ENGINEERS REPORT
for
PARADISE PARK RESTROOM BUILDING PROJECT
750 PARADISE ROAD
EAST AMHERST NY 14051

Prepared for

TOWN OF AMHERST
ENGINEERING DEPARTMENT
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ENGINEERS REPORT

TABLE OF CONTENTS

DRAINAGE STUDY

LIST OF APPENDICES

I. INTRODUCTION

DiDonato Associates, P.E., P.C. has been retained by the Town of Amherst to perform the site design services for a restroom building for Paradise Park located at 750 Paradise Road in the Town of Amherst, Erie County, New York. The proposed development will comprise of a 1900± square feet single story building.

The following Engineers Report, which includes the drainage study, has been performed in accordance with the Town of Amherst requirements. The drainage study for the building site will address the existing site drainage and the proposed drainage measures related to the construction of the project.

II. ANALYSIS

A. *Methodology* :

The Natural Resources Conservation Service (NRCS), formerly the Soils Conservation Service (SCS) Technical Report 20 (TR-20) method utilizing HydroCAD 10.0 program by Applied Microcomputer Systems was used to analyze the runoff hydrograph and perform stormwater routing calculations.

As per the Town of Amherst's standards, the retention volume is based on the difference in runoff from the post-developed 25-year storm and the 10-year pre-developed storm.

The Time of Concentration was based on the methods described in the NRCS Technical Report 55 (TR-55). A storm recurrence of 10 years was used for the analysis of the existing watershed and a 25-year storm for analysis of proposed improvements for the watershed. The NRCS Soil Survey of Erie County was used to determine the existing soil classification and is attached in Appendix A. The hydrologic conditions used for the analysis were based primarily on topographic maps for the area along with limited topographic survey data and field investigations. Hydraulic calculations are contained in Appendix C of this report.

B. *Design Parameters* :

It is proposed that the entire 0.27 acres of the property will be disturbed for this project. The existing hydrology for the site will not be changed due to this construction. The watershed for this analysis was the area impacted by the construction and was used to determine the runoff coefficient for the area based on the watershed characteristics. A section of the property is designated as non- jurisdictional wetlands and will not be disturbed. The time of concentration was taken as the travel time from the most hydraulically distant point in the area to the upstream end of the receiving point.

III. RESULTS

The proposed project will disturb approximately 0.27 acres for the construction of the restroom building some sidewalk along the existing parking lot which is less than an acre and therefore does not require SPDES construction permit. However, this report focuses on the detention of the 10-year design storm for the pre-developed conditions and 25-year design storm for the post-developed conditions as per the Town of Amherst requirements.

The increase in runoff from the post-developed conditions as compared to the pre-developed conditions is due to the increase in the impervious areas for the proposed building and the small sidewalk area. There will however be no overall increase in the runoff for the post-developed conditions at the outfall point. The runoff generated from the new building will be diverted to the existing outfall via a 6-inch perforated pipe under the proposed swale and ultimately to the existing outfall area

The runoff from the existing conditions and the proposed conditions is as follows:

A. EXISTING DRAINAGE CONDITIONS

The existing Paradise Park area consists of playing fields and associated parking area. Runoff from the area flows into an existing depressed grass area and conveyed to an outfall area that acts as a small wetland.

Site soils as depicted in the Web Soil Survey and the Soil Survey of Erie County, New York consist of Cheektowaga (Ch) fine sandy loam (100%), with 0 to 3% slopes, and cover the entire disturbed area and is characterized as poorly drained soil. This soil falls under the hydrologic group C/D. A Natural Resources Conservation Service (NRCS) custom soils report is attached in Appendix A.

The overall runoff from the 1.47± acre section of land is approximately 3.66 cfs for a 10-year storm event. The runoff from this area retained in the wetland overflows into the closed system along Paradise Road. Runoff calculations for the existing conditions are attached in Appendix C of this report. The following table summarizes the existing conditions:

TABLE 1
EXISTING PEAK RUNOFF

DRAINAGE CONDITIONS	STORM FREQUENCY	DRAINAGE AREA (acre)			PEAK RUNOFF (cfs)
		Impervious	Pervious	Total	
EXISTING	10 Year	0.98	0.49	1.47	3.66
TOTAL EXISTING 10 YEAR PEAK RUNOFF					**3.66**

B. PROPOSED DRAINAGE CONDITIONS

Approximately 0.27 acre site will be disturbed as part of the project. The proposed development will consist of a 1900 square feet single story building that will be used for commercial purposes. The new impervious area will occupy approximately 0.1.04 acres, including the proposed restroom building and the existing parking lot. The paved area will continue to drain into a grass area as before and a swale has been provided to detain any excess runoff. A 6-inch perforated outlet pipe from the bottom of the swale carrying the building roof runoff will convey the runoff to a drainage structure located under the swale ultimately draining in the existing outfall area.. The purpose of this design is to slow down the runoff velocities and reduce the overall runoff from the developed site.

The following table summarizes the runoff from the proposed development for a 25 year post developed storm event:

TABLE 2
PROPOSED PEAK RUNOFF

PROPOSED DRAINAGE CONDITIONS	STORM FREQUENCY	DRAINAGE AREA (acre)			PEAK RUNOFF (cfs)
		Impervious	11	Total	
DEVELOPED SITE	**25 Year**	**1.04**	**0.43**	**1.47**	**4.77**
TOTAL 25 YEAR OVERALL PEAK RUNOFF					**4.77**

C. PROPOSED DETENTION SYSTEMS

The following table summarizes the amount of detention being provided for the post-developed conditions as compared to the pre-developed conditions as required by the Town of Amherst guidelines.

TABLE 3
PROPOSED DETENTION

DETENTION AREA	STORM FREQUENCY	RUNOFF (cfs)			PEAK RUNOFF (cfs)
		Inflow	Outflow	Storage (cf)	
OVERALL SITE	**25 Year**	**4.77**	**2.50**	**3442**	**2.50**
PROPOSED 25 YEAR PEAK RUNOFF					**2.50**

The overall runoff from the developed site increases due to the creation of the impervious areas. The runoff from the 10 year storm for the existing conditions is 3.66 cfs as compared to the 4.77 cfs for the 25 year storm, the increase in the runoff will require detention of the excess runoff generated. It is proposed that the excess runoff from the site will be stored within the drainage swales proposed for the project. The peak runoff from the developed site will be 2.50 cfs as compared to the allowable 3.66 cfs, thus reducing the overall site runoff by approximately 32%. Detention for the excess runoff will be provided in the swale located along two parking areas. The calculations for the existing and proposed conditions are attached in Appendix C of this report.

IV. SUMMARY AND CONCLUSIONS

The storm sewer system for the proposed restroom building for Paradise Park located at 750 Paradise Road in Amherst is designed to meet the requirements of the Town of Amherst. The proposed development will result in no net increase in the peak stormwater runoff from the developed site as compared to the pre-developed conditions on the outfall location. The majority of the existing area characteristics and the drainage pattern of the surrounding area will not change due to this development.

V. WATERLINE DESIGN / RPZ REPORT

There is an existing 3-inch RPZ located at Paradise Park, and it is proposed that the proposed water services to the new restroom building will be connected to the existing water lie at the RPZ.

This new water service will be used for typical bathroom uses (including toilet flushing and hand washing). The design water usage for the proposed office building shall be **250 gallons per day**.

Waterline Chlorination and Testing

The newly installed water service shall be tested prior to being placed in service. Current Erie County Water Authority and Erie County Health Department (Erie County Department of Environment and Planning) standards will be utilized for these tests. All installed pipes will be new and in excellent condition and will be disinfected with a chlorine solution meeting the requirements of the ECWA and the American Water Works Association (AWWA). Approval from the Paradise County Water Authority will be obtained prior to placing any waterline in service.

VI. SANITARY SEWER DESIGN

The proposed system will be designed based on 250 **gallons per day** usage for the proposed restroom building.

A 6-inch sewer line from the proposed restroom building will be connected to an existing Town of Amherst sewer manhole located within the Paradise Park area.as shown on the drawing C 104 – Utility Plan attached in Appendix B of this report.

Design Criteria

The new waterline and sanitary sewer were designed using standards from various agencies which govern in the project area. These agencies include the Paradise County Department of Environment and Planning (ECDEP), the Town of Amherst, Paradise County Water Authority (ECWA), the American Water Works Association (AWWA), and the New York State Department of Transportation (NYSDOT). Ten State Standards were used as a guide for the waterline and sanitary sewer design along with common engineering practices.

DiDonato Associates

APPENDIX A

LOCATION & SOIL MAPS

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for

Erie County, New York

Paradise Park Restroom Building 750 Paradise Road Amherst NY14051

November 20, 2024

Preface

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

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

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

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

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

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

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Contents

How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

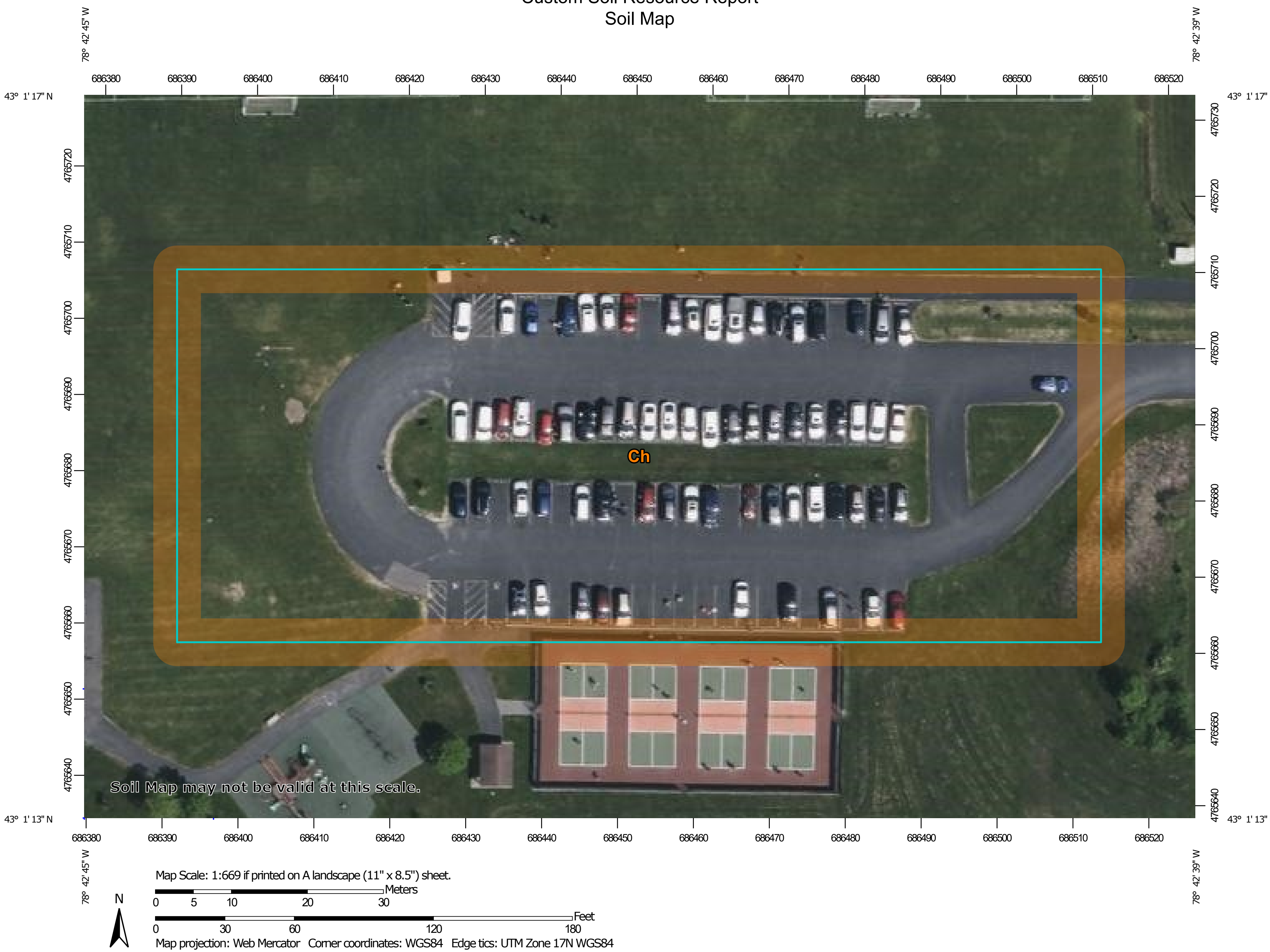
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree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

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

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

Soil Map


78° 42' 45" W
78° 42' 39" W
43° 1' 17" N
43° 1' 13" N
686380 686390 686400 686410 686420 686430 686440 686450 686460 686470 686480 686490 686500 686510 686520
4765640 4765650 4765660 4765670 4765680 4765690 4765700 4765710 4765720 4765730
Ch
Soil Map may not be valid at this scale.
Map Scale: 1:669 if printed on A landscape (11" x 8.5") sheet.
Meters
0 5 10 20 30
Feet
0 30 60 120 180
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N 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: Erie County, New York
Survey Area Data: Version 24, Aug 25, 2024

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

Date(s) aerial images were photographed: May 13, 2023—May 27, 2023

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
Ch	Cheektowaga fine sandy loam	1.5	100.0%
Totals for Area of Interest		**1.5**	**100.0%**

Map Unit Descriptions

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

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

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

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

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

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

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

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

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

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

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

Erie County, New York

Ch—Cheektowaga fine sandy loam

Map Unit Setting

National map unit symbol: 9rkn
Elevation: 200 to 800 feet
Mean annual precipitation: 36 to 48 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 115 to 195 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cheektowaga and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cheektowaga

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy deltaic deposits over clayey glaciolacustrine deposits

Typical profile

H1 - 0 to 9 inches: fine sandy loam
H2 - 9 to 22 inches: loamy fine sand
H3 - 22 to 26 inches: loamy fine sand
H4 - 26 to 60 inches: stratified silty clay to silty clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F101XY007NY - Wet Outwash
Hydric soil rating: Yes

Minor Components

Canandaigua

Percent of map unit: 5 percent

Landform: Depressions
Hydric soil rating: Yes

Claverack

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

Cosad

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

Lamson

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

Unnamed soils

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

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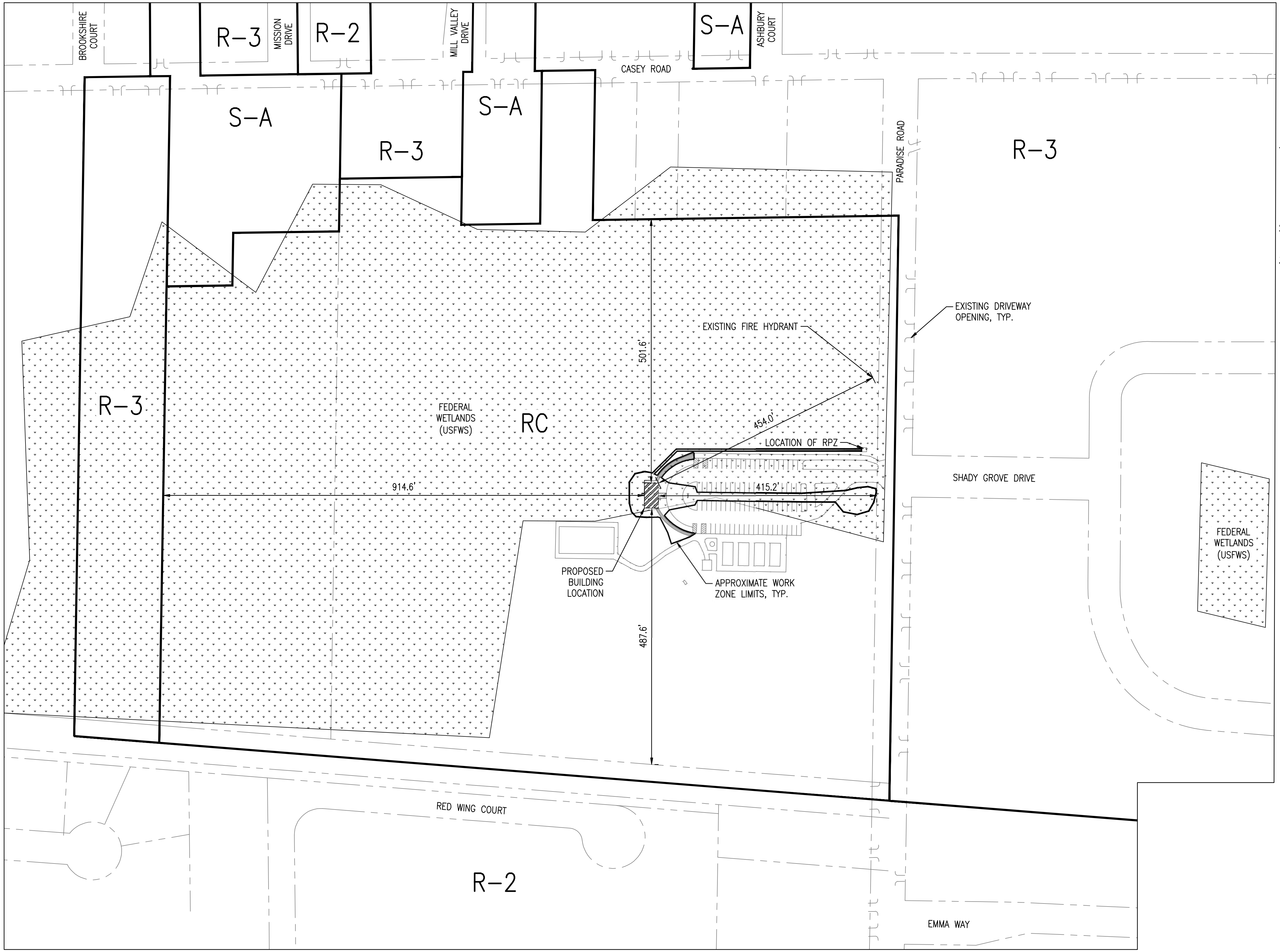
APPENDIX B

PROJECT DRAWINGS



ZONING DISTRICTS

S-A = SUBURBAN AGRICULTURAL
R-3 = RESIDENTIAL DISTRICT 3
RC = RECREATION CONSERVATION
R-2 = RESIDENTIAL DISTRICT 2

N

NOTES:

1. SITE DOES NOT CONTAIN ANY STATE WETLANDS AND IS NOT LOCATED IN A FEMA FLOODPLAIN OR FLOODWAY. APPROXIMATE LOCATION OF FEDERAL WETLANDS (USFWS) IS SHOWN PER TOWN OF AMHERST GIS MAP.
2. 750 PARADISE PARK SBL 42.11-2-13.21 ACREAGE 32.2 ACRES
3. BOUNDARY AND TOPOGRAPHIC INFORMATION TAKEN FROM TOPOGRAPHIC MAP – JOB #4805, PREPARED BY FRANDINA ENGINEERING AND LAND SURVEYING DATED 11/5/2021.

50 0 50 100 200
SCALE (FEET)

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didonatoassociates.com

STATE OF NEW YORK · WILLIAM F. RA... · 081988 · LICENSED PROFESSIONAL ENGINEER

TOWN OF AMHERST

PARADISE PARK RESTROOM BUILDING

MARK	DATE	DESCRIPTION
1	11/20/24	SITE PLAN SUBMISSION

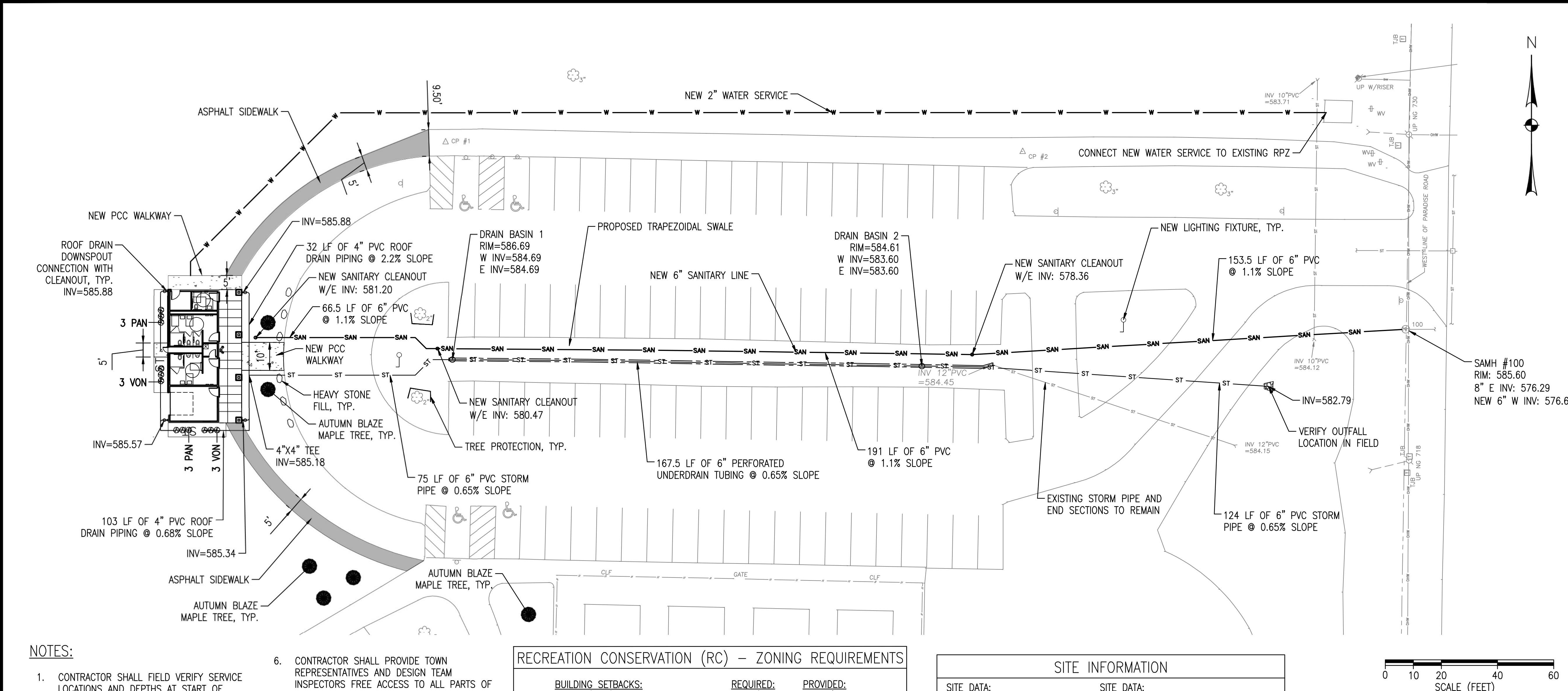
ISSUE:	
PROJECT NO:	2015.024A
DESIGNER PROJECT NO:	22-3279
CAD DWG FILE:	CP100.DWG
DRAWN BY:	ADS
CHECKED BY:	JDM
SCALE:	AS NOTED
COPYRIGHT:	

SHEET TITLE

OVERALL SITE AND ZONING PLAN

DRAWING#

CP100



NOTES:

1. CONTRACTOR SHALL FIELD VERIFY SERVICE LOCATIONS AND DEPTHS AT START OF CONSTRUCTION AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
2. CONNECT ROOF DRAINS INTO EXISTING DRAINAGE SYSTEM.
3. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PRESERVE THE INTEGRITY OF THE EXISTING UTILITIES TO REMAIN AND SHALL PROVIDE UNINTERRUPTED SERVICE TO ALL USERS OF THE EXISTING UTILITIES. INSTALLATION OF ALL UTILITIES, INCLUDING ANY REMOVAL OR RELOCATION, SHALL BE IN ACCORDANCE WITH THE TOWN OF AMHERST REQUIREMENTS.
4. EXISTING UTILITIES (LOCATION, SIZES AND INVERTS) SHOWN ON THE PLANS HAVE BEEN PLOTTED FROM FIELD SURVEYS AND RECORD MAPS AND ARE NOT CERTIFIED AS TO THE ACCURACY OF THEIR LOCATION OR COMPLETENESS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATIONS AND DEPTH OF ALL UTILITIES AND STRUCTURES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DELAYS OR DAMAGES OCCURRING AS A RESULT OF INCORRECTLY LOCATED UTILITIES. NO EXTENSIONS OF CONTRACT TIME AND NO MONETARY DAMAGE CLAIMS SHALL BE ALLOWED AS A RESULT OF REVISED DESIGN LOCATIONS.
5. THE CONTRACTOR SHALL EXPOSE EXISTING UTILITIES AHEAD OF ALL PIPE LAYING OPERATIONS TO ALLOW FOR MINOR ADJUSTMENTS TO BE MADE IN ELEVATION AND/OR ALIGNMENT DUE TO INTERFERENCE FROM THESE UTILITIES, IF NECESSARY.
6. CONTRACTOR SHALL PROVIDE TOWN REPRESENTATIVES AND DESIGN TEAM INSPECTORS FREE ACCESS TO ALL PARTS OF THE SITE FOR PROPER INSPECTION.
7. CONTRACTOR SHALL PERFORM NO WORK OUTSIDE OF THE DESIGNATED WORK LIMITS WITHOUT APPROVAL FROM THE ENGINEER.

LEGEND

- ASPHALT SIDEWALK
- CONCRETE SIDEWALK
- TREE
- RIP-RAP
- ST — STORM SEWER PIPE
- SAN — SANITARY SEWER PIPE
- W — WATER SERVICE PIPE
- LIGHTING FIXTURE

RECREATION CONSERVATION (RC) – ZONING REQUIREMENTS

BUILDING SETBACKS:	REQUIRED:	PROVIDED:
NORTH (SIDE)	50'	501'
SOUTH (SIDE)	50'	487'
EAST (FRONT)	20'	415'
WEST (REAR)	50'	914'

VEHICLE USE SETBACKS	REQUIRED:	PROVIDED:
NORTH (SIDE)	25'	N/A
SOUTH (SIDE)	25'	N/A
EAST (FRONT)	15'	N/A
WEST (REAR)	25'	N/A

* NOTE SETBACKS BASED ON MAX. STRUCTURE HEIGHT < 65'

AVAILABLE PARKING DATA

NARC PARKING LOT — HANDICAP SPACES – 4; STANDARD SPACES – 82

SITE INFORMATION

SITE DATA:	SITE DATA:
CURRENT ZONING: 750 PARADISE PARK	RECREATION CONSERVATION DISTRICT (RC)
TOTAL SITE AREA:	32.2 Ac
TOTAL PROJECT DISTURBANCE:	11,300 S.F.±
BUILDING DATA	
GROSS BUILDING AREA:	1,248 S.F.±
NET BUILDING AREA:	1,100 S.F.±
MAX. BUILDING HT.:	16'-8½"

PLANT LIST

QTY	ITEM	BOTANICAL NAME	COMMON NAME	MIN SIZE HT
6	PAN	PICEA ABIES 'NIDIFORMIS'	BIRD'S NEST SPRUCE	24"
6	VON	VIBURNUM OPULUS NANUM	DWARF EUROPEAN CRANBERRYBUSH	24"
6	AB	ACER X FREEMANII	AUTUMN BLAZE MAPLE TREE	–

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STATE OF NEW YORK — WILLIAM F. RAPP — LICENSED PROFESSIONAL ENGINEER — 081988

TOWN OF AMHERST

PARADISE PARK RESTROOM BUILDING

MARK	DATE	DESCRIPTION
	11/20/24	SITE PLAN SUBMISSION

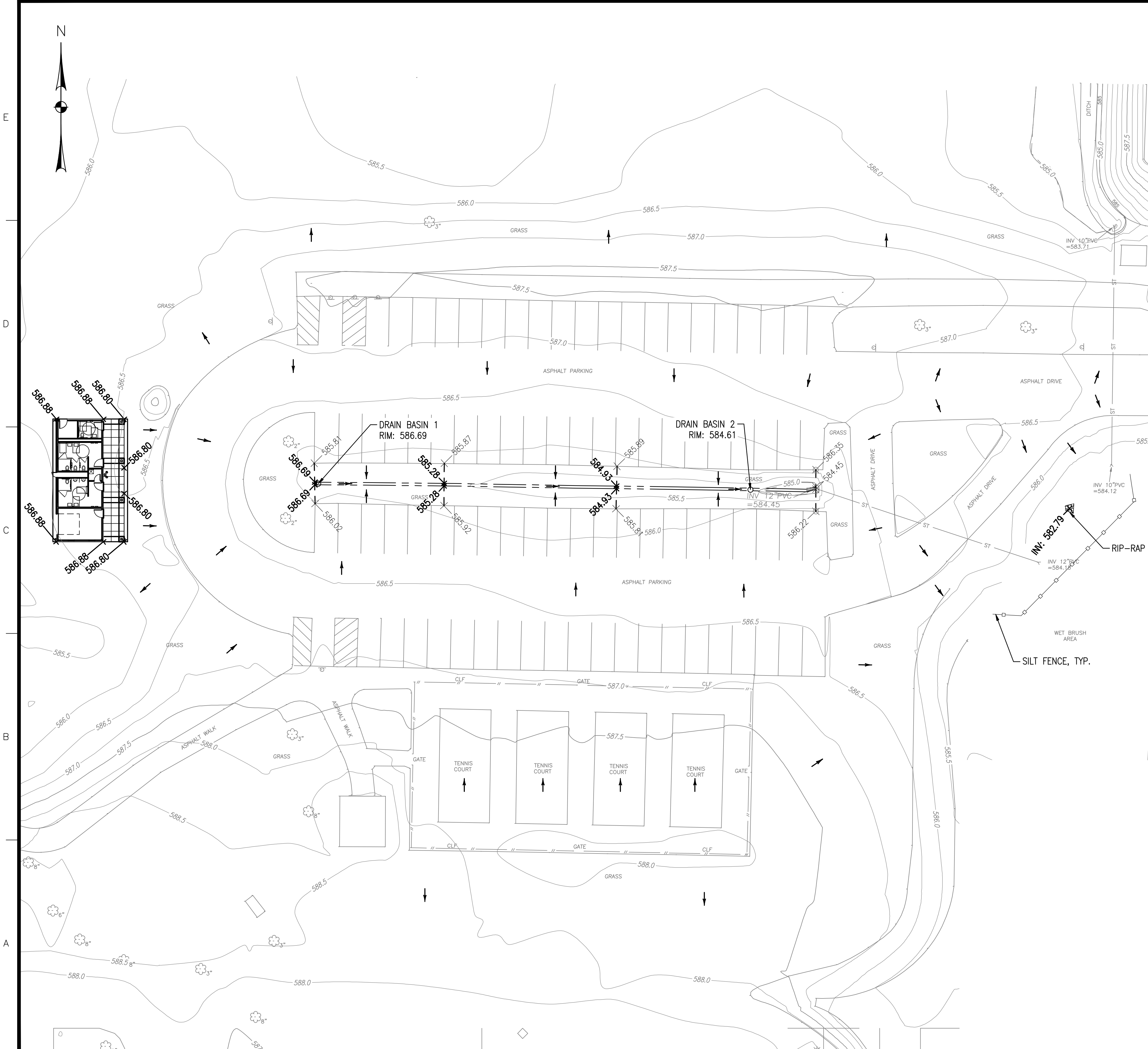
ISSUE:	
PROJECT NO:	2015.024A
DESIGNER PROJECT NO:	22-3279
CAD DWG FILE:	CP101.DWG
DRAWN BY:	ADS
CHECKED BY:	JDM
SCALE:	AS NOTED
COPYRIGHT:	

SHEET TITLE

SITE AND UTILITY PLAN

DRAWING#

CP101



NOTES:

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7. CONTRACTOR SHALL PERFORM NO WORK OUTSIDE OF THE DESIGNATED WORK LIMITS WITHOUT APPROVAL FROM THE ENGINEER.

LEGEND

---588.0---	EXISTING CONTOUR
— — — —	GRADE BREAK
585.28	PROPOSED SPOT GRADE
585.88	EXISTING SPOT GRADE
→	DIRECTION OF FLOW
-o-o-o-	PROPOSED SILT FENCE

0 10 20 40 60
SCALE (FEET)

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STATE OF NEW YORK · WILLIAM F. RAPP · 081066 · LICENSED PROFESSIONAL ENGINEER

TOWN OF AMHERST

PARADISE PARK
RESTROOM BUILDING

MARK	DATE	DESCRIPTION
	11/20/24	SITE PLAN SUBMISSION

ISSUE:	
PROJECT NO:	2015.024A
DESIGNER PROJECT NO:	22-3279
CAD DWG FILE:	GP101.DWG
DRAWN BY:	ADS
CHECKED BY:	JDM
SCALE:	AS NOTED
COPYRIGHT:	

SHEET TITLE

GRADING PLAN

DRAWING#
GP101

APPENDIX C

HYDRAULIC ANALYSIS

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point

Smoothing	Yes
State	New York
Location	New York, United States
Latitude	43.021 degrees North
Longitude	78.712 degrees West
Elevation	170 feet
Date/Time	Mon Nov 18 2024 12:00:41 GMT-0500 (Eastern Standard Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.27	0.41	0.51	0.66	0.83	1.01	**1yr**	0.71	0.94	1.14	1.34	1.57	1.81	2.08	**1yr**	1.60	2.00	2.41	2.90	3.37	**1yr**
2yr	0.31	0.47	0.59	0.77	0.97	1.19	**2yr**	0.84	1.09	1.34	1.59	1.87	2.17	2.43	**2yr**	1.92	2.34	2.76	3.29	3.78	**2yr**
5yr	0.36	0.56	0.70	0.94	1.20	1.48	**5yr**	1.04	1.36	1.68	1.98	2.31	2.65	2.97	**5yr**	2.34	2.86	3.35	3.95	4.50	**5yr**
10yr	0.40	0.64	0.80	1.09	1.42	1.76	**10yr**	1.23	1.62	1.99	2.35	2.71	3.08	3.46	**10yr**	2.72	3.32	3.87	4.53	5.14	**10yr**
25yr	0.48	0.76	0.97	1.34	1.78	2.21	**25yr**	1.53	2.03	2.49	2.92	3.34	3.76	4.23	**25yr**	3.33	4.07	4.70	5.45	6.13	**25yr**
50yr	0.54	0.87	1.12	1.56	2.10	2.62	**50yr**	1.81	2.41	2.96	3.45	3.92	4.38	4.93	**50yr**	3.88	4.74	5.44	6.27	7.00	**50yr**
100yr	0.62	1.00	1.29	1.83	2.49	3.12	**100yr**	2.15	2.86	3.52	4.08	4.61	5.10	5.74	**100yr**	4.52	5.52	6.29	7.21	8.01	**100yr**
200yr	0.71	1.16	1.50	2.14	2.96	3.70	**200yr**	2.55	3.41	4.17	4.82	5.41	5.95	6.70	**200yr**	5.27	6.44	7.29	8.29	9.16	**200yr**
500yr	0.85	1.40	1.82	2.65	3.71	4.65	**500yr**	3.20	4.29	5.23	6.01	6.69	7.29	8.21	**500yr**	6.45	7.89	8.86	9.98	10.94	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.35	0.43	0.58	0.71	0.89	**1yr**	0.61	0.87	0.85	1.16	1.47	1.66	1.96	**1yr**	1.47	1.89	2.16	2.51	3.04	**1yr**
2yr	0.29	0.45	0.56	0.76	0.93	1.07	**2yr**	0.81	1.05	1.17	1.43	1.72	2.11	2.37	**2yr**	1.87	2.28	2.70	3.21	3.69	**2yr**
5yr	0.33	0.51	0.63	0.87	1.11	1.27	**5yr**	0.96	1.24	1.39	1.67	2.02	2.45	2.79	**5yr**	2.17	2.68	3.17	3.73	4.24	**5yr**
10yr	0.36	0.56	0.69	0.96	1.24	1.43	**10yr**	1.07	1.40	1.57	1.88	2.27	2.74	3.16	**10yr**	2.43	3.04	3.56	4.18	4.65	**10yr**
25yr	0.41	0.63	0.79	1.12	1.48	1.70	**25yr**	1.27	1.66	1.82	2.19	2.66	3.17	3.72	**25yr**	2.81	3.58	4.14	4.84	5.18	**25yr**
50yr	0.46	0.69	0.86	1.24	1.67	1.92	**50yr**	1.44	1.87	2.03	2.45	2.99	3.53	4.22	**50yr**	3.13	4.06	4.66	5.42	5.62	**50yr**
100yr	0.50	0.75	0.94	1.36	1.87	2.16	**100yr**	1.61	2.11	2.26	2.73	3.36	3.94	4.78	**100yr**	3.49	4.60	5.22	6.07	6.06	**100yr**
200yr	0.55	0.83	1.05	1.52	2.11	2.45	**200yr**	1.82	2.40	2.50	3.02	3.75	4.38	5.41	**200yr**	3.88	5.21	5.85	6.78	6.51	**200yr**
500yr	0.62	0.93	1.20	1.74	2.47	2.89	**500yr**	2.13	2.82	2.84	3.45	4.33	5.03	6.39	**500yr**	4.45	6.14	6.81	7.85	7.12	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.30	0.46	0.56	0.75	0.92	1.07	**1yr**	0.80	1.04	1.21	1.41	1.68	1.91	2.21	**1yr**	1.69	2.12	2.56	3.08	3.56	**1yr**
2yr	0.32	0.49	0.60	0.82	1.01	1.17	**2yr**	0.87	1.14	1.30	1.57	1.86	2.25	2.50	**2yr**	1.99	2.41	2.86	3.37	3.95	**2yr**
5yr	0.39	0.60	0.74	1.02	1.30	1.54	**5yr**	1.12	1.51	1.70	2.07	2.45	2.86	3.16	**5yr**	2.53	3.04	3.54	4.17	4.73	**5yr**
10yr	0.46	0.71	0.88	1.22	1.58	1.90	**10yr**	1.36	1.86	2.11	2.57	3.03	3.43	3.77	**10yr**	3.04	3.63	4.18	4.91	5.53	**10yr**
25yr	0.58	0.88	1.10	1.57	2.06	2.52	**25yr**	1.78	2.47	2.81	3.43	4.00	4.39	4.77	**25yr**	3.89	4.59	5.23	6.10	6.82	**25yr**
50yr	0.69	1.04	1.30	1.87	2.51	3.14	**50yr**	2.17	3.07	3.50	4.27	4.94	5.30	5.71	**50yr**	4.69	5.49	6.20	7.19	8.02	**50yr**
100yr	0.82	1.24	1.55	2.24	3.07	3.89	**100yr**	2.65	3.80	4.38	5.33	6.12	6.40	6.82	**100yr**	5.67	6.55	7.36	8.49	9.42	**100yr**
200yr	0.97	1.47	1.86	2.69	3.75	4.83	**200yr**	3.24	4.72	5.50	6.67	7.58	7.74	8.14	**200yr**	6.85	7.83	8.72	10.03	11.08	**200yr**
500yr	1.24	1.84	2.37	3.44	4.90	6.44	**500yr**	4.22	6.30	7.43	8.97	10.09	9.98	10.32	**500yr**	8.84	9.92	10.94	12.50	13.74	**500yr**

Powered by ACIS
Northeast Regional Climate Center

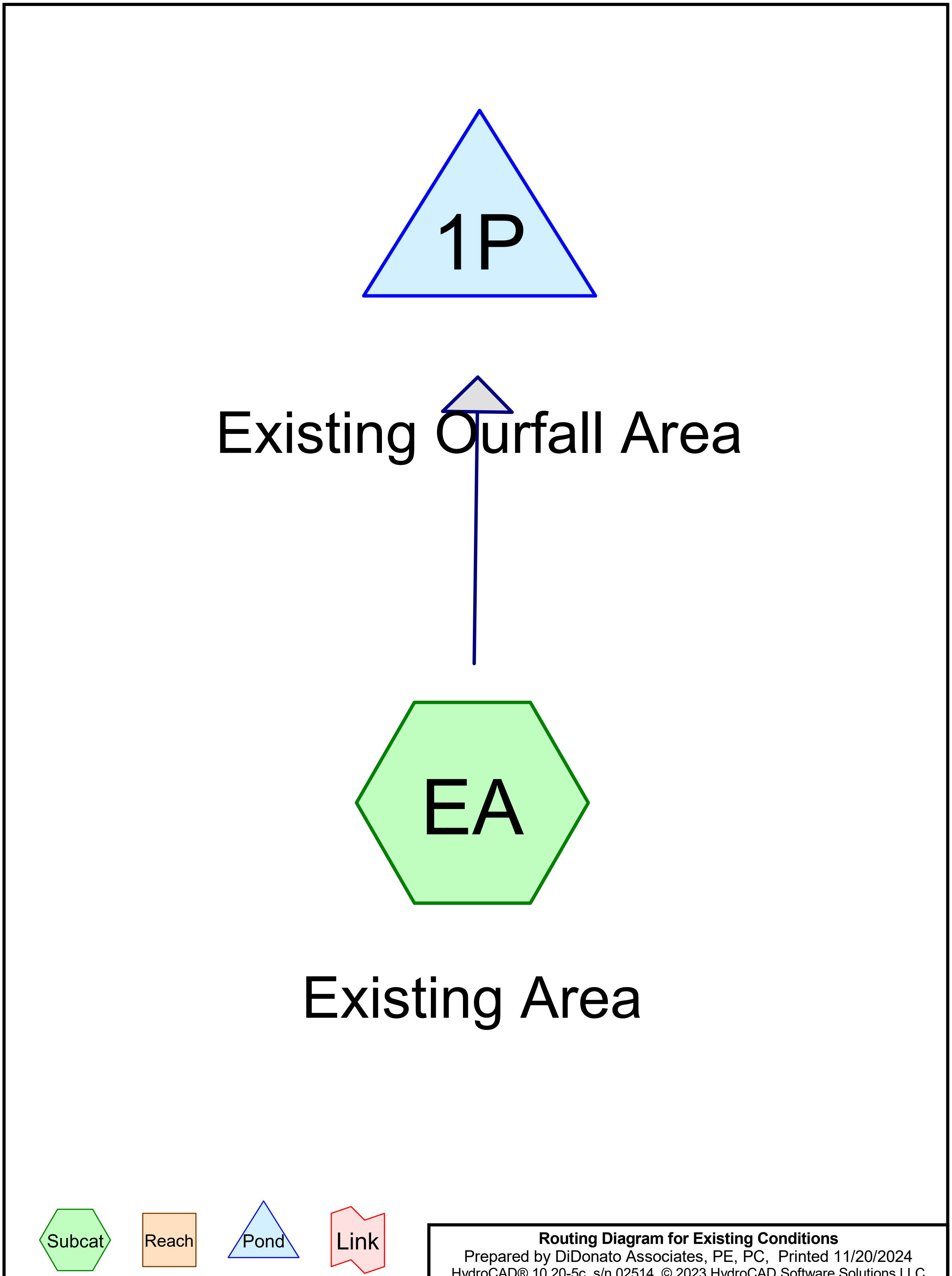
DiDonato Associates

EXISTING CONDITIONS

DiDonato Associates

10 YEAR STORM

EXISTING CONDITIONS



Routing Diagram for Existing Conditions
Prepared by DiDonato Associates, PE, PC, Printed 11/20/2024

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.490	74	>75% Grass cover, Good, HSG C (EA)
0.980	98	Paved parking, HSG C (EA)
1.470	**90**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
1.470	HSG C	EA
0.000	HSG D	
0.000	Other	
1.470		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.490	0.000	0.000	0.490	>75% Grass cover, Good	EA
0.000	0.000	0.980	0.000	0.000	0.980	Paved parking	EA
0.000	**0.000**	**1.470**	**0.000**	**0.000**	**1.470**	**TOTAL AREA**	

Summary for Subcatchment EA: Existing Area

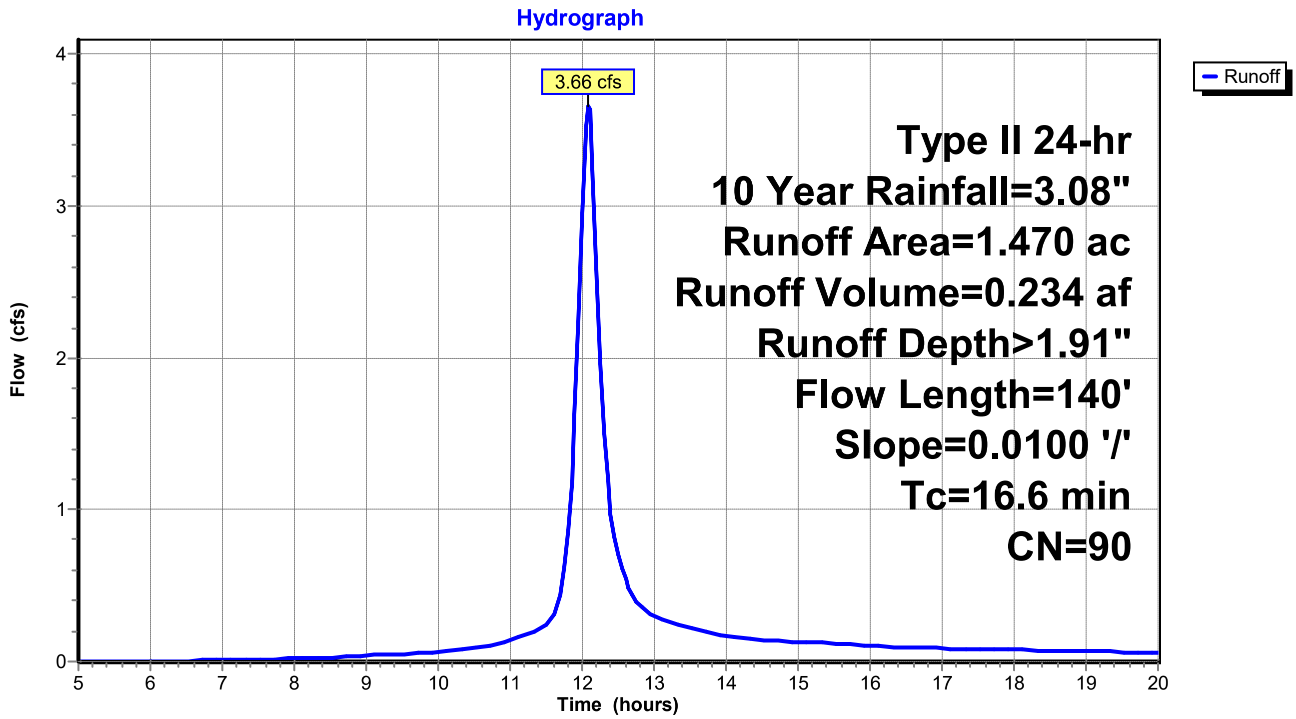
Runoff = 3.66 cfs @ 12.09 hrs, Volume= 0.234 af, Depth> 1.91"
Routed to Pond 1P : Existing Ourfall Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 Year Rainfall=3.08"

Area (ac)	CN	Description
0.490	74	>75% Grass cover, Good, HSG C
0.980	98	Paved parking, HSG C
1.470	90	Weighted Average
0.490		33.33% Pervious Area
0.980		66.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.17"
0.9	40	0.0100	0.71		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.17"
16.6	140	Total			

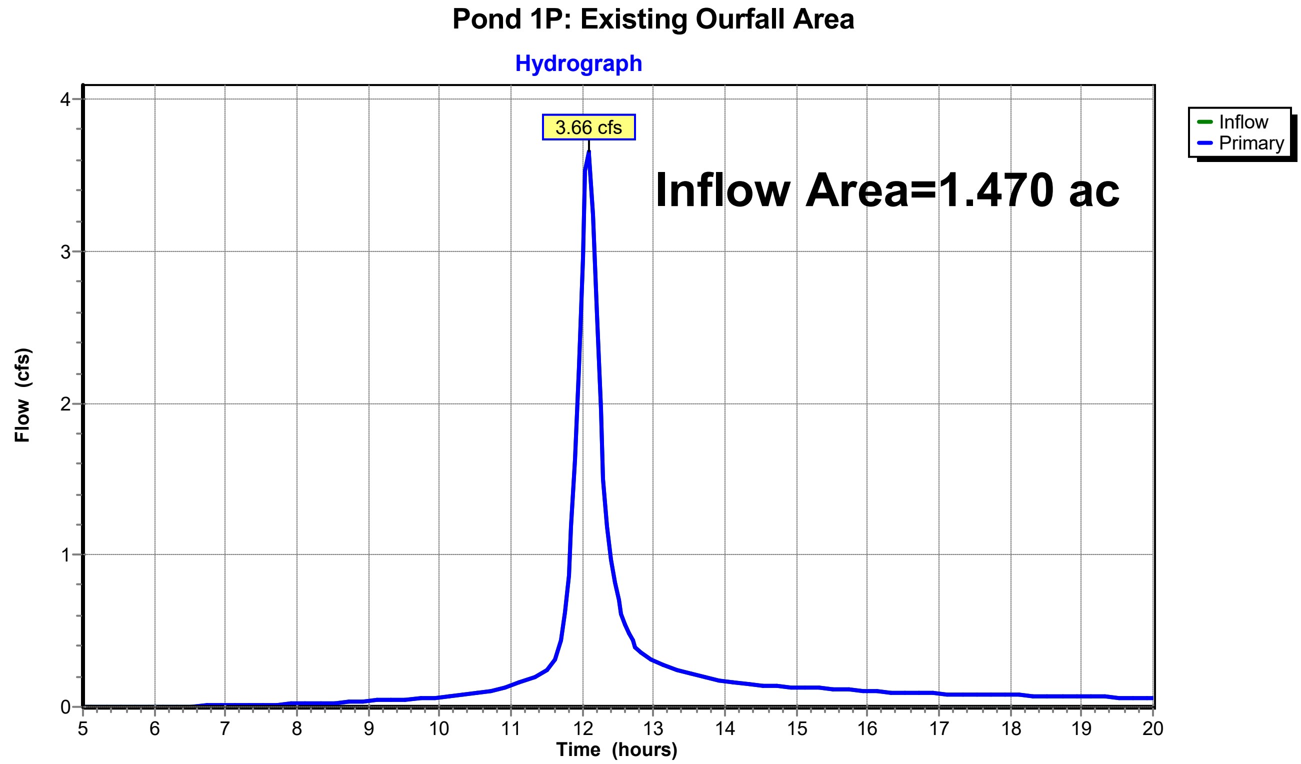
Subcatchment EA: Existing Area



Summary for Pond 1P: Existing Ourfall Area

Inflow Area =	1.470 ac, 66.67% Impervious, Inflow Depth > 1.91" for 10 Year event		
Inflow =	3.66 cfs @ 12.09 hrs, Volume=	0.234 af	
Primary =	3.66 cfs @ 12.09 hrs, Volume=	0.234 af, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



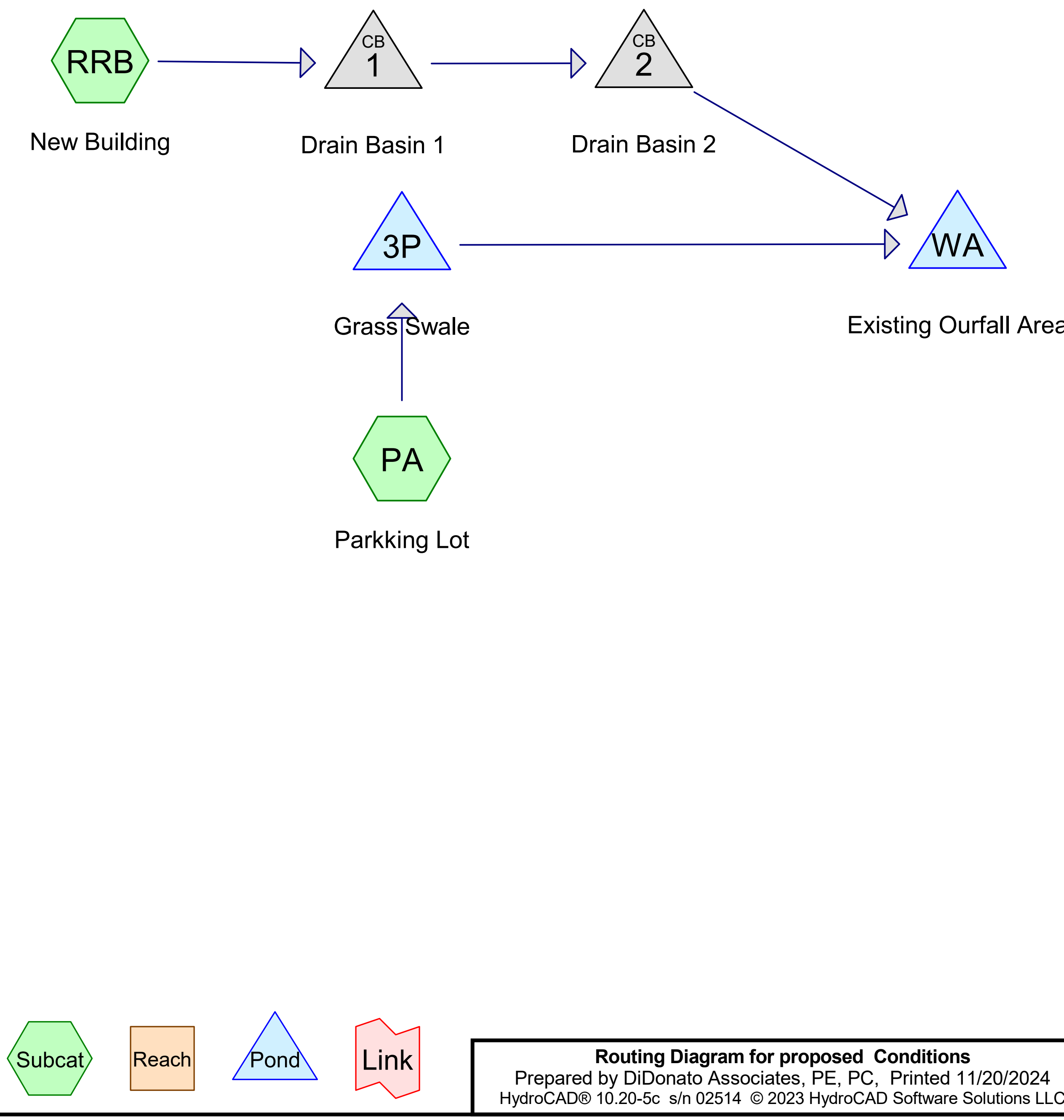
DiDonato Associates

PROPOSED CONDITIONS

DiDonato Associates

25 YEAR STORM

PROPOSED CONDITIONS



Routing Diagram for proposed Conditions
Prepared by DiDonato Associates, PE, PC, Printed 11/20/2024

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.430	74	>75% Grass cover, Good, HSG C (PA)
1.000	98	Paved parking, HSG C (PA)
0.040	98	Roofs, HSG C (RRB)
1.470	**91**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
1.470	HSG C	PA, RRB
0.000	HSG D	
0.000	Other	
1.470		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.430	0.000	0.000	0.430	>75% Grass cover, Good	PA
0.000	0.000	1.000	0.000	0.000	1.000	Paved parking	PA
0.000	0.000	0.040	0.000	0.000	0.040	Roofs	RRB
0.000	**0.000**	**1.470**	**0.000**	**0.000**	**1.470**	**TOTAL AREA**	

Summary for Subcatchment PA: Parkking Lot

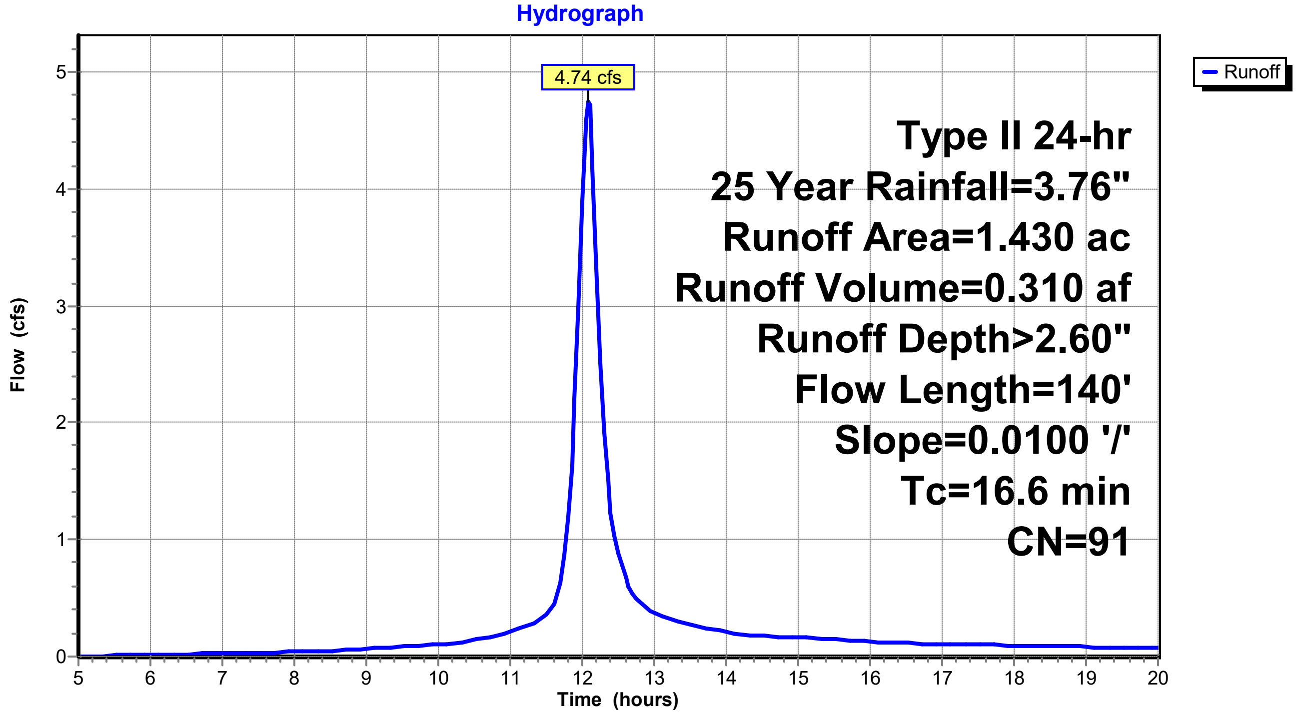
Runoff = 4.74 cfs @ 12.08 hrs, Volume= 0.310 af, Depth> 2.60"
Routed to Pond 3P : Grass Swale

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 Year Rainfall=3.76"

Area (ac)	CN	Description
0.430	74	>75% Grass cover, Good, HSG C
1.000	98	Paved parking, HSG C
1.430	91	Weighted Average
0.430		30.07% Pervious Area
1.000		69.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0100	0.11		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.17"
0.9	40	0.0100	0.71		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.17"
16.6	140	Total			

Subcatchment PA: Parkking Lot



Summary for Subcatchment RRB: New Building

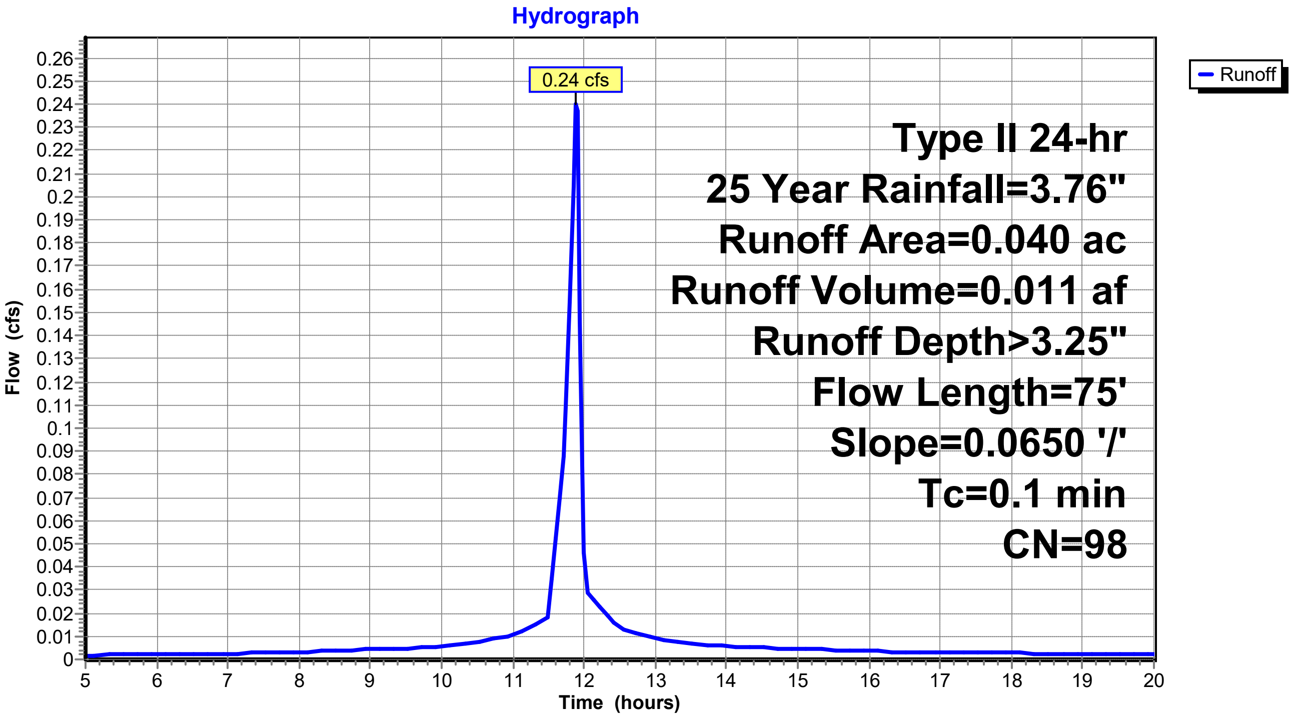
Runoff = 0.24 cfs @ 11.89 hrs, Volume= 0.011 af, Depth> 3.25"
Routed to Pond 1 : Drain Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 Year Rainfall=3.76"

Area (ac)	CN	Description
0.040	98	Roofs, HSG C
0.040		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	75	0.0650	8.61	1.69	**Pipe Channel,** 6.0" Round Area= 0.2 sf Perim= 1.6' r= 0.13' n= 0.011

Subcatchment RRB: New Building



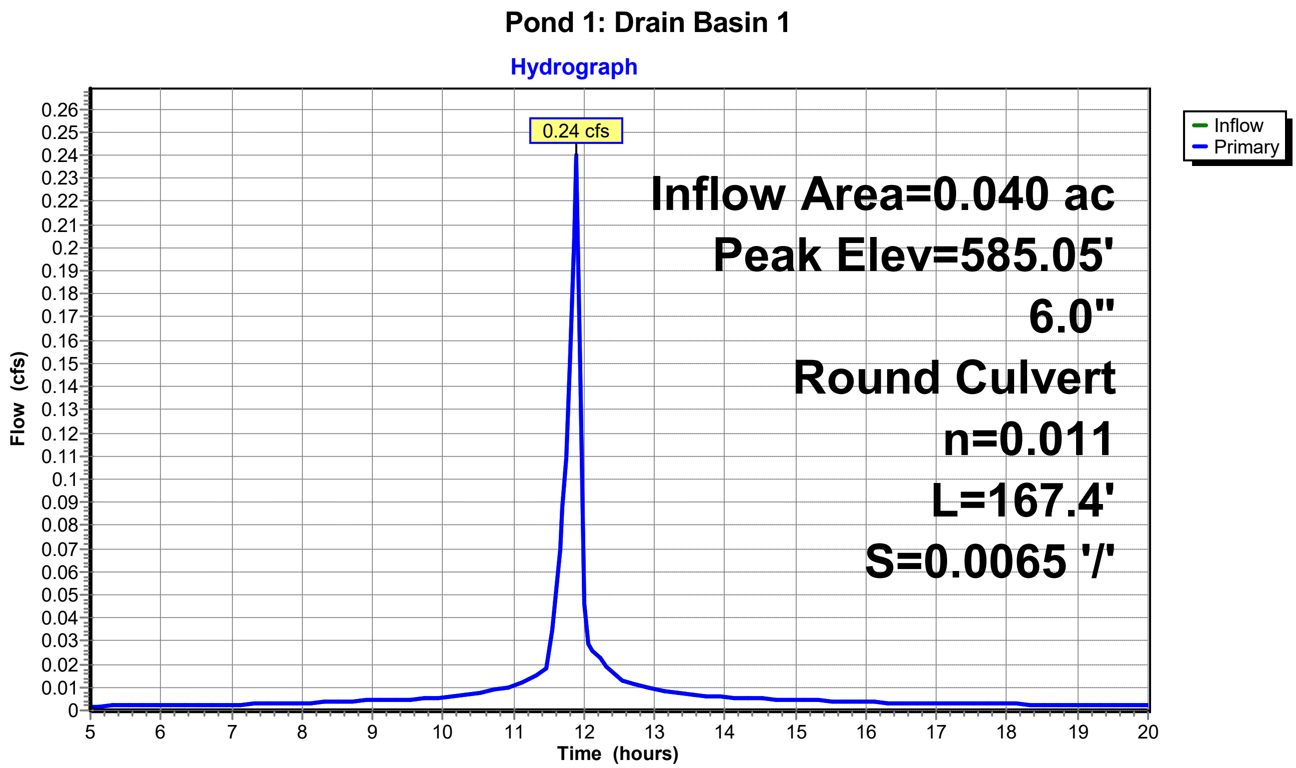
Summary for Pond 1: Drain Basin 1

Inflow Area = 0.040 ac,100.00% Impervious, Inflow Depth > 3.25" for 25 Year event
Inflow = 0.24 cfs @ 11.89 hrs, Volume= 0.011 af
Outflow = 0.24 cfs @ 11.89 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Primary = 0.24 cfs @ 11.89 hrs, Volume= 0.011 af
Routed to Pond 2 : Drain Basin 2

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 585.05' @ 11.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	584.69'	**6.0" Round Culvert** L= 167.4' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 584.69' / 583.60' S= 0.0065 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf

Primary OutFlow Max=0.23 cfs @ 11.89 hrs HW=585.04' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.23 cfs @ 1.58 fps)



Summary for Pond 2: Drain Basin 2

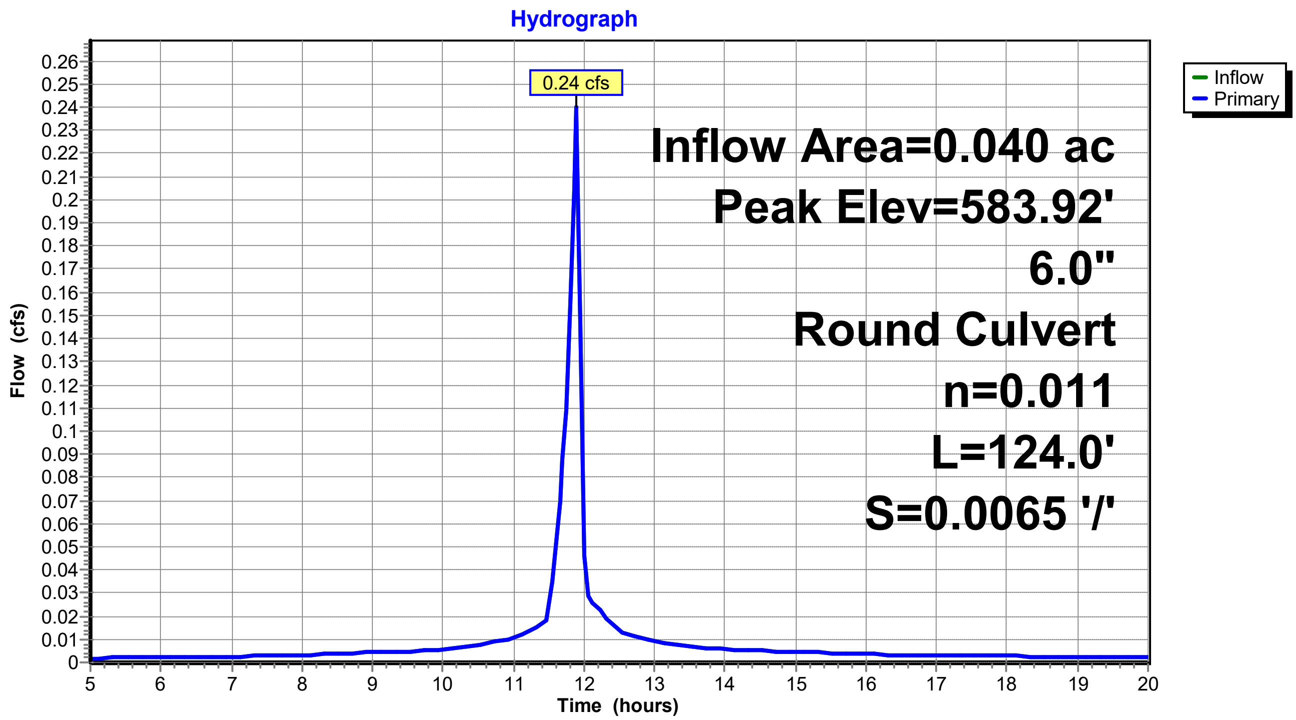
Inflow Area = 0.040 ac,100.00% Impervious, Inflow Depth > 3.25" for 25 Year event
Inflow = 0.24 cfs @ 11.89 hrs, Volume= 0.011 af
Outflow = 0.24 cfs @ 11.89 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Primary = 0.24 cfs @ 11.89 hrs, Volume= 0.011 af
Routed to Pond WA : Existing Ourfall Area

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 583.92' @ 11.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	583.60'	**6.0" Round Culvert** L= 124.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 583.60' / 582.79' S= 0.0065 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf

Primary OutFlow Max=0.23 cfs @ 11.89 hrs HW=583.91' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.23 cfs @ 2.53 fps)

Pond 2: Drain Basin 2



Summary for Pond 3P: Grass Swale

Inflow Area = 1.430 ac, 69.93% Impervious, Inflow Depth > 2.60" for 25 Year event
Inflow = 4.74 cfs @ 12.08 hrs, Volume= 0.310 af
Outflow = 2.48 cfs @ 12.26 hrs, Volume= 0.308 af, Atten= 48%, Lag= 10.4 min
Primary = 2.48 cfs @ 12.26 hrs, Volume= 0.308 af
Routed to Pond WA : Existing Ourfall Area

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 585.58' @ 12.26 hrs Surf.Area= 4,416 sf Storage= 3,442 cf

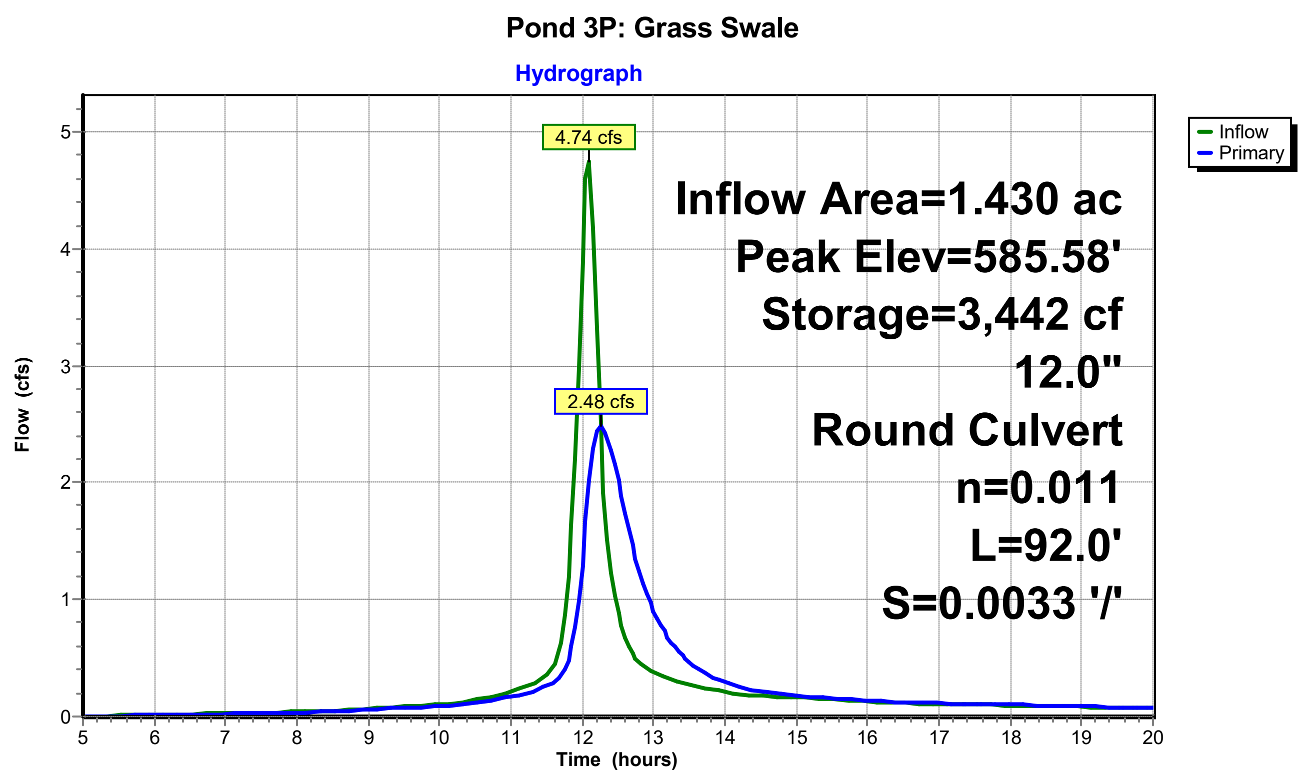
Plug-Flow detention time= 21.3 min calculated for 0.307 af (99% of inflow)
Center-of-Mass det. time= 18.4 min (785.2 - 766.8)

Volume	Invert	Avail.Storage	Storage Description
#1	584.45'	4,893 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
584.45	1	0	0
585.00	3,800	1,045	1,045
585.90	4,750	3,847	4,893

Device	Routing	Invert	Outlet Devices
#1	Primary	584.45'	**12.0" Round Culvert** L= 92.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 584.45' / 584.15' S= 0.0033 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf

Primary OutFlow Max=2.47 cfs @ 12.26 hrs HW=585.58' (Free Discharge)
↑**1=Culvert** (Barrel Controls 2.47 cfs @ 3.48 fps)



Summary for Pond WA: Existing Ourfall Area

Inflow Area =	1.470 ac, 70.75% Impervious, Inflow Depth > 2.61" for 25 Year event		
Inflow =	2.50 cfs @ 12.26 hrs, Volume=	0.319 af	
Primary =	2.50 cfs @ 12.26 hrs, Volume=	0.319 af, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs