
STORMWATER MANAGEMENT REPORT

for

30 CROSS STREET

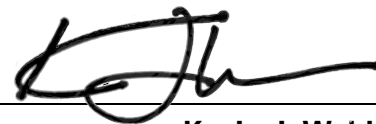
Block 113, Lot Nos. 7, 7.01, 7.02, 7.03, 8, 8.01, and 8.02 (Bogota)
Block 152.01, Lot Nos. 1, 1.01, and 2 (Ridgefield Park)
Borough of Bogota and Village of Ridgefield Park,
Bergen County, NJ

Prepared For:

Hampshire Venture Partners, LLC
22 Maple Avenue
Morristown, NJ 07960

Prepared By:

Langan Engineering and Environmental Services, Inc.
989 Lenox Drive
Suite 124
Lawrenceville, NJ 08648
NJ Certificate of Authorization No: 24GA27996400



Kevin J. Webb, PE
Professional Engineer License No. 24GE04075100

LANGAN

03 March 2021
Project Number 130148001

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1.0 INTRODUCTION

1.1. Purpose of Report

The purpose of this report is to present the criteria and methods utilized in the design of the storm sewer collection system for the project known as 30 Cross Street. This report has been prepared in conjunction with plans titled "Preliminary and Final Site Plans for 30 Cross Street," prepared by Langan Engineering dated February 19, 2021, and addresses the stormwater management requirements according to the following:

- Borough of Bogota and Village of Ridgefield Park;
- Bergen County;
- Standards for Soil Erosion and Sediment Control in New Jersey; and
- N.J.A.C. 7:8 and the NJDEP New Jersey Stormwater Best Management Practices Manual.

1.2. Project Description

The project consists of the redevelopment of the approximately ±12 acre site located at 30 Cross Street in Borough of Bogota and Village of Ridgefield Park. The site consists of seven lots identified as Block 113, Lots 7, 7.01, 7.02, 7.03, 8, 8.01, and 8.02, in the Borough of Bogota, and three lots identified as Block 152.01, Lots 1, 1.01, and 2, in the Village of Ridgefield Park. The site is bounded by the Hackensack River to the west; an industrial facility and an apartment complex to the north; Industrial Avenue, an active rail line, and an industrial facility to the east; and Interstate 80 to the south. The site is currently known as the Bogota Golf Center and is occupied by a building containing a golf and sports center, an attached multi-story driving range, and a car parking lot.

In the post-developed condition, two warehouses are proposed. Building 1, located in Ridgefield Park, has a building area of 98,400 square feet with 11 loading docks and 100 car parking spaces. Building 2, located in Bogota, has a building area of 89,130 square feet with 10 loading docks and 154 car parking spaces. In addition, associated site improvements including utilities, stormwater conveyance, landscaping, and lighting will be included in the proposed redevelopment.

A site location map has been provided in the Figures section of this report for reference.

1.3. Hydrologic Methodologies

This report was prepared using the SCS Method as contained in the USDA Soil Conservation Service Publication Technical Release No. 55 (TR-55) "Urban Hydrology for Small Watersheds". TR-55 outlines procedures for calculating stormwater runoff volumes and rates resulting from precipitation events at the project site. The TR-55 procedure simulates runoff from a watershed using the drainage area, curve number (CN), and time of concentration (Tc). Drainage areas were determined based on topography and stormwater runoff conveyance. CN values were determined based on the soil types and land cover types within each watershed. Tc values were determined based on land cover and the flow path from the hydraulically most distant point of the watershed.

The soil boundaries for the soil types were determined by the NRCS Web Soil Survey. A copy of the Soil Survey has been provided in the Figures section of this report. The following soil types are located at the site:

- Urban Land, (UR) – Hydrologic Soil Group D

The hydrologic model was analyzed and designed with the HydroCAD software program.

1.4. Water Quantity Design

The site's runoff discharges to the Hackensack River, which is a tidal waterbody. Accordingly, the development is not subject to peak runoff reduction rates according to NJAC 7:8-5.4(a)3.iv. However, stormwater quantity measures are required to comply with the Standards for Soil Erosion and Sediment Control (SESC) in New Jersey. Hydrographs have been generated utilizing the SCS Unit hydrograph and regional rainfall data for Bergen County (as contained in the New Jersey Department of Agriculture Technical Bulletin 2004-4.0 (last revised in August 2012)). Hydrographs for impervious and pervious areas have been calculated separately, according to NJAC 7:8-5.6(a)4.

1.5. Water Quality Design

Stormwater quality management measures for the site were designed using the pollutant removal requirements set forth in the NJDEP Stormwater Best Management Practices Manual. Runoff volume generated by the water quality design storm, which is a 1.25-inch/2-hour variable rate rainfall event and whose distribution is presented in the Appendix, must be treated by utilizing stormwater management methods to reduce the

developed site's average annual total suspended solids (TSS) load by at least 80% for runoff from new impervious areas and by at least 50% from existing impervious areas.

1.6. Groundwater Recharge Design

The project is a redevelopment of a site within Planning Area 1 and is, therefore, exempt from the groundwater recharge requirements according to NJAC 7:8-5.4(a)2.ii. Furthermore, the entire project site is subject to a Deed Notice and a Classification Exception Area to address soil and groundwater contamination associated with prior industrial uses and the presence of historic fill at the site. Due to these existing conditions, no proposed groundwater recharge measures are proposed pursuant to NJAC 7:8-5.4(a)2.iii., as promoting groundwater recharge at the site would be inconsistent with the capping remedy and the engineering and institutional controls approved as part of the Remedial Action Permit.

2.0 PRE-DEVELOPMENT CONDITIONS

2.1. Land use and Topography

Runoff from the existing Bogota Golf Center Main Building, multi-story driving range platform, and car parking lot drains through the on-site storm sewer network to the existing 24-inch outfall, out to the Hackensack River. The drainage area to the existing outfall is approximately 2.85 acres, which includes approximately 2.76 AC. of existing impervious coverage. Runoff from the southeast section of the driving range and a portion of Industrial Avenue flows southward towards a tributary at the southeast corner of the lots, which also discharges to the river nearby. The remainder of the site drains towards the Hackensack River.

2.2. Pre-Developed Watershed

A plan entitled "Pre-Developed Watershed Plan" is included in the drawings section of this report. This plan delineates the present drainage areas and the time of concentration flow path to the analysis points. Runoff hydrographs have been calculated for each area shown under its present conditions to determine present drainage characteristics for the portions of the site under development.

The present drainage areas are defined as follows:

Pre-Developed Watershed A – Watershed A drains through the Bogota Golf Center on-site storm sewer system and out the existing outfall to the Hackensack River.

Pre-Developed Watershed B – Watershed B drains west to the Hackensack River.

Pre-Developed Watershed C – Watershed C drains south into the unnamed tributary on the southeast corner of the site. The tributary eventually flows to the Hackensack River.

3.0 POST-DEVELOPMENT CONDITIONS

3.1. Stormwater Management Facilities

When fully constructed, the redevelopment will consist of two warehouses. The runoff from Building 2, will be captured by a proposed on-site storm network and will connect to the existing outfall to the Hackensack River. The runoff from Building 1, will be captured by a separate proposed on-site storm network and will discharge through a newly proposed outfall to the Hackensack River south of the existing outfall.

3.2. Post-Development Watershed

A plan titled “Post-Development Watershed Plan” is included in the drawings section of this report. This plan delineates the developed drainage areas and the time of concentration flow path to the analysis points. Runoff hydrographs have been calculated for each area shown under its developed conditions to determine developed drainage characteristics for the portion of the site under development.

The developed drainage areas are defined as follows:

Post-Developed Watershed A – Watershed A takes the runoff from Building 2 and associated car parking lot, and drains through proposed the storm sewer system that connects into the existing outfall to the Hackensack River.

Post-Developed Watershed B

- **Detained Watershed B** takes the runoff from Building 1, shared truck loading docks, and associated car parking lot, and drains through proposed the storm sewer system that connects into the proposed outfall to the Hackensack River.
- **Undetained Watershed B** collects the runoff from the 30-ft public access easement along the river and drains west into the Hackensack River.

Post-Developed Watershed C – Watershed C drains south into the unnamed tributary on the southeast corner of the site. The stream eventually flows into the Hackensack River.

3.3. Stormwater Quality

Stormwater runoff from the proposed development needs to be treated for removal of total suspended solids (TSS) per NJDEP requirements. All impervious areas corresponding with vehicular traffic are subject to the TSS removal requirements. Any existing impervious surfaces must be treated to 50% and any proposed impervious areas must be treated to 80%. Table 1 below shows the values used to calculate the Target TSS Removal Rate.

TABLE 1: TARGET TSS REMOVAL RATE CALCULATIONS

Watershed	Existing Regulated Motor Vehicle Surface (existing impervious cover not including buildings) (ac)¹	Proposed Regulated Motor Vehicle Surface (proposed impervious cover not including buildings) (ac)	Increase in Impervious Coverage (ac)²	Target TSS Removal Rate	Total TSS Removal Provided
A	1.71	1.67	0.04	50.7%	51.2%
B (Detained)	0.00	2.33	2.40	80.0%	80.0%

¹ Impervious Coverage subjected to 50% TSS removal

² Impervious Coverage subjected to 80% TSS removal

To meet the Target TSS removal requirement, the runoff from the car parking lots and truck loading docks will be directed through a series of manufactured treatment devices (MTDs). Runoff from Watershed A, including Building 2’s car parking lot and a portion of Industrial Avenue, will be directed through a CONTECH Cascade Separator at the system’s outfall. The Cascade Separator is certified by NJDEP to provide 50% TSS Removal. Runoff from detained Watershed B, including Building 1’s car parking lot and the shared truck loading court, will be directed through CONTECH Offline Filterra Systems located at each catchment structure in the system. The Filterra units are currently in the NJDEP MTD Certification process and are expected to be certified for 80% TSS removal.

See Appendix A for calculations.

3.4. Stormwater Conveyance

The storm sewer system has been designed using the Rational Method in accordance with N.J.A.C. 5:21-7.2, 7.3, and 7.4. The site was divided into sub-watersheds, each contributing runoff to an individual catch basin. Values for area and runoff coefficient were calculated for each sub-watershed. An average runoff coefficient was chosen based on the percentage of each type of land cover using the following coefficients:

RUNOFF COEFFICIENTS

Land Cover	C
Grass/Landscaped (Type D Soil)	0.65
Paved/Roof	0.99

The Bogota IDF curve, as determined by NOAA Atlas 14 and specified in NJAC 5:21-7.2(c)5, was utilized to determine the storm intensity. A minimum time of concentration of 10 minutes was utilized in the design, as specified in NJAC 5:21-7.2(c)5.

The proposed storm sewer system has been designed for the 25-year storm event.

All storm sewer conveyance calculations are provided in Appendix B of this report. A map titled "Subwatershed Areas" is included in the drawings section of the report.

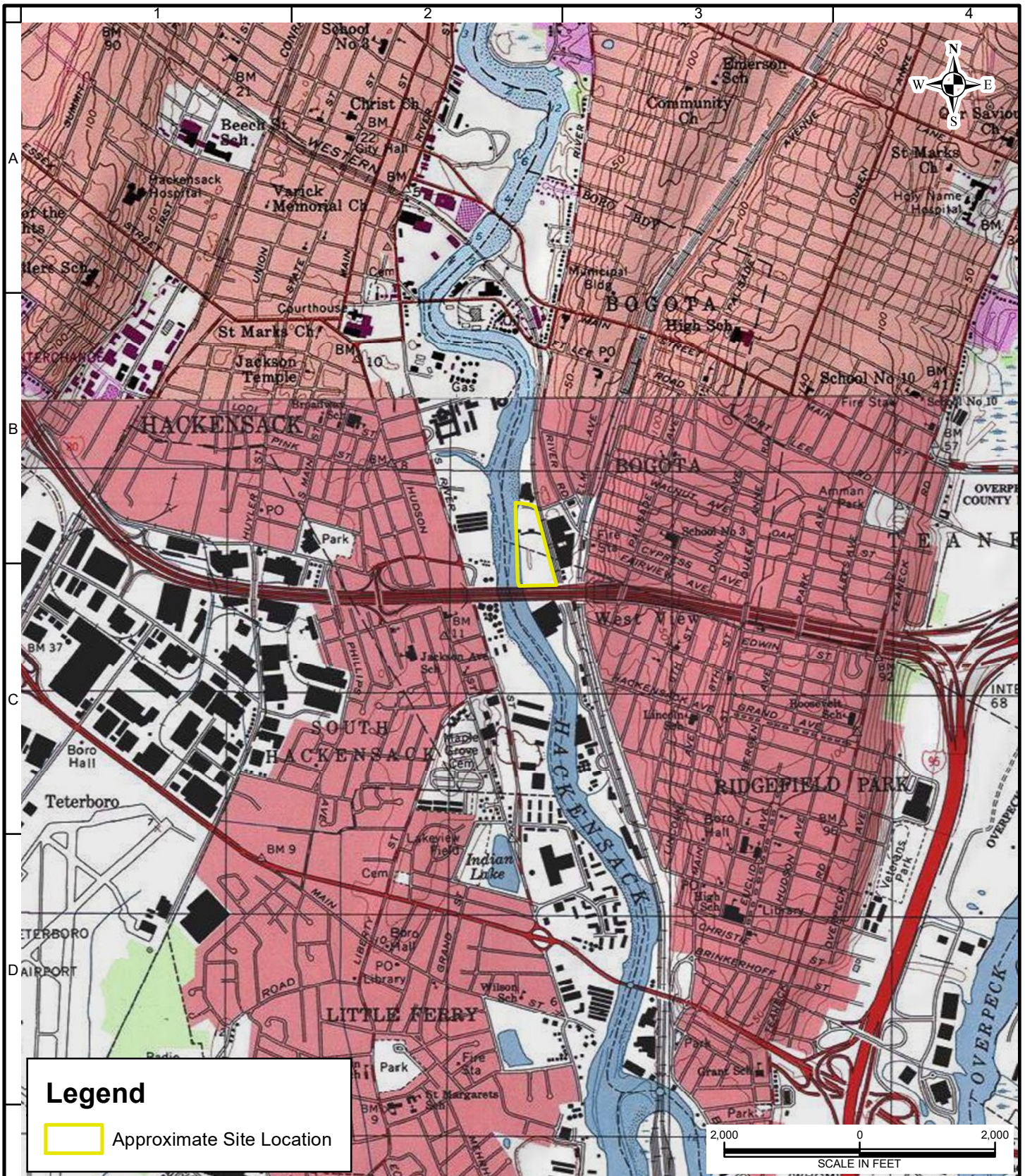
3.5. Soil Erosion and Sediment Control

The project has been designed to meet all soil erosion and sediment control criteria including provisions for the prevention of soil erosion during construction, as shown on the Soil Erosion & Sediment Control plan and detail sheets.

3.6. Conclusion

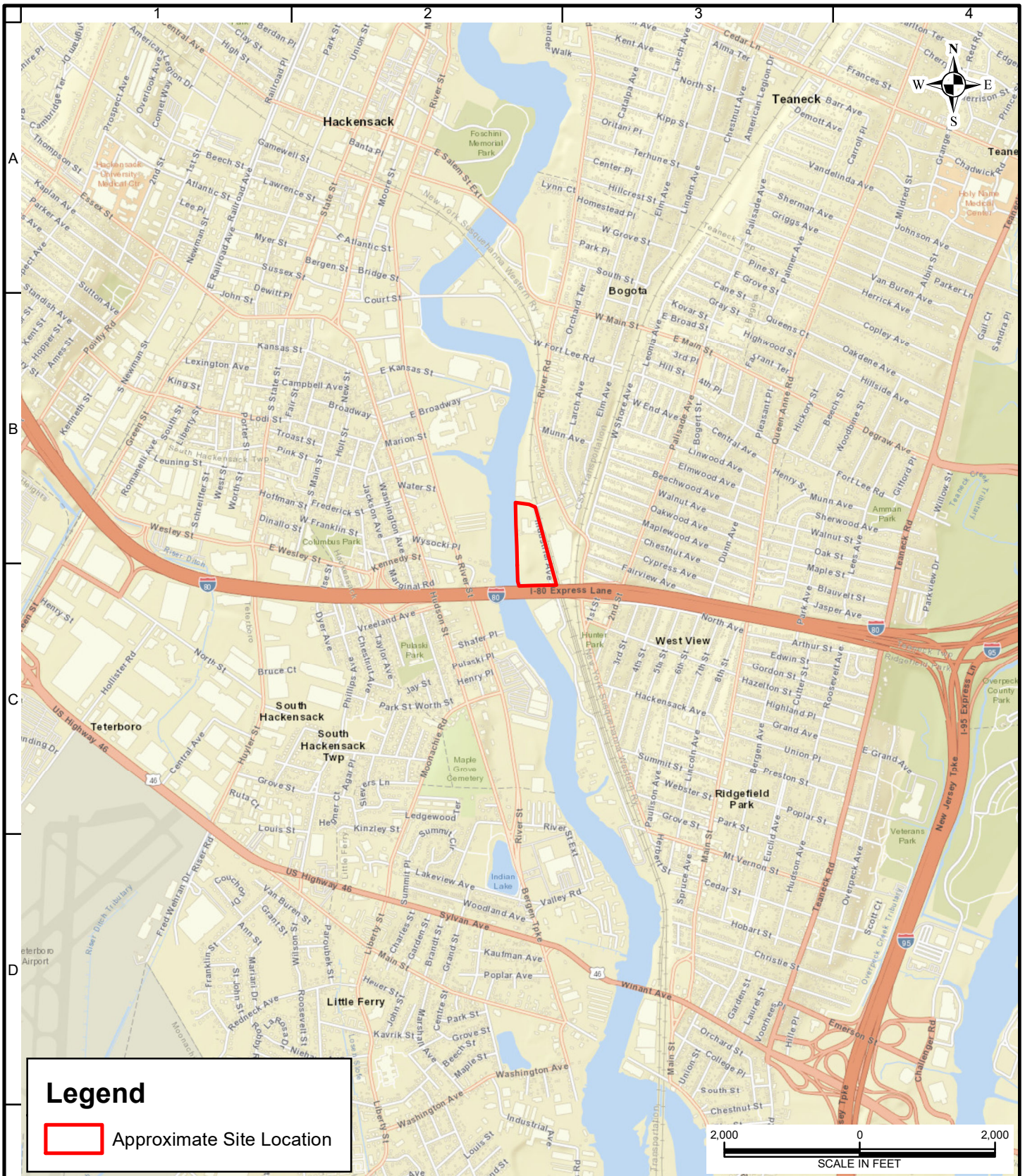
In conclusion, the proposed development has been designed in accordance with NJAC 7:8 (NJDEP Stormwater Management Regulations) and the Borough of Bogota and Village of Ridgefield Park Ordinances. The proposed stormwater management design will safely convey all developed runoff from the project with no negative effects on downstream properties or waterways.

FIGURES



Map References: Esri USA Topo Maps 2019

<p>LANGAN 300 Kimball Drive Parsippany, NJ 07054 T: 973.560.4900 F: 973.560.4901 www.langan.com</p> <p>Langan Engineering & Environmental Services, Inc. Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. Langan International LLC Collectively known as Langan</p> <p>NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400</p>	<p>Project</p> <p>30 CROSS STREET</p> <p>BOROUGH OF BOGOTA & VILLAGE OF RIDGEFIELD PARK</p> <p>BERGEN COUNTY NEW JERSEY</p>	<p>Drawing Title</p> <p>USGS SITE LOCATION MAP</p>	<p>Project No. 130148001</p> <p>Date 1/21/2020</p> <p>Scale 1" = 2,000'</p> <p>Drawn By MWen</p>	<p>Figure</p> <p>1</p>
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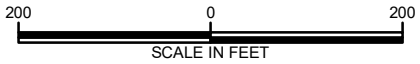


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	<p>© 2020 Langan</p>			



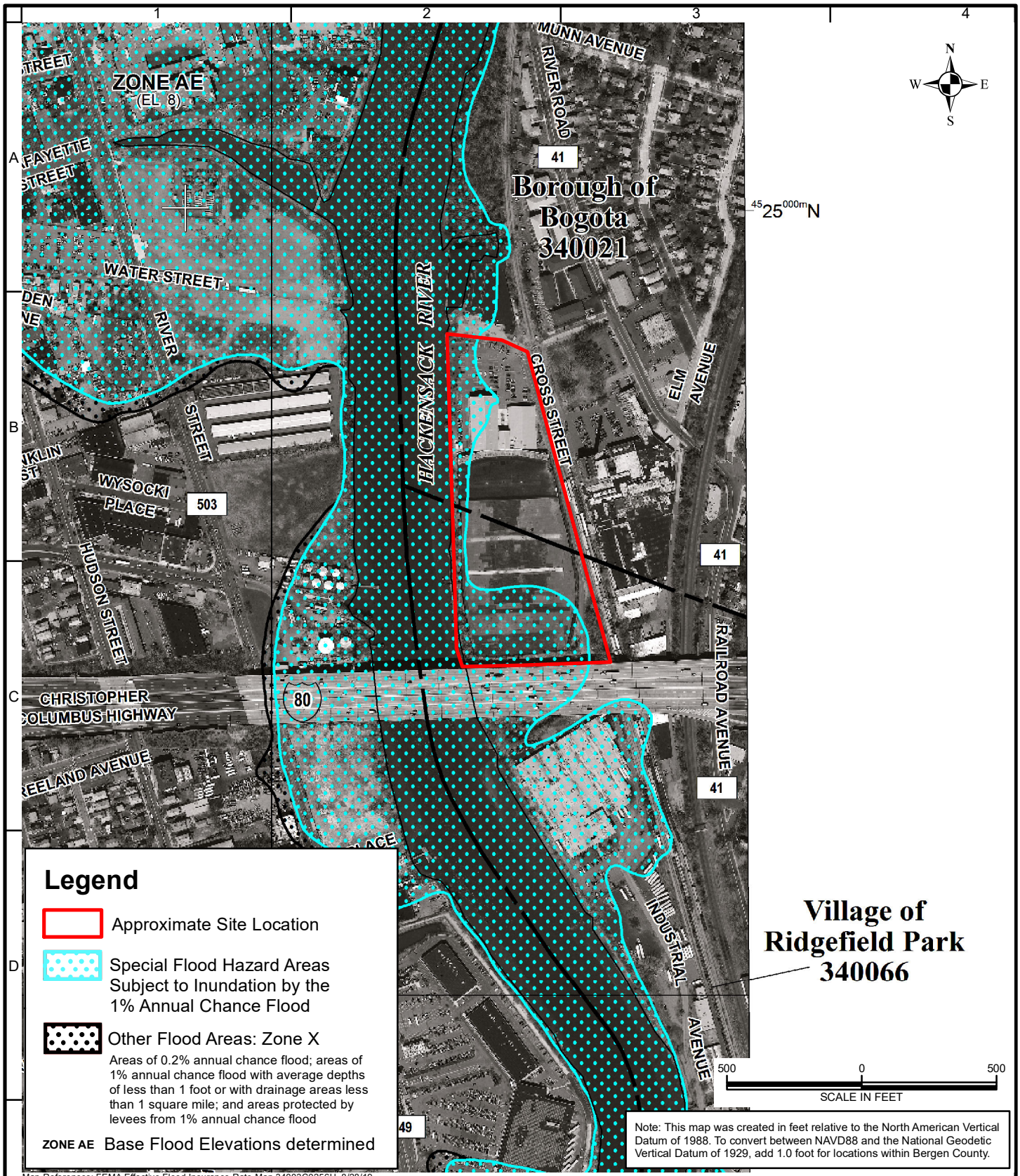
Legend

Approximate Site Location



Map References: NJDEP Aerial Imagery 2015

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Legend

- Approximate Site Location
- Special Flood Hazard Areas Subject to Inundation by the 1% Annual Chance Flood
- Other Flood Areas: Zone X
Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood

ZONE AE Base Flood Elevations determined

Note: This map was created in feet relative to the North American Vertical Datum of 1988. To convert between NAVD88 and the National Geodetic Vertical Datum of 1929, add 1.0 foot for locations within Bergen County.

Map References: FEMA Effective Flood Insurance Rate Map 34003C0256H, 8/28/19

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	Project No. 130148001	Figure								
Date 1/21/2020	4									
Scale 1" = 500'										
Drawn By MWen										
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Legend

- Approximate Site Location

NRCS Soils

- UR - Urban Land
- UdwbB - Udorthents, wet substratum-Urban land complex
- WATER

Map References: NRCS Web Soil Survey SSRUGO GIS Data, Bergen County, 2019; NJDEP Aerial Imagery 2015

LANGAN
 300 Kimball Drive
 Parsippany, NJ 07054
 T: 973.560.4900 F: 973.560.4901 www.langan.com

Langan Engineering & Environmental Services, Inc.
 Langan Engineering, Environmental, Surveying,
 Landscape Architecture and Geology, D.P.C.
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 Collectively known as Langan

NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project

30 CROSS STREET
 BLOCK 113, LOTS 7 & 8
 BOROUGH OF BOGOTA

BLOCK 152.01, LOTS 1,1.01,2
 VILLAGE OF RIDGEFIELD PARK
 BERGEN COUNTY NEW JERSEY

Drawing Title

**NRCS
 SOILS MAP**

Project No.
130148001

Date
1/27/2021

Scale
1" = 200'

Drawn By
MAD

Figure

5

Appendix A
Water Quality Analysis

TOTAL TSS REMOVAL RATE SUMMARY**Analysis Point****Calculate the Target TSS Removal Rate - Outfall 1**

osed Regulated Motor Service Vehicle Surface Subject to Water Quality Standards	2.33 acres
Existing Regulated Motor Vehicle Surface	0 acres
Target TSS Removal Rate	50%
Proposed Regulated Motor Vehicle Surface	2.33 acres
Target TSS Removal Rate	80%
Total TSS Removal Rate = for the Entire Drainage Area	$(x) + (0 \times 0.5) + (2.33 \times 0.8)$ (+ 2.33)
Target TSS Removal Rate =	80.0%

Calculate the Target TSS Removal Rate - Outfall 2

osed Regulated Motor Service Vehicle Surface Subject to Water Quality Standards	1.71 acres
Existing Regulated Motor Vehicle Surface	1.67 acres
Target TSS Removal Rate	50%
Proposed Regulated Motor Vehicle Surface	0.04 acres
Target TSS Removal Rate	80%
Total TSS Removal Rate = for the Entire Drainage Area	$(0 \times 0) + (1.67 \times 0.5) + (0.04 \times 0.8)$ (0 + 1.71)
Target TSS Removal Rate =	50.7%

Calculate the Target TSS Removal Rate - Outfall 2

osed Regulated Motor Service Vehicle Surface Subject to Water Quality Standards	1.71 acres
Existing Regulated Motor Vehicle Surface	1.64 acres
Target TSS Removal Rate	50%
Proposed Regulated Motor Vehicle Surface	0.07 acres
Target TSS Removal Rate	80%
Total TSS Removal Rate = for the Entire Drainage Area	0.876 1.71
Target TSS Removal Rate =	51.2%

Summary for Subcatchment 48S: 1/2 CB201

Runoff = 0.27 cfs @ 1.15 hrs, Volume= 396 cf, Depth= 0.95"

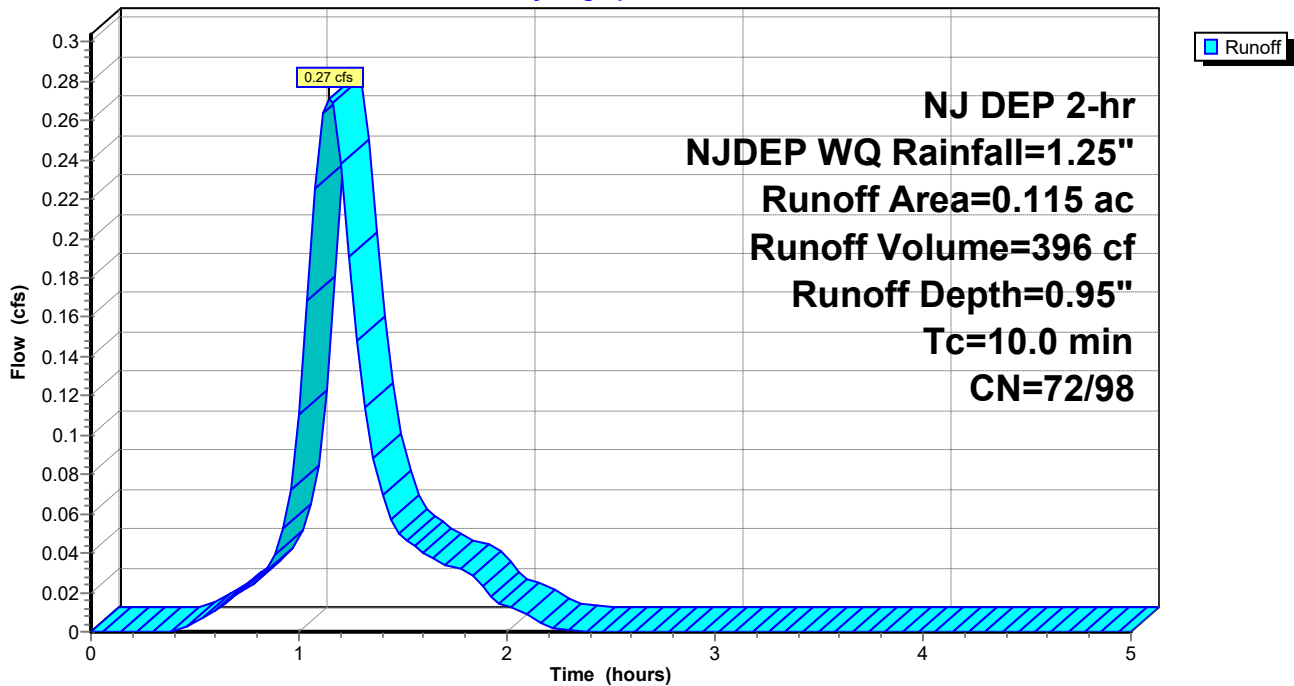
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
 NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.105	98	
* 0.010	72	
0.115	96	Weighted Average
0.010	72	8.70% Pervious Area
0.105	98	91.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 48S: 1/2 CB201

Hydrograph



Summary for Pond 25P: Filterra 6x6

Inflow Area = 0.115 ac, 91.30% Impervious, Inflow Depth = 0.95" for NJDEP WQ event
 Inflow = 0.27 cfs @ 1.15 hrs, Volume= 396 cf
 Outflow = 0.25 cfs @ 1.12 hrs, Volume= 401 cf, Atten= 8%, Lag= 0.0 min
 Primary = 0.25 cfs @ 1.12 hrs, Volume= 401 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.12' @ 1.18 hrs Surf.Area= 0.001 ac Storage= 4 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.2 min (74.3 - 74.1)

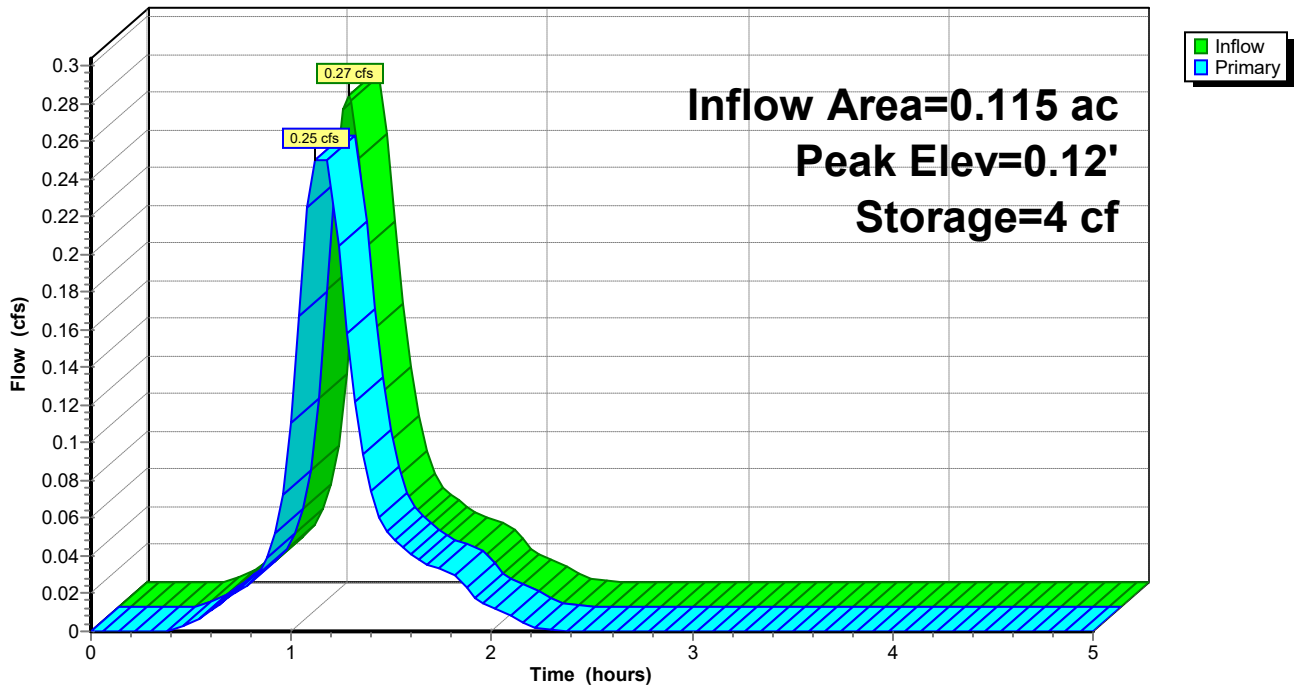
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	72 cf	6.00'W x 6.00'L x 2.00'H Prismatic

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.25 cfs @ 1.12 hrs HW=0.03' (Free Discharge)
 ←1=Exfiltration (Exfiltration Controls 0.25 cfs @ 0.01 fps)

Pond 25P: Filterra 6x6

Hydrograph



Summary for Subcatchment 42S: CB202

Runoff = 0.49 cfs @ 1.15 hrs, Volume= 717 cf, Depth= 0.94"

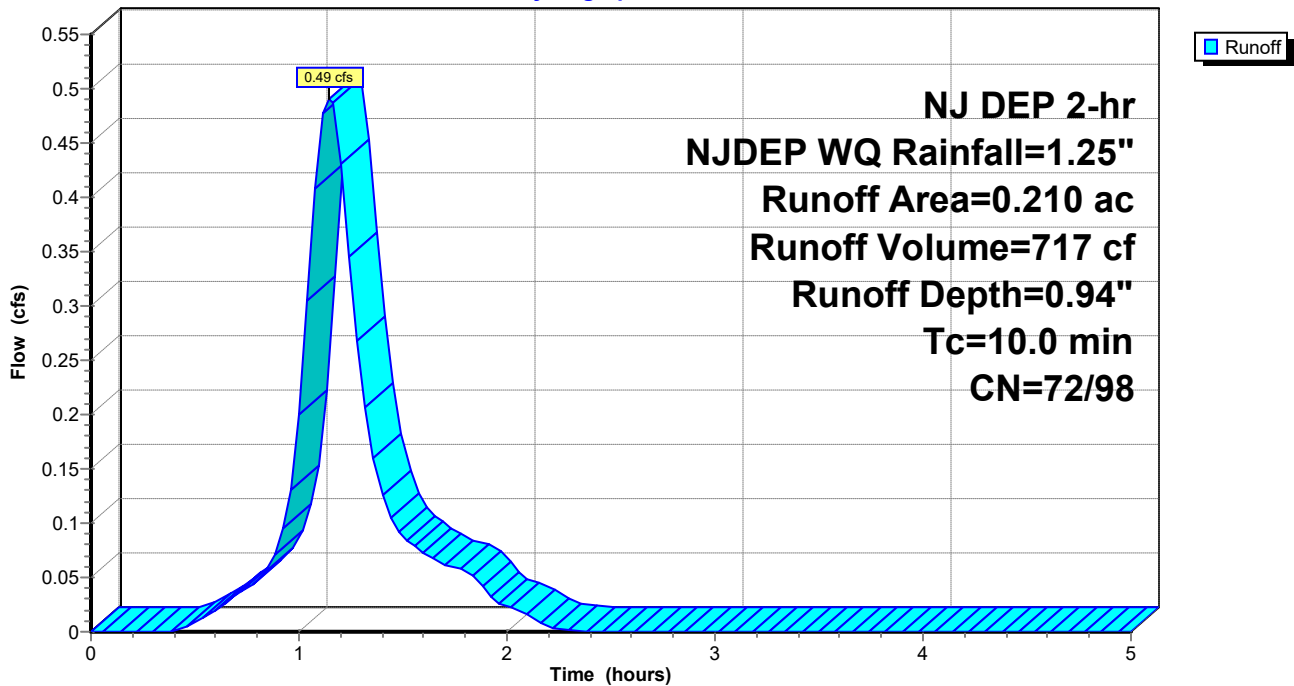
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
 NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.190	98	
* 0.020	72	
0.210	96	Weighted Average
0.020	72	9.52% Pervious Area
0.190	98	90.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 42S: CB202

Hydrograph



Summary for Pond 1P: Filterra 10x6

Inflow Area = 0.210 ac, 90.48% Impervious, Inflow Depth = 0.94" for NJDEP WQ event
 Inflow = 0.49 cfs @ 1.15 hrs, Volume= 717 cf
 Outflow = 0.42 cfs @ 1.12 hrs, Volume= 779 cf, Atten= 15%, Lag= 0.0 min
 Primary = 0.42 cfs @ 1.12 hrs, Volume= 779 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.35' @ 1.20 hrs Surf.Area= 0.001 ac Storage= 21 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 1.0 min (75.1 - 74.1)

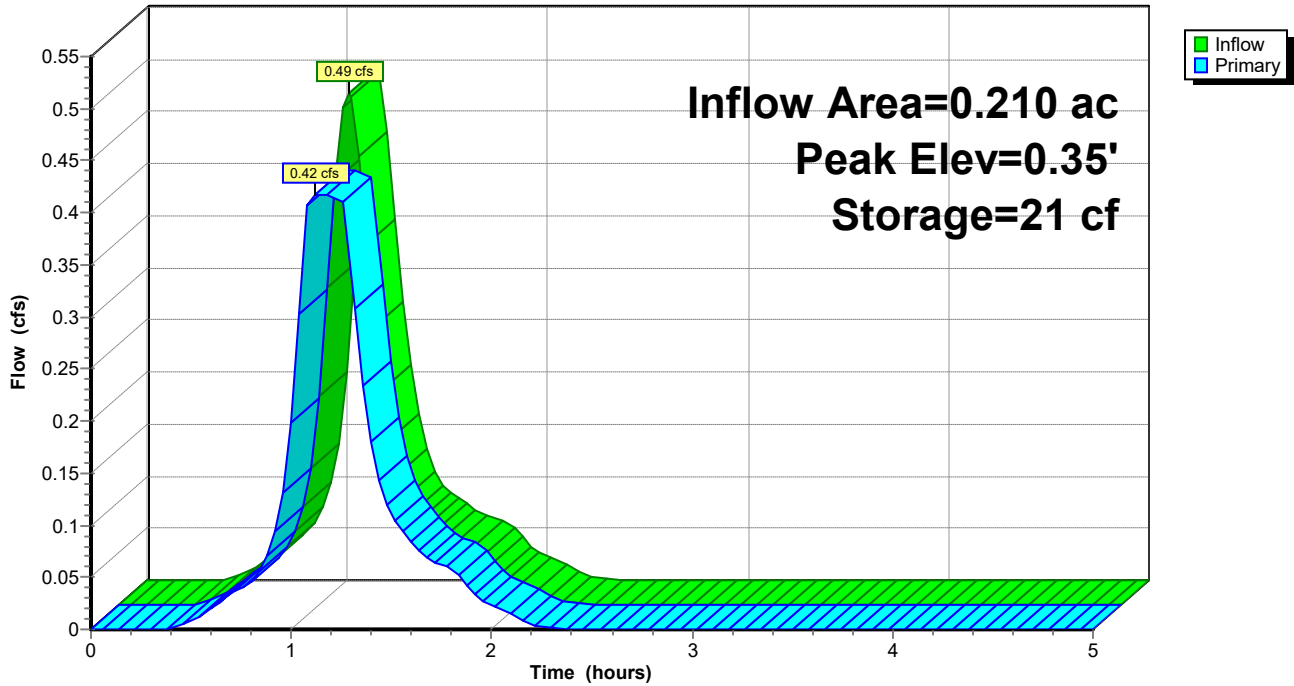
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	120 cf	6.00'W x 10.00'L x 2.00'H Prismatic

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.42 cfs @ 1.12 hrs HW=0.09' (Free Discharge)
 ←1=Exfiltration (Exfiltration Controls 0.42 cfs @ 0.01 fps)

Pond 1P: Filterra 10x6

Hydrograph



Summary for Subcatchment 44S: CB205

Runoff = 2.04 cfs @ 1.15 hrs, Volume= 2,989 cf, Depth= 0.90"

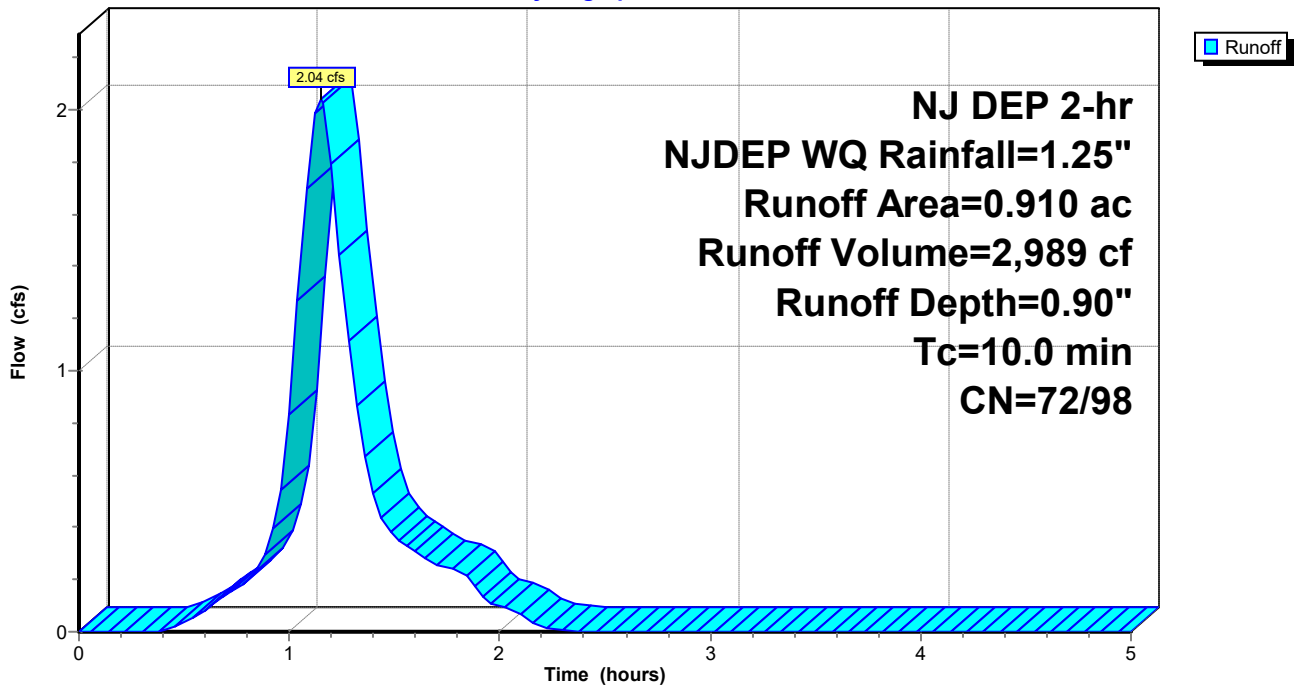
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
 NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.790	98	
* 0.120	72	
0.910	95	Weighted Average
0.120	72	13.19% Pervious Area
0.790	98	86.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 44S: CB205

Hydrograph



Summary for Subcatchment 45S: CB206

Runoff = 1.60 cfs @ 1.15 hrs, Volume= 2,349 cf, Depth= 0.89"

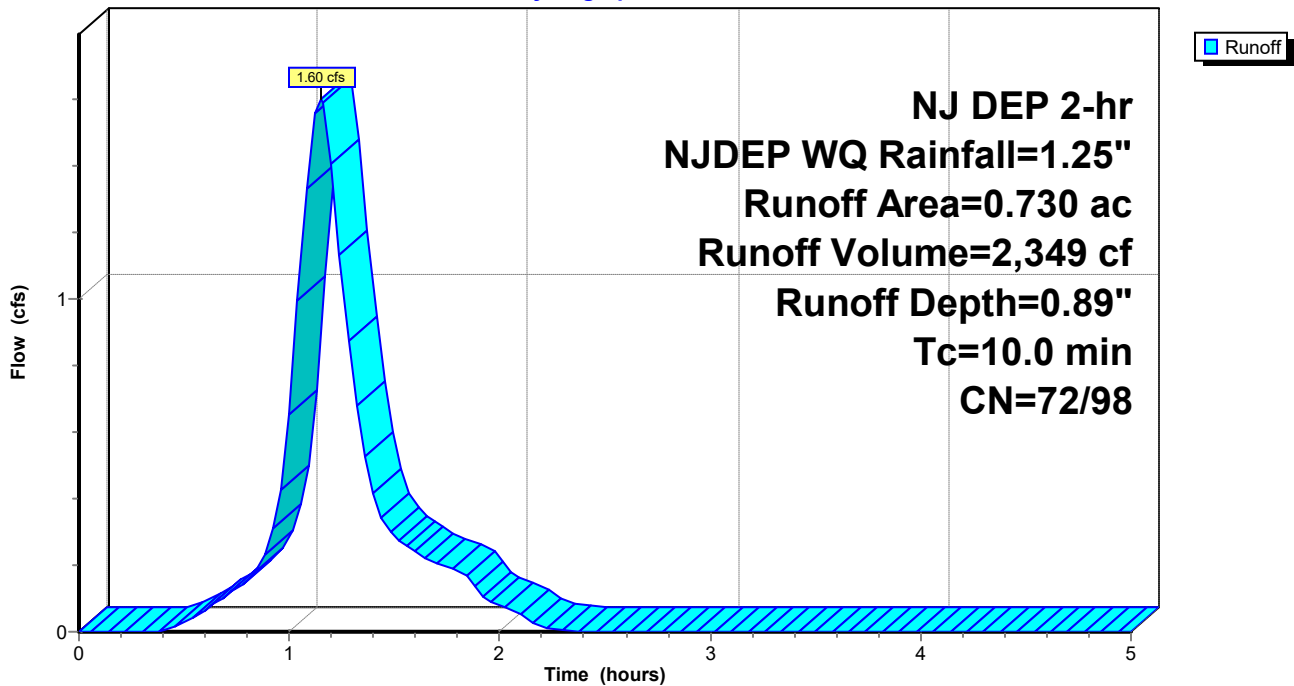
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
 NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.620	98	
* 0.110	72	
0.730	94	Weighted Average
0.110	72	15.07% Pervious Area
0.620	98	84.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 45S: CB206

Hydrograph



Summary for Subcatchment 47S: CB212

Runoff = 0.65 cfs @ 1.15 hrs, Volume= 944 cf, Depth= 0.93"

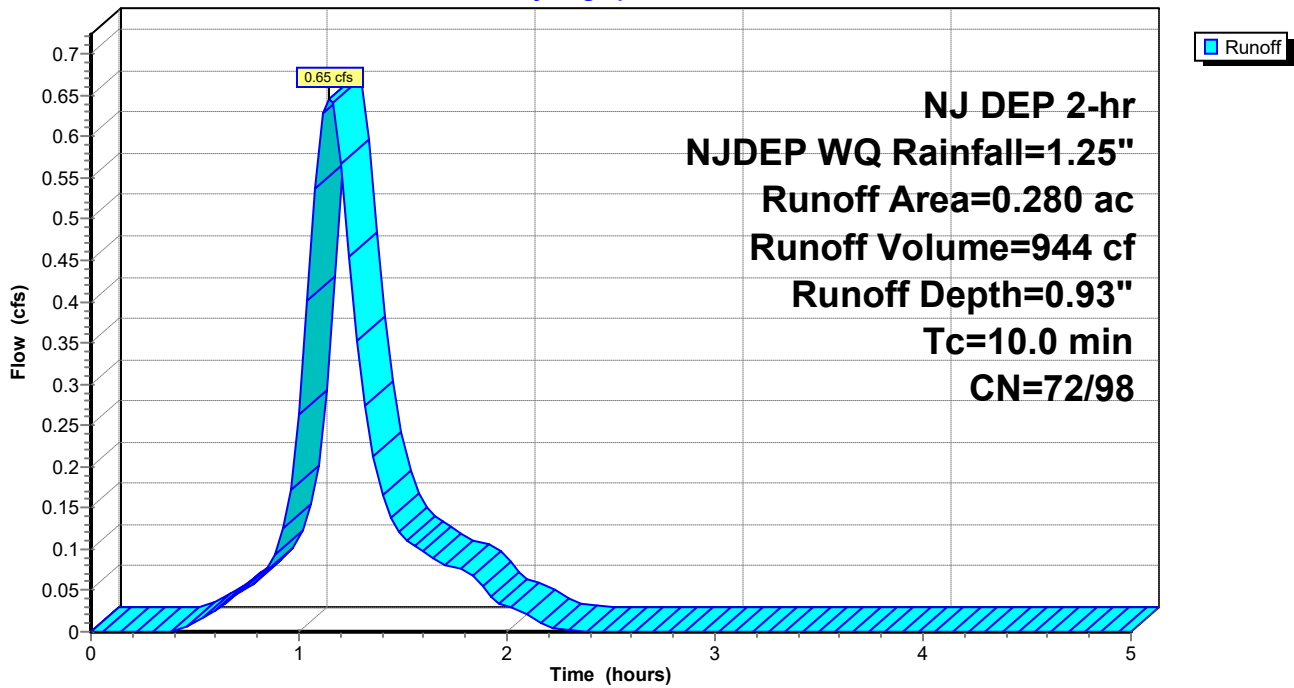
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-5.00 hrs, dt= 0.04 hrs
 NJ DEP 2-hr NJDEP WQ Rainfall=1.25"

Area (ac)	CN	Description
* 0.250	98	
* 0.030	72	
0.280	95	Weighted Average
0.030	72	10.71% Pervious Area
0.250	98	89.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 47S: CB212

Hydrograph



Summary for Pond 43P: Filterra 13x7

Inflow Area = 0.280 ac, 89.29% Impervious, Inflow Depth = 0.93" for NJDEP WQ event
 Inflow = 0.65 cfs @ 1.15 hrs, Volume= 944 cf
 Outflow = 0.64 cfs @ 1.14 hrs, Volume= 934 cf, Atten= 1%, Lag= 0.0 min
 Primary = 0.64 cfs @ 1.14 hrs, Volume= 934 cf

Routing by Stor-Ind method, Time Span= 0.00-5.00 hrs, dt= 0.04 hrs / 2
 Peak Elev= 0.03' @ 1.16 hrs Surf.Area= 0.002 ac Storage= 2 cf

Plug-Flow detention time= 0.7 min calculated for 934 cf (99% of inflow)
 Center-of-Mass det. time= 0.0 min (74.1 - 74.1)

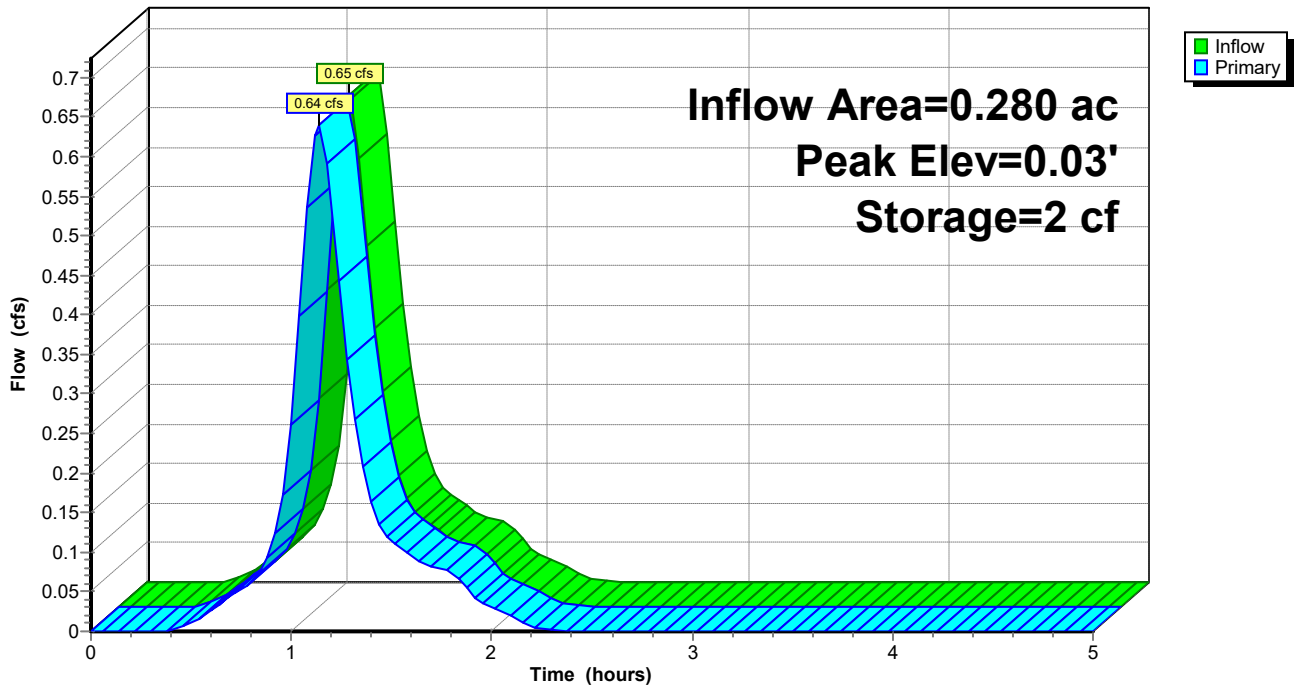
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	182 cf	7.00'W x 13.00'L x 2.00'H Prismatic

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	300.000 in/hr Exfiltration over Surface area

Primary OutFlow Max=0.63 cfs @ 1.14 hrs HW=0.02' (Free Discharge)
 ←1=Exfiltration (Exfiltration Controls 0.63 cfs @ 0.01 fps)

Pond 43P: Filterra 13x7

Hydrograph



Summary for Pond 68P: Filtterra 416sf

Inflow Area = 1.750 ac, 79.43% Impervious, Inflow Depth = 0.86" for WQ event
 Inflow = 3.69 cfs @ 1.15 hrs, Volume= 0.125 af
 Outflow = 2.89 cfs @ 1.10 hrs, Volume= 0.126 af, Atten= 22%, Lag= 0.0 min
 Primary = 2.89 cfs @ 1.10 hrs, Volume= 0.126 af
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 7.82' @ 1.22 hrs Surf.Area= 416 sf Storage= 272 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 0.7 min (75.2 - 74.5)

Volume	Invert	Avail.Storage	Storage Description
#1	7.17'	1,248 cf	16.00'W x 26.00'L x 3.00'H Prismatic

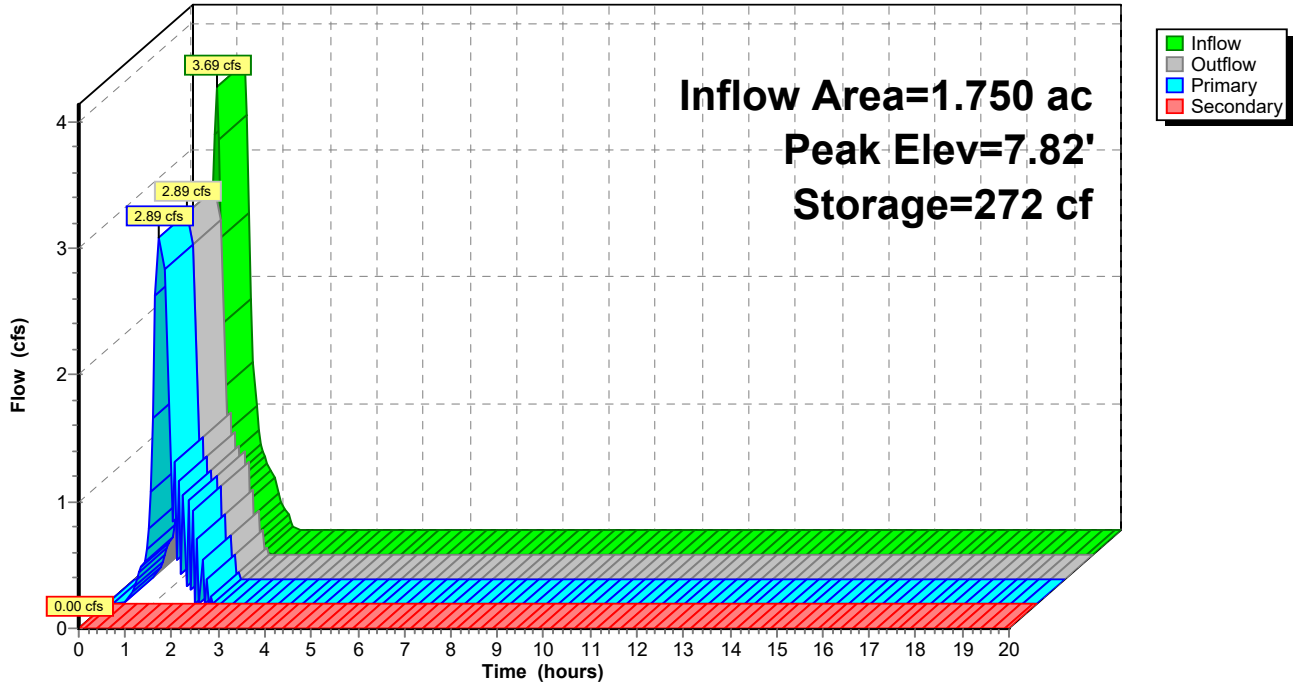
Device	Routing	Invert	Outlet Devices
#1	Primary	7.17'	300.000 in/hr Exfiltration over Surface area
#2	Secondary	7.82'	6.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.89 cfs @ 1.10 hrs HW=7.26' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 2.89 cfs @ 0.01 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=7.17' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 68P: Filterra 416sf

Hydrograph



Outfall 2 (2-5-21)

Prepared by quikrete

HydroCAD® 10.00-20 s/n 05509 © 2017 HydroCAD Software Solutions LLC

NJ DEP 2-hr Rainfall=1.25"

Printed 2/5/2021

Page 1

Summary for Subcatchment 5S: Outfall 2

Runoff = 9.69 cfs @ 1.15 hrs, Volume= 14,194.915 cf, Depth= 0.94"

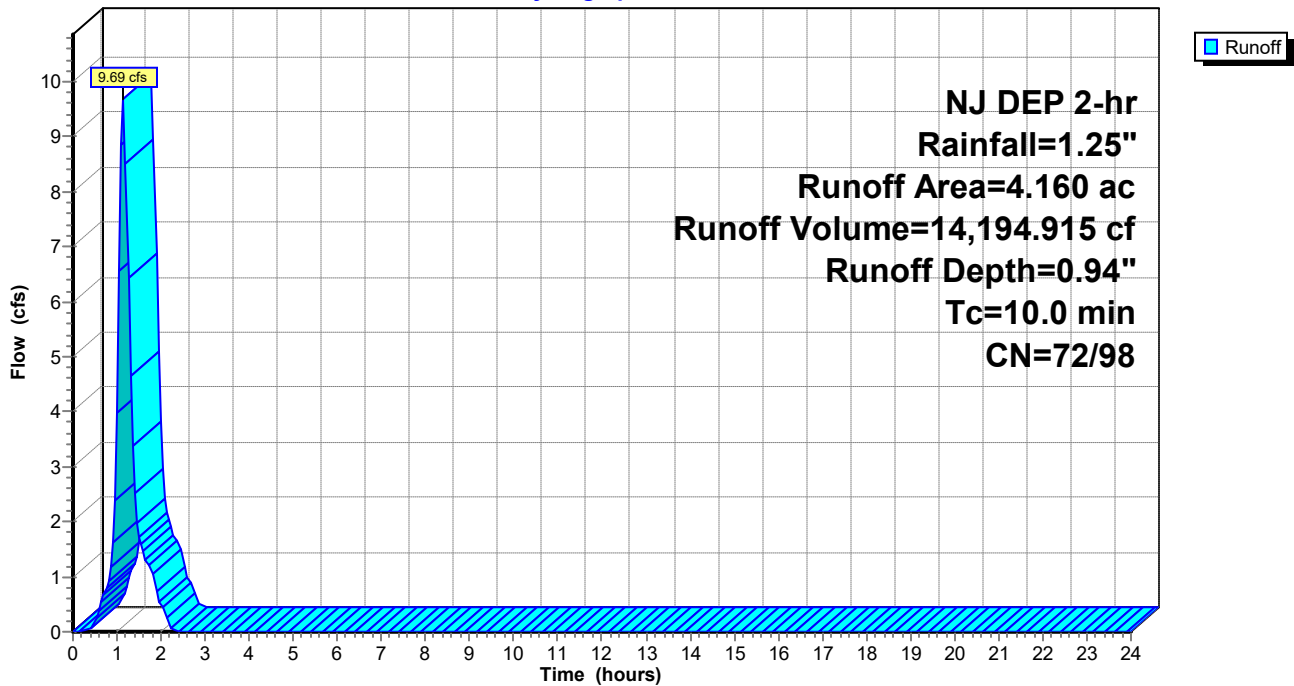
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NJ DEP 2-hr Rainfall=1.25"

Area (ac)	CN	Description
* 3.760	98	
* 0.400	72	
4.160	96	Weighted Average
0.400	72	9.62% Pervious Area
3.760	98	90.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 5S: Outfall 2

Hydrograph



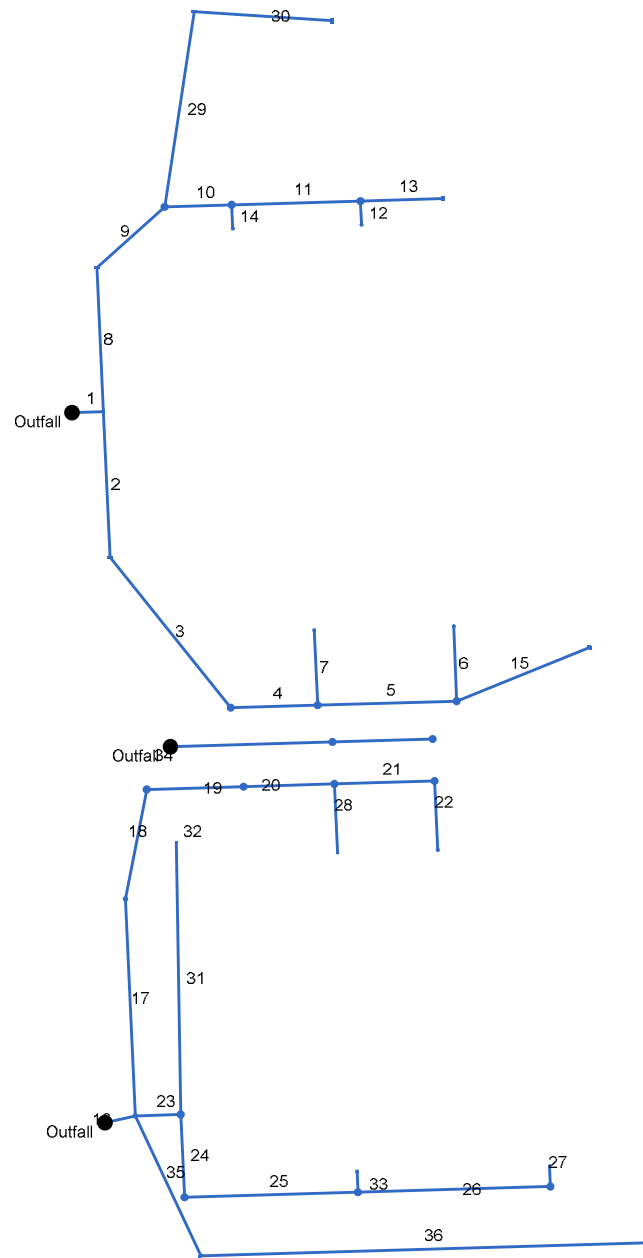
Appendix B
Storm Conveyance Analysis

ABSOLUTE AUTO - WEIGHTED 'C' VALUES

SOIL TYPE(S) : URBAN LAND COMPLEX (UR)

STRUCTURE	TOTAL AREA (acres)	IMPERVIOUS		'C' = 0.99		GRASS HSG D		'C' = 0.65		GRASS HSG A		'C' = 0.25		TOTAL WEIGHTED 'C'
		AREA (acres)	%	'C'	IMPERV 'C'	AREA (acres)	%	'C'	GRASS 'C'	AREA (acres)	%	'C'	GRASS 'C'	
STM100														
CB-101	0.16	0.14	90%	0.99	0.89	0.02	10%	0.65	0.07	0.00	0%	0.25	0.00	0.96
CB-102	0.17	0.15	90%	0.99	0.89	0.02	10%	0.65	0.06	0.00	0%	0.25	0.00	0.96
MH-103														
CB-104	0.60	0.57	95%	0.99	0.94	0.03	5%	0.65	0.03	0.00	0%	0.25	0.00	0.97
CB-105	0.51	0.46	90%	0.99	0.89	0.05	10%	0.65	0.06	0.00	0%	0.25	0.00	0.96
CO-106														
RL-106A	0.47	0.47	100%	0.99	0.99	0.00	0%	0.65	0.00	0.00	0%	0.25	0.00	0.99
CO-107														
RL-107A	0.46	0.46	100%	0.99	0.99	0.00	0%	0.65	0.00	0.00	0%	0.25	0.00	0.99
CB-108	0.18	0.07	39%	0.99	0.39	0.11	61%	0.65	0.40	0.00	0%	0.25	0.00	0.78
CB-109	0.20	0.18	91%	0.99	0.90	0.02	9%	0.65	0.06	0.00	0%	0.25	0.00	0.96
MH-110														
CO-111	0.03	0.01	17%	0.99	0.17	0.03	83%	0.65	0.54	0.00	0%	0.25	0.00	0.71
RL-111A	0.47	0.47	100%	0.99	0.99	0.00	0%	0.65	0.00	0.00	0%	0.25	0.00	0.99
MH-112														
RL-112A	0.65	0.65	100%	0.99	0.99	0.00	0%	0.65	0.00	0.00	0%	0.25	0.00	0.99
CB-113	0.27	0.13	48%	0.99	0.48	0.14	52%	0.65	0.34	0.00	0%	0.25	0.00	0.81
CB-201	0.23	0.21	91%	0.99	0.90	0.02	9%	0.65	0.06	0.00	0%	0.25	0.00	0.96
CB-202	0.21	0.19	90%	0.99	0.89	0.02	10%	0.65	0.06	0.00	0%	0.25	0.00	0.96
MH-203														
CB-204	0.91	0.73	81%	0.99	0.80	0.18	19%	0.65	0.13	0.00	0%	0.25	0.00	0.92
CB-205	0.84	0.66	78%	0.99	0.77	0.18	22%	0.65	0.14	0.00	0%	0.25	0.00	0.92
MH-206														
MH-207														
MH-208														
MH-209														
RL-209A	0.53	0.53	100%	0.99	0.99	0.00	0%	0.65	0.00	0.00	0%	0.25	0.00	0.99
MH-210														
RL-210A	0.57	0.57	100%	0.99	0.99	0.00	0%	0.65	0.00	0.00	0%	0.25	0.00	0.99
MH-211														
MH-212														
RL-212A	0.55	0.55	100%	0.99	0.99	0.00	0%	0.65	0.00	0.00	0%	0.25	0.00	0.99
MH-213														
RL-213A	0.61	0.61	100%	0.99	0.99	0.00	0%	0.65	0.00	0.00	0%	0.25	0.00	0.99
CB-214	0.33	0.30	92%	0.99	0.91	0.03	8%	0.65	0.06	0.00	0%	0.25	0.00	0.96
CB-215	0.28	0.25	92%	0.99	0.91	0.02	8%	0.65	0.05	0.00	0%	0.25	0.00	0.96
TOTALS	9.23	8.37	91%	0.99	0.90	0.86	9%	0.65	0.06	0.00	0%	0.25	0.00	

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: New.stm

Number of lines: 36

Date: 2/19/2021

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	23.879	0.16	4.14	0.96	0.15	3.97	10.0	16.3	4.8	18.98	19.65	7.13	24	1.01	3.93	4.17	5.50	5.76	6.31	11.38	101-100
2	1	137.028	0.20	1.59	0.96	0.19	1.52	10.0	15.4	4.9	7.46	9.76	2.37	24	0.25	4.17	4.51	7.52	7.72	11.38	11.38	109-101
3	2	168.834	0.00	1.39	0.00	0.00	1.33	0.0	14.2	5.1	6.76	9.78	2.15	24	0.25	4.51	4.93	7.79	7.99	11.38	10.21	110-109
4	3	66.107	0.00	1.39	0.00	0.00	1.33	0.0	13.7	5.2	6.86	9.94	2.18	24	0.26	4.93	5.10	8.05	8.13	10.21	9.31	111-110
5	4	105.658	0.00	0.92	0.00	0.00	0.86	0.0	12.6	5.4	4.62	9.72	1.47	24	0.25	5.10	5.36	8.21	8.27	9.31	9.31	112-111
6	5	70.533	0.65	0.65	0.99	0.64	0.64	10.0	10.0	5.9	3.78	5.57	4.81	12	2.08	6.36	7.83	8.30	8.98	9.31	10.00	112A-112
7	4	70.476	0.47	0.47	0.99	0.47	0.47	10.0	10.0	5.9	2.73	5.55	3.48	12	2.07	6.10	7.56	8.21	8.56	9.31	10.01	111A-111
8	1	135.647	0.17	2.39	0.96	0.16	2.30	10.0	14.5	5.0	11.57	11.66	3.68	24	0.35	4.17	4.65	7.52	7.99	11.38	11.25	102-101
9	8	76.975	0.00	2.22	0.00	0.00	2.13	0.0	14.2	5.1	10.86	11.82	3.46	24	0.36	4.65	4.93	8.22	8.46	11.25	13.83	103-102
10	9	50.931	0.00	1.11	0.00	0.00	1.06	0.0	13.7	5.2	5.48	19.62	1.74	24	1.00	5.01	5.52	8.60	8.64	13.83	13.68	106-103
11	10	97.926	0.00	0.64	0.00	0.00	0.60	0.0	12.2	5.4	3.23	19.61	1.03	24	1.00	5.52	6.50	8.69	8.71	13.68	12.86	107-106
12	11	22.335	0.46	0.46	0.99	0.46	0.46	10.0	10.0	5.9	2.67	5.54	3.63	12	2.06	7.50	7.96	8.73	8.79	12.86	14.00	107A-107
13	11	62.521	0.18	0.18	0.78	0.14	0.14	10.0	10.0	5.9	0.82	7.63	0.49	18	0.70	7.00	7.44	8.73	8.73	12.86	11.81	108-107
14	10	22.342	0.47	0.47	0.99	0.47	0.47	10.0	10.0	5.9	2.73	5.60	3.48	12	2.10	6.52	6.99	8.69	8.80	13.68	14.00	106A-106
15	5	112.980	0.27	0.27	0.81	0.22	0.22	10.0	10.0	5.9	1.28	4.53	0.73	18	0.25	5.86	6.14	8.30	8.32	9.31	11.00	113-112
16	9	184.953	0.60	1.11	0.97	0.58	1.07	10.0	11.1	5.6	6.05	9.78	1.93	24	0.25	4.93	5.39	8.60	8.78	13.83	9.39	104-103
17	16	105.013	0.51	0.51	0.96	0.49	0.49	10.0	10.0	5.9	2.87	4.61	1.63	18	0.26	5.39	5.66	8.86	8.97	9.39	9.82	105-104
18	End	24.070	0.23	3.31	0.96	0.22	3.25	10.0	17.7	4.6	20.78	25.10	5.95	30	0.50	3.37	3.49	5.02	5.19	6.85	10.96	201-200
19	18	204.214	0.21	1.31	0.96	0.20	1.29	10.0	13.6	5.2	9.68	19.10	1.98	30	0.29	3.49	4.08	6.38	6.53	10.96	10.93	202-201
20	19	104.226	0.00	1.10	0.00	0.00	1.09	0.0	12.7	5.3	8.81	17.75	1.84	30	0.25	4.08	4.34	6.56	6.61	10.93	10.61	207-202
21	20	73.676	0.00	1.10	0.00	0.00	1.09	0.0	12.1	5.5	5.94	13.51	1.89	24	0.48	4.35	4.70	6.66	6.70	10.61	9.82	208-207
22	21	69.052	0.00	1.10	0.00	0.00	1.09	0.0	11.5	5.6	6.06	9.73	1.95	24	0.25	4.70	4.87	6.71	6.77	9.82	9.40	209-208

Project File: 2021-02-19-100-WQ.stm

Number of lines: 36

Run Date: 3/3/2021

NOTES: Intensity = 52.99 / (Inlet time + 9.60) ^ 0.74; Return period = Yrs. 25 ; c = cir e = ellip b = box

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
23	22	76.210	0.00	0.57	0.00	0.00	0.56	0.0	10.3	5.8	3.28	9.79	1.08	24	0.25	4.87	5.06	6.83	6.85	9.40	9.40	210-209
24	23	65.005	0.57	0.57	0.99	0.56	0.56	10.0	10.0	5.9	3.31	5.58	4.97	12	2.09	6.06	7.42	6.86	8.20	9.40	10.00	210A-210
25	18	34.487	0.00	1.16	0.00	0.00	1.15	10.0	12.3	5.4	9.08	11.56	2.89	24	0.35	3.49	3.61	6.38	6.46	10.96	11.54	206-201
26	25	77.919	0.00	1.16	0.00	0.00	1.15	0.0	11.9	5.5	6.30	7.29	3.56	18	0.64	3.61	4.11	6.59	6.96	11.54	12.91	211-206
27	26	132.017	0.00	1.16	0.00	0.00	1.15	0.0	11.3	5.6	6.43	6.48	3.64	18	0.51	4.11	4.78	7.16	7.82	12.91	13.75	212-211
28	27	146.371	0.00	0.61	0.00	0.00	0.60	0.0	10.1	5.9	3.54	6.43	2.00	18	0.50	4.78	5.51	8.02	8.24	13.75	11.97	213-212
29	28	19.499	0.61	0.61	0.99	0.60	0.60	10.0	10.0	5.9	3.55	5.59	4.51	12	2.10	6.01	6.42	8.31	8.47	11.97	12.92	213A-213
30	22	65.006	0.53	0.53	0.99	0.52	0.52	10.0	10.0	5.9	3.08	5.56	4.42	12	2.08	5.87	7.22	6.83	7.97	9.40	10.00	209A-209
31	25	256.093	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	2.86	11.16	0.96	24	0.32	4.11	4.94	6.59	6.64	11.54	7.54	203B-206
32	27	19.457	0.55	0.55	0.99	0.54	0.54	10.0	10.0	5.9	3.20	5.60	4.07	12	2.11	5.28	5.69	8.02	8.16	13.75	14.00	212A-212
33	18	140.880	0.33	0.61	0.96	0.32	0.59	10.0	16.4	4.8	2.79	6.51	1.58	18	0.51	3.49	4.21	6.38	6.51	10.96	11.46	214-201
34	33	342.000	0.28	0.28	0.96	0.27	0.27	10.0	10.0	5.9	1.58	4.99	0.90	18	0.30	4.21	5.24	6.57	6.67	11.46	9.00	215-214
35	End	123.284	0.91	1.75	0.92	0.84	1.61	10.0	10.9	5.7	9.15	9.99	4.37	24	0.26	4.45	4.77	5.53	6.34	10.08	9.00	204-203
36	35	76.210	0.84	0.84	0.92	0.77	0.77	10.0	10.0	5.9	4.54	9.79	1.77	24	0.25	4.77	4.96	6.37	6.41	9.00	9.00	205-204

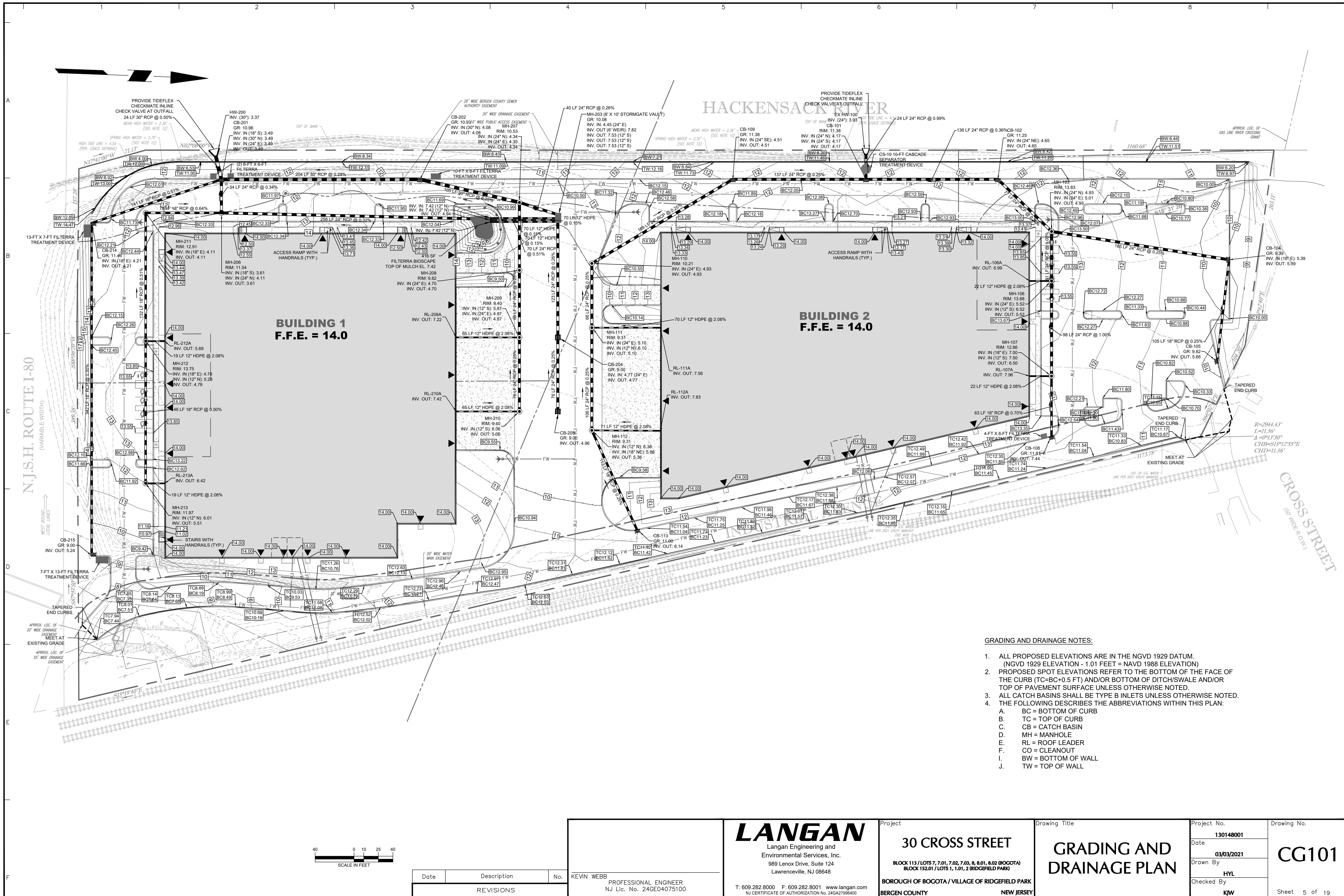
Project File: 2021-02-19-100-WQ.stm

Number of lines: 36

Run Date: 3/3/2021

NOTES: Intensity = 52.99 / (Inlet time + 9.60) ^ 0.74; Return period = Yrs. 25 ; c = cir e = ellip b = box

DRAWINGS



- GRADING AND DRAINAGE NOTES:**
- ALL PROPOSED ELEVATIONS ARE IN THE NGVD 1929 DATUM. (NGVD 1929 ELEVATION - 1.01 FEET = NAVD 1988 ELEVATION)
 - PROPOSED SPOT ELEVATIONS REFER TO THE BOTTOM OF THE FACE OF THE CURB (TC=BC+0.5 FT) AND/OR BOTTOM OF DITCH/SWALE AND/OR TOP OF PAVEMENT SURFACE UNLESS OTHERWISE NOTED.
 - ALL CATCH BASINS SHALL BE TYPE B INLETS UNLESS OTHERWISE NOTED.
 - THE FOLLOWING DESCRIBES THE ABBREVIATIONS WITHIN THIS PLAN:
 - A. BC = BOTTOM OF CURB
 - B. TC = TOP OF CURB
 - C. CB = CATCH BASIN
 - D. MH = MANHOLE
 - E. RL = ROOF LEADER
 - F. CO = CLEANOUT
 - I. BW = BOTTOM OF WALL
 - J. TW = TOP OF WALL

Date	Description	No.
REVISIONS		

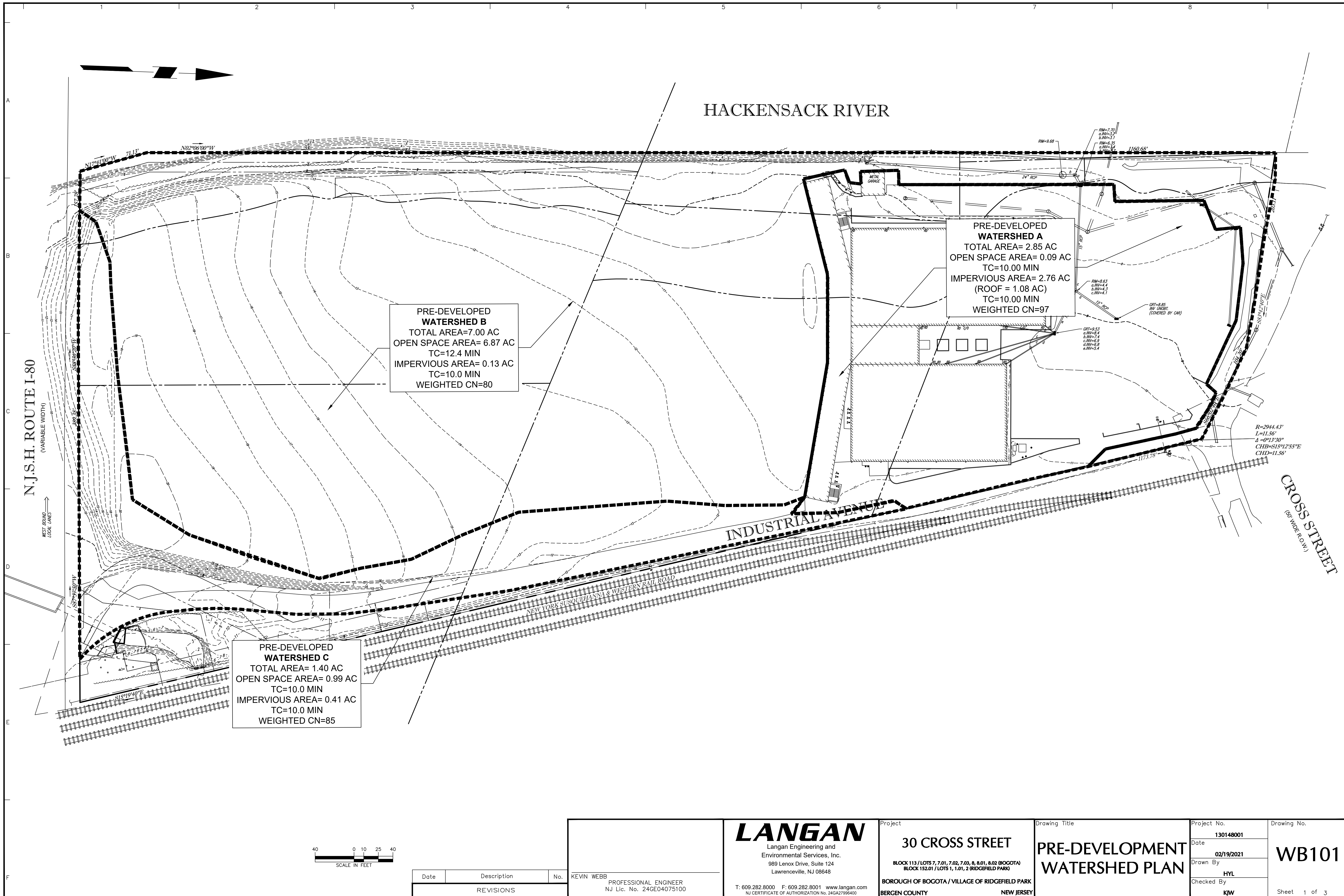
KEVIN WEBB
 PROFESSIONAL ENGINEER
 NJ Lic. No. 24GE04075100

LANGAN
 Langan Engineering and
 Environmental Services, Inc.
 989 Lenox Drive, Suite 124
 Lawrenceville, NJ 08648

T: 609.282.8000 F: 609.282.8001 www.langan.com
 NJ CERTIFICATE OF AUTHORIZATION NO. 24GA27896400

Project
30 CROSS STREET
 BLOCK 113 / LOTS 7, 01, 7, 02, 7, 03, 8, 8, 01, 8, 02 (BOGOTA)
 BLOCK 152.01 / LOTS 1, 1.01, 2 (RIDGEFIELD PARK)
 BOROUGHS OF BOGOTA / VILLAGE OF RIDGEFIELD PARK
 BERGEN COUNTY NEW JERSEY

Drawing Title	Project No.	Drawing No.
GRADING AND DRAINAGE PLAN	130148001	CG101
	Date	
	03/03/2021	
	Drawn By	
HYL	Checked By	Sheet 5 of 19
KW		



PRE-DEVELOPED WATERSHED B
 TOTAL AREA=7.00 AC
 OPEN SPACE AREA= 6.87 AC
 TC=12.4 MIN
 IMPERVIOUS AREA= 0.13 AC
 TC=10.0 MIN
 WEIGHTED CN=80

PRE-DEVELOPED WATERSHED A
 TOTAL AREA= 2.85 AC
 OPEN SPACE AREA= 0.09 AC
 TC=10.00 MIN
 IMPERVIOUS AREA= 2.76 AC
 (ROOF = 1.08 AC)
 TC=10.00 MIN
 WEIGHTED CN=97

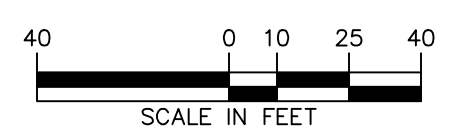
PRE-DEVELOPED WATERSHED C
 TOTAL AREA= 1.40 AC
 OPEN SPACE AREA= 0.99 AC
 TC=10.0 MIN
 IMPERVIOUS AREA= 0.41 AC
 TC=10.0 MIN
 WEIGHTED CN=85

HACKENSACK RIVER

N.J.S.H. ROUTE I-80
 (VARIABLE WIDTH)
 WEST BOUND LOCAL LANES

INDUSTRIAL AVENUE

CROSS STREET
 (60' WIDE R.O.W.)



Date	Description	No.
REVISIONS		

KEVIN WEBB
 PROFESSIONAL ENGINEER
 NJ Lic. No. 24GE04075100

LANGAN
 Langan Engineering and Environmental Services, Inc.
 989 Lenox Drive, Suite 124
 Lawrenceville, NJ 08648
 T: 609.282.8000 F: 609.282.8001 www.langan.com
 NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project
30 CROSS STREET
 BLOCK 113 / LOTS 7, 7.01, 7.02, 7.03, 8, 8.01, 8.02 (BOGOTA)
 BLOCK 152.01 / LOTS 1, 1.01, 2 (RIDGEFIELD PARK)
 BOROUGH OF BOGOTA / VILLAGE OF RIDGEFIELD PARK
 BERGEN COUNTY NEW JERSEY

Drawing Title
PRE-DEVELOPMENT WATERSHED PLAN

Project No. 130148001	Drawing No. WB101
Date 02/19/2021	Sheet 1 of 3
Drawn By HYL	
Checked By KW	

HACKENSACK RIVER

POST-DEVELOPED
UNDETAINED WATERSHED B
 TOTAL AREA = 1.01 AC
 OPEN SPACE AREA= 0.99 AC
 TC=10.0 MIN
 IMPERVIOUS AREA= 0.02 AC
 TC=10.0 MIN
 WEIGHTED CN = 80

BUILDING 1
 F.F.E. = 14.0

POST-DEVELOPED
DETAINED WATERSHED B
 TOTAL AREA= 5.06 AC
 OPEN SPACE AREA= 0.47 AC
 TC=10.0 MIN
 IMPERVIOUS AREA= 4.59 AC
 TC=10.0 MIN
 WEIGHTED CN = 96

POST-DEVELOPED
WATERSHED A
 TOTAL AREA= 4.17 AC
 OPEN SPACE AREA= 0.41 AC
 TC=10.0 MIN
 IMPERVIOUS AREA= 3.76 AC
 TC=10.0 MIN
 WEIGHTED CN=96

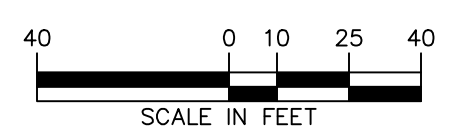
POST-DEVELOPED
WATERSHED C
 TOTAL AREA = 0.85 AC
 OPEN SPACE AREA= 0.44 AC
 TC=10.0 MIN
 IMPERVIOUS AREA= 0.41 AC
 TC=10.0 MIN
 WEIGHTED CN = 89

N.J.S.H. ROUTE I-80
 (VARIABLE WIDTH)

INDUSTRIAL AVENUE

CROSS STREET
 (60' WIDE R.O.W.)

NEW YORK SUSQUEHANNA & WESTERN RAIL ROAD



Date	Description	No.
REVISIONS		

KEVIN WEBB
 PROFESSIONAL ENGINEER
 NJ Lic. No. 24GE04075100

LANGAN

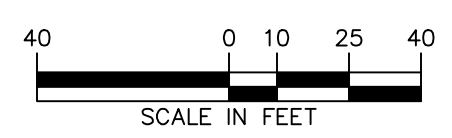
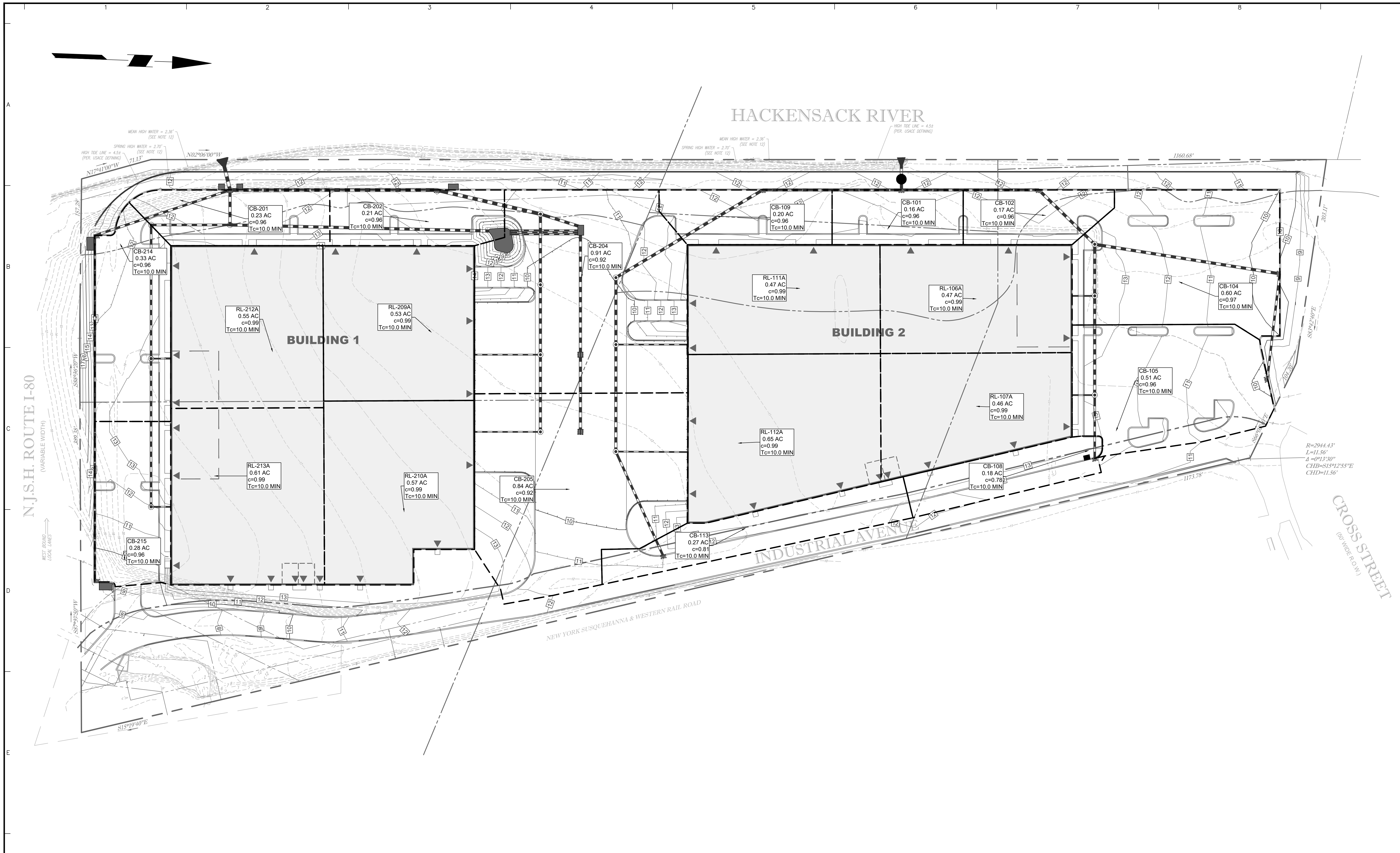
Langan Engineering and
 Environmental Services, Inc.
 989 Lenox Drive, Suite 124
 Lawrenceville, NJ 08648

T: 609.282.8000 F: 609.282.8001 www.langan.com
 NJ CERTIFICATE OF AUTHORIZATION No. 24GA27896400

Project
30 CROSS STREET
 BLOCK 113 / LOTS 7, 7.01, 7.02, 7.03, 8, 8.01, 8.02 (BOGOTA)
 BLOCK 152.01 / LOTS 1, 1.01, 2 (RIDGEFIELD PARK)
 BOROUGH OF BOGOTA / VILLAGE OF RIDGEFIELD PARK
 BERGEN COUNTY NEW JERSEY

Drawing Title
**POST-DEVELOPMENT
 WATERSHED PLAN**

Project No. 130148001	Drawing No. WB102
Date 02/19/2021	Sheet 2 of 3
Drawn By HYL	
Checked By KW	



Date	Description	No.
REVISIONS		

KEVIN WEBB
 PROFESSIONAL ENGINEER
 NJ Lic. No. 24GE04075100

LANGAN
 Langan Engineering and Environmental Services, Inc.
 989 Lenox Drive, Suite 124
 Lawrenceville, NJ 08648
 T: 609.282.8000 F: 609.282.8001 www.langan.com
 NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project
30 CROSS STREET
 BLOCK 113 / LOTS 7, 7.01, 7.02, 7.03, 8, 8.01, 8.02 (BOGOTA)
 BLOCK 152.01 / LOTS 1, 1.01, 2 (RIDGEFIELD PARK)
 BOROUGH OF BOGOTA / VILLAGE OF RIDGEFIELD PARK
 BERGEN COUNTY NEW JERSEY

Drawing Title
SUB-WATERSHED PLAN

Project No. 130148001	Drawing No. WB103
Date 02/04/2021	Sheet 3 of 3
Drawn By HYL	
Checked By KJW	