	0.40	10.00	0.07	10.00	5.71	2.28	2.28	12	15.0	0.012	0.0050	2.73	3.48
I-310	I-300	0.00	0.95	0.00	0.40	10.00	0.22	10.07	5.71	0.00	2.28	15	54.0	0.012	0.0050	4.95	4.04
II-300	I-300	0.27	0.95	0.26	0.26	10.00	0.07	10.00	5.71	1.48	1.48	12	15.0	0.012	0.0050	2.73	3.48
I-300	I-290	0.00	0.95	0.00	0.66	10.00	0.22	10.29	5.71	0.00	3.77	15	54.0	0.012	0.0050	4.95	4.04
II-290	I-290	0.27	0.95	0.26	0.26	10.00	0.07	10.00	5.71	1.48	1.48	12	15.0	0.012	0.0050	2.73	3.48
I-290	I-280	0.00	0.95	0.00	0.92	10.00	0.20	10.51	5.58	0.00	5.13	18	54.0	0.012	0.0050	8.04	4.55
II-280	I-280	0.27	0.95	0.26	0.26	10.00	0.07	10.00	5.71	1.48	1.48	12	15.0	0.012	0.0050	2.73	3.48
I-280	I-270	0.00	0.95	0.00	1.18	10.00	0.20	10.71	5.58	0.00	6.58	18	54.0	0.012	0.0050	8.04	4.55
II-270	I-270	0.27	0.95	0.26	0.26	10.00	0.07	10.00	5.71	1.48	1.48	12	15.0	0.012	0.0050	2.73	3.48
I-270	I-260	0.00	0.95	0.00	1.44	10.00	0.20	10.91	5.58	0.00	8.04	18	54.0	0.012	0.0050	8.04	4.55
II-260	I-260	0.27	0.95	0.26	0.26	10.00	0.07	10.00	5.71	1.48	1.48	12	15.0	0.012	0.0050	2.73	3.48
I-260	I-250	0.00	0.95	0.00	1.70	10.00	0.16	11.11	5.45	0.00	9.27	24	54.0	0.012	0.0050	17.33	5.52
II-250	I-250	0.27	0.95	0.26	0.26	10.00	0.07	10.00	5.71	1.48	1.48	12	15.0	0.012	0.0050	2.73	3.48
I-250	I-240	0.00	0.95	0.00	1.96	10.00	0.16	11.27	5.45	0.00	10.68	24	54.0	0.012	0.0050	17.33	5.52
II-240	I-240	0.27	0.95	0.26	0.26	10.00	0.07	10.00	5.71	1.48	1.48	12	15.0	0.012	0.0050	2.73	3.48
I-240	I-230	0.00	0.95	0.00	2.22	10.00	0.16	11.43	5.45	0.00	12.10	24	54.0	0.012	0.0050	17.33	5.52
II-230	I-230	0.27	0.95	0.26	0.26	10.00	0.07	10.00	5.71	1.48	1.48	12	15.0	0.012	0.0050	2.73	3.48
I-230	I-220	0.00	0.95	0.00	2.48	10.00	0.16	11.59	5.34	0.00	13.23	24	54.0	0.012	0.0050	17.33	5.52
II-220	I-220	0.27	0.95	0.26	0.26	10.00	0.07	10.00	5.71	1.48	1.48	12	15.0	0.012	0.0050	2.73	3.48
I-220	I-210	0.00	0.95	0.00	2.74	10.00	0.16	11.75	5.34	0.00	14.62	24	54.0	0.012	0.0050	17.33	5.52
II-210	I-210	0.27	0.95	0.26	0.26	10.00	0.07	10.00	5.71	1.48	1.48	12	15.0	0.012	0.0050	2.73	3.48
I-210	I-200	0.00	0.95	0.00	3.00	10.00	0.14	11.91	5.34	0.00	16.01	30	54.0	0.012	0.0050	31.42	6.40
II-200	I-200	0.27	0.95	0.26	0.26	10.00	0.07	10.00	5.71	1.48	1.48	12	15.0	0.012	0.0050	2.73	3.48
I-200	I-190	0.00	0.95	0.00	3.26	10.00	0.14	12.05	5.22	0.00	17.02	30	54.0	0.012	0.0050	31.42	6.40
II-190	I-190	0.27	0.95	0.26	0.26	10.00	0.07	10.00	5.71	1.48	1.48	12	15.0	0.012	0.0050	2.73	3.48
I-190	I-180	0.00	0.95	0.00	3.52	10.00	0.14	12.19	5.22	0.00	18.37	30	54.0	0.012	0.0050	31.42	6.40
II-180	I-180	0.27	0.95	0.26	0.26	10.00	0.07	10.00	5.71	1.48	1.48	12	15.0	0.012	0.0050	2.73	3.48
I-180	I-170	0.00	0.95	0.00	3.78	10.00	0.14	12.33	5.22	0.00	19.73	30	54.0	0.012	0.0050	31.42	6.40
II-170	I-170	0.42	0.95	0.40	0.40	10.00	0.07	10.00	5.71	2.28	2.28	12	15.0	0.012	0.0050	2.73	3.48
I-170	I-160	0.00	0.95	0.00	4.18	10.00	0.14	12.47	5.22	0.00	21.82	30	54.0	0.012	0.0050	31.42	6.40
I-160	I-150	0.00	0.95	0.00	4.18	10.00	0.14	12.61	5.13	0.00	21.42	30	55.0	0.012	0.0050	31.42	6.40
I-150	I-140	0.00	0.95	0.00	4.18	10.00	0.67	12.75	5.13	0.00	21.42	30	257.0	0.012	0.0050	31.42	6.40
BASIN F	I-140	0.00	0.95	0.00	3.18	10.00	0.34	14.50	4.80	0.00	15.26	24	111.0	0.012	0.0050	17.33	5.52
I-140	I-130	0.00	0.95	0.00	7.36	10.00	0.10	14.84	4.80	0.00	35.33	36	42.0	0.012	0.0050	51.09	7.23
I-130	I-120	0.00	0.95	0.00	7.36	10.00	0.83	14.94	4.80	0.00	35.33	36	358.0	0.012	0.0050	51.09	7.23
I-120	I-110	0.00	0.95	0.00	7.36	10.00	0.77	15.77	4.65	0.00	34.19	36	336.0	0.012	0.0050	51.09	7.23
I-110	I-100	0.00	0.95	0.00	7.36	10.00	0.02	16.54	4.49	0.00	33.01	36	13.0	0.012	0.0156	90.24	12.77
A-210	A-200	1.20	0.86	1.03	1.03	10.00	1.09	10.00	5.71	5.88	5.88	18	298.0	0.012	0.0050	8.04	4.55
A-200	A-190	0.14	0.83	0.12	1.15	10.00	0.66	11.09	5.45	0.65	6.27	18	179.0	0.012	0.0050	8.04	4.55
A-190	A-180	0.98	0.91	0.89	2.04	10.00	0.97	11.75	5.34	4.75	10.88	24	320.0	0.012	0.0050	17.33	5.52
A-181	A-180	1.29	0.68	0.88	0.88	10.00	0.54	10.00	5.71	5.02	5.02	18	148.0	0.012	0.0050	8.04	4.55
A-180	A-170	0.58	0.95	0.55	3.47	10.00	0.41	12.72	5.13	2.82	17.78	30	158.0	0.012	0.0050	31.42	6.40
A-170	A-160	1.46	0.85	1.24	4.71	10.00	0.66	13.13	5.03	6.24	23.69	30	255.0	0.012	0.0050	31.42	6.40
A-160	A-150	1.62	0.78	1.26	5.97	10.00	0.66	13.79	4.95	6.24	29.55	36	264.0	0.013	0.0050	47.16	6.68
A-150	A-140	0.35	0.95	0.33	6.30	10.00	0.30	14.45	4.87	1.61	30.68	36	131.0	0.012	0.0050	51.09	7.23
A-140	A-130	0.85	0.59	0.50	6.80	10.00	0.88	14.75	4.80	2.40	32.64	36	380.0	0.012	0.0050	51.09	7.23
A-131	A-130	0.30	0.95	0.29	0.29	10.00	0.53	10.00	5.71	1.66	1.66	15	128.0	0.012	0.0050	4.95	4.04
A-130	A-120	0.78	0.78	0.61	7.70	10.00	0.86	15.63	4.65	2.83	35.77	36	372.0	0.012	0.0050	51.09	7.23
A-120	A-110	1.01	0.95	0.96	8.66	10.00	0.81	16.49	4.56	4.38	39.49	36	350.0	0.012	0.0050	51.09	7.23
IA-1017	A-1017	0.33	0.95	0.31	0.31	10.00	0.06	10.00	5.71	1.77	1.77	15	15.0	0.012	0.0050	4.95	4.04
A-1017	A-1016	0.00	0.95	0.00	0.31	10.00	0.22	10.06	5.71	0.00	1.77	15	54.0	0.012	0.0050	4.95	4.04
IA-1016	A-1016	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
A-1016	A-1015	0.00	0.95	0.00	0.52	10.00	0.22	10.28	5.71	0.00	2.97	15	54.0	0.012	0.0050	4.95	4.04
IA-1015	A-1015	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
A-1015	A-1014	0.22	0.95	0.21	0.94	10.00	0.20	10.50	5.58	1.17	5.25	18	54.0	0.012	0.0050	8.04	4.55
IA-1014	A-1014	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
A-1014	A-1013	0.00	0.95	0.00	1.15	10.00	0.20	10.70	5.58	0.00	6.42	18	54.0	0.012	0.0050	8.04	4.55
IA-1013	A-1013	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
A-1013	A-1012	0.00	0.95	0.00	1.36	10.00	0.20	10.90	5.58	0.00	7.59	18	54.0	0.012	0.0050	8.04	4.55
IA-1012	A-1012	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
A-1012	A-1011	0.00	0.95														

PIPE SECTION		SUBCATCHMENT AREA	INCREMENTAL		CUMULATIVE	TIME OF CONCENTRATION			I	PEAK RUNOFF		PIPING INPUT			PIPING DATA		
FROM	TO	Area (Acres)	"C"	A x C Ac	A x C (acres)	Tc to Inlet (min)	Tc in Pipe (min.)	Final Tc (min)	(In/Hr)	Q to Inlet (CFS)	Q cum. for Pipe (CFS)	Dia. (In)	Length (Ft)	Man. "n"	Slope (ft/ft)	Pipe Capacity (cfs)	Pipe Velocity (fps)
IA-1009	A-1009	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
A-1009	A-1008	0.00	0.95	0.00	2.20	10.00	0.16	11.58	5.34	0.00	11.74	24	54.0	0.012	0.0050	17.33	5.52
IA-1008	A-1008	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
A-1008	A-1000	0.00	0.95	0.00	2.41	10.00	0.16	11.74	5.34	0.00	12.86	24	54.0	0.012	0.0050	17.33	5.52
IA-1007	A-1007	0.32	0.95	0.30	0.30	10.00	0.06	10.00	5.71	1.71	1.71	15	15.0	0.012	0.0050	4.95	4.04
A-1007	A-1006	0.00	0.95	0.00	0.30	10.00	0.19	10.06	5.71	0.00	1.71	15	45.0	0.012	0.0050	4.95	4.04
A-1006	A-1005	0.00	0.95	0.00	0.51	10.00	0.20	10.25	5.71	0.00	2.91	18	54.0	0.012	0.0050	8.04	4.55
IA-1006	A-1006	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
IA-1005	A-1005	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
A-1005	A-1004	0.00	0.95	0.00	0.72	10.00	0.20	10.45	5.71	0.00	4.11	18	54.0	0.012	0.0050	8.04	4.55
IA-1004	A-1004	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
A-1004	A-1003	0.00	0.95	0.00	0.93	10.00	0.20	10.65	5.58	0.00	5.19	18	54.0	0.012	0.0050	8.04	4.55
IA-1003	A-1003	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
A-1003	A-1002	0.00	0.95	0.00	1.14	10.00	0.20	10.85	5.58	0.00	6.36	18	54.0	0.012	0.0050	8.04	4.55
IA-1002	A-1002	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
A-1002	A-1001	0.00	0.95	0.00	1.35	10.00	0.20	11.05	5.45	0.00	7.36	18	54.0	0.012	0.0050	8.04	4.55
IA-1001	A-1001	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
A-1001	A-1000	0.00	0.95	0.00	1.56	10.00	0.16	11.25	5.45	0.00	8.50	24	54.0	0.012	0.0050	17.33	5.52
IA-1000	A-1000	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
A-1000	A-110	0.00	0.95	0.00	4.18	10.00	0.29	11.90	5.34	0.00	22.30	30	111.0	0.012	0.0050	31.42	6.40
A-110	A-100	0.00	0.95	0.00	12.84	10.00	0.11	17.30	4.41	0.00	56.62	36	65.0	0.012	0.0086	67.00	9.48
IE-1016	E-1016	0.49	0.95	0.47	0.47	10.00	0.07	10.00	5.71	2.68	2.68	12	15.0	0.012	0.0050	2.73	3.48
E-1016	E-1015	0.00	0.95	0.00	0.47	10.00	0.22	10.07	5.71	0.00	2.68	15	54.0	0.012	0.0050	4.95	4.04
IE-1015	E-1015	0.20	0.95	0.19	0.19	10.00	0.07	10.00	5.71	1.08	1.08	12	15.0	0.012	0.0050	2.73	3.48
E-1015	E-1014	0.00	0.95	0.00	0.66	10.00	0.22	10.29	5.71	0.00	3.77	15	54.0	0.012	0.0050	4.95	4.04
IE-1014	E-1014	0.20	0.95	0.19	0.19	10.00	0.07	10.00	5.71	1.08	1.08	12	15.0	0.012	0.0050	2.73	3.48
E-1014	E-1013	0.00	0.95	0.00	0.85	10.00	0.22	10.51	5.58	0.00	4.74	15	54.0	0.012	0.0050	4.95	4.04
IE-1013	E-1013	0.20	0.95	0.19	0.19	10.00	0.07	10.00	5.71	1.08	1.08	12	15.0	0.012	0.0050	2.73	3.48
E-1013	E-1012	0.00	0.95	0.00	1.04	10.00	0.20	10.73	5.58	0.00	5.80	18	54.0	0.012	0.0050	8.04	4.55
IE-1012	E-1012	0.20	0.95	0.19	0.19	10.00	0.07	10.00	5.71	1.08	1.08	12	15.0	0.012	0.0050	2.73	3.48
E-1012	E-1011	0.00	0.95	0.00	1.23	10.00	0.20	10.93	5.58	0.00	6.86	18	54.0	0.012	0.0050	8.04	4.55
IE-1011	E-1011	0.20	0.95	0.19	0.19	10.00	0.07	10.00	5.71	1.08	1.08	12	15.0	0.012	0.0050	2.73	3.48
E-1011	E-1010	0.00	0.95	0.00	1.42	10.00	0.20	11.13	5.45	0.00	7.74	18	54.0	0.012	0.0050	8.04	4.55
IE-1010	E-1010	0.20	0.95	0.19	0.19	10.00	0.07	10.00	5.71	1.08	1.08	12	15.0	0.012	0.0050	2.73	3.48
E-1010	E-1009	0.00	0.95	0.00	1.61	10.00	0.16	11.33	5.45	0.00	8.77	24	54.0	0.012	0.0050	17.33	5.52
IE-1009	E-1009	0.20	0.95	0.19	0.19	10.00	0.07	10.00	5.71	1.08	1.08	12	15.0	0.012	0.0050	2.73	3.48
E-1009	E-1008	0.00	0.95	0.00	1.80	10.00	0.16	11.49	5.45	0.00	9.81	24	54.0	0.012	0.0050	17.33	5.52
IE-1008	E-1008	0.20	0.95	0.19	0.19	10.00	0.07	10.00	5.71	1.08	1.08	12	15.0	0.012	0.0050	2.73	3.48
E-1008	E-1007	0.00	0.95	0.00	1.99	10.00	0.16	11.65	5.34	0.00	10.62	24	54.0	0.012	0.0050	17.33	5.52
IE-1007	E-1007	0.20	0.95	0.19	0.19	10.00	0.07	10.00	5.71	1.08	1.08	12	15.0	0.012	0.0050	2.73	3.48
E-1007	E-1006	0.00	0.95	0.00	2.18	10.00	0.16	11.81	5.34	0.00	11.63	24	54.0	0.012	0.0050	17.33	5.52
IE-1006	E-1006	0.20	0.95	0.19	0.19	10.00	0.07	10.00	5.71	1.08	1.08	12	15.0	0.012	0.0050	2.73	3.48
E-1006	E-1005	0.00	0.95	0.00	2.37	10.00	0.16	11.97	5.34	0.00	12.64	24	54.0	0.012	0.0050	17.33	5.52
IE-1005	E-1005	0.20	0.95	0.19	0.19	10.00	0.07	10.00	5.71	1.08	1.08	12	15.0	0.012	0.0050	2.73	3.48
E-1005	E-1004	0.00	0.95	0.00	2.56	10.00	0.16	12.13	5.22	0.00	13.36	24	54.0	0.012	0.0050	17.33	5.52
IE-1004	E-1004	0.20	0.95	0.19	0.19	10.00	0.07	10.00	5.71	1.08	1.08	12	15.0	0.012	0.0050	2.73	3.48
E-1004	E-1003	0.00	0.95	0.00	2.75	10.00	0.16	12.29	5.22	0.00	14.36	24	54.0	0.012	0.0050	17.33	5.52
IE-1003	E-1003	0.20	0.95	0.19	0.19	10.00	0.07	10.00	5.71	1.08	1.08	12	15.0	0.012	0.0050	2.73	3.48
E-1003	E-1002	0.00	0.95	0.00	2.94	10.00	0.16	12.45	5.22	0.00	15.35	24	54.0	0.012	0.0050	17.33	5.52
IE-1002	E-1002	0.20	0.95	0.19	0.19	10.00	0.07	10.00	5.71	1.08	1.08	12	15.0	0.012	0.0050	2.73	3.48
E-1002	E-1001	0.00	0.95	0.00	3.13	10.00	0.18	12.61	5.13	0.00	16.04	24	58.0	0.012	0.0050	17.33	5.52
IE-1001	E-1000	0.00	0.95	0.00	3.13	10.00	0.16	12.79	5.13	0.00	16.04	24	54.0	0.012	0.0050	17.33	5.52
E-120	E-1000	0.23	0.94	0.22	0.22	10.00	0.76	10.00	5.71	1.26	1.26	15	169.0	0.013	0.0050	4.57	3.73
E-1000	BASIN E	0.00	0.95	0.00	3.35	10.00	0.21	12.95	5.13	0.00	17.17	30	73.0	0.013	0.0050	29.00	5.91
E-110	BASIN E	0.15	0.95	0.14	0.14	10.00	0.05	10.00	5.71	0.80	0.80	15	12.0	0.012	0.0050	4.95	4.04
E-210	BASIN E	0.29	0.95	0.28	0.28	10.00	0.04	10.00	5.71	1.60	1.60	15	10.0	0.012	0.0050	4.95	4.04
E-310	BASIN E	0.15	0.95	0.14	0.14	10.00	0.05	10.00	5.71	0.80	0.80	15	13.0	0.012	0.0050	4.95	4.04
C-1407	C-1406	0.18	0.86	0.15	0.15	10.00	0.62	10.00	5.71	0.86	0.86	18	168.0	0.012	0.0050	8.04	4.55
C-1406	C-1405	0.30	0.95	0.29	0.44	10.00	0.62	10.62	5.58	1.62	2.46	18	168.0	0.012	0.0050	8.04	4.55
C-1405	C-1404	0.15	0.95	0.14	0.58	10.00	0.42	11.24	5.45	0.76	3.16	18	114.0	0.012	0.0050	8.04	4.55
C-1408	C-1404	1.01	0.74	0.75	0.75	10.00	0.18	10.00	5.71	4.28	4.28	18	50.0	0.012	0.0050	8.04	4.55
C-1404	C-1401	0.00	0.95	0.00	1.33	10.00	0.97	11.66	5.34	0.00	7.10	18	266.0	0.012	0.0050	8.04	4.55
C-1403	C-1402	0.94	0.95	0.89	0.89	10.00	0.79	10.00	5.71	5.08	5.08	18	215.0	0.012	0.0050	8.04	4.55
C-1402	C-1401	0.91	0.93	0.85	1.74	10.00	0.19	10.79	5.58	4.74	9.71	24	63.0	0.012	0.0050	17.33	5.52
C-1401	C-1400	0.17	0.87	0.15	3.22	10.00	0.27	12.63	5.13	0.77	16.50	24	88.0	0.012	0.0050	17.33	5.52
C-1503	C-1502	1.14	0.85	0.97	0.97	10.00	0.29	10.00	5.71	5.54	5.54	18	78.0	0.012	0.0050	8.04	4.55
C-1504	C-1502	0.93	0.95	0.88	0.88	10.00	0.50	10.00	5.71	5.02	5.02	18	137.0	0.012	0.0050	8.04	4.55
C-1502	C-1501	0.00	0.95	0.00	1.85	10.00	0.18	10.50	5.58	0.00	10.32	24	58.0	0.012	0.0050	17.33	5.52
C-1501	C-1500	0.17	0.87	0.15	2.00	10.00	1.33	10.68	5.58	0.84	11.16	24	442.0	0.012	0.0050	17.33	5.52
C-1500	C-1400	0.69	0.72	0.50	2.50	10.00	0.19	12.01	5.22	2.61	13.05						

PIPE SECTION		SUBCATCHMENT AREA	INCREMENTAL		CUMULATIVE	TIME OF CONCENTRATION			I	PEAK RUNOFF		PIPING INPUT			PIPING DATA		
FROM	TO	Area (Acres)	"C"	A x C Ac	A x C (acres)	Tc to Inlet (min)	Tc in Pipe (min.)	Final Tc (min)	(In/Hr)	Q to Inlet (CFS)	Q cum. for Pipe (CFS)	Dia. (In)	Length (Ft)	Man. "n"	Slope (ft/ft)	Pipe Capacity (cfs)	Pipe Velocity (fps)
IC-1307	C-1307	0.00	0.95	0.00	0.00	10.00	0.06	10.00	5.71	0.00	0.00	15	15.0	0.012	0.0050	4.95	4.04
C-1307	C-1306	0.00	0.95	0.00	0.37	10.00	0.20	10.26	5.71	0.00	2.11	18	54.0	0.012	0.0050	8.04	4.55
IC-1306	C-1306	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
C-1306	C-1305	0.00	0.95	0.00	0.74	10.00	0.16	10.46	5.71	0.00	4.23	24	54.0	0.012	0.0050	17.33	5.52
IC-1305	C-1305	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
C-1305	C-1304	0.00	0.95	0.00	1.11	10.00	0.16	10.62	5.58	0.00	6.19	24	54.0	0.012	0.0050	17.33	5.52
C-1304	C-1302	0.00	0.95	0.00	4.12	10.00	0.18	11.12	5.45	0.00	22.45	36	78.0	0.012	0.0050	51.09	7.23
C-1303	C-1302	1.61	0.78	1.26	1.26	10.00	0.34	10.00	5.71	7.19	7.19	18	92.0	0.012	0.0050	8.04	4.55
C-1302	C-1301	0.00	0.95	0.00	5.38	10.00	0.41	11.30	5.45	0.00	29.32	36	178.0	0.012	0.0050	51.09	7.23
C-1301	C-1300	3.92	0.57	2.23	7.61	10.00	0.83	11.71	5.34	11.90	40.60	36	358.0	0.012	0.0050	51.09	7.23
C-1300	C-1203	0.82	0.75	0.62	14.57	10.00	3.83	13.23	5.03	3.12	73.29	42	1841.0	0.012	0.0050	77.07	8.01
C-1203	C-1202	0.43	0.87	0.37	14.94	10.00	0.33	17.06	4.41	1.63	65.89	42	161.0	0.012	0.0050	77.07	8.01
C-1202	C-1201	0.28	0.95	0.27	15.21	10.00	0.33	17.39	4.41	1.19	67.08	42	161.0	0.012	0.0050	77.07	8.01
C-1201	C-1200	0.28	0.95	0.27	15.48	10.00	0.46	17.72	4.35	1.17	67.26	42	222.0	0.012	0.0050	77.07	8.01
C-1200	C-1100	0.23	0.95	0.22	15.70	10.00	0.34	18.18	4.28	0.94	67.20	42	162.0	0.012	0.0050	77.07	8.01
IC-1110	C-1110	0.39	0.00	0.00	0.00	10.00	0.06	10.00	5.71	0.00	0.00	15	15.0	0.012	0.0050	4.95	4.04
C-1110	C-1109	0.00	0.95	0.00	0.00	10.00	0.20	10.06	5.71	0.00	0.00	18	54.0	0.012	0.0050	8.04	4.55
IC-1109	C-1109	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
C-1109	C-1108	0.00	0.95	0.00	0.37	10.00	0.20	10.26	5.71	0.00	2.11	18	54.0	0.012	0.0050	8.04	4.55
IC-1108	C-1108	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
C-1108	C-1107	0.00	0.95	0.00	0.74	10.00	0.20	10.46	5.71	0.00	4.23	18	54.0	0.012	0.0050	8.04	4.55
IC-1107	C-1107	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
C-1107	C-1106	0.00	0.95	0.00	1.11	10.00	0.20	10.66	5.58	0.00	6.19	18	54.0	0.012	0.0050	8.04	4.55
IC-1106	C-1106	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
C-1106	C-1105	0.00	0.95	0.00	1.48	10.00	0.16	10.86	5.58	0.00	8.26	24	54.0	0.012	0.0050	17.33	5.52
IC-1105	C-1105	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
C-1105	C-1104	0.00	0.95	0.00	1.85	10.00	0.16	11.02	5.45	0.00	10.88	24	54.0	0.012	0.0050	17.33	5.52
IC-1104	C-1104	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
C-1104	C-1103	0.00	0.95	0.00	2.22	10.00	0.16	11.18	5.45	0.00	12.10	24	54.0	0.012	0.0050	17.33	5.52
IC-1103	C-1103	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
C-1103	C-1102	0.00	0.95	0.00	2.59	10.00	0.12	11.34	5.45	0.00	14.12	36	54.0	0.012	0.0050	51.09	7.23
IC-1102	C-1102	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
C-1102	C-1101	0.00	0.95	0.00	2.96	10.00	0.12	11.46	5.45	0.00	16.13	36	54.0	0.012	0.0050	51.09	7.23
IC-1101	C-1101	0.84	0.95	0.80	0.80	10.00	0.22	10.00	5.71	4.57	4.57	15	54.0	0.012	0.0050	4.95	4.04
C-1101	C-1100	0.00	0.95	0.00	3.76	10.00	0.11	11.58	5.34	0.00	20.66	36	46.0	0.012	0.0050	51.09	7.23
C-1100	C-1003	0.00	0.95	0.00	19.46	10.00	0.05	18.52	4.22	0.00	82.12	48	25.0	0.012	0.0050	110.04	8.76
C-1005	C-1004	1.05	0.95	1.00	1.00	10.00	1.65	10.00	5.71	5.71	5.71	18	377.0	0.012	0.0035	6.73	3.81
C-1004	C-1003	1.08	0.95	1.03	2.03	10.00	1.04	11.65	5.34	5.50	10.83	24	345.0	0.012	0.0050	17.33	5.52
C-1003	C-1002	0.63	0.87	0.55	22.04	10.00	0.01	18.57	4.22	2.32	93.01	60	25.0	0.012	0.0400	564.33	28.76
C-1002	C-1001	0.00	0.95	0.00	22.04	10.00	0.01	18.58	4.22	0.00	93.01	60	25.0	0.012	0.0400	564.33	28.76
C-1001	C-1000	0.00	0.95	0.00	22.04	10.00	0.10	18.59	4.22	0.00	93.01	60	61.0	0.012	0.0050	199.52	10.17
IB-1516	B-1516	0.33	0.95	0.31	0.31	10.00	0.06	10.00	5.71	1.77	1.77	15	15.0	0.012	0.0050	4.95	4.04
B-1516	B-1515	0.00	0.95	0.00	0.31	10.00	0.22	10.06	5.71	0.00	1.77	15	54.0	0.012	0.0050	4.95	4.04
IB-1515	B-1515	0.22	0.95	0.21	0.21	10.00	0.22	10.00	5.71	1.20	1.20	15	54.0	0.012	0.0050	4.95	4.04
B-1515	B-1514	0.00	0.95	0.00	0.52	10.00	0.22	10.28	5.71	0.00	2.97	15	54.0	0.012	0.0050	4.95	4.04
IB-1514	B-1514	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
B-1514	B-1513	0.00	0.95	0.00	0.73	10.00	0.20	10.50	5.58	0.00	4.07	18	54.0	0.012	0.0050	8.04	4.55
IB-1513	B-1513	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
B-1513	B-1512	0.00	0.95	0.00	0.94	10.00	0.20	10.70	5.58	0.00	5.25	18	54.0	0.012	0.0050	8.04	4.55
IB-1512	B-1512	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
B-1512	B-1511	0.00	0.95	0.00	1.15	10.00	0.20	10.90	5.58	0.00	6.42	18	54.0	0.012	0.0050	8.04	4.55
IB-1511	B-1511	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
B-1511	B-1510	0.00	0.95	0.00	1.36	10.00	0.16	11.10	5.45	0.00	7.41	24	54.0	0.012	0.0050	17.33	5.52
IB-1510	B-1510	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
B-1510	B-1509	0.00	0.95	0.00	1.57	10.00	0.16	11.26	5.45	0.00	8.56	24	54.0	0.012	0.0050	17.33	5.52
IB-1509	B-1509	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
B-1509	B-1508	0.00	0.95	0.00	1.78	10.00	0.16	11.42	5.45	0.00	9.70	24	54.0	0.012	0.0050	17.33	5.52
IB-1508	B-1508	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
B-1508	B-1507	0.00	0.95	0.00	1.99	10.00	0.16	11.58	5.34	0.00	10.62	24	54.0	0.012	0.0050	17.33	5.52
IB-1507	B-1507	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
B-1507	B-1506	0.00	0.95	0.00	2.20	10.00	0.16	11.74	5.34	0.00	11.74	24	54.0	0.012	0.0050	17.33	5.52
IB-1506	B-1506	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
B-1506	B-1505	0.00	0.95	0.00	2.41	10.00	0.12	11.90	5.34	0.00	12.86	36	54.0	0.012	0.0050	51.09	7.23
IB-1505	B-1505	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
B-1505	B-1504	0.00	0.95	0.00	2.62	10.00	0.12	12.02	5.22	0.00	13.68	36	54.0	0.012	0.0050	51.09	7.23
IB-1504	B-1504	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
B-1504	B-1503	0.00	0.95	0.00	2.83	10.00	0.12	12.14	5.22	0.00	14.77	36	54.0	0.012	0.0050	51.09	7.23
IB-1503	B-1503	0.22	0.95	0.21	0.21	10.00	0.06	10.00	5.71	1.20	1.20	15	15.0	0.012	0.0050	4.95	4.04
B-1503	B-1502	0.00	0.95	0.00	3.04	10.00	0.12	12.26	5.22	0.00	15.87	36	54.0	0.012	0.0050	51.09	7.23
IB-1502	B-1502	0.00	0.95	0.00	0.00	10.00											

PIPE SECTION		SUBCATCHMENT AREA	INCREMENTAL		CUMULATIVE	TIME OF CONCENTRATION			I	PEAK RUNOFF		PIPING INPUT			PIPING DATA		
FROM	TO	Area (Acres)	"C"	A x C Ac	A x C (acres)	Tc to Inlet (min)	Tc in Pipe (min.)	Final Tc (min)	(In/Hr)	Q to Inlet (CFS)	Q cum. for Pipe (CFS)	Dia. (In)	Length (Ft)	Man. "n"	Slope (ft/ft)	Pipe Capacity (cfs)	Pipe Velocity (fps)
B-1308	B-1307	0.00	0.95	0.00	0.74	10.00	0.16	10.46	5.71	0.00	4.23	24	54.0	0.012	0.0050	17.33	5.52
IB-1307	B-1307	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
B-1307	B-1306	0.00	0.95	0.00	1.11	10.00	0.16	10.62	5.58	0.00	6.19	24	54.0	0.012	0.0050	17.33	5.52
IB-1306	B-1306	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
B-1306	B-1305	0.00	0.95	0.00	1.48	10.00	0.16	10.78	5.58	0.00	8.26	24	54.0	0.012	0.0050	17.33	5.52
IB-1305	B-1305	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
B-1305	B-1304	0.00	0.95	0.00	1.85	10.00	0.12	10.94	5.58	0.00	10.32	36	54.0	0.012	0.0050	51.09	7.23
IB-1304	B-1304	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
B-1304	B-1303	0.00	0.95	0.00	2.22	10.00	0.14	11.06	5.45	0.00	12.10	36	61.0	0.012	0.0050	51.09	7.23
IB-1303	B-1303	0.34	0.95	0.32	0.32	10.00	0.18	10.00	5.71	1.83	1.83	15	43.0	0.012	0.0050	4.95	4.04
B-1312	B-1311	1.19	0.93	1.11	1.11	10.00	0.89	10.00	5.71	6.34	6.34	18	243.0	0.012	0.0050	8.04	4.55
B-1311	B-1303	1.31	0.86	1.13	2.24	10.00	0.20	10.89	5.58	6.31	12.50	24	67.0	0.012	0.0050	17.33	5.52
B-1303	B-1302	0.00	0.95	0.00	4.78	10.00	0.11	11.20	5.45	0.00	26.05	36	46.0	0.012	0.0050	51.09	7.23
IB-1302	B-1302	0.88	0.95	0.84	0.84	10.00	0.27	10.00	5.71	4.80	4.80	15	65.0	0.012	0.0050	4.95	4.04
B-1302	B-1301	0.00	0.95	0.00	5.62	10.00	0.32	11.31	5.45	0.00	30.63	36	138.0	0.012	0.0050	51.09	7.23
B-1301	B-1300	0.00	0.95	0.00	5.62	10.00	0.27	11.63	5.34	0.00	29.98	36	119.0	0.012	0.0050	51.09	7.23
B-1300	B-1200	1.74	0.84	1.46	13.36	10.00	0.68	15.01	4.73	6.91	63.19	48	360.0	0.012	0.0050	110.04	8.76
B-1202	B-1201	0.41	0.85	0.35	0.35	10.00	0.57	10.00	5.71	2.00	2.00	18	155.0	0.012	0.0050	8.04	4.55
B-1201	B-1200	0.27	0.95	0.26	0.61	10.00	0.47	10.57	5.58	1.45	3.40	18	129.0	0.012	0.0050	8.04	4.55
B-1200	B-1100	0.61	0.73	0.45	14.42	10.00	0.85	15.69	4.65	2.09	66.98	48	449.0	0.012	0.0050	110.04	8.76
B-1112	B-1111	0.27	0.95	0.26	0.26	10.00	0.95	10.00	5.71	1.48	1.48	18	258.0	0.012	0.0050	8.04	4.55
B-1111	B-1100	0.29	0.95	0.28	0.54	10.00	0.24	10.95	5.58	1.56	3.01	18	160.0	0.012	0.0300	19.70	11.15
IB-1110	B-1110	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
B-1110	B-1109	0.00	0.95	0.00	0.37	10.00	0.22	10.06	5.71	0.00	2.11	15	54.0	0.012	0.0050	4.95	4.04
IB-1109	B-1109	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
B-1109	B-1108	0.00	0.95	0.00	0.74	10.00	0.20	10.28	5.71	0.00	4.23	18	54.0	0.012	0.0050	8.04	4.55
IB-1108	B-1108	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
B-1108	B-1107	0.00	0.95	0.00	1.11	10.00	0.20	10.48	5.71	0.00	6.34	18	54.0	0.012	0.0050	8.04	4.55
IB-1107	B-1107	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
B-1107	B-1106	0.00	0.95	0.00	1.48	10.00	0.16	10.68	5.58	0.00	8.26	24	54.0	0.012	0.0050	17.33	5.52
IB-1106	B-1106	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
B-1106	B-1105	0.00	0.95	0.00	1.85	10.00	0.16	10.84	5.58	0.00	10.32	24	54.0	0.012	0.0050	17.33	5.52
IB-1105	B-1105	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
B-1105	B-1104	0.00	0.95	0.00	2.22	10.00	0.16	11.00	5.45	0.00	12.10	24	54.0	0.012	0.0050	17.33	5.52
IB-1104	B-1104	0.39	0.95	0.37	0.37	10.00	0.06	10.00	5.71	2.11	2.11	15	15.0	0.012	0.0050	4.95	4.04
B-1104	B-1103	0.00	0.95	0.00	2.59	10.00	0.14	11.16	5.45	0.00	14.12	30	54.0	0.012	0.0050	31.42	6.40
IB-1103	B-1103	0.00	0.95	0.00	0.00	10.00	0.06	10.00	5.71	0.00	0.00	15	15.0	0.012	0.0050	4.95	4.04
B-1103	B-1102	0.00	0.95	0.00	2.59	10.00	0.19	11.30	5.45	0.00	14.12	30	149.0	0.012	0.0200	62.83	12.81
B-1102	JELLY FISH MTD B-1101	0.60	0.83	0.50	3.09	10.00	0.10	11.49	5.45	2.73	16.84	30	40.0	0.012	0.0050	31.42	6.40
JELLY FISH MTD B-1101	B-1100	0.00	0.95	0.00	3.09	10.00	0.27	11.59	5.34	0.00	16.49	30	205.0	0.012	0.0200	62.83	12.81
B-1100	B-1002	0.73	0.70	0.51	18.56	10.00	0.18	16.54	4.49	2.29	83.24	48	262.0	0.012	0.0400	311.23	24.78
B-1002	B-1001	0.52	0.86	0.45	19.01	10.00	0.28	16.72	4.49	2.02	85.26	48	417.0	0.012	0.0400	311.23	24.78
B-1001	B-1000	0.48	0.91	0.44	19.45	10.00	0.17	17.00	4.41	1.94	85.77	36	147.0	0.012	0.0200	102.18	14.46
H-1010	H-1000	0.40	0.90	0.36	0.36	10.00	0.29	10.00	5.71	2.06	2.06	18	78.0	0.012	0.0050	8.04	4.55
G-1160	G-1150	0.88	0.88	0.77	0.77	10.00	1.51	10.00	5.71	4.40	4.40	18	319.0	0.013	0.0035	6.21	3.52
G-1150	G-1100	0.00	0.95	0.00	0.77	10.00	1.40	11.51	5.34	0.00	4.11	18	319.0	0.012	0.0035	6.73	3.81
G-1140	G-1130	1.00	0.61	0.61	0.61	10.00	0.95	10.00	5.71	3.48	3.48	15	327.0	0.012	0.0100	7.00	5.71
G-1130	G-1120	0.37	0.85	0.31	0.92	10.00	0.46	10.95	5.58	1.73	5.13	15	335.0	0.012	0.0450	14.84	12.10
G-1120	G-1110	0.61	0.81	0.49	1.41	10.00	0.77	11.41	5.45	2.67	7.68	15	370.0	0.012	0.0200	9.89	8.06
G-1110	G-1100	0.38	0.89	0.34	1.75	10.00	0.29	12.18	5.22	1.77	9.14	15	141.0	0.012	0.0200	9.89	8.06
G-1100	G-1020	0.00	0.95	0.00	2.52	10.00	0.21	12.91	5.13	0.00	12.92	24	69.0	0.012	0.0050	17.33	5.52
G-1020	G-1010	0.45	0.87	0.39	2.91	10.00	1.54	13.12	5.03	1.96	14.64	24	469.0	0.013	0.0050	15.99	5.09
G-1010	G-1000	1.01	0.89	0.90	3.81	10.00	1.52	14.66	4.80	4.32	18.29	30	451.0	0.013	0.0035	24.26	4.94
IL-190	L-190	1.10	0.95	1.05	1.05	10.00	0.05	10.00	5.71	6.00	6.00	18	15.0	0.012	0.0050	8.04	4.55
L-190	L-180	0.00	0.95	0.00	1.05	10.00	0.16	10.05	5.71	0.00	6.00	24	54.0	0.012	0.0050	17.33	5.52
IL-180	L-180	0.44	0.95	0.42	0.42	10.00	0.07	10.00	5.71	2.40	2.40	12	15.0	0.012	0.0050	2.73	3.48
L-180	L-170	0.00	0.95	0.00	1.47	10.00	0.16	10.21	5.71	0.00	8.39	24	54.0	0.012	0.0050	17.33	5.52
IL-170	L-170	0.44	0.95	0.42	0.42	10.00	0.07	10.00	5.71	2.40	2.40	12	15.0	0.012	0.0050	2.73	3.48
L-170	L-160	0.00	0.95	0.00	1.89	10.00	0.16	10.37	5.71	0.00	10.79	24	54.0	0.012	0.0050	17.33	5.52
IL-160	L-160	0.44	0.95	0.42	0.42	10.00	0.07	10.00	5.71	2.40	2.40	12	15.0	0.012	0.0050	2.73	3.48
L-160	L-150	0.00	0.95	0.00	2.31	10.00	0.16	10.53	5.58	0.00	12.89	24	54.0	0.012	0.0050	17.33	5.52
IL-150	L-150	0.44	0.95	0.42	0.42	10.00	0.07	10.00	5.71	2.40	2.40	12	15.0	0.012	0.0050	2.73	3.48
L-140	L-150	0.00	0.95	0.00	3.18	10.00	0.14	10.85	5.58	0.00	17.74	30	54.0	0.012	0.0050	31.42	6.40
IL-140	L-140	0.47	0.95	0.45	0.45	10.00	0.07	10.00	5.71	2.57	2.57	12	15.0	0.012	0.0050	2.73	3.48
L-150	L-130	0.00	0.95	0.00	5.91	10.00	0.66	10.99	5.58	0.00	32.98	36	286.0	0.012	0.0050	51.09	7.23
L-130	L-120	0.00	0.95	0.00	5.91	10.00	0.12	11.65	5.34	0.00	31.53	36	47.0	0.012	0.0042	46.82	6.63
L-110	L-100	1.57	0.35	0.55	0.55	10.00	0.16	10.00	5.71	3.14	3.14	48	83.0	0.012	0.0050	110.04	8.76
K-130	K-120	9.78	0.95	9.29	9.29	10.00	0.01	10.00	5.71	53.05	53.05	24	13.0	0.012	0.0500	54.79	17.45
K-120	K-110	0.00	0.95	0.00	9.29	10.00	0.08	10.01	5.71	0.00	53.05	24	143.0	0.012	0.1500	94.90	30.22
K-110	K-100	0.00	0.95	0.00	9.29	10											

OUTLET PROTECTION CALCULATIONS

245 Main Street, Suite 110, Chester, NJ 07930
 (908) 879-9229

Calculated By: DGL
 Checked By: TJB

Conduit Outlet Protection Calculations
 Rip Rap Pad # L-100

Design Parameters:

Design Storm Flow for 25 Year, Q	56.62 cfs
Vertical Dimension of Outlet Pipe, D_o	36 in
Horizontal Dimension of Outlet Pipe, W_o	36 in
Tailwater Depth, TW^1	1.79 ft

Apron Dimension Calculations:

Unit Discharge, $q = Q/D_o = 18.87$ cfs per foot

• **Case I: $TW < 1/2 D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o =$

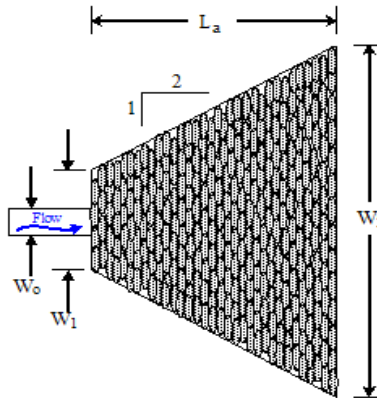
$L_a =$

Width, $W_1 = 3W_o =$

$W_1 =$

Width, $W_2 = 3W_o + L_a =$

$W_2 =$



• **Case II: $TW \geq 1/2 D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}} = 32.69$ ft

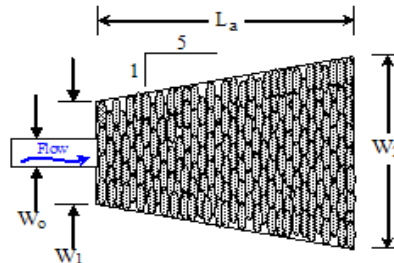
or $L_a = 33$ ft

Width, $W_1 = 3W_o = 9$ ft

or $W_1 = 9$ ft

Width, $W_2 = 3W_o + 0.4L_a = 22.08$ ft

or $W_2 = 23$ ft



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW} = 6.67$ in

$d_{50} = 7$ in

Notes:

- Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
- The side slopes shall be 2:1 or flatter.
- The bottom grade shall be 0.0% (level).
- There shall be no overfall at the end of the apron or at the end of the culvert.
- Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50} . The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
- The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
- Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
- No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

- Tailwater depth shall be the 2-year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
- For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

245 Main Street, Suite 110, Chester, NJ 07930
 (908) 879-9229

Calculated By: DGL
 Checked By: TJB

Conduit Outlet Protection Calculations
 Rip Rap Pad # -1000

Design Parameters:

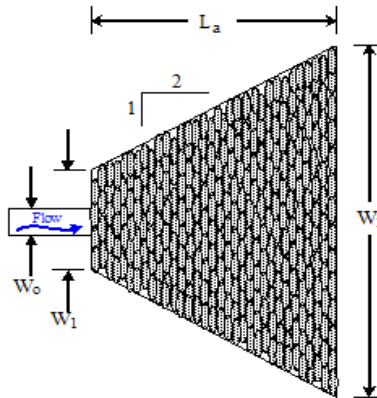
Design Storm Flow for 25 Year, Q	85.77 cfs
Vertical Dimension of Outlet Pipe, D_o	48 in
Horizontal Dimension of Outlet Pipe, W_o	48 in
Tailwater Depth, TW^1	1.73 ft

Apron Dimension Calculations:

Unit Discharge, $q = Q/D_o = 21.44$ cfs per foot

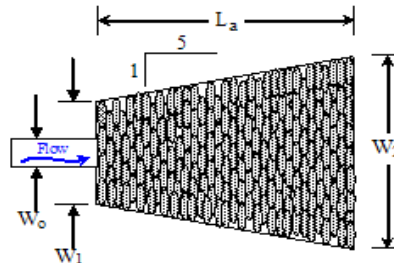
• **Case I: $TW < 1/2 D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o = 47.3$ ft	or	$L_a = 48$ ft
Width, $W_1 = 3W_o = 12$ ft	or	$W_1 = 12$ ft
Width, $W_2 = 3W_o + L_a = 59.3$ ft	or	$W_2 = 60$ ft



• **Case II: $TW \geq 1/2 D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}} =$	$L_a =$
Width, $W_1 = 3W_o =$	$W_1 =$
Width, $W_2 = 3W_o + 0.4L_a =$	$W_2 =$



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW} = 8.18$ in	$d_{50} = 9$ in
--	-----------------

Notes:

- Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
- The side slopes shall be 2:1 or flatter.
- The bottom grade shall be 0.0% (level).
- There shall be no overfall at the end of the apron or at the end of the culvert.
- Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50} . The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
- The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
- Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
- No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

- Tailwater depth shall be the 2-year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
- For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

245 Main Street, Suite 110, Chester, NJ 07930
 (908) 879-9229

Calculated By: DGL
 Checked By: TJB

Conduit Outlet Protection Calculations
 Rip Rap Pad # -1000

Design Parameters:

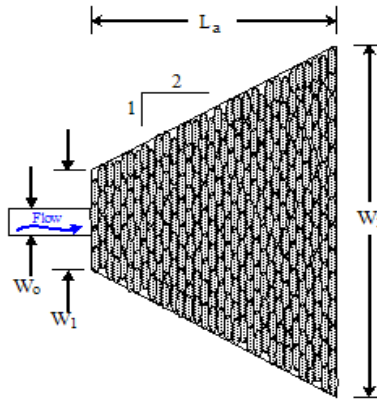
Design Storm Flow for 25 Year, Q	93.01 cfs
Vertical Dimension of Outlet Pipe, D_o	60 in
Horizontal Dimension of Outlet Pipe, W_o	60 in
Tailwater Depth, TW^1	0.75 ft

Apron Dimension Calculations:

Unit Discharge, $q = Q/D_o = 18.60$ cfs per foot

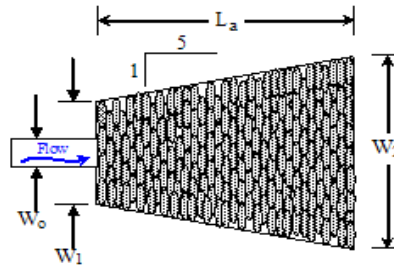
• **Case I: $TW < 1/2 D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o = 49.97$ ft	or	$L_a = 50$ ft
Width, $W_1 = 3W_o = 15$ ft	or	$W_1 = 15$ ft
Width, $W_2 = 3W_o + L_a = 64.97$ ft	or	$W_2 = 65$ ft



• **Case II: $TW \geq 1/2 D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}} =$	$L_a =$
Width, $W_1 = 3W_o =$	$W_1 =$
Width, $W_2 = 3W_o + 0.4L_a =$	$W_2 =$



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW} = #####$	$d_{50} = 16$ in
--	------------------

Notes:

- Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
- The side slopes shall be 2:1 or flatter.
- The bottom grade shall be 0.0% (level).
- There shall be no overfall at the end of the apron or at the end of the culvert.
- Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50} . The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
- The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
- Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
- No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

- Tailwater depth shall be the 2-year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
- For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

245 Main Street, Suite 110, Chester, NJ 07930
 (908) 879-9229

Calculated By: DGL
 Checked By: TJB

Conduit Outlet Protection Calculations
 Rip Rap Pad # -1000

Design Parameters:

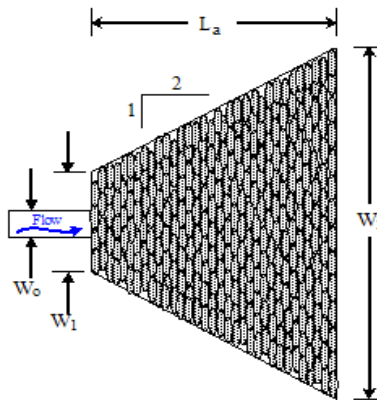
Design Storm Flow for 25 Year, Q	18.29 cfs
Vertical Dimension of Outlet Pipe, D_o	30 in
Horizontal Dimension of Outlet Pipe, W_o	30 in
Tailwater Depth, TW^1	0.09 ft

Apron Dimension Calculations:

Unit Discharge, $q = Q/D_o = 7.32$ cfs per foot

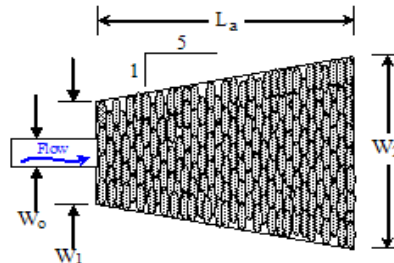
• **Case I: $TW < 1/2 D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o = 25.83$ ft	or	$L_a = 26$ ft
Width, $W_1 = 3W_o = 7.5$ ft	or	$W_1 = 8$ ft
Width, $W_2 = 3W_o + L_a = 33.33$ ft	or	$W_2 = 34$ ft



• **Case II: $TW \geq 1/2 D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}} =$	$L_a =$
Width, $W_1 = 3W_o =$	$W_1 =$
Width, $W_2 = 3W_o + 0.4L_a =$	$W_2 =$



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW} = #####$	$d_{50} = 38$ in
--	------------------

Notes:

- Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
- The side slopes shall be 2:1 or flatter.
- The bottom grade shall be 0.0% (level).
- There shall be no overfall at the end of the apron or at the end of the culvert.
- Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50} . The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
- The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
- Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
- No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

- Tailwater depth shall be the 2-year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
- For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

Conduit Outlet Protection Calculations
 Rip Rap Pad # -2000

Design Parameters:

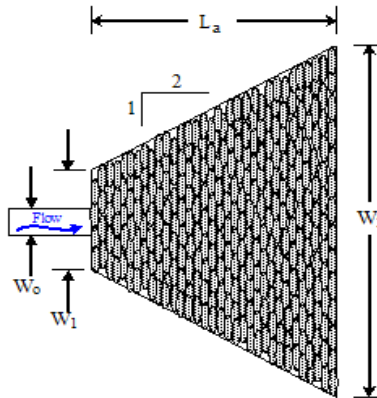
Design Storm Flow for 25 Year, Q	0.21 cfs
Vertical Dimension of Outlet Pipe, D_o	36 in
Horizontal Dimension of Outlet Pipe, W_o	36 in
Tailwater Depth, TW^1	0.09 ft

Apron Dimension Calculations:

Unit Discharge, $q = Q/D_o = 0.07$ cfs per foot

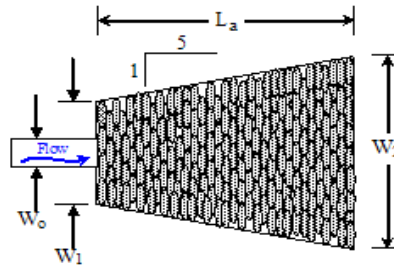
• **Case I: $TW < 1/2 D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o = 21.07$ ft	or	$L_a = 22$ ft
Width, $W_1 = 3W_o = 9$ ft	or	$W_1 = 9$ ft
Width, $W_2 = 3W_o + L_a = 30.07$ ft	or	$W_2 = 31$ ft



• **Case II: $TW \geq 1/2 D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}} =$	$L_a =$
Width, $W_1 = 3W_o =$	$W_1 =$
Width, $W_2 = 3W_o + 0.4L_a =$	$W_2 =$



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW} = 0.08$ in	$d_{50} = 6$ in
--	-----------------

Notes:

- Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
- The side slopes shall be 2:1 or flatter.
- The bottom grade shall be 0.0% (level).
- There shall be no overfall at the end of the apron or at the end of the culvert.
- Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50} . The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
- The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
- Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
- No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

- Tailwater depth shall be the 2-year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
- For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

Conduit Outlet Protection Calculations
 Rip Rap Pad # I-100

Design Parameters:

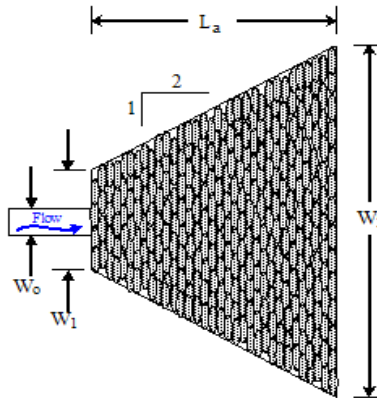
Design Storm Flow for 25 Year, Q	2.06 cfs
Vertical Dimension of Outlet Pipe, D_o	18 in
Horizontal Dimension of Outlet Pipe, W_o	18 in
Tailwater Depth, TW^1	0.09 ft

Apron Dimension Calculations:

Unit Discharge, $q = Q/D_o = 1.37$ cfs per foot

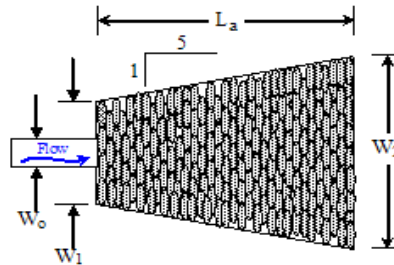
• **Case I: $TW < 1/2 D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o = 12.52$ ft	or	$L_a = 13$ ft
Width, $W_1 = 3W_o = 4.5$ ft	or	$W_1 = 5$ ft
Width, $W_2 = 3W_o + L_a = 17.02$ ft	or	$W_2 = 18$ ft



• **Case II: $TW \geq 1/2 D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}} =$	$L_a =$
Width, $W_1 = 3W_o =$	$W_1 =$
Width, $W_2 = 3W_o + 0.4L_a =$	$W_2 =$



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW} = 4.07$ in	$d_{50} = 6$ in
--	-----------------

Notes:

- Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
- The side slopes shall be 2:1 or flatter.
- The bottom grade shall be 0.0% (level).
- There shall be no overfall at the end of the apron or at the end of the culvert.
- Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50} . The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
- The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
- Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
- No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

- Tailwater depth shall be the 2-year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
- For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

Conduit Outlet Protection Calculations
 Rip Rap Pad # -2000

Design Parameters:

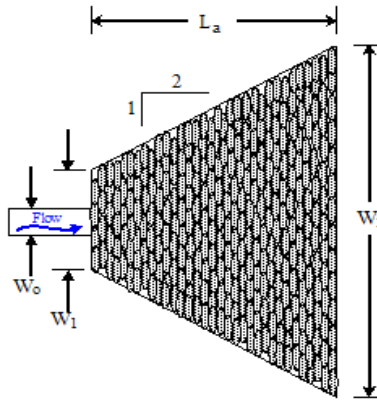
Design Storm Flow for 25 Year, Q	0.21 cfs
Vertical Dimension of Outlet Pipe, D_o	36 in
Horizontal Dimension of Outlet Pipe, W_o	36 in
Tailwater Depth, TW^1	0.09 ft

Apron Dimension Calculations:

Unit Discharge, $q = Q/D_o = 0.07$ cfs per foot

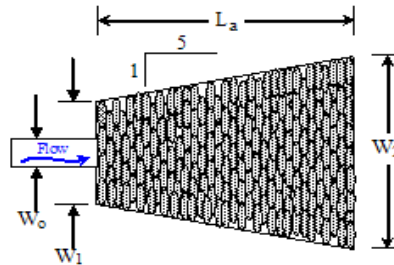
• **Case I: $TW < 1/2 D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o = 21.07$ ft	or	$L_a = 22$ ft
Width, $W_1 = 3W_o = 9$ ft	or	$W_1 = 9$ ft
Width, $W_2 = 3W_o + L_a = 30.07$ ft	or	$W_2 = 31$ ft



• **Case II: $TW \geq 1/2 D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}} =$	$L_a =$
Width, $W_1 = 3W_o =$	$W_1 =$
Width, $W_2 = 3W_o + 0.4L_a =$	$W_2 =$



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW} = 0.08$ in	$d_{50} = 6$ in
--	-----------------

Notes:

- Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
- The side slopes shall be 2:1 or flatter.
- The bottom grade shall be 0.0% (level).
- There shall be no overfall at the end of the apron or at the end of the culvert.
- Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50} . The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
- The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
- Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
- No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

- Tailwater depth shall be the 2-year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
- For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

245 Main Street, Suite 110, Chester, NJ 07930
 (908) 879-9229

Calculated By: DGL
 Checked By: TJB

Conduit Outlet Protection Calculations
 Rip Rap Pad # 1-210

Design Parameters:

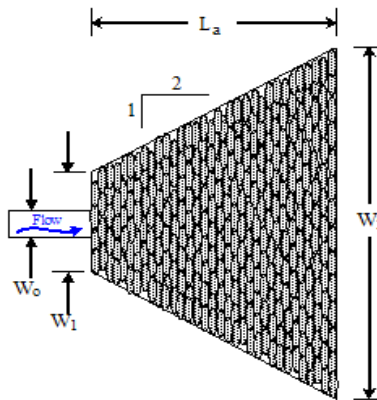
Design Storm Flow for 25 Year, Q	2.06 cfs
Vertical Dimension of Outlet Pipe, D_o	36 in
Horizontal Dimension of Outlet Pipe, W_o	36 in
Tailwater Depth, TW^1	0.09 ft

Apron Dimension Calculations:

Unit Discharge, $q = Q/D_o = 0.69$ cfs per foot

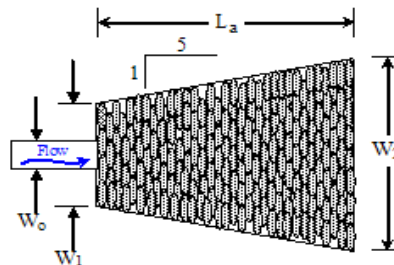
• **Case I: $TW < 1/2 D_o$**

Apron Length, $L_a = \frac{1.8q}{D_o^{1/2}} + 7D_o = 21.71$ ft	or	$L_a = 22$ ft
Width, $W_1 = 3W_o = 9$ ft	or	$W_1 = 9$ ft
Width, $W_2 = 3W_o + L_a = 30.71$ ft	or	$W_2 = 31$ ft



• **Case II: $TW \geq 1/2 D_o$**

Apron Length, $L_a = \frac{3q}{D_o^{1/2}} =$	$L_a =$
Width, $W_1 = 3W_o =$	$W_1 =$
Width, $W_2 = 3W_o + 0.4L_a =$	$W_2 =$



Rip Rap Stone Size Calculations:

Median Stone, $d_{50} = \frac{0.02q^{1.33}}{TW} = 1.62$ in	$d_{50} = 6$ in
--	-----------------

Notes:

- Where there is a well-defined channel downstream of the apron, the bottom width of the apron shall be at least equal to the bottom width of the channel and the structural lining shall extend at least one foot above the tailwater elevation, but no lower than two-thirds of the vertical conduit dimension above the conduit invert.
- The side slopes shall be 2:1 or flatter.
- The bottom grade shall be 0.0% (level).
- There shall be no overfall at the end of the apron or at the end of the culvert.
- Fifty (50) percent by weight of the rip-rap mixture shall be smaller than the median size stone designated as d_{50} . The largest stone size in the mixture shall be 1.5 times the d_{50} size. The rip-rap shall be reasonably well graded.
- The thickness of the rip-rap apron may be two (2) times the median stone diameter provided that the apron is constructed on a bedding of four (4) inches of 3/4 inch clean stone on approved filter fabric material.
- Rip-rap and filter fabric shall meet the standards of the governing Soil Conservation District as well as the requirements of the local municipality.
- No bends or curves at the intersection of the conduit and apron will be permitted.

Footnote:

- Tailwater depth shall be the 2-year storm if discharging into a detention basin. For areas where tailwater cannot be computed, use $TW = 0.2D_o$.
- For multiple pipes, increase rip-rap sizes by 25% when pipe spacing is greater than or equal to $1/4W_o$.

SCOUR HOLE DESIGN

Project: Prop. Industrial Warehouse
 Job #: 2803-99-012
 Location: Cornwall, NY
 Design Storm: 25-year
 Computed By: TJB
 Checked By: RDM
 Date: 9/20/2023

Discharge not in Basin, Therefore Tailwater is less than 0.5 x Do

Discharge Point	FES #107
Q (25-yr storm cfs)	7.25
Inside Height of Outlet Culvert, Do (in)	36
Inside Height of Outlet Culvert, Do (ft)	3.0
Tailwater (ft), Tw	0.60
Length of Apron, L (ft)	9.00
Width of Culvert, Wo(in)	36
Width of Culvert, Wo(ft)	3.0
Width of Apron, W(ft)	6.00
Where Y = 1/2 Do, Y(ft)	1.500
Median Stone Diameter, D50 (ft)	0.07
Where Y = Do, Y(ft)	3.000
Median Stone Diameter, D50 (ft)	0.04

Note: Use D50 of 6 inches minimum

Equations used:

$$L=3*Do$$

$$W=2*Wo$$

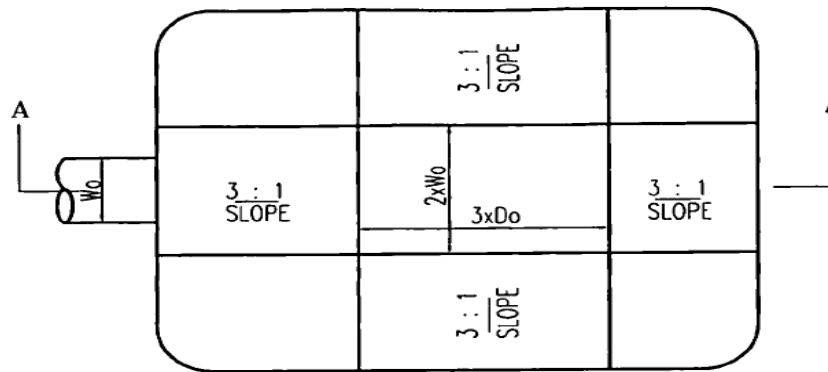
$$Tw=0.2*Do \text{ (if Tw cannot be computed)}$$

$$\text{Where } Y=1/2 \text{ Do}$$

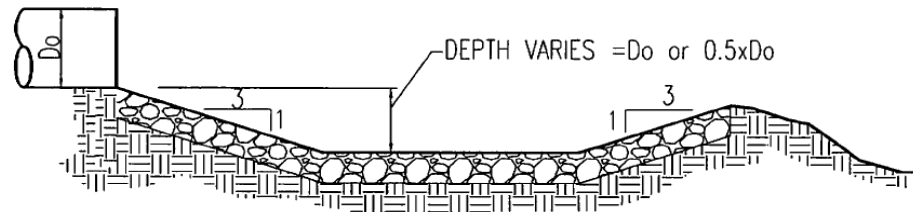
$$D50=(0.0125/Tw)*(q^{1.33})$$

$$\text{Where } Y=Do$$

$$D50=(0.0082/Tw)*(q^{1.33})$$



PLAN



SECTION A-A

Notes:

1. The use of scour holes shall comply with county or local ordinances which would restrict the use of such devices due to the possible problems with mosquito breeding.
2. No bends or curves at the intersection of the conduit and apron or scour hole will be permitted.
3. There shall be no over fall from the end of the apron to the receiving material.
4. The thickness of the riprap lining, filter, and quality shall meet the requirements in the Riprap Standard Section of the Standards for Soil Erosion Control in New Jersey.

SCOUR HOLE DESIGN

Project: Prop. Industrial Warehouse
 Job #: 2803-99-012
 Location: Cornwall, NY
 Design Storm: 25-year
 Computed By: MA
 Checked By: RDM
 Date: 9/20/2023

Discharge not in Basin, Therefore Tailwater is less than 0.5 x Do

Discharge Point	FES #406
Q (25-yr storm cfs)	17.93
Inside Height of Outlet Culvert, Do (in)	24
Inside Height of Outlet Culvert, Do (ft)	2.0
Tailwater (ft), Tw	0.40
Length of Apron, L (ft)	6.00
Width of Culvert, Wo(in)	24
Width of Culvert, Wo(ft)	2.0
Width of Apron, W(ft)	4.00
Where Y = 1/2 Do, Y(ft)	1.000
Median Stone Diameter, D50 (ft)	0.58
Where Y = Do, Y(ft)	2.000
Median Stone Diameter, D50 (ft)	0.38

Note: Use D50 of 6 inches minimum

Equations used:

$$L=3*Do$$

$$W=2*Wo$$

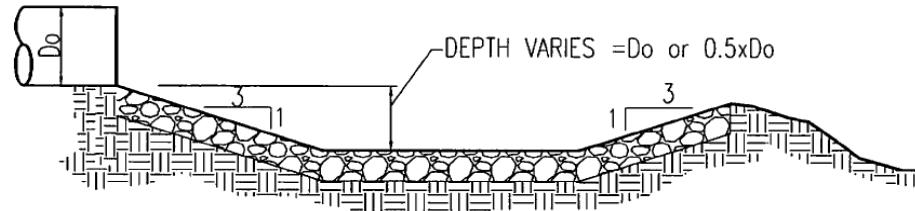
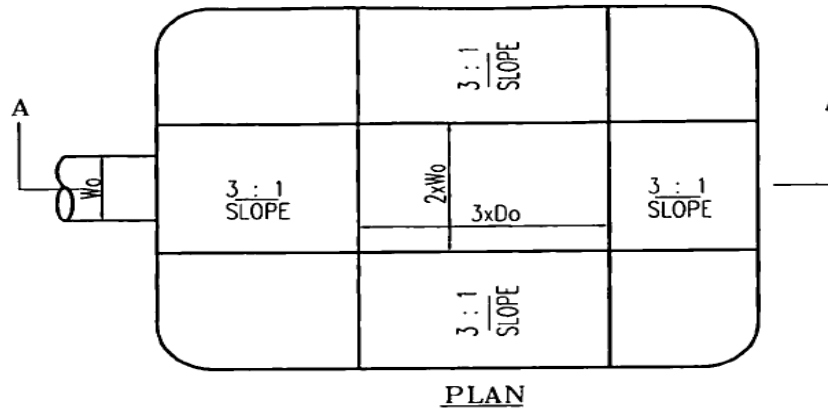
$$Tw=0.2*Do \text{ (if Tw cannot be computed)}$$

$$\text{Where } Y=1/2 \text{ Do}$$

$$D50=(0.0125/Tw)*(q^{1.33})$$

$$\text{Where } Y=Do$$

$$D50=(0.0082/Tw)*(q^{1.33})$$



Notes:

1. The use of scour holes shall comply with county or local ordinances which would restrict the use of such devices due to the possible problems with mosquito breeding.
2. No bends or curves at the intersection of the conduit and apron or scour hole will be permitted.
3. There shall be no over fall from the end of the apron to the receiving material.
4. The thickness of the riprap lining, filter, and quality shall meet the requirements in the Riprap Standard Section of the Standards for Soil Erosion Control in New Jersey.

SCOUR HOLE DESIGN

Project: Prop. Industrial Warehouse
 Job #: 2803-99-012
 Location: Cornwall, NY
 Design Storm: 25-year
 Computed By: MA
 Checked By: RDM
 Date: 9/20/2023

Discharge not in Basin, Therefore Tailwater is less than 0.5 x Do

Discharge Point	FES #96
Q (25-yr storm cfs)	38.62
Inside Height of Outlet Culvert, Do (in)	30
Inside Height of Outlet Culvert, Do (ft)	2.5
Tailwater (ft), Tw	0.50
Length of Apron, L (ft)	7.50
Width of Culvert, Wo(in)	30
Width of Culvert, Wo(ft)	2.5
Width of Apron, W(ft)	5.00
Where Y = 1/2 Do, Y(ft)	1.250
Median Stone Diameter, D50 (ft)	0.95
Where Y = Do, Y(ft)	2.500
Median Stone Diameter, D50 (ft)	0.63

Note: Use D50 of 6 inches minimum

Equations used:

$$L=3*Do$$

$$W=2*Wo$$

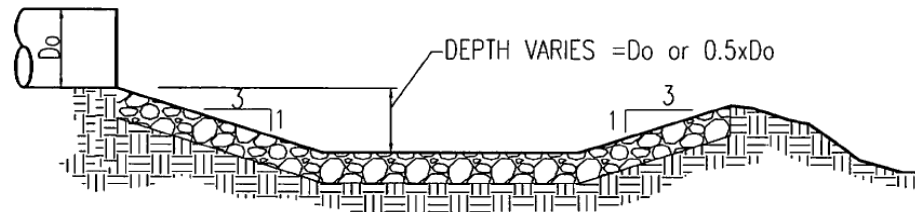
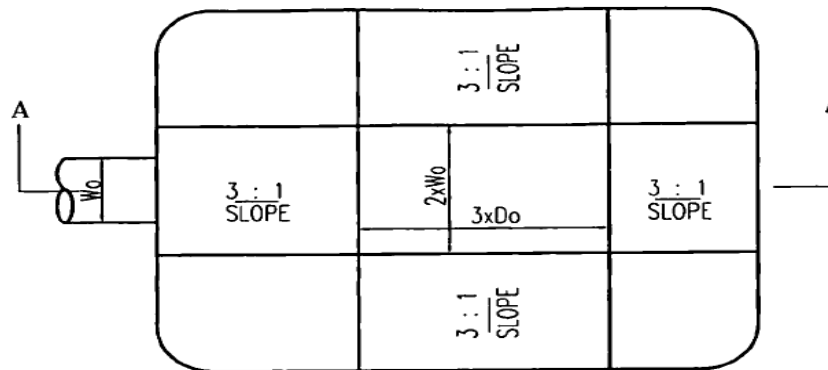
$$Tw=0.2*Do \text{ (if } Tw \text{ cannot be computed)}$$

$$\text{Where } Y=1/2 \text{ Do}$$

$$D50=(0.0125/Tw)*(q^{1.33})$$

$$\text{Where } Y=Do$$

$$D50=(0.0082/Tw)*(q^{1.33})$$



Notes:

1. The use of scour holes shall comply with county or local ordinances which would restrict the use of such devices due to the possible problems with mosquito breeding.
2. No bends or curves at the intersection of the conduit and apron or scour hole will be permitted.
3. There shall be no over fall from the end of the apron to the receiving material.
4. The thickness of the riprap lining, filter, and quality shall meet the requirements in the Riprap Standard Section of the Standards for Soil Erosion Control in New Jersey.

SCOUR HOLE DESIGN

Project: Prop. Industrial Warehouse
 Job #: 2803-99-012
 Location: Cornwall, NY
 Design Storm: 25-year
 Computed By: MA
 Checked By: RDM
 Date: 9/20/2023

Discharge not in Basin, Therefore Tailwater is less than 0.5 x Do

Discharge Point	HW #98
Q (25-yr storm cfs)	55.77
Inside Height of Outlet Culvert, Do (in)	48
Inside Height of Outlet Culvert, Do (ft)	4.0
Tailwater (ft), Tw	0.80
Length of Apron, L (ft)	12.00
Width of Culvert, Wo(in)	48
Width of Culvert, Wo(ft)	4.0
Width of Apron, W(ft)	8.00
Where Y = 1/2 Do, Y(ft)	2.000
Median Stone Diameter, D50 (ft)	0.52
Where Y = Do, Y(ft)	4.000
Median Stone Diameter, D50 (ft)	0.34

Note: Use D50 of 6 inches minimum

Equations used:

$L=3*Do$

$W=2*Wo$

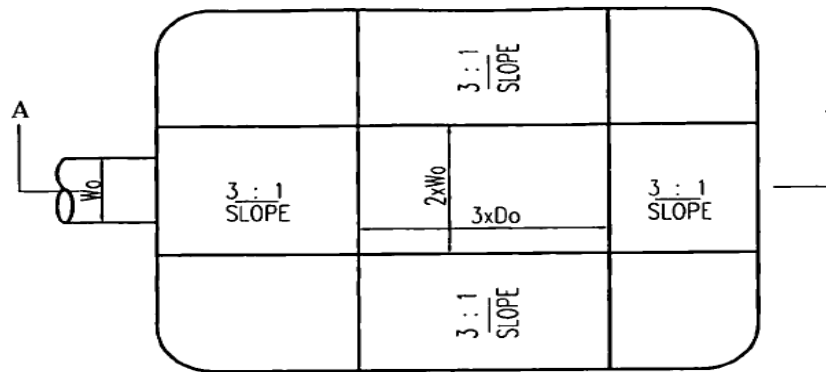
$Tw=0.2*Do$ (If Tw cannot be computed)

Where Y=1/2 Do

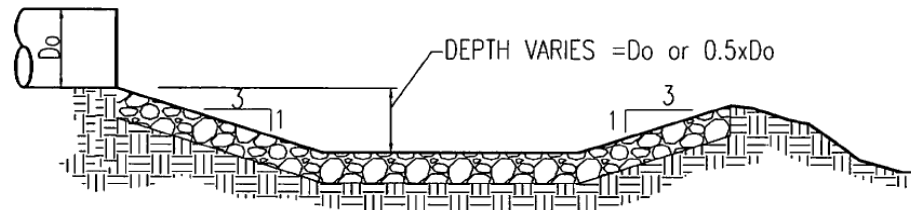
$D50=(0.0125/Tw)*(q^{1.33})$

Where Y=Do

$D50=(0.0082/Tw)*(q^{1.33})$



PLAN



SECTION A-A

Notes:

1. The use of scour holes shall comply with county or local ordinances which would restrict the use of such devices due to the possible problems with mosquito breeding.
2. No bends or curves at the intersection of the conduit and apron or scour hole will be permitted.
3. There shall be no over fall from the end of the apron to the receiving material.
4. The thickness of the riprap lining, filter, and quality shall meet the requirements in the Riprap Standard Section of the Standards for Soil Erosion Control in New Jersey.

SITE LOGBOOK

**APPENDIX F
CONSTRUCTION SITE INSPECTION
AND MAINTENANCE LOG BOOK**

**STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION
ACTIVITIES**

SAMPLE CONSTRUCTION SITE LOG BOOK

Table of Contents

- I. Pre-Construction Meeting Documents
 - a. Preamble to Site Assessment and Inspections
 - b. Pre-Construction Site Assessment Checklist

- II. Construction Duration Inspections
 - a. Directions
 - b. Modification to the SWPPP

I. PRE-CONSTRUCTION MEETING DOCUMENTS

Project Name _____
Permit No. _____ **Date of Authorization** _____
Name of Operator _____
Prime Contractor _____

a. Preamble to Site Assessment and Inspections

The Following Information To Be Read By All Person’s Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified inspector¹ conduct an assessment of the site prior to the commencement of construction² and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State’s standards and meets all Federal, State and local erosion and sediment control requirements. A preconstruction meeting should be held to review all of the SWPPP requirements with construction personnel.

When construction starts, site inspections shall be conducted by the qualified inspector at least every 7 calendar days. The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified inspector perform a final site inspection. The qualified inspector shall certify that the site has undergone final stabilization³ using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 Refer to “Qualified Inspector” inspection requirements in the current SPDES General Permit for Stormwater Discharges from Construction Activity for complete list of inspection requirements.
2 “Commencement of construction” means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.
3 “Final stabilization” means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

b. Pre-construction Site Assessment Checklist

(NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA

- Has a Notice of Intent been filed with the NYS Department of Conservation?
- Is the SWPPP on-site? Where? _____
- Is the Plan current? What is the latest revision date? _____
- Is a copy of the NOI (with brief description) onsite? Where? _____
- Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

Yes No NA

- Are construction limits clearly flagged or fenced?
- Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
- Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA

- Clean stormwater runoff has been diverted from areas to be disturbed.
- Bodies of water located either on site or in the vicinity of the site have been identified and protected.
- Appropriate practices to protect on-site or downstream surface water are installed.
- Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Access

Yes No NA

- A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
- Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
- Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Sediment Controls

Yes No NA

- Silt fence material and installation comply with the standard drawing and specifications.
- Silt fences are installed at appropriate spacing intervals
- Sediment/detention basin was installed as first land disturbing activity.
- Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA

- The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
- The plan is contained in the SWPPP on page _____
- Appropriate materials to control spills are onsite. Where? _____

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:

Inspection Forms will be filled out during the entire construction phase of the project.

Required Elements:

- 1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;
- 2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;
- 3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;
- 4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);
- 5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and
- 6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH

Inspector (print name)

Date of Inspection

Qualified Inspector (print name)

Qualified Inspector Signature

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality

Yes No NA

- Is there an increase in turbidity causing a substantial visible contrast to natural conditions at the outfalls?
- Is there residue from oil and floating substances, visible oil film, or globules or grease at the outfalls?
- All disturbance is within the limits of the approved plans.
- Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions

Yes No NA

- Is construction site litter, debris and spoils appropriately managed?
- Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
- Is construction impacting the adjacent property?
- Is dust adequately controlled?

2. Temporary Stream Crossing

Yes No NA

- Maximum diameter pipes necessary to span creek without dredging are installed.
- Installed non-woven geotextile fabric beneath approaches.
- Is fill composed of aggregate (no earth or soil)?
- Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

3. Stabilized Construction Access

Yes No NA

- Stone is clean enough to effectively remove mud from vehicles.
- Installed per standards and specifications?
- Does all traffic use the stabilized entrance to enter and leave site?
- Is adequate drainage provided to prevent ponding at entrance?

Runoff Control Practices

1. Excavation Dewatering

Yes No NA

- Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
- Clean water from upstream pool is being pumped to the downstream pool.
- Sediment laden water from work area is being discharged to a silt-trapping device.
- Constructed upstream berm with one-foot minimum freeboard.

Runoff Control Practices (continued)

2. Flow Spreader

Yes No NA

- Installed per plan.
- Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
- Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales

Yes No NA

- Installed per plan with minimum side slopes 2H:1V or flatter.
- Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
- Sediment-laden runoff directed to sediment trapping structure

4. Stone Check Dam

Yes No NA

- Is channel stable? (flow is not eroding soil underneath or around the structure).
- Check is in good condition (rocks in place and no permanent pools behind the structure).
- Has accumulated sediment been removed?.

5. Rock Outlet Protection

Yes No NA

- Installed per plan.
- Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No NA

- Stockpiles are stabilized with vegetation and/or mulch.
- Sediment control is installed at the toe of the slope.

2. Revegetation

Yes No NA

- Temporary seedings and mulch have been applied to idle areas.
- 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Silt Fence and Linear Barriers

Yes No NA

- Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
 - Joints constructed by wrapping the two ends together for continuous support.
 - Fabric buried 6 inches minimum.
 - Posts are stable, fabric is tight and without rips or frayed areas.
- Sediment accumulation is ___% of design capacity.

Sediment Control Practices (continued)

2. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated; Filter Sock or Manufactured practices)

Yes No NA

- Installed concrete blocks lengthwise so open ends face outward, not upward.
 - Placed wire screen between No. 3 crushed stone and concrete blocks.
 - Drainage area is 1acre or less.
 - Excavated area is 900 cubic feet.
 - Excavated side slopes should be 2:1.
 - 2" x 4" frame is constructed and structurally sound.
 - Posts 3-foot maximum spacing between posts.
 - Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
 - Posts are stable, fabric is tight and without rips or frayed areas.
 - Manufactured insert fabric is free of tears and punctures.
 - Filter Sock is not torn or flattened and fill material is contained within the mesh sock.
- Sediment accumulation ___% of design capacity.

3. Temporary Sediment Trap

Yes No NA

- Outlet structure is constructed per the approved plan or drawing.
 - Geotextile fabric has been placed beneath rock fill.
 - Sediment trap slopes and disturbed areas are stabilized.
- Sediment accumulation is ___% of design capacity.

4. Temporary Sediment Basin

Yes No NA

- Basin and outlet structure constructed per the approved plan.
 - Basin side slopes are stabilized with seed/mulch.
 - Drainage structure flushed and basin surface restored upon removal of sediment basin facility.
 - Sediment basin dewatering pool is dewatering at appropriate rate.
- Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design. All practices shall be maintained in accordance with their respective standards.

Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

MS4 SWPPP ACCEPTANCE FORM



Department of
Environmental
Conservation

NYS Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit
*(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

I. Project Owner/Operator Information

1. Owner/Operator Name:

2. Contact Person:

3. Street Address:

4. City/State/Zip:

II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/State/Zip:

III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information

8. SWPPP Reviewed by:

9. Title/Position:

10. Date Final SWPPP Reviewed and Accepted:

IV. Regulated MS4 Information

11. Name of MS4:

12. MS4 SPDES Permit Identification Number: NYR20A

13. Contact Person:

14. Street Address:

15. City/State/Zip:

16. Telephone Number:

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s).
Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

MAINTENANCE AND INSPECTION CHECKLIST

Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project _____
 Location: _____
 Site Status: _____

 Date: _____
 Time: _____

 Inspector: _____

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Embankment and emergency spillway (Annual, After Major Storms)		
1. Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Cracking, bulging, or sliding of dam		
a. Upstream face		
b. Downstream face		
c. At or beyond toe		
downstream		
upstream		
d. Emergency spillway		
6. Pond, toe & chimney drains clear and functioning		
7. Seeps/leaks on downstream face		
8. Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam "As-Built"		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
10. Emergency spillway clear of obstructions and debris		
11. Other (specify)		
2. Riser and principal spillway (Annual)		
Type: Reinforced concrete _____ Corrugated pipe _____ Masonry _____		
1. Low flow orifice obstructed		
2. Low flow trash rack. a. Debris removal necessary		
b. Corrosion control		
3. Weir trash rack maintenance a. Debris removal necessary		
b. corrosion control		
4. Excessive sediment accumulation insider riser		
5. Concrete/masonry condition riser and barrels a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (rebars exposed)		
d. Joint failures		
e. Water tightness		
6. Metal pipe condition		
7. Control valve a. Operational/exercised		
b. Chained and locked		
8. Pond drain valve a. Operational/exercised		
b. Chained and locked		
9. Outfall channels functioning		
10. Other (specify)		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
3. Permanent Pool (Wet Ponds) (monthly)		
1. Undesirable vegetative growth		
2. Floating or floatable debris removal required		
3. Visible pollution		
4. Shoreline problem		
5. Other (specify)		
4. Sediment Forebays		
1. Sedimentation noted		
2. Sediment cleanout when depth < 50% design depth		
5. Dry Pond Areas		
1. Vegetation adequate		
2. Undesirable vegetative growth		
3. Undesirable woody vegetation		
4. Low flow channels clear of obstructions		
5. Standing water or wet spots		
6. Sediment and / or trash accumulation		
7. Other (specify)		
6. Condition of Outfalls (Annual , After Major Storms)		
1. Riprap failures		
2. Slope erosion		
3. Storm drain pipes		
4. Endwalls / Headwalls		
5. Other (specify)		
7. Other (Monthly)		
1. Encroachment on pond, wetland or easement area		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
2. Complaints from residents		
3. Aesthetics a. Grass growing required		
b. Graffiti removal needed		
c. Other (specify)		
4. Conditions of maintenance access routes.		
5. Signs of hydrocarbon build-up		
6. Any public hazards (specify)		
8. Wetland Vegetation (Annual)		
1. Vegetation healthy and growing Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)		
2. Dominant wetland plants: Survival of desired wetland plant species Distribution according to landscaping plan?		
3. Evidence of invasive species		
4. Maintenance of adequate water depths for desired wetland plant species		
5. Harvesting of emergent plantings needed		
6. Have sediment accumulations reduced pool volume significantly or are plants "choked" with sediment		
7. Eutrophication level of the wetland.		
8. Other (specify)		

Comments:

Actions to be Taken:

Infiltration Trench Operation, Maintenance, and Management Inspection Checklist

Project:
 Location:
 Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Trench surface clear of debris		
Inflow pipes clear of debris		
Overflow spillway clear of debris		
Inlet area clear of debris		
2. Sediment Traps or Forebays (Annual)		
Obviously trapping sediment		
Greater than 50% of storage volume remaining		
3. Dewatering (Monthly)		
Trench dewaterers between storms		
4. Sediment Cleanout of Trench (Annual)		
No evidence of sedimentation in trench		
Sediment accumulation doesn't yet require cleanout		
5. Inlets (Annual)		

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
Good condition		
No evidence of erosion		
6. Outlet/Overflow Spillway (Annual)		
Good condition, no need for repair		
No evidence of erosion		
7. Aggregate Repairs (Annual)		
Surface of aggregate clean		
Top layer of stone does not need replacement		
Trench does not need rehabilitation		

Comments:

Actions to be Taken:

Sand/Organic Filter Operation, Maintenance and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Contributing areas clean of debris		
Filtration facility clean of debris		
Inlet and outlets clear of debris		
2. Oil and Grease (Monthly)		
No evidence of filter surface clogging		
Activities in drainage area minimize oil and grease entry		
3. Vegetation (Monthly)		
Contributing drainage area stabilized		
No evidence of erosion		
Area mowed and clipping removed		
4. Water Retention Where Required (Monthly)		
Water holding chambers at normal pool		
No evidence of leakage		
5. Sediment Deposition (Annual)		

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
Filter chamber free of sediments		
Sedimentation chamber not more than half full of sediments		
6. Structural Components (Annual)		
No evidence of structural deterioration		
Any grates are in good condition		
No evidence of spalling or cracking of structural parts		
7. Outlet/Overflow Spillway (Annual)		
Good condition, no need for repairs		
No evidence of erosion (if draining into a natural channel)		
8. Overall Function of Facility (Annual)		
Evidence of flow bypassing facility		
No noticeable odors outside of facility		

Comments:

Actions to be Taken:

Bioretention Operation, Maintenance and Management Inspection Checklist

Project:
 Location:
 Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Bioretention and contributing areas clean of debris		
No dumping of yard wastes into practice		
Litter (branches, etc.) have been removed		
2. Vegetation (Monthly)		
Plant height not less than design water depth		
Fertilized per specifications		
Plant composition according to approved plans		
No placement of inappropriate plants		
Grass height not greater than 6 inches		
No evidence of erosion		
3. Check Dams/Energy Dissipaters/Sumps (Annual, After Major Storms)		
No evidence of sediment buildup		

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
Sumps should not be more than 50% full of sediment		
No evidence of erosion at downstream toe of drop structure		
4. Dewatering (Monthly)		
Dewaterers between storms		
No evidence of standing water		
5. Sediment Deposition (Annual)		
Swale clean of sediments		
Sediments should not be > 20% of swale design depth		
6. Outlet/Overflow Spillway (Annual, After Major Storms)		
Good condition, no need for repair		
No evidence of erosion		
No evidence of any blockages		
7. Integrity of Filter Bed (Annual)		
Filter bed has not been blocked or filled inappropriately		

Comments:

Actions to be Taken:

Open Channel Operation, Maintenance, and Management Inspection Checklist

Project:
 Location:
 Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Contributing areas clean of debris		
2. Check Dams or Energy Dissipators (Annual, After Major Storms)		
No evidence of flow going around structures		
No evidence of erosion at downstream toe		
Soil permeability		
Groundwater / bedrock		
3. Vegetation (Monthly)		
Mowing done when needed		
Minimum mowing depth not exceeded		
No evidence of erosion		
Fertilized per specification		
4. Dewatering (Monthly)		
Dewaterers between storms		

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
5. Sediment deposition (Annual)		
Clean of sediment		
6. Outlet/Overflow Spillway (Annual)		
Good condition, no need for repairs		
No evidence of erosion		

Comments:

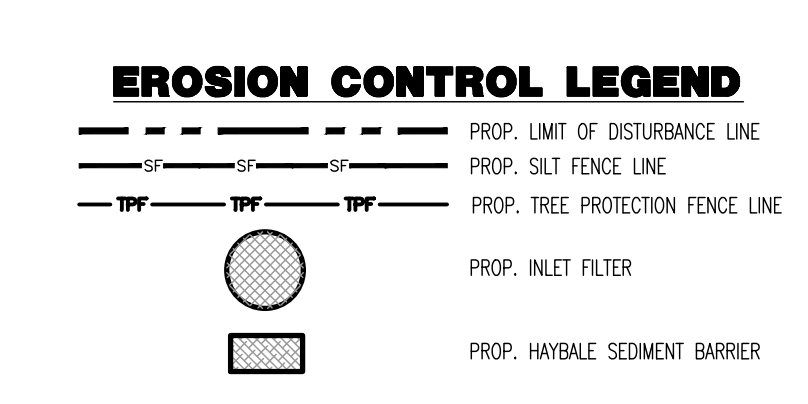
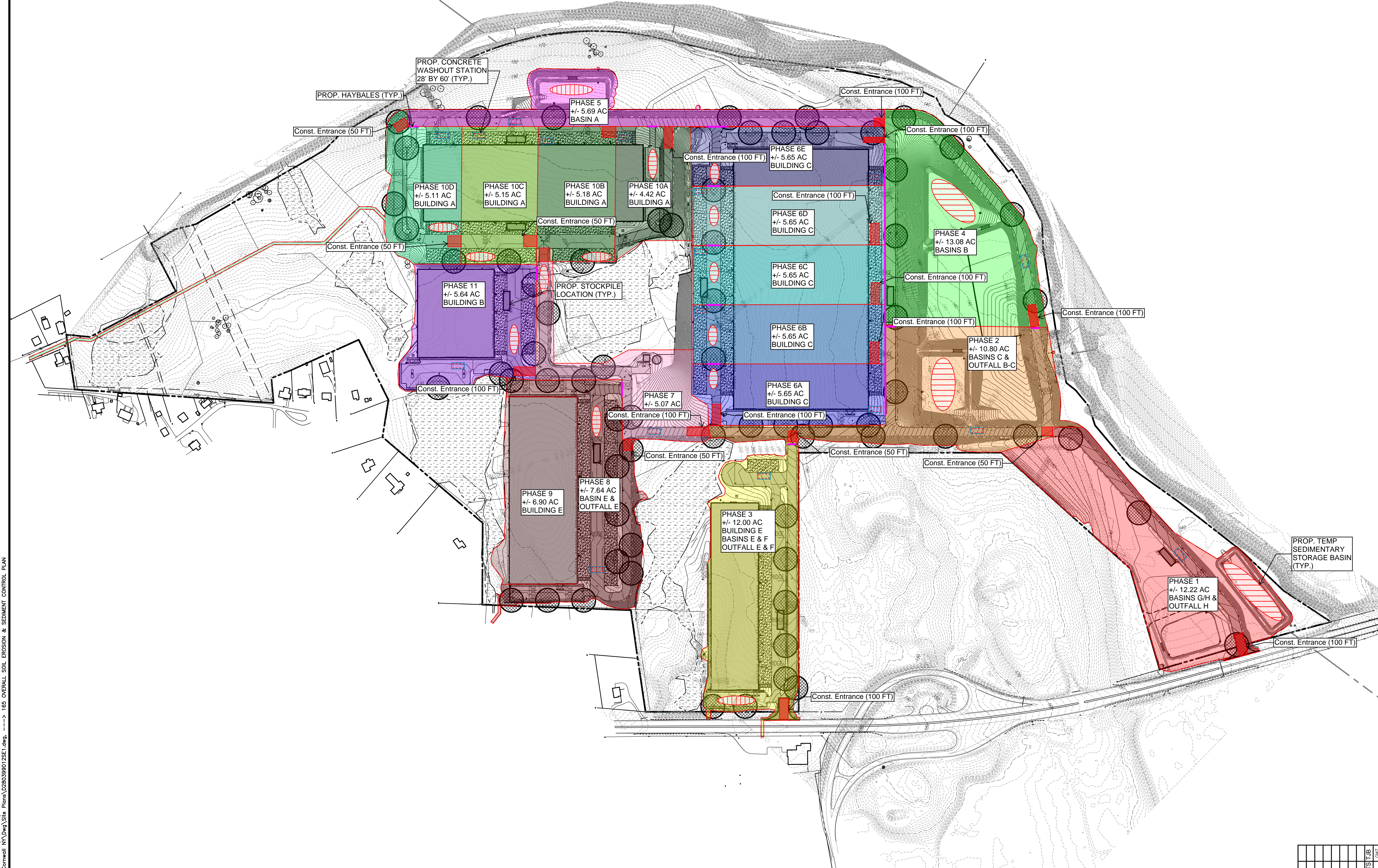
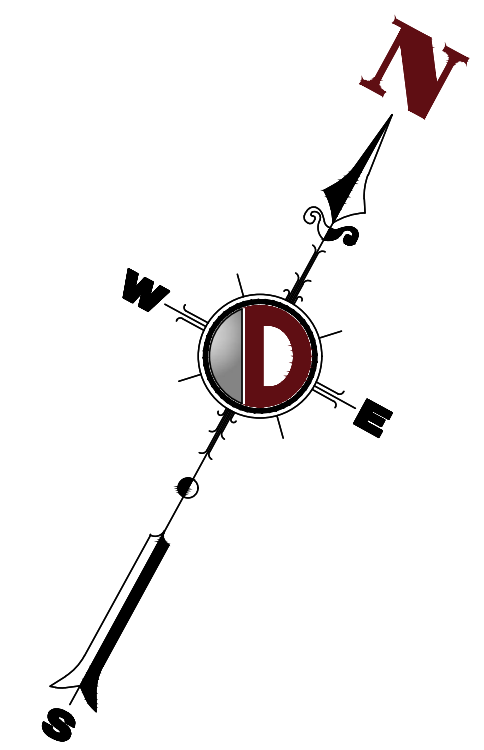
Actions to be Taken:

This page is left intentionally blank

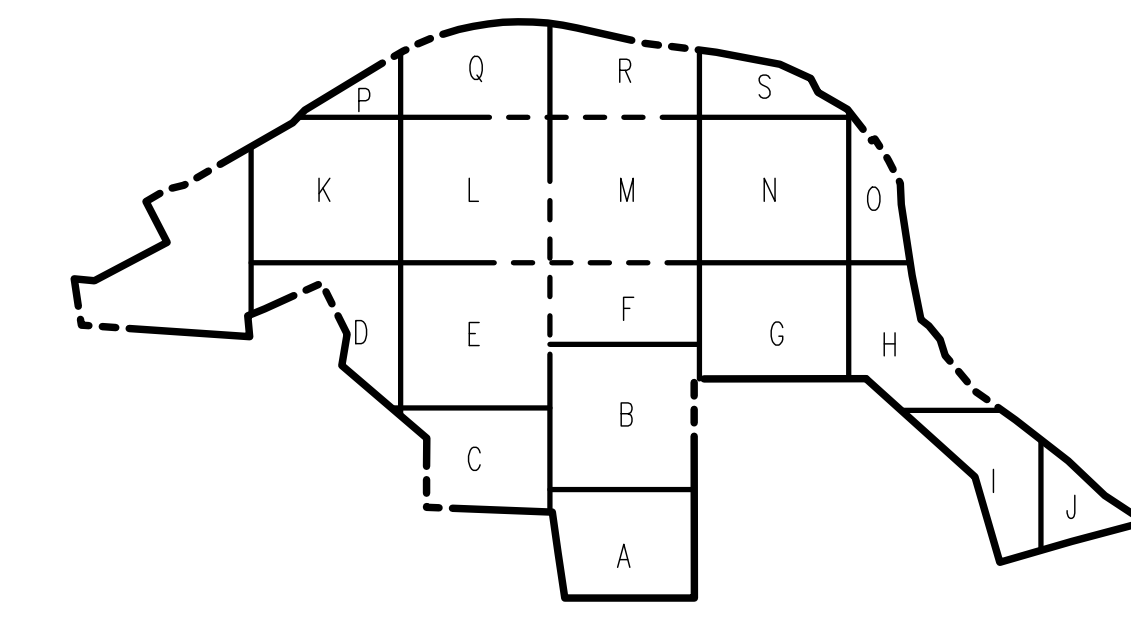
Appendix H

This page is left intentionally blank

OVERALL PHASING PLAN

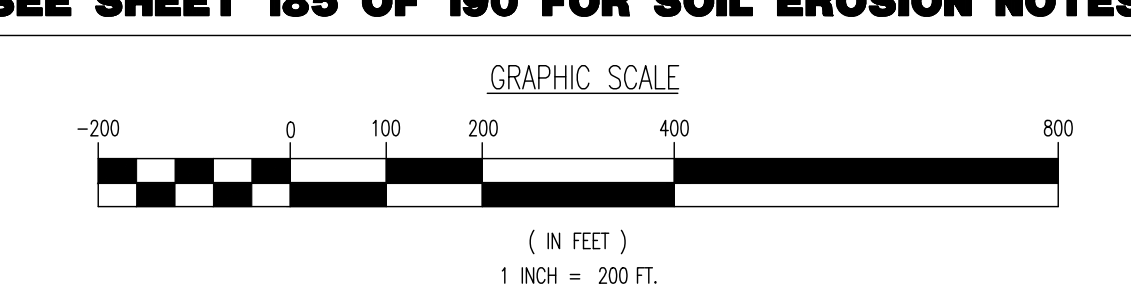


LIMIT OF DISTURBANCE = 5,651,481.19 SF. (129.7 Ac.)



KEY MAP
NOT TO SCALE

SEE SHEET 185 OF 190 FOR SOIL EROSION NOTES



THIS PLAN SET IS FOR PERMITTING PURPOSES ONLY AND MAY NOT BE USED FOR CONSTRUCTION

DYNAMIC ENGINEERING
LAND DEVELOPMENT CONSULTING • PERMITTING • GEOTECHNICAL • ENVIRONMENTAL • SURVEY • PLANNING & ZONING

1904 Main Street
Lake Grove, NJ 07730
T: 732.974.1116
F: 732.974.1821
www.dynamicce.com

OVERALL PHASING PLAN EXHIBIT

PROJECT: **CORNWALL LOGISTICS, LLC**
PROPOSED INDUSTRIAL WAREHOUSE
SECTION 9, BLOCK 1, LOT 25.22
2615 US ROUTE 9 WEST
TOWN OF CORNWALL, ORANGE COUNTY, NEW YORK

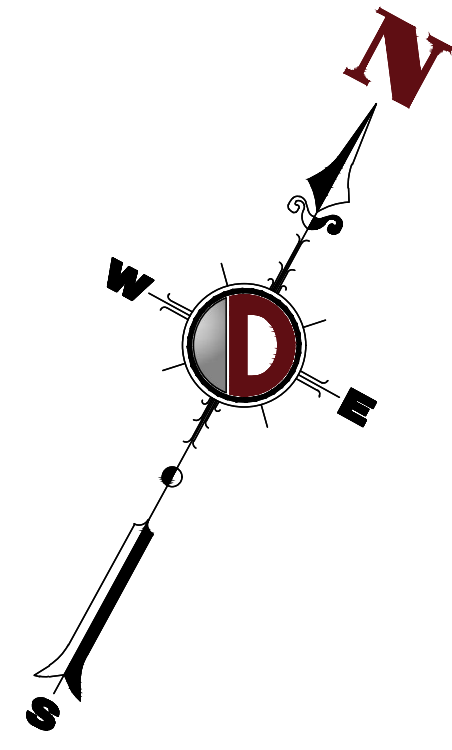
JOB No: 2803-99-012 DATE: 01/18/2023
SCALE (H) 1"=200'
SHEET No: **1** OF 2

DESIGNED BY: CAM
CHECKED BY: JMS
DRAWN BY: RDM

JOSHUA M. SEWALD
PROFESSIONAL ENGINEER
NEW YORK LICENSE No. 097639

Product Ver: 24.2a (LMS Tech) By: arevela Date: 07/12/23 5:09 PM
 File: P:\Users\arevela\Documents\2023\Development\2803-99-012_Cornwall_ILW\Site Plans\280399012SET.dwg 185 OVERALL SOIL EROSION & SEDIMENT CONTROL PLAN

DRAINAGE AREA MAPS



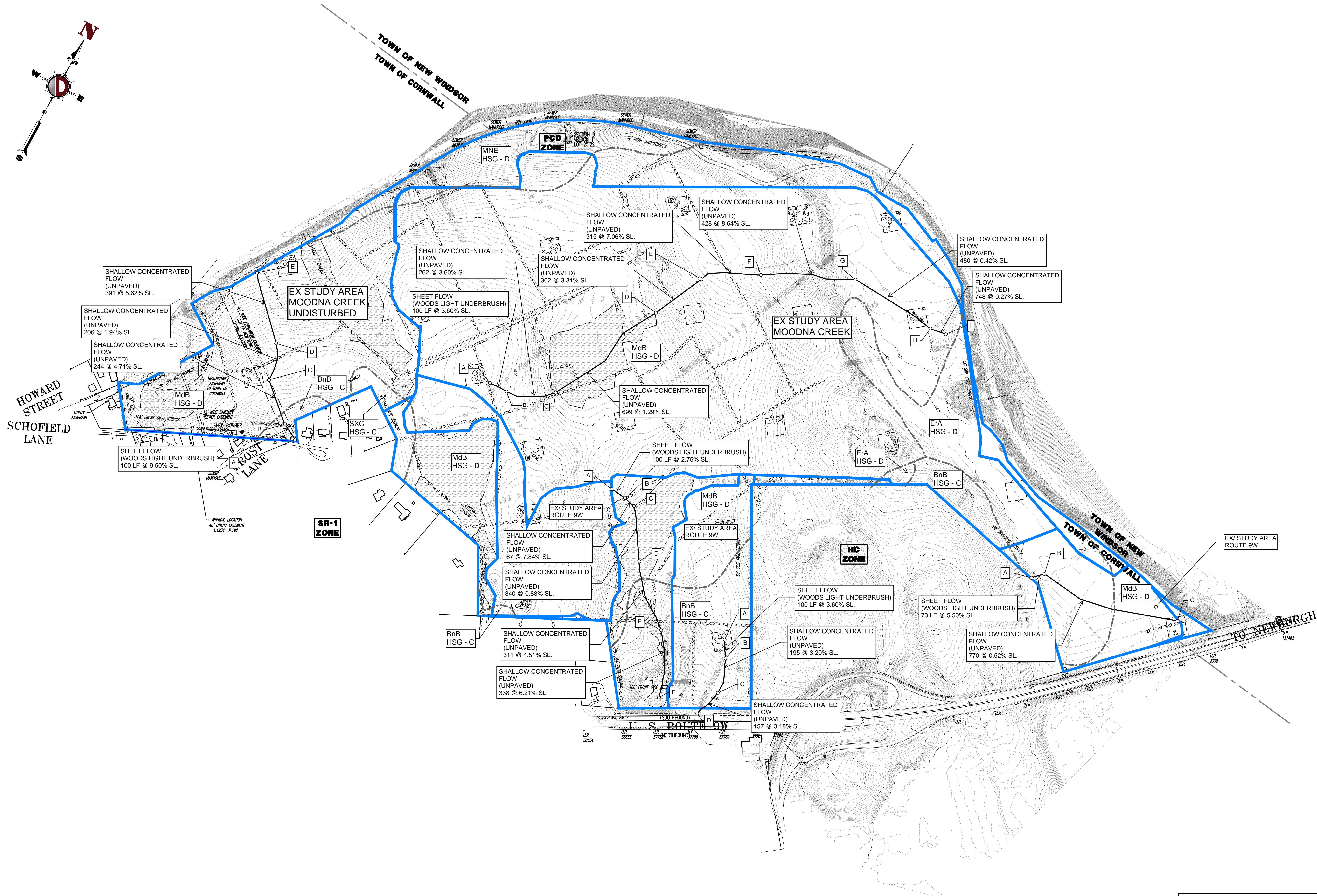
TOWN OF NEW WINDSOR
TOWN OF CORNWALL

HOWARD STREET
SCHOFIELD LANE

AROST LANE

TOWN OF NEW WINDSOR
TOWN OF CORNWALL

TO NEWBURGH



SR-1 ZONE

PCD ZONE

HC ZONE

Plotfile: 10/17/23 - 11:02 AM By: ameyr Product: Ver: 24.2a (LMS Tech) Path: \\unicon\resources\Users\ameyr\Projects\230515 - Highway Development\DR-212 - Cornwall, NY\DWG\Map\Map\2305150120AED.dwg -> -> EXISTING DA MAP

COPYRIGHT © 2023 - DYNAMIC ENGINEERING CONSULTANTS, PC - ALL RIGHTS RESERVED

THIS PLAN SET IS FOR PERMITTING PURPOSES ONLY AND MAY NOT BE USED FOR CONSTRUCTION

DYNAMIC ENGINEERING
LAND DEVELOPMENT CONSULTING • PERMITTING • GEOTECHNICAL • ENVIRONMENTAL • SURVEY • PLANNING & ZONING

1944 Main Street
Lark Cove, NJ 07110
T: 732.974.1116
F: 732.974.1321
www.dynamiceng.com

TITLE: **EXISTING DRAINAGE AREA MAP**

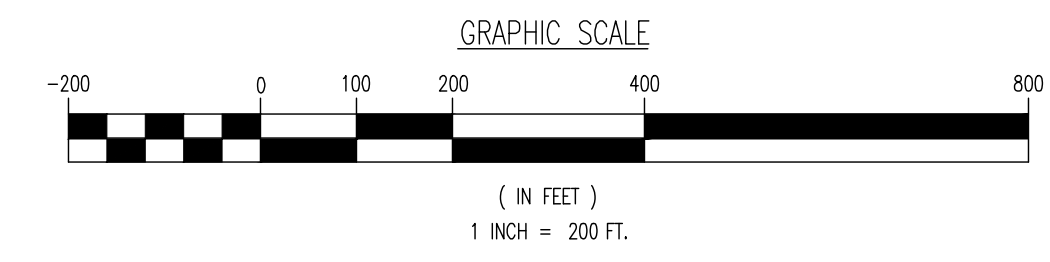
PROJECT: **CORNWALL LOGISTICS, LLC
PROPOSED INDUSTRIAL WAREHOUSE**
SECTION 9, BLOCK 1, LOT 25.22
2615 US ROUTE 9 WEST
TOWN OF CORNWALL, ORANGE COUNTY, NEW YORK

JOB No: 2803-99-012 DATE: 01/18/2023
DRAWN BY: MFD SCALE (H) 1"=200'
DESIGNED BY: RDM SHEET No: 1
CHECKED BY: JMS
PROFESSIONAL ENGINEER
NEW YORK LICENSE No. 097639

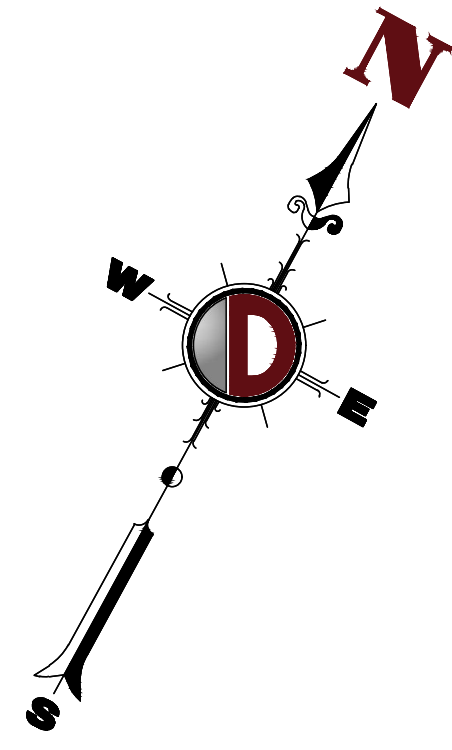
JOSHUA M. SEWALD

PROTECT YOURSELF
IT'S YOUR RESPONSIBILITY
TO OBTAIN A COPY OF THE
LATEST EDITION OF THE
UNIFORM CONSTRUCTION CODE
FOR YOUR AREA. VISIT
WWW.CALL1811.COM

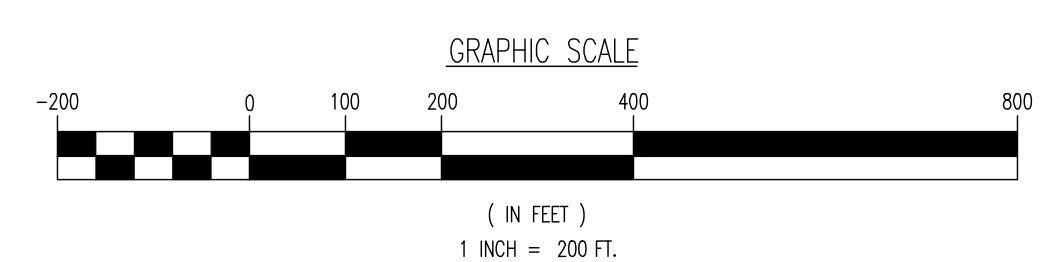
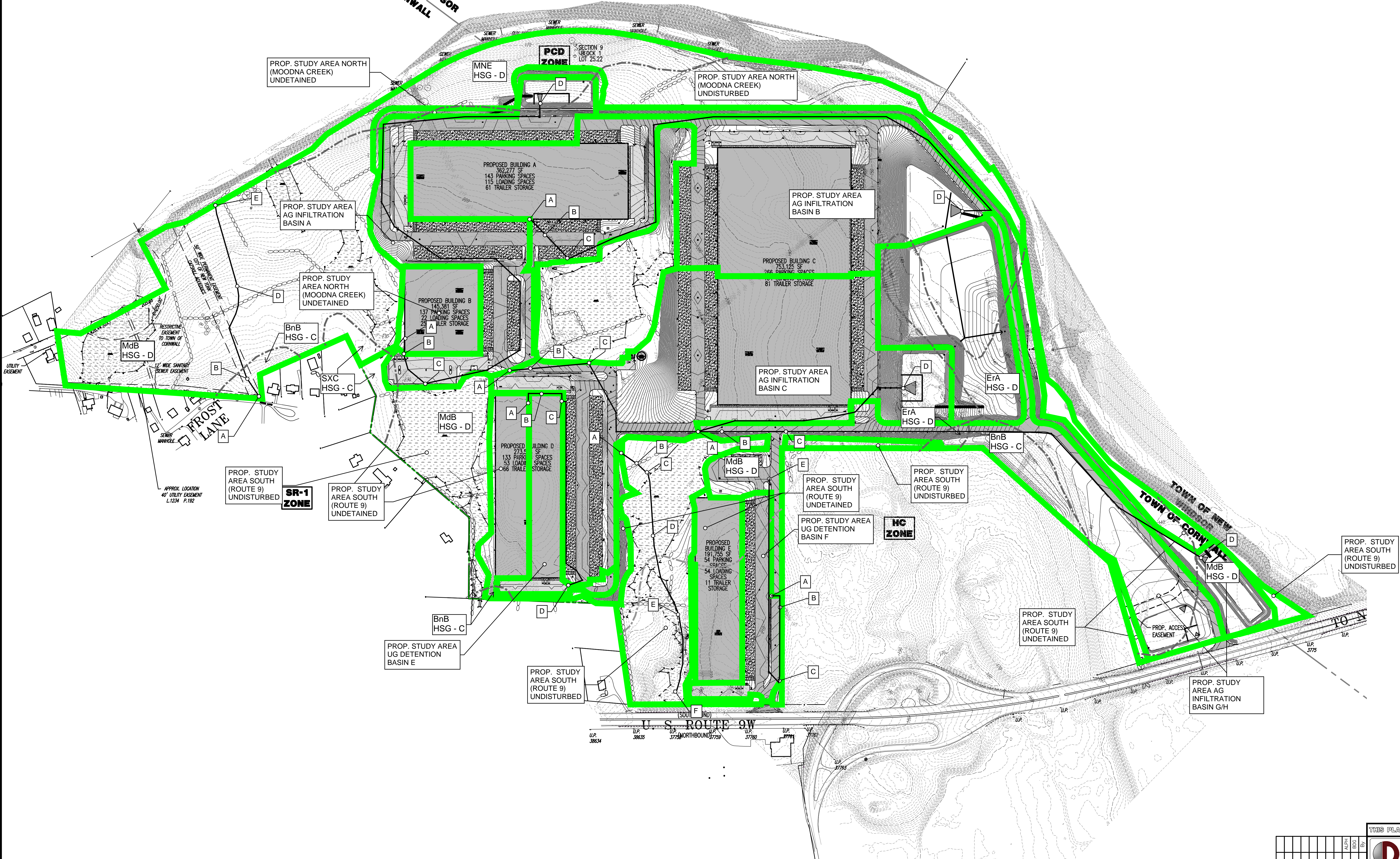
Rev. # 2



Rev.	Date	Comments
1	07/10/23	REV FOR TOWN OF CORNWALL COMMENTS
2	07/17/23	REV FOR TOWN OF CORNWALL COMMENTS



PAVEMENT LEGEND	
	PROPOSED STANDARD DUTY ASPHALT PAVEMENT
	PROPOSED HEAVY DUTY ASPHALT PAVEMENT
	PROPOSED HEAVY DUTY CONCRETE PAVEMENT
	PROPOSED STANDARD DUTY CONCRETE PAVEMENT



Project: 10/17/23 - 11:00 AM By: jms Date: 10/17/23
 Product: Ver. 24.2 (US Tech)
 File: P:\Projects\2023\230523_Cornwall_Industrial_Warehouse\230523_Cornwall_ILW.dwg, 01 - PROPOSED DRAINAGE MAP

GRADING/UTILITY GRAPHIC LEGEND			
	EXIST. CUR WIRE		PROP. WATER VALVE
	EXIST. LIGHT POLE		PROP. GAS VALVE
	EXIST. BUILDING LIGHT		PROP. STORM CLEANOUT
	EXIST. COBBLE LIGHT POLE		PROP. AREA LIGHT
	EXIST. TRAFFIC SIGNAL POLE		PROP. SANITARY SEWER LINE
	EXIST. MANHOLE		PROP. STORM DRAIN LINE
	EXIST. 12" INLET		PROP. MINOR CONTOUR & ELEVATION
	EXIST. 18" INLET		PROP. MAJOR CONTOUR & ELEVATION
	EXIST. FLARED END SECTION		PROP. FINISH GRADE CONTOUR & ELEVATION
	EXIST. HEADWALL		PROP. DIRECTION OF DRAINAGE FLOW ARROW
	EXIST. UTILITY POLE		EXIST. SPOT ELEVATIONS
	EXIST. MONITORING WELL		EXIST. GUTTER ELEV.
	EXIST. FIRE HYDRANT		EXIST. TOP OF CURB ELEV.
	EXIST. WATER VALVE		EXIST. FINISH FLOOR ELEV.
	EXIST. GAS VALVE		EXIST. GARAGE FLOOR ELEV.
	EXIST. GAS METER		EXIST. GARAGE SPOT ELEV.
	EXIST. ELECTRIC METER		PROP. TOP OF CURB & FINISHED GRADE ELEV.
	EXIST. ELECTRIC BOX		PROP. FINISHED FLOOR ELEV.
	EXIST. CLEAN OUT		PROP. TOP OF WALL & FINISHED GRADE & LOW SIDE OF WALL (ACTUAL BOTTOM OF WALL FOOTING TO BE ESTABLISHED BY WALL DESIGNER)
	EXIST. WELL		PROP. TOP OF EXTENDED CURB (ON FINISHED GRADE & HIGH SIDE OF EXTENDED CURB & ON FINISHED GRADE & LOW SIDE OF EXTENDED CURB)
	EXIST. WATER SHUT OFF VALVE		
	EXIST. TELEPHONE BOX		
	EXIST. CABLE TV BOX		
	PROP. HEADWALL		
	PROP. FLARED END SECTION		
	PROP. WATER VALVE		
	PROP. GAS VALVE		
	PROP. STORM CLEANOUT		
	PROP. AREA LIGHT		
	PROP. SANITARY SEWER LINE		
	PROP. STORM DRAIN LINE		
	PROP. MINOR CONTOUR & ELEVATION		
	PROP. MAJOR CONTOUR & ELEVATION		
	PROP. FINISH GRADE CONTOUR & ELEVATION		
	PROP. DIRECTION OF DRAINAGE FLOW ARROW		
	EXIST. UNDERGROUD ELEC./TELE. SERVICE (NO. & SIZE OF CONDUITS NOT DEFINED)		EXIST. SANITARY SEWER LINE
	EXIST. UNDERGROUD ELEC./TELE. SERVICE (NO. & SIZE OF CONDUITS NOT DEFINED)		EXIST. STORM DRAIN LINE
	EXIST. SANITARY SEWER LINE		EXIST. MINOR CONTOUR & ELEVATION
	EXIST. STORM DRAIN LINE		EXIST. MAJOR CONTOUR & ELEVATION
	EXIST. MINOR CONTOUR & ELEVATION		EXIST. FINISH GRADE CONTOUR & ELEVATION
	EXIST. MAJOR CONTOUR & ELEVATION		EXIST. DIRECTION OF DRAINAGE FLOW ARROW
	EXIST. FINISH GRADE CONTOUR & ELEVATION		
	EXIST. DIRECTION OF DRAINAGE FLOW ARROW		

DYNAMIC ENGINEERING

LAND DEVELOPMENT CONSULTING • PERMITTING • GEOTECHNICAL • ENVIRONMENTAL • SURVEY • PLANNING & ZONING

1984 Main Street
Lark Cove, NJ 07110
T: 732.974.1116
F: 732.974.1121
www.dynamiceng.com

PROPOSED DRAINAGE MAP

PROJECT: **CORNWALL LOGISTICS, LLC**
PROPOSED INDUSTRIAL WAREHOUSE
 SECTION 9, BLOCK 1, LOT 25.22
 2615 US ROUTE 9 WEST
 TOWN OF CORNWALL, ORANGE COUNTY, NEW YORK

JOB No: 2803-99-012 DATE: 01/18/2023

DESIGNED BY: CAM SCALE: (H) 1"=200'
 CHECKED BY: RDM (V)

CHECKED BY: JMS SHEET No: **1**

JOSHUA M. SEWALD OF 1

PROFESSIONAL ENGINEER Rev. # 2
 NEW YORK LICENSE No. 097639

PROTECT YOURSELF
 ALL STATE ENGINEERS ARE REQUIRED TO MAINTAIN A CURRENT LICENSE AND REGISTERED SEAL. FAILURE TO DO SO IS A VIOLATION OF THE PROFESSIONAL ENGINEERING ACT AND MAY BE PENALIZED BY THE STATE ENGINEERING BOARD.

**PRELIMINARY AND FINAL MAJOR SITE PLANS
(ATTACHED SEPARATELY)**