



STORMWATER POLLUTION PREVENTION PLAN

HUCK FINN'S WAREHOUSE CONVERSION
25 Erie Boulevard
City of Albany, NY

September 28, 2021

DRAFT

OWNER:

Huckleberry Finn Pottery
19 Erie Boulevard
Albany, NY 12305

DEVELOPER:

21 Erie Assoc., LLC
204 Lafayette Street
Schenectady, NY 12305

PREPARED BY:

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DESCRIPTION OF EXISTING SITE

The project site is located at 19 & 21 Erie Boulevard in the city of Albany, NY and is comprised of two adjacent parcels owned by Huckleberry Finn Pottery Inc. Land Parcel No. 65.16-5-4.1 lies adjacent to Erie Boulevard and is approximately 8.0 acres in size. Land Parcel No. 65.16-5-4.2 lies behind the first parcel and is approximately 1.06 acre in size. Together, the lots are 9.06 acres. The site is currently developed with large parking lots and a large furniture store, The Warehouse at Huck Finn, which is 3.9 acres in size. Behind the warehouse lies a brownfield with railroad tracks along with various industrial artifacts that are no longer in use.

The site is in an industrial area located within the MU-FW (Multi-Use, Form-Based Warehouse) Zoning District. The neighboring properties to the project site are Huck Finn's Playland and the F.W. Webb Company. Behind the project site is the right of way for Interstate 787, with the Hudson River beyond the interstate. Proximity to the Hudson River in conjunction with the site's low elevation puts the entire project site in a FEMA Zone AE, which means it is 1% likely to flood on an annual basis. No known wetlands or stormwater best management practices currently exist on the site; however, swales and catch basins exist throughout the site.

Most of the site slopes less than 5% towards either Erie Boulevard or towards Interstate 787/the Hudson River.

DESCRIPTION OF EXISTING SOILS

A United States Department of Agriculture (USDA) Soil Survey was obtained from the Natural Resource Conservation Service website to evaluate soil properties. The soil report indicates the site has Udorthents, loamy soils (Ug) in areas not developed with parking lots and buildings. Developed areas of the site are classified as Urban land (Ur).

Ug soils are identified by the USDA as Hydrologic Soil Group (HSG) "A" and are moderately well drained. The depth to restrictive layer is noted to be more than 80 inches, and the depth to the water table can range from 36 inches to 72 inches.

The description of Ur soils did not include HSG, a drainage class, the depth to restrictive layer, nor the depth to the water table. Most land classified with Ur soils is impervious on the site. Any impervious areas in Ur areas were modeled as HSG A.

A series of soil borings were performed and evaluated by LaBella on January 20 and 21, 2021 as part of an ongoing environmental site assessment. Results of the soil borings indicate that native soils at the site generally consist of sand and clayey silts. Groundwater was encountered at the depths of 10 to 15 feet below the existing grade. Results of the soil borings are documented and summarized in the report titled "Phase II Environmental Site Assessment" prepared by LaBella, dated February 18, 2021 (Phase II ESA).

Stormwater design infiltration rates were conservatively assumed based on soil structures identified in the Phase II ESA in conjunction with soil properties identified in the aforementioned NRCS soil survey. Additional infiltration tests will be performed and evaluated by a licensed

professional prior to construction to confirm subsurface conditions at the site. The NRCS soil survey is provided in Appendix B of this report.

DESCRIPTION OF PROPOSED DEVELOPMENT

Proposed site work includes the partial conversion of the existing furniture warehouse into apartment units, minimal reconfiguration of existing parking lots, and (three) additional parking lots around the warehouse will be provided for the new tenants. Additional development includes a recreational area behind the warehouse, which will incorporate a walking/running trail loop, community gardens, a bocce ball court, a volleyball court, a pool, a pool house, and a dog park. All proposed stormwater management practices will take place behind the warehouse, within or near the recreational area. Existing utilities will be minimally impacted. Landscaping improvements throughout the site are also proposed. Some of these improvements include a series of street trees along Erie Boulevard, planters with trees in the existing parking lots, plant beds along the warehouse foundation, and trees to buffer Interstate 787 from the recreation area. All remaining pervious surfaces will be landscaped with native plants and ornamental trees, or restored with grass, meadow, and flowering seed mixes. Proposed grading will generally preserve existing drainage patterns to the greatest extent possible. Anticipated disturbance areas, pervious and impervious areas are as follows:

Disturbance Area	± 166,222 ft ²
Impervious (<i>existing/proposed</i>)	± 27,338 ft ² / ± 88,133 ft ²
Pervious (<i>existing/proposed</i>)	± 138,884 ft ² / ± 78,089 ft ²

* Impervious and pervious area calculations pertain only to area within the disturbance limits.

CONSTRUCTION PHASING

The first phase of construction consists of the partial conversion of the furniture warehouse into apartment units. The conversion of the warehouse is expected to begin January of 2022 and site construction of the entire site is expected to conclude in the summer of 2023. Site preparation will begin by installing silt soxx and silt fences, which will be in accordance with the construction drawings prior to any disturbance of the existing ground surface. Immediately following the installation of silt soxx and silt fences, a stabilized construction entrance consisting of crushed stone and geotextile stabilization fabric will be installed as shown on the construction drawings. Afterwards, two concrete washout areas and two areas for soil stockpiling will be established, both practices will be in accordance with the construction drawings.

POLLUTION PREVENTION MEASURES

Any litter on site, including construction debris, will be picked up each day and disposed of into solid waste containers. The contractor shall provide an approved secondary containment system for all fuel and petroleum temporarily stored on site. During the placement of concrete for any new structures, measures will be taken to ensure that fresh concrete does not enter any defined drainage paths and a concrete washout area will be provided by the contractor in accordance with the construction drawings. Topsoil and imported fill materials will be stock piled in the protected areas indicated on the construction drawings.

SEDIMENTATION AND EROSION CONTROL

Prior to commencing any land clearing, silt soxx and silt fence will be installed in accordance with the construction drawings and in accordance with the New York State Stormwater Management Design Manual, January 2015 and the New York Standards and Specifications for Erosion and Sediment Control.

A stabilized temporary construction entrance at the locations indicated on the construction drawings will be required for all construction traffic entering and leaving the site. The contractor is required to maintain the silt socks, silt fences, and the temporary construction entrance throughout the construction period.

All exposed surfaces not covered with paving, structures, landscaping and similar finished surfaces will be covered with topsoil and seeded within 10 days following substantial completion of construction to establish a turf or meadow covering or will be landscaped in accordance with the construction drawings. The areas receiving seed will be mulched to minimize erosion. Silt soxx and silt fences shall be installed downslope of all newly seeded areas. The silt fences and soxx shall be maintained and replaced as required during construction until a well-established vegetative cover is established.

PERMANENT STORMWATER CONTROLS

Permanent stormwater controls for the proposed development will include two sediment forebays that outlet to an infiltration basin, a bioretention basin, subsurface infiltration chambers, and a conveyance system consisting of roof leaders, drain grates, storm culverts, rip rap energy dissipaters at each culvert outlet, rip rap lined swales, and vegetative swales. Proposed work will include resurfacing existing asphalt surfaces, constructing planters within the existing asphalt parking lots, constructing three new parking lots behind the warehouse, and building a new outdoor recreation area at the rear of the warehouse. Disturbed areas that are not subject to construction of impervious surface will be vegetated in an effort to restore original soil properties. Cleared areas will be landscaped in accordance with the landscaping schedule which includes a series of groundcovers, meadow mixes, wildflower seed mixes, native plantings, and trees approved by the City of Albany. Existing vegetated areas are minimal, but those existing will be preserved to the greatest extent possible. Penetrating roots in the proposed permeable areas will support aeration and facilitate infiltration of stormwater runoff.

Proposed Green Infrastructure practices (GI) techniques and standard Stormwater Management Practices (SMPs) meet the post-construction criteria for new development and redevelopment activities in accordance with Part I.C.2.c.iv.d of the *New York State Department of Environmental Conservation SPDES General Permit for Stormwater for Stormwater Discharges from Construction Activity (2020)*. In accordance with Part I.C.2.c of the SPDES General Permit GP-0-20-001, portions of the site proposed for redevelopment encompassed by Subcatchment areas 1S and 2S (see Table 1) include Runoff Reduction techniques sized in accordance with the *New York State Department of Environmental Conservation Stormwater Management Design Manual (2015; NYSDEC SMDM)* to reduce a minimum of 25% of the Water Quality Volume (WQv) from the disturbed impervious area. The remainder of the site subject to WQv treatment objectives for new development activities includes a stormwater management system consisting of both GI

techniques and SMPs to provide a total Runoff Reduction Volume (RRv) greater than or equal to the minimum RRv generated from the proposed development. The remaining WQv, after the application of the RRv practices, is then treated by the proposed standard stormwater management practices sized in accordance with the NYSDEC SMDM.

Based on the soil hydrologic group in the proposed construction areas, the following curve numbers were assumed for the hydrologic analyses:

<u>Land Cover Type</u>	<u>Curve Number</u>
50%-75% Grass cover, Fair, HSG A	CN 49
<50% Grass cover, Poor, HSG A	CN 68
Paved Surface, Roof Area	CN 98
Woods/grass Combo, Fair, HSG A	CN 43
Urban Industrial, 72% Imp	CN 81
Water Surface, HSG A	CN 98
Meadow, non-grazed, HSG A	CN 30

The post developed site was divided into five subcatchment areas based on the flow direction of runoff generated from the proposed structures, access driveways and pervious areas. Subcatchment land cover and runoff control descriptions are provided in Table 1.

Table 1. Subcatchment Area Descriptions

Subcatchment	Landcover	Stormwater Control Measures
1S	Existing parking area, proposed landscaped islands, street trees and an existing roadside grassed buffer area	Runoff generated from existing asphalt surface will be follow existing drainage patterns to an existing roadside grassed buffer strip that will be planted with along Erie Blvd, where it will ultimately discharge to Design Point #1.
2S	Existing parking area and proposed landscaped islands	Runoff generated by existing impervious surfaces will follow existing drainage patterns to a series of catch basins located within the parking lot area represented by Design Point #2.
3S	Existing and proposed parking lot areas, redeveloped vegetated area, a proposed pool area, and an outdoor recreation area.	Runoff generated by asphalt surface located on the east side of the building will be conveyed via sheet flow to a french drain and a storm pipe that will ultimately discharge flow to a sediment forebay located in the northeast corner of the site.

		Runoff generated by parking lot areas located at the rear of the building will be conveyed via sheet flow to a gravel lined swale that will discharge flow to the sediment forebay. Overflow will discharge from the forebay to an infiltration basin running along the northern property line via a stone lined weir and a culvert. Excess runoff will outlet from the infiltration basin via a series of stone lined weirs to Design Point #3
4S	Existing offsite parking lot area and vegetated areas.	Runoff generated from the asphalt surface will be conveyed via sheet flow to a proposed bioretention basin located in the northwest corner of the site. Excess runoff will discharge from the bioretention basin via a riser pipe and culvert to Design Point #3.
5S	Existing and proposed parking lot area, vegetated areas, and a portion of the outdoor recreation area.	Runoff generated from the asphalt surface will be conveyed via sheet flow to a gravel lined swale. Flow will then be discharged from the swale through a storm culvert to a sediment forebay located adjacent to the northern property line. Runoff will be discharged from the forebay to an infiltration chamber located beneath proposed parking area. Excess runoff will outlet the infiltrator chambers and flow back into the sediment forebay. Overflow will outlet the forebay via a stone lined weir to the infiltration basin. Excess runoff will outlet the infiltration basin via a series of stone lined weirs to Design Point #3.

Notes:

1. Refer to the Construction Drawings for permanent runoff control measure locations and details.
2. Stormwater management control measures shall be installed in accordance with the construction drawings and the New York State Stormwater Management Design Manual, January 2015.

The following table summarizes the RRv and treated WQv values of the GI Practices and SMPs proposed under the project stormwater management system to provide a minimum RRv greater than or equal to 13,415 ft³, and treat a WQv greater than or equal to 24,952 ft³:

Table 2. Green Infrastructure and Stormwater Management Practice Summary

Subcatchment	Green Infrastructure Technique/SMP Provided	RRv Provided	WQv Treated
1S&2S	Street Trees	233 ft ³	N/A
3S	Infiltration Basin	7,677 ft ³	1,164 ft ³
4S	Bioretention Basin	1,538 ft ³	5,037 ft ³
5S	Infiltrator Chambers	5,491 ft ³	4,975 ft ³

RRv Total = 14,939 ft³ ≥ Min. RRv: RRv + WQv_{treated} = 26,115 ft³ > WQv

Design storm events were assumed to be customized storm curves based upon Extreme Precipitation Data in New York & New England available through a joint collaboration between the Northeast Regional Climate Center and Natural Resources Conservation Service for Type II, 24-hour 1-year, 10-year, and 100-year storm events. Rainfall magnitudes for the storm events were determined as follows: 2.24 inches, 3.80 inches and 6.49 inches. The runoff rates were modeled using HydroCAD version 10.0 software which calculates runoff based on the modified SCS TR-20 method. The peak runoff discharge passing through the proposed stormwater management system will be attenuated to be less than the pre-development flow rates for the aforementioned design storm events at established discharge design points. Peak off-site discharge rates for the channel protection volume (Cpv: 1 year 24-hour storm event), overbank flood (Qp:10-year storm event), and extreme storm ((Qf)h: 100-year storm event) are summarized in the following table:

Table 3. Peak Off-site Discharge Rates

Location	1-year Storm Volume (ft ³)		10-year Storm Peak Discharge (ft ³ /s)		100-year Storm Peak Discharge (ft ³ /s)	
	Pre	Post	Pre	Post	Pre	Post
Design Point #1	4.44	3.75	10.60	9.20	21.85	19.28
Design Point #2	2.23	2.10	3.90	3.79	6.73	6.66
Design Point #3	3.20	1.25	11.42	3.21	28.76	28.75

SITE INSPECTIONS DURING CONSTRUCTION

A qualified inspector as defined in Appendix A of the New York State Department of Environmental Conservation SPDES General Permit for Stormwater Discharges from Construction Activity Permit No. GP-0-20-001 shall conduct construction inspections in accordance with Part IV.C of GP-0-20-001.

MAINTENANCE OF STORMWATER MANAGEMENT SYSTEM

All vegetated swales (where applicable) shall maintain a grass height of 4 to 6 inches and shall be monitored for excessive sediment build-up within the bottom of the channel. The broad crested

overflow weirs, drain basins, and drain grates should be periodically checked for the accumulation of debris that may constrict runoff from flowing freely at the outlet invert elevations. Roof leaders shall be checked periodically to confirm connections are secured and outlets are not restricted by debris build up. In addition to the maintenance of the stormwater practices described, the lawns and landscaped areas shall be maintained in good condition to prevent erosion. Any deteriorated areas of lawn shall be re-seeded, and a stable turf reestablished. Additionally, the property owner shall provide arrangements for the future maintenance of the post-construction stormwater control measures in a form of a formal maintenance agreement prepared in accordance with the *Section § 133-107* of the City of Albany Code. The formal maintenance agreement shall be recorded in the office of the County Clerk or its terms shall be incorporated into covenants appearing in the deed, declarations of covenants and restrictions or other such documents to ensure that record notice of its terms is provided to future owners of the site.

RETENTION OF RECORDS

The contractor shall maintain at the project site a copy of this Storm Water Pollution Prevention Plan (SWPPP). In addition, the contractor shall maintain a site logbook which will contain all storm water and erosion control inspection reports to be prepared by the qualified professional. A current copy of the construction drawings shall also be kept in the logbook with comments that may have been added by the qualified inspector.

SWPPP Report Prepared by:



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APPENDIX A
PROJECT LOCATION

Figure 1. Project Location Map



APPENDIX B
USDA SOIL SURVEY

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.

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Map Scale: 1:3,930 if printed on A portrait (8.5" x 11") 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: Albany County, New York
 Survey Area Data: Version 18, 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: Jul 1, 2014—Sep 22, 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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Du	Dumps	4.0	10.4%
Ug	Udorthents, loamy	11.2	29.4%
Uk	Udorthents, loamy-Urban land complex	0.6	1.7%
Ur	Urban land	22.3	58.5%
Totals for Area of Interest		38.0	100.0%

Map Unit Descriptions

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

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

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

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

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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.

Albany County, New York

Du—Dumps

Map Unit Setting

National map unit symbol: 9pfk
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Dumps: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dumps

Typical profile

H1 - 0 to 60 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Ug—Udorthents, loamy

Map Unit Setting

National map unit symbol: 9pj1
Elevation: 0 to 1,640 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, loamy, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Loamy

Typical profile

H1 - 0 to 4 inches: loam
H2 - 4 to 70 inches: channery loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained

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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 36 to 72 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Minor Components

Unnamed soils

Percent of map unit: 10 percent

Uk—Udorthents, loamy-Urban land complex

Map Unit Setting

National map unit symbol: 9pj3

Elevation: 0 to 1,440 feet

Mean annual precipitation: 36 to 41 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 170 days

Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, loamy, and similar soils: 40 percent

Urban land: 30 percent

Minor components: 30 percent

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

Description of Udorthents, Loamy

Typical profile

H1 - 0 to 4 inches: loam

H2 - 4 to 70 inches: channery loam

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: 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 36 to 72 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 15 percent

Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Minor Components

Valois

Percent of map unit: 10 percent

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Hydric soil rating: No

Nunda

Percent of map unit: 10 percent

Hydric soil rating: No

Riverhead

Percent of map unit: 9 percent

Hydric soil rating: No

Ilion

Percent of map unit: 1 percent

Landform: Depressions

Hydric soil rating: Yes

Ur—Urban land

Map Unit Setting

National map unit symbol: 9pj8

Mean annual precipitation: 36 to 41 inches

Mean annual air temperature: 45 to 48 degrees F

Frost-free period: 100 to 170 days

Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent

Minor components: 15 percent

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

Description of Urban Land

Typical profile

H1 - 0 to 6 inches: variable

Minor Components

Unnamed soils

Percent of map unit: 10 percent

Udorthents

Percent of map unit: 5 percent

Hydric soil rating: No

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

APPENDIX C
SUBCATCHMENT PLANS

IT IS A VIOLATION OF NEW YORK STATE EDUCATION LAW FOR ANY PERSON UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR TO ALTER ANY ITEM IN ANY WAY BY ANY TERM BEARING THE STAMP OF A LICENSED PROFESSIONAL. IF ALTERED, THE ALTERING LICENSED PROFESSIONAL SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.



REVISIONS	DATE	DESCRIPTION	CITY COMMENTS	REVISIONS PER CLIENT
	08/30/21			
	09/28/21			

PREPARED FOR
REDBURN DEVELOPMENT
204 LAFAYETTE STREET
SCHENECTADY, NY 12305

PROJECT
HISTORIC REDEVELOPMENT OF 19 ERIE BOULEVARD

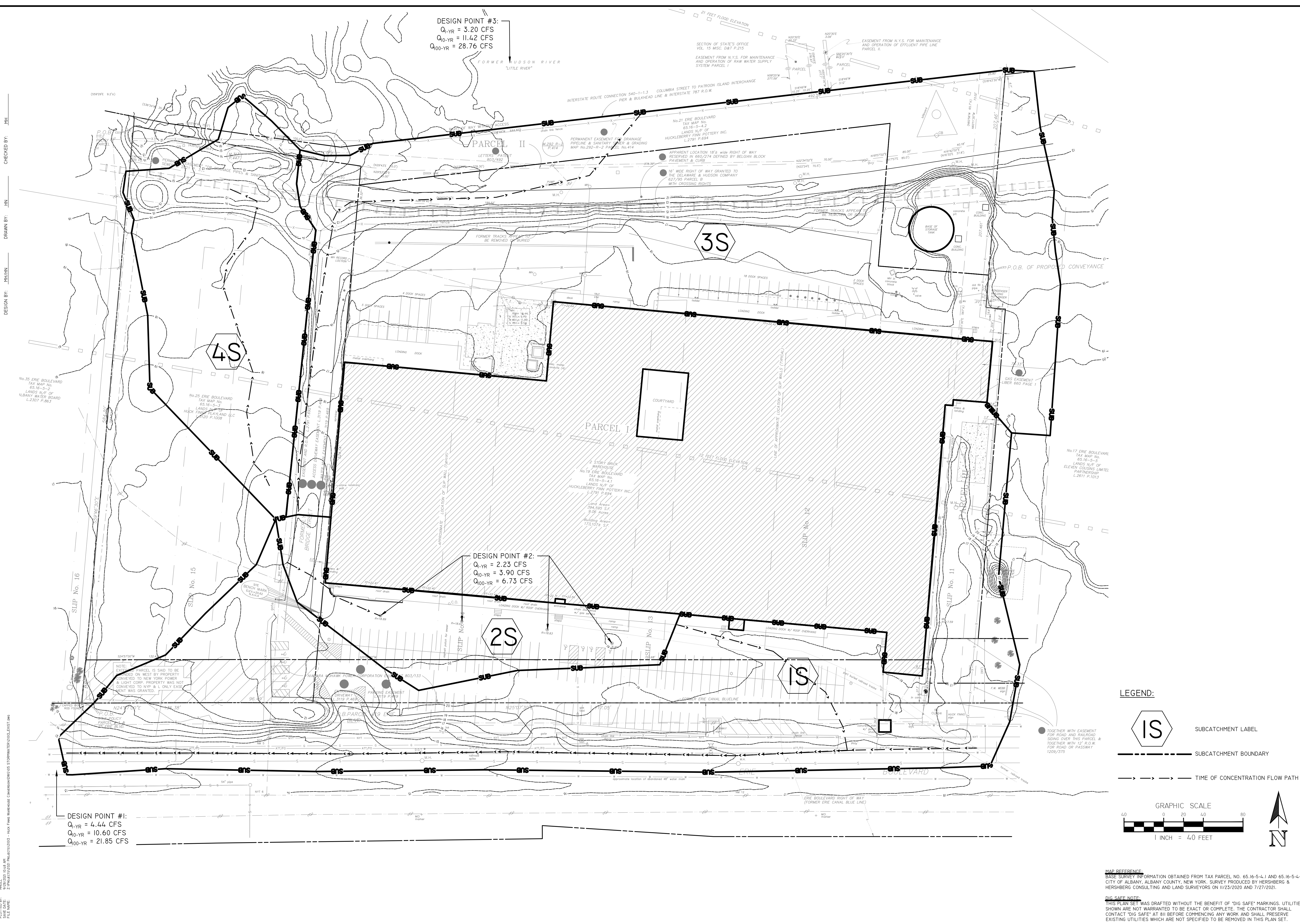
DRAWING TITLE
PRE-CONSTRUCTION SUBCATCHMENTS PLAN

DATE: 09/28/2021

PROJECT NO.
21013

DRAWING NO.
SC-1

DWG 1 OF 2



DESIGN BY: MH/JHN
DRAWN BY: JHN
CHECKED BY: JHN

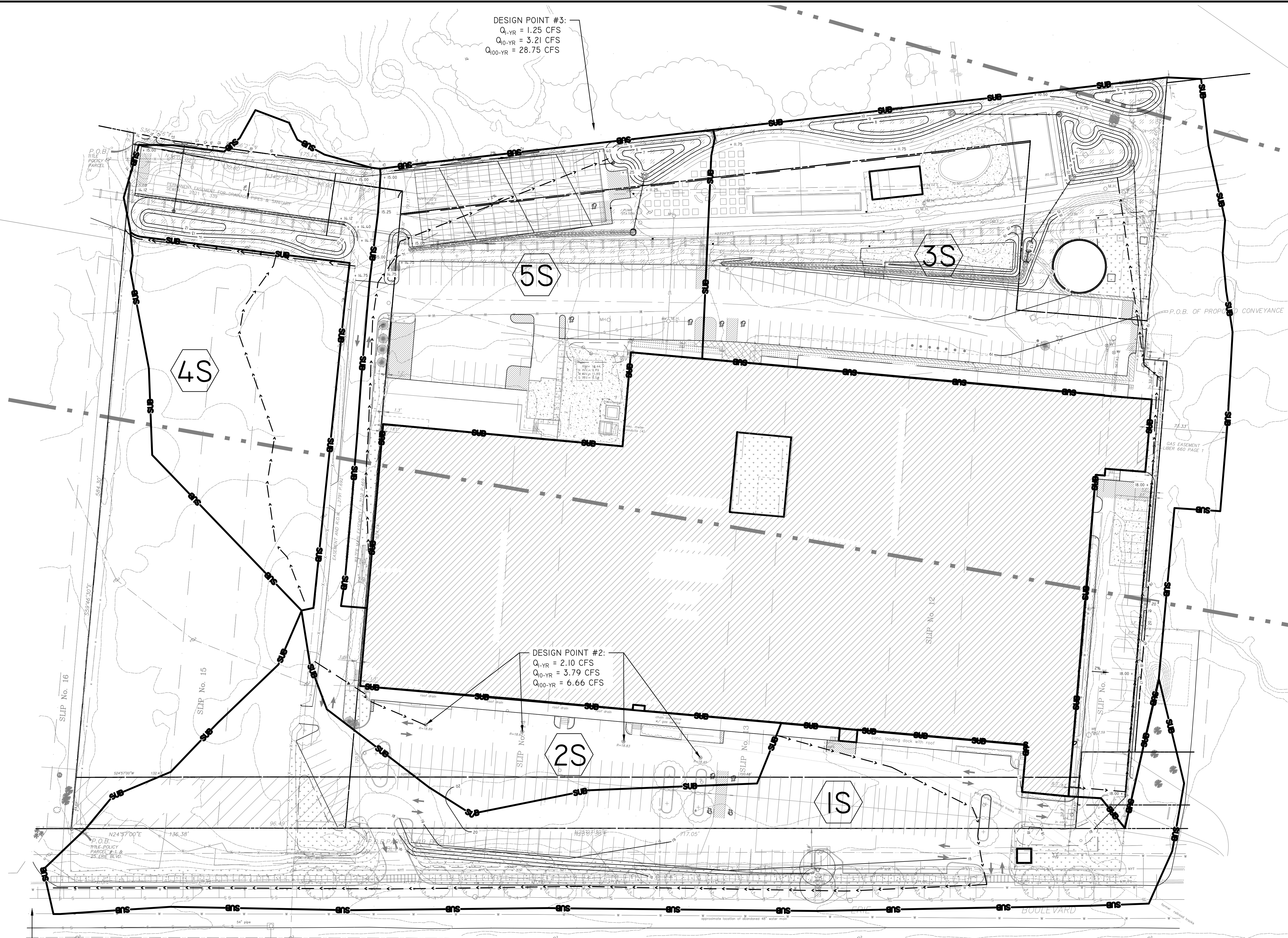
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SAVE DATE: 09/28/2021 10:53 AM
FILE NAME: 2 PRE-CONSTRUCTION SUBCATCHMENTS PLAN.DWG

DESIGN BY: MH/JN
 DRAWN BY: MH/JN
 CHECKED BY: JN

DESIGN POINT #3:
 $Q_{1-YR} = 1.25$ CFS
 $Q_{10-YR} = 3.21$ CFS
 $Q_{100-YR} = 28.75$ CFS

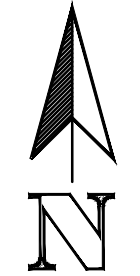
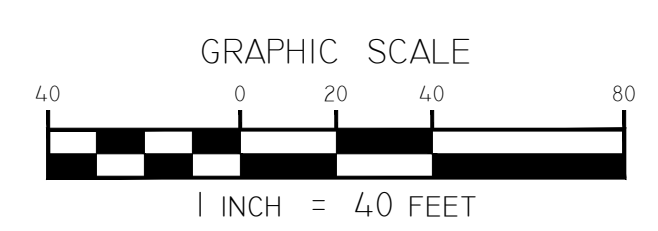
DESIGN POINT #2:
 $Q_{1-YR} = 2.10$ CFS
 $Q_{10-YR} = 3.79$ CFS
 $Q_{100-YR} = 6.66$ CFS

DESIGN POINT #1:
 $Q_{1-YR} = 3.75$ CFS
 $Q_{10-YR} = 9.20$ CFS
 $Q_{100-YR} = 19.28$ CFS



LEGEND:

- SUBCATCHMENT LABEL
- SUBCATCHMENT BOUNDARY
- TIME OF CONCENTRATION FLOW PATH



MAP REFERENCE:
 BASE SURVEY INFORMATION OBTAINED FROM TAX PARCEL NO. 65.16-5-4-1 AND 65.16-5-4-2, CITY OF ALBANY, ALBANY COUNTY, NEW YORK, SURVEY PRODUCED BY HERSHBERG & HERSHBERG CONSULTING AND LAND SURVEYORS ON 11/23/2020 AND 7/27/2021.

DIG SAFE NOTE:
 THIS PLAN SET WAS DRAFTED WITHOUT THE BENEFIT OF "DIG SAFE" MARKINGS. UTILITIES SHOWN ARE NOT WARRANTED TO BE EXACT OR COMPLETE. THE CONTRACTOR SHALL CONTACT "DIG SAFE" AT 811 BEFORE COMMENCING ANY WORK AND SHALL PRESERVE EXISTING UTILITIES WHICH ARE NOT SPECIFIED TO BE REMOVED IN THIS PLAN SET.

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 Landscape Architecture + Engineering, DPC
STUDIO A
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 MAILING:
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 SARATOGA SPRINGS, NY 12866
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REVISIONS	DATE	DESCRIPTION	CITY COMMENTS	REVISIONS PER CLIENT
	08/30/21			
	09/28/21			

PREPARED FOR
 REDBURN DEVELOPMENT
 204 LAFAYETTE STREET
 SCHENECTADY, NY 12305

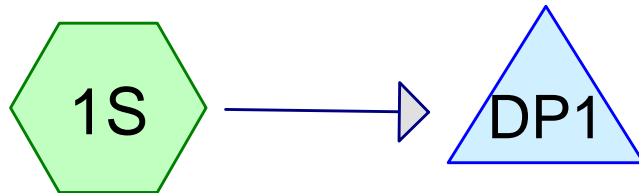
PROJECT
 HISTORIC REDEVELOPMENT OF 19 ERIE BOULEVARD
 DRAWING TITLE
 POST-CONSTRUCTION SUBCATCHMENTS PLAN

DATE: 09/28/2021
 PROJECT NO. 21013
 DRAWING NO. SC-2
 DWG 2 OF 2

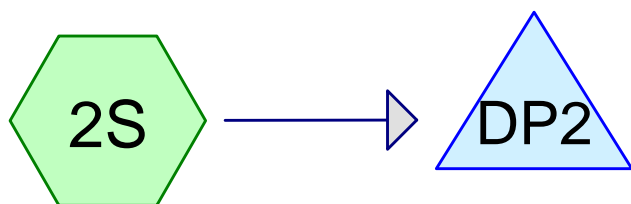
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APPENDIX D
STORMWATER CALCULATIONS

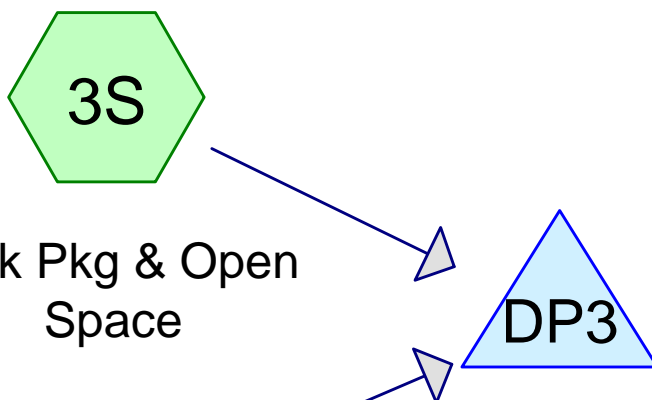
EXISTING CONDITIONS



Erie Blvd & Front Pkg Lot Design Point 1



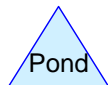
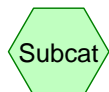
Front Pkg Lot Design Point 2



Back Pkg & Open Space

Design Point 3

Huck Finns Playland



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Type II 24-hr 1-yr Rainfall=2.24"

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Summary for Subcatchment 1S: Erie Blvd & Front Pkg Lot

Runoff = 4.44 cfs @ 12.01 hrs, Volume= 10,476 cf, Depth= 0.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.24"

Area (sf)	CN	Description
58,811	68	<50% Grass cover, Poor, HSG A
68,188	98	Paved parking, HSG A
* 1,663	98	Unconnected pavement, HSG A - Conc. Pad
* 8,240	81	Urban industrial, 72% imp, HSG A - F.W. Webb Company
136,902	84	Weighted Average
61,118		44.64% Pervious Area
75,784		55.36% Impervious Area
1,663		2.19% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	100	0.0100	0.95		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 2.63"
1.3	139	0.0074	1.75		Shallow Concentrated Flow, Parking Lot Paved Kv= 20.3 fps
6.4	800	0.0054	2.09	10.46	Channel Flow, Erie Blvd Swale Area= 5.0 sf Perim= 40.2' r= 0.12' n= 0.013 Asphalt, smooth
9.5	1,039	Total			

Summary for Subcatchment 2S: Front Pkg Lot

Runoff = 2.23 cfs @ 11.90 hrs, Volume= 4,584 cf, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.24"

Area (sf)	CN	Description
495	49	50-75% Grass cover, Fair, HSG A
28,344	98	Paved parking, HSG A
28,839	97	Weighted Average
495		1.72% Pervious Area
28,344		98.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0200	1.09		Sheet Flow, Driveway and parking lot Smooth surfaces n= 0.011 P2= 2.63"
0.3	60	0.0200	2.87		Shallow Concentrated Flow, Parking lot Paved Kv= 20.3 fps
1.1	110	Total			

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Type II 24-hr 1-yr Rainfall=2.24"

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Summary for Subcatchment 3S: Back Pkg & Open Space

Runoff = 2.53 cfs @ 12.04 hrs, Volume= 7,088 cf, Depth= 0.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.24"

Area (sf)	CN	Description
* 1,622	98	Unconnected pavement, HSG A - Water Tower
* 10,884	98	Unconnected pavement, HSG A - Asphalt Path
69,972	98	Paved parking, HSG A
* 94,253	49	50-75% Grass cover, Fair, HSG A - Open Space
* 19,733	81	Urban industrial, 72% imp, HSG A - Neighboring Prop.
196,464	73	Weighted Average
99,778		50.79% Pervious Area
96,686		49.21% Impervious Area
12,506		12.93% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	274	0.0255	2.70	8.09	Channel Flow, Driveway swale Area= 3.0 sf Perim= 24.0' r= 0.13' n= 0.022 Earth, clean & straight
8.6	373	0.0107	0.72		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
10.3	647	Total			

Summary for Subcatchment 4S: Huck Finns Playland

Runoff = 1.45 cfs @ 11.94 hrs, Volume= 2,740 cf, Depth= 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.24"

Area (sf)	CN	Description
* 38,989	81	Urban industrial, 72% imp, HSG A - Huck Finns Playland
13,655	68	<50% Grass cover, Poor, HSG A
52,644	78	Weighted Average
24,572		46.68% Pervious Area
28,072		53.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0300	1.47		Sheet Flow, Huck Finn's Playland Smooth surfaces n= 0.011 P2= 2.63"
1.2	186	0.0175	2.69		Shallow Concentrated Flow, Huck Finn's Playland Paved Kv= 20.3 fps
0.5	51	0.0702	1.85		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.8	337	Total			

Summary for Pond DP1: Design Point 1

Inflow Area = 136,902 sf, 55.36% Impervious, Inflow Depth = 0.92" for 1-yr event
Inflow = 4.44 cfs @ 12.01 hrs, Volume= 10,476 cf
Primary = 4.44 cfs @ 12.01 hrs, Volume= 10,476 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond DP2: Design Point 2

Inflow Area = 28,839 sf, 98.28% Impervious, Inflow Depth = 1.91" for 1-yr event
Inflow = 2.23 cfs @ 11.90 hrs, Volume= 4,584 cf
Primary = 2.23 cfs @ 11.90 hrs, Volume= 4,584 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond DP3: Design Point 3

Inflow Area = 249,108 sf, 50.08% Impervious, Inflow Depth = 0.47" for 1-yr event
Inflow = 3.20 cfs @ 12.00 hrs, Volume= 9,828 cf
Primary = 3.20 cfs @ 12.00 hrs, Volume= 9,828 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

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Type II 24-hr 10-yr Rainfall=3.80"

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Summary for Subcatchment 1S: Erie Blvd & Front Pkg Lot

Runoff = 10.60 cfs @ 12.01 hrs, Volume= 25,050 cf, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.80"

Area (sf)	CN	Description
58,811	68	<50% Grass cover, Poor, HSG A
68,188	98	Paved parking, HSG A
* 1,663	98	Unconnected pavement, HSG A - Conc. Pad
* 8,240	81	Urban industrial, 72% imp, HSG A - F.W. Webb Company
136,902	84	Weighted Average
61,118		44.64% Pervious Area
75,784		55.36% Impervious Area
1,663		2.19% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	100	0.0100	0.95		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 2.63"
1.3	139	0.0074	1.75		Shallow Concentrated Flow, Parking Lot Paved Kv= 20.3 fps
6.4	800	0.0054	2.09	10.46	Channel Flow, Erie Blvd Swale Area= 5.0 sf Perim= 40.2' r= 0.12' n= 0.013 Asphalt, smooth
9.5	1,039	Total			

Summary for Subcatchment 2S: Front Pkg Lot

Runoff = 3.90 cfs @ 11.90 hrs, Volume= 8,297 cf, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.80"

Area (sf)	CN	Description
495	49	50-75% Grass cover, Fair, HSG A
28,344	98	Paved parking, HSG A
28,839	97	Weighted Average
495		1.72% Pervious Area
28,344		98.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0200	1.09		Sheet Flow, Driveway and parking lot Smooth surfaces n= 0.011 P2= 2.63"
0.3	60	0.0200	2.87		Shallow Concentrated Flow, Parking lot Paved Kv= 20.3 fps
1.1	110	Total			

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Type II 24-hr 10-yr Rainfall=3.80"

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Summary for Subcatchment 3S: Back Pkg & Open Space

Runoff = 9.25 cfs @ 12.03 hrs, Volume= 22,685 cf, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.80"

Area (sf)	CN	Description
* 1,622	98	Unconnected pavement, HSG A - Water Tower
* 10,884	98	Unconnected pavement, HSG A - Asphalt Path
69,972	98	Paved parking, HSG A
* 94,253	49	50-75% Grass cover, Fair, HSG A - Open Space
* 19,733	81	Urban industrial, 72% imp, HSG A - Neighboring Prop.
196,464	73	Weighted Average
99,778		50.79% Pervious Area
96,686		49.21% Impervious Area
12,506		12.93% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	274	0.0255	2.70	8.09	Channel Flow, Driveway swale Area= 3.0 sf Perim= 24.0' r= 0.13' n= 0.022 Earth, clean & straight
8.6	373	0.0107	0.72		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
10.3	647	Total			

Summary for Subcatchment 4S: Huck Finns Playland

Runoff = 4.07 cfs @ 11.94 hrs, Volume= 7,585 cf, Depth= 1.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.80"

Area (sf)	CN	Description
* 38,989	81	Urban industrial, 72% imp, HSG A - Huck Finns Playland
13,655	68	<50% Grass cover, Poor, HSG A
52,644	78	Weighted Average
24,572		46.68% Pervious Area
28,072		53.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0300	1.47		Sheet Flow, Huck Finn's Playland Smooth surfaces n= 0.011 P2= 2.63"
1.2	186	0.0175	2.69		Shallow Concentrated Flow, Huck Finn's Playland Paved Kv= 20.3 fps
0.5	51	0.0702	1.85		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.8	337	Total			

Summary for Pond DP1: Design Point 1

Inflow Area = 136,902 sf, 55.36% Impervious, Inflow Depth = 2.20" for 10-yr event
Inflow = 10.60 cfs @ 12.01 hrs, Volume= 25,050 cf
Primary = 10.60 cfs @ 12.01 hrs, Volume= 25,050 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond DP2: Design Point 2

Inflow Area = 28,839 sf, 98.28% Impervious, Inflow Depth = 3.45" for 10-yr event
Inflow = 3.90 cfs @ 11.90 hrs, Volume= 8,297 cf
Primary = 3.90 cfs @ 11.90 hrs, Volume= 8,297 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond DP3: Design Point 3

Inflow Area = 249,108 sf, 50.08% Impervious, Inflow Depth = 1.46" for 10-yr event
Inflow = 11.42 cfs @ 11.99 hrs, Volume= 30,270 cf
Primary = 11.42 cfs @ 11.99 hrs, Volume= 30,270 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

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Type II 24-hr 100-yr Rainfall=6.49"

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Summary for Subcatchment 1S: Erie Blvd & Front Pkg Lot

Runoff = 21.85 cfs @ 12.01 hrs, Volume= 53,130 cf, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.49"

Area (sf)	CN	Description
58,811	68	<50% Grass cover, Poor, HSG A
68,188	98	Paved parking, HSG A
* 1,663	98	Unconnected pavement, HSG A - Conc. Pad
* 8,240	81	Urban industrial, 72% imp, HSG A - F.W. Webb Company
136,902	84	Weighted Average
61,118		44.64% Pervious Area
75,784		55.36% Impervious Area
1,663		2.19% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	100	0.0100	0.95		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 2.63"
1.3	139	0.0074	1.75		Shallow Concentrated Flow, Parking Lot Paved Kv= 20.3 fps
6.4	800	0.0054	2.09	10.46	Channel Flow, Erie Blvd Swale Area= 5.0 sf Perim= 40.2' r= 0.12' n= 0.013 Asphalt, smooth
9.5	1,039	Total			

Summary for Subcatchment 2S: Front Pkg Lot

Runoff = 6.73 cfs @ 11.90 hrs, Volume= 14,739 cf, Depth= 6.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.49"

Area (sf)	CN	Description
495	49	50-75% Grass cover, Fair, HSG A
28,344	98	Paved parking, HSG A
28,839	97	Weighted Average
495		1.72% Pervious Area
28,344		98.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0200	1.09		Sheet Flow, Driveway and parking lot Smooth surfaces n= 0.011 P2= 2.63"
0.3	60	0.0200	2.87		Shallow Concentrated Flow, Parking lot Paved Kv= 20.3 fps
1.1	110	Total			

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Type II 24-hr 100-yr Rainfall=6.49"

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Summary for Subcatchment 3S: Back Pkg & Open Space

Runoff = 23.60 cfs @ 12.02 hrs, Volume= 57,292 cf, Depth= 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.49"

Area (sf)	CN	Description
* 1,622	98	Unconnected pavement, HSG A - Water Tower
* 10,884	98	Unconnected pavement, HSG A - Asphalt Path
69,972	98	Paved parking, HSG A
* 94,253	49	50-75% Grass cover, Fair, HSG A - Open Space
* 19,733	81	Urban industrial, 72% imp, HSG A - Neighboring Prop.
196,464	73	Weighted Average
99,778		50.79% Pervious Area
96,686		49.21% Impervious Area
12,506		12.93% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	274	0.0255	2.70	8.09	Channel Flow, Driveway swale Area= 3.0 sf Perim= 24.0' r= 0.13' n= 0.022 Earth, clean & straight
8.6	373	0.0107	0.72		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
10.3	647	Total			

Summary for Subcatchment 4S: Huck Finns Playland

Runoff = 9.15 cfs @ 11.93 hrs, Volume= 17,614 cf, Depth= 4.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.49"

Area (sf)	CN	Description
* 38,989	81	Urban industrial, 72% imp, HSG A - Huck Finns Playland
13,655	68	<50% Grass cover, Poor, HSG A
52,644	78	Weighted Average
24,572		46.68% Pervious Area
28,072		53.32% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0300	1.47		Sheet Flow, Huck Finn's Playland Smooth surfaces n= 0.011 P2= 2.63"
1.2	186	0.0175	2.69		Shallow Concentrated Flow, Huck Finn's Playland Paved Kv= 20.3 fps
0.5	51	0.0702	1.85		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
2.8	337	Total			

Summary for Pond DP1: Design Point 1

Inflow Area = 136,902 sf, 55.36% Impervious, Inflow Depth = 4.66" for 100-yr event
Inflow = 21.85 cfs @ 12.01 hrs, Volume= 53,130 cf
Primary = 21.85 cfs @ 12.01 hrs, Volume= 53,130 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond DP2: Design Point 2

Inflow Area = 28,839 sf, 98.28% Impervious, Inflow Depth = 6.13" for 100-yr event
Inflow = 6.73 cfs @ 11.90 hrs, Volume= 14,739 cf
Primary = 6.73 cfs @ 11.90 hrs, Volume= 14,739 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond DP3: Design Point 3

Inflow Area = 249,108 sf, 50.08% Impervious, Inflow Depth = 3.61" for 100-yr event
Inflow = 28.76 cfs @ 11.99 hrs, Volume= 74,906 cf
Primary = 28.76 cfs @ 11.99 hrs, Volume= 74,906 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

POST-CONSTRUCTION

Is this project subject to Chapter 10 of the NYS Design Manual (i.e. WQv is equal to post-development 1 year runoff volume)?.....

Design Point:		
P=	1.20	inch

Breakdown of Subcatchments						
Catchment Number	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (ft ³)	Description
1	2.82	1.80	64%	0.62	7,671	
2	0.66	0.62	94%	0.90	2,574	
3	2.85	1.80	63%	0.62	7,677	
4	0.58	0.36	62%	0.61	1,538	
5	1.56	1.31	84%	0.81	5,491	
6						
7						
8						
9						
10						
Subtotal (1-30)	8.47	5.89	70%	0.68	24,952	Subtotal 1
Total	8.47	5.89	70%	0.68	24,952	Initial WQv

Identify Runoff Reduction Techniques By Area			
Technique	Total Contributing Area	Contributing Impervious Area	Notes
	(Acre)	(Acre)	
Conservation of Natural Areas	0.00	0.00	minimum 10,000 sf
Riparian Buffers	0.00	0.00	maximum contributing length 75 feet to 150 feet
Filter Strips	0.00	0.00	
Tree Planting	0.00	0.00	Up to 100 sf directly connected impervious area may be subtracted per tree
Total	0.00	0.00	

Recalculate WQv after application of Area Reduction Techniques					
	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Runoff Coefficient Rv	WQv (ft ³)
"<<Initial WQv"	8.47	5.89	70%	0.68	24,952
Subtract Area	0.00	0.00			
WQv adjusted after Area Reductions	8.47	5.89	70%	0.68	24,952
Disconnection of Rooftops		0.00			
Adjusted WQv after Area Reduction and Rooftop Disconnect	8.47	5.89	70%	0.68	24,952
WQv reduced by Area Reduction techniques					0

Minimum RRv

Enter the Soils Data for the site

Soil Group	Acres	S
A	8.47	55%
B		40%
C		30%
D		20%
Total Area	8.47	

Calculate the Minimum RRv

S =	0.55	
Impervious =	5.89	<i>acre</i>
Precipitation	1.2	<i>in</i>
Rv	0.95	
Minimum RRv	13,415	<i>ft3</i>
	0.31	<i>af</i>

Infiltration Basin Worksheet

Design Point:	3						
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (ft ³)	Precipitation (in)	Description
3	2.85	1.80	0.63	0.62	7677.45	1.20	
Enter Impervious Area Reduced by Disconnection of Roofs etc.			63%	0.62	7,677	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						ft ³	
Pretreatment Techniques to Prevent Clogging							
Infiltration Rate			5.67	in/hour	Okay		
Pretreatment Sizing			100	% WQv	25% minimum; 50% if >2 in/hr 100% if >5in/hour		
Pretreatment Required Volume			7,677	ft ³			
Pretreatment Provided			9,144	ft ³			
Pretreatment Techniques utilized							
Size An Infiltration Basin							
Design Volume	7,677	ft ³	WQv				
Basal Area Required	2,559	ft ²	<i>Infiltration practices shall be designed to exfiltrate the entire WQv through the floor of each practice.</i>				
Basal Area Provided	2,947	ft ²					
Design Depth	3.00	ft					
Volume Provided	8,841	ft ³	<i>Storage Volume provided in infiltration basin area (not including pretreatment.</i>				
Determine Runoff Reduction							
RRv	7,677	ft³	90% of the storage provided in the basin or WQv whichever is smaller				
Volume Treated	0	ft ³	<i>This is the portion of the WQv that is not reduced/infiltrated</i>				
Sizing v	OK		<i>The infiltration basin must provide storage equal to or greater than the WQv of the contributing area.</i>				

Infiltration Basin Worksheet

Design Point:	3						
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (ft ³)	Precipitation (in)	Description
5	1.56	1.31	0.84	0.81	5491.17	1.20	
Enter Impervious Area Reduced by Disconnection of Practice			84%	0.81	5,491	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						ft ³	
Pretreatment Techniques to Prevent Clogging							
Infiltration Rate			5.67	in/hour	<i>Okay</i>		
Pretreatment Sizing			100	% WQv	25% minimum; 50% if >2 in/hr 100% if >5in/hour		
Pretreatment Required Volume			5,491	ft ³			
Pretreatment Provided			6,186	ft ³			
Pretreatment Techniques utilized							
Size An Infiltration Basin							
Design Volume	5,491	ft ³	WQv				
Basal Area Required	3,661	ft ²	<i>Infiltration practices shall be designed to exfiltrate the entire WQv through the floor of each practice.</i>				
Basal Area Provided	6,977	ft ²					
Design Depth	1.50	ft					
Volume Provided	10,466	ft ³	<i>Storage Volume provided in infiltration basin area (not including pretreatment.</i>				
Determine Runoff Reduction							
RRv	5,491	ft³	90% of the storage provided in the basin or WQv whichever is smaller				
Volume Treated	0	ft ³	<i>This is the portion of the WQv that is not reduced/infiltrated</i>				
Sizing v	OK	<i>The infiltration basin must provide storage equal to or greater than the WQv of the contributing area.</i>					

Infiltrating Bioretention Worksheet

(For use on HSG A or B Soils without underdrains)

$$WQv \leq VSM + VDL + (DP \times ARG)$$

$$VSM = ARG \times DSM \times nSM$$

$$VDL \text{ (optional)} = ARG \times DDL \times nDL$$

Design Point:	3						
Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	Total Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (ft ³)	Precipitation (in)	Description
4	0.58	0.36	0.62	0.61	1537.67	1.20	
Enter Impervious Area Reduced by Disconnection of Rooftops			62%	0.61	1,538	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						ft ³	
Infiltrating Bioretention Parameters							
Treatment Volume		WQv	1,538	ft ³			
Enter depth of soil Media		DSM	2.50	ft	2.5 - 4 ft		
Enter depth of drainage		DDL	0.5	ft	≥ 0.5 ft		
Enter ponding depth above		DP	1.5	ft	≤ 0.5		
Enter porosity of Soil Media		nSM	0.40		≥ 20%		
Enter porosity of Drainage		nDL	0.40		≥ 40%		
Required Bioretention Area		ARG	570	sf			
Bioretention Area Provided			2435	ft ²			
Native Soil Infiltration Rate			5.67	in/hr	Okay		
Are you using underdrains?			No				
Total Volume Provided			6,575	ft ³	Sum of storage Volume Provided in each layer		
Determine Runoff Reduction							
Runoff Reduction			1,538	ft³	<i>This is 80% of storage volume provided or WQv whichever is less</i>		
Volume Treated			0	ft ³	<i>This is the portion of the WQv that is not reduced in the practice</i>		
Sizing v			OK		<i>Check to be sure Area provided ≥ Af</i>		

Redevelopment Area (15)

$$\text{Area} = 40,700 \text{ ft}^2$$

$$WQ_v = \frac{PR_v A}{12} = \frac{1.2 [0.05 - 0.009(100\%)] 0.93 \text{ acre}}{12} = 0.088 \text{ ac-ft}$$

$$WQ_v = 3833 \text{ ft}^3$$

$$\begin{aligned} \text{Req'd Reduction per GP-0-20-001} &= 0.25(WQ_v) \\ &= 958 \text{ ft}^3 \end{aligned}$$

$$\text{Trees Req'd} = 100 \text{ ft}^2 \text{ reduction/tree}$$

Area reduction req'd

$$\frac{2875 \text{ ft}^3}{43,560} = \frac{1.2(0.95)(A)}{12}$$

$$A = 0.70 \text{ acres}$$

$$\begin{aligned} 0.93 \text{ acres} - 0.70 \text{ acres} &= 0.23 \text{ acres} (43,560) \\ &= 10,019 \text{ ft}^2 \end{aligned}$$

$$\text{Trees req'd} = \frac{10,019 \text{ ft}^2}{100 \text{ ft}^2} = 100 \text{ trees}$$

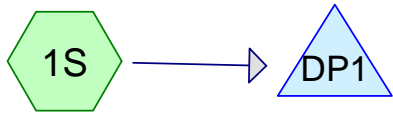
$$28 \text{ trees provided} = 2,800 \text{ ft}^2 \text{ reduced}$$

$$WQ_v \text{ w/ tree reduction} = \frac{1.2(0.95)(0.93 \text{ acres} - \frac{2800 \text{ ft}^2}{43,560 \text{ ft}^2/\text{acre}})}{12} = 3,600 \text{ ft}^3$$

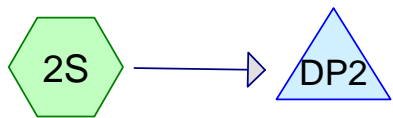
$$WQ_v - WQ_v \text{ w/ tree reduction} = 233 \text{ ft}^3$$

$$\text{Remaining } WQ_v \text{ to be reduced} = 958 - 233 = 725 \text{ ft}^3$$

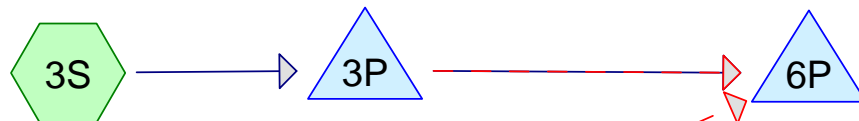
725 ft³ reduction not feasible due to exist. site constraints. However Min. RR_v criteria are met on a total off-site flow basis



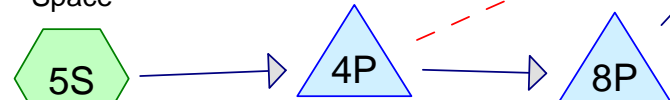
Erie Blvd & Front Pkg Lot Design Point 1



Front Pkg Lot Design Point 2

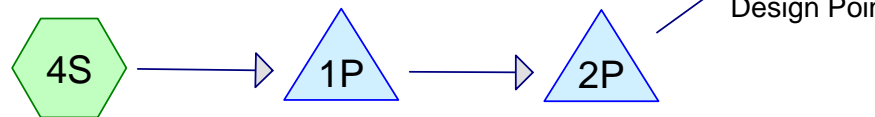


Back Pkg & Open Space Sedimentation Basin Infiltration Basin

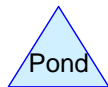
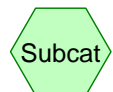


Back Pkg Sedimentation Basin Infiltrator

Back Parking Gravel Diaphragm Bioretention Basin



Design Point 3 Huck Finn's Playland



Routing Diagram for 21013_Proposed
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Type II 24-hr 1-yr Rainfall=2.24"

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Summary for Subcatchment 1S: Erie Blvd & Front Pkg Lot

Runoff = 3.75 cfs @ 12.01 hrs, Volume= 8,832 cf, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.24"

Area (sf)	CN	Description
27,557	68	<50% Grass cover, Poor, HSG A
72,937	98	Paved parking, HSG A
* 8,240	81	Urban industrial, 72% imp, HSG A - F.W. Webb
13,958	32	Woods/grass comb., Good, HSG A
122,692	83	Weighted Average
43,822		35.72% Pervious Area
78,870		64.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	100	0.0100	0.95		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 2.63"
1.2	130	0.0074	1.75		Shallow Concentrated Flow, Parking Lot Paved Kv= 20.3 fps
6.4	800	0.0054	2.09	10.46	Channel Flow, Erie Blvd Swale Area= 5.0 sf Perim= 40.2' r= 0.12' n= 0.013
9.4	1,030	Total			

Summary for Subcatchment 2S: Front Pkg Lot

Runoff = 2.10 cfs @ 11.90 hrs, Volume= 4,116 cf, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.24"

Area (sf)	CN	Description
495	49	50-75% Grass cover, Fair, HSG A
27,227	98	Paved parking, HSG A
* 1,117	49	50-75% Grass cover, Fair, HSG A - Plant Beds
28,839	95	Weighted Average
1,612		5.59% Pervious Area
27,227		94.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0200	1.09		Sheet Flow, Driveay and parking lot Smooth surfaces n= 0.011 P2= 2.63"
0.3	60	0.0200	2.87		Shallow Concentrated Flow, Parking Lot Paved Kv= 20.3 fps
1.1	110	Total			

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Type II 24-hr 1-yr Rainfall=2.24"

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Summary for Subcatchment 3S: Back Pkg & Open Space

Runoff = 3.71 cfs @ 11.94 hrs, Volume= 6,910 cf, Depth= 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.24"

Area (sf)	CN	Description
* 1,622	98	Unconnected pavement, HSG A - Water Tower
* 8,331	98	Unconnected pavement, HSG A - Asphalt Path
45,420	98	Paved parking, HSG A
* 40,010	49	50-75% Grass cover, Fair, HSG A - Open Space
* 19,733	81	Urban industrial, 72% imp, HSG A - Neighboring Prop.
* 1,000	98	Water Surface, HSG A - Pool
* 1,032	98	Roofs, HSG A - Pool House
* 1,170	98	Unconnected pavement, HSG A - Bocce Ball Court
* 1,800	98	Unconnected pavement, HSG A - Volleyball Court
* 3,950	98	Unconnected pavement, HSG A - Pool Apron
124,068	79	Weighted Average
45,535		36.70% Pervious Area
78,533		63.30% Impervious Area
16,873		21.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	50	0.0150	2.49		Shallow Concentrated Flow, Paking lot to french drain Paved Kv= 20.3 fps
2.0	530	0.0100	4.50	1.57	Pipe Channel, Trench drain to forebay 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
2.3	580	Total			

Summary for Subcatchment 4S: Back Parking

Runoff = 0.47 cfs @ 11.92 hrs, Volume= 923 cf, Depth= 0.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.24"

Area (sf)	CN	Description
9,485	30	Meadow, non-grazed, HSG A
16,110	98	Paved parking, HSG A
25,595	73	Weighted Average
9,485		37.06% Pervious Area
16,110		62.94% Impervious Area

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Type II 24-hr 1-yr Rainfall=2.24"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	40	0.0200	1.04		Sheet Flow, Parking Smooth surfaces n= 0.011 P2= 2.63"
0.3	14	0.0100	0.70		Shallow Concentrated Flow, Parking lot to bioretention Short Grass Pasture Kv= 7.0 fps
0.9	54	Total			

Summary for Subcatchment 5S: Back Pkg

Runoff = 3.33 cfs @ 11.93 hrs, Volume= 6,223 cf, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.24"

Area (sf)	CN	Description
* 57,252	98	Impervious surfaces, HSG A
10,828	30	Meadow, non-grazed, HSG A
68,080	87	Weighted Average
10,828		15.90% Pervious Area
57,252		84.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	269	0.0186	2.77		Shallow Concentrated Flow, Driveway to parking area to catch Paved Kv= 20.3 fps
0.5	190	0.0100	5.90	4.63	Pipe Channel, Catch basin to forebay 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
2.1	459	Total			

Summary for Subcatchment 7S: Huck Finn's Playland

Runoff = 1.25 cfs @ 11.96 hrs, Volume= 2,475 cf, Depth= 0.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-yr Rainfall=2.24"

Area (sf)	CN	Description
* 38,989	81	Urban industrial, 72% imp, HSG A - Huck Finn's Playland
10,917		28.00% Pervious Area
28,072		72.00% Impervious Area

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Type II 24-hr 1-yr Rainfall=2.24"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0300	1.47		Sheet Flow, Huck Finn's Playland Smooth surfaces n= 0.011 P2= 2.63"
1.3	213	0.0175	2.69		Shallow Concentrated Flow, Huck Finn's Playland Paved Kv= 20.3 fps
2.1	125	0.0100	0.98	1.96	Channel Flow, Diversion swale Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.080 Earth, long dense weeds
4.5	438	Total			

Summary for Pond 1P: Gravel Diaphragm

Inflow Area = 25,595 sf, 62.94% Impervious, Inflow Depth = 0.43" for 1-yr event
 Inflow = 0.47 cfs @ 11.92 hrs, Volume= 923 cf
 Primary = 0.47 cfs @ 11.92 hrs, Volume= 923 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 2P: Bioretention Basin

Inflow Area = 25,595 sf, 62.94% Impervious, Inflow Depth = 0.43" for 1-yr event
 Inflow = 0.47 cfs @ 11.92 hrs, Volume= 923 cf
 Outflow = 0.12 cfs @ 11.85 hrs, Volume= 923 cf, Atten= 75%, Lag= 0.0 min
 Discarded = 0.12 cfs @ 11.85 hrs, Volume= 923 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 9.46' @ 12.04 hrs Surf.Area= 891 sf Storage= 163 cf

Plug-Flow detention time= 7.4 min calculated for 923 cf (100% of inflow)
 Center-of-Mass det. time= 7.3 min (893.6 - 886.3)

Volume #1	Invert	Avail.Storage	Storage Description			
	9.00'	5,421 cf	Custom Stage Data (Irregular) Listed below			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
9.00	891	239.0	0.0	0	0	891
9.50	891	239.0	40.0	178	178	1,011
12.00	891	239.0	40.0	891	1,069	1,608
12.25	1,671	363.0	100.0	315	1,384	7,549
12.50	1,671	363.0	100.0	418	1,802	7,640
13.00	1,853	366.0	100.0	881	2,683	7,892
13.25	2,502	377.0	100.0	542	3,225	8,549
13.50	2,786	381.0	100.0	661	3,886	8,808
14.00	3,365	391.0	100.0	1,535	5,421	9,452

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Type II 24-hr 1-yr Rainfall=2.24"

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Device	Routing	Invert	Outlet Devices
#1	Primary	12.50'	8.0" Round Culvert L= 57.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 12.50' / 11.93' S= 0.0100 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.35 sf
#2	Device 1	13.75'	8.0" Horiz. Office/Grate C= 0.600 Limited to weir flow at low heads
#3	Discarded	9.00'	5.670 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.12 cfs @ 11.85 hrs HW=9.08' (Free Discharge)

↳ **3=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=9.00' (Free Discharge)

↳ **1=Culvert** (Controls 0.00 cfs)

↳ **2=Office/Grate** (Controls 0.00 cfs)

Summary for Pond 3P: Sedimentation Basin

Inflow Area = 124,068 sf, 63.30% Impervious, Inflow Depth = 0.67" for 1-yr event
 Inflow = 3.71 cfs @ 11.94 hrs, Volume= 6,910 cf
 Outflow = 0.06 cfs @ 18.86 hrs, Volume= 1,039 cf, Atten= 98%, Lag= 415.7 min
 Primary = 0.06 cfs @ 18.86 hrs, Volume= 1,039 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 10.66' @ 18.86 hrs Surf.Area= 2,817 sf Storage= 5,906 cf

Plug-Flow detention time= 566.7 min calculated for 1,039 cf (15% of inflow)
 Center-of-Mass det. time= 412.5 min (1,272.9 - 860.4)

Volume	Invert	Avail.Storage	Storage Description			
#1	7.00'	9,427 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
7.00	709	112.0	0	0	709	
8.00	1,091	135.0	893	893	1,178	
9.00	1,655	190.0	1,363	2,256	2,609	
10.00	2,287	276.0	1,963	4,219	5,807	
11.00	3,109	219.0	2,688	6,906	8,066	
11.50	3,445	228.0	1,638	8,544	8,405	
11.75	3,618	233.0	883	9,427	8,597	

Device	Routing	Invert	Outlet Devices
#1	Primary	8.75'	12.0" Round Culvert L= 88.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 8.75' / 8.00' S= 0.0085 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	10.65'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	10.65'	5.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50

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Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=0.04 cfs @ 18.86 hrs HW=10.66' (Free Discharge)

- 1=Culvert (Passes 0.03 cfs of 3.97 cfs potential flow)
- 2=Orifice/Grate (Weir Controls 0.03 cfs @ 0.36 fps)
- 3=Broad-Crested Rectangular Weir (Weir Controls 0.02 cfs @ 0.27 fps)

Summary for Pond 4P: Sedimentation Basin

Inflow Area = 68,080 sf, 84.10% Impervious, Inflow Depth = 1.10" for 1-yr event
 Inflow = 3.33 cfs @ 11.93 hrs, Volume= 6,223 cf
 Outflow = 0.12 cfs @ 13.54 hrs, Volume= 2,179 cf, Atten= 96%, Lag= 96.7 min
 Primary = 0.12 cfs @ 13.54 hrs, Volume= 2,179 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 10.53' @ 13.54 hrs Surf.Area= 2,210 sf Storage= 4,108 cf

Plug-Flow detention time= 346.0 min calculated for 2,177 cf (35% of inflow)
 Center-of-Mass det. time= 218.3 min (1,046.4 - 828.1)

Volume	Invert	Avail.Storage	Storage Description			
#1	7.00'	6,400 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
7.00	315	81.0	0	0	315	
8.00	720	124.0	504	504	1,024	
9.00	1,244	169.0	970	1,474	2,083	
10.00	1,883	204.0	1,553	3,026	3,139	
11.00	2,523	223.0	2,195	5,222	3,819	
11.50	2,196	213.0	1,179	6,400	4,182	

Device	Routing	Invert	Outlet Devices
#1	Primary	8.75'	18.0" Round Culvert L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 8.75' / 8.65' S= 0.0100 1/8" Cc= 0.900 n= 0.010, Flow Area= 1.77 sf
#2	Device 1	10.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Secondary	10.75'	10.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

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Primary OutFlow Max=0.10 cfs @ 13.54 hrs HW=10.53' (Free Discharge)

↳ **1=Culvert** (Passes 0.10 cfs of 7.36 cfs potential flow)

↳ **2=Orifice/Grate** (Weir Controls 0.10 cfs @ 0.56 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=7.00' (Free Discharge)

↳ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 6P: Infiltration Basin

Inflow Area = 192,148 sf, 70.67% Impervious, Inflow Depth = 0.06" for 1-yr event
 Inflow = 0.06 cfs @ 18.86 hrs, Volume= 1,039 cf
 Outflow = 0.06 cfs @ 18.96 hrs, Volume= 1,039 cf, Atten= 1%, Lag= 5.9 min
 Discarded = 0.06 cfs @ 18.96 hrs, Volume= 1,039 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 8.02' @ 18.96 hrs Surf.Area= 805 sf Storage= 14 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 3.7 min (1,276.7 - 1,272.9)

Volume	Invert	Avail.Storage	Storage Description			
#1	8.00'	8,385 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
8.00	790	206.0	0	0	790	
9.00	1,880	336.0	1,296	1,296	6,404	
10.00	3,358	456.0	2,584	3,880	13,977	
11.00	5,759	786.0	4,505	8,385	46,599	

Device	Routing	Invert	Outlet Devices																
#1	Discarded	8.00'	5.670 in/hr Exfiltration over Surface area																
#2	Primary	10.50'	18.0' long x 3.0' breadth Broad-Crested Rectangular Weir																
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	1.80	2.00	2.50	3.00	3.50	4.00	4.50	
			Coef. (English)	2.44	2.58	2.68	2.67	2.65	2.64	2.64	2.64	2.68	2.68	2.72	2.81	2.92	2.97	3.07	3.32
#3	Primary	10.50'	18.0' long x 3.0' breadth Broad-Crested Rectangular Weir																
			Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	1.80	2.00	2.50	3.00	3.50	4.00	4.50	
			Coef. (English)	2.44	2.58	2.68	2.67	2.65	2.64	2.64	2.64	2.68	2.68	2.72	2.81	2.92	2.97	3.07	3.32

Discarded OutFlow Max=0.11 cfs @ 18.96 hrs HW=8.02' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=8.00' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

↳ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 8P: Infiltrator

Inflow Area = 68,080 sf, 84.10% Impervious, Inflow Depth = 0.38" for 1-yr event
 Inflow = 0.12 cfs @ 13.54 hrs, Volume= 2,179 cf
 Outflow = 0.12 cfs @ 13.59 hrs, Volume= 2,179 cf, Atten= 0%, Lag= 3.3 min
 Discarded = 0.12 cfs @ 13.59 hrs, Volume= 2,179 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 7.51' @ 13.59 hrs Surf.Area= 9,250 sf Storage= 19 cf

Plug-Flow detention time= 2.5 min calculated for 2,177 cf (100% of inflow)
 Center-of-Mass det. time= 2.5 min (1,048.9 - 1,046.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	7.50'	6,977 cf	58.92'W x 157.00'L x 3.21'H Field A 29,677 cf Overall - 12,235 cf Embedded = 17,442 cf x 40.0% Voids
#2A	8.00'	12,235 cf	Cultec R-280HD x 286 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 13 rows
		19,211 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	7.50'	5.670 in/hr Exfiltration over Surface area
#2	Primary	10.50'	24.0" Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=1.21 cfs @ 13.59 hrs HW=7.51' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 1.21 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=7.50' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond DP1: Design Point 1

Inflow Area = 122,692 sf, 64.28% Impervious, Inflow Depth = 0.86" for 1-yr event
 Inflow = 3.75 cfs @ 12.01 hrs, Volume= 8,832 cf
 Primary = 3.75 cfs @ 12.01 hrs, Volume= 8,832 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond DP2: Design Point 2

Inflow Area = 28,839 sf, 94.41% Impervious, Inflow Depth = 1.71" for 1-yr event
 Inflow = 2.10 cfs @ 11.90 hrs, Volume= 4,116 cf
 Primary = 2.10 cfs @ 11.90 hrs, Volume= 4,116 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond DP3: Design Point 3

Inflow Area = 256,732 sf, 70.10% Impervious, Inflow Depth = 0.12" for 1-yr event
Inflow = 1.25 cfs @ 11.96 hrs, Volume= 2,475 cf
Primary = 1.25 cfs @ 11.96 hrs, Volume= 2,475 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

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Summary for Subcatchment 1S: Erie Blvd & Front Pkg Lot

Runoff = 9.20 cfs @ 12.01 hrs, Volume= 21,609 cf, Depth= 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.80"

Area (sf)	CN	Description
27,557	68	<50% Grass cover, Poor, HSG A
72,937	98	Paved parking, HSG A
* 8,240	81	Urban industrial, 72% imp, HSG A - F.W. Webb
13,958	32	Woods/grass comb., Good, HSG A
122,692	83	Weighted Average
43,822		35.72% Pervious Area
78,870		64.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	100	0.0100	0.95		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 2.63"
1.2	130	0.0074	1.75		Shallow Concentrated Flow, Parking Lot Paved Kv= 20.3 fps
6.4	800	0.0054	2.09	10.46	Channel Flow, Erie Blvd Swale Area= 5.0 sf Perim= 40.2' r= 0.12' n= 0.013
9.4	1,030	Total			

Summary for Subcatchment 2S: Front Pkg Lot

Runoff = 3.79 cfs @ 11.90 hrs, Volume= 7,772 cf, Depth= 3.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.80"

Area (sf)	CN	Description
495	49	50-75% Grass cover, Fair, HSG A
27,227	98	Paved parking, HSG A
* 1,117	49	50-75% Grass cover, Fair, HSG A - Plant Beds
28,839	95	Weighted Average
1,612		5.59% Pervious Area
27,227		94.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0200	1.09		Sheet Flow, Driveay and parking lot Smooth surfaces n= 0.011 P2= 2.63"
0.3	60	0.0200	2.87		Shallow Concentrated Flow, Parking Lot Paved Kv= 20.3 fps
1.1	110	Total			

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Summary for Subcatchment 3S: Back Pkg & Open Space

Runoff = 9.99 cfs @ 11.93 hrs, Volume= 18,635 cf, Depth= 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.80"

Area (sf)	CN	Description
* 1,622	98	Unconnected pavement, HSG A - Water Tower
* 8,331	98	Unconnected pavement, HSG A - Asphalt Path
45,420	98	Paved parking, HSG A
* 40,010	49	50-75% Grass cover, Fair, HSG A - Open Space
* 19,733	81	Urban industrial, 72% imp, HSG A - Neighboring Prop.
* 1,000	98	Water Surface, HSG A - Pool
* 1,032	98	Roofs, HSG A - Pool House
* 1,170	98	Unconnected pavement, HSG A - Bocce Ball Court
* 1,800	98	Unconnected pavement, HSG A - Volleyball Court
* 3,950	98	Unconnected pavement, HSG A - Pool Apron
124,068	79	Weighted Average
45,535		36.70% Pervious Area
78,533		63.30% Impervious Area
16,873		21.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	50	0.0150	2.49		Shallow Concentrated Flow, Paking lot to french drain Paved Kv= 20.3 fps
2.0	530	0.0100	4.50	1.57	Pipe Channel, Trench drain to forebay 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
2.3	580	Total			

Summary for Subcatchment 4S: Back Parking

Runoff = 1.64 cfs @ 11.91 hrs, Volume= 2,955 cf, Depth= 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.80"

Area (sf)	CN	Description
9,485	30	Meadow, non-grazed, HSG A
16,110	98	Paved parking, HSG A
25,595	73	Weighted Average
9,485		37.06% Pervious Area
16,110		62.94% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	40	0.0200	1.04		Sheet Flow, Parking Smooth surfaces n= 0.011 P2= 2.63"
0.3	14	0.0100	0.70		Shallow Concentrated Flow, Parking lot to bioretention Short Grass Pasture Kv= 7.0 fps
0.9	54	Total			

Summary for Subcatchment 5S: Back Pkg

Runoff = 7.05 cfs @ 11.92 hrs, Volume= 13,922 cf, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.80"

Area (sf)	CN	Description
* 57,252	98	Impervious surfaces, HSG A
10,828	30	Meadow, non-grazed, HSG A
68,080	87	Weighted Average
10,828		15.90% Pervious Area
57,252		84.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	269	0.0186	2.77		Shallow Concentrated Flow, Driveway to parking area to catch Paved Kv= 20.3 fps
0.5	190	0.0100	5.90	4.63	Pipe Channel, Catch basin to forebay 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
2.1	459	Total			

Summary for Subcatchment 7S: Huck Finn's Playland

Runoff = 3.21 cfs @ 11.95 hrs, Volume= 6,350 cf, Depth= 1.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.80"

Area (sf)	CN	Description
* 38,989	81	Urban industrial, 72% imp, HSG A - Huck Finn's Playland
10,917		28.00% Pervious Area
28,072		72.00% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0300	1.47		Sheet Flow, Huck Finn's Playland Smooth surfaces n= 0.011 P2= 2.63"
1.3	213	0.0175	2.69		Shallow Concentrated Flow, Huck Finn's Playland Paved Kv= 20.3 fps
2.1	125	0.0100	0.98	1.96	Channel Flow, Diversion swale Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.080 Earth, long dense weeds
4.5	438	Total			

Summary for Pond 1P: Gravel Diaphragm

Inflow Area = 25,595 sf, 62.94% Impervious, Inflow Depth = 1.39" for 10-yr event
 Inflow = 1.64 cfs @ 11.91 hrs, Volume= 2,955 cf
 Primary = 1.64 cfs @ 11.91 hrs, Volume= 2,955 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 2P: Bioretention Basin

Inflow Area = 25,595 sf, 62.94% Impervious, Inflow Depth = 1.39" for 10-yr event
 Inflow = 1.64 cfs @ 11.91 hrs, Volume= 2,955 cf
 Outflow = 0.13 cfs @ 12.47 hrs, Volume= 2,956 cf, Atten= 92%, Lag= 34.1 min
 Discarded = 0.13 cfs @ 12.47 hrs, Volume= 2,956 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 12.02' @ 12.47 hrs Surf.Area= 966 sf Storage= 1,100 cf

Plug-Flow detention time= 74.5 min calculated for 2,953 cf (100% of inflow)
 Center-of-Mass det. time= 74.6 min (921.2 - 846.7)

Volume #1	Invert	Avail.Storage	Storage Description			
	9.00'	5,421 cf	Custom Stage Data (Irregular) Listed below			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
9.00	891	239.0	0.0	0	0	891
9.50	891	239.0	40.0	178	178	1,011
12.00	891	239.0	40.0	891	1,069	1,608
12.25	1,671	363.0	100.0	315	1,384	7,549
12.50	1,671	363.0	100.0	418	1,802	7,640
13.00	1,853	366.0	100.0	881	2,683	7,892
13.25	2,502	377.0	100.0	542	3,225	8,549
13.50	2,786	381.0	100.0	661	3,886	8,808
14.00	3,365	391.0	100.0	1,535	5,421	9,452

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Device	Routing	Invert	Outlet Devices
#1	Primary	12.50'	8.0" Round Culvert L= 57.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 12.50' / 11.93' S= 0.0100 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.35 sf
#2	Device 1	13.75'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Discarded	9.00'	5.670 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.13 cfs @ 12.47 hrs HW=12.02' (Free Discharge)

↳ **3=Exfiltration** (Exfiltration Controls 0.13 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=9.00' (Free Discharge)

↳ **1=Culvert** (Controls 0.00 cfs)

↳ **2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 3P: Sedimentation Basin

Inflow Area = 124,068 sf, 63.30% Impervious, Inflow Depth = 1.80" for 10-yr event
 Inflow = 9.99 cfs @ 11.93 hrs, Volume= 18,635 cf
 Outflow = 6.44 cfs @ 12.00 hrs, Volume= 12,827 cf, Atten= 36%, Lag= 4.1 min
 Primary = 6.44 cfs @ 12.00 hrs, Volume= 12,827 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 10.98' @ 12.00 hrs Surf.Area= 3,096 sf Storage= 6,859 cf

Plug-Flow detention time= 171.7 min calculated for 12,813 cf (69% of inflow)
 Center-of-Mass det. time= 64.8 min (895.4 - 830.6)

Volume	Invert	Avail.Storage	Storage Description			
#1	7.00'	9,427 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
7.00	709	112.0	0	0	709	
8.00	1,091	135.0	893	893	1,178	
9.00	1,655	190.0	1,363	2,256	2,609	
10.00	2,287	276.0	1,963	4,219	5,807	
11.00	3,109	219.0	2,688	6,906	8,066	
11.50	3,445	228.0	1,638	8,544	8,405	
11.75	3,618	233.0	883	9,427	8,597	

Device	Routing	Invert	Outlet Devices
#1	Primary	8.75'	12.0" Round Culvert L= 88.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 8.75' / 8.00' S= 0.0085 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	10.65'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	10.65'	5.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50

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Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=6.29 cfs @ 12.00 hrs HW=10.98' (Free Discharge)

- 1=Culvert (Passes 3.89 cfs of 4.39 cfs potential flow)
- 2=Orifice/Grate (Weir Controls 3.89 cfs @ 1.88 fps)
- 3=Broad-Crested Rectangular Weir (Weir Controls 2.40 cfs @ 1.45 fps)

Summary for Pond 4P: Sedimentation Basin

Inflow Area = 68,080 sf, 84.10% Impervious, Inflow Depth = 2.45" for 10-yr event
 Inflow = 7.05 cfs @ 11.92 hrs, Volume= 13,922 cf
 Outflow = 6.52 cfs @ 11.95 hrs, Volume= 9,869 cf, Atten= 8%, Lag= 2.1 min
 Primary = 5.14 cfs @ 11.96 hrs, Volume= 9,438 cf
 Secondary = 1.38 cfs @ 11.95 hrs, Volume= 431 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 10.90' @ 11.96 hrs Surf.Area= 2,453 sf Storage= 4,965 cf

Plug-Flow detention time= 158.3 min calculated for 9,869 cf (71% of inflow)
 Center-of-Mass det. time= 60.3 min (865.4 - 805.1)

Volume	Invert	Avail.Storage	Storage Description			
#1	7.00'	6,400 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
7.00	315	81.0	0	0	315	
8.00	720	124.0	504	504	1,024	
9.00	1,244	169.0	970	1,474	2,083	
10.00	1,883	204.0	1,553	3,026	3,139	
11.00	2,523	223.0	2,195	5,222	3,819	
11.50	2,196	213.0	1,179	6,400	4,182	

Device	Routing	Invert	Outlet Devices
#1	Primary	8.75'	18.0" Round Culvert L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 8.75' / 8.65' S= 0.0100 1/8" Cc= 0.900 n= 0.010, Flow Area= 1.77 sf
#2	Device 1	10.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Secondary	10.75'	10.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

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Type II 24-hr 10-yr Rainfall=3.80"

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Primary OutFlow Max=5.01 cfs @ 11.96 hrs HW=10.89' (Free Discharge)

↳ **1=Culvert** (Passes 5.01 cfs of 8.85 cfs potential flow)

↳ **2=Orifice/Grate** (Weir Controls 5.01 cfs @ 2.04 fps)

Secondary OutFlow Max=1.29 cfs @ 11.95 hrs HW=10.89' (Free Discharge)

↳ **3=Broad-Crested Rectangular Weir** (Weir Controls 1.29 cfs @ 0.92 fps)

Summary for Pond 6P: Infiltration Basin

Inflow Area = 192,148 sf, 70.67% Impervious, Inflow Depth = 0.83" for 10-yr event
 Inflow = 7.19 cfs @ 11.99 hrs, Volume= 13,257 cf
 Outflow = 0.49 cfs @ 13.09 hrs, Volume= 13,260 cf, Atten= 93%, Lag= 65.9 min
 Discarded = 0.49 cfs @ 13.09 hrs, Volume= 13,260 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 10.17' @ 13.09 hrs Surf.Area= 3,724 sf Storage= 4,487 cf

Plug-Flow detention time= 113.8 min calculated for 13,246 cf (100% of inflow)
 Center-of-Mass det. time= 113.7 min (1,003.3 - 889.6)

Volume	Invert	Avail.Storage	Storage Description			
#1	8.00'	8,385 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
8.00	790	206.0	0	0	790	
9.00	1,880	336.0	1,296	1,296	6,404	
10.00	3,358	456.0	2,584	3,880	13,977	
11.00	5,759	786.0	4,505	8,385	46,599	

Device	Routing	Invert	Outlet Devices															
#1	Discarded	8.00'	5.670 in/hr Exfiltration over Surface area															
#2	Primary	10.50'	18.0' long x 3.0' breadth Broad-Crested Rectangular Weir															
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00															
			2.50 3.00 3.50 4.00 4.50															
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68															
			2.72 2.81 2.92 2.97 3.07 3.32															
#3	Primary	10.50'	18.0' long x 3.0' breadth Broad-Crested Rectangular Weir															
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00															
			2.50 3.00 3.50 4.00 4.50															
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68															
			2.72 2.81 2.92 2.97 3.07 3.32															

Discarded OutFlow Max=0.49 cfs @ 13.09 hrs HW=10.17' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.49 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=8.00' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

↳ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 8P: Infiltrator

Inflow Area = 68,080 sf, 84.10% Impervious, Inflow Depth = 1.66" for 10-yr event
 Inflow = 5.14 cfs @ 11.96 hrs, Volume= 9,438 cf
 Outflow = 1.21 cfs @ 11.90 hrs, Volume= 9,438 cf, Atten= 76%, Lag= 0.0 min
 Discarded = 1.21 cfs @ 11.90 hrs, Volume= 9,438 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 8.01' @ 12.15 hrs Surf.Area= 9,250 sf Storage= 1,915 cf

Plug-Flow detention time= 9.5 min calculated for 9,428 cf (100% of inflow)
 Center-of-Mass det. time= 9.5 min (881.6 - 872.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	7.50'	6,977 cf	58.92'W x 157.00'L x 3.21'H Field A 29,677 cf Overall - 12,235 cf Embedded = 17,442 cf x 40.0% Voids
#2A	8.00'	12,235 cf	Cultec R-280HD x 286 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 13 rows
		19,211 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	7.50'	5.670 in/hr Exfiltration over Surface area
#2	Primary	10.50'	24.0" Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=1.21 cfs @ 11.90 hrs HW=7.56' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 1.21 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=7.50' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond DP1: Design Point 1

Inflow Area = 122,692 sf, 64.28% Impervious, Inflow Depth = 2.11" for 10-yr event
 Inflow = 9.20 cfs @ 12.01 hrs, Volume= 21,609 cf
 Primary = 9.20 cfs @ 12.01 hrs, Volume= 21,609 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond DP2: Design Point 2

Inflow Area = 28,839 sf, 94.41% Impervious, Inflow Depth = 3.23" for 10-yr event
 Inflow = 3.79 cfs @ 11.90 hrs, Volume= 7,772 cf
 Primary = 3.79 cfs @ 11.90 hrs, Volume= 7,772 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond DP3: Design Point 3

Inflow Area = 256,732 sf, 70.10% Impervious, Inflow Depth = 0.30" for 10-yr event
Inflow = 3.21 cfs @ 11.95 hrs, Volume= 6,350 cf
Primary = 3.21 cfs @ 11.95 hrs, Volume= 6,350 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

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Type II 24-hr 100-yr Rainfall=6.49"

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Summary for Subcatchment 1S: Erie Blvd & Front Pkg Lot

Runoff = 19.28 cfs @ 12.00 hrs, Volume= 46,503 cf, Depth= 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.49"

Area (sf)	CN	Description
27,557	68	<50% Grass cover, Poor, HSG A
72,937	98	Paved parking, HSG A
* 8,240	81	Urban industrial, 72% imp, HSG A - F.W. Webb
13,958	32	Woods/grass comb., Good, HSG A
122,692	83	Weighted Average
43,822		35.72% Pervious Area
78,870		64.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	100	0.0100	0.95		Sheet Flow, Parking Lot Smooth surfaces n= 0.011 P2= 2.63"
1.2	130	0.0074	1.75		Shallow Concentrated Flow, Parking Lot Paved Kv= 20.3 fps
6.4	800	0.0054	2.09	10.46	Channel Flow, Erie Blvd Swale Area= 5.0 sf Perim= 40.2' r= 0.12' n= 0.013
9.4	1,030	Total			

Summary for Subcatchment 2S: Front Pkg Lot

Runoff = 6.66 cfs @ 11.90 hrs, Volume= 14,176 cf, Depth= 5.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.49"

Area (sf)	CN	Description
495	49	50-75% Grass cover, Fair, HSG A
27,227	98	Paved parking, HSG A
* 1,117	49	50-75% Grass cover, Fair, HSG A - Plant Beds
28,839	95	Weighted Average
1,612		5.59% Pervious Area
27,227		94.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0200	1.09		Sheet Flow, Driveay and parking lot Smooth surfaces n= 0.011 P2= 2.63"
0.3	60	0.0200	2.87		Shallow Concentrated Flow, Parking Lot Paved Kv= 20.3 fps
1.1	110	Total			

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Summary for Subcatchment 3S: Back Pkg & Open Space

Runoff = 22.06 cfs @ 11.93 hrs, Volume= 42,599 cf, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.49"

Area (sf)	CN	Description
* 1,622	98	Unconnected pavement, HSG A - Water Tower
* 8,331	98	Unconnected pavement, HSG A - Asphalt Path
45,420	98	Paved parking, HSG A
* 40,010	49	50-75% Grass cover, Fair, HSG A - Open Space
* 19,733	81	Urban industrial, 72% imp, HSG A - Neighboring Prop.
* 1,000	98	Water Surface, HSG A - Pool
* 1,032	98	Roofs, HSG A - Pool House
* 1,170	98	Unconnected pavement, HSG A - Bocce Ball Court
* 1,800	98	Unconnected pavement, HSG A - Volleyball Court
* 3,950	98	Unconnected pavement, HSG A - Pool Apron
124,068	79	Weighted Average
45,535		36.70% Pervious Area
78,533		63.30% Impervious Area
16,873		21.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	50	0.0150	2.49		Shallow Concentrated Flow, Paking lot to french drain Paved Kv= 20.3 fps
2.0	530	0.0100	4.50	1.57	Pipe Channel, Trench drain to forebay 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.010 PVC, smooth interior
2.3	580	Total			

Summary for Subcatchment 4S: Back Parking

Runoff = 4.09 cfs @ 11.90 hrs, Volume= 7,464 cf, Depth= 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.49"

Area (sf)	CN	Description
9,485	30	Meadow, non-grazed, HSG A
16,110	98	Paved parking, HSG A
25,595	73	Weighted Average
9,485		37.06% Pervious Area
16,110		62.94% Impervious Area

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Type II 24-hr 100-yr Rainfall=6.49"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	40	0.0200	1.04		Sheet Flow, Parking Smooth surfaces n= 0.011 P2= 2.63"
0.3	14	0.0100	0.70		Shallow Concentrated Flow, Parking lot to bioretention Short Grass Pasture Kv= 7.0 fps
0.9	54	Total			

Summary for Subcatchment 5S: Back Pkg

Runoff = 13.74 cfs @ 11.92 hrs, Volume= 28,295 cf, Depth= 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.49"

Area (sf)	CN	Description
* 57,252	98	Impervious surfaces, HSG A
10,828	30	Meadow, non-grazed, HSG A
68,080	87	Weighted Average
10,828		15.90% Pervious Area
57,252		84.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	269	0.0186	2.77		Shallow Concentrated Flow, Driveway to parking area to catch Paved Kv= 20.3 fps
0.5	190	0.0100	5.90	4.63	Pipe Channel, Catch basin to forebay 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
2.1	459	Total			

Summary for Subcatchment 7S: Huck Finn's Playland

Runoff = 6.91 cfs @ 11.95 hrs, Volume= 14,078 cf, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=6.49"

Area (sf)	CN	Description
* 38,989	81	Urban industrial, 72% imp, HSG A - Huck Finn's Playland
10,917		28.00% Pervious Area
28,072		72.00% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0300	1.47		Sheet Flow, Huck Finn's Playland Smooth surfaces n= 0.011 P2= 2.63"
1.3	213	0.0175	2.69		Shallow Concentrated Flow, Huck Finn's Playland Paved Kv= 20.3 fps
2.1	125	0.0100	0.98	1.96	Channel Flow, Diversion swale Area= 2.0 sf Perim= 5.2' r= 0.38' n= 0.080 Earth, long dense weeds
4.5	438	Total			

Summary for Pond 1P: Gravel Diaphragm

Inflow Area = 25,595 sf, 62.94% Impervious, Inflow Depth = 3.50" for 100-yr event
 Inflow = 4.09 cfs @ 11.90 hrs, Volume= 7,464 cf
 Primary = 4.09 cfs @ 11.90 hrs, Volume= 7,464 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond 2P: Bioretention Basin

Inflow Area = 25,595 sf, 62.94% Impervious, Inflow Depth = 3.50" for 100-yr event
 Inflow = 4.09 cfs @ 11.90 hrs, Volume= 7,464 cf
 Outflow = 0.32 cfs @ 12.42 hrs, Volume= 7,467 cf, Atten= 92%, Lag= 31.1 min
 Discarded = 0.32 cfs @ 12.42 hrs, Volume= 7,467 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 13.22' @ 12.42 hrs Surf.Area= 2,435 sf Storage= 3,169 cf

Plug-Flow detention time= 119.3 min calculated for 7,460 cf (100% of inflow)
 Center-of-Mass det. time= 119.5 min (939.2 - 819.7)

Volume #1	Invert	Avail.Storage	Storage Description			
	9.00'	5,421 cf	Custom Stage Data (Irregular) Listed below			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
9.00	891	239.0	0.0	0	0	891
9.50	891	239.0	40.0	178	178	1,011
12.00	891	239.0	40.0	891	1,069	1,608
12.25	1,671	363.0	100.0	315	1,384	7,549
12.50	1,671	363.0	100.0	418	1,802	7,640
13.00	1,853	366.0	100.0	881	2,683	7,892
13.25	2,502	377.0	100.0	542	3,225	8,549
13.50	2,786	381.0	100.0	661	3,886	8,808
14.00	3,365	391.0	100.0	1,535	5,421	9,452

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Device	Routing	Invert	Outlet Devices
#1	Primary	12.50'	8.0" Round Culvert L= 57.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 12.50' / 11.93' S= 0.0100 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.35 sf
#2	Device 1	13.75'	8.0" Horiz. Office/Grate C= 0.600 Limited to weir flow at low heads
#3	Discarded	9.00'	5.670 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.32 cfs @ 12.42 hrs HW=13.22' (Free Discharge)

↳ **3=Exfiltration** (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=9.00' (Free Discharge)

↳ **1=Culvert** (Controls 0.00 cfs)

↳ **2=Office/Grate** (Controls 0.00 cfs)

Summary for Pond 3P: Sedimentation Basin

Inflow Area = 124,068 sf, 63.30% Impervious, Inflow Depth = 4.12" for 100-yr event
 Inflow = 22.06 cfs @ 11.93 hrs, Volume= 42,599 cf
 Outflow = 19.07 cfs @ 11.95 hrs, Volume= 36,741 cf, Atten= 14%, Lag= 1.7 min
 Primary = 19.07 cfs @ 11.95 hrs, Volume= 36,741 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 11.68' @ 11.95 hrs Surf.Area= 3,570 sf Storage= 9,179 cf

Plug-Flow detention time= 94.8 min calculated for 36,703 cf (86% of inflow)
 Center-of-Mass det. time= 30.7 min (837.6 - 806.9)

Volume	Invert	Avail.Storage	Storage Description			
#1	7.00'	9,427 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
7.00	709	112.0	0	0	709	
8.00	1,091	135.0	893	893	1,178	
9.00	1,655	190.0	1,363	2,256	2,609	
10.00	2,287	276.0	1,963	4,219	5,807	
11.00	3,109	219.0	2,688	6,906	8,066	
11.50	3,445	228.0	1,638	8,544	8,405	
11.75	3,618	233.0	883	9,427	8,597	

Device	Routing	Invert	Outlet Devices
#1	Primary	8.75'	12.0" Round Culvert L= 88.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 8.75' / 8.00' S= 0.0085 '/ Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#2	Device 1	10.65'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	10.65'	5.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50

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2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=18.86 cfs @ 11.95 hrs HW=11.67' (Free Discharge)

- 1=Culvert (Inlet Controls 5.19 cfs @ 6.61 fps)
- 2=Orifice/Grate (Passes 5.19 cfs of 15.29 cfs potential flow)
- 3=Broad-Crested Rectangular Weir (Weir Controls 13.67 cfs @ 2.68 fps)

Summary for Pond 4P: Sedimentation Basin

Inflow Area = 68,080 sf, 84.10% Impervious, Inflow Depth = 4.99" for 100-yr event
 Inflow = 13.74 cfs @ 11.92 hrs, Volume= 28,295 cf
 Outflow = 13.40 cfs @ 11.93 hrs, Volume= 24,260 cf, Atten= 2%, Lag= 0.8 min
 Primary = 8.85 cfs @ 11.93 hrs, Volume= 21,365 cf
 Secondary = 4.56 cfs @ 11.93 hrs, Volume= 2,896 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 11.07' @ 11.93 hrs Surf.Area= 2,475 sf Storage= 5,398 cf

Plug-Flow detention time= 104.1 min calculated for 24,260 cf (86% of inflow)
 Center-of-Mass det. time= 38.4 min (823.5 - 785.1)

Volume	Invert	Avail.Storage	Storage Description			
#1	7.00'	6,400 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
7.00	315	81.0	0	0	315	
8.00	720	124.0	504	504	1,024	
9.00	1,244	169.0	970	1,474	2,083	
10.00	1,883	204.0	1,553	3,026	3,139	
11.00	2,523	223.0	2,195	5,222	3,819	
11.50	2,196	213.0	1,179	6,400	4,182	

Device	Routing	Invert	Outlet Devices
#1	Primary	8.75'	18.0" Round Culvert L= 10.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 8.75' / 8.65' S= 0.0100 1/8" Cc= 0.900 n= 0.010, Flow Area= 1.77 sf
#2	Device 1	10.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Secondary	10.75'	10.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

21013_Proposed

Type II 24-hr 100-yr Rainfall=6.49"

Prepared by {enter your company name here}

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Primary OutFlow Max=8.53 cfs @ 11.93 hrs HW=11.06' (Free Discharge)

- ↑1=Culvert (Passes 8.53 cfs of 9.37 cfs potential flow)
- ↑2=Orifice/Grate (Weir Controls 8.53 cfs @ 2.44 fps)

Secondary OutFlow Max=4.27 cfs @ 11.93 hrs HW=11.06' (Free Discharge)

- ↑3=Broad-Crested Rectangular Weir (Weir Controls 4.27 cfs @ 1.39 fps)

Summary for Pond 6P: Infiltration Basin

Inflow Area = 192,148 sf, 70.67% Impervious, Inflow Depth = 2.48" for 100-yr event
 Inflow = 23.45 cfs @ 11.95 hrs, Volume= 39,637 cf
 Outflow = 22.73 cfs @ 11.97 hrs, Volume= 39,815 cf, Atten= 3%, Lag= 1.3 min
 Discarded = 0.72 cfs @ 11.97 hrs, Volume= 21,722 cf
 Primary = 22.02 cfs @ 11.97 hrs, Volume= 18,093 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
 Peak Elev= 10.89' @ 11.97 hrs Surf.Area= 5,453 sf Storage= 7,746 cf

Plug-Flow detention time= 73.8 min calculated for 39,608 cf (100% of inflow)
 Center-of-Mass det. time= 76.8 min (905.5 - 828.6)

Volume	Invert	Avail.Storage	Storage Description			
#1	8.00'	8,385 cf	Custom Stage Data (Irregular) Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
8.00	790	206.0	0	0	790	
9.00	1,880	336.0	1,296	1,296	6,404	
10.00	3,358	456.0	2,584	3,880	13,977	
11.00	5,759	786.0	4,505	8,385	46,599	

Device	Routing	Invert	Outlet Devices															
#1	Discarded	8.00'	5.670 in/hr Exfiltration over Surface area															
#2	Primary	10.50'	18.0' long x 3.0' breadth Broad-Crested Rectangular Weir															
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00															
			2.50 3.00 3.50 4.00 4.50															
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68															
			2.72 2.81 2.92 2.97 3.07 3.32															
#3	Primary	10.50'	18.0' long x 3.0' breadth Broad-Crested Rectangular Weir															
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00															
			2.50 3.00 3.50 4.00 4.50															
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68															
			2.72 2.81 2.92 2.97 3.07 3.32															

Discarded OutFlow Max=0.71 cfs @ 11.97 hrs HW=10.87' (Free Discharge)

- ↑1=Exfiltration (Exfiltration Controls 0.71 cfs)

Primary OutFlow Max=20.53 cfs @ 11.97 hrs HW=10.87' (Free Discharge)

- ↑2=Broad-Crested Rectangular Weir (Weir Controls 10.27 cfs @ 1.55 fps)
- ↑3=Broad-Crested Rectangular Weir (Weir Controls 10.27 cfs @ 1.55 fps)

Summary for Pond 8P: Infiltrator

Inflow Area = 68,080 sf, 84.10% Impervious, Inflow Depth = 3.77" for 100-yr event
 Inflow = 8.85 cfs @ 11.93 hrs, Volume= 21,365 cf
 Outflow = 1.21 cfs @ 11.65 hrs, Volume= 21,365 cf, Atten= 86%, Lag= 0.0 min
 Discarded = 1.21 cfs @ 11.65 hrs, Volume= 21,365 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 8.70' @ 12.41 hrs Surf.Area= 9,250 sf Storage= 7,524 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 46.2 min (884.6 - 838.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	7.50'	6,977 cf	58.92'W x 157.00'L x 3.21'H Field A 29,677 cf Overall - 12,235 cf Embedded = 17,442 cf x 40.0% Voids
#2A	8.00'	12,235 cf	Cultec R-280HD x 286 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 13 rows
		19,211 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	7.50'	5.670 in/hr Exfiltration over Surface area
#2	Primary	10.50'	24.0" Vert. Orifice/Grate C= 0.600

Discarded OutFlow Max=1.21 cfs @ 11.65 hrs HW=7.58' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 1.21 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=7.50' (Free Discharge)
 ↑2=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond DP1: Design Point 1

Inflow Area = 122,692 sf, 64.28% Impervious, Inflow Depth = 4.55" for 100-yr event
 Inflow = 19.28 cfs @ 12.00 hrs, Volume= 46,503 cf
 Primary = 19.28 cfs @ 12.00 hrs, Volume= 46,503 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond DP2: Design Point 2

Inflow Area = 28,839 sf, 94.41% Impervious, Inflow Depth = 5.90" for 100-yr event
 Inflow = 6.66 cfs @ 11.90 hrs, Volume= 14,176 cf
 Primary = 6.66 cfs @ 11.90 hrs, Volume= 14,176 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Summary for Pond DP3: Design Point 3

Inflow Area = 256,732 sf, 70.10% Impervious, Inflow Depth = 1.50" for 100-yr event
Inflow = 28.75 cfs @ 11.97 hrs, Volume= 32,171 cf
Primary = 28.75 cfs @ 11.97 hrs, Volume= 32,171 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs