Stormwater Management Report

Progressive Sheetmetal
49 Mascolo Rd
South Windsor, CT

Prepared for:

Progressive Sheetmetal, LLC
36 Mascolo Road
South Windsor, CT

Prepared by:

Design Professionals, Inc.
21 Jeffrey Drive
South Windsor, CT

July 13, 2020

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Introduction

Progressive Sheetmetal, LLC is proposing a 3,230 SF ± building expansion to their existing 8,724 ± SF building. Progressive Sheetmetal's 0.88 ± acre parcel is located at 49 Mascolo Road, South Windsor, Connecticut. The property is referenced on the Town of South Windsor Tax Assessors map as GIS#57600049. The proposed development will include the construction of the 3,230 ± SF building expansion and associated site improvements to include, but not be limited to, new parking areas for standard vehicles, landscaping, lighting, utility upgrades and stormwater management BMP's.

Of the 0.88 ± acre parcel, approximately 0.34 ± acres are proposed to be disturbed for the construction of the industrial facility. There are no wetlands located on site. For more information, please refer to the plans entitled "Progressive Sheetmetal ~ Site Plan Modification ~ 49 Macolo Road ~ South Windsor, CT ~ GIS#5760049" prepared by Design Professionals, Inc. and dated June 29th, 2020, as amended.

Pre-Development Site Conditions

The existing site currently operates as an industrial manufacturing facility with a mix of impervious areas including parking spaces, drive aisles, and the existing 8,724 SF building. The site is abutted by industrial properties to the east and west, and woodland areas to the south.

All runoff generated on site currently sheet flows across the northern property line to the stormwater capture system for Mascolo Road. Based on a review of town topo and aerial imagery, all stormwater collected in the Mascolo Road stormwater system gets discharged to the Newberry Brook. The Newberry Brook is a tributary stream of the Connecticut River.

Based on Natural Resources Conservation Service (NRCS) Hydrologic Soil Group (HSG) mapping, all soils onsite are type B/D. See **Appendix A** for The NRCS Soil Map & Data.

Post-Development Site Conditions

The subject project proposes the construction of a 3,230 ± SF building expansion and associated site improvements to accommodate. Due to the site's proximity to the Connecticut River and associated flood plain, it is assumed that limiting post-development peak flows to be equal to or less than pre-developed peak flows is not required or warranted. The proposed drainage system was designed to update the site to water quality standards of Connecticut's 2004 Stormwater Quality Manual. Ground Water Recharge and Water Quality Flow considerations as specified in the manual were the key design factors considered. To achieve these two design objectives, the following is proposed:

- **Ground Water Recharge:** One Cultec R-330XLHD underground stormwater chamber is proposed to facilitate groundwater recharge of the roof area of the proposed addition and west parking surface area. The Groundwater Recharge Volume calculation and the underground chamber stage storage report is included as **Appendix B** of this report.

- **Water Quality Flow**: The Cultec R-330XLHD underground chamber will also treatment all runoff from the western parking area. Runoff collected in the eastern parking area will be treated via an ADS Barracuda S3 Hydrodynamic Separator. Both the underground chamber and hydrodynamic separator unit were selected based on their ability to treat the determined Water Quality Flow rate for the area draining to each. Water Quality Flow calculations and Manufacturer specs on both systems are included in **Appendix C** of this report.

A drainage area map showing areas considered for both groundwater recharge and water quality flow is included as **Appendix E** of this report.

Storm Sewer Collection System

The proposed subsurface stormwater collection and conveyance system was designed to adequately convey proposed runoff under 10- year storm event conditions. The design of the storm sewers followed the guidelines set forth in the Connecticut Department of Transportation's Drainage Manual. It is estimated that during a 10-year storm event, all proposed subsurface culverts will convey storm runoff without resulting in any unacceptable flooding conditions. The computations are included as **Appendix D**.

Conclusion

The proposed stormwater management system as discussed herein and shown on the referenced plans is appropriate for the proposed development on the subject site, is consistent with Town and State requirements, and should not pose any detrimental impacts to the surrounding stormwater conditions.

APPENDIX A
NRCS Soil Map & Data

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 State of Connecticut

April 17, 2020

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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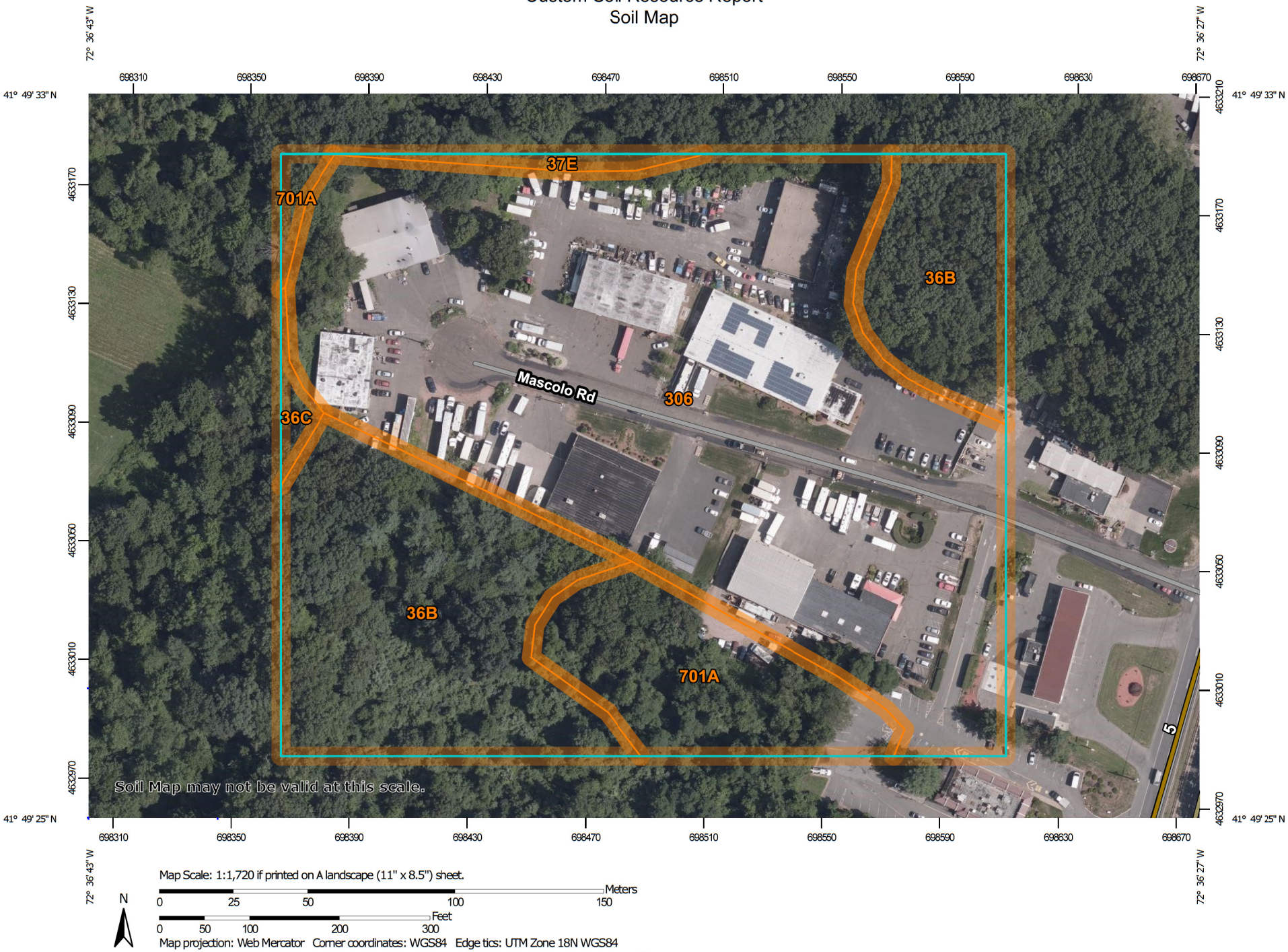
Contents

Soil Map

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

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,720 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 19, Sep 13, 2019

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

Date(s) aerial images were photographed: Jul 15, 2019—Aug 29, 2019

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
36B	Windsor loamy sand, 3 to 8 percent slopes	3.3	26.9%
36C	Windsor loamy sand, 8 to 15 percent slopes	0.1	0.8%
37E	Manchester gravelly sandy loam, 15 to 45 percent slopes	0.1	0.9%
306	Udorthents-Urban land complex	7.5	60.9%
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	1.3	10.5%
Totals for Area of Interest		**12.4**	**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.

State of Connecticut

36B—Windsor loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svkf
Elevation: 0 to 1,210 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Windsor, Loamy Sand

Setting

Landform: Outwash plains, deltas, outwash terraces, dunes
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand
Bw - 3 to 25 inches: loamy sand
C - 25 to 65 inches: sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Hinckley, loamy sand

Percent of map unit: 10 percent
Landform: Eskers, kames, outwash plains, deltas
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Deerfield, loamy sand

Percent of map unit: 5 percent
Landform: Outwash plains, terraces, deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

36C—Windsor loamy sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svkq
Elevation: 0 to 1,260 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Windsor

Setting

Landform: — error in exists on —
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, riser
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

Ap - 1 to 11 inches: loamy sand
Bw - 11 to 31 inches: loamy sand
C - 31 to 65 inches: sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Hinckley

Percent of map unit: 10 percent
Landform: Deltas, eskers, kames, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Deerfield

Percent of map unit: 5 percent
Landform: Outwash plains, terraces, deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

37E—Manchester gravelly sandy loam, 15 to 45 percent slopes

Map Unit Setting

National map unit symbol: 9ln7
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F

Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Manchester

Setting

Landform: Eskers, kames, outwash plains, terraces
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glaciofluvial deposits derived from sandstone and shale and/or basalt

Typical profile

Ap - 0 to 9 inches: gravelly sandy loam
Bw - 9 to 18 inches: gravelly loamy sand
C - 18 to 65 inches: stratified extremely gravelly coarse sand to very gravelly loamy sand

Properties and qualities

Slope: 15 to 45 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Hartford

Percent of map unit: 5 percent
Landform: Outwash plains, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Branford

Percent of map unit: 5 percent
Landform: Outwash plains, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Penwood

Percent of map unit: 5 percent
Landform: Outwash plains, terraces
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Walpole

Percent of map unit: 3 percent
Landform: Drainageways on terraces, depressions on terraces
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scitico

Percent of map unit: 2 percent
Landform: Terraces, drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

306—Udorthents-Urban land complex

Map Unit Setting

National map unit symbol: 9lmg
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 50 percent
Urban land: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Drift

Typical profile

A - 0 to 5 inches: loam
C1 - 5 to 21 inches: gravelly loam
C2 - 21 to 80 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 25 percent

Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: About 54 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.8 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Urban Land

Typical profile
H - 0 to 6 inches: material

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Unnamed, undisturbed soils
Percent of map unit: 8 percent
Hydric soil rating: No

Udorthents, wet substratum
Percent of map unit: 5 percent
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop
Percent of map unit: 2 percent
Hydric soil rating: No

701A—Ninigret fine sandy loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2y07d
Elevation: 0 to 1,260 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days

Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Ninigret

Setting

Landform: Outwash plains, kame terraces, outwash terraces, kames, moraines
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, concave
Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss, granite, schist, and/or phyllite

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 16 inches: fine sandy loam
Bw2 - 16 to 26 inches: fine sandy loam
2C - 26 to 65 inches: stratified loamy sand to loamy fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 18 to 38 inches to strongly contrasting textural stratification
Natural drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 17 to 39 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent
Landform: Eskers, outwash terraces, kames, moraines, outwash plains
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope, crest, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Agawam

Percent of map unit: 5 percent

Landform: Moraines, outwash plains, kame terraces, outwash terraces, kames
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope, crest, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Tisbury

Percent of map unit: 3 percent
Landform: Outwash terraces, outwash plains, deltas, valley trains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Raypol

Percent of map unit: 2 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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

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

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

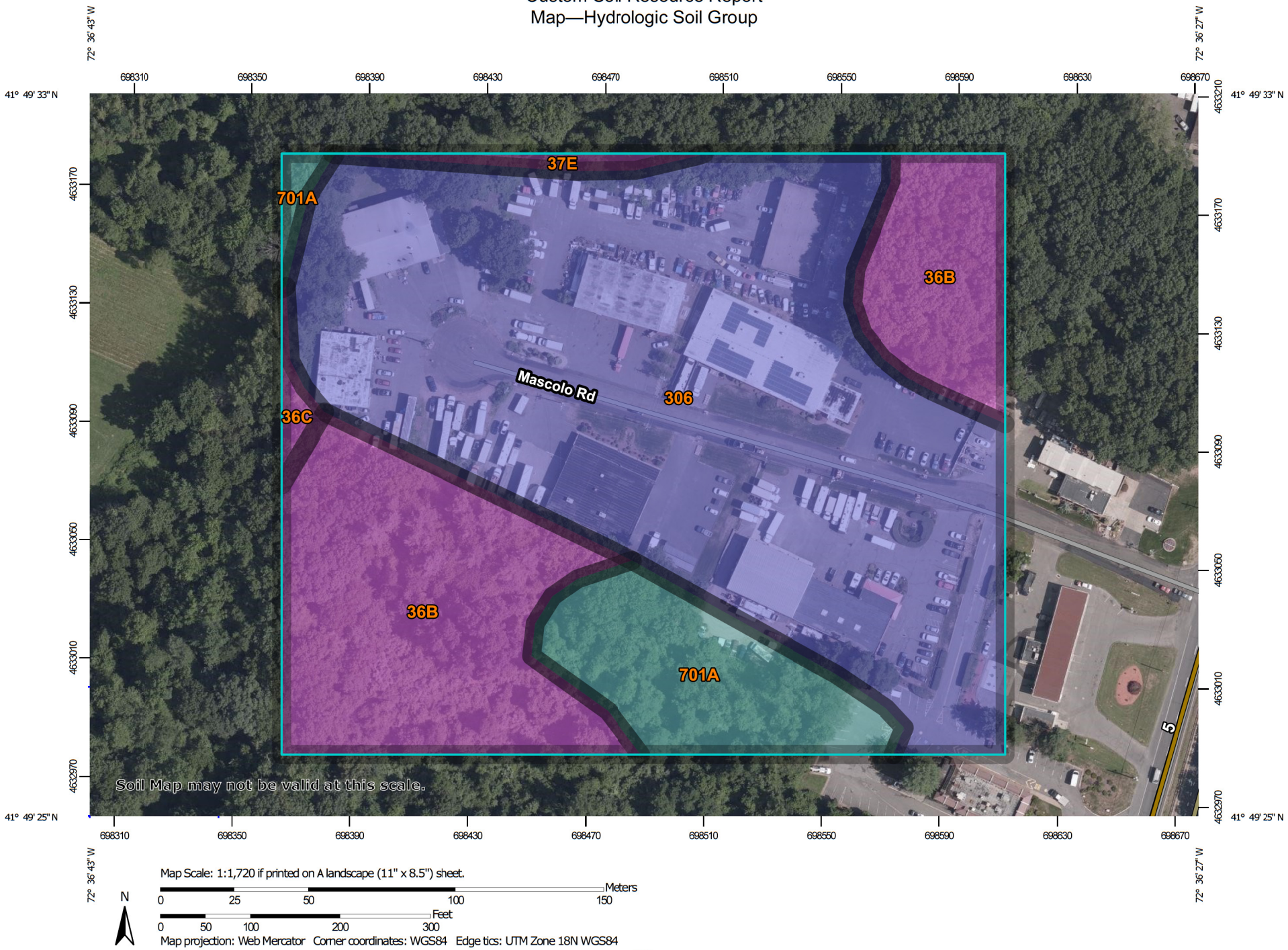
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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

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

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

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:1,720 if printed on A landscape (11" x 8.5") sheet.

N

0 25 50 100 150 Meters

0 50 100 200 300 Feet

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 Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 19, Sep 13, 2019

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

Date(s) aerial images were photographed: Jul 15, 2019—Aug 29, 2019

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.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
36B	Windsor loamy sand, 3 to 8 percent slopes	A	3.3	26.9%
36C	Windsor loamy sand, 8 to 15 percent slopes	A	0.1	0.8%
37E	Manchester gravelly sandy loam, 15 to 45 percent slopes	A	0.1	0.9%
306	Udorthents-Urban land complex	B	7.5	60.9%
701A	Ninigret fine sandy loam, 0 to 3 percent slopes	C	1.3	10.5%
Totals for Area of Interest			**12.4**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

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APPENDIX B
Ground Water Recharge Volume

49 Mascolo Road – Progressive Sheet Metal
DPI Project No:3838
July 13, 2020

Groundwater Recharge Volume Calculations
Per 2004 Connecticut Stormwater Quality Manual, Section 7.5.1:

Areas for Calculation: Water Quality Basin (P2), Car Parking Area (P3), Truck Parking Area (P4), and Roof Areas (P5 & P6)

	Area (acres)
	West Parking & Addition Roof
Impervious	0.14
Pervious	0.14
Total Area	0.14
%Impervious	100%

Groundwater Recharge Volume (GRV) = (D)(A)(I)/12, where:

D = Depth of runoff volume (per Table 7-4)
A = Site Area (acres)
I = Post Development Site Imperviousness (decimal)

Hydraulic Soil Groups on Site: HSG=B
D= 0.25"

GRV = (D)(A acres)(I)/12 inches per foot
GRV = (0.25")(.14 acres)(1.00) /12 inches per foot
GRV = 0.003 acre-feet required = 127.05 cft

Table 7-4
Groundwater Recharge Depth

NRCS Hydrologic Soil Group	Average Annual Recharge	Groundwater Recharge Depth (D)
A	18 inches/year	0.4 inches
B	12 inches/year	0.25 inches
C	6 inches/year	0.10 inches
D	3 inches/year	0 inches (waived)

Source: MADEP, 1997.
NRCS – Natural Resources Conservation Service

Proposed BMP
The proposed **Cultec R-330XLHD** in the west parking area will provide **132.2 cft** of stormwater storage below the systems outlet invert @ **Elev. 57.84**. See storage summary sheet included in the appendix of this report.

Summary for Pond UGC: UGC

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

Volume	Invert	Avail.Storage	Storage Description
#1A	54.30'	69 cf	**6.33'W x 10.50'L x 3.54'H Field A** 236 cf Overall - 63 cf Embedded = 172 cf x 40.0% Voids
#2A	54.80'	63 cf	**Cultec R-330XLHD** Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		132 cf	Total Available Storage

Storage Group A created with Chamber Wizard

APPENDIX C
Water Quality FLow

49 Mascolo Road – Progressive Sheet Metal
DPI Project No:3838
July 13, 2020

Water Quality Flow Calculations
Per 2004 Connecticut Stormwater Quality Manual
Per Appendix B page B-3:
Water Quality Flow (WQF) = (qu)(A)(Q), where:
qu = unit peak discharge (cfs/mi^2/inch) per Exhibit 4-III
A = drainage area (mi^2)
Q = runoff depth (in watershed inches)
= [Water Quality Volume (WQV) (in acre-feet)] x [12 inches/foot] / drainage area (acres)

West Parking Area

To find Unit Peak Discharge qu with Exhibit 4-III, the following is needed:
Time of Concentration (Tc):
6 mins = 0.1 hours
Initial Abstraction (Ia) in inches / Design Precipitation (P) in inches:
Initial abstraction (Ia) from Table 4-I in Chapter 4 of TR-55 needs Curve Number (CN)
CN = 98
Ia = 0.043 inches
Design Precipitation (P) = 1" for water quality storms per Appendix B
Ia/P = 0.043
Unit Peak Discharge qu = 700 cfs/mi^2/inch

Drainage Area A = 2,785 sf = 0.063 acres = 0.0001 mi^2

Runoff Depth Q = WQV (acre-feet) x 12 / drainage area (acres)

Water Quality Volume (WQV) = (1")(R)(A)/12, where:
R = volumetric runoff coefficient
= 0.05 + 0.009(I), where I = percent impervious cover = 100%
R = 0.05 + 0.009(I)
R = 0.05 + 0.009(100.0)
R = 0.95

A = drainage area in acres = 0.063 acres

WQV = (1")(R)(A)/12
WQV = (1")(0.950)(0.063 acres) / 12 in/ft
WQV = 0.005 acre-feet

Q = (WQV X 12 in/ft)/Drainage Area
Q = (0.005 acre-feet x 12 in/ft) / 0.063 acres
Q = 0.95 in

WQF = qu x A x Q
WQF = 700 cfs/mi^2/inch x 0.0001 mi^2 x 0.95 in
WQF = **0.067 cfs required**

Proposed
As shown on the enclosed water quality per unit sizing report, the proposed Cultec Isolator chamber (utilizing **1 ~ R-330XLHD** chamber @ **0.17 cfs** treated flow rate per chamber) is rated for 80% TSS removal for the required **0.067 cfs** water quality flow. The current design plan proposes **1** isolator chamber for the subject area, providing **0.17 cfs** of WQF. See isolator row sizing chart included in the appendix.

East Parking Area

To find Unit Peak Discharge qu with Exhibit 4-III, the following is needed:

Time of Concentration (Tc):

6 mins = 0.1 hours

Initial Abstraction (Ia) in inches / Design Precipitation (P) in inches:

Initial abstraction (Ia) from Table 4-I in Chapter 4 of TR-55 needs Curve Number (CN)

CN = 85

Ia = 0.353 inches

Design Precipitation (P) = 1" for water quality storms per Appendix B

Ia/P = 0.353

Unit Peak Discharge qu = 550 cfs/mi^2/inch

Drainage Area A = 14,757 sf = 0.34 acres = 0.0005 mi^2

Runoff Depth Q = WQV (acre-feet) x 12 / drainage area (acres)

Water Quality Volume (WQV) = (1")(R)(A)/12, where:

R = volumetric runoff coefficient

= 0.05 + 0.009(I), where I = percent impervious cover = 64.15%

R = 0.05 + 0.009(I)

R = 0.05 + 0.009(64.15)

R = 0.63

A = drainage area in acres = 0.34 acres

WQV = (1")(R)(A)/12

WQV = (1")(0.63)(0.34 acres) / 12 in/ft

WQV = 0.018 acre-feet

Q = (WQV X 12 in/ft)/Drainage Area

Q = (0.018 acre-feet x 12 in/ft) / 0.34 acres

Q = 0.64 in

WQF = qu x A x Q

WQF = 550 cfs/mi^2/inch x 0.0005 mi^2 x 0.64 in

WQF = **0.18 cfs required**

Proposed

As shown on the enclosed water quality per unit sizing report, the proposed **ADS S3 Barracuda** is rated for 80% TSS removal for the required **0.18 cfs** water quality flow. See the ADA Barracuda sizing chart included in the appendix.

CULTEC Separator Row Sizing Tables (Imperial)

Maine DEP / ADS Equivalent Sizing (OK 110 Particle Distribution)

	80% TSS Flow Rate (Maine DEP)	Chamber Width	Installed Chamber Length	Bottom Area	Treatment Rate / Chamber
CONTACTOR 100HD	2.5 gpm/sf	3.00'	7.5'	22.50 s.f.	0.125 cfs
RECHARGER 150XLHD	2.5 gpm/sf	2.75'	10.25'	28.18 s.f.	0.157 cfs
RECHARGER 180HD	2.5 gpm/sf	3.00'	6.33'	18.99 s.f.	0.106 cfs
RECHARGER 280HD	2.5 gpm/sf	3.91'	7.00'	27.37 s.f.	0.152 cfs
RECHARGER 330XLHD	2.5 gpm/sf	4.33'	7.00'	31.31 s.f.	0.174 cfs
RECHARGER 360HD	2.5 gpm/sf	5.00'	3.67'	18.35 s.f.	0.102 cfs
RECHARGER 902HD	2.5 gpm/sf	6.50'	3.67'	23.86 s.f.	0.133 cfs

ETV (ETV / NJDEP Particle Distribution)

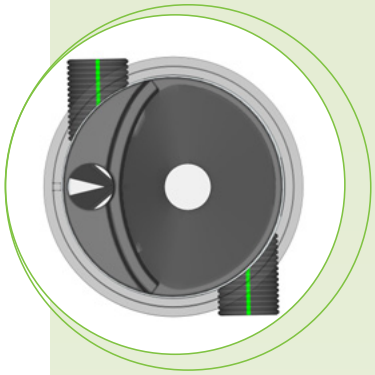
	80% TSS Flow Rate (ETV)	Chamber Width	Installed Chamber Length	Bottom Area	Treatment Rate / Chamber
CONTACTOR 100HD	1.0 gpm/sf	3.00'	7.5'	22.50 s.f.	0.050 cfs
RECHARGER 150XLHD	1.0 gpm/sf	2.75'	10.25'	28.18 s.f.	0.063 cfs
RECHARGER 180HD	1.0 gpm/sf	3.00'	6.33'	18.99 s.f.	0.042 cfs
RECHARGER 280HD	1.0 gpm/sf	3.91'	7.00'	27.37 s.f.	0.061 cfs
RECHARGER 330XLHD	1.0 gpm/sf	4.33'	7.00'	31.31 s.f.	0.070 cfs
RECHARGER 360HD	1.0 gpm/sf	5.00'	3.67'	18.35 s.f.	0.041 cfs
RECHARGER 902HD	1.0 gpm/sf	6.50'	3.67'	23.86 s.f.	0.053 cfs

BAYSAVER TECHNOLOGIES®

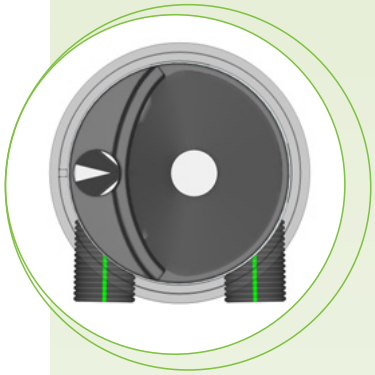
ADS®

Barracuda S4

The Barracuda S4 is a market-changing stormwater quality technology. This high performance vortex hydrodynamic separator is designed to remove total suspended solids in order to protect our precious receiving waters. The Barracuda is also an outstanding value that offers multiple pipe configurations, and quick installation.



Inline Configuration



Offline Configuration

FEATURES:

- Single manhole design
- No elevation loss between the inlet and outlet
- Flexible inlet/outlet positions (not just 180 degree orientation)
- Internal bypass for inline installation (where applicable)
- Revolutionary, patent pending “teeth” mitigate turbulence in the sump area to prevent resuspension of captured contaminants.

BENEFITS:

- Internal components are in stock for quick delivery.
- The S4 can be provided within a 48” ADS HP Manhole, to be factory fabricated and delivered complete to the jobsite.
- The S4 can also be installed in a standard 48” precast manhole. The Barracuda “teeth” apparatus is fabricated and designed for quick and easy field assembly.
- Designed for easy maintenance using a vacuum truck or similar equipment.
- Inspection and maintenance are performed from the surface with no confined space entry.

ADS Service: ADS representatives are committed to providing you with the answers to all your questions, including specifications, installation and more.

BARRACUDA S4 SPECIFICATION

MATERIALS AND DESIGN

- Concrete Structures: Designed for H-20 traffic loading and applicable soil loads or as otherwise determined by a Licensed Professional Engineer. The materials and structural design of the devices shall be per ASTM C857 and ASTM C858.
- 48" HP Manhole Structures: Made from an impact modified copolymer polypropylene meeting the material requirements of ASTM F2764. The eccentric cone reducer shall be manufactured from polyethylene material meeting ASTM D3350 cell class 213320C. Gaskets shall be made of material meeting the requirements of ASTM F477.
- Separator internals shall be substantially constructed of stainless steel, polyethylene or other thermoplastic material approved by the manufacturer.

PERFORMANCE

- The stormwater treatment unit shall be an inline unit capable of conveying 100% of the design peak flow. If peak flow rates exceed maximum hydraulic rate, the unit shall be installed offline.

- The Barracuda unit shall be designed to remove at least 80% of the suspended solids on an annual aggregate removal basis. Said removal shall be based on full-scale third party testing using OK-110 media gradation or equivalent and 300 mg/L influent concentration. Said full scale testing shall have included sediment capture based on actual total mass collected by the stormwater treatment unit.

  - OR -

  The Barracuda unit shall be designed to remove at least 50% of TSS using a media mix with d_{50}=75 micron and 200 mg/L influent concentration.

  - OR -

  The Barracuda unit shall be designed to remove at least 50% of TSS per current NJDEP/NJCAT HDS protocol .

- The stormwater treatment unit internals shall consist of (1) separator cone assembly, and (1) sump assembly which includes (4) legs with "teeth".

	Manhole Diameter	80% Removal OK-110	50% TSS per NJCAT	Max Hydraulic Rate
Barracuda S4	48"	1.08 CFS	1.25 CFS	6.25 CFS

INSTALLATION

Installation of the stormwater treatment unit(s) shall be performed per manufacturer's installation instructions. Such instructions can be obtained by calling Advanced Drainage Systems at (800) 821-6710 or by logging on to www.ads-pipe.com or www.baysaver.com.

Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

BOGGS ENVIRONMENTAL CONSULTANTS

Middletown, MD & Morgantown, WV

Administrative Office:
200 W Main Street
Middletown, Maryland 21769

Office (301) 694-5687
Fax (301) 694-9799

BaySaver Technologies, LLC
1030 Deer Hollow Drive
Mount Airy, MD 21771
(301) 679-0640; dfigola@ads-pipe.com

November 1, 2017

ATTENTION: Daniel Figola, General Manager
REFERENCE: Third Party Review of Testing Procedures for Barracuda™ Separator at the Mid Atlantic Storm Water Research Center, 1207 Park Ridge Drive, Mount Airy, MD 21771

SUMMARY

Boggs Environmental Consultants, Inc. (BEC) was hired by Advanced Drainage Systems (ADS) in August of 2017, to serve as independent third-party oversight of the BaySaver Barracuda S4 Separator test unit for removal of sediment with equivalent particle size distribution to the industry standard OK-110. The BaySaver Barracuda S4 is a storm water treatment device with a Maximum Treatment Flow Rate (MTFR) of approximately 1.08 cubic feet per second (cfs) that removes suspended solids from storm water runoff, with an average removal efficiency of 80% at the MTFR and a feed concentration of 300 mg/L. The device is an insert that can be installed in either Polypropylene plastic pipe or concrete vault, and consists of a cone (vortex separator) and baffles ("teeth").

SCALED RESULTS

Testing flow rates ranged from 0.31 to 1.61 cfs, with a feed OK-110 concentration of 300 mg/L. Based upon New Jersey scaling methodology, the table below represents treatment and device information for the S4, S6, and S8 units.

Table 1: MTFR's and Sizing for BaySaver Barracuda Models

Model[1]	Man-hole Diam-eter[1] (ft)	OK110 80% TSS Maximum Treatment Flow Rate (cfs)	Treat-ment Area (ft^2)	Hydraulic Loading rate (gpm/ft^2)	Chamber Depth (ft)	Wet Volume (ft^3)	50% Maximum Sediment Storage[2] (ft^3)
Barracuda S4	4	1.08	12.57	38.6	6.83	75.4	10.47
Barracuda S6	6	2.43	28.27	38.6	6.83	169.7	23.56
Barracuda S8	8	4.32	50.27	38.6	11.03	512.7	41.89

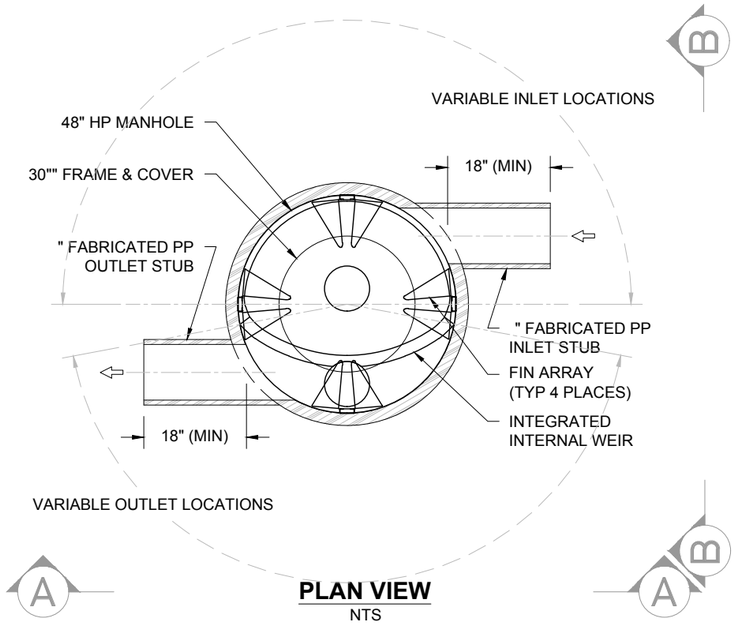
Notes:
1. In some areas, Barracuda units are available in additional diameters. Units not listed here are sized not to exceed 38.6 gpm/ft^2 of effective treatment during the peak water quality flow.
2. 50% Sediment Storage Capacity is equal to manhole diameter x 10 inches of sediment depth. Each Barracuda unit has a 20 inches deep sediment sump.

Should you have any questions, contact our office at your earliest convenience.

Sincerely,
BOGGS ENVIRONMENTAL CONSULTANTS, INC.

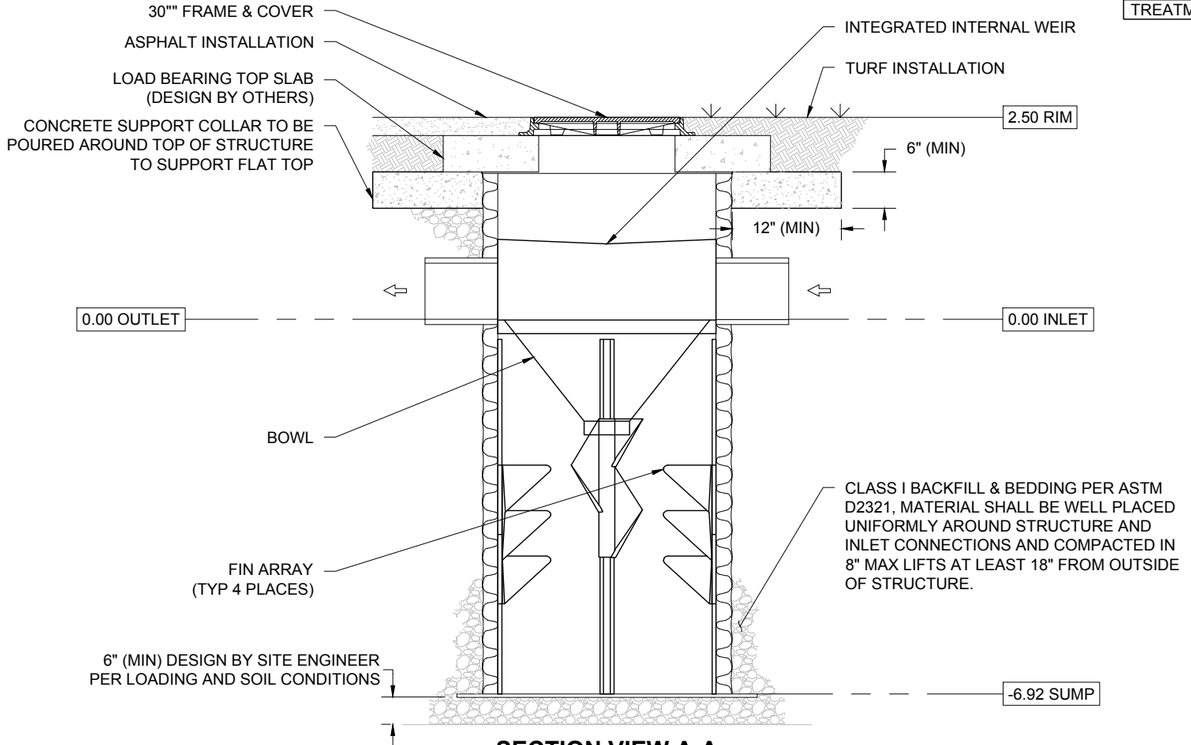
William R. Warfel
Principal Environmental Scientist

Robin J. Maliszewskyj
Chemical Engineer

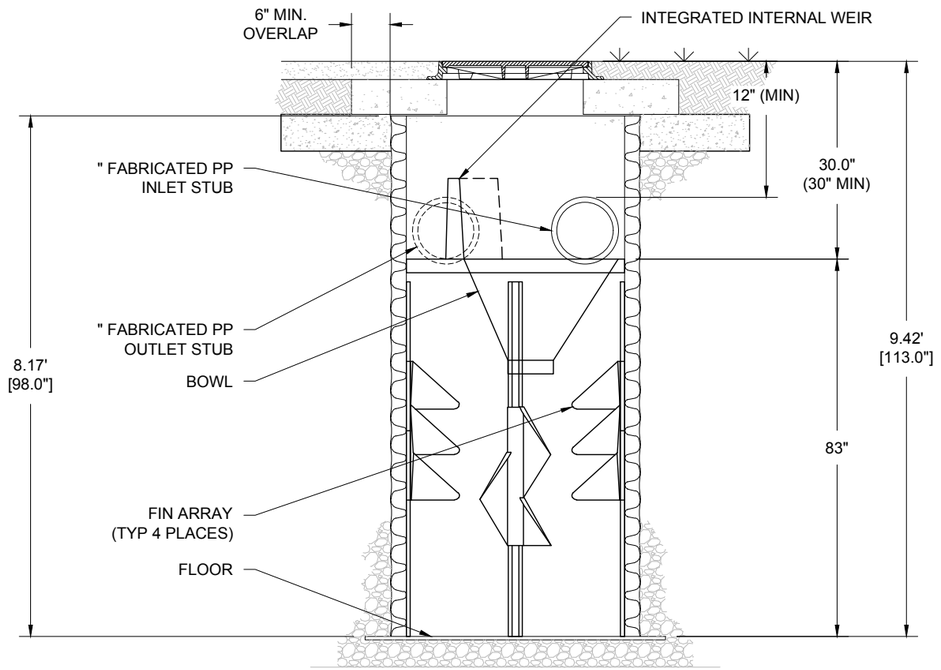


PLAN VIEW
NTS

BARRACUDA S4	
UNIT ID	BMP#1
PEAK FLOW RATE (CFS)	
TREATMENT FLOW RATE (CFS)	1.25 CFS



SECTION VIEW A-A
NTS



SECTION VIEW B-B
NTS

BARRACUDA S4 HP
STANDARD DETAIL

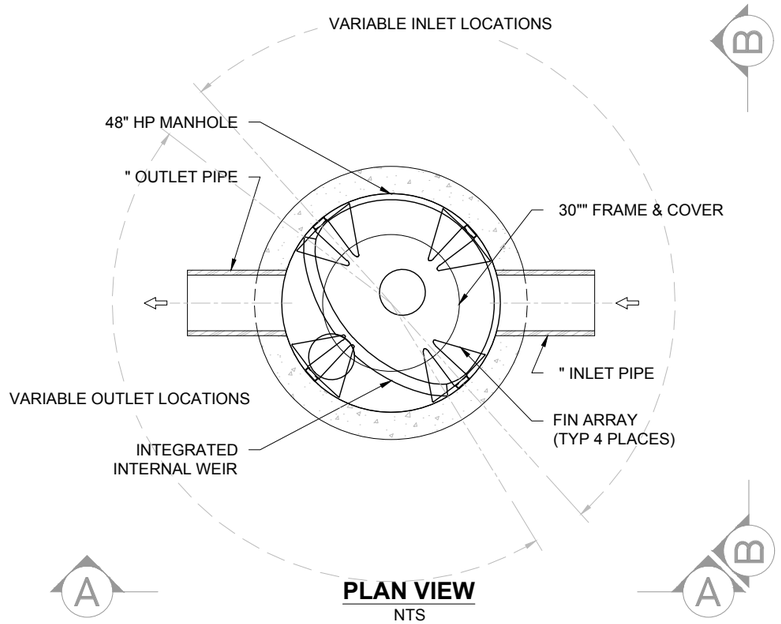
DATE: 10/20/17 DRAWN: EKH
PROJECT #: CHECKED: ----

REV	DWN	CKD	DESCRIPTION

1030 Deer Hollow Drive
Mount Airy, MD 21771
1-800-BAYSAVER
1-800-229-7283
barracuda

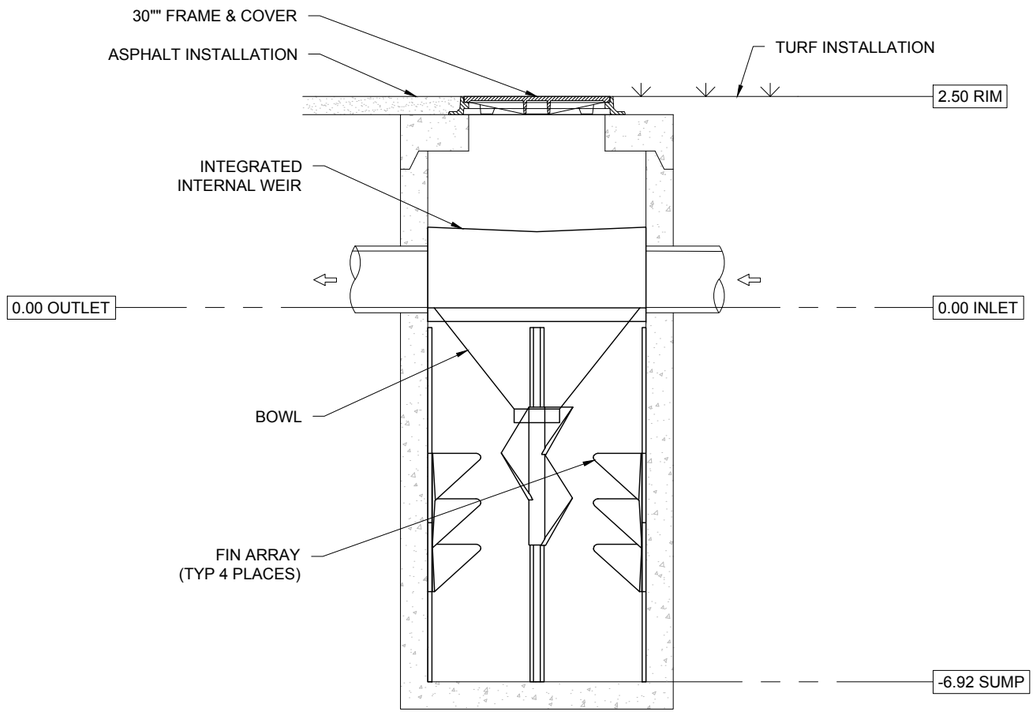
4640 TRUEMAN BLVD
HILLIARD, OH 43026
ADS® ADVANCED DRAINAGE SYSTEMS, INC.

NOT TO SCALE

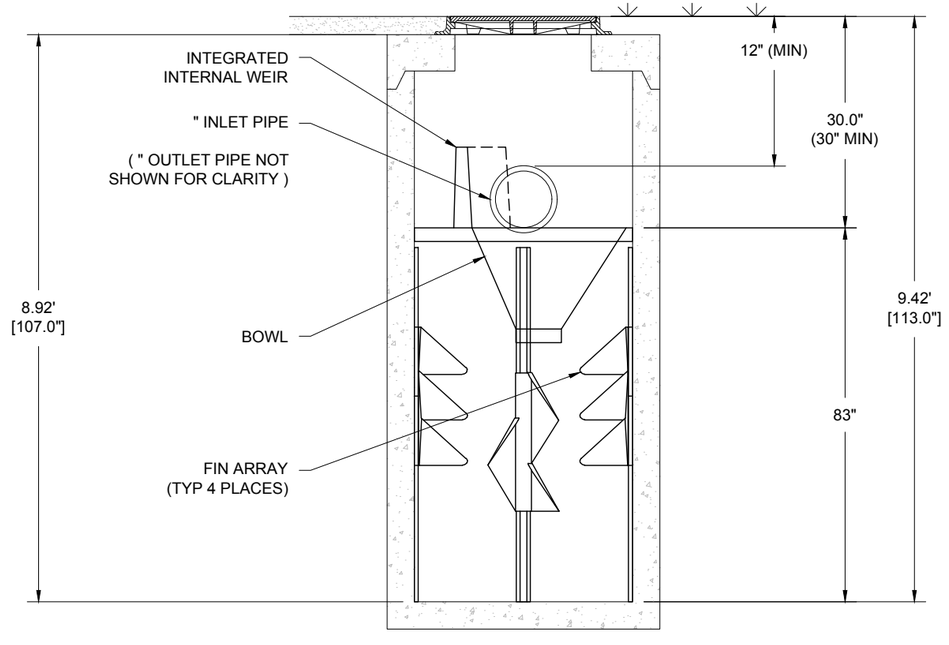


PLAN VIEW
NTS

BARRACUDA S4	
UNIT ID	BMP#1
PEAK FLOW RATE (CFS)	
TREATMENT FLOW RATE (CFS)	1.25 CFS



SECTION VIEW A-A
NTS



SECTION VIEW B-B
NTS

BARRACUDA S4
STANDARD DETAIL

DATE: 10/20/17
DRAWN: EKH
PROJECT #:
CHECKED: ----

REV	DWN	CKD	DESCRIPTION

1030 Deer Hollow Drive
Mount Airy, MD 21771
1-800-BAYSAVER
1-800-229-7283
barracuda

4640 TRUEMAN BLVD
HILLIARD, OH 43026
ADS
ADVANCED DRAINAGE SYSTEMS, INC.

NOT TO SCALE

Maintenance Guide

BaySaver Barracuda™

July 2017

One of the advantages of the BaySaver Barracuda is the ease of maintenance. Like any system that collects pollutants, the BaySaver Barracuda must be maintained for continued effectiveness. Maintenance is a simple procedure performed using a vacuum truck or similar equipment. The systems were designed to minimize the volume of water removed during routine maintenance, reducing disposal costs.

Contractors can access the pollutants stored in the manhole through the manhole cover. This allows them to gain vacuum hose access to the bottom of the manhole to remove sediment and trash. There is no confined space entry necessary for inspection or maintenance.

The entire maintenance procedure typically takes from 2 to 4 hours, depending on the size of the system, the captured material, and the capacity of the vacuum truck.

Local regulations may apply to the maintenance procedure. Safe and legal disposal of pollutants is the responsibility of the maintenance contractor. Maintenance should be performed only by a qualified contractor.

Inspection and Cleaning Cycle

Periodic inspection is needed to determine the need for and frequency of maintenance. You should begin inspecting as soon as construction is complete and thereafter on an annual basis. Typically, the system needs to be cleaned every 1-3 years.

Excessive oils, fuels or sediments may reduce the maintenance cycle. Periodic inspection is important.

Determining When to Clean

To determine the sediment depth, the maintenance contractor should lower a stadia rod into the manhole until it contacts the top of the captured sediment and mark that spot on the rod. Then push the probe through to the bottom of the sump and mark that spot to determine sediment depth.

Maintenance should occur when the sediment has reached the levels indicated in the Storage Capacity Chart.

BaySaver Barracuda Storage Capacities

Model	Manhole Diameter	Treatment Chamber Capacity	Standard Sediment Capacity (20" depth)	NJDEP Sediment Capacity (50% of standard depth)
S3	36"	212 gallons	0.44 cubic yards	0.22 cubic yards
S4	48"	564 gallons	0.78 cubic yards	0.39 cubic yards
S5	60"	881 gallons	1.21 cubic yards	0.61 cubic yards
S6	72"	1269 gallons	1.75 cubic yards	0.88 cubic yards
S8	96"	3835 gallons	3.10 cubic yards	1.55 cubic yards
S10	120"	7496 gallons	4.85 cubic yards	2.43 cubic yards

Maintenance Instructions

1. Remove the manhole cover to provide access to the pollutant storage. Pollutants are stored in the sump, below the bowl assembly visible from the surface. You'll access this area through the 10" diameter access cylinder.

2. Use a vacuum truck or other similar equipment to remove all water, debris, oils and sediment. See figure 1.
3. Use a high pressure hose to clean the manhole of all the remaining sediment and debris. Then, use the vacuum truck to remove the water.
4. Fill the cleaned manhole with water until the level reaches the invert of the outlet pipe.
5. Replace the manhole cover.
6. Dispose of the polluted water, oils, sediment and trash at an approved facility.
   - Local regulations prohibit the discharge of solid material into the sanitary system. Check with the local sewer authority for authority to discharge the liquid.
   - Some localities treat the pollutants as leachate. Check with local regulators about disposal requirements.
   - Additional local regulations may apply to the maintenance procedure.

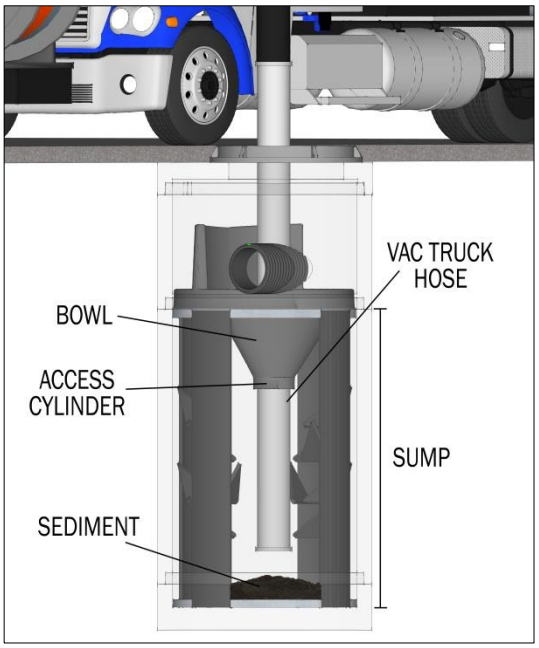


Figure 1

APPENDIX D
Storm Sewer Analysis

49 Mascolo Road– Progressive Sheet Metal
Storm Sewer Analysis
July 13, 2020

Peak Flow Calculations (Rational Method)

Q = C I A

Q = Peak Flow (cfs)
C = Runoff Coefficient
I = Intensity (in/hr)
A = Drainage Area (Acres)

West Parking Area

Drainage Area A = 6,018 sf = 0.14 acres

Rain Intensity I =7.45 in/hr @ 5 min duration (Per NOAA Atlas 14)

Runoff Coefficient C = 0.90 (Impervious)

Q = 0.90 x 7.45 in/hr x 0.14 acres
Q = 0.94 CFS

Capacity Check
A 12" HDPE @ 0.92% is proposed as the final conveyance to send runoff from the western parking area to the stormwater collection system in Mascolo Road. Manning equation results considering a roughness coefficient of n=0.013 for HDPE pipe, determined the capacity of the proposed 12" pipe to be **3.49 CFS**. The 12" HDPE @ 0.92% slope has sufficient capacity to convey the 10-yr peak flow of 0.94 CFS. Manning equation calculations are included in this Appendix.

East Parking Area

Drainage Area A = 14,756 sf = 0.34 acres

Rain Intensity I =7.45 in/hr @ 5 min duration (Per NOAA Atlas 14)

Runoff Coefficient C = [0.12 acres x 0.25 (Grass)] + [0.22 acres x 0.90 (Impervious)] / (0.34 Total Acres)
C = 0.67

Q = 0.67 x 7.45 in/hr x 0.34 acres
Q = 1.70 CFS

Capacity Check
A 12" HDPE @ 1.00% is proposed to convey runoff from the eastern parking area to the stormwater collection system in Mascolo Road. Manning equation results considering a roughness coefficient of n=0.013 for HDPE pipe, determined the capacity of the proposed 12" pipe to be **3.68 CFS**. The 12" HDPE @ 1.00% slope has sufficient capacity to convey the 10-yr peak flow of 0.94 CFS. Manning equation calculations are included in this Appendix.

Partially Full Pipe Flow Calculations - U.S. Units

II. Calculation of Discharge, Q, and average velocity, V
for pipes more than half full

Instructions: *Enter values in blue boxes. Calculations in yellow*

Inputs

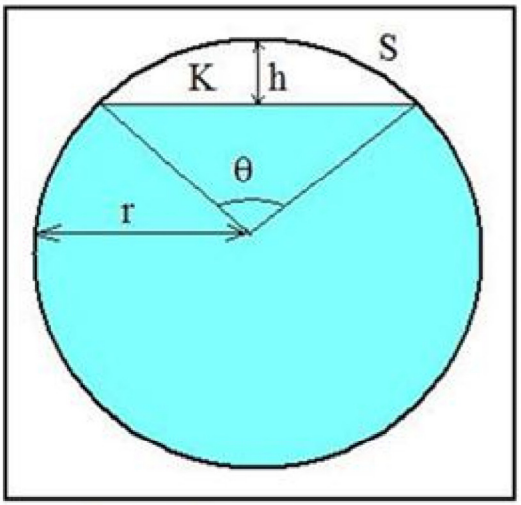
Pipe Diameter, **D** =	12	in
Depth of flow, **y** =	11	in
(must have y ≥ D/2)		
Full Pipe Manning roughness, n_{full} =	0.013	
Channel bottom slope, **S** =	0.01	ft/ft

Calculations

n/n_{full} =	1.0416666	
Partially Full Manning roughness, **n** =	0.014	

Calculations

Pipe Diameter, **D** =	1	ft
Pipe Radius, **r** =	0.5	ft
Circ. Segment Height, **h** =	0.083	ft
Central Angle, **q** =	1.17	radians
Cross-Sect. Area, **A** =	0.75	ft^2
Wetted Perimeter, **P** =	2.6	ft
Hydraulic Radius, **R** =	0.30	ft
Discharge, **Q** =	3.68	cfs
Ave. Velocity, **V** =	4.88	ft/sec
pipe % full $[(A/A_{full})*100\%]$ =	96.0%	



Partially Full Pipe Flow Parameters

r = D/2

h = 2r - y

(hydraulic radius)

R = A/P

(Manning Equation)

$Q = (1.49/n)(A)(R^{2/3})(S^{1/2})$

V = Q/A

P

$$\theta = 2 \arccos\left(\frac{r - h}{r}\right)$$

https://www.engineersedge.com/fluid_flow/partially_full_pipe_flow_calculation/partiallyfullpipeflow_calculation.htm

Partially Full Pipe Flow Calculations - U.S. Units

II. Calculation of Discharge, Q, and average velocity, V
for pipes more than half full

Instructions: *Enter values in blue boxes. Calculations in yellow*

Inputs

Pipe Diameter, **D** =	12	in
Depth of flow, **y** =	11	in

(must have y ≥ D/2)

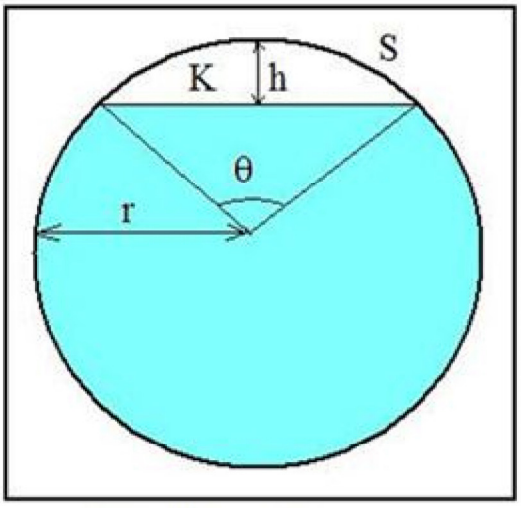
Full Pipe Manning roughness, n_{full} =	0.013	
Channel bottom slope, **S** =	0.0092	ft/ft

Calculations

n/n_{full} =	1.0416666	
Partially Full Manning roughness, **n** =	0.014	

Calculations

Pipe Diameter, **D** =	1	ft
Pipe Radius, **r** =	0.5	ft
Circ. Segment Height, **h** =	0.083	ft
Central Angle, **q** =	1.17	radians
Cross-Sect. Area, **A** =	0.75	ft^2
Wetted Perimeter, **P** =	2.6	ft
Hydraulic Radius, **R** =	0.30	ft
Discharge, **Q** =	3.53	cfs
Ave. Velocity, **V** =	4.68	ft/sec
pipe % full [$(A/A_{full})*100\%$] =	96.0%	



Partially Full Pipe Flow Parameters

r = D/2

h = 2r - y

(hydraulic radius)

R = A/P

(Manning Equation)

$Q = (1.49/n)(A)(R^{2/3})(S^{1/2})$

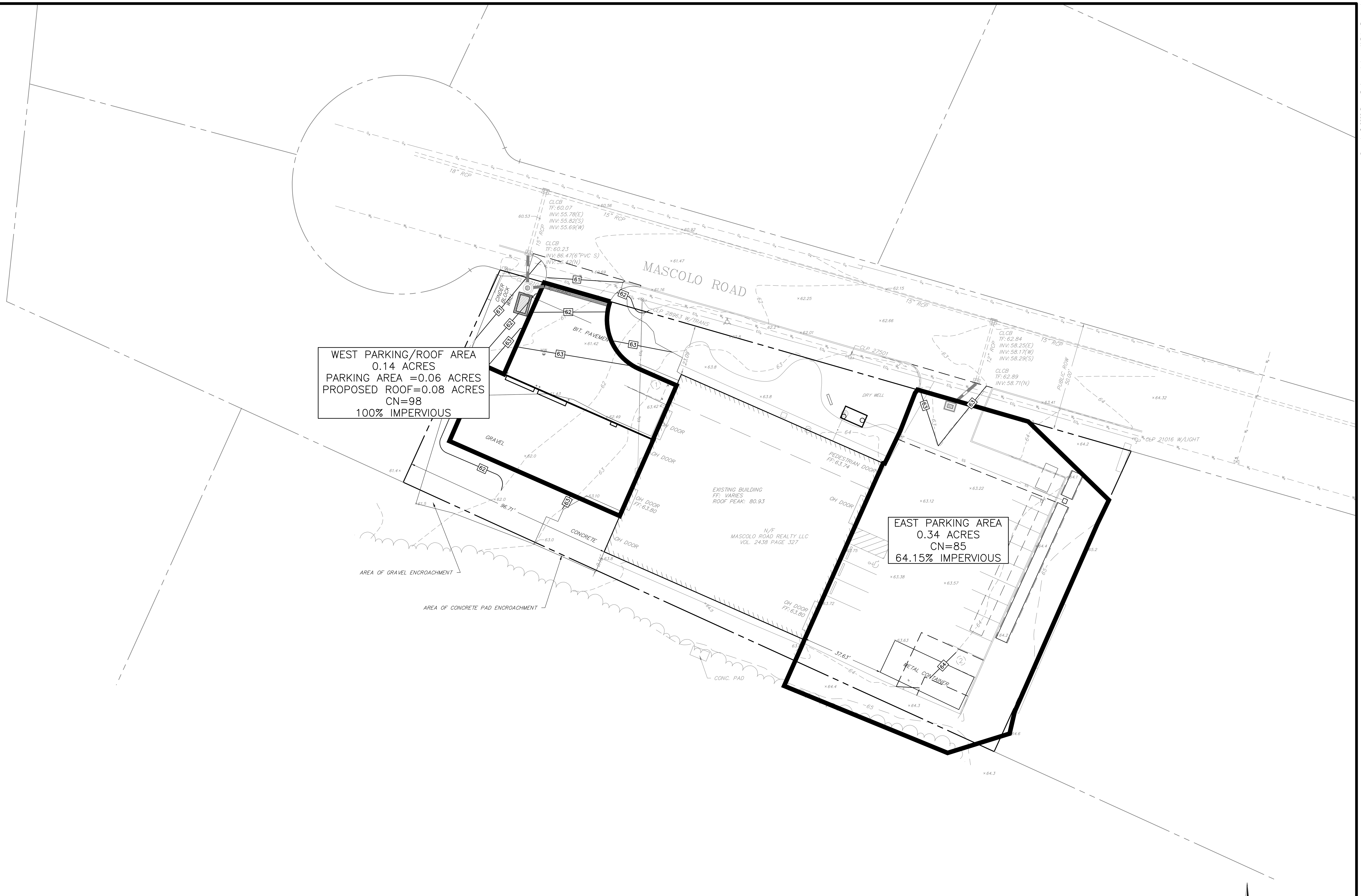
V = Q/A

P

$$\theta = 2\arccos\left(\frac{r - h}{r}\right)$$

Reference: https://www.engineersedge.com/fluid_flow/partially_full_pipe_flow_calculation/partiallyfullpipeflow_calculation.htm

APPENDIX E
Drainage Area Maps



PROPERTY OWNERS:
MASCOLO ROAD REALTY, LLC
36 MASCOLO ROAD
SOUTH WINDSOR, CT 06074

APPLICANT:
PROGRESSIVE SHEETMETAL, LLC
36 MASCOLO ROAD
SOUTH WINDSOR, CT 06074
860-436-9884

REFERENCES:
THIS PLAN REFERS TO THE FOLLOWING:
1. PLAN ENTITLED "PROPERTY & TOPOGRAPHIC PLAN, 49 MASCOLO ROAD, SOUTH WINDSOR, CONNECTICUT" DATED 3/23/2017 PREPARED BY DESIGN PROFESSIONALS, INC.

Design Professionals
CIVIL & TRAFFIC ENGINEERS / LAND SURVEYORS
PLANNERS / LANDSCAPE ARCHITECTS
21 JEFFREY DRIVE
P.O. BOX 1167
SOUTH WINDSOR, CT 06074
860-291-8755 T
860-291-8757 F
www.designprofessionalsinc.com

PREPARED FOR:
Progressive
Sheetmetal, LLC
36 Mascolo Road
South Windsor, CT 06074
860-436-9884 T

PROJECT NO. 3838
DATE: 7/13/2020
DESIGN BY: DHJ
DRAWN BY: REM
CHECKED BY: DHJ

PROGRESSIVE SHEETMETAL SITE PLAN MODIFICATION

49 MASCOLO ROAD
SOUTH WINDSOR, CONNECTICUT
GIS #57600049

REVISIONS

NO	DATE	BY

DRAINAGE AREA MAP WATER QUALITY AREAS

SCALE: 1" = 40'

SHEET
C-DA1
SHEET 1 OF 1

File: C:\jobs\3838\AutoCad\3838 Site Plan.dwg Layout: C-DA1 Plotted: 7/13/2020 11:51 AM Last Saved: 6/29/2020 4:12 PM Last Saved By: daniel.jameson