NOTE:

This SWPPP/SWMR was prepared in accordance with Unified Sustainable Development Ordinance and with the New York State Stormwater Management Design Manual. This SWPPP/SWMR must be kept on the job site and available for use of contractors & subcontractors. A Pre-Construction meeting must be held prior to commencing any excavation with the Albany Department of Water. Maintenance Plan is attached and includes both temporary and permanent facilities maintenance. This SWPPP/SWMR, together with all required plans, completed inspection forms and a log of activities including any mitigation of items noted on inspection forms must be kept on the job site and available for inspection by regulatory authorities. SWPPP inspections must be forwarded electronically to the City of Albany Department of Water & Water Supply

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)/ STORM WATER MANAGEMENT REPORT (SWMR) 363 Ontario Street Apartments

363 Ontario Street

CITY OF ALBANY COUNTY OF ALBANY STATE OF NEW YORK

Applicant: Jankow Companies

PREPARED BY:

HERSHBERG & HERSHBERG



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September 29, 2017 Revised: December 12, 2017 Revised: January 10, 2018

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INTRODUCTION

Hershberg & Hershberg, Consulting Engineers and Land Surveyors, were retained by Jankow Companies (hereinafter the "Applicant") with an address of PO Box 1366, Guilderland, NY 12084 as site engineer for the construction of a mixed-use development plan to be known as 363 Ontario Street Apartments.

DESCRIPTION OF EXISTING SITE:

PARCEL AREA

The existing parcel is Tax Map Parcel #64.76-4-47 listed as No. 363 Ontario Street with a site area of 76,345 SF or 1.75 Acres.



Fig. No. 1 - Aerial Photo of Site

STORMWATER POLLUTION PREVENTION PLAN/STORMWATER MANAGEMENT REPORT 363 ONTARIO STREET CITY OF ALBANY, ALBANY COUNTY, NEW YORK PAGE 1

WATERCOURSES

There are no watercourses which cross the subject site.

EXISTING WETLANDS

There are no Federal wetlands (Waters of the United States) or New York State Freshwater Wetlands within 0r adjacent to the site.

FLOOD PLAIN

The site to be developed lies primarily Zone X (Area of Minimal Flooding) as shown on Flood Insurance Rate Map reproduced below:

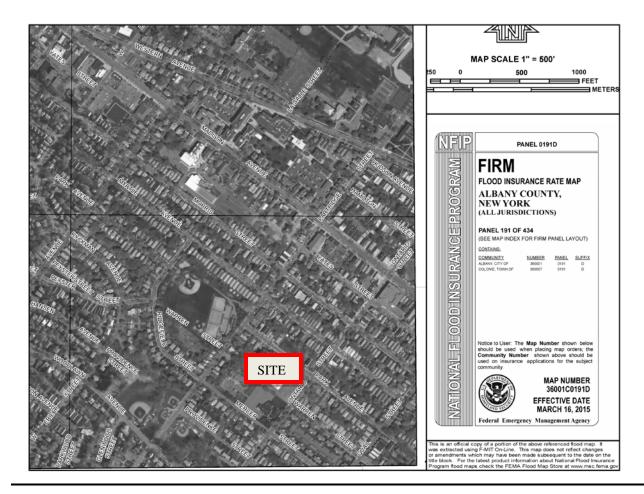


Fig. No. 2 – Firmette from FEMA Map Center

STORMWATER POLLUTION PREVENTION PLAN/STORMWATER MANAGEMENT REPORT 363 ONTARIO STREET CITY OF ALBANY, ALBANY COUNTY, NEW YORK PAGE 2

HISTORIC OR ARCHEOLOGICAL RESOURCES

The entire site has been previously developed. The potential for finding any archeological properties is very small. The building was constructed in 1941 and is not listed on any register of historic places.

LISTED, ENDANGERED OR THREATENED SPECIES

NYSDEC Environmental Resource Mapper shows no rare plants or animals or any significant natural community in the area of the project

EXISTING USAGE

The site is currently occupied by the Playdium Bowling Alley, retail stores and a parking area.

EXISTING SOILS

The project area is located in an area of Udorthents clayey – Urban Land Complex which is a Hydrologic Class C/D soil which make in inappropriate for infiltration methods.



Fig. No. 3 – Soils Map

Soil Map—Albany County, New York

Area of I	Area of Interest (AOI)	8	Spoil Area Stony Spot	The soil surveys that comprise your AOI were mapped at 1:15,800.
Soils	Soil Map Unit Polygons	0	Very Stony Spot	Warning: Soil Map may not be valid at this scale.
~	Soil Map Unit Lines	\$	Wet Spot Other	Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of so line placement. The maps do not show the small areas of
Specia	Soil Map Unit Points	-	Special Line Features	contrasting soils that could have been shown at a more details scale.
(0)	Blowout	Water Feat	tures	
	Borrow Pit	Transport	Streams and Canals	Please rely on the bar scale on each map sheet for map measurements.
×	Clay Spot Closed Depression	+++	Rails	Source of Map: Natural Resources Conservation Service Web Soil Survey URL:
×	Gravel Pit	~	Interstate Highways US Routes	Coordinate System: Web Mercator (EPSG:3857) Maps from the Web Soil Survey are based on the Web Merca
	Gravelly Spot	~	Major Roads	projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as t
Ø A	Lava Flow	Backgrour	Local Roads	Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.
alle	Marsh or swamp	1	Aerial Photography	This product is generated from the USDA-NRCS certified data of the version date(s) listed below.
穴 〇	Mine or Quarry Miscellaneous Water			Soll Survey Area: Albany County, New York Survey Area Data: Version 14, Sep 23, 2016
0	Perennial Water			Soil map units are labeled (as space allows) for map scales 1:50.000 or larger.
×	Rock Outcrop Saline Spot			Date(s) aerial images were photographed: Jun 10, 2015—M 29: 2017
:-:	Sandy Spot			The orthophoto or other base map on which the soil lines wer
ه ه	Severely Eroded Spot Sinkhole			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.
è	Slide or Slip			smally of hap and boardaries hay be evident.
65	Sodic Spot			

USDA Natural Resources Conservation Service Web Soil Survey National Cooperative Soil Survey 9/25/2017 Page 2 of 3

Fig. No. 4 - Map Legend

Soil Map-Albany County, New York

Map Unit Legend

Albany County, New York (NY001)					
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI		
Uh	Udorthents, clayey-Urban land complex	1.8	100.0%		
Totals for Area of Interest		1.8	100.0%		

Fig. No. 5 - Map Unit Legend

STORMWATER POLLUTION PREVENTION PLAN/STORMWATER MANAGEMENT REPORT 363 ONTARIO STREET CITY OF ALBANY, ALBANY COUNTY, NEW YORK PAGE 5

WATERSHED DESCRIPTION

The entire project site drains from the Northwest corner of the site along Park Avenue to the Southeast corner at Warren Street. The site is tributary to a 4'9" circular brick pipe in Warren Street which is a portion of the Beaver Creek Sewer District.

SITE TOPOGRAPHY

The site slopes from Northwest corner of the site along Park Avenue at Elevation 205 to the Southeast corner of the site at Warren Street at Elevtaion 190. The average grade is 3.75%.

DESCRIPTION OF INTENDED SITE DEVELOPMENT AND USE

Under the current application the Applicant is proposing to demolish the existing Playdium building and parking lot and replace it with a mixed use development of the property. This includes three apartment buildings with a total of 106 units of apartments and retail space along Ontario Street. Basement level parking is provided for 96 cars and paved parking for 49 cars. Also included are landscaping, lighting, stormwater management and utility connections.

DESIGN CONSIDERATIONS:

The design of the SWPPP for the subject site considered the following critical factors:

1. Compliance with Section 375-4(G)(11) of the Unified Sustainable Development Ordinance entitled STORMWATER MANAGEMENT

(a) All development and redevelopment in the City shall comply with the requirements of Article 14 of Chapter 133 (Stormwater Management and

Erosion Control) of the City Code, and with Chapter 299 (Sewers) of the City Code.

(b) Each application for development or redevelopment shall be referred to the Department of Water and Water Supply for a determination of whether the existing sanitary and storm sewer infrastructure is adequate in size, location, connectivity, and construction quality to accommodate expected flows of both sanitary sewer and stormwater from the proposed facility. If the Albany Department of Water and Water Supply determines that the existing sanitary and/or storm sewer infrastructure is not adequate to accommodate expected sanitary and stormwater flows from the proposed development, the City may require that the applicant modify the proposed development and/or install or contribute a proportional share of the overall cost to the installation of required storm and sanitary sewer infrastructure before the proposed development is approved, and the applicant may be required to pay its proportionate share of those costs.

(c) All development and redevelopment within the City with a proposed area of disturbance greater than or equal to one-quarter (1/4) of an acre in size shall comply with the latest version of the New York State Department of Environmental Conservation Stormwater Management Design Manual that are written as applicable to properties with areas of disturbance of one (1) acre in size or larger.

(d) The maximum allowable design peak-flow stormwater discharge into the combined sewer system shall be limited to the calculated peak-flow discharge of the **10-year storm for un-development site conditions**, as determined by a Professional Engineer, and to be reviewed and accepted by the Department of Water and Water Supply. (emphasis added)

- 2. During construction comply with the New York State Standards and Specifications for Erosion and Sediment Control dated July, 2016.
- 3. The permanent system complies with the New York State Stormwater Management Design Manual (hereinafter NYSSWDM), last revised

January, 2015 with the exception of the consideration of the 10 year undeveloped site as opposed to the redevelopment standard.

Based upon the HydroCAD analysis in Appendix 6 the following information is provided for the studied storms:

	12/12/2017								
Undeveloped & Post Development Run-off Summary									
		1 YEAR STO	RM	RM 2 YEAR STORM 10 YEAR STORM		100 YEAR STORM			
UNDEVELOPED	POST	UNDEVELOPED	POST	UNDEVELOPED	POST	UNDEVELOPED	POST	UNDEVELOPED	POST
R1		2.13		2.28		5.57		10.70	
	R1		1.43		1.51		2.73		4.07

Fig. No. 6 – Pre and Post Runoff Calculations

With the entire site considered as unpaved for the existing computation the reduction of flow from this is from 5.57 CFS to 2.73 CFS under the 10 year storm.

SELECTED METHODS OF TREATMENT & STORAGE:

The design of the SWPPP includes the following elements of treatment and storage:

POROUS PAVEMENT WITH UNDERDRAIN

Porous Asphalt pavement is listed as RR-9 on the NYSDEC GI worksheet. This has been selected for the site paving. Because infiltration rate is less than 0.5 inches per hour an underdrain system is employed to collect any water not collected and discharge the treated stormwater to the overflow subsurface pipe gallery preceded by a sedimentation structure. The underdrain system also serves to distribute the stormwater over the entire pavement subgrade. Also to assure that storm water does not concentrate at the lowest internal dams are installed. The minimum depth is 8 inches for the stone reservoir. For the porous pavement the stone reservoir is 16 inches so it can contain the peak elevations reached by all storms up to an including the 100 year storm. The Peak Elevation in the stone reservoir is 0.30 feet at the 1 year storm 0.86 feet at the 10 year storm and 2.96 feet at the 100 year storm. Additional Storage is provided in a subsurface Pipe Storage Gallery.

WATER QUALITY VOLUME

Water Quality Volume (WQ_v) is computed based upon the following formula:¹

$$WQ_v = (P) (R_v) (A)$$

12

Where WQ_v = water quality volume (acre-feet)

- P = 90% rainfall event² (1.20 inches)
- $R_v = 0.05 + 0.009 I$, where I is percent impervious cover

A = site area in acres

¹ **Ibid.** Table 4-1, Page 4-3

² **Ibid.**, Page 4-2, Figure 4.1

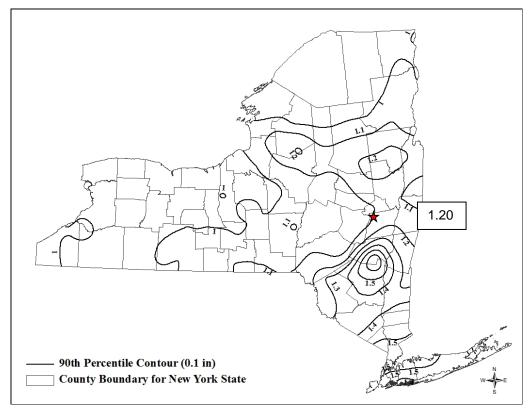


Fig. No. 7 – NYSDEC 90th Percentile Contour

The Water Quality Volume (WQ_v) is computed in Appendix #7. The total WQv for the site is 7,006 cubic feet or 0.161 acre-feet. This factor is utilized to size the sediment basin exceeding 25% of WQv prior to discharge at 1,800 cubic feet.

CONSTRUCTION SEQUENCING & SEDIMENTATION AND EROSION CONTROL DURING CONSTRUCTION

The construction sequence for this project is shown below. Approximate timing is indicated where applicable in red following steps.

Prior to commencement of any work this SWPPP

✓ Assure that copy of SWMR & SWPPP is on the site. ON

COMMENCEMENT

- Establish Qualified Individual who will be performing site inspection. ON COMMENCEMENT
- Inspections must be performed by the qualified professional must be submitted to the MS4 Coordinator. FROM COMMENCEMENT UNTIL PROJECT COMPLETE
- ✓ Establish Trained Contractor who will be on site. At least one Trained Contractor must be on site whenever ground disturbing activities are being undertaken.
 ON COMMENCEMENT
- ✓ Establish contact person for Contractor/Subcontractor. ON COMMENCEMENT
- ✓ IN CASE OF ANY SPILLS OF MATERIALS ON SITE, EXECUTE SPILL
- ✓ RESPONSE PLAN CONTAINED IN APPENDIX #7

Construction Sequence

- ✓ Install traffic controls as required. PRIOR TO THE START OF ANY
- ✓ CONSTRUCTION
- ✓ Install construction fencing as required. PRIOR TO THE START OF ANY CONSTRUCTION
- ✓ Commence work on site.
- ✓ Undertake any utility relocations or abandonment required. PRIOR TO DEMOLITION
- ✓ Install sedimentation fence or other controls as indicated on the plan. PRIOR TO COMMENCEMENT OF ANY GRADING – FENCE TO REMAIN IN PLACE UNTIL ALL AREAS ARE STABILIZED.
- ✓ Grade and prepare construction entrance. PRIOR TO COMMENCEMENT OF ANY GRADING – CONSTRUCTION ENTRANCE TO REMAIN IN PLACE UNTIL ALL AREAS ARE STABILIZED.
- ✓ Demolish building and asphalt pavement. UPON COMPLETION OF DEMOLITION REMOVE ITEMS TO BE SALVAGED FROM SITE OR STOCKPILE ON SITE FOR REUSE.
- Commence installation of the temporary sediment trap and discharge pipe.
 THIS SHOULD BE IN PLACE AFTER DEMOLITION AN MAY BE RELOCATED AS CONSTRUCTION TAKES PLACE>
- ✓ Establish fueling area. Relocate when required. MAINTAIN A FUELING AREA FOR EQUIPMENT UNTIL NO LONGER REQUIRED.
- ✓ The existing pavement must be kept swept clean to avoid tracking materials onto any streets. CONTINUOUSLY FROM INCEPTION TO COMPLETION OF STABILIZATION OR UNTIL PROJECT IS COMPLETE.
- Maintain this area clean of debris and verify condition and safety of storage of materials listed below. Requires daily inspection. CONTINUOUSLY FROM INCEPTION UNTIL PROJECT IS COMPLETE.
- Any construction materials, chemicals or construction debris must be stored in sealed receptacles, trailers or buildings. Any storage piles of materials meant

for installation (i.e., sand, etc.) must be surrounded by sedimentation fence. The list of anticipated materials stored on site during construction is provided below and must be updated if any additional materials are utilized: CONTINUOUSLY FROM INCEPTION UNTIL PROJECT IS COMPLETE.

- Select Fill
- Fencing Materials
- Pipes
- Pipe Solvents
- Concrete Structures
- Reinforcing Steel
- Decorative Stone
- Brick
- Concrete Additives
- Concrete Sealers
- ✓ MSDS sheets must be available on site for all materials used or imported to the site. CONTINUOUSLY FROM INCEPTION UNTIL PROJECT IS COMPLETE.
- ✓ Any chemical spills must be contained immediately on site and reported to NYSDEC. CONTINUOUSLY FROM INCEPTION TO FILING OF NOTICE UNTIL PROJECT IS COMPLETE.
- ✓ Oil and grease spills from equipment shall be treated immediately. CONTINUOUSLY FROM INCEPTION UNTIL PROJECT IS COMPLETE.
- ✓ Clean sediment trap as required. CONTINUOUSLY FROM INSTALLATION UNTIL PROJECT IS COMPLETE..
- ✓ Direct drainage to porous pavement and treatment system. PRIOR TO REMOVAL OF TEMPORARY SEDIMENT TRAP.
- ✓ Abandon sediment trap. AFTER PERMANENT STORAGE AND POROUS PAVEMENT GOES ON LINE.
- ✓ Complete construction of Project.
- Obtain approval of Project completion from the Department of Water & Water Supply,

HOUSEKEEPING SECTION

During construction any construction materials, chemicals or construction debris must be stored in sealed receptacles, trailers or buildings. Any storage piles of materials meant for installation (i.e., sand, etc.) must be surrounded by sedimentation fence. The list of anticipated materials stored on site during construction is provided below and must be updated if any additional materials are utilized:

- Select Fill
- Fencing Materials
- Pipes
- Pipe Solvents
- Concrete Structures
- Reinforcing Steel
- Decorative Stone
- Brick
- Concrete Additives
- Concrete Sealers

MSDS sheets must be available on site for all materials used or imported to the site.

Any chemical spills must be contained immediately on site and reported to NYSDEC.

IN CASE OF ANY SPILLS OF MATERIALS ON SITE, EXECUTE SPILL RESPONSE PLAN CONTAINED IN APPENDIX #9

Oil and grease spills from equipment shall be treated immediately. Vehicle fueling must take place in designated area. Relocate designated fueling area when required.

DESCRIPTION OF NEED FOR WINTER CONDITION

The construction sequence for this project may require work between November 15th and April 1st of any year when construction is ongoing. Some unstabilized soil areas may exist on November 15th. This Section is issued for use in the event that such conditions exist. The **STANDARD AND SPECIFICATIONS FOR WINTER STABILIZATION** (reproduced below) will apply to this project area. Accommodation for wintertime conditions are addressed below.

STANDARD AND SPECIFICATIONS FOR WINTER STABILIZATION



Definition & Scope

A temporary site specific, enhanced erosion and sediment control plan to manage runoff and sediment at the site during construction activities in the winter months to protect off-site water resources.

Conditions Where Practice Applies

This standard applies to all construction activities involved with ongoing land disturbance and exposure between November 15th to the following April 1st.

Design Criteria

- Prepare a snow management plan with adequate storage for snow and control of melt water, requiring cleared snow to be stored in a manner not affecting ongoing construction activities.
- Enlarge and stabilize access points to provide for snow management and stockpiling. Snow management activities must not destroy or degrade installed erosion and sediment control practices.
- A minimum 25 foot buffer shall be maintained from all perimeter controls such as silt fence. Mark silt fence with tall stakes that are visible above the snow pack.
- Edges of disturbed areas that drain to a waterbody within 100 feet will have 2 rows of silt fence, 5 feet apart, installed on the contour.
- Drainage structures must be kept open and free of snow and ice dams. All debris, ice dams, or debris from plowing operations, that restrict the flow of runoff and meltwater, shall be removed.
- 6. Sediment barriers must be installed at all appropriate

November 2016

perimeter and sensitive locations. Silt fence and other practices requiring earth disturbance must be installed before the ground freezes.

- Soil stockpiles must be protected by the use of established vegetation, anchored straw mulch, rolled stabilization matting, or other durable covering. A barrier must be installed at least 15 feet from the toe of the stockpile to prevent soil migration and to capture loose soil.
- 8. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures should be initiated by the end of the next business day and completed within three (3) days. Rolled erosion control blankets must be used on all slopes 3 horizontal to 1 vertical or steeper.
- 9. If straw mulch alone is used for temporary stabilization, it shall be applied at double the standard rate of 2 tons per acre, making the application rate 4 tons per acre. Other manufactured mulches should be applied at double the manufacturer's recommended rate.
- 10. To ensure adequate stabilization of disturbed soil in advance of a melt event, areas of disturbed soil should be stabilized at the end of each work day unless:
 - a. work will resume within 24 hours in the same area and no precipitation is forecast or;
 - the work is in disturbed areas that collect and retain runoff, such as open utility trenches, foundation excavations, or water management areas.
- 11. Use stone paths to stabilize access perimeters of buildings under construction and areas where construction vehicle traffic is anticipated. Stone paths should be a minimum 10 feet in width but wider as necessary to accommodate equipment.

Maintenance

The site shall be inspected frequently to ensure that the erosion and sediment control plan is performing its winter stabilization function. If the site will not have earth disturbing activities ongoing during the "winter season", **all** bare exposed soil must be stabilized by established vegetation, straw or other acceptable mulch, matting, rock, or other approved material such as rolled erosion control products. Seeding of areas with mulch cover is preferred but seeding alone is not acceptable for proper stabilization.

Compliance inspections must be performed and reports filed properly in accordance with the SWPPP for all sites under a winter shutdown.

Page 2.38

New York State Standards and Specifications For Erosion and Sediment Control

STORMWATER POLLUTION PREVENTION PLAN/STORMWATER MANAGEMENT REPORT 363 ONTARIO STREET CITY OF ALBANY, ALBANY COUNTY, NEW YORK PAGE 16

WINTER CONDITIONS ITEMS TO BE ADDRESSED

1. Identify areas within the site to store snow which is tributary to the temporary sedimentation basin. As work progresses this area may move but positive drainage tributary to the temporary sedimentation basin must be maintained.

2. Widen stabilized construction access points to a minimum of 15 feet. Where pavement forms a portion of that route, maintain 50 feet of stone pavement meeting the detail as shown on the SWPPP plan. Stockpile a minimum of 25 cubic yard of stone for the purposes of establishing stone access point after snow storms.

3, Where any areas at the street grade or within two feet of the street grade remain disturbed overnight, stabilize those areas using 6" of broken stone.

4. Where equipment or vehicles are traversing the bottom of the excavation, establish paths using 6" of broken stone.

5. At any point on the perimeter where drainage from accumulated snow or ice will drain away from the site protect these areas coir logs or polyethelene coated check dam materials (Filtrexx, Erosion eel or equal).

6. If work is to cease for more than 3 days, stabilize all disturbed soils.

WINTER CONDITIONS SUMMARY:

The following is a summary of the required work if wintertime as presented by the preparer of this report:

- 1. The temporary system and control measures proposed herein and on the plans comply with the *New York State Standards and Specifications for Erosion and Sediment Control* dated July, 2016.
- The winter stabilization complies with Standard and Specifications for Winter Stabilization as described New York State Standards and Specifications for Erosion and Sediment Control dated July, 2016.

SUMMARY:

The following is a summary of the findings of this study as presented by the preparer of this report:

- 1. The temporary system and control measures proposed herein and on the plans comply with the *New York State Standards and Specifications for Erosion and Sediment Control* dated July, 2016.
- The permanent system complies with Section 375-4(G)(11) of the Unified Sustainable Development Ordinance entitled STORMWATER MANAGEMENT.

CONCLUSION & CERTIFICATION:

It is the conclusion of the Engineer that the erosion and sediment control system, as designed, and the permanent storage and treatment system will function adequately to clean the stormwater prior to discharge. Also, the Engineer certifies that the project will not adversely impact adjacent or downstream properties or the downstream sewer collection system.



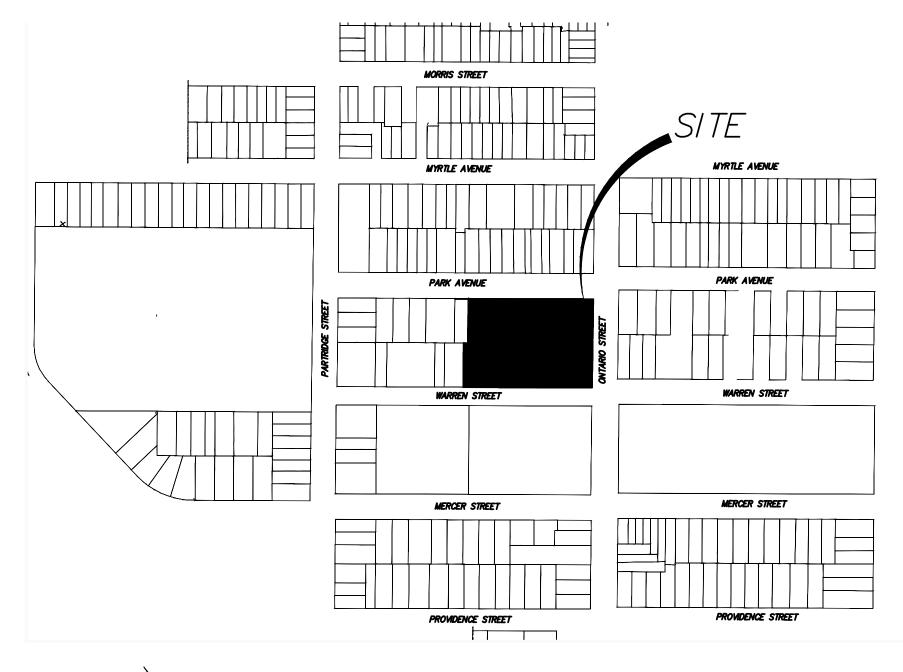
Prepared by:

Daniel R. Hershberg, P.E. & L.S. Lic. No. 44226

File:DRH/SWPPP/SWPPP&SWMR20170034 112917.DOC

APPENDIX #1

SITE LOCATION MAP



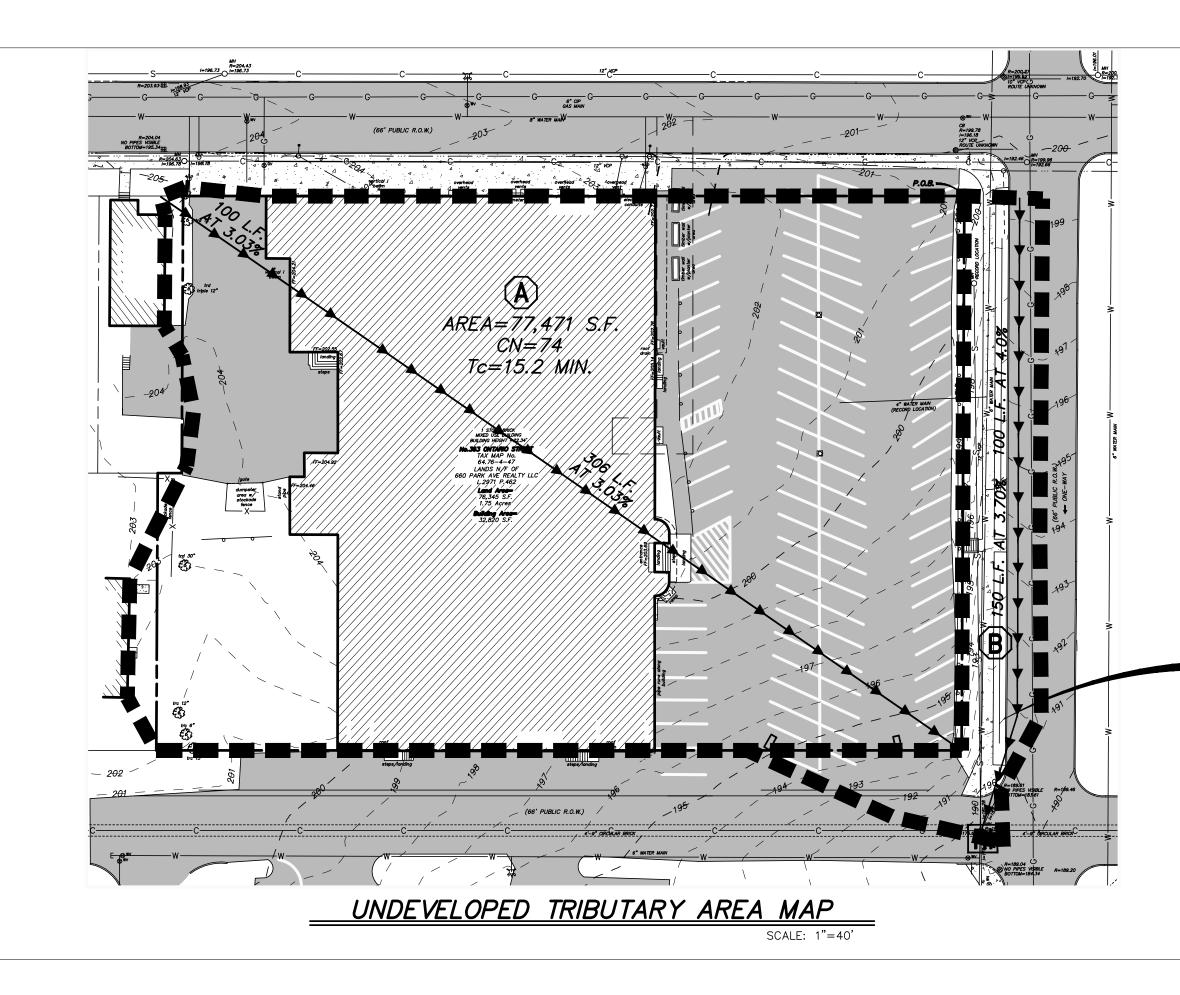


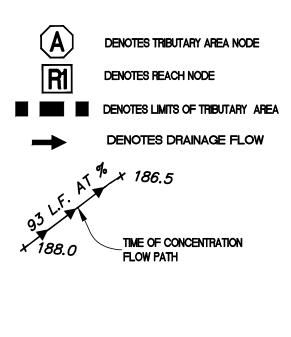
SITE LOCATION MAP

1"=100'

APPENDIX #2

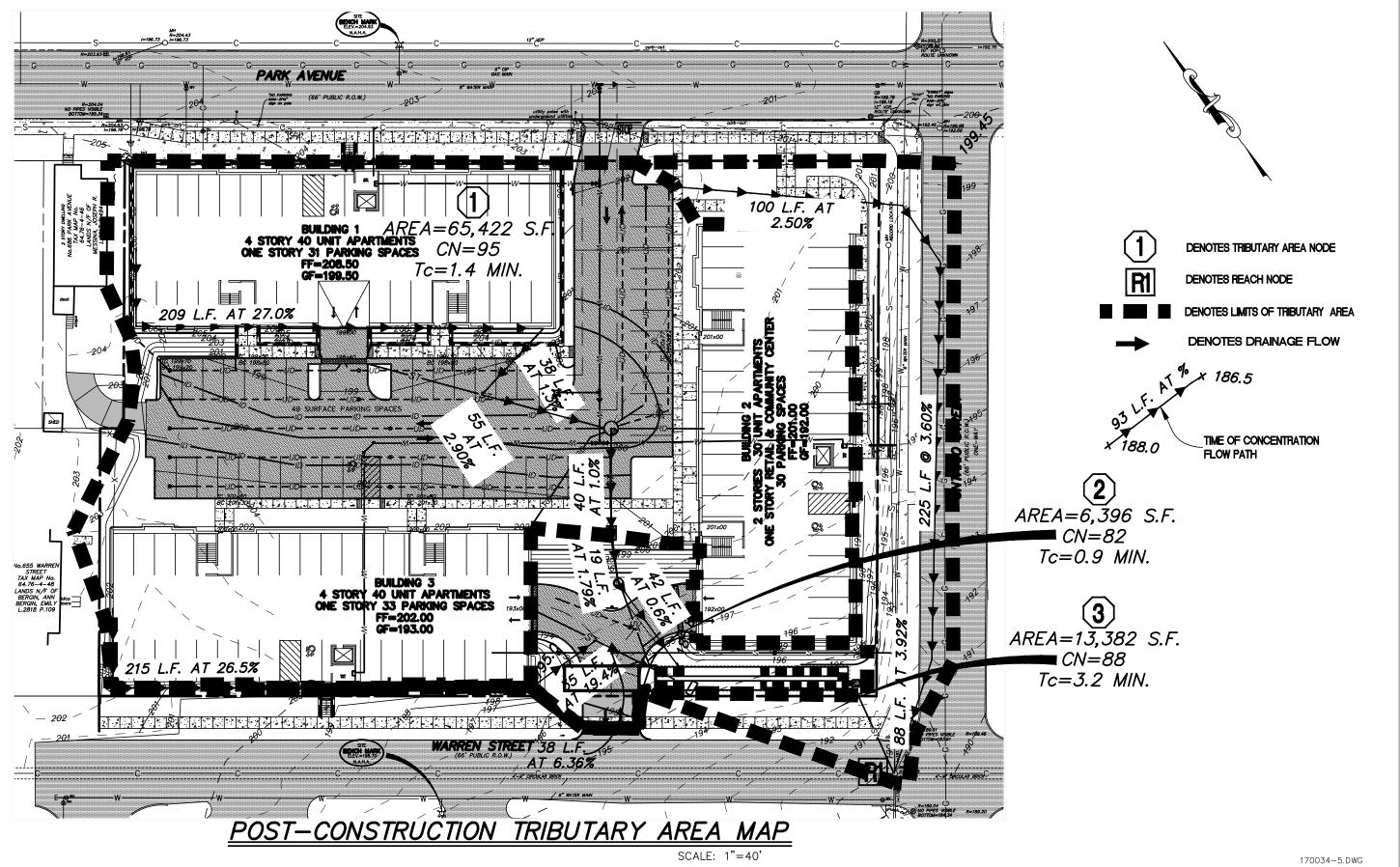
TRIBUTARY AREA MAPS





AREA=9,768 S.F. CN=90 Tc=1.6 MIN

170034-5.DWG



APPENDIX #3

MAINTENANCE PLAN

Facility Owner (Responsible Party): Jankow Companies PO Box 1366 Guilderland, NY 12084

The facility owner will be responsible to provide capital funding for this facility. The source will be from infrastructure funds set aside for construction. On an annual basis the responsible party will budget funds to fund the annual operating and maintenance costs. The facility owner must maintain all drainage facilities, stormwater quantity control facilities and all stormwater quality control facilities in accordance with approved plans and with this maintenance manual. Complete inspection form and retain with SWPPP. Inspection may be performed by a Qualified Inspector or a Qualified Professional. The Qualified Inspector is defined in GP #0-15-002 as follows:

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or other Department endorsed individual(s). It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years. It can also mean a person that meets the Qualified Professional qualifications in addition to the Qualified Inspector qualifications.

The Qualified Professional is defined in GP #0-15-002 as follows:

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such

as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics in order to prepare a SWPPP that conforms to the Department's technical standard. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

The elements of this SWPPP which require inspection include:

Porous pavement – Conduct a quarterly inspection which includes: Open and examine water level in monitoring wells, report any standing water to engineer, vacuum sweep porous pavement and use high-pressure hosing to free pores (if required). If pavement shows any evidence of failure, report to the Engineer.

Sediment basin, Structures and Pipe Storage Gallery – Conduct a quarterly inspection for accumulated sediment. If sediment builds up in either the sediment basin or pipe gallery to 6", use vacuum methods to clear these structures of sediment.

Vegetation cover within the tributary area. The inspection shall verify that on lawns or other seeded areas that vegetation covers a minimum of 90% of the exposed ground. Other areas such as mulch beds or landscaped areas shall be inspected to verify that proper mulching is in place.

Housekeeping Section – This section describes items requiring regular checking and should be conducted on a daily basis.

Daily inspection.

Debris cleanup – Remove and dispose of all debris encountered on parking area, on lawn areas or in area adjacent to public right-of-way.

Materials storage – Verify that all materials identified in the Housekeeping Section have been properly stored.

Winter Conditions and Transition Periods - Follow winter conditions for construction between November 15th and April 1^{st.} After April 1st during spring thaw, if ground remains unstabilized extend winter conditions. Prior to

November 15th, if freezing occurs and ground remains unstabilized extend winter conditions.

Oil & Grease – Any visible oil and grease shall be treated with proper materials to capture residue. Remove any materials from the site. If possible, determine cause of accumulation of oil & grease and address these.

Monthly inspection or inspection after every significant rainfall (0.5 inches in 24 hours) shall determine whether the following benchmarks are reached in which case appropriate action shall be taken.

Condition of vegetation – Areas with seeded lawns should be maintained in accordance with good cultural practices. Mow and remove clippings if required. Dead or diseased plant material shall be replaced.

Annual inspection shall determine whether the benchmarks listed in the checklist are met.

Operation, Maintenance and Management Inspection Checklist (Complete in 3 Pages)

Project:	363 Ontario Apartme	<u>ents</u>		
Location:	363 Ontario Street			
	City of Albany, Albany	County, NY		
Date:				
Time:				
Inspector:				
MAINTENANCI	EITEM	SATISFACTORY(S)/	0	
		UNSATISFACTORY(U)	COMMENTS	
4.01]
1. Cleanout				
Contributing	areas clean of debris	□ (S) □ (U)		
2. Oil and G				
Keep Pavem	nent area free of			
of oil & greas	se	🗌 (S) 🗌 (U)		
-				
3. Vegetatio	on Control			
Keep drainag	ge area stabilized	□ (S) □ (U)		
<u>No evidence</u>	of erosion	🗌 (S) 🗌 (U)		
Area mowed	and clipping removed	🗌 (S) 🗌 (U)		
	• •			
	al Components			
	tural damage			
of pipes or st		□ <u>(</u> S) □ (U)		-
	nt is in good condition			
Evaluate ag	gregate kick-out"	□ (S) □ (U)		-
5. Overall F	unction of Porous Pa	vement		
	ep porous pavement	□ (S) □ (U)		
	re hosing to free pores i			
	j	□ (S) □ (U)		

Date of Inspection _____ Sheet 1 of 3

Inspection ITEM	SATISFACTORY(S)/ UNSATISFACTORY(U)	Comments
1. Cleanout (Monthly or after any	significant storm even	t)
Contributing areas clean of debris	🗌 (S) 🗌 (U)	
2 Oil and Crosse (Manthly)		
2. Oil and Grease (Monthly) Inspect Pavement area for evidence	e of	
oil & grease	□ (S) □ (U)	
Activities in drainage area minimize		
and grease entry		
2 Manufation Control (Manthha)		
3. Vegetation Control (Monthly)		
Contributing drainage area stabilize		
No evidence of erosion	<u> </u>	
Area mowed and clipping removed	□ (S) □ (U)	
4. Structural Components (Annua	al)	
No evidence of structural damage of	f flare ends outfalls	(S) 🗌 (U)
The pavement is in good condition		
Evaluate "aggregate kick-out"	🗌 (S) 🗌 (U)	
5. Overall Function of Porous Pa	voment & Sodiment St	ructure and Subsurface Pine
<u>Gallery(Quarterly)</u>	vement & Seument St	
Open and examine water level in m	onitoring wells	
Report any standing water to engine	eer 🛛 (S) 🗌 (U)	
Vacuum sweep porous pavement	□ (S) □ (U)
High-pressure hosing to free pores	if required	
	□ (S) □ (U)	
Pavement shows no evidence of fai		
areas which may need repavement	□ (S) □ (U)	
Examine manholes, orifice control s		
and pipe gallery for sediment buildu sediment exceeds 6" clean pipes, s		
and/or pipe gallery	<u>Indetates</u> □ (S) □ (U	
		/

Date of Inspection _____ Sheet 2 of 3

MAINTENANCE ITEM	SATISFACTORY(S)/ UNSATISFACTORY(U)	COMMENTS	
6. Winter Conditions and Transi	tion Periods (Daily)		
Follow winter conditions for			
construction between November 1	5 th		
and April 1 st	□ (U)		
After April 1 st during spring thaw,			
if ground remains unstabilized			
extend winter conditions	🗌 (S) 🗌 (U)		
Prior to November 15th, if freezing	occurs_		
and ground remains unstabilized			
extend winter conditions	🗌 (S) 🗌 (U)		

Comments:

Actions to be Taken:

Date of Inspection _____ Sheet 3 of 3

APPENDIX #4

MAINTENANCE AGREEMENT

STORMWATER MANAGEMENT SYSTEM MAINTENANCE AGREEMENT 363 Ontario Street Apartments

THIS AGREEMENT ("Agreement") is made and entered into on the _____ day of _____, 2017, by and between Jankow Companies, with an address at PO Box 1366, Guilderland, NY 12084 (hereinafter referred to as the "Facility Owner"), and

CITY OF ALBANY, a municipal corporation with an address at 24 Eagle Street, Albany, New York 12207 (hereinafter referred to as the "City").

WITNESSETH:

WHEREAS, the Facility Owner is the owner of the subject parcel of land in the City of Albany, County of Albany and State of New York as more particularly located at 363 Ontario Street, Albany New York.

WHEREAS, the City and the Facility Owner desire that the stormwater management system be built in accordance with the approved project documents and thereafter be maintained, cleaned, repaired, replaced and continued in perpetuity in order to ensure optimum performance of the components; and

WHEREAS, the City has requested this legally binding and enforceable maintenance agreement from the Facility Owner; and

WHEREAS, the Facility Owner is representing the following design documents, with their City approved revisions, as containing all necessary information to construct, operate and maintain the stormwater management system for the lifetime of the facility:

a. Plan set submitted to the City representing a stormwater management system including stormwater collection, conveyance and storage using structures designed and specified by Hershberg & Hershberg, Consulting Engineers, sealed by Daniel R. Hershberg, P.E., as the Engineer of Record. The plan sheets showing features associated with the stormwater management system are listed below.

Sheet# C-1	<u>Date</u> 6/12/17 Rev. 12/12/17	<u>Drawing Title</u> Existing Conditions Plan
C-2	6/12/17 Rev. 12/12/17	Site Demolition Plan
<i>C-3</i>	6/12/17 Rev. 12/12/17	Site Plan
<i>C-4</i>	6/12/17 Rev. 12/12/17	Utility Plan
C-5	6/12/17 Rev. 12/12/17	Sedimentation & Erosion Control Plan
<i>C-6</i>	6/12/17 Rev. 12/12/17	Landscaping Plan
C-7	6/12/17 Rev. 12/1217	Details
C-8	6/12/17 Rev. 12/12/17	Erosion & Sediment Control and Site Details
C-9	6/12/17 Rev.	Details
C-10	12/12/17 11/29/17 Rev. 12/12/17	Utility Profiles

b. STORM WATER POLLUTION PREVENTION PLAN (SWPPP) & STORM WATER MANAGEMENT REPORT (SWMR), 363 Ontario Street Apartments prepared by Hershberg & Hershberg, Consulting Engineers and Land Surveyors, dated September 29, 2017

IN CONSIDERATION THEREOF, the parties agree as follow:

1. The Facility Owner shall be responsible for maintaining the storm water facility in a manner to prevent silt from becoming tributary to the City's storm water drainage system.

2. Operation and maintenance, including inspection and cleaning of the full storm water drainage system, shall be the responsibility of the Facility Owner.

3. In the event the Facility Owner fails to maintain the system in a manner to control storm water the City may order the system cleaned and bill the Facility Owner the full cost of this work at labor cost (direct labor plus 50% salary burden) and materials (at cost) if work is performed by the Department of Water & Water Supply; or the cost of a subcontractor plus 10% of the subcontractor's bill if the Department of Water & Water Supply obtains a subcontractor to perform the work. Invoices are payable to the Department of Water & Water & Water Supply within ten (10) business days from the date of invoice. In the event payment for costs is not received within said ten (10) day period, the Department of Water & Water Supply shall have the right to file a lien in the amount of the invoice, together with reasonable costs of collection incurred in connection therewith, against the property of the Facility Owner.

4. The City has the right to access the premises for periodic inspections and to perform any maintenance of the stormwater system.

5. The Facility Owner shall disclose this Agreement to any successor or assignees in interest.

6. This Agreement is binding on the Facility Owner and any successor or assignees in interest hereof.

7. Facility Owner agrees to defend, indemnify, and save harmless the CITY and its officers, employees and agents, from and against all claims, actions, causes of action, injuries, damages, losses, liabilities, and expenses (including, without limitation, reasonable attorney's fees and court costs) arising out of, or in consequence of, any negligent or intentional act or omission of Facility Owner to the extent of its or their responsibility for such claims, actions, causes of action, injuries, damages, losses, liabilities, and expenses. The provisions of this Article shall survive any termination or expiration of this Agreement.

[Signatures on next page]

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be signed by their duly authorized officers as of the day and year first above written.

CITY OF ALBANY, NEW YORK

BY:_____ KATHY M. SHEEHAN MAYOR, CITY OF ALBANY

JANKOW COMPANIES

BY_____ RYAN JANKOW

STATE OF NEW YORK)) ss.: COUNTY OF ALBANY)

On the _ day of ______, 201_, before me the undersigned, a Notary Public in and for said State, personally appeared ______, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual, or person upon behalf of which the individual acted, executed the instrument.

Notary Public

STATE OF NEW YORK)) ss.: COUNTY OF____-)

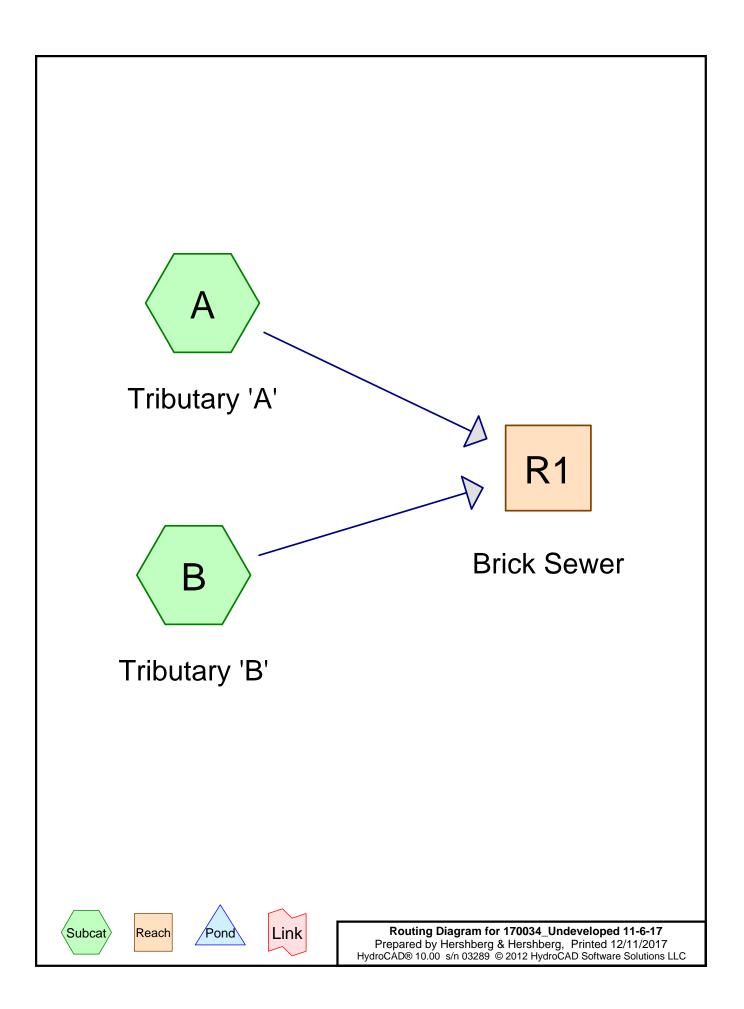
On the _ day of ______, 201_, before me the undersigned, a Notary Public in and for said State, personally appeared ______, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual, or person upon behalf of which the individual acted, executed the instrument.

Notary Public

APPENDIX #5

HYDROCAD® 10.00 CALCULATIONS

APPENDIX #6 – WQV CALCULATION



Area Listing (all nodes)

Area	CN	Description
(acres)		(subcatchment-numbers)
1.857	74	>75% Grass cover, Good, HSG C (A, B)
0.482	98	Paved parking, HSG C (B)
2.339	79	TOTAL AREA

Soil Listing (all nodes)

Area	Soil	Subcatchment
(acres)	Group	Numbers
0.000	HSG A	
0.000	HSG B	
2.339	HSG C	А, В
0.000	HSG D	
0.000	Other	
2.339		TOTAL AREA

170034_Undeveloped 11-6-17

Prepared by Hershberg &	Hershberg
HydroCAD® 10.00 s/n 03289	© 2012 HydroCAD Software Solutions LLC

Ground Covers (all nodes)

HSG-A	HSG-B	HSG-C	HSG-D	Other	Total	Ground	Subcatchment
 (acres)	(acres)	(acres)	(acres)	(acres)	(acres)	Cover	Numbers
 0.000	0.000	1.857	0.000	0.000	1.857	>75% Grass cover, Good	А, В
0.000	0.000	0.482	0.000	0.000	0.482	Paved parking	В
0.000	0.000	2.339	0.000	0.000	2.339	TOTAL AREA	

	Pipe Listing (all nodes)									
	Line#	Node	In-Invert	Out-Invert	Length	Slope	n	Diam/Width	Height	Inside-Fill
_		Number	(feet)	(feet)	(feet)	(ft/ft)		(inches)	(inches)	(inches)
	1	R1	175.68	175.09	119.0	0.0050	0.015	57.0	0.0	0.0

170034_Undeveloped 11-6-17 Prepared by Hershberg & Hershberg	Type II 24-hr 1 year Rainfall=2.50" Printed 12/11/2017				
HydroCAD® 10.00 s/n 03289 © 2012 HydroCA	AD Software Solutions LLC Page 6				
Time span=0.00-30.00 hrs, dt=0.10 hrs, 301 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind method - Pond routing by Stor-Ind method					
Subcatchment A: Tributary 'A' Flow Length=406'	Runoff Area=77,471 sf 0.00% Impervious Runoff Depth=0.61" Slope=0.0303 '/' Tc=15.2 min CN=74 Runoff=1.21 cfs 0.090 af				
Subcatchment B: Tributary 'B'	Runoff Area=24,406 sf 86.04% Impervious Runoff Depth=1.96" Flow Length=225' Tc=2.3 min CN=95 Runoff=1.82 cfs 0.092 af				

 Reach R1: Brick Sewer
 Avg. Flow Depth=0.41'
 Max Vel=2.82 fps
 Inflow=2.18 cfs
 0.182 af

 57.0"
 Round Pipe
 n=0.015
 L=119.0'
 S=0.0050 '/'
 Capacity=138.62 cfs
 Outflow=2.13 cfs
 0.182 af

Total Runoff Area = 2.339 acRunoff Volume = 0.182 afAverage Runoff Depth = 0.93"79.39% Pervious = 1.857 ac20.61% Impervious = 0.482 ac

Summary for Subcatchment A: Tributary 'A'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

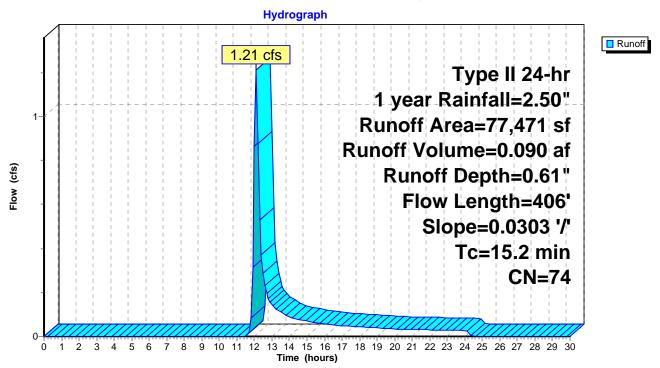
The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 1.21 cfs @ 12.10 hrs, Volume= 0.090 af, Depth= 0.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 1 year Rainfall=2.50"

A	rea (sf)	CN E	Description					
	77,471 74 >75% Grass cover, Good, HSG C							
77,471 100.00% Pervious Area					a			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
13.4	100	0.0303	0.12		Sheet Flow, Sheet			
1.8	306	0.0303	2.80		Grass: Dense n= 0.240 P2= 2.60" Shallow Concentrated Flow, grass Unpaved Kv= 16.1 fps			
15.2	406	Total						

Subcatchment A: Tributary 'A'



Summary for Subcatchment B: Tributary 'B'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

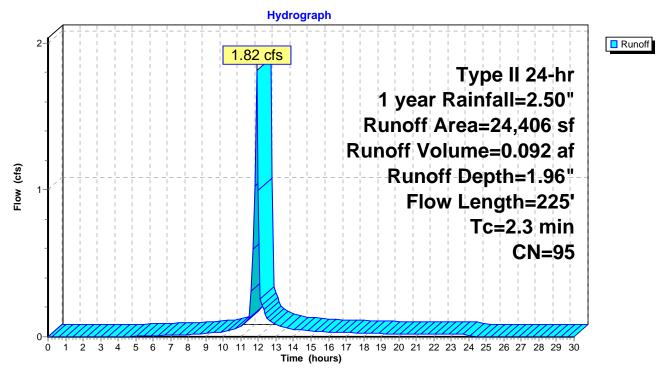
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 1.82 cfs @ 11.90 hrs, Volume= 0.092 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 1 year Rainfall=2.50"

	A	rea (sf)	CN E	Description					
		3,406	74 >	74 >75% Grass cover, Good, HSG C					
		21,000	98 F	Paved park	ing, HSG C				
		24,406	95 V	5 Weighted Average					
		3,406	13.96% Pervious Area						
		21,000	8	86.04% Imp	pervious Are	ea			
	Tc	Length	Slope	Velocity	Capacity	Description			
(m	in)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
C).8	75	0.0373	1.50		Sheet Flow, Sheet			
						Smooth surfaces n= 0.011 P2= 2.60"			
1	1.5	150	0.0370	1.72		Sheet Flow,			
						Smooth surfaces n= 0.011 P2= 2.60"			
2	2.3	225	Total						



Subcatchment B: Tributary 'B'

Summary for Reach R1: Brick Sewer

 Inflow Area =
 2.339 ac, 20.61% Impervious, Inflow Depth =
 0.93" for 1 year event

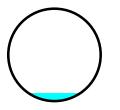
 Inflow =
 2.18 cfs @
 11.93 hrs, Volume=
 0.182 af

 Outflow =
 2.13 cfs @
 11.95 hrs, Volume=
 0.182 af, Atten= 3%, Lag= 1.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Max. Velocity= 2.82 fps, Min. Travel Time= 0.7 min Avg. Velocity = 1.00 fps, Avg. Travel Time= 2.0 min

Peak Storage= 89 cf @ 11.95 hrs Average Depth at Peak Storage= 0.41' Bank-Full Depth= 4.75' Flow Area= 17.7 sf, Capacity= 138.62 cfs

57.0" Round Pipe n= 0.015 Brickwork Length= 119.0' Slope= 0.0050 '/' Inlet Invert= 175.68', Outlet Invert= 175.09'



Hydrograph Inflow Outflow 2.18 cfs Inflow Area=2.339 ac 2.13 cfs Avg. Flow Depth=0.41' 2 Max Vel=2.82 fps 57.0" **Round Pipe** Flow (cfs) n=0.015 L=119.0' 1 S=0.0050 '/' Capacity=138.62 cfs 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Time (hours)

Reach R1: Brick Sewer

170034_Undeveloped 11-6-17	Type II 24-hr 2 year Rainfall=2.60"				
Prepared by Hershberg & Hershberg	Printed 12/11/2017				
HydroCAD® 10.00 s/n 03289 © 2012 HydroCA	AD Software Solutions LLC Page 11				
Time span=0.00-30.00 hrs, dt=0.10 hrs, 301 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind method - Pond routing by Stor-Ind method					
Subcatchment A: Tributary 'A'	Runoff Area=77,471 sf 0.00% Impervious Runoff Depth=0.67"				
	Slope=0.0303 '/' Tc=15.2 min CN=74 Runoff=1.34 cfs 0.099 af				
Subcatchment B: Tributary 'B'	Runoff Area=24,406 sf 86.04% Impervious Runoff Depth=2.06" Flow Length=225' Tc=2.3 min CN=95 Runoff=1.90 cfs 0.096 af				

 Reach R1: Brick Sewer
 Avg. Flow Depth=0.43'
 Max Vel=2.88 fps
 Inflow=2.34 cfs
 0.195 af

 57.0"
 Round Pipe
 n=0.015
 L=119.0'
 S=0.0050 '/'
 Capacity=138.62 cfs
 Outflow=2.28 cfs
 0.195 af

Total Runoff Area = 2.339 acRunoff Volume = 0.195 afAverage Runoff Depth = 1.00"79.39% Pervious = 1.857 ac20.61% Impervious = 0.482 ac

Summary for Subcatchment A: Tributary 'A'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

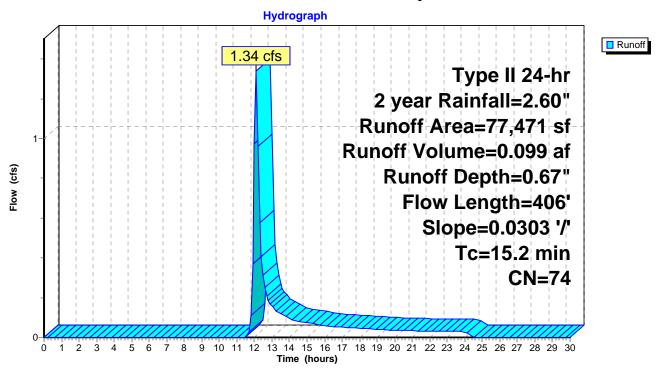
The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 1.34 cfs @ 12.10 hrs, Volume= 0.099 af, Depth= 0.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 2 year Rainfall=2.60"

_	A	rea (sf)	CN E	Description				
	77,471 74 >75% Grass cover, Good, HSG C							
77,471 100.00% Pervious Area					ervious Are	a		
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description		
-	13.4	100	0.0303	0.12		Sheet Flow, Sheet		
	1.8	306	0.0303	2.80		Grass: Dense n= 0.240 P2= 2.60" Shallow Concentrated Flow, grass Unpaved Kv= 16.1 fps		
	15.2	406	Total					

Subcatchment A: Tributary 'A'



Summary for Subcatchment B: Tributary 'B'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

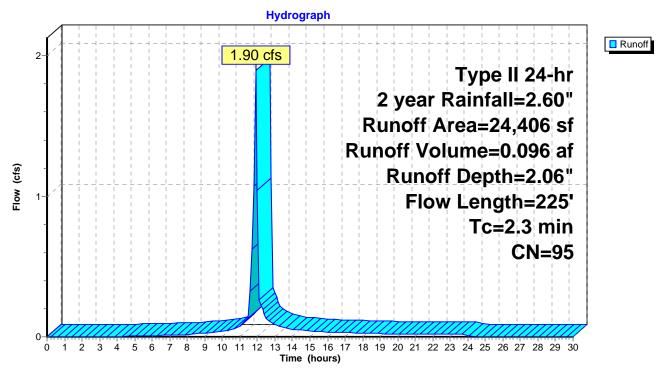
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 1.90 cfs @ 11.90 hrs, Volume= 0.096 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 2 year Rainfall=2.60"

Area	a (sf)	CN D	CN Description					
3	3,406	74 >	74 >75% Grass cover, Good, HSG C					
21	,000	98 P	Paved parking, HSG C					
24	,406	95 V	95 Weighted Average					
3	3,406	13.96% Pervious Area						
21	,000	8	6.04% Imp	pervious Ar	ea			
Tc L	ength	Slope	Velocity	Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
0.8	75	0.0373	1.50		Sheet Flow, Sheet			
					Smooth surfaces n= 0.011 P2= 2.60"			
1.5	150	0.0370	1.72		Sheet Flow,			
					Smooth surfaces n= 0.011 P2= 2.60"			
2.3	225	Total						



Subcatchment B: Tributary 'B'

Summary for Reach R1: Brick Sewer

 Inflow Area =
 2.339 ac, 20.61% Impervious, Inflow Depth =
 1.00" for 2 year event

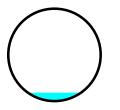
 Inflow =
 2.34 cfs @
 11.93 hrs, Volume=
 0.195 af

 Outflow =
 2.28 cfs @
 11.95 hrs, Volume=
 0.195 af, Atten= 2%, Lag= 1.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Max. Velocity= 2.88 fps, Min. Travel Time= 0.7 min Avg. Velocity = 1.02 fps, Avg. Travel Time= 2.0 min

Peak Storage= 93 cf @ 11.95 hrs Average Depth at Peak Storage= 0.43' Bank-Full Depth= 4.75' Flow Area= 17.7 sf, Capacity= 138.62 cfs

57.0" Round Pipe n= 0.015 Brickwork Length= 119.0' Slope= 0.0050 '/' Inlet Invert= 175.68', Outlet Invert= 175.09'



Hydrograph Inflow Outflow 2.34 cfs Inflow Area=2.339 ac 2.28 cfs Avg. Flow Depth=0.43' Max Vel=2.88 fps 2 57.0" **Round Pipe** Flow (cfs) n=0.015 L=119.0' 1 S=0.0050 '/' Capacity=138.62 cfs 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Time (hours)

Reach R1: Brick Sewer

170034_Undeveloped 11-6-17	Type II 24-hr 10 year Rainfall=4.50"				
Prepared by Hershberg & Hershberg	Printed 12/11/2017				
HydroCAD® 10.00 s/n 03289 © 2012 HydroCA	AD Software Solutions LLC Page 16				
Time span=0.00-30.00 hrs, dt=0.10 hrs, 301 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind method - Pond routing by Stor-Ind method					
Subcatchment A: Tributary 'A'	Runoff Area=77,471 sf 0.00% Impervious Runoff Depth=1.97"				
Flow Length=406'	Slope=0.0303 '/' Tc=15.2 min CN=74 Runoff=4.32 cfs 0.292 af				
Subcatchment B: Tributary 'B'	Runoff Area=24,406 sf 86.04% Impervious Runoff Depth=3.92" Flow Length=225' Tc=2.3 min CN=95 Runoff=3.48 cfs 0.183 af				

 Reach R1: Brick Sewer
 Avg. Flow Depth=0.65'
 Max Vel=3.82 fps
 Inflow=5.46 cfs
 0.476 af

 57.0"
 Round Pipe
 n=0.015
 L=119.0'
 S=0.0050 '/'
 Capacity=138.62 cfs
 Outflow=5.57 cfs
 0.476 af

Total Runoff Area = 2.339 acRunoff Volume = 0.476 afAverage Runoff Depth = 2.44"79.39% Pervious = 1.857 ac20.61% Impervious = 0.482 ac

Summary for Subcatchment A: Tributary 'A'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

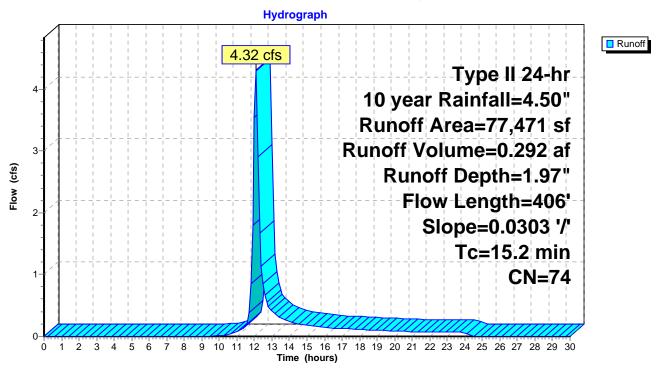
The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 4.32 cfs @ 12.09 hrs, Volume= 0.292 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 10 year Rainfall=4.50"

_	A	rea (sf)	CN E	Description				
77,471 74 >75% Grass cover, Good, HSG C								
		77,471	1	00.00% Pe	ervious Are	a		
	Tc Length Slope Velocity Capacity (min) (feet) (ft/ft) (ft/sec) (cfs)					Description		
-	13.4	100	0.0303	0.12		Sheet Flow, Sheet		
	1.8	306	0.0303	2.80		Grass: Dense n= 0.240 P2= 2.60" Shallow Concentrated Flow, grass Unpaved Kv= 16.1 fps		
	15.2	406	Total					

Subcatchment A: Tributary 'A'



Summary for Subcatchment B: Tributary 'B'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 3.48 cfs @ 11.90 hrs, Volume= 0.183 af, Depth= 3.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 10 year Rainfall=4.50"

	A	rea (sf)	CN E	CN Description							
		3,406	74 >	74 >75% Grass cover, Good, HSG C							
		21,000	98 F	98 Paved parking, HSG C							
		24,406	95 V	95 Weighted Average							
		3,406	1	3.96% Pei	vious Area						
		21,000	8	86.04% Imp	pervious Are	ea					
	Tc	Length	Slope	Velocity	Capacity	Description					
(m	in)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
C).8	75	0.0373	1.50		Sheet Flow, Sheet					
						Smooth surfaces n= 0.011 P2= 2.60"					
1	1.5	150	0.0370	1.72		Sheet Flow,					
						Smooth surfaces n= 0.011 P2= 2.60"					
2	2.3	225	Total								

Hydrograph Runoff 3.48 cfs Type II 24-hr 10 year Rainfall=4.50" 3-Runoff Area=24,406 sf Runoff Volume=0.183 af Flow (cfs) Runoff Depth=3.92" 2 Flow Length=225' Tc=2.3 min CN=95 1 0 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Time (hours)

Subcatchment B: Tributary 'B'

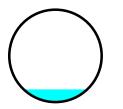
Summary for Reach R1: Brick Sewer

Inflow Area =2.339 ac, 20.61% Impervious, Inflow Depth =2.44" for 10 year eventInflow =5.46 cfs @11.97 hrs, Volume=0.476 afOutflow =5.57 cfs @11.99 hrs, Volume=0.476 af, Atten= 0%, Lag= 1.1 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Max. Velocity= 3.82 fps, Min. Travel Time= 0.5 min Avg. Velocity = 1.22 fps, Avg. Travel Time= 1.6 min

Peak Storage= 173 cf @ 11.99 hrs Average Depth at Peak Storage= 0.65' Bank-Full Depth= 4.75' Flow Area= 17.7 sf, Capacity= 138.62 cfs

57.0" Round Pipe n= 0.015 Brickwork Length= 119.0' Slope= 0.0050 '/' Inlet Invert= 175.68', Outlet Invert= 175.09'



Hydrograph Inflow Outflow 5.57 cfs 6 Inflow Area=2.339 ac Avg. Flow Depth=0.65' 5 Max Vel=3.82 fps 57.0" 4 **Round Pipe** Flow (cfs) n=0.015 3-L=119.0' S=0.0050 '/' 2 Capacity=138.62 cfs 1 0 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Time (hours)

Reach R1: Brick Sewer

170034_Undeveloped 11-6-17	Type II 24-hr	100 Year Rainfall=7.00"
Prepared by Hershberg & Hershberg		Printed 12/11/2017
HydroCAD® 10.00 s/n 03289 © 2012 HydroCAD Software Solution	ns LLC	Page 21

Time span=0.00-30.00 hrs, dt=0.10 hrs, 301 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment A: Tributary 'A'	Runoff Area=77,471 sf 0.00% Impervious Runoff Depth=4.04"
Flow Length=406'	Slope=0.0303 '/' Tc=15.2 min CN=74 Runoff=8.87 cfs 0.599 af
Subcatchment B: Tributary 'B'	Runoff Area=24,406 sf 86.04% Impervious Runoff Depth=6.41" Flow Length=225' Tc=2.3 min CN=95 Runoff=5.52 cfs 0.299 af

Avg. Flow Depth=0.89' Max Vel=4.64 fps Inflow=10.55 cfs 0.898 af Reach R1: Brick Sewer 57.0" Round Pipe n=0.015 L=119.0' S=0.0050 '/' Capacity=138.62 cfs Outflow=10.70 cfs 0.898 af

> Total Runoff Area = 2.339 ac Runoff Volume = 0.898 af Average Runoff Depth = 4.61" 79.39% Pervious = 1.857 ac 20.61% Impervious = 0.482 ac

Summary for Subcatchment A: Tributary 'A'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

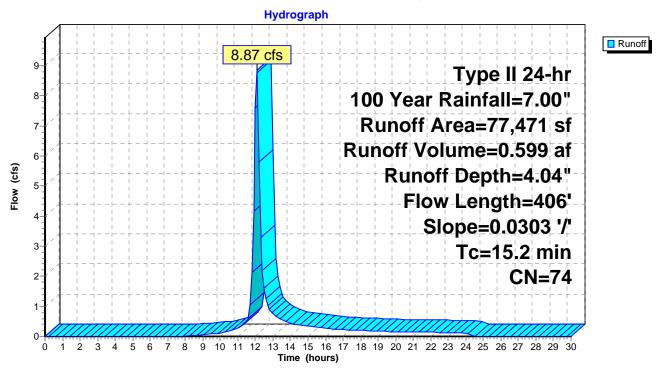
The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 8.87 cfs @ 12.08 hrs, Volume= 0.599 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 100 Year Rainfall=7.00"

_	A	rea (sf)	CN E	Description			
		77,471	74 >	75% Gras	s cover, Go	ood, HSG C	
77,471 100.00% Pervious Area						a	
	Tc Length Slope Velocity Capacity (min) (feet) (ft/ft) (ft/sec) (cfs)					Description	
-	13.4	100	0.0303	0.12		Sheet Flow, Sheet	
	1.8	306	0.0303	2.80		Grass: Dense n= 0.240 P2= 2.60" Shallow Concentrated Flow, grass Unpaved Kv= 16.1 fps	
	15.2	406	Total				

Subcatchment A: Tributary 'A'



Summary for Subcatchment B: Tributary 'B'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

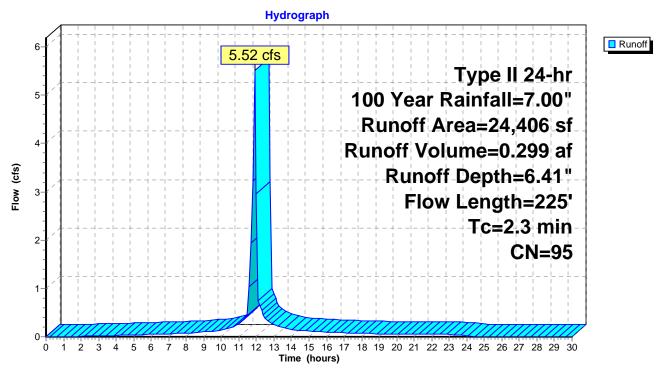
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 5.52 cfs @ 11.90 hrs, Volume= 0.299 af, Depth= 6.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 100 Year Rainfall=7.00"

Are	ea (sf)	CN D	escription						
	3,406 74 >75% Grass cover, Good, HSG C								
2	1,000	98 F	aved park	ing, HSG C					
2	4,406	95 Weighted Average							
	3,406	1	3.96% Per	vious Area					
2	1,000	8	6.04% Imp	ervious Ar	ea				
Tc	Length	Slope	Velocity	Capacity	Description				
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
0.8	75	0.0373	1.50		Sheet Flow, Sheet				
					Smooth surfaces n= 0.011 P2= 2.60"				
1.5	150	0.0370	1.72		Sheet Flow,				
					Smooth surfaces n= 0.011 P2= 2.60"				
2.3	225	Total							



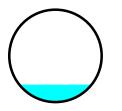
Subcatchment B: Tributary 'B'

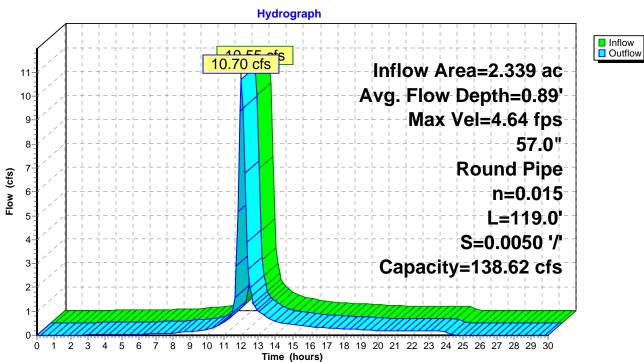
Summary for Reach R1: Brick Sewer

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Max. Velocity= 4.64 fps, Min. Travel Time= 0.4 min Avg. Velocity = 1.44 fps, Avg. Travel Time= 1.4 min

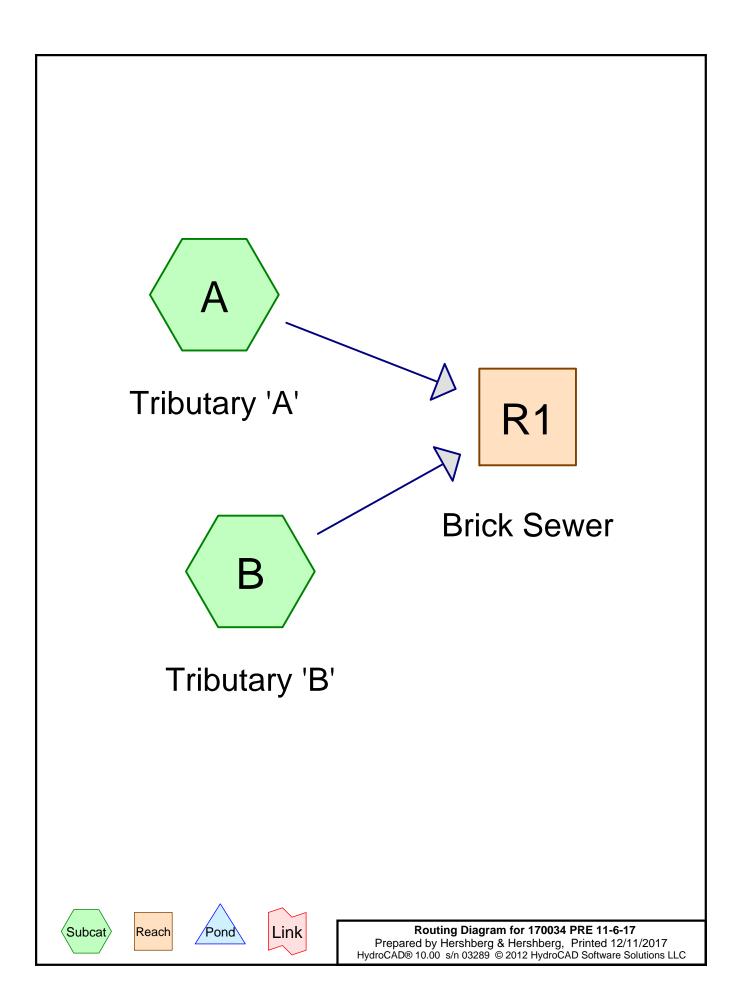
Peak Storage= 275 cf @ 12.00 hrs Average Depth at Peak Storage= 0.89' Bank-Full Depth= 4.75' Flow Area= 17.7 sf, Capacity= 138.62 cfs

57.0" Round Pipe n= 0.015 Brickwork Length= 119.0' Slope= 0.0050 '/' Inlet Invert= 175.68', Outlet Invert= 175.09'





Reach R1: Brick Sewer



Area Listing (all nodes)

Area	CN	Description
(acres)		(subcatchment-numbers)
0.322	74	>75% Grass cover, Good, HSG C (A, B)
1.681	98	Paved parking, HSG C (A, B)
2.003	94	TOTAL AREA

Soil Listing (all nodes)

Area	Soil	Subcatchment
(acres)	Group	Numbers
0.000	HSG A	
0.000	HSG B	
2.003	HSG C	А, В
0.000	HSG D	
0.000	Other	
2.003		TOTAL AREA

Ground Covers (all nodes)

HSG-A	HSG-B	HSG-C	HSG-D	Other	Total	Ground	Subcatchment
 (acres)	(acres)	(acres)	(acres)	(acres)	(acres)	Cover	Numbers
 0.000	0.000	0.322	0.000	0.000	0.322	>75% Grass cover, Good	A, B
0.000	0.000	1.681	0.000	0.000	1.681	Paved parking	А, В
0.000	0.000	2.003	0.000	0.000	2.003	TOTAL AREA	

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Pipe Listing (all nodes)										
Line#	Node	In-Invert	Out-Invert	Length	Slope	n	Diam/Width	Height	Inside-Fill	
	Number	(feet)	(feet)	(feet)	(ft/ft)		(inches)	(inches)	(inches)	
1	R1	175.68	175.09	119.0	0.0050	0.015	57.0	0.0	0.0	

Pipe Listing (all nodes)

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Prepared by Hershberg & Hershberg	
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Time span=0.00-30.00 hrs, dt=0.10 hrs, 301 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment A: Tributary 'A' Flow Length=406'	Runoff Area=77,471 sf 86.32% Impervious Runoff Depth=1.96" Slope=0.0303 '/' Tc=15.2 min CN=95 Runoff=4.12 cfs 0.291 af
Subcatchment B: Tributary 'B'	Runoff Area=9,768 sf 65.13% Impervious Runoff Depth=1.53" Flow Length=317' Tc=2.1 min CN=90 Runoff=0.60 cfs 0.029 af
	Avg. Flow Depth=0.57' Max Vel=3.50 fps Inflow=4.26 cfs 0.320 af 9.0' S=0.0050 '/' Capacity=138.62 cfs Outflow=4.26 cfs 0.320 af

Total Runoff Area = 2.003 ac Runoff Volume = 0.320 af Average Runoff Depth = 1.91" 16.05% Pervious = 0.322 ac 83.95% Impervious = 1.681 ac

Summary for Subcatchment A: Tributary 'A'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 4.12 cfs @ 12.07 hrs, Volume= 0.291 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 1 year Rainfall=2.50"

A	rea (sf)	CN D	escription				
	10,599	74 >	4 >75% Grass cover, Good, HSG C				
	66,872	98 P	aved park	ing, HSG C			
	77,471	95 V	Veighted A	verage			
	10,599	1	3.68% Per	vious Area			
	66,872	8	6.32% Imp	pervious Ar	ea		
Tc	Length	Slope	Velocity	Capacity	Description		
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)			
13.4	100	0.0303	0.12		Sheet Flow, Sheet		
					Grass: Dense n= 0.240 P2= 2.60"		
1.8	306	0.0303	2.80		Shallow Concentrated Flow, grass		
					Unpaved Kv= 16.1 fps		
15.2	406	Total					

Hydrograph Runoff 4.12 cfs Type II 24-hr 4 1 year Rainfall=2.50" Runoff Area=77,471 sf 3-Runoff Volume=0.291 af Flow (cfs) Runoff Depth=1.96" Flow Length=406' 2-Slope=0.0303 '/' Tc=15.2 min **CN=95** 1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Ó Time (hours)

Subcatchment A: Tributary 'A'

Summary for Subcatchment B: Tributary 'B'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

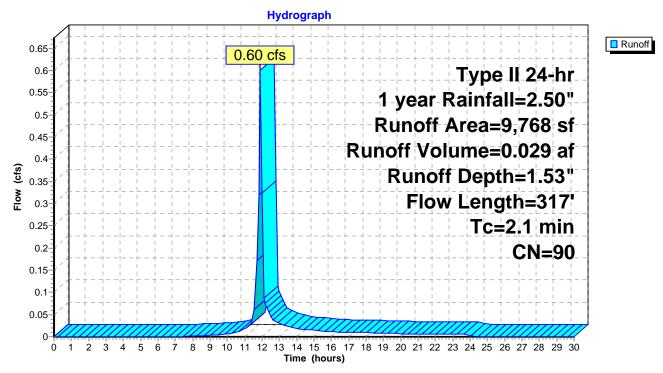
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 0.60 cfs @ 11.90 hrs, Volume= 0.029 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 1 year Rainfall=2.50"

A	rea (sf)	CN E	Description		
	3,406	74 >	75% Gras	s cover, Go	bod, HSG C
	6,362	98 F	aved park	ing, HSG C	
	9,768	90 V	Veighted A	verage	
	3,406	3	4.87% Pei	vious Area	
	6,362	6	5.13% Imp	pervious Are	ea
Та		Clana	Valasity	Conseitu	Description
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	75	0.0373	1.50		Sheet Flow, Sheet
					Smooth surfaces n= 0.011 P2= 2.60"
1.3	242	0.0370	3.10		Shallow Concentrated Flow, grass
					Unpaved Kv= 16.1 fps
2.1	317	Total			



Subcatchment B: Tributary 'B'

Summary for Reach R1: Brick Sewer

 Inflow Area =
 2.003 ac, 83.95% Impervious, Inflow Depth =
 1.91" for 1 year event

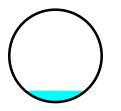
 Inflow =
 4.26 cfs @
 12.06 hrs, Volume=
 0.320 af

 Outflow =
 4.26 cfs @
 12.07 hrs, Volume=
 0.320 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Max. Velocity= 3.50 fps, Min. Travel Time= 0.6 min Avg. Velocity = 1.14 fps, Avg. Travel Time= 1.7 min

Peak Storage= 144 cf @ 12.06 hrs Average Depth at Peak Storage= 0.57' Bank-Full Depth= 4.75' Flow Area= 17.7 sf, Capacity= 138.62 cfs

57.0" Round Pipe n= 0.015 Brickwork Length= 119.0' Slope= 0.0050 '/' Inlet Invert= 175.68', Outlet Invert= 175.09'



Hydrograph Inflow Outflow <u>4 26 cfs</u> 4.26 cfs Inflow Area=2.003 ac Avg. Flow Depth=0.57' 4 Max Vel=3.50 fps 57.0" 3 **Round Pipe** Flow (cfs) n=0.015 2 L=119.0' S=0.0050 '/' Capacity=138.62 cfs 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Time (hours)

Reach R1: Brick Sewer

170034 PRE 11-6-17	7
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Time span=0.00-30.00 hrs, dt=0.10 hrs, 301 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment A: Tributary 'A' Flow Length=406	Runoff Area=77,471 sf 86.32% Impervious Runoff Depth=2.06" Slope=0.0303 '/' Tc=15.2 min CN=95 Runoff=4.31 cfs 0.305 af
Subcatchment B: Tributary 'B'	Runoff Area=9,768 sf 65.13% Impervious Runoff Depth=1.62" Flow Length=317' Tc=2.1 min CN=90 Runoff=0.63 cfs 0.030 af
Reach R1: Brick Sewer	Avg Flow Depth=0.58' Max Vel=3.55 fps Inflow=4.46 cfs 0.336 af

 Keacn K1: Brick Sewer
 Avg. Flow Depth=0.58' Max Vel=3.55 tps
 Inflow=4.46 cfs
 0.336 af

 57.0" Round Pipe
 n=0.015
 L=119.0'
 S=0.0050 '/'
 Capacity=138.62 cfs
 Outflow=4.46 cfs
 0.336 af

Total Runoff Area = 2.003 ac Runoff Volume = 0.336 af Average Runoff Depth = 2.01" 16.05% Pervious = 0.322 ac 83.95% Impervious = 1.681 ac

Summary for Subcatchment A: Tributary 'A'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

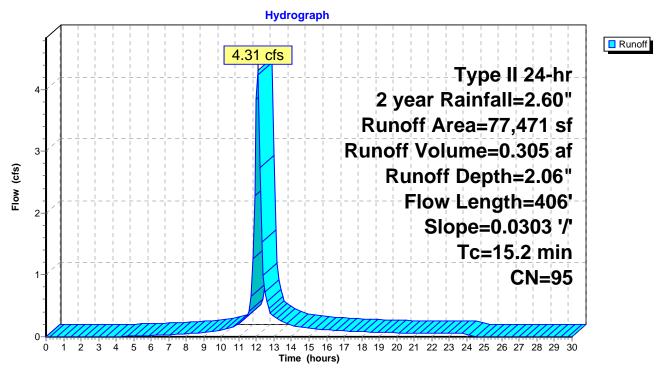
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 4.31 cfs @ 12.07 hrs, Volume= 0.305 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 2 year Rainfall=2.60"

A	rea (sf)	CN D	escription				
	10,599	74 >	4 >75% Grass cover, Good, HSG C				
	66,872	98 P	aved park	ing, HSG C			
	77,471	95 V	Veighted A	verage			
	10,599	1	3.68% Per	vious Area			
	66,872	8	6.32% Imp	pervious Ar	ea		
Tc	Length	Slope	Velocity	Capacity	Description		
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)			
13.4	100	0.0303	0.12		Sheet Flow, Sheet		
					Grass: Dense n= 0.240 P2= 2.60"		
1.8	306	0.0303	2.80		Shallow Concentrated Flow, grass		
					Unpaved Kv= 16.1 fps		
15.2	406	Total					



Subcatchment A: Tributary 'A'

Summary for Subcatchment B: Tributary 'B'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

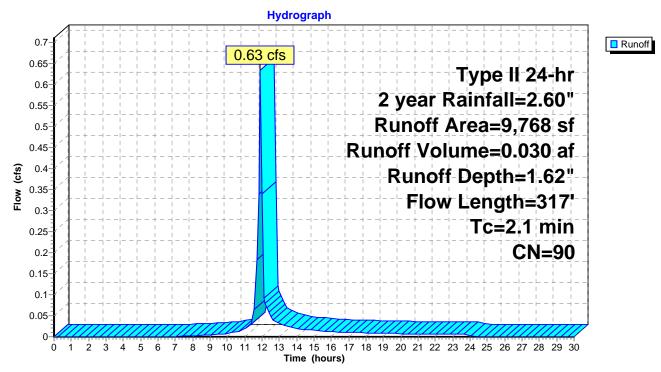
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 0.63 cfs @ 11.90 hrs, Volume= 0.030 af, Depth= 1.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 2 year Rainfall=2.60"

A	rea (sf)	CN E	Description		
	3,406	74 >	75% Gras	s cover, Go	bod, HSG C
	6,362	98 F	aved park	ing, HSG C	
	9,768	90 V	Veighted A	verage	
	3,406	3	4.87% Pei	vious Area	
	6,362	6	5.13% Imp	pervious Are	ea
Та		Clana	Valasity	Conseitu	Description
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	75	0.0373	1.50		Sheet Flow, Sheet
					Smooth surfaces n= 0.011 P2= 2.60"
1.3	242	0.0370	3.10		Shallow Concentrated Flow, grass
					Unpaved Kv= 16.1 fps
2.1	317	Total			



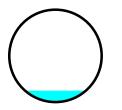
Subcatchment B: Tributary 'B'

Summary for Reach R1: Brick Sewer

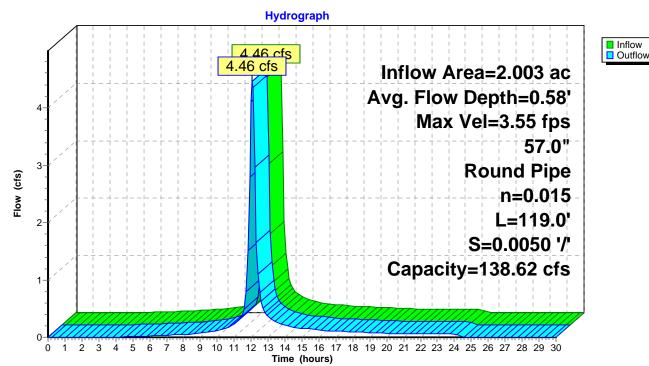
Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Max. Velocity= 3.55 fps, Min. Travel Time= 0.6 min Avg. Velocity = 1.15 fps, Avg. Travel Time= 1.7 min

Peak Storage= 149 cf @ 12.06 hrs Average Depth at Peak Storage= 0.58' Bank-Full Depth= 4.75' Flow Area= 17.7 sf, Capacity= 138.62 cfs

57.0" Round Pipe n= 0.015 Brickwork Length= 119.0' Slope= 0.0050 '/' Inlet Invert= 175.68', Outlet Invert= 175.09'



Reach R1: Brick Sewer



170034 PRE 11-6-17	Тy
Prepared by Hershberg & Hershberg	
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Time span=0.00-30.00 hrs, dt=0.10 hrs, 301 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment A: Tributary 'A' Flow Length=406	Runoff Area=77,471 sf 86.32% Impervious Runoff Depth=3.92" ' Slope=0.0303 '/' Tc=15.2 min CN=95 Runoff=7.92 cfs 0.582 af
Subcatchment B: Tributary 'B'	Runoff Area=9,768 sf 65.13% Impervious Runoff Depth=3.40" Flow Length=317' Tc=2.1 min CN=90 Runoff=1.28 cfs 0.063 af
Reach R1: Brick Sewer	Avg. Flow Depth=0.79' Max Vel=4.25 fps Inflow=8.23 cfs 0.645 af

57.0" Round Pipe n=0.015 L=119.0' S=0.0050 '/' Capacity=138.62 cfs Outflow=8.22 cfs 0.645 af

Total Runoff Area = 2.003 ac Runoff Volume = 0.645 af Average Runoff Depth = 3.87" 16.05% Pervious = 0.322 ac 83.95% Impervious = 1.681 ac

Summary for Subcatchment A: Tributary 'A'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

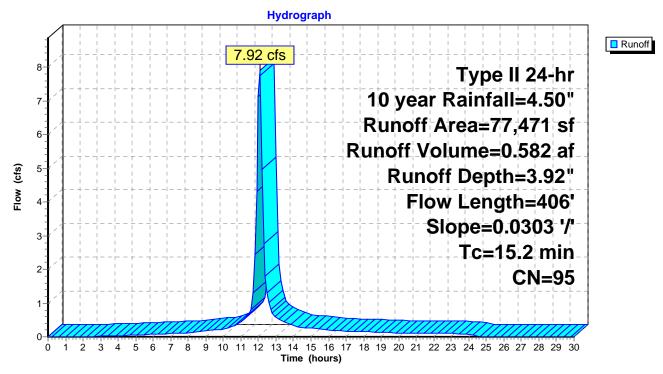
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 7.92 cfs @ 12.07 hrs, Volume= 0.582 af, Depth= 3.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 10 year Rainfall=4.50"

A	rea (sf)	CN D	escription				
	10,599	74 >	4 >75% Grass cover, Good, HSG C				
	66,872	98 P	aved park	ing, HSG C			
	77,471	95 V	Veighted A	verage			
	10,599	1	3.68% Per	vious Area			
	66,872	8	6.32% Imp	pervious Ar	ea		
Tc	Length	Slope	Velocity	Capacity	Description		
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)			
13.4	100	0.0303	0.12		Sheet Flow, Sheet		
					Grass: Dense n= 0.240 P2= 2.60"		
1.8	306	0.0303	2.80		Shallow Concentrated Flow, grass		
					Unpaved Kv= 16.1 fps		
15.2	406	Total					



Subcatchment A: Tributary 'A'

Summary for Subcatchment B: Tributary 'B'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 1.28 cfs @ 11.90 hrs, Volume= 0.063 af, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 10 year Rainfall=4.50"

A	rea (sf)	CN D	escription		
	3,406	74 >	75% Gras	s cover, Go	ood, HSG C
	6,362	98 P	aved park	ing, HSG C	
	9,768	90 V	Veighted A	verage	
	3,406	3	4.87% Per	vious Area	
	6,362	6	5.13% Imp	pervious Ar	ea
Тс	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
0.8	75	0.0373	1.50		Sheet Flow, Sheet
					Smooth surfaces n= 0.011 P2= 2.60"
1.3	242	0.0370	3.10		Shallow Concentrated Flow, grass
					Unpaved Kv= 16.1 fps
2.1	317	Total			

Hydrograph Runoff 1.28 cfs Type II 24-hr 10 year Rainfall=4.50" Runoff Area=9,768 sf 1-Runoff Volume=0.063 af Flow (cfs) Runoff Depth=3.40" Flow Length=317' Tc=2.1 min **CN=90** 0-0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Time (hours)

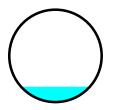
Subcatchment B: Tributary 'B'

Summary for Reach R1: Brick Sewer

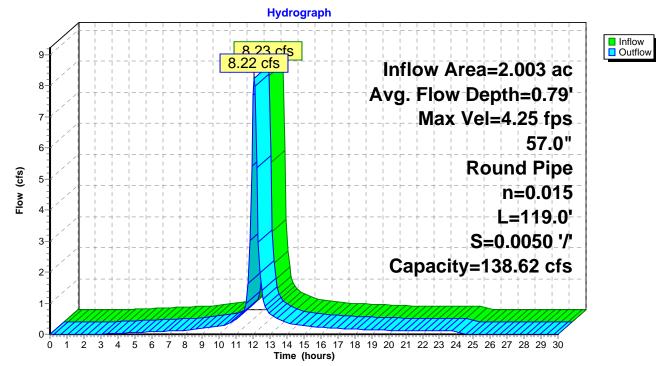
Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Max. Velocity= 4.25 fps, Min. Travel Time= 0.5 min Avg. Velocity = 1.36 fps, Avg. Travel Time= 1.5 min

Peak Storage= 228 cf @ 12.06 hrs Average Depth at Peak Storage= 0.79' Bank-Full Depth= 4.75' Flow Area= 17.7 sf, Capacity= 138.62 cfs

57.0" Round Pipe n= 0.015 Brickwork Length= 119.0' Slope= 0.0050 '/' Inlet Invert= 175.68', Outlet Invert= 175.09'



Reach R1: Brick Sewer



170034 PRE 11-6-17	Тур
Prepared by Hershberg & Hershberg	
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Time span=0.00-30.00 hrs, dt=0.10 hrs, 301 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment A: Tributary 'A' Flow Length=406'	Runoff Area=77,471 sf 86.32% Impervious Runoff Depth=6.41" Slope=0.0303 '/' Tc=15.2 min CN=95 Runoff=12.59 cfs 0.949 af
Subcatchment B: Tributary 'B'	Runoff Area=9,768 sf 65.13% Impervious Runoff Depth=5.82" Flow Length=317' Tc=2.1 min CN=90 Runoff=2.13 cfs 0.109 af
	Avg. Flow Depth=0.99' Max Vel=4.87 fps Inflow=13.10 cfs 1.058 af 9.0' S=0.0050 '/' Capacity=138.62 cfs Outflow=13.09 cfs 1.058 af

Total Runoff Area = 2.003 ac Runoff Volume = 1.058 af Average Runoff Depth = 6.34" 16.05% Pervious = 0.322 ac 83.95% Impervious = 1.681 ac

Summary for Subcatchment A: Tributary 'A'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

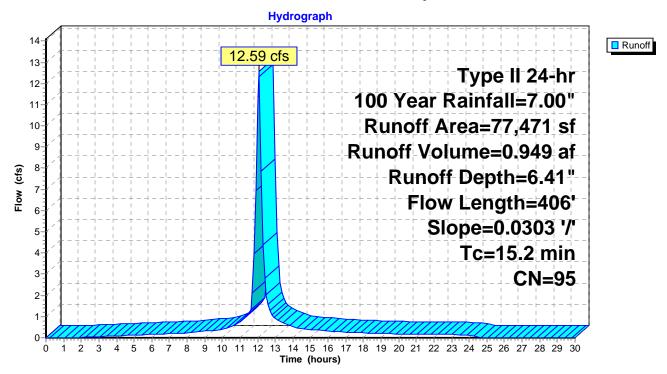
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 12.59 cfs @ 12.07 hrs, Volume= 0.949 af, Depth= 6.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 100 Year Rainfall=7.00"

A	rea (sf)	CN D	escription						
	10,599	74 >	>75% Grass cover, Good, HSG C						
	66,872	98 P	Paved parking, HSG C						
	77,471	95 V	5 Weighted Average						
	10,599	1	3.68% Per	vious Area					
	66,872	8	6.32% Imp	pervious Ar	ea				
Тс	Length	Slope	Velocity	Capacity	Description				
<u>(min)</u>	(feet)	(ft/ft)	(ft/sec)	(cfs)					
13.4	100	0.0303	0.12		Sheet Flow, Sheet				
					Grass: Dense n= 0.240 P2= 2.60"				
1.8	306	0.0303	2.80		Shallow Concentrated Flow, grass				
					Unpaved Kv= 16.1 fps				
15.2	406	Total							



Subcatchment A: Tributary 'A'

Summary for Subcatchment B: Tributary 'B'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 2.13 cfs @ 11.90 hrs, Volume= 0.109 af, Depth= 5.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 100 Year Rainfall=7.00"

A	rea (sf)	CN D	escription						
	3,406	74 >	74 >75% Grass cover, Good, HSG C						
	6,362	98 P	Paved parking, HSG C						
	9,768	90 V	90 Weighted Average						
	3,406	3	4.87% Per	vious Area					
	6,362	6	5.13% Imp	pervious Ar	ea				
Тс	Length	Slope	Velocity	Capacity	Description				
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
0.8	75	0.0373	1.50		Sheet Flow, Sheet				
					Smooth surfaces n= 0.011 P2= 2.60"				
1.3	242	0.0370	3.10		Shallow Concentrated Flow, grass				
					Unpaved Kv= 16.1 fps				
2.1	317	Total							

Hydrograph Runoff 2.13 cfs Type II 24-hr 2-100 Year Rainfall=7.00" Runoff Area=9,768 sf Runoff Volume=0.109 af Flow (cfs) Runoff Depth=5.82" Flow Length=317' 1 Tc=2.1 min **CN=90** 0-0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Time (hours)

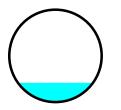
Subcatchment B: Tributary 'B'

Summary for Reach R1: Brick Sewer

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Max. Velocity= 4.87 fps, Min. Travel Time= 0.4 min Avg. Velocity = 1.57 fps, Avg. Travel Time= 1.3 min

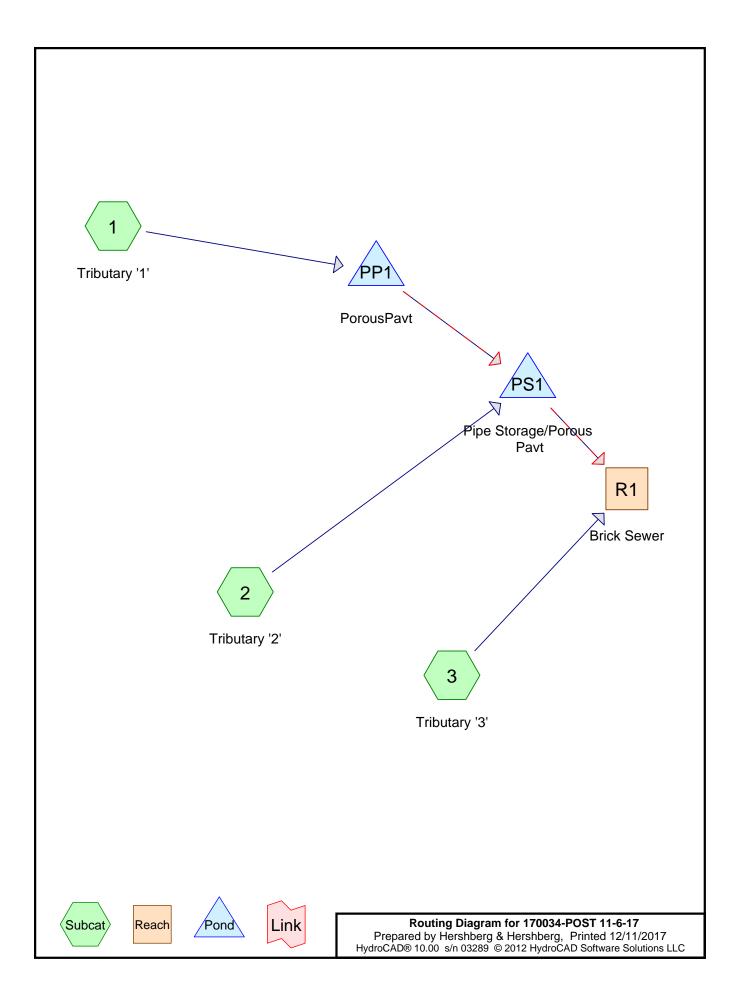
Peak Storage= 317 cf @ 12.06 hrs Average Depth at Peak Storage= 0.99' Bank-Full Depth= 4.75' Flow Area= 17.7 sf, Capacity= 138.62 cfs

57.0" Round Pipe n= 0.015 Brickwork Length= 119.0' Slope= 0.0050 '/' Inlet Invert= 175.68', Outlet Invert= 175.09'



Hydrograph Inflow Outflow 13 10 cfs 13.09 cfs 14 Inflow Area=2.003 ac 13 Avg. Flow Depth=0.99' 12-Max Vel=4.87 fps 11 10-57.0" 9 **Round Pipe** Flow (cfs) 8 n=0.015 7. L=119.0' 6 5-S=0.0050 '/' 4 Capacity=138.62 cfs 3 2 1 0 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 1 Time (hours)

Reach R1: Brick Sewer



Area Listing (all nodes)

Area	CN	Description
(acres)		(subcatchment-numbers)
0.420	74	>75% Grass cover, Good, HSG C (1, 2, 3)
0.937	98	Buildings, HSG C (1)
0.172	98	Buildings, Paved parking, HSG C (3)
0.422	98	Porous Pavement (1, 2)
1.951	93	TOTAL AREA

Soil Listing (all nodes)

Area	Soil	Subcatchment
(acres)	Group	Numbers
0.000	HSG A	
0.000	HSG B	
1.529	HSG C	1, 2, 3
0.000	HSG D	
0.422	Other	1, 2
1.951		TOTAL AREA

Ground Covers (all nodes)

 HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.420	0.000	0.000	0.420	>75% Grass cover, Good	1, 2, 3
0.000	0.000	0.937	0.000	0.000	0.937	Buildings	1
0.000	0.000	0.172	0.000	0.000	0.172	Buildings, Paved parking	3
0.000	0.000	0.000	0.000	0.422	0.422	Porous Pavement	1, 2
0.000	0.000	1.529	0.000	0.422	1.951	TOTAL AREA	

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Line	e#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
	1	1	0.00	0.00	38.0	0.0130	0.013	8.0	0.0	0.0
	2	1	0.00	0.00	55.0	0.0290	0.013	15.0	0.0	0.0
	3	1	0.00	0.00	40.0	0.0100	0.013	15.0	0.0	0.0
	4	2	0.00	0.00	35.0	0.1940	0.013	8.0	0.0	0.0
	5	2	0.00	0.00	38.0	0.0636	0.013	15.0	0.0	0.0
	6	R1	175.68	175.09	119.0	0.0050	0.015	57.0	0.0	0.0

Pipe Listing (all nodes)

Time span=0.00-30.00 hrs, dt=0.10 hrs, 301 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment1: Tributary'1'	Runoff Area=65,422 sf 87.16% Impervious Runoff Depth=1.96" Flow Length=233' Tc=0.9 min CN=95 Runoff=5.10 cfs 0.246 af
Subcatchment 2: Tributary '2'	Runoff Area=6,396 sf 34.16% Impervious Runoff Depth=1.00" Flow Length=288' Tc=0.9 min CN=82 Runoff=0.27 cfs 0.012 af
Subcatchment 3: Tributary '3'	Runoff Area=13,153 sf 56.82% Impervious Runoff Depth=1.38" Flow Length=325' Tc=3.2 min CN=88 Runoff=0.69 cfs 0.035 af
Reach R1: Brick Sewer 57.0" Round Pipe n=0.015 L=1	Avg. Flow Depth=0.34' Max Vel=2.54 fps Inflow=1.42 cfs 0.293 af 19.0' S=0.0050 '/' Capacity=138.62 cfs Outflow=1.43 cfs 0.293 af
Pond PP1: PorousPavt Primary=1.74 cfs	Peak Elev=196.75' Storage=2,028 cf Inflow=5.10 cfs 0.246 af s 0.246 af Secondary=0.00 cfs 0.000 af Outflow=1.74 cfs 0.246 af
Pond PS1: Pipe Storage/Porous Pavt Primary=1.37 cfs	Peak Elev=189.88' Storage=3,153 cf Inflow=2.00 cfs 0.258 af 0.258 af Secondary=0.00 cfs 0.000 af Outflow=1.37 cfs 0.258 af

Total Runoff Area = 1.951 ac Runoff Volume = 0.293 af Average Runoff Depth = 1.80" 21.52% Pervious = 0.420 ac 78.48% Impervious = 1.531 ac

Summary for Subcatchment 1: Tributary '1'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 5.10 cfs @ 11.89 hrs, Volume= 0.246 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 1 year Rainfall=2.50"

	Area (sf)	CN E	Description						
÷	8,398								
*	40,833		5,						
	16,191		98 Porous Pavement						
	65,422		Veighted A	•					
	8,398			rvious Area					
	57,024	ð	57.16% imp	pervious Ar	ea				
Т	c Length	Slope	Velocity	Capacity	Description				
(min		(ft/ft)	(ft/sec)	(cfs)					
0.	5 100	0.2700	3.51		Sheet Flow, Roof				
					Smooth surfaces n= 0.011 P2= 2.60"				
0.2	2 38	0.0130	3.95	1.38					
					8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17'				
					n= 0.013 Corrugated PE, smooth interior				
0.	1 55	0.0290	8.96	11.00	Pipe Channel, 15" AWWA C900				
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'				
					n= 0.013 Corrugated PE, smooth interior				
0.	1 40	0.0100	5.26	6.46	Pipe Channel, 15" HDPE				
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'				
					n= 0.013 Corrugated PE, smooth interior				
0.9	9 233	Total							

Hydrograph Runoff 5.10 cfs Type II 24-hr 5-1 year Rainfall=2.50" Runoff Area=65,422 sf 4-Runoff Volume=0.246 af Runoff Depth=1.96" Flow (cfs) 3-Flow Length=233' Tc=0.9 min 2-**CN=95** 1-0-1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Ó Time (hours)

Subcatchment 1: Tributary '1'

Summary for Subcatchment 2: Tributary '2'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

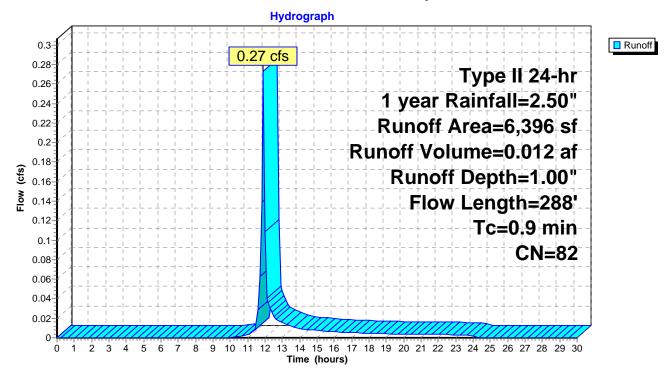
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 0.27 cfs @ 11.89 hrs, Volume= 0.012 af, Depth= 1.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 1 year Rainfall=2.50"

	A	rea (sf)	CN E	escription						
		4,211								
*		2,185	<u>98</u> F	98 Porous Pavement						
		6,396	82 V	82 Weighted Average						
		4,211	6	5.84% Pei	vious Area					
		2,185	3	4.16% Imp	pervious Ar	ea				
	Тс	Length	Slope	Velocity	Capacity	Description				
((min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	0.9	215	0.2650	4.06		Sheet Flow, Roof				
						Smooth surfaces n= 0.011 P2= 2.60"				
	0.0	35	0.1940	15.25	5.32	Pipe Channel, Pipe				
						8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17'				
						n= 0.013 Corrugated PE, smooth interior				
	0.0	38	0.0636	13.28	16.29	Pipe Channel, Pipe				
						15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'				
						n= 0.013 Corrugated PE, smooth interior				
	0.9	288	Total							



Subcatchment 2: Tributary '2'

Summary for Subcatchment 3: Tributary '3'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

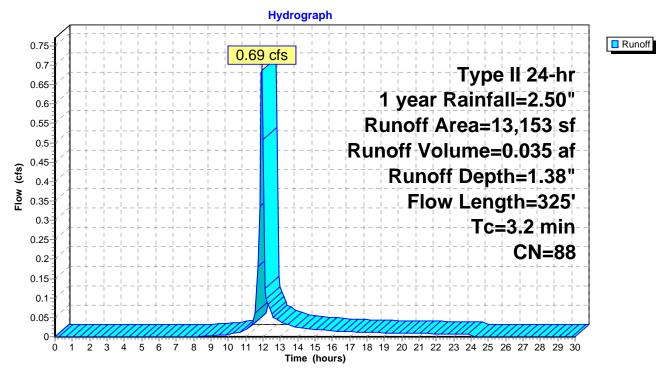
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 0.69 cfs @ 11.92 hrs, Volume= 0.035 af, Depth= 1.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 1 year Rainfall=2.50"

_	A	rea (sf)	CN D	Description						
		5,679	74 >	74 >75% Grass cover, Good, HSG C						
*		7,474	98 E	98 Buildings, Paved parking, HSG C						
		13,153	3,153 88 Weighted Average							
		5,679	4	3.18% Per	vious Area					
		7,474	5	6.82% Imp	ervious Ar	ea				
	Тс	Length	Slope	Velocity	Capacity	Description				
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	1.2	100	0.0250	1.36		Sheet Flow, Pavement				
						Smooth surfaces n= 0.011 P2= 2.60"				
	2.0	225	0.0360	1.84		Sheet Flow,				
						Smooth surfaces n= 0.011 P2= 2.60"				
	3.2	325	Total							



Subcatchment 3: Tributary '3'

Summary for Reach R1: Brick Sewer

 Inflow Area =
 1.951 ac, 78.48% Impervious, Inflow Depth =
 1.80" for 1 year event

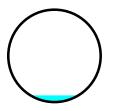
 Inflow =
 1.42 cfs @
 12.44 hrs, Volume=
 0.293 af

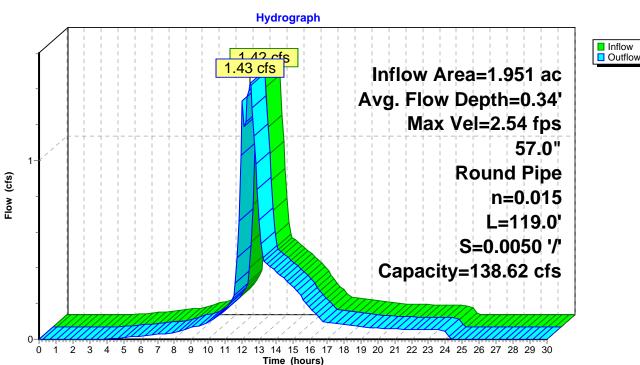
 Outflow =
 1.43 cfs @
 12.47 hrs, Volume=
 0.293 af, Atten= 0%, Lag= 1.4 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Max. Velocity= 2.54 fps, Min. Travel Time= 0.8 min Avg. Velocity = 1.16 fps, Avg. Travel Time= 1.7 min

Peak Storage= 67 cf @ 12.47 hrs Average Depth at Peak Storage= 0.34' Bank-Full Depth= 4.75' Flow Area= 17.7 sf, Capacity= 138.62 cfs

57.0" Round Pipe n= 0.015 Brickwork Length= 119.0' Slope= 0.0050 '/' Inlet Invert= 175.68', Outlet Invert= 175.09'





Reach R1: Brick Sewer

Summary for Pond PP1: PorousPavt

Inflow Area =	1.502 ac, 87.16% Impervious, Inflow De	epth = 1.96" for 1 year event
Inflow =	5.10 cfs @ 11.89 hrs, Volume=	0.246 af
Outflow =	1.74 cfs @ 12.03 hrs, Volume=	0.246 af, Atten= 66%, Lag= 8.4 min
Primary =	1.74 cfs @ 12.03 hrs, Volume=	0.246 af
Secondary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af

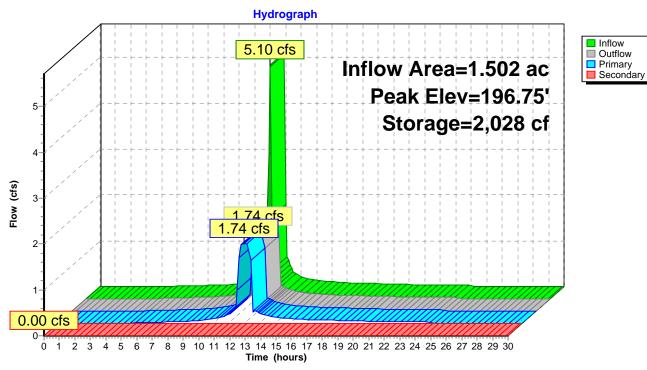
Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Peak Elev= 196.75' @ 12.03 hrs Surf.Area= 16,964 sf Storage= 2,028 cf

Plug-Flow detention time= 6.3 min calculated for 0.245 af (100% of inflow) Center-of-Mass det. time= 6.3 min (787.3 - 780.9)

Volume	Invert	Avail.Sto	rage Sto	brage Description		
#1	196.45'	9,02		rous Pavement (Prismatic)Listed below (Recalc)		
"0		4 7		562 cf Overall x 40.0% Voids		
#2	198.85'	1,73	97 cf Cu	stom Stage Data (Prismatic)Listed below (Recalc)		
		10,82	22 cf Tot	tal Available Storage		
Elevatio	n Si	urf.Area	Inc.Sto	re Cum.Store		
(feet	-	(sq-ft)	(cubic-fee			
	/					
196.4		16,964		0 0		
197.78	8	16,964	22,56	62 22,562		
Elevation	n Su	urf.Area	Inc.Sto	re Cum.Store		
(feet	:)	(sq-ft)	(cubic-fee	et) (cubic-feet)		
198.8	5	41	•	0 0		
199.00	0	1,289	10	00 100		
199.50	0	5,500	1,69	97 1,797		
Device	Routing	Invert	Outlet De	evices		
#1	Primary	189.50'	5.0" Ver	t. Orifice C= 0.600		
	Secondary	199.20'		x 1.00' rise Sharp-Crested Rectangular Weir		
	cocondary	100120	-	ontraction(s) 0.5' Crest Height		
Primary OutFlow Max=1 74 cfs @ 12 03 hrs HW=196 74' (Free Discharge)						

Primary OutFlow Max=1.74 cfs @ 12.03 hrs HW=196.74' (Free Discharge) -1=Orifice (Orifice Controls 1.74 cfs @ 12.77 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=196.45' (Free Discharge)



Pond PP1: PorousPavt

Summary for Pond PS1: Pipe Storage/Porous Pavt

Inflow Area =	1.649 ac, 82.44% Impervious, Inflow De	epth = 1.88" for 1 year event
Inflow =	2.00 cfs @ 11.90 hrs, Volume=	0.258 af
Outflow =	1.37 cfs @ 12.46 hrs, Volume=	0.258 af, Atten= 32%, Lag= 33.5 min
Primary =	1.37 cfs @ 12.46 hrs, Volume=	0.258 af
Secondary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Peak Elev= 189.88' @ 12.46 hrs Surf.Area= 1,068 sf Storage= 3,153 cf

Plug-Flow detention time= 33.2 min calculated for 0.257 af (100% of inflow) Center-of-Mass det. time= 33.1 min (822.9 - 789.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	185.30'	1,268 cf	12.00'W x 89.00'L x 5.50'H Field A
			5,874 cf Overall - 2,704 cf Embedded = 3,171 cf x 40.0% Voids
#2A	185.80'	2,257 cf	ADS N-12 48 x 8 Inside #1
			Inside= 47.7"W x 47.7"H => 12.40 sf x 20.00'L = 248.0 cf
			Outside= 54.0"W x 54.0"H => 14.86 sf x 20.00'L = 297.1 cf
			11.00' Header x 12.40 sf x 2 = 272.8 cf Inside
#3	190.18'	2,185 cf	Porous Pavement (Prismatic)Listed below (Recalc)
#4	191.80'	27 cf	Custom Stage Data (Prismatic)Listed below (Recalc)
		5,737 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation	Surf.Area	Inc.Store	Cum.Store
(feet)	(sq-ft)	(cubic-feet)	(cubic-feet)
190.18	2,185	0	0
191.18	2,185	2,185	2,185
Elevation	Surf.Area	Inc.Store	Cum.Store
(feet)	(sq-ft)	(cubic-feet)	(cubic-feet)
191.80	34	0	0
192.00	234	27	27

Device	Routing	Invert	Outlet Devices
#1	Primary	185.00'	3.0" Vert. Orifice C= 0.600
#2	Secondary	191.50'	3.0' long x 1.00' rise Sharp-Crested Rectangular Weir
			2 End Contraction(s) 0.5' Crest Height
#3	Primary	188.00'	5.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=1.35 cfs @ 12.46 hrs HW=189.83' (Free Discharge) **1=Orifice** (Orifice Controls 0.51 cfs @ 10.45 fps)

-3=Orifice/Grate (Orifice Controls 0.84 cfs @ 6.14 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=185.30' (Free Discharge) 2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PS1: Pipe Storage/Porous Pavt - Chamber Wizard Field A

Chamber Model = ADS N-12 48

Inside= 47.7"W x 47.7"H => 12.40 sf x 20.00'L = 248.0 cf Outside= 54.0"W x 54.0"H => 14.86 sf x 20.00'L = 297.1 cf

54.0" Wide + 24.0" Spacing = 78.0" C-C Row Spacing

4 Chambers/Row x 20.00' Long +4.50' Header x 2 = 89.00' Row Length 2 Rows x 54.0" Wide + 24.0" Spacing x 1 + 6.0" Side Stone x 2 = 12.00' Base Width 6.0" Base + 54.0" Chamber Height + 6.0" Cover = 5.50' Field Height

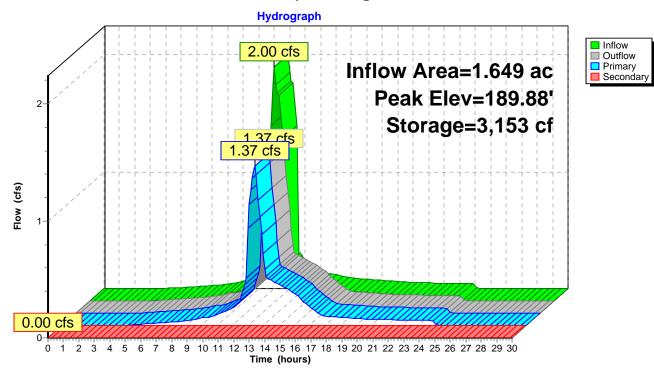
8 Chambers x 248.0 cf + 11.00' Header x 12.40 sf x 2 = 2,256.8 cf Chamber Storage 8 Chambers x 297.1 cf + 11.00' Header x 14.86 sf x 2 = 2,703.7 cf Displacement

5,874.2 cf Field - 2,703.7 cf Chambers = 3,170.5 cf Stone x 40.0% Voids = 1,268.2 cf Stone Storage

Chamber Storage + Stone Storage = 3,525.0 cf = 0.081 afOverall Storage Efficiency = 60.0%

8 Chambers 217.6 cy Field 117.4 cy Stone





Pond PS1: Pipe Storage/Porous Pavt

Time span=0.00-30.00 hrs, dt=0.10 hrs, 301 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment1: Tributary '1'	Runoff Area=65,422 sf 87.16% Impervious Runoff Depth=2.06" Flow Length=233' Tc=0.9 min CN=95 Runoff=5.34 cfs 0.258 af
Subcatchment 2: Tributary '2'	Runoff Area=6,396 sf 34.16% Impervious Runoff Depth=1.07" Flow Length=288' Tc=0.9 min CN=82 Runoff=0.29 cfs 0.013 af
Subcatchment 3: Tributary '3'	Runoff Area=13,153 sf 56.82% Impervious Runoff Depth=1.47" Flow Length=325' Tc=3.2 min CN=88 Runoff=0.73 cfs 0.037 af
Reach R1: Brick Sewer 57.0" Round Pipe n=0.015 L=1	Avg. Flow Depth=0.35' Max Vel=2.59 fps Inflow=1.51 cfs 0.308 af 19.0' S=0.0050 '/' Capacity=138.62 cfs Outflow=1.51 cfs 0.308 af
Pond PP1: PorousPavt Primary=1.75 cfs	Peak Elev=196.77' Storage=2,202 cf Inflow=5.34 cfs 0.258 af 0.258 af Secondary=0.00 cfs 0.000 af Outflow=1.75 cfs 0.258 af
Pond PS1: Pipe Storage/Porous Pavt Primary=1.45 cfs	Peak Elev=190.17' Storage=3,264 cf Inflow=2.03 cfs 0.271 af 6 0.271 af Secondary=0.00 cfs 0.000 af Outflow=1.45 cfs 0.271 af

Total Runoff Area = 1.951 ac Runoff Volume = 0.308 af Average Runoff Depth = 1.89" 21.52% Pervious = 0.420 ac 78.48% Impervious = 1.531 ac

Summary for Subcatchment 1: Tributary '1'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

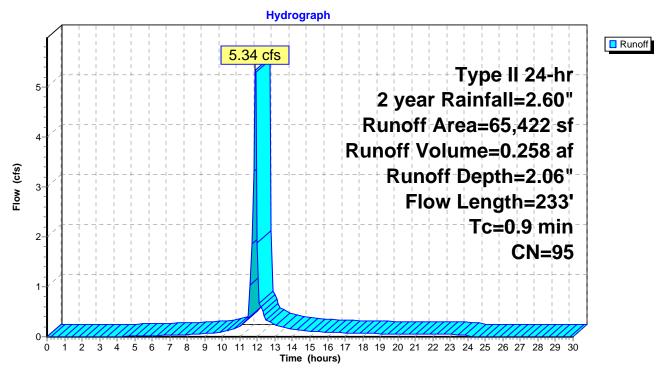
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 5.34 cfs @ 11.89 hrs, Volume= 0.258 af, Depth= 2.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 2 year Rainfall=2.60"

A	vrea (sf)	CN E	Description					
	8,398	74 >	74 >75% Grass cover, Good, HSG C					
*	40,833	98 E	Buildings, HSG C					
*	16,191	98 F	Porous Pav	rement				
	65,422	95 V	Veighted A	verage				
	8,398		•	vious Area				
	57,024	8	7.16% Imp	pervious Ar	ea			
Тс	Length	Slope	Velocity	Capacity	Description			
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	·			
0.5	100	0.2700	3.51		Sheet Flow, Roof			
					Smooth surfaces n= 0.011 P2= 2.60"			
0.2	38	0.0130	3.95	1.38				
					8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17'			
					n= 0.013 Corrugated PE, smooth interior			
0.1	55	0.0290	8.96	11.00	Pipe Channel, 15" AWWA C900			
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'			
					n= 0.013 Corrugated PE, smooth interior			
0.1	40	0.0100	5.26	6.46	Pipe Channel, 15" HDPE			
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'			
					n= 0.013 Corrugated PE, smooth interior			
0.9	233	Total						



Subcatchment 1: Tributary '1'

Summary for Subcatchment 2: Tributary '2'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

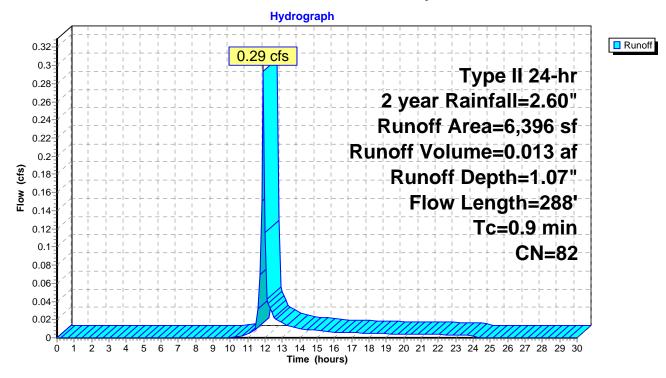
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 0.29 cfs @ 11.89 hrs, Volume= 0.013 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 2 year Rainfall=2.60"

	A	rea (sf)	CN D	escription					
		4,211							
*		2,185	<u>98</u> F	orous Pav	ement				
		6,396	82 V	Veighted A	verage				
		4,211	6	5.84% Pei	vious Area				
		2,185	3	4.16% Imp	pervious Ar	ea			
	Тс	Length	Slope	Velocity	Capacity	Description			
((min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	0.9	215	0.2650	4.06		Sheet Flow, Roof			
						Smooth surfaces n= 0.011 P2= 2.60"			
	0.0	35	0.1940	15.25	5.32	Pipe Channel, Pipe			
						8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17'			
						n= 0.013 Corrugated PE, smooth interior			
	0.0	38	0.0636	13.28	16.29	Pipe Channel, Pipe			
						15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'			
						n= 0.013 Corrugated PE, smooth interior			
	0.9	288	Total						



Subcatchment 2: Tributary '2'

Summary for Subcatchment 3: Tributary '3'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

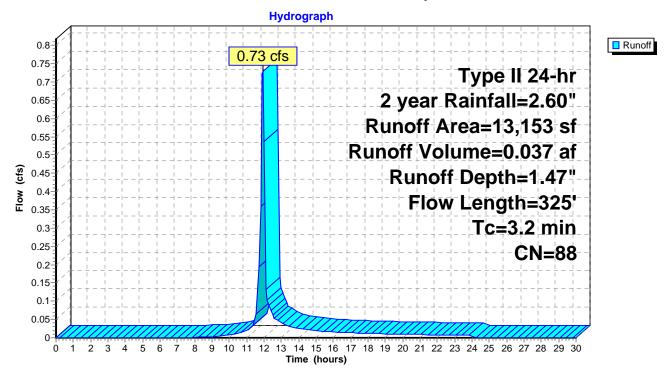
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 0.73 cfs @ 11.92 hrs, Volume= 0.037 af, Depth= 1.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 2 year Rainfall=2.60"

_	A	rea (sf)	CN D	CN Description					
		5,679				ood, HSG C			
*		7,474	98 B	uildings, P	aved parki	ng, HSG C			
		13,153	88 V	Veighted A	verage				
		5,679	4	3.18% Per	vious Area				
		7,474	5	6.82% Imp	pervious Ar	ea			
	Тс	Length	Slope	Velocity	Capacity	Description			
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)				
	1.2	100	0.0250	1.36		Sheet Flow, Pavement			
						Smooth surfaces n= 0.011 P2= 2.60"			
	2.0	225	0.0360	1.84		Sheet Flow,			
_						Smooth surfaces n= 0.011 P2= 2.60"			
	3.2	325	Total						



Subcatchment 3: Tributary '3'

Summary for Reach R1: Brick Sewer

 Inflow Area =
 1.951 ac, 78.48% Impervious, Inflow Depth =
 1.89" for 2 year event

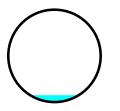
 Inflow =
 1.51 cfs @
 12.49 hrs, Volume=
 0.308 af

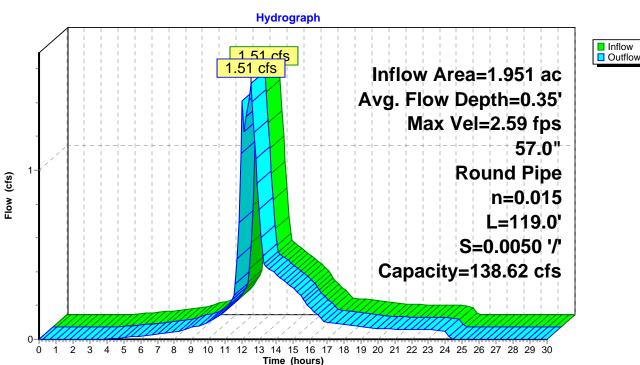
 Outflow =
 1.51 cfs @
 12.50 hrs, Volume=
 0.308 af, Atten= 0%, Lag= 0.6 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Max. Velocity= 2.59 fps, Min. Travel Time= 0.8 min Avg. Velocity = 1.17 fps, Avg. Travel Time= 1.7 min

Peak Storage= 70 cf @ 12.50 hrs Average Depth at Peak Storage= 0.35' Bank-Full Depth= 4.75' Flow Area= 17.7 sf, Capacity= 138.62 cfs

57.0" Round Pipe n= 0.015 Brickwork Length= 119.0' Slope= 0.0050 '/' Inlet Invert= 175.68', Outlet Invert= 175.09'





Reach R1: Brick Sewer

Summary for Pond PP1: PorousPavt

Inflow Area =	1.502 ac, 87.16% Impervious, Inflow De	epth = 2.06" for 2 year event
Inflow =	5.34 cfs @ 11.89 hrs, Volume=	0.258 af
Outflow =	1.75 cfs @ 12.03 hrs, Volume=	0.258 af, Atten= 67%, Lag= 8.6 min
Primary =	1.75 cfs @ 12.03 hrs, Volume=	0.258 af
Secondary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Peak Elev= 196.77' @ 12.03 hrs Surf.Area= 16,964 sf Storage= 2,202 cf

Plug-Flow detention time= 6.7 min calculated for 0.257 af (100% of inflow) Center-of-Mass det. time= 6.7 min (786.3 - 779.6)

Volume	Invert	Avail.Sto	rage Stora	rage Description		
#1	196.45'	9,02		ous Pavement (Prismatic)Listed below (Recalc)		
# 0	100 05	4 70		562 cf Overall x 40.0% Voids		
#2	198.85'	,		stom Stage Data (Prismatic)Listed below (Recalc)		
		10,82	22 cf Total	al Available Storage		
Elevatio	n Su	rf.Area	Inc.Store	e Cum.Store		
(feet		(sq-ft)	(cubic-feet)			
196.4						
		16,964	-			
197.78	8	16,964	22,562	2 22,562		
Elevatio	n Su	rf.Area	Inc.Store	e Cum.Store		
(feet	t)	(sq-ft)	(cubic-feet)	t) (cubic-feet)		
198.8	5	41	0	0 0		
199.00	0	1,289	100	0 100		
199.50	0	5,500	1,697	7 1,797		
Device	Routing	Invert	Outlet Dev	vices		
#1	Primary	189.50'	5.0" Vert.	. Orifice C= 0.600		
#2	Secondary	199.20'	5.0' long x	x 1.00' rise Sharp-Crested Rectangular Weir		
	cocondary	100120		ntraction(s) 0.5' Crest Height		
			2 2110 001			
Primary OutFlow Max=1 74 cfs @ 12 03 hrs HW=196 76' (Free Discharge)						

Primary OutFlow Max=1.74 cfs @ 12.03 hrs HW=196.76' (Free Discharge) —1=Orifice (Orifice Controls 1.74 cfs @ 12.79 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=196.45' (Free Discharge) 2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PP1: PorousPavt

Summary for Pond PS1: Pipe Storage/Porous Pavt

Inflow Area =	1.649 ac, 82.44% Impervious, Inflow De	epth = 1.97" for 2 year event
Inflow =	2.03 cfs @ 11.90 hrs, Volume=	0.271 af
Outflow =	1.45 cfs @ 12.49 hrs, Volume=	0.271 af, Atten= 28%, Lag= 35.7 min
Primary =	1.45 cfs @ 12.49 hrs, Volume=	0.271 af
Secondary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Peak Elev= 190.17' @ 12.49 hrs Surf.Area= 1,068 sf Storage= 3,264 cf

Plug-Flow detention time= 33.2 min calculated for 0.270 af (100% of inflow) Center-of-Mass det. time= 33.1 min (821.9 - 788.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	185.30'	1,268 cf	12.00'W x 89.00'L x 5.50'H Field A
			5,874 cf Overall - 2,704 cf Embedded = 3,171 cf x 40.0% Voids
#2A	185.80'	2,257 cf	ADS N-12 48 x 8 Inside #1
			Inside= 47.7"W x 47.7"H => 12.40 sf x 20.00'L = 248.0 cf
			Outside= 54.0"W x 54.0"H => 14.86 sf x 20.00'L = 297.1 cf
			11.00' Header x 12.40 sf x 2 = 272.8 cf Inside
#3	190.18'	2,185 cf	Porous Pavement (Prismatic)Listed below (Recalc)
#4	191.80'	27 cf	Custom Stage Data (Prismatic)Listed below (Recalc)
		5,737 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation	Surf.Area	Inc.Store	Cum.Store
(feet)	(sq-ft)	(cubic-feet)	(cubic-feet)
190.18	2,185	0	0
191.18	2,185	2,185	2,185
		,	
Elevation	Surf.Area	Inc.Store	Cum.Store
(feet)	(sq-ft)	(cubic-feet)	(cubic-feet)
191.80	34	0	0
192.00	234	27	27

Device	Routing	Invert	Outlet Devices
#1	Primary	185.00'	3.0" Vert. Orifice C= 0.600
#2	Secondary	191.50'	3.0' long x 1.00' rise Sharp-Crested Rectangular Weir
			2 End Contraction(s) 0.5' Crest Height
#3	Primary	188.00'	5.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=1.44 cfs @ 12.49 hrs HW=190.15' (Free Discharge) **1=Orifice** (Orifice Controls 0.53 cfs @ 10.79 fps)

-3=Orifice/Grate (Orifice Controls 0.91 cfs @ 6.70 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=185.30' (Free Discharge) 2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PS1: Pipe Storage/Porous Pavt - Chamber Wizard Field A

Chamber Model = ADS N-12 48

Inside= 47.7"W x 47.7"H => 12.40 sf x 20.00'L = 248.0 cf Outside= 54.0"W x 54.0"H => 14.86 sf x 20.00'L = 297.1 cf

54.0" Wide + 24.0" Spacing = 78.0" C-C Row Spacing

4 Chambers/Row x 20.00' Long +4.50' Header x 2 = 89.00' Row Length 2 Rows x 54.0" Wide + 24.0" Spacing x 1 + 6.0" Side Stone x 2 = 12.00' Base Width 6.0" Base + 54.0" Chamber Height + 6.0" Cover = 5.50' Field Height

8 Chambers x 248.0 cf + 11.00' Header x 12.40 sf x 2 = 2,256.8 cf Chamber Storage 8 Chambers x 297.1 cf + 11.00' Header x 14.86 sf x 2 = 2,703.7 cf Displacement

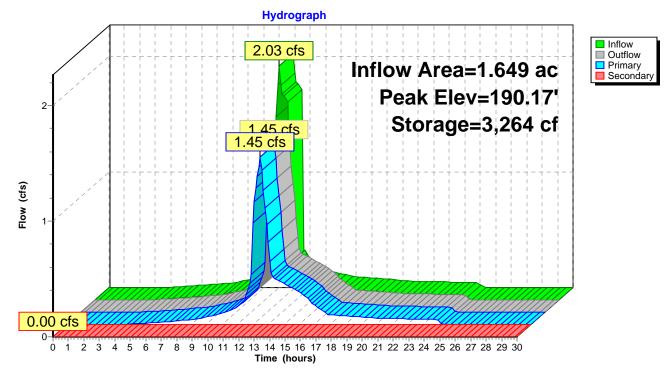
5,874.2 cf Field - 2,703.7 cf Chambers = 3,170.5 cf Stone x 40.0% Voids = 1,268.2 cf Stone Storage

Chamber Storage + Stone Storage = 3,525.0 cf = 0.081 afOverall Storage Efficiency = 60.0%

8 Chambers 217.6 cy Field 117.4 cy Stone



Type II 24-hr 2 year Rainfall=2.60"



Pond PS1: Pipe Storage/Porous Pavt

Time span=0.00-30.00 hrs, dt=0.10 hrs, 301 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1: Tributary '1'	Runoff Area=65,422 sf 87.16% Impervious Runoff Depth=3.92" Flow Length=233' Tc=0.9 min CN=95 Runoff=9.74 cfs 0.491 af
Subcatchment 2: Tributary '2'	Runoff Area=6,396 sf 34.16% Impervious Runoff Depth=2.64" Flow Length=288' Tc=0.9 min CN=82 Runoff=0.71 cfs 0.032 af
Subcatchment 3: Tributary '3'	Runoff Area=13,153 sf 56.82% Impervious Runoff Depth=3.20" Flow Length=325' Tc=3.2 min CN=88 Runoff=1.55 cfs 0.080 af
Reach R1: Brick Sewer 57.0" Round Pipe n=0.015 L=1	Avg. Flow Depth=0.46' Max Vel=3.06 fps Inflow=2.76 cfs 0.604 af 19.0' S=0.0050 '/' Capacity=138.62 cfs Outflow=2.73 cfs 0.604 af
Pond PP1: PorousPavt Primary=1.81 cfs	Peak Elev=197.31' Storage=5,863 cf Inflow=9.74 cfs 0.491 af 0.491 af Secondary=0.00 cfs 0.000 af Outflow=1.81 cfs 0.491 af
Pond PS1: Pipe Storage/Porous Pavt Primary=1.59 cfs	Peak Elev=190.70' Storage=4,621 cf Inflow=2.49 cfs 0.523 af 0.523 af Secondary=0.00 cfs 0.000 af Outflow=1.59 cfs 0.523 af

Total Runoff Area = 1.951 ac Runoff Volume = 0.604 af Average Runoff Depth = 3.71" 21.52% Pervious = 0.420 ac 78.48% Impervious = 1.531 ac

Summary for Subcatchment 1: Tributary '1'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

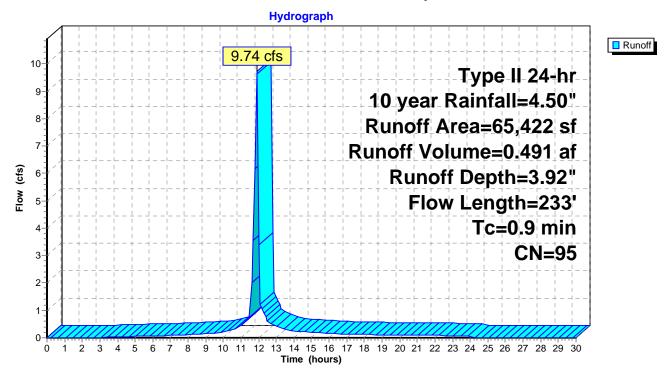
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 9.74 cfs @ 11.89 hrs, Volume= 0.491 af, Depth= 3.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 10 year Rainfall=4.50"

	A	rea (sf)	CN E	Description					
*		8,398 40,833							
*		40,833		0 /					
		65,422		95 Weighted Average					
		8,398		0	vious Area				
		57,024	8	7.16% Imp	pervious Ar	ea			
	Тс	Length	Slope	Velocity	Capacity	Description			
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	۲			
	0.5	100	0.2700	3.51		Sheet Flow, Roof			
	~ ~		0.0400	0.05	4.00	Smooth surfaces $n=0.011$ P2= 2.60"			
	0.2	38	0.0130	3.95	1.38	Pipe Channel, 8" RD 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17'			
						n= 0.013 Corrugated PE, smooth interior			
	0.1	55	0.0290	8.96	11.00	Pipe Channel, 15" AWWA C900			
						15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'			
						n= 0.013 Corrugated PE, smooth interior			
	0.1	40	0.0100	5.26	6.46	Pipe Channel, 15" HDPE			
						15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'			
						n= 0.013 Corrugated PE, smooth interior			
	0.9	233	Total						



Subcatchment 1: Tributary '1'

Summary for Subcatchment 2: Tributary '2'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

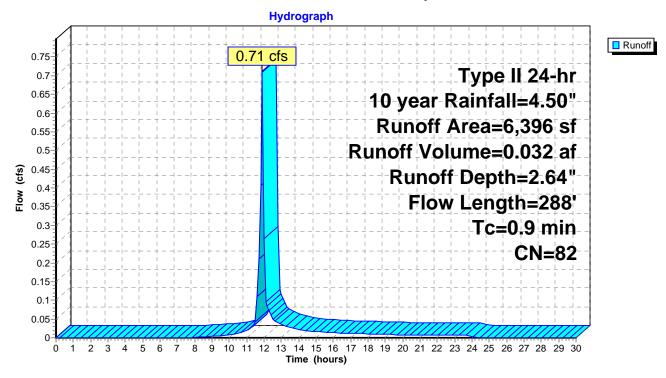
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 0.71 cfs @ 11.89 hrs, Volume= 0.032 af, Depth= 2.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 10 year Rainfall=4.50"

	Area	(sf)	CN	Description						
	,	211	74 :	74 >75% Grass cover, Good, HSG C						
*	2,	185	98	98 Porous Pavement						
	6,3	396	82	82 Weighted Average						
	4,2	211		65.84% Pei	rvious Area					
	2,	185		34.16% Imp	pervious Ar	ea				
٦		ength	Slope		Capacity	Description				
(mi	n) (feet)	(ft/ft)	(ft/sec)	(cfs)					
0	.9	215	0.2650	4.06		Sheet Flow, Roof				
						Smooth surfaces n= 0.011 P2= 2.60"				
0	.0	35	0.1940	15.25	5.32					
						8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17'				
						n= 0.013 Corrugated PE, smooth interior				
0	.0	38	0.0636	13.28	16.29	Pipe Channel, Pipe				
						15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'				
						n= 0.013 Corrugated PE, smooth interior				
0	.9	288	Total							



Subcatchment 2: Tributary '2'

Summary for Subcatchment 3: Tributary '3'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 1.55 cfs @ 11.91 hrs, Volume= 0.080 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 10 year Rainfall=4.50"

_	A	rea (sf)	CN D	escription						
		5,679	74 >	74 >75% Grass cover, Good, HSG C						
*		7,474	98 E	98 Buildings, Paved parking, HSG C						
	13,153 88 Weighted Average									
		5,679	4	3.18% Per	vious Area					
		7,474	5	6.82% Imp	pervious Ar	ea				
	Тс	Length	Slope	Velocity	Capacity	Description				
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)					
	1.2	100	0.0250	1.36		Sheet Flow, Pavement				
						Smooth surfaces n= 0.011 P2= 2.60"				
	2.0	225	0.0360	1.84		Sheet Flow,				
_						Smooth surfaces n= 0.011 P2= 2.60"				
	3.2	325	Total							

Subcatchment 3: Tributary '3'

Summary for Reach R1: Brick Sewer

 Inflow Area =
 1.951 ac, 78.48% Impervious, Inflow Depth = 3.72" for 10 year event

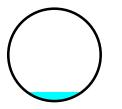
 Inflow =
 2.76 cfs @ 11.93 hrs, Volume=
 0.604 af

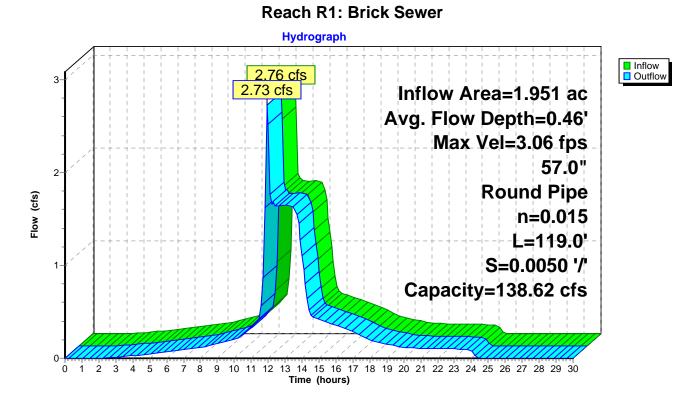
 Outflow =
 2.73 cfs @ 11.94 hrs, Volume=
 0.604 af, Atten= 1%, Lag= 0.6 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Max. Velocity= 3.06 fps, Min. Travel Time= 0.6 min Avg. Velocity = 1.39 fps, Avg. Travel Time= 1.4 min

Peak Storage= 106 cf @ 11.94 hrs Average Depth at Peak Storage= 0.46' Bank-Full Depth= 4.75' Flow Area= 17.7 sf, Capacity= 138.62 cfs

57.0" Round Pipe n= 0.015 Brickwork Length= 119.0' Slope= 0.0050 '/' Inlet Invert= 175.68', Outlet Invert= 175.09'





Summary for Pond PP1: PorousPavt

Inflow Area =	1.502 ac, 87.16% Impervious, Inflow D	epth = 3.92" for 10 year event
Inflow =	9.74 cfs @ 11.89 hrs, Volume=	0.491 af
Outflow =	1.81 cfs @ 12.09 hrs, Volume=	0.491 af, Atten= 81%, Lag= 12.4 min
Primary =	1.81 cfs @ 12.09 hrs, Volume=	0.491 af
Secondary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af

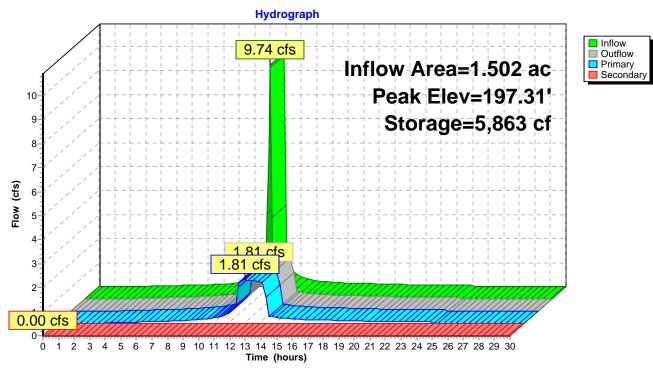
Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Peak Elev= 197.31' @ 12.09 hrs Surf.Area= 16,964 sf Storage= 5,863 cf

Plug-Flow detention time= 17.7 min calculated for 0.490 af (100% of inflow) Center-of-Mass det. time= 17.7 min (780.4 - 762.8)

Volume	Inve	rt Avail.St	orage	Storage D	Description	
#1	196.45	5' 9,0	025 cf			smatic)Listed below (Recalc)
			/		Overall x 40.	
#2	198.85	ō' 1,ī	797 cf	Custom S	Stage Data (P	rismatic)Listed below (Recalc)
		10,8	322 cf	Total Ava	ilable Storage	
Elevatio	n (Surf.Area	Inc	.Store	Cum.Store	
	_ · · · · · · · · · · · · · · · · · · ·					
(fee	/	(sq-ft)	(Cubic	c-feet)	(cubic-feet)	
196.4	5	16,964		0	0	
197.7	8	16,964	2	2,562	22,562	
Elevatio	n S	Surf.Area	Inc.	.Store	Cum.Store	
(feet	t)	(sq-ft)	(cubic	c-feet)	(cubic-feet)	
198.8		41		0		
199.0	0	1,289		100	100	
199.5	0	5,500		1,697	1,797	
Device	Routing	Invert	Outle	et Devices		
#1	Primary	189.50	5.0"	Vert. Orifi	ce C= 0.600	
#2	Secondar	v 199.20'	5.0' I	ona x 1.0	0' rise Sharp-	Crested Rectangular Weir
		,			ion(s) 0.5' Cr	
Primary OutFlow Max=1.81 cfs @ 12.09 hrs HW=197.31' (Free Discharge)						

Primary OutFlow Max=1.81 cfs @ 12.09 hrs HW=197.31' (Free Discharge) 1=Orifice (Orifice Controls 1.81 cfs @ 13.28 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=196.45' (Free Discharge) 2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)



Pond PP1: PorousPavt

Summary for Pond PS1: Pipe Storage/Porous Pavt

Inflow Area =	1.649 ac, 82.44% Impervious, Inflow De	epth = 3.81" for 10 year event
Inflow =	2.49 cfs @ 11.90 hrs, Volume=	0.523 af
Outflow =	1.59 cfs @ 13.37 hrs, Volume=	0.523 af, Atten= 36%, Lag= 88.8 min
Primary =	1.59 cfs @ 13.37 hrs, Volume=	0.523 af
Secondary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Peak Elev= 190.70' @ 13.37 hrs Surf.Area= 3,253 sf Storage= 4,621 cf

Plug-Flow detention time= 36.8 min calculated for 0.522 af (100% of inflow) Center-of-Mass det. time= 36.7 min (819.1 - 782.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	185.30'	1,268 cf	12.00'W x 89.00'L x 5.50'H Field A
			5,874 cf Overall - 2,704 cf Embedded = 3,171 cf x 40.0% Voids
#2A	185.80'	2,257 cf	ADS N-12 48 x 8 Inside #1
			Inside= 47.7"W x 47.7"H => 12.40 sf x 20.00'L = 248.0 cf
			Outside= 54.0"W x 54.0"H => 14.86 sf x 20.00'L = 297.1 cf
			11.00' Header x 12.40 sf x 2 = 272.8 cf Inside
#3	190.18'	2,185 cf	Porous Pavement (Prismatic)Listed below (Recalc)
#4	191.80'	27 cf	Custom Stage Data (Prismatic)Listed below (Recalc)
		5,737 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation	Surf.Area	Inc.Store	Cum.Store
(feet)	(sq-ft)	(cubic-feet)	(cubic-feet)
190.18	2,185	0	0
191.18	2,185	2,185	2,185
Elevation	Surf.Area	Inc.Store	Cum.Store
(feet)	(sq-ft)	(cubic-feet)	(cubic-feet)
191.80	34	0	0
192.00	234	27	27

Device	Routing	Invert	Outlet Devices
#1	Primary	185.00'	3.0" Vert. Orifice C= 0.600
#2	Secondary	191.50'	3.0' long x 1.00' rise Sharp-Crested Rectangular Weir
			2 End Contraction(s) 0.5' Crest Height
#3	Primary	188.00'	5.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=1.59 cfs @ 13.37 hrs HW=190.69' (Free Discharge) 1=Orifice (Orifice Controls 0.56 cfs @ 11.36 fps) 2 Orifice (Orifice Controls 0.56 cfs @ 7.50 fps)

-3=Orifice/Grate (Orifice Controls 1.03 cfs @ 7.59 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=185.30' (Free Discharge) 2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PS1: Pipe Storage/Porous Pavt - Chamber Wizard Field A

Chamber Model = ADS N-12 48

Inside= 47.7"W x 47.7"H => 12.40 sf x 20.00'L = 248.0 cf Outside= 54.0"W x 54.0"H => 14.86 sf x 20.00'L = 297.1 cf

54.0" Wide + 24.0" Spacing = 78.0" C-C Row Spacing

4 Chambers/Row x 20.00' Long +4.50' Header x 2 = 89.00' Row Length 2 Rows x 54.0" Wide + 24.0" Spacing x 1 + 6.0" Side Stone x 2 = 12.00' Base Width 6.0" Base + 54.0" Chamber Height + 6.0" Cover = 5.50' Field Height

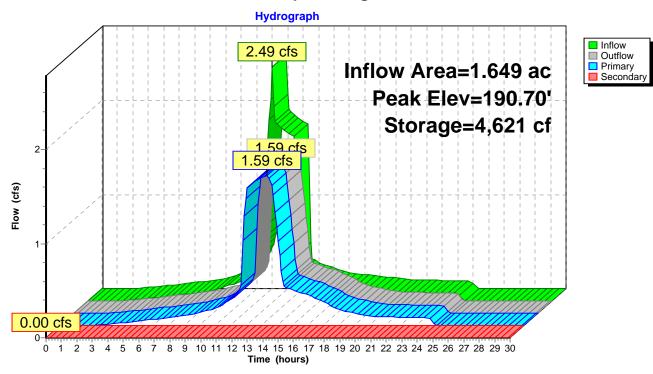
8 Chambers x 248.0 cf + 11.00' Header x 12.40 sf x 2 = 2,256.8 cf Chamber Storage 8 Chambers x 297.1 cf + 11.00' Header x 14.86 sf x 2 = 2,703.7 cf Displacement

5,874.2 cf Field - 2,703.7 cf Chambers = 3,170.5 cf Stone x 40.0% Voids = 1,268.2 cf Stone Storage

Chamber Storage + Stone Storage = 3,525.0 cf = 0.081 afOverall Storage Efficiency = 60.0%

8 Chambers 217.6 cy Field 117.4 cy Stone





Pond PS1: Pipe Storage/Porous Pavt

Time span=0.00-30.00 hrs, dt=0.10 hrs, 301 points Runoff by SCS TR-20 method, UH=SCS Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment1: Tributary '1'	Runoff Area=65,422 sf 87.16% Impervious Runoff Depth=6.41" Flow Length=233' Tc=0.9 min CN=95 Runoff=15.44 cfs 0.802 af
Subcatchment 2: Tributary '2'	Runoff Area=6,396 sf 34.16% Impervious Runoff Depth=4.92" Flow Length=288' Tc=0.9 min CN=82 Runoff=1.29 cfs 0.060 af
Subcatchment 3: Tributary '3'	Runoff Area=13,153 sf 56.82% Impervious Runoff Depth=5.59" Flow Length=325' Tc=3.2 min CN=88 Runoff=2.64 cfs 0.141 af
Reach R1: Brick Sewer 57.0" Round Pipe n=0.015 L=1	Avg. Flow Depth=0.56' Max Vel=3.47 fps Inflow=4.15 cfs 1.003 af 19.0' S=0.0050 '/' Capacity=138.62 cfs Outflow=4.07 cfs 1.003 af
Pond PP1: PorousPavt Primary=2.05 cfs	Peak Elev=199.41' Storage=10,373 cf Inflow=15.44 cfs 0.802 af s 0.773 af Secondary=1.65 cfs 0.029 af Outflow=3.69 cfs 0.802 af
Pond PS1: Pipe Storage/Porous Pavt Primary=1.84 cfs	Peak Elev=191.74' Storage=5,710 cf Inflow=4.03 cfs 0.862 af s 0.837 af Secondary=0.97 cfs 0.025 af Outflow=2.81 cfs 0.862 af

Total Runoff Area = 1.951 ac Runoff Volume = 1.003 af Average Runoff Depth = 6.17" 21.52% Pervious = 0.420 ac 78.48% Impervious = 1.531 ac

Summary for Subcatchment 1: Tributary '1'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

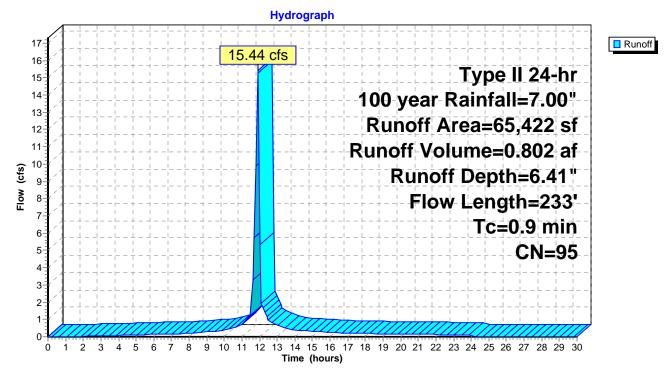
Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 15.44 cfs @ 11.89 hrs, Volume= 0.802 af, Depth= 6.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 100 year Rainfall=7.00"

A	vrea (sf)	CN E	Description		
	8,398	74 >75% Grass cover, Good, HSG C			
*	40,833	98 E	Buildings, H	ISG C	
*	16,191	98 F	Porous Pav	rement	
	65,422	95 V	Veighted A	verage	
	8,398		12.84% Pervious Area		
	57,024	8	87.16% Impervious Area		
Тс	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	·
0.5	100	0.2700	3.51		Sheet Flow, Roof
					Smooth surfaces n= 0.011 P2= 2.60"
0.2	38	0.0130	3.95	1.38	
					8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17'
					n= 0.013 Corrugated PE, smooth interior
0.1	55	0.0290	8.96	11.00	Pipe Channel, 15" AWWA C900
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.013 Corrugated PE, smooth interior
0.1	40	0.0100	5.26	6.46	Pipe Channel, 15" HDPE
					15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
					n= 0.013 Corrugated PE, smooth interior
0.9	233	Total			



Subcatchment 1: Tributary '1'

Summary for Subcatchment 2: Tributary '2'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

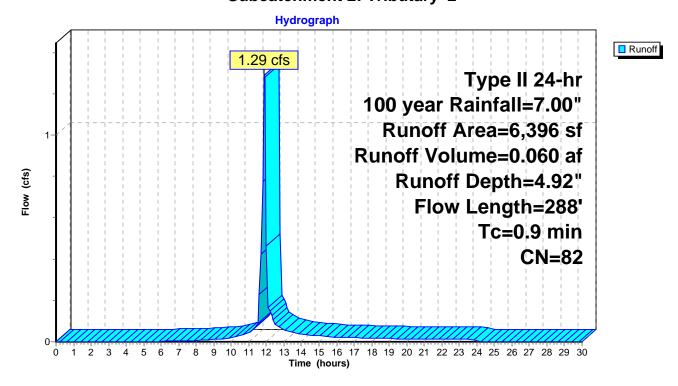
The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 1.29 cfs @ 11.89 hrs, Volume= 0.060 af, Depth= 4.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 100 year Rainfall=7.00"

	A	rea (sf)	CN E	escription		
		4,211	74 >75% Grass cover, Good, HSG C			
*		2,185	98 F	orous Pav	ement	
		6,396	82 Weighted Average			
		4,211	65.84% Pervious Area			
		2,185	34.16% Impervious Area			
	Тс	Length	Slope	Velocity	Capacity	Description
((min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	0.9	215	0.2650	4.06		Sheet Flow, Roof
						Smooth surfaces n= 0.011 P2= 2.60"
	0.0	35	0.1940	15.25	5.32	Pipe Channel, Pipe
						8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17'
						n= 0.013 Corrugated PE, smooth interior
	0.0	38	0.0636	13.28	16.29	Pipe Channel, Pipe
						15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'
						n= 0.013 Corrugated PE, smooth interior
	0.9	288	Total			

Subcatchment 2: Tributary '2'



Summary for Subcatchment 3: Tributary '3'

This subcatchment reproduces the runoff calculation from Sample Job #1 in the TR-20 manual.

Since TR-20 has no CN or Tc calculation procedures, these values have been entered directly, rather than using HydroCAD's built-in CN lookup table and Tc calculation procedures.

The resulting peak flow is approximately 4% higher than the published TR-20 value of 2097 CFS. This difference is due to the more recent polynomial-based rainfall distributions used in HydroCAD.

Runoff = 2.64 cfs @ 11.91 hrs, Volume= 0.141 af, Depth= 5.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Type II 24-hr 100 year Rainfall=7.00"

_	A	rea (sf)	CN E	Description		
		5,679	74 >	75% Gras	s cover, Go	bod, HSG C
*		7,474	98 E	Buildings, F	aved parki	ng, HSG C
		13,153	88 V	Veighted A	verage	
	5,679 43.18% Pervious Area					
	7,474 56.82% Impervious Area					
	Тс	Length	Slope	Velocity	Capacity	Description
	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	1.2	100	0.0250	1.36		Sheet Flow, Pavement
						Smooth surfaces n= 0.011 P2= 2.60"
	2.0	225	0.0360	1.84		Sheet Flow,
_						Smooth surfaces n= 0.011 P2= 2.60"
	3.2	325	Total			

Hydrograph Runoff 2.64 cfs Type II 24-hr 100 year Rainfall=7.00" Runoff Area=13,153 sf 2-Runoff Volume=0.141 af Flow (cfs) Runoff Depth=5.59" Flow Length=325' Tc=3.2 min 1 **CN=88** 0 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Time (hours)

Subcatchment 3: Tributary '3'

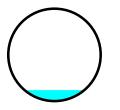
Summary for Reach R1: Brick Sewer

Inflow Area =1.951 ac, 78.48% Impervious, Inflow Depth =6.17" for 100 year eventInflow =4.15 cfs @11.91 hrs, Volume =1.003 afOutflow =4.07 cfs @11.92 hrs, Volume =1.003 af, Atten = 2%, Lag = 0.6 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Max. Velocity= 3.47 fps, Min. Travel Time= 0.6 min Avg. Velocity = 1.62 fps, Avg. Travel Time= 1.2 min

Peak Storage= 139 cf @ 11.92 hrs Average Depth at Peak Storage= 0.56' Bank-Full Depth= 4.75' Flow Area= 17.7 sf, Capacity= 138.62 cfs

57.0" Round Pipe n= 0.015 Brickwork Length= 119.0' Slope= 0.0050 '/' Inlet Invert= 175.68', Outlet Invert= 175.09'



Hydrograph Inflow Outflow 4.15 cfs Inflow Area=1.951 ac 4.07 cfs Avg. Flow Depth=0.56' Max Vel=3.47 fps 57.0" 3 **Round Pipe** Flow (cfs) n=0.015 2 L=119.0' S=0.0050 '/' Capacity=138.62 cfs 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Ò Time (hours)

Reach R1: Brick Sewer

Summary for Pond PP1: PorousPavt

Inflow Area =	1.502 ac, 87.16% Impervious, Inflow [Depth = 6.41" for 100 year event
Inflow =	15.44 cfs @ 11.89 hrs, Volume=	0.802 af
Outflow =	3.69 cfs @ 12.06 hrs, Volume=	0.802 af, Atten= 76%, Lag= 10.2 min
Primary =	2.05 cfs @ 12.05 hrs, Volume=	0.773 af
Secondary =	1.65 cfs @ 12.06 hrs, Volume=	0.029 af

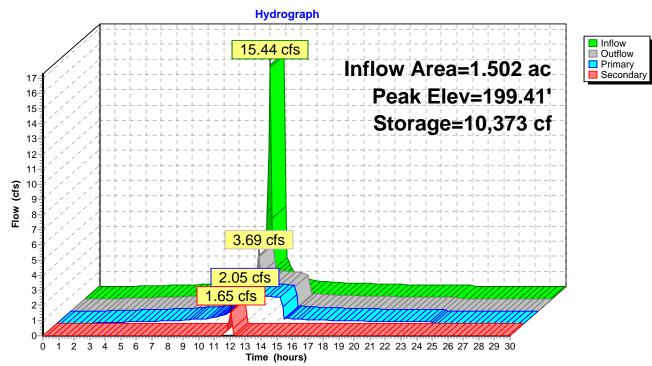
Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Peak Elev= 199.41' @ 12.05 hrs Surf.Area= 21,727 sf Storage= 10,373 cf

Plug-Flow detention time= 29.0 min calculated for 0.799 af (100% of inflow) Center-of-Mass det. time= 29.0 min (780.4 - 751.4)

Volume	Invert	Avail.Stor	rage S	storage D	escription	
#1	196.45'	9,02				smatic)Listed below (Recalc)
				,	Overall x 40.	
#2	198.85'	1,79	97 cf C	Sustom S	Stage Data (P	rismatic)Listed below (Recalc)
		10,82	22 cf T	otal Avai	lable Storage	
Elevatior	n Su	rf.Area	Inc.St	tore	Cum.Store	
(feet		(sq-ft)	(cubic-fe		(cubic-feet)	
· · · ·						
196.45		16,964		0	0	
197.78	3	16,964	22,	562	22,562	
Elevatior	n Su	rf.Area	Inc.St	tore	Cum.Store	
(feet)	(sq-ft)	(cubic-fe	eet)	(cubic-feet)	
198.85	5	41		0	0	
199.00	C	1,289		100	100	
199.50)	5,500	1.	697	1,797	
	-	-,	- ,		.,	
Device	Routing	Invert	Outlet I	Devices		
#1	Primary	189.50'	5.0" Ve	ert. Orifi	ce C= 0.600	
	Secondary	199.20'	5.0' lor	na x 1.00)' rise Sharp-	Crested Rectangular Weir
	,				on(s) 0.5' Cr	
				2 2		
Drimonu						

Primary OutFlow Max=2.04 cfs @ 12.05 hrs HW=199.40' (Free Discharge) 1=Orifice (Orifice Controls 2.04 cfs @ 14.99 fps)

Secondary OutFlow Max=1.50 cfs @ 12.06 hrs HW=199.40' (Free Discharge) 2=Sharp-Crested Rectangular Weir (Weir Controls 1.50 cfs @ 1.53 fps)



Pond PP1: PorousPavt

Summary for Pond PS1: Pipe Storage/Porous Pavt

Inflow Area =	1.649 ac, 82.44% Impervious, Inflow De	epth = 6.27" for 100 year event
Inflow =	4.03 cfs @ 12.03 hrs, Volume=	0.862 af
Outflow =	2.81 cfs @ 12.29 hrs, Volume=	0.862 af, Atten= 30%, Lag= 15.7 min
Primary =	1.84 cfs @ 12.27 hrs, Volume=	0.837 af
Secondary =	0.97 cfs @ 12.29 hrs, Volume=	0.025 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.10 hrs Peak Elev= 191.74' @ 12.27 hrs Surf.Area= 3,253 sf Storage= 5,710 cf

Plug-Flow detention time= 43.1 min calculated for 0.859 af (100% of inflow) Center-of-Mass det. time= 43.0 min (824.5 - 781.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	185.30'	1,268 cf	12.00'W x 89.00'L x 5.50'H Field A
			5,874 cf Overall - 2,704 cf Embedded = 3,171 cf x 40.0% Voids
#2A	185.80'	2,257 cf	ADS N-12 48 x 8 Inside #1
			Inside= 47.7"W x 47.7"H => 12.40 sf x 20.00'L = 248.0 cf
			Outside= 54.0"W x 54.0"H => 14.86 sf x 20.00'L = 297.1 cf
			11.00' Header x 12.40 sf x 2 = 272.8 cf Inside
#3	190.18'	2,185 cf	Porous Pavement (Prismatic)Listed below (Recalc)
#4	191.80'	27 cf	Custom Stage Data (Prismatic)Listed below (Recalc)
		5,737 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
190.18	2,185	0	0
191.18	2,185	2,185	2,185
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
191.80	34	0	0
192.00	234	27	27

Device	Routing	Invert	Outlet Devices
#1	Primary	185.00'	3.0" Vert. Orifice C= 0.600
#2	Secondary	191.50'	3.0' long x 1.00' rise Sharp-Crested Rectangular Weir
			2 End Contraction(s) 0.5' Crest Height
#3	Primary	188.00'	5.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=1.83 cfs @ 12.27 hrs HW=191.67' (Free Discharge) -1=Orifice (Orifice Controls 0.60 cfs @ 12.32 fps)

-3=Orifice/Grate (Orifice Controls 1.22 cfs @ 8.96 fps)

Secondary OutFlow Max=0.90 cfs @ 12.29 hrs HW=191.70' (Free Discharge) 2=Sharp-Crested Rectangular Weir (Weir Controls 0.90 cfs @ 1.53 fps)

Pond PS1: Pipe Storage/Porous Pavt - Chamber Wizard Field A

Chamber Model = ADS N-12 48

Inside= 47.7"W x 47.7"H => 12.40 sf x 20.00'L = 248.0 cf Outside= 54.0"W x 54.0"H => 14.86 sf x 20.00'L = 297.1 cf

54.0" Wide + 24.0" Spacing = 78.0" C-C Row Spacing

4 Chambers/Row x 20.00' Long +4.50' Header x 2 = 89.00' Row Length 2 Rows x 54.0" Wide + 24.0" Spacing x 1 + 6.0" Side Stone x 2 = 12.00' Base Width 6.0" Base + 54.0" Chamber Height + 6.0" Cover = 5.50' Field Height

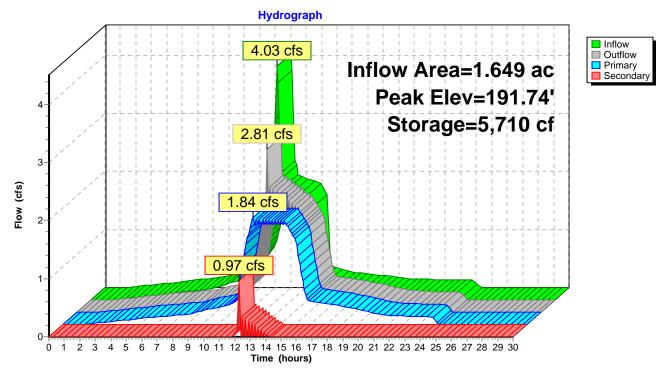
8 Chambers x 248.0 cf + 11.00' Header x 12.40 sf x 2 = 2,256.8 cf Chamber Storage 8 Chambers x 297.1 cf + 11.00' Header x 14.86 sf x 2 = 2,703.7 cf Displacement

5,874.2 cf Field - 2,703.7 cf Chambers = 3,170.5 cf Stone x 40.0% Voids = 1,268.2 cf Stone Storage

Chamber Storage + Stone Storage = 3,525.0 cf = 0.081 afOverall Storage Efficiency = 60.0%

8 Chambers 217.6 cy Field 117.4 cy Stone





Pond PS1: Pipe Storage/Porous Pavt

APPENDIX #7

SPILL RESPONSE PLAN

SPILL RESPONSE PLAN 363 ONTARIO STREET APARTMENTS

In addition to the good housekeeping and material management practices discussed in relevant sections of this plan, the following practices will be implemented for spill prevention and cleanup:

Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies. Any spill in excess or suspected to be in excess of two gallons will be reported to the

NYSDEC Spill Response Unit. Notification to NYSDEC (1-800-457-7362) must be completed within two hours of the discovery of the spill.

Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not be limited to: absorbent pads, brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.

All spills will be cleaned up immediately after discovery.

The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with spilled substance.

Spills of toxic or hazardous material will be reported to the appropriate State or local government agency, regardless of the size.

The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring, and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.

The contractor/trained individual will be the spill prevention and cleanup coordinator. He will designate at least three other site personnel who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel will be posted in the material storage area on the onsite construction office or trailer.

A Spill Response Report notifications are provided below.

SPILL RESPONSE REPORT 363 ONTARIO STREET APARTMENTS

Within 1 hour of a spill discovery less than 2 gallons in volume the following must be notified:

Jankow Companies, City of Albany, Randy Milano, P.E., City Engineer, 518-427-7481 City of Albany, Neil O'Connor, P.E., 518-434-5300

Within 1 hour of a spill discovery greater than 2 gallons in volume the following must be notified:

NYSDEC Spill Response Hotline 800-457-7362 Jankow Companies, City of Albany, Randy Milano, P.E., City Engineer, 518-427-7481 City of Albany, Neil O'Connor, P.E., 518-434-5300 Spill Response Contractor, *To Be Designated*

APPENDIX #8

COMPLETED NOI

NOI for coverage under Stormwater General Permit for Construction Activity

version 1.18

(Submission #: 2XF-28VT-AZ2C, version 1)

PRINTED ON 12/1/2017

Summary			
Submission #:	2XF-28VT-AZ2C	Date Submitted:	Not Submitted
Form:	NOI for coverage under Stormwater General Permit for Construction Activity version 1.18 (363 Ontario St. Apartments - ALBANY)	Status:	Draft
Applicant:	Daniel Hershberg	Active Steps:	Form Submitted
Reference #:			
Reference #.			

Notes There are currently no Submission Notes.

Details

Owner/Operator Information

Owner/Operator Name (Company/Private Owner/Municipality/Agency/Institution, etc.) Jankow Companies

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

Jankow

Owner/Operator Contact Person First Name

Ryan

Owner/Operator Mailing Address

P.O. Box 1366

City Guilderland

State

New York

Zip

12084

Phone 631-793-8527

Email ryan.jankow@gmail.com

Federal Tax ID NONE PROVIDED

Project Location

Project/Site Name 363 Ontario Street Apartments

Street Address (Not P.O. Box) 363 Ontario Street

Side of Street West

City/Town/Village (THAT ISSUES BUILDING PERMIT) Albany (C)

State New York

Zip 12206

County ALBANY

DEC Region 4

Name of Nearest Cross Street Park Street

Distance to Nearest Cross Street (Feet)

0

Project In Relation to Cross Street South

Tax Map Numbers Section-Block-Parcel 64,76-4-47

Tax Map Numbers NONE PROVIDED

1. Coordinates

Provide the Geographic Coordinates for the project site. The two methods are: - Navigate to the project location on the map (below) and click to place a marker and obtain the XY coordinates. - The "Find Me" button will provide the lat/long for the person filling out this form. Then pan the map to the correct location and click the map to place a marker and obtain the XY coordinates.

Navigate to your location and click on the map to get the X,Y coordinates 42.65810571743538,-73.78568276137702

Project Details

2. What is the nature of this project? New Construction

3. Select the predominant land use for both pre and post development conditions.

Pre-Development Existing Landuse Commercial

Post-Development Future Land Use Multifamily Residential

3a. If Single Family Subdivision was selected in question 3, enter the number of subdivision lots. NONE PROVIDED

4. In accordance with the larger common plan of development or sale, enter the total project site acreage, the acreage to be disturbed and the future impervious area (acreage) within the disturbed area. *** ROUND TO THE NEAREST TENTH OF AN ACRE. ***

Total Site Area (acres) 1.8 Total Area to be Disturbed (acres) 1.8

Existing Impervious Area to be Disturbed (acres)

1.5

Future Impervious Area Within Disturbed Area (acres) 1.3

5. Do you plan to disturb more than 5 acres of soil at any one time? No

6. Indicate the percentage (%) of each Hydrologic Soil Group(HSG) at the site.

A (%) 0 B (%) 0 C (%) 50 D (%) 50 7. Is this a phased project?

No

8. Enter the planned start and end dates of the disturbance activities.

Start Date 01/01/2018

End Date 09/30/2018

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge. Hudson River

9a. Type of waterbody identified in question 9? River Off Site

Other Waterbody Type Off Site Description NONE PROVIDED

9b. If "wetland" was selected in 9A, how was the wetland identified? NONE PROVIDED

10. Has the surface waterbody(ies in question 9 been identified as a 303(d) segment in Appendix E of GP-0-15-002? No

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-15-002? No

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? No

If No, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey?

No

If Yes, what is the acreage to be disturbed? NONE PROVIDED

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? No

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)?

No

16. What is the name of the municipality/entity that owns the separate storm sewer system? NONE PROVIDED

17. Does any runoff from the site enter a sewer classified as a Combined Sewer? Yes

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law? No

19. Is this property owned by a state authority, state agency, federal government or local government? No

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.) No

Required SWPPP Components

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)? Yes

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)? No

If you answered No in question 22, skip question 23 and the Post-construction Criteria and Post-construction SMP Identification sections.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual? Yes

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by: Professional Engineer (P.E.)

SWPPP Preparer Hershberg & Hershberg

Contact Name (Last, Space, First) Hershberg Daniel

Mailing Address 18 Locust Street

City

Albany

State

NY

Zip

12203

Phone 518-459-3096

Email

dan@hhershberg.com

Download SWPPP Preparer Certification Form

Please take the following steps to prepare and upload your preparer certification form: 1) Click on the link below to download a blank certification form 2) The certified SWPPP preparer should sign this form 3) Scan the signed form 4) Upload the scanned document

Download SWPPP Preparer Certification Form

Please upload the SWPPP Preparer Certification - Attachment 20170034SWPPP Preparer Certification Form (GP-0-15-002).pdf Comment: NONE PROVIDED

Erosion & Sediment Control Criteria

25. Has a construction sequence schedule for the planned management practices been prepared? Yes

26. Select all of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural Sediment Traps Silt Fence Stabilized Construction Entrance Storm Drain Inlet Protection

Biotechnical

None

Vegetative Measures

Mulching Seeding Temporary Swale

Permanent Structural

Land Grading Retaining Wall

Other NONE PROVIDED

Post-Construction Criteria

* IMPORTANT: Completion of Questions 27-39 is not required if response to Question 22 is No.

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project. Building Footprint Reduction

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).

All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout). (Acre-feet) 0.161

29. Post-construction SMP Identification

Use the Post-construction SMP Identification section to identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity that were used to reduce the Total WQv Required (#28). Identify the SMPs to be used by providing the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice. Note: Redevelopment projects shall use the Post-Construction SMP Identification section to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29. (acre-feet)

0.161

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28)? Yes

If Yes, go to question 36. If No, go to question 32.

32. Provide the Minimum RRv required based on HSG. [Minimum RRv Required = (P) (0.95) (Ai) / 12, Ai=(s) (Aic)] (acre-feet) NONE PROVIDED

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?

If Yes, go to question 33.

Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP. If No, sizing criteria has not been met; therefore, NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. SMPs

Use the Post-construction SMP Identification section to identify the Standard SMPs and, if applicable, the Alternative SMPs to be used to treat the remaining total WQv (=Total WQv Required in #28 - Total RRv Provided in #30). Also, provide the total impervious area that contributes runoff to each practice selected. NOTE: Use the Post-construction SMP Identification section to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question #29. (acre-feet) NONE PROVIDED

Note: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a). NONE PROVIDED

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)?

If Yes, go to question 36. If No, sizing criteria has not been met; therefore, NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv required and provided or select waiver (#36a), if applicable.

CPv Required (acre-feet) NONE PROVIDED

CPv Provided (acre-feet) NONE PROVIDED 36a. The need to provide channel protection has been waived because:

Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (#37a), if applicable.

Overbank Flood Control Criteria (Qp)

Pre-Development (CFS) 5.50

Post-Development (CFS) 4.38

Total Extreme Flood Control Criteria (Qf)

Pre-Development (CFS) 10.58

Post-Development (CFS) 6.89

37a. The need to meet the Qp and Qf criteria has been waived because:

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? Yes

If Yes, Identify the entity responsible for the long term Operation and Maintenance Jankow Companies

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). (See question #32a) This space can also be used for other pertinent project information.

This NOI was prepared for the City of Albany Department of Water & Water Supply for an application under USDO.

Post-Construction SMP Identification

Runoff Reduction (RR) Techniques, Standard Stormwater Management Practices (SMPs) and Alternative SMPs

Identify the Post-construction SMPs to be used by providing the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

RR Techniques (Area Reduction)

 Round to the nearest tenth

 Total Contributing Acres for Conservation of Natural Area (RR-1)

 0.0

 Total Contributing Impervious Acres for Conservation of Natural Area (RR-1)

 0.0

 Total Contributing Acres for Sheetflow to Riparian Buffers/Filter Strips (RR-2)

 0.0

 Total Contributing Impervious Acres for Sheetflow to Riparian Buffers/Filter Strips (RR-2)

 0.0

 Total Contributing Impervious Acres for Sheetflow to Riparian Buffers/Filter Strips (RR-2)

 0.0

Total Contributing Acres for Tree Planting/Tree Pit (RR-3) 0.0	
Total Contributing Impervious Acres for Tree Planting/Tree Pit (RR-3) 0.0	
Total Contributing Acres for Disconnection of Rooftop Runoff (RR-4) 0.0	
RR Techniques (Volume Reduction)	
Total Contributing Impervious Acres for Disconnection of Rooftop Runoff (RR-4) 0.0	
Total Contributing Impervious Acres for Vegetated Swale (RR-5) 0.0	
Total Contributing Impervious Acres for Rain Garden (RR-6) 0.0	
Total Contributing Impervious Acres for Stormwater Planter (RR-7) 0.0	
Total Contributing Impervious Acres for Rain Barrel/Cistern (RR-8) 0.0	
Total Contributing Impervious Acres for Porous Pavement (RR-9) 0.9	
Total Contributing Impervious Acres for Green Roof (RR-10) 0.0	
Standard SMPs with RRv Capacity	
Total Contributing Impervious Acres for Infiltration Trench (I-1) 0.0	
Total Contributing Impervious Acres for Infiltration Basin (I-2) 0.0	
Total Contributing Impervious Acres for Dry Well (I-3) 0.0	
Total Contributing Impervious Acres for Underground Infiltration System (I-4) 0.0	
Total Contributing Impervious Acres for Bioretention (F-5) 0.0	
Total Contributing Impervious Acres for Dry Swale (O-1) 0.0	
Standard SMPs	

Total Contributing Impervious Acres for Micropool Extended Detention (P-1) 0.0

Total Contributing Impervious Acres for Wet Extended Detention (P-3) 0.0
Total Contributing Impervious Acres for Multiple Pond System (P-4) 0.0
Total Contributing Impervious Acres for Pocket Pond (P-5) 0.0
Total Contributing Impervious Acres for Surface Sand Filter (F-1) 0.0
Total Contributing Impervious Acres for Underground Sand Filter (F-2) 0.0
Total Contributing Impervious Acres for Perimeter Sand Filter (F-3) 0.0
Total Contributing Impervious Acres for Organic Filter (F-4) 0.0
Total Contributing Impervious Acres for Shallow Wetland (W-1) 0.0
Total Contributing Impervious Acres for Extended Detention Wetland (W-2) 0.0
Total Contributing Impervious Acres for Pond/Wetland System (W-3) 0.0
Total Contributing Impervious Acres for Pocket Wetland (W-4) 0.0
Total Contributing Impervious Acres for Wet Swale (O-2) 0.0
Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY

Total Contributing Impervious Area for Hydrodynamic 0.0

Total Contributing Impervious Area for Wet Vault 0.0

Total Contributing Impervious Area for Media Filter 0.0

"Other" Alternative SMP? NONE PROVIDED

Total Contributing Impervious Area for "Other" 0.0

Provide the name and manufaturer of the alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

,

NONE PROVIDED

Name of Alternative SMP NONE PROVIDED

Other Permits

40. Identify other DEC permits, existing and new, that are required for this project/facility. None

If SPDES Multi-Sector GP, then give permit ID NONE PROVIDED

If Other, then identify NONE PROVIDED

41. Does this project require a US Army Corps of Engineers Wetland Permit? No

If "Yes," then indicate Size of Impact, in acres, to the nearest tenth NONE PROVIDED

42. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. NONE PROVIDED

MS4 SWPPP Acceptance

43. Is this project subject to the requirements of a regulated, traditional land use control MS4? Yes - Please attach the MS4 Acceptance form below

If No, skip question 44

44. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI?

MS4 SWPPP Acceptance Form Download

Download form from the link below. Complete, sign, and upload. MS4 SWPPP Acceptance Form

MS4 Acceptance Form Upload - Attachment

swpppaccept.pdf Comment: NONE PROVIDED

Owner/Operator Certification

Owner/Operator Certification Form Download

Download the certification form by clicking the link below. Complete, sign, scan, and upload the form. Owner/Operator Certification Form (PDF, 45KB)

Upload Owner/Operator Certification Form * - Attachment NONE PROVIDED Comment: NONE PROVIDED

Attachments			
Date	Attachment Name		Context
12/01/2017 01 <u>;</u> 36 PM	20170034SWPPP Pro	eparer Certification Form (GP-0-15-002).pdf	v1 - Required SWPPP Components
12/01/2017 02:50 PM	swpppaccept.pdf		v1 - MS4 SWPPP Acceptance
Status History Date None	User	Processing Status	
Processing Steps Step Name Form Submitted		Assigned To/Completed By	Date Completed
Deemed Complete Step Name		Toni Cioffi Assigned To/Completed By	Date Completed

APPENDIX #9

DRAFT NOT

-	

New York State Department of Environmental Conservation Division of Water 625 Broadway, 4th Floor Albany, New York 12233-3505 *(NOTE: Submit completed form to address above)*

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity

Please indicate your permit identific	cation number: NYR
I. Owner or Operator Information	
1. Owner/Operator Name:	
2. Street Address:	
3. City/State/Zip:	
4. Contact Person:	4a.Telephone:
5. Contact Person E-Mail:	
II. Project Site Information	
5. Project/Site Name:	
6. Street Address:	
7. City/Zip:	
8. County:	
III. Reason for Termination	
9a. □ All disturbed areas have achieved final *Date final stabilization completed (m	stabilization in accordance with the general permit and SWPPP.
identification number: NYR	new owner/operator. Indicate new owner/operator's permit inated by owner identified in I.1. above until new owner/operator mit)
9c. Other (Explain on Page 2)	
IV. Final Site Information:	
10a. Did this construction activity require the stormwater management practices?	development of a SWPPP that includes post-construction yes □ no (If no, go to question 10f.)
10b. Have all post-construction stormwater ma □ yes □ no (If no, explain on Page 2)	anagement practices included in the final SWPPP been constructed?
10c. Identify the entity responsible for long-te	rm operation and maintenance of practice(s)?

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

10d. Has the entity responsible for long-term operation operation and maintenance plan required by the get	
 management practice(s): Post-construction stormwater management practice(s) have been deeded to the municipalit Executed maintenance agreement is in place with stormwater management practice(s). For post-construction stormwater management place modified to include a deed covenant that reaccordance with the operation and maintenance For post-construction stormwater management place accordance with the operation and maintenance 	y. h the municipality that will maintain the post-construction practices that are privately owned, the deed of record has equires operation and maintenance of the practice(s) in plan. plan. practices that are owned by a public or private institution agency or authority, policy and procedures are in place
10f. Provide the total area of impervious surface (i.e. the disturbance area?	roof, pavement, concrete, gravel, etc.) constructed within (acres)
 Is this project subject to the requirements of a regu (If Yes, complete section VI - "MS4 Acceptance") 	
(Use this section to answer questions 9c. and 10b.,	if applicable)
VI. MS4 Acceptance - MS4 Official (principal exec Authorized Representative (Note: Not required when	
I have determined that it is acceptable for the owner or to submit the Notice of Termination at this time.	operator of the construction project identified in question 5
Printed Name:	
Title/Position:	
Signature:	Date:

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

VII.	Qualified	Inspector	Certification -	Final	Stabilization:	
------	-----------	-----------	-----------------	-------	----------------	--

I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the
general permit, and that all temporary, structural erosion and sediment control measures have been removed.
Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced
permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative
proceedings.

Printed Name:

Title/Position:

Signature:

Date:

VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):

I hereby certify that all post-construction stormwater management practices have been constructed in conformance
with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation
of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or
administrative proceedings.

Printed Name:

Title/Position:

Signature:

Date:

IX. Owner or Operator Certification

I hereby certify that this document was prepared by me or under my direction or based upon my inquiry of the person(s) who managed the construction activity, responsible for gathering the information, is that the information provided in th complete. Furthermore, I understand that certifying false, incorrect or inaccurat referenced permit and the laws of the State of New York and could subject me administrative proceedings.	or those persons directly is document is true, accurate and e information is a violation of the
Printed Name:	
Title/Position:	
Signature:	Date:

(NYS DEC Notice of Termination - January 2010)

APPENDIX #10

DRAFT SWPPP ACCEPTANCE

NEW YORK STATE OF OPPORTUNITYDepartment of Environmental ConservationNYS Department of Environmental Conservation Division of Water 625 Broadway, 4th Floor Albany, New York 12233-3505
MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form
Construction Activities Seeking Authorization Under SPDES General Permit *(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)
I. Project Owner/Operator Information
1. Owner/Operator Name:
2. Contact Person:
3. Street Address:
4. City/State/Zip:
II. Project Site Information
5. Project/Site Name:
6. Street Address:
7. City/State/Zip:
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information
8. SWPPP Reviewed by:
9. Title/Position:
10. Date Final SWPPP Reviewed and Accepted:
IV. Regulated MS4 Information
11. Name of MS4:
12. MS4 SPDES Permit Identification Number: NYR20A
13. Contact Person:
14. Street Address:
15. City/State/Zip:
16. Telephone Number:

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

(NYS DEC - MS4 SWPPP Acceptance Form - January 2015)

APPENDIX #11

SAMPLE SWPPP INSPECTION FORM

(This is a sample only. Other formats may be used.)

CONSTRUCTION DURATION SWPPP INSPECTION REPORT

Project:				
	/Contrac			
	ed Inspe			
	ed Profes			
			Increation Time:	
	tion Date		•	emperature:
Weathe	er Condit	tions:	Soil Conditions: DRY / WET / SATUR	ATED / FROZEN / SNOW COVERED
_			INSPECTION CHEC	XK LIST
	ord Kee			
Yes	No	N/A		
í'	ſ'		Is a copy of the Notice of Intent (NOI) and ack	knowledgment on site?
				-
í T			Is a copy of the SWPPP report and all necess	sary signed permittee and contractor certification
		·	statements retained at the construction site?	
·			Is a copy of the SPDES General Permit retain	and at the construction site?
	<u>'</u> '			
		, 	Are the OM/DDD increation report loss rateins	A state a parate restance of the O
<u>ا</u> ــــــــــــــــــــــــــــــــــــ	<u>'</u> '		Are the SWPPP inspection report logs retaine	at the construction site?
		-		
	l Observ			
Describ	be water	runoff co	conditions at all points of discharge from the cons	struction site. Include identification of any silt or
Isedime	ent disch	arges fro	om the site, including discharges from conveyan	ce systems (i.e. pipes, culverts, ditches, etc.).

Discharge Point	Sediment Discharge		Description of runoff water and codiment discharge (if applicable)
Discharge Foint	Yes	No	Description of runoff water and sediment discharge (if applicable)
NA			

Describe conditions of all natural surface water bodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any discharges of sediment to the surface water **body**.

Water body	Sediment Discharge		Description of water and codiment discharge (if applicable)
Water body	Yes	No	Description of water and sediment discharge (if applicable)
NA			

Describe areas where temporary or permanent stabilization are required or have been implemented.

Area	Description of stabilization (temporary or permanent), type of stabilization, installed or required
Building Pad	
	¬
Yes No N/A	
	Is the construction entrance/exit installed and effective? If No, recommendations;
· · · · ·	
	Are the public roads being kept clean?
	Is the perimeter silt fence installed, effective and cleaned?
	Does the perimeter silt fence require repairs or replacement ? If yes provide location(s):
	Does the permeter sit tence require repairs of replacement? If yes provide location(s).
	Is inlet protection installed in accordance with approved details? If No, recommendations;
	Is outlet protection installed and effective? If No recommendations;

CONSTRUCTION DURATION SWPPP INSPECTION REPORT

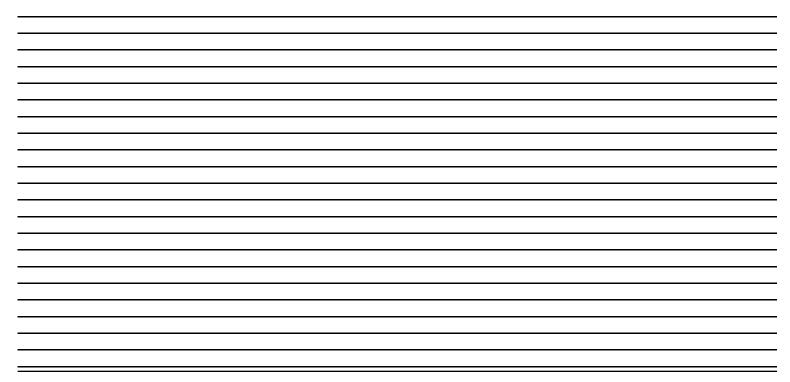
Yes	No	N/A	
100			Is a temporary sediment basin installed and effective? If No recommendations;
			Are soil stockpiles on site surrounded within a silt fence enclosure? If No, recommendations;
			Are there currently less than 5 acres of disturbed soils at the site? If No, explain;
			Has the contractor completed repairs/remediation's recommended in previous inspection report? If No, recommendations;
Но	usekeej	oing	
Yes	No	N/A	
			Litter, including building materials, has been picked up, and has been disposed of in appropriate dumpsters? Are the dumpsters being emptied regularly? If No, explain;
			Construction equipment has been inspected for oil and grease leaks?
			All construction equipment that was found to be leaking has been repaired?
			Hazardous or toxic materials, including oil, grease, detergents and solvents, are stored under cover where they cannot come in contact with storm water?
			Empty containers have been disposed of?
			Onsite fueling areas are being maintained and have adequate spill protection devices?

Use this space to explain each "No" checked above and to provide additional comments as necessary. Identify any areas with gully erosion on slopes, loss of vegetation, seed or mulch, excessive deposition of sediments or ponding water along diversion or barrier systems. Also identify any areas of erosion near outlet or overflow structures in the sedimentation basin areas.

Signature of Qualified Inspector:		
Signature of Qualified Professional:	Project Name:	
	Project Location:	
Signature of Owner's Representative:	Project File No.	

CONSTRUCTION DURATION SWPPP INSPECTION REPORT

ADDITIONAL NOTES AND LIST OF DEFFICENCIES





APPENDIX # 12

GEOTECHNICAL REPORT

GEOTECHNICAL EVALUATION ONTARIO STREET APARTMENTS ALBANY, NEW YORK Dente File No. JB175553

Prepared For: Mr. Dan Hershberg Hershberg & Hershberg 18 Locust Street Albany, NY 12203

January 2018

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- APPENDIX B Subsurface Logs w/ Key
- APPENDIX C Infiltration Test



GEOTECHNICAL EVALUATION ONTARIO STREET APARTMENTS ALBANY, NEW YORK

Dente File No. JB175553

I. INTRODUCTION

This report presents the results of a geotechnical evaluation completed by the Dente Group for the proposed Ontario Street Apartment Buildings in Albany, New York. The evaluation was completed in general accord with Dente proposal number FDE-17-187, which was accepted by Hershberg & Hershberg of Albany, New York.

In general, our scope of services for this project consisted of the following:

- Review of Geotechnical studies completed by this office at nearby sites,
- Layout and completion of five test borings and three infiltration tests,
- Preparation of this report, which summarizes the results of our explorations and presents recommendations to assist in planning for the geotechnical related aspects of the project.

This report and the recommendations contained within it were developed for specific application to the site and construction planned, as we currently understand it. Corrections in our understanding, changes in the structure locations, their grades, loads, etc. should be brought to our attention so that we may evaluate their effect upon the recommendations offered in this report.

It should be understood that this report was prepared, in part, on the basis of a limited field exploration. The borings were advanced at discrete locations and the overburden soils sampled at specific depths. Conditions are only known at the locations and through the depths investigated. Conditions at other locations and depths may be



different, and these differences may impact upon the conclusions reached and the recommendations offered. For this reason, we strongly recommend that we be retained to provide site observation services during construction.

This report was prepared for informational purposes only and should not be considered part of the contract documents. It should be made available to interested parties in its entirety only. Should the data contained in this report not be adequate for the contractors' bidding purposes, the contractors may make their own investigations, tests, and analyses for use in bid preparation.

The recommendations offered in this report concerning the control of surface and subsurface waters, moisture, or vapor membranes address conventional Geotechnical Engineering aspects only and are not to be construed as recommendations for controlling or providing an environment that would prohibit or control infestations of the structure or its surroundings with mold or other biological agents.

II. SITE AND PROJECT DESCRIPTION

The site is located along the west side of Ontario Street between its intersection with Warren Street and Park Avenue as depicted on the USGS and Site Plan presented in Appendix A. The proposed building site is sloped downward from the northwest to the southeast between elevations of about 204 and 197 feet. The parcel now is occupied by the Playdium Bowling Center, Laundromat, and Food Store surrounded with asphalt pavements, lawn, and shrubs. The existing building is a single story structure with a plan area of about 33,000 square feet with a finished floor at about elevation 204 feet. The existing building will be demolished for this development.

Three new apartment buildings, each with below grade parking, are planned for the site. The buildings will be two and four story wood frame construction with a below grade cast in place concrete parking levels. The grade levels range between 192 and 199 feet, some three to nine feet beneath the existing site grades.

III. SUBSURFACE CONDITIONS

The subsurface conditions at the site were investigated through the completion of five test borings and three infiltration tests at the approximate locations shown on the plan in Appendix A. The test borings were completed using a standard rotary drill rig equipped with hollow stem augers. As the augers were advanced, the overburden soils were sampled and their relative density determined using split-spoon sampling techniques in general accord with ASTM D1586 procedures. Representative portions

of the recovered soil samples were transported to our office for visual classification by a Geotechnical Engineer. Individual subsurface logs were prepared for the borings on this basis and are presented in Appendix B.

The subsurface logs should be reviewed for a description of the conditions encountered at the specific test locations. It should be understood that conditions are only known at the depths and locations sampled. Conditions at other depths and locations may be different.

Subsurface Profile

About two to eight feet of fill material was found at the investigated locations across the site. The fill material is composed of relatively loose mixtures of sand, gravel, the native site soils, and building rubble and debris. The fills were likely created when the current building was constructed and former buildings were demolished and placed into their former basement levels. The underlying native soils were brown grading to grey varved and laminated silt and clay. These cohesive soils were of a medium/stiff grading to very soft consistency through the depths explored at this site, about 52 feet.

Groundwater Conditions

Groundwater measurements were attempted at completion of drilling and sampling and the results are noted on the individual subsurface logs. It should be understood that these measurements likely do not accurately reflect the actual groundwater depths because adequate time did not pass after completion of drilling for water to enter and achieve a static level in the augers.

Based on the change in the soil coloration, it appears that the static groundwater level was generally present below about 10 feet. Layers of trapped or perched groundwater should be expected to exist seasonally within the surface fill materials and also at very shallow depths in the silt and clay soils following the spring thaws and periods of precipitation.

IV. GEOTECHNICAL RECOMMENDATIONS

A. General Site Evaluation

Based upon our evaluation of the subsurface conditions disclosed through our investigation, we have developed the following general conclusions and recommendations to assist in planning for design and construction.

1. All existing fills should be removed and replaced from beneath new building areas, their foundations, and floor slabs.

- 2. Consideration can be given to leaving the fills in place beneath exterior pavements provided that their surfaces are proof-rolled and stabilized and the Owner accepts some risk that settlement may occur in the future and require greater than normal maintenance.
- 3. The new building may be supported using ordinary spread foundations bearing upon the undisturbed native soils or upon structural fill placed after the existing fills are removed from the building areas.
- 4. All buildings should be encircled with foundation level drains.
- 5. Layers of trapped or perched groundwater may be encountered in the site excavations at shallow depths, seasonally. For these reasons, perimeter swales and or underdrains should be provided along and beneath pavements, and foundation drains along the sides of the perimeter building foundations.
- 6. Site preparation should preferably be done during a seasonal dry period to reduce the adverse impacts of soft/wet subgrades on construction. This will minimize the quantity of undercutting that will be required to remove and replace soft and/or wet soils and establish a stable base for construction. A contingency should be carried in the project budget for undercutting and replacement of soft and/or wet subgrade soils.
- 7. The on-site soils, in some areas and at certain depths, contain appreciable amounts of silt, and they will be very sensitive to construction activities and even slight variations in moisture content.

The following report sections provide detailed recommendations to assist in planning for design and construction. We should review plans and specifications prior to their release for bidding to allow us to refine our recommendations, if required, and confirm that our recommendations were properly interpreted and applied.

B. Seismic Design Considerations

For seismic design purposes, we evaluated the site conditions in accord with Section 1613 of the International Building Code (2015) adopted by New York State. On this basis, it was determined that Seismic Site Class "D - Stiff Profile" is applicable to this project. Based upon the composition of the site soils, liquefaction should not occur in response to earthquake motions. The site classification and liquefaction analyses is based, in part, upon shear wave velocity testing conducted in similar subsurface profiles in the general project area.

C. Site Preparation and Earthwork

We caution that the subgrade soils, where silt rich, will easily soften and lose strength when subjected to ordinary construction equipment traffic whether the soils are moist or wet. The contractor should make efforts to maintain the subgrades in as dry and stable condition as possible. These efforts may include the installation of drainage trenches and shaping of subgrade surfaces to promote runoff away from the construction areas, restricting construction equipment traffic from traveling across the subgrade surface when it is wet, and installing temporary haul and construction roads as appropriate for the specific weather conditions and equipment he intends to employ at the site.

After the existing building is demolished and its foundations and slabs area removed in their entirety, site preparation in the new building pad and pavement areas should commence with the clearing and stripping of pavements, topsoil and surficial organics, along with the installation of perimeter swales to intercept and divert runoff away from the work areas.

All existing fills should be removed from beneath the new building pads and the adjoining areas extending at least five (5) feet beyond the building perimeter.

The existing fills may be left in place beneath exterior pavements provided that the surfaces are proof-rolled and stabilized as recommended below and the Owner accepts some risk that settlement may occur.

The subgrades must be shaped, crowned, and sloped to promote their drainage at all times and that of the granular structural fills which will overlie them. Prior to placing fills, the building and pavement subgrades should be proof-rolled by completing at least three (3) passes using a steel drum roller with a static weight of at least ten (10) tons. The roller should operate in the static mode unless directed otherwise by a Geotechnical Engineer observing the work. Any subgrade soils that are or become soft and wet should be undercut and stabilized accordingly.

Imported Structural Fill should be used as fill and backfill in new building and pavement areas and it should consist of well graded bank-run sand and gravel with no particles larger than three (3) inches, between 30 and 70 percent passing the No. 4 sieve, and less than 15 percent, by weight, of material finer than a No. 200 mesh sieve. The fill should not contain recycled asphalt, bricks, glass, pyritic shale, or recycled concrete, unless the recycled concrete is from a NYSDOT approved stockpile, and even then only with the owner's specific consent. The existing site soils are considered unsuitable for use as a source of structural fill and should be reserved for use in landscaped areas well away from the planned buildings and their backfills.

The Structural Fill should be placed in uniform loose layers no more than about one (1) foot in thickness where heavy vibratory compaction equipment is used. Smaller lifts should be used where hand operated equipment is required for compaction. Each

lift should be compacted to no less than 95 percent of the maximum dry density for the soil which is established by the Modified Proctor Compaction Test, ASTM D1557. In landscape areas, the compaction may be reduced to 90 percent of maximum dry density.

D. Foundations

New building foundations may be seated on the undisturbed native soils or imported Structural Fill placed to increase site grades.

Where the native soils will form bearing grades or less than a foot of structural fill will separate the foundations and the native silt and clay soils, the bearing grades must be protected throughout the construction period using either a three-inch-thick lean concrete mud mat or by over excavating 12 inches beneath the bearing grade and placing synthetic fabric followed with a 50/50 blend of NYSDOT #1 & 2 aggregate to form a stabilized bearing pad.

The foundations, when bearing upon structural fill, the mud mat, or the stone pad protected grades, may be proportioned for a maximum net allowable bearing pressure equal to 3,000 psf. Continuous wall and isolated column foundations should have minimum widths of 18 and 36 inches, respectively, even if this results in a bearing pressure which is less than the maximum allowable. Exterior foundations should bear at least four (4) feet beneath final adjacent exterior grades to afford frost penetration protection. Interior foundations may be seated at a nominal two (2) foot depth below the floor slab if allowed by local codes.

Assuming standard care is used in preparing the bearing grades, we estimate that total foundation settlement should be less than one (1) inch. The settlements should occur within a few days after construction is completed and each load increment is applied.

All below grade foundation and any site retaining walls should be designed to support lateral earth pressures together with all applicable temporary and permanent surcharge loads. Structural fill materials should be used as the retaining and foundation wall's backfill.

If the walls are free to deflect as the backfill is placed or surcharge loads applied, "Active" earth pressures may be assumed. If the walls are braced prior to backfilling or applying surcharge loads, "At-Rest" conditions should be assumed. The following design parameters are provided to assist in determining the lateral wall loads for level soil surfaces above and below the wall, whichever apply:

•	Coefficient of "At-Rest" Lateral Earth Pressure Coefficient of "Active" Lateral Earth Pressure	$K_o = 0.50$ $K_a = 0.33$
•	Coefficient of "Passive" Earth Pressure	$K_{P} = 2.0$
•	Total Unit Weight of Soil and Compacted Backfill Coefficient of Sliding Friction (On Native or Fill Soil)	$Y_T = 120 \text{ pcf}$ $\delta_f = 0.30$

The building walls should be moisture proofed, the walls provided with a drainage layer and the below grade building areas encircled with a perimeter foundation drain. The stone layer which we recommended to be placed beneath the below grade slabs must be drained to the foundation drainage system. The foundation and sub slab systems should drain via gravity where possible and if not possible, through a pump system with backup power.

Any site retaining walls should have a foundation level drain provided.

E. Floor Slabs

At grade floor slabs should be constructed upon a minimum eight (8) inch thick subbase of Imported Structural Fill and, where floor coverings or moisture sensitive coatings are to be placed upon the slabs, four (4) inch thick base of crushed stone (ASTM Blend 57 material). Where the below grade slabs are planned, the crushed stone should be at least twelve (12) inches thick and drained to the recommended foundation drainage system.

A vapor retarder (Stego Wrap 15 mil Class A or equivalent) should be installed if any floor coverings or moisture sensitive coatings are to be placed upon the slabs. The vapor retarder should be positioned above or below the stone base in accord with the American Concrete Institute Manual of Concrete Practice Manual Section 302.1R. A modulus of subgrade reaction equal to 150 pounds per cubic inch (pci) at the top of the stone base layer may be assumed for the slab design purposes.

F. Pavements

Two flexible pavement sections are provided for consideration at the site dependent upon anticipated traffic types. A Heavy Section should be used for entrance drives and areas subject to repeated truck traffic, and a Light Section employed for areas subject to automobile parking and occasional delivery and/or service trucks. We should review final grading plans to determine if modifications to the pavement design are needed.

All base course layers and their subgrades should be drained through sloping and crowning of subgrades to the peripheral swales and/or french drains recommended

previously, or to underdrains where appropriate to the final grading plan to assure satisfactory performance. Peripheral and intermediate under drains should also be incorporated, as well as gravel backfilled utilities with sloped subgrades, to assure that drained base courses are provided. All base course materials should be compacted to 95 percent of the material's maximum dry density as established through the Modified Proctor Test, ASTM D-1557.

	THICKNES	SS (inches)	NYSDOT	
MATERIAL SECTION	Light Section	Heavy Section	SPECIFICATION	
Wearing Course	1	1	403 Type 6	
Binder Course	2	3	403 Type 3	
Base Course	8	12	304 Type 2	
Fabric – Mirafi 500X or Eq.	Yes	Yes	-	

Note: The base course thickness may be reduced to 8" where at least 12" of imported Structural Fill is placed beneath the subgrade elevation.

Rigid Portland concrete pavement may be designed to bear upon twelve (12) inches of NYSDOT Type 2 material and the synthetic fabric recommended above, and designed in accord with the recommended procedures of the American Concrete Institute or Portland Cement Association using a composite modulus of subgrade reaction equal to 150 pounds per cubic inch when constructed upon the subgrades prepared as recommended previously.

It should be understood that sidewalks and pavements constructed upon the site's soils will heave as frost seasonally penetrates the subgrades. The magnitude of the seasonal heave will vary with many factors, and result in differential movements. As the frost leaves the ground, the sidewalks and pavements will settle back, but not entirely in all areas, and this may accentuate the differential movements across the pavement areas. Where curbs, walks, and storm drains meet these pavements, these differential heave and settlements may result in undesirable movements, and create trip hazards. To limit the magnitude of heave and the creation of these uneven joints to generally tolerable magnitudes for most winters, a sixteen (16) inch thick crushed stone base course, composed of Blend 57 aggregate, may be placed beneath the sensitive sidewalk, drive, etc. areas. The stone layer must have an underdrain placed within it.

It should also be understood that the recommended pavement sections were not designed to support heavy construction equipment loads which would require an augmented section. The contractor should construct temporary haul and construction roadways and routes about the site as appropriate for the specific weather conditions and construction equipment he intends to employ, and the overburden soil conditions encountered in the specific areas. Construction period traffic should not be routed across the recommended pavement sections unless augmented.

Finally, all pavements require routine maintenance and occasional repairs. Failure to provide maintenance and complete the required repairs in a timely manner will result in a shortened pavement service life.

G. Plan Review and Construction Monitoring

The Dente Group should be retained to review plans and specifications related to site grading, foundations, and earthwork prior to their release for bidding to confirm that the recommendations contained herein were properly interpreted and applied.

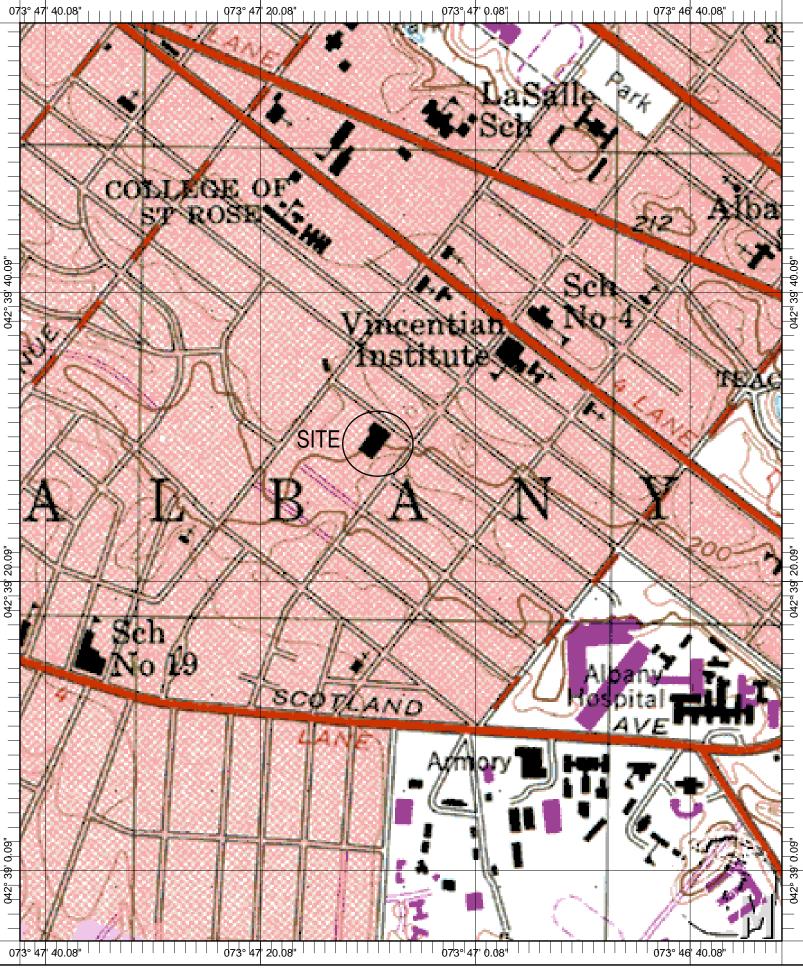
It should be understood that the actual subsurface conditions that exist across this site will only be known when the site is excavated. For this reason, we should be retained to monitor earthwork and bearing grade preparations for foundations, floor slabs, and pavements. The presence of the Geotechnical Engineer during the earthwork and foundation construction phases will allow validation of the subsurface conditions assumed to exist for this study and the design recommended in this report.

V. CLOSURE

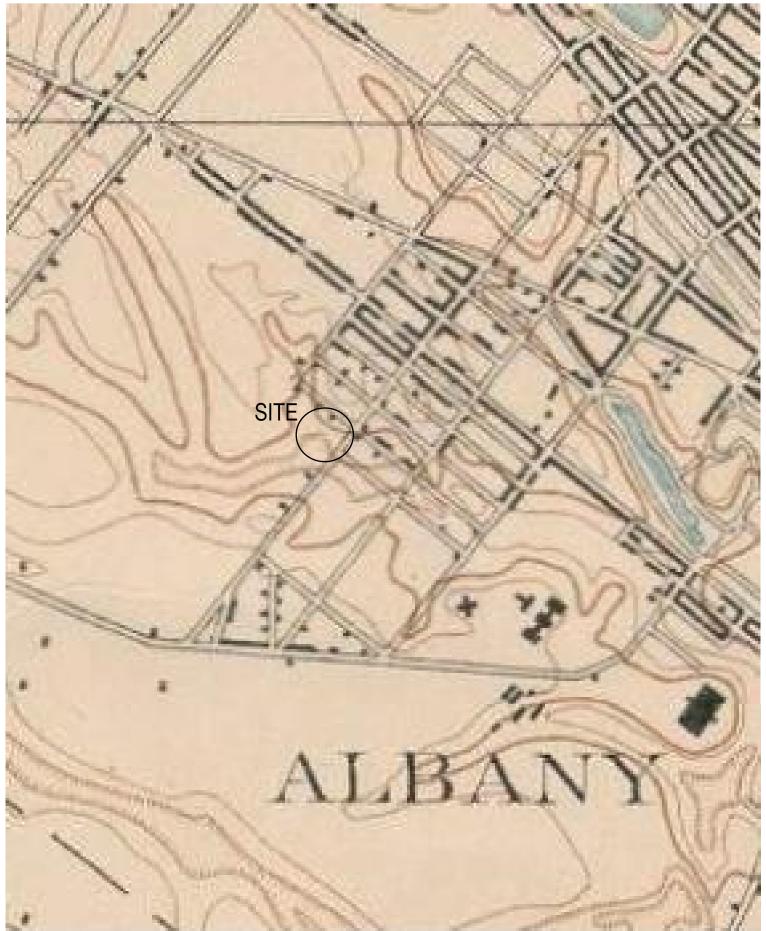
This report was prepared for specific application to the project site and the construction planned using methods and practices common to Geotechnical Engineering in the area and at the time of its preparation. No other warranty, either expressed or implied, is made. We appreciate the opportunity to be of service. Should questions arise or if we may be of any other service, please contact us at your convenience.



APPENDIX A



Name: ALBANY Date: 12/14/117 Scale: 1 inch equals 666 feet Location: 042° 39' 26.9" N $\,$ 073° 47' 07.0" W $\,$



363 Ontario Street, Albany, New York 1893



USDA Natural Resources

Conservation Service

Web Soil Survey National Cooperative Soil Survey 12/14/2017 Page 1 of 3

N	AP LEGEND	MAP INFORMATION		
Area of Interest (AOI) Area of Interest (AOI) Soils Soil Map Unit Pro Soil Map Unit Lin Soil Map Unit Lin Soil Map Unit Pro Soil Map Unit Pro Soil Map Unit Pro Soil Map Unit Pro <t< th=""><th>AOI) Spoil Area AOI) Stony Spot ygons Wer Spot Sources AOI Very Stony Spot Wet Spot Special Line Features Water Features Water Features Streams and Canals Transportation +++ Rails</th><th>The soil surveys that comprise your AOI were mapped at 1:15,800. Warning: Soil Map may not be valid at this scale. Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale. Please rely on the bar scale on each map sheet for map measurements. Source of Map: Natural Resources Conservation Service Web Soil Survey URL: Coordinate System: Web Mercator (EPSG:3857) Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required. This product is generated from the USDA-NRCS certified data a</th></t<>	AOI) Spoil Area AOI) Stony Spot ygons Wer Spot Sources AOI Very Stony Spot Wet Spot Special Line Features Water Features Water Features Streams and Canals Transportation +++ Rails	The soil surveys that comprise your AOI were mapped at 1:15,800. Warning: Soil Map may not be valid at this scale. Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale. Please rely on the bar scale on each map sheet for map measurements. Source of Map: Natural Resources Conservation Service Web Soil Survey URL: Coordinate System: Web Mercator (EPSG:3857) Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required. This product is generated from the USDA-NRCS certified data a		
 Mine or Quarry Miscellaneous W Perennial Water Rock Outcrop Saline Spot Sandy Spot Severely Erodect Sinkhole Slide or Slip Sodic Spot 		of the version date(s) listed below. Soil Survey Area: Albany County, New York Survey Area Data: Version 15, Oct 8, 2017 Soil map units are labeled (as space allows) for map scales 1:50,000 or larger. Date(s) aerial images were photographed: Jun 10, 2015—Ma 29, 2017 The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.		



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Uh	Udorthents, clayey-Urban land complex	2.1	100.0%
Totals for Area of Interest		2.1	100.0%



Albany County, New York

Uh—Udorthents, clayey-Urban land complex

Map Unit Setting

National map unit symbol: 9pj2 Mean annual precipitation: 36 to 41 inches Mean annual air temperature: 45 to 48 degrees F Frost-free period: 100 to 170 days Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, clayey, and similar soils: 40 percent Urban land: 30 percent Minor components: 30 percent Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Clayey

Typical profile

H1 - 0 to 18 inches: silty clay *H2 - 18 to 72 inches:* stratified silt loam to clay

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.2 inches)

Description of Urban Land

Typical profile

H1 - 0 to 6 inches: variable

Minor Components

Scio

Percent of map unit: 10 percent *Hydric soil rating:* No

Hudson

Percent of map unit: 10 percent *Hydric soil rating:* No

Rhinebeck

Percent of map unit: 7 percent Hydric soil rating: No

USDA

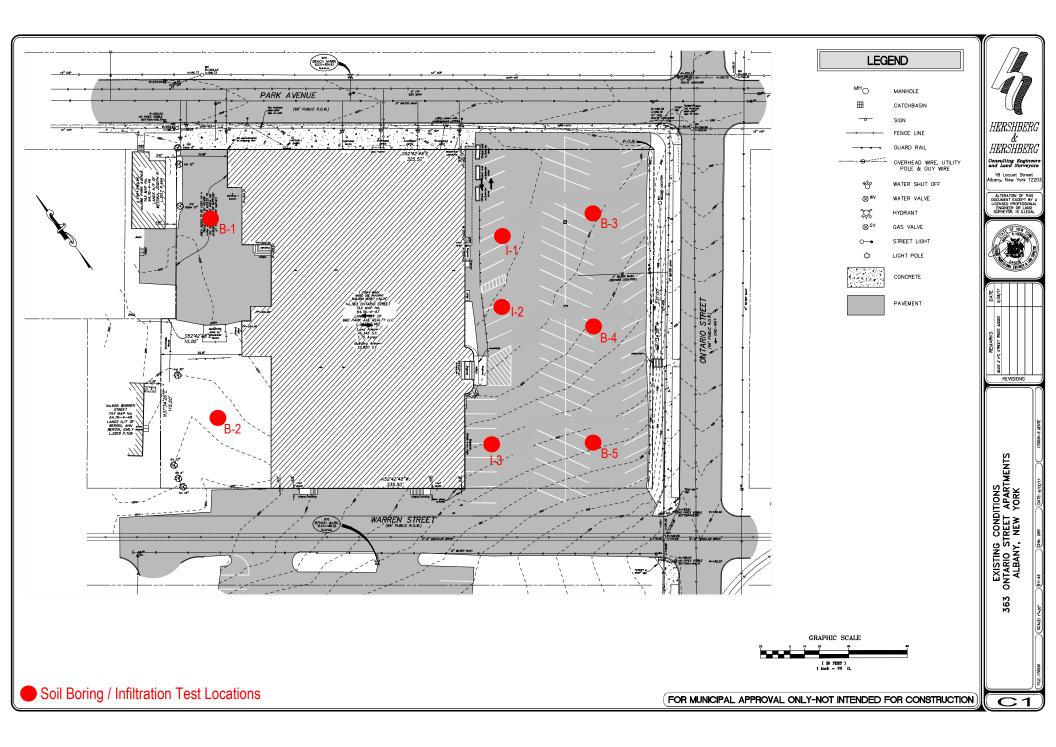
Madalin

Percent of map unit: 3 percent Landform: Depressions Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Albany County, New York Survey Area Data: Version 15, Oct 8, 2017





APPENDIX B

INTERPRETATION OF SUBSURFACE LOGS

The Subsurface Logs present observations and the results of tests performed in the field by the Driller, Technicians, Geologists and Geotechnical Engineers as noted. Soil/Rock Classifications are made visually, unless otherwise noted, on a portion of the materials recovered through the sampling process and may not necessarily be representative of the materials between sampling intervals or locations.

The following defines some of the terms utilized in the preparation of the Subsurface Logs.

SOIL CLASSIFICATIONS

Soil Classifications are visual descriptions on the basis of the Unified Soil Classification ASTM D-2487 and USBR, 1973 with additional comments by weight of constituents by BUHRMASTER. The soil density or consistency is based on the penetration resistance determined by ASTM METHOD D1586. Soil Moisture of the recovered materials is described as DRY, MOIST, WET or SATURATED.

SIZE DES	CRIPTION	RELATIVE DENSITY/CONSISTENCY (basis ASTM D1586)					
SOIL TYPE	PARTICLE SIZE	GRANUL	AR SOIL	COHESIVE SOIL			
BOULDER	> 12	DENSITY	BLOWS/FT.	CONSISTENCY	BLOWS/FT.		
COBBLE	3" - 12"	LOOSE	< 10	VERY SOFT	< 3		
GRAVEL-COARSE	3" - 3/4"	FIRM	11 - 30	SOFT	4 - 5		
GRAVEL - FINE	3/4" - #4	COMPACT	31 - 50	MEDIUM	6 - 15		
SAND - COARSE	#4 - #10	VERY COMPACT	50 +	STIFF	16 - 25		
SAND - MEDIUM	#10 - #40			HARD	25 +		
SAND - FINE	#40 - #200						
SILT/NONPLASTIC	< #200						
CLAY/PLASTIC	< #200						

SOIL ST	RUCTURE	RELATIVE PROPORTION OF SOIL TYPES		
STRUCTURE	DESCRIPTION	DESCRIPTION	% OF SAMPLE BY WEIGHT	
LAYER	6" THICK OR GREATER	AND	35 - 50	
SEAM	6" THICK OR LESS	SOME	20 - 35	
PARTING	LESS THAN 1/4" THICK	LITTLE	10 - 20	
VARVED	UNIFORM HORIZONTAL PARTINGS OR SEAMS	TRACE	LESS THAN 10	

Note that the classification of soils or soil like materials is subject to the limitations imposed by the size of the sampler, the size of the sample and its degree of disturbance and moisture.

ROCK CLASSIFICATIONS

Rock Classifications are visual descriptions on the basis of the Driller's, Technician's, Geologist's or Geotechnical Engineer's observations of the coring activity and the recovered samples applying the following classifications.

CLASSIFICATION TERM	DESCRIPTION
VERY HARD	NOT SCRATCHED BY KNIFE
HARD	SCRATCHED WITH DIFFICULTY
MEDIUM HARD	SCRATCHED EASILY
SOFT	SCRATCHED WITH FINGERNAIL
VERY WEATHERED	DISINTEGRATED WITH NUMEROUS SOIL SEAM
WEATHERED	SLIGHT DISINTEGRATION, STAINING, NO SEAMS
SOUND	NO EVIDENCE OF ABOVE
MASSIVE	ROCK LAYER GREATER THAN 36" THICK
THICK BEDDED	ROCK LAYER 12" - 36"
BEDDED	ROCK LAYER 4" - 12"
THIN BEDDED	ROCK LAYER 1" - 4"
LAMINATED	ROCK LAYER LESS THAN 1"
FRACTURES	NATURAL BREAKS AT SOME ANGLE TO BEDS

Core sample recovery is expressed as percent recovered of total sampled. The ROCK QUALITY DESIGNATION (RQD) is the total length of core sample pieces exceeding 4" length divided by the total core sample length for N size cored.

GENERAL

- Soil and Rock classifications are made visually on samples recovered. The presence of Gravel, Cobbles and Boulders will influence sample recovery classification density/consistency determination.
- Groundwater, if encountered, was measured and its depth recorded at the time and under the conditions as noted.
- Topsoil or pavements, if present, were measured and recorded at the time and under the conditions as noted.
- Stratification Lines are approximate boundaries between soil types. These transitions may be gradual or distinct and are approximated.

DEI	NTE	GRO	UP, a	TERR	ACON C	OMPAN	14	SUB	SURFACE LO	G: B-1
PRO	JECT:	363 On	tario St	reet			D	ATE	start: 12/15/17	finish: 12/15/17
LOC	ATION:	Albany	/, New `	York			ME	THOD	S: 3 1/4" Hollow S	tem Augers, ASTM
CLIE	CLIENT: Hershberg & Hershberg								ing Methods with	Auto Hammer
JOB	NUMB	ER: JB1	175553				SUF	RFACE	ELEVATION: +	./- 204.0'
DRIL	DRILL TYPE: CME 45C							ASSIFI	CATION: O.Bur	าร
SAN	IPLE			BLOWS	ON SAMP	LER		CLA	ASSIFICATION / OBSE	ERVATIONS
DEPTH	#	6"	12"	18"	24"	N			+/- 2" Aspahlt	
–	1	5	15				FILL:	Sand a	and Gravel noted	
				5	3	20				
	2	3	3				Browr	n Varve	ed and Banded S	SILT and CLAY
5'	3	2	2	3	3	6			(MOIST)	
р С	3	2	2	2	3	4				
-					0					
								0		
10' _	4	WH	1	1	1	2	Grade	es Gray	ý	
_				- 1	1	2				
-										
15' _	5	1	1	0	2	2				
_				2	2	3				
-										
20'	6	WH	WH							
-				2	2	2				
-										
25'	7	1/12"	-							
-				1	1	1				
┦ -										l l
<u> </u>					L					

DE	NTE	GRO	UP, a	TERRA	ACON C	٩Y	SUBS	SURFACE LOC	G: B-1 contin.	
PRO	JECT :	363 On	tario St	reet			D	ATE	start: 12/15/17	FINISH: 12/15/17
		Albany rshberg						:3 1/4" Hollow St	em Augers, ASTM	
JOB	NUMBI	ER: JB [^]	175553				SUF	RFACE	ELEVATION: +,	/- 204.0'
DRIL		E: CME	45C				CLA	ASSIFIC	ATION: O.Burr	IS
SAN	IPLE			BLOWS C	ON SAMP	LER		CLAS	SSIFICATION / OBSE	RVATIONS
<u>DEPTH</u> 30'	# 8	6" WH	12" 1	18" 1	24" 1	N 2	Gray	Varved	and Banded SIL	T and CLAY
35' _ 	9	WH	WH	WH	1	WH	-			
40'	10	WH	WH	2	3	2				
45' - 	11	WH	WH	2	2	2				
	12	WH	WH	1	2	1		(MOIST	, MEDIUM TO V	(ERY SOFT)
							Grour	ndwater	52.0' depth. was not presen completion of b	-

DEI	NTE	GRO	UP, A	TERR	ACON C	OMPAN	NY	SUBS	SURFACE LOO	G: B-2
PRO	JECT:	363 Or	ntario St	treet			D	ATE	start: 12/18/17	finish: 12/18/17
LOC	ATION :	Albany	y, New `	York		ME	THODS	: 3 1/4" Hollow Si	tem Augers, ASTM	
CLIE	NT: He	rshberg	g & Her	shberg			D15	86 Drillir	ng Methods with A	Auto Hammer
JOB	NUMB	ER: JB	175553				SUF	RFACE	ELEVATION: +	/- 202.5'
DRIL		: CME	45C				CLA	ASSIFIC	ATION: O.Burr	าร
SAN	IPLE		T	BLOWS	ON SAMP	LER		CLAS	SIFICATION / OBSE	RVATIONS
DEPTH		6"	12"	18"	24"	N			+/- 1.5" Topsoil	
_	1	2	3						and CLAY with C	Occasional
_			<u> </u>	4	7	7	Silt Se	eams (N	(10151)	
_	2	4	4		-		-			
_	3	3	4	2	2	6	-			
5'	5	5	4	5	5	9				
	4	8	8	5	5	5	-			
				6	4	14	-			
10'	5	1	1							
				2	4	3				
							-			
_							-			
151			2				Simila	r with C	Some Varved Ba	ande
15' _	6	2	2	3	4	5	SIUIIS		ome varved Ba	IIIUS
_				3	4	5	-			
-							-			
-							-			
20'	7	2	3				-			
_				3	2	6	-	(MOI	ST, MEDIUM AI	ND SOFT)
								-	22.0' depth.	
_									was not presen	-
25'							casinę	gs upon	completion of b	oorehole.
_							-			
┦ _							-			

12/15/17 FINISH: 12/15/17 Hollow Stem Augers, ASTM ods with Auto Hammer ATION: +/- 201.0' N: O.Burns 'ION / OBSERVATIONS '- 4" Aspahlt ND and GRAVEL, Little IOIST, COMPACT)
ods with Auto Hammer ATION: +/- 201.0' N: O.Burns TION / OBSERVATIONS '- 4" Aspahlt ND and GRAVEL, Little
N: O.Burns
<u>'- 4" Aspahlt</u> ND and GRAVEL, Little
- 4" Aspahlt ND and GRAVEL, Little
ID and GRAVEL, Little
and CLAY
UM TO VERY SOFT)
depth.
ot present within auger etion of borehole.

DEI	NTE	GRO	JP, a	TERR	NY	SUBS	SURFACE LOC	G: B-4				
PRO	JECT:	363 On	tario St	treet		D	ATE	start: 12/14/17	finish: 12/14/17			
LOC	ATION:	Albany	v, New	York		ME	THODS	: 2 1/4" Hollow St	em Augers, ASTM			
CLIE	NT: He	rshberg	& Her	shberg			D15	86 Drillir	ng Methods with A	uto Hammer		
JOB	JOB NUMBER: JB175553							RFACE	ELEVATION: +	/- 200.0'		
DRIL	DRILL TYPE: CME 55							ASSIFIC	CATION: O.Burr	IS		
SAN	IPLE			BLOWS	ON SAMP	LER		CLAS	SSIFICATION / OBSE	RVATIONS		
DEPTH	#	6"	12"	18"	24"	N		+/- 3.5	5" Aspahlt, +/- 10" Bar	ıkrun Gravel		
									F-C SAND, SILT			
	1	15	13		4.5	07	GRA	/EL, Liti	le Roots, trace l			
-				14	15	27			(MOIST, FIRI	vi) 		
-							-					
5'	2	4	4				Dark I	Brown/C	Gray to Brown M	lottled SILT and		
				4	4	8	CLAY					
							_					
-							Circila					
10' _	3	2	1	2		3	Simila	ir with S	Silt Seams			
-				2		3						
-												
-												
15'	4	WH	1				Grade	es Gray	Varved and Bar	nded		
				2		3						
							1					
							-					
20'	5	1	2				-	(MO	IST, MEDIUM T	O SOFT)		
20 -	5		2	2		4						
-						·	-					
							End o	f boring	21.5' depth.			
							Grour	ndwater	was not presen	t within auger		
25'							casinę	gs upon	completion of b	orehole.		
							4					
┦ _							-					

DEI	NTE	GROI	JP, a	TERRA	ACON C	٩Y	SUBS	SURFACE LOC	6: B- 5			
PRO	JECT:	363 On	tario St	treet		D	ATE	start: 12/15/17	FINISH: 12/15/17			
LOCATION: Albany, New York CLIENT: Hershberg & Hershberg								METHODS: 2 1/4" Hollow Stem Augers, ASTM D1586 Drilling Methods with Auto Hammer				
	JOB NUMBER: JB175553								ELEVATION: +,			
DRILL TYPE: CME 55								ATION: O.Burr				
SAN	MPLE			BLOWS	ON SAMP	LER		CLAS	SSIFICATION / OBSE	RVATIONS		
DEPTH	#	6"	12"	18"	24"	N		+/- 3" As	sphalt, +/- 10" Silt & G	ravel Subbase		
-	1	6	6						Dark Brown Mot			
_			7	5	6	11			sand and brick (·		
	2	6	7	8	11	15			e F-C Sand and	Brick Brown SILT and		
5'	3	3	3	0		15	-		ash and brick			
- T		0	0	4	4	7	(MOIST, FIRM, LOOSE, AND MEDIUM)					
-	4	3	3						Brown Mottled S			
-				5	5	8						
10'	5	2	3				Grade	e Brow	n/Gray Mottled			
- 10	5	2	3	3		6	Giaue		n/Gray Mottleu			
-							-					
_							-					
15'	6	2	2				Simila	ar with S	Silt Seams			
_				4		6	-					
_							-					
-							-					
20'	7	3	3				Grade	es Gray	, Varved and Ba	nded		
				2		5						
-							-					
-							-					
25'	8	WH/18"	-				-					
		VVI I/ 10		-		WH	-					
-							1					

DEI	NTE	GROI	JP,	TERR	ACON C	NY	SUB	SURFACE LOC	G: B-5 contin.		
PRO	JECT:	363 Ont	tario St	treet		D	ATE	start: 12/15/17	finish: 12/15/17		
LOCATION: Albany, New York CLIENT: Hershberg & Hershberg								METHODS: 2 1/4" Hollow Stem Augers, ASTM D1586 Drilling Methods with Auto Hammer			
	JOB NUMBER: JB175553 DRILL TYPE: CME 55								ELEVATION: +, CATION: O.Burr		
SAN	IPLE			BLOWS	ON SAMP	LER		CLA	SSIFICATION / OBSE	RVATIONS	
DEPTH	#	6"	12"	18"	24"	N					
30' _ 	9	WH/18"	-	-		WH	Gray	Varved	and Banded SIL	T and CLAY	
35' - - -	10	WH/18"	-	-		WH					
40' _ 	11	WH/18"	-	-		WH	-				
	12	WH/18"	-	-		WH					
 50'	13	WH/18"	-	-		WH	-	(MOIST	, MEDIUM TO V	ERY SOFT)	
							refusa Grour	al. ndwater	g 51.5' depth with was not present completion of b	t within auger	

DE	NTE	GRO	UP, A	TERR	ACON C	14	SUB	SURFACE LOO	G: I-1	
PRO	JECT:	363 On	itario Si	treet		D	ATE	start: 12/14/17	finish: 12/14/17	
LOCA	LOCATION: Albany, New York								5: 2 1/4" Hollow S ⁻	tem Augers, ASTM
CLIEI	CLIENT: Hershberg & Hershberg							86 Drilli	ng Methods with A	Auto Hammer
JOB	JOB NUMBER: JB175553							RFACE	ELEVATION: +	/- 202.0'
DRIL		E: CME	55				CLA	ASSIFI	CATION: O.Burr	าร
SAM	IPLE		1	BLOWS	ON SAMP	LER		CLA	SSIFICATION / OBSE	RVATIONS
DEPTH	#	6"	12"	18"	24"	N		+/- 1	l" Aspahlt, +/- 12" Ban	krun Gravel
							FILL N	Noted		
	1	4	4						SILT and CLA	(MOIST)
				4	5	8	-			
5'	2	2	1							
_	_	_		2	3	3				
	3	3	3							
10' -				2	2	5		(MO	ST, MEDIUM A	ND SOFT)
-							End o	f boring	g 10.0' depth.	
_										
15'										
_										
-										
20'										
25'										
_										
┦										l
25'										

DEN	NTE	GRO	UP, A	TERR	ACON C	IY	SUB	SURFACE LOO	G: I-2	
PRO	JECT:	363 On	tario Si	treet		D	ATE	start: 12/14/17	finish: 12/14/17	
	LOCATION: Albany, New York								2 1/4" Hollow Sing Methods with A	tem Augers, ASTM
	CLIENT: Hershberg & Hershberg JOB NUMBER: JB175553								ELEVATION: +	
	DRILL TYPE: CME 55								CATION: O.Burr	
SAM	IPLE			BLOWS	ON SAMP	LER		CLA	SSIFICATION / OBSE	RVATIONS
DEPTH	#	6"	12"	18"	24"	N			" Asphalt, +/- 11" Banl	
	1	6	5				Browr	n Bande	ed SILT and CLA	AY (MOIST)
_				4	4	9				
5' _	2	2	4				Grade	es Gray	, fine sand partir	ngs noted
				2	3	6				
_	3	2	1	2	4	3			Brown Bands , MEDIUM TO \	
10'				2	4	3				
								-	g 10.0' depth.	
_									was not presen completion of b	J. J
_							Casin	ys upon		
15'										
_										
20' _										
25'										

DEI	NTE	GRO	UP, A	TERR	ACON C	IY	SUB	SURFACE LOO	G: I-3		
PROJECT: 363 Ontario Street								ATE	start: 12/14/17	finish: 12/14/17	
LOC	LOCATION: Albany, New York								: 2 1/4" Hollow St	em Augers, ASTM	
CLIE	NT: He	rshberg	g & Her	shberg			D15	86 Drillir	ng Methods with A	Auto Hammer	
JOB	JOB NUMBER: JB175553							RFACE	ELEVATION: +	/- 198.0'	
DRIL	DRILL TYPE: CME 55							ASSIFIC	CATION: O.Burr	IS	
SAN	IPLE			BLOWS	ON SAMP	LER		CLAS	SSIFICATION / OBSE	RVATIONS	
DEPTH	#	6"	12"	18"	24"	Ν		+/- 2.	5" Aspahlt, +/- 10" Bar	ikrun Gravel	
_											
_	1		7				FILL:	Dark B	rown/Gray SILT	and CLAY, trace	
_				5	4		ash, b	orick and	d charred wood	(MOIST)	
		4				9					
5'	2	5	4				Grade	es to Bla	ack/White/Red C	INDERS ASH	
_	2	0		3	3	7	Grades to Black/White/Red CINDERS, ASH, and BRICK, Some Gravel, trace coal Grades Little Silt and Clay				
_	3	3	2								
				1	1	3			(MOIST, LOO	SE)	
10'							End o	f borinc	g 10.0' depth.		
-							Lina o				
15' _											
_											
20' _											
_											
_											
25' _											
¶ _										u I	

APPENDIX C



INFILTRATION TEST RESULTS												
PROJECT: 3	63 Ontartio Sti	reet		PROJECT NO. JB175553								
PROJECT L	OCATION: Alb	TEST DATE: 12/15/17										
WEATHER:				TESTER: J. La	mm							
Test Location	Test Depth (feet)	Trial No.	Water Drop (inches)	Elapsed Time (hours)	Infiltration Rate (inches/hour)							
I-1	8.0	1	0.0	1.00	0.0							
		2	0.0	1.00	0.0							
		3	0.0	1.00	0.0							
		Water did not infiltrate over a three hour period, and as such the infiltration test is considered failed.										
I-2	8.0	1	3.0	1.00	3.0							
		2	1.5	1.00	1.5							
		3	0.5	1.00	0.5							
		Approximately 12 inches of presoak water was found remaining within the infiltration pipe. Average infiltration rate for three trials was 1.7 inches per hour. Infiltration rate of final trial was 0.5 inches per hour.										
I-3	8.0	1	12.0	1.00	12.0							
		2	10.0	1.00	10.0							
		3	7.0	1.00 7.0								
Notes:		-		three trials was s as 7.0 inches per h	9.7 inches per hour. our.							

(1) Testing was conducted in general accord with the "Infiltration Testing Requirements" contained in Appendix D of the New York State Storm Water Management Design Manual.

(2) Test pipes were installed in boreholes made adjacent to test borings I-1, -2, and -3.

Dente Group, A Terracon Company 594 Broadway Watervliet, NY 12189 P (518) 266 0310 F (518) 266 9238 terracon.com

SOIL CLASSIFICATION AT TEST DEPTH

Test Location I-1:	Gray Banded SILT and CLAY
Test Location I-2:	Gray Banded SILT and CLAY with fine sand partings, Occasional Brown Bands
Test Location I-3:	FILL: Black/White/Red CINDERS, ASH, and BRICK, Some Gravel, Little Silt and Clay, trace coal

ATTACHMENT NO. 1

SPDES PERMIT GP#0-15-002



NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP-0-15-002

Issued Pursuant to Article 17, Titles 7, 8 and Article 70 of the Environmental Conservation Law

Effective Date: January 29, 2015

Expiration Date: January 28, 2020

John J. Ferguson Chief Permit Administrator

Authorized Signature

1 / 12 / 15

Date

Address: NYS DEC Division of Environmental Permits 625 Broadway, 4th Floor Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System ("NPDES")* permit or by a state permit program. New York's *State Pollutant Discharge Elimination System ("SPDES")* is a NPDES-approved program with permits issued in accordance with the *Environmental Conservation Law ("ECL")*.

This general permit ("permit") is issued pursuant to Article 17, Titles 7, 8 and Article 70 of the ECL. An *owner or operator* may obtain coverage under this permit by submitting a Notice of Intent ("NOI") to the Department. Copies of this permit and the NOI for New York are available by calling (518) 402-8109 or at any New York State Department of Environmental Conservation ("the Department") regional office (see Appendix G).They are also available on the Department's website at: http://www.dec.ny.gov/

An owner or operator of a construction activity that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of "*construction activity*", as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a point source and therefore, pursuant to Article 17-0505 of the ECL, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. They cannot wait until there is an actual *discharge* from the construction site to obtain permit coverage.

*Note: The italicized words/phrases within this permit are defined in Appendix A.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES <u>FROM CONSTRUCTION ACTIVITIES</u>

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(Part I)

I.

Part I. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

- Construction activities involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger* common plan of development or sale that will ultimately disturb one or more acres of land; excluding routine maintenance activity that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;
- 2. Construction activities involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State.*
- 3. Construction activities located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

B. Effluent Limitations Applicable to Discharges from Construction Activities *Discharges* authorized by this permit must achieve, at a minimum, the effluent limitations in Part I.B.1. (a) – (f) of this permit. These limitations represent the degree of effluent reduction attainable by the application of best practicable technology currently available._

1. Erosion and Sediment Control Requirements - The owner or operator must select, design, install, implement and maintain control measures to minimize the discharge of pollutants and prevent a violation of the water quality standards. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the owner or operator must include in the Stormwater Pollution Prevention Plan ("SWPPP") the reason(s) for the deviation or alternative design and provide information

(Part I.B.1)

which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

- a. **Erosion and Sediment Controls.** Design, install and maintain effective erosion and sediment controls to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such controls must be designed, installed and maintained to:
 - (i) *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharges*;
 - (ii) Control stormwater *discharges* to *minimize* channel and streambank erosion and scour in the immediate vicinity of the *discharge* points;
 - (iii) *Minimize* the amount of soil exposed during *construction activity*;
 - (iv) Minimize the disturbance of steep slopes;
 - (v) *Minimize* sediment *discharges* from the site;
 - (vi) Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharges*, unless *infeasible*;
 - (vii) Minimize soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted; and
 - (viii) Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover.
- b. Soil Stabilization. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the current soil disturbance activity ceased. For construction sites that *directly discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. See Appendix A for definition of *Temporarily Ceased*.
- c. **Dewatering**. *Discharges* from dewatering activities, including *discharges*

(Part I.B.1.c)

from dewatering of trenches and excavations, must be managed by appropriate control measures.

- d. **Pollution Prevention Measures.** Design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be designed, installed, implemented and maintained to:
 - (i) Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. This applies to washing operations that use clean water only. Soaps, detergents and solvents cannot be used;
 - (ii) Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and to stormwater. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use); and
 - (iii) Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.
- e. Prohibited Discharges. The following discharges are prohibited:
 - (i) Wastewater from washout of concrete;
 - (ii) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
 - (iii) Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance;
 - (iv) Soaps or solvents used in vehicle and equipment washing; and
 - (v) Toxic or hazardous substances from a spill or other release.
- f. Surface Outlets. When discharging from basins and impoundments, the outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion

(Part I.B.1.f)

at or below the outlet does not occur.

C. Post-construction Stormwater Management Practice Requirements

- 1. The owner or operator of a construction activity that requires postconstruction stormwater management practices pursuant to Part III.C. of this permit must select, design, install, and maintain the practices to meet the performance criteria in the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015, using sound engineering judgment. Where post-construction stormwater management practices ("SMPs") are not designed in conformance with the performance criteria in the Design Manual, the owner or operator must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is equivalent to the technical standard.
- 2. The owner or operator of a construction activity that requires postconstruction stormwater management practices pursuant to Part III.C. of this permit must design the practices to meet the applicable *sizing criteria* in Part I.C.2.a., b., c. or d. of this permit.

a. Sizing Criteria for New Development

- (i) Runoff Reduction Volume ("RRv"): Reduce the total Water Quality Volume ("WQv") by application of RR techniques and standard SMPs with RRv capacity. The total WQv shall be calculated in accordance with the criteria in Section 4.2 of the Design Manual.
- (ii) Minimum RRv and Treatment of Remaining Total WQv: Construction activities that cannot meet the criteria in Part I.C.2.a.(i) of this permit due to site limitations shall direct runoff from all newly constructed impervious areas to a RR technique or standard SMP with RRv capacity unless infeasible. The specific site limitations that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each impervious area that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered infeasible.

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.3 of the Design Manual. The remaining portion of the total WQv

(Part I.C.2.a.ii)

that cannot be reduced shall be treated by application of standard SMPs.

- (iii) Channel Protection Volume ("Cpv"): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
 - Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
 - (2) The site *discharges* directly to tidal waters, or fifth order or larger streams.
- (iv) Overbank Flood Control Criteria ("Qp"): Requires storage to attenuate the post-development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
 - (1) the site *discharges* directly to tidal waters or fifth order or larger streams, or
 - (2) A downstream analysis reveals that overbank control is not required.
- (v) Extreme Flood Control Criteria ("Qf"): Requires storage to attenuate the post-development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
 - (1) the site *discharges* directly to tidal waters or fifth order or larger streams, or
 - (2) A downstream analysis reveals that overbank control is not required.

b. Sizing Criteria for New Development in Enhanced Phosphorus Removal Watershed

- (i) Runoff Reduction Volume (RRv): Reduce the total Water Quality Volume (WQv) by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24 hour design storm over the post-developed watershed and shall be calculated in accordance with the criteria in Section 10.3 of the Design Manual.
- (ii) Minimum RRv and Treatment of Remaining Total WQv: Construction activities that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to site limitations shall direct runoff from all newly constructed impervious areas to a RR technique or

standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible*.

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 10.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

- (iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
 - (1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
 - (2) The site *discharges* directly to tidal waters, or fifth order or larger streams.
- (iv) Overbank Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
 - (1) the site *discharges* directly to tidal waters or fifth order or larger streams, or
 - (2) A downstream analysis reveals that overbank control is not required.
- (v) Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
 - (1) the site *discharges* directly to tidal waters or fifth order or larger streams, or
 - (2) A downstream analysis reveals that overbank control is not required.

c. Sizing Criteria for Redevelopment Activity

(Part I.C.2.c.i)

- (i) Water Quality Volume (WQv): The WQv treatment objective for redevelopment activity shall be addressed by one of the following options. Redevelopment activities located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C of this permit) shall calculate the WQv in accordance with Section 10.3 of the Design Manual. All other redevelopment activities shall calculate the WQv in accordance with Section 4.2 of the Design Manual.
 - (1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or
 - (2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or
 - (3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or
 - (4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

If there is an existing post-construction stormwater management practice located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 - 4 above.

- (ii) Channel Protection Volume (Cpv): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.
- (iii) Overbank Flood Control Criteria (Qp): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(Part I.C.2.c.iv)

(iv) Extreme Flood Control Criteria (Qf): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

d. Sizing Criteria for Combination of Redevelopment Activity and New Development

Construction projects that include both *New Development* and *Redevelopment Activity* shall provide post-construction stormwater management controls that meet the *sizing criteria* calculated as an aggregate of the *Sizing Criteria* in Part I.C.2.a. or b. of this permit for the *New Development* portion of the project and Part I.C.2.c of this permit for *Redevelopment Activity* portion of the project.

D. Maintaining Water Quality

The Department expects that compliance with the conditions of this permit will control *discharges* necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any discharge to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

- 1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;
- 2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and
- 3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the stormwater *discharges* authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standards*; the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this general permit and document in accordance with Part IV.C.4. of this general permit. To address the *water quality standard* violation the *owner or operator* may need to provide additional information, include and implement appropriate controls in the SWPPP to correct the problem, or obtain an individual SPDES permit.

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharges* authorized by this permit are causing or contributing to a violation of *water quality standards*, or

(Part I.D)

if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharges* will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

E. Eligibility Under This General Permit

- 1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters* of *the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph F. of this Part.
- 2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharges* from *construction activities*.
- 3. Notwithstanding paragraphs E.1 and E.2 above, the following nonstormwater discharges may be authorized by this permit: discharges from firefighting activities; fire hydrant flushings; waters to which cleansers or other components have not been added that are used to wash vehicles or control dust in accordance with the SWPPP, routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; uncontaminated groundwater or spring water; uncontaminated *discharges* from construction site de-watering operations; and foundation or footing drains where flows are not contaminated with process materials such as solvents. For those entities required to obtain coverage under this permit, and who *discharge* as noted in this paragraph, and with the exception of flows from firefighting activities, these discharges must be identified in the SWPPP. Under all circumstances, the owner or operator must still comply with water quality standards in Part I.D of this permit.
- 4. The owner or operator must maintain permit eligibility to discharge under this permit. Any discharges that are not compliant with the eligibility conditions of this permit are not authorized by the permit and the owner or operator must either apply for a separate permit to cover those ineligible discharges or take steps necessary to make the discharge eligible for coverage.
- **F. Activities Which Are Ineligible for Coverage Under This General Permit** All of the following are <u>not</u> authorized by this permit:

(Part I.F)

- 1. *Discharges* after *construction activities* have been completed and the site has undergone *final stabilization*;
- Discharges that are mixed with sources of non-stormwater other than those expressly authorized under subsection E.3. of this Part and identified in the SWPPP required by this permit;
- 3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII.K. of this permit;
- 4. Construction activities or discharges from construction activities that may adversely affect an endangered or threatened species unless the owner or operator has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.C.2 of this permit.
- 5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;
- 6. Construction activities for residential, commercial and institutional projects:
 - a. Where the *discharges* from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and
 - b. Which disturb one or more acres of land with no existing *impervious cover*, and
 - c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture ("USDA") Soil Survey for the County where the disturbance will occur.
- 7. Construction activities for linear transportation projects and linear utility projects:
 - a. Where the *discharges* from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and
 - b. Which disturb two or more acres of land with no existing *impervious cover*, and
 - c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the USDA Soil Survey for the County where the disturbance will occur.

(Part I.F.8)

- 8. Construction activities that have the potential to affect an *historic property*, unless there is documentation that such impacts have been resolved. The following documentation necessary to demonstrate eligibility with this requirement shall be maintained on site in accordance with Part II.C.2 of this permit and made available to the Department in accordance with Part VII.F of this permit:
 - a. Documentation that the construction activity is not within an archeologically sensitive area indicated on the sensitivity map, and that the construction activity is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the construction site within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the construction site within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant.
 - 1-5 acres of disturbance 20 feet
 - 5-20 acres of disturbance 50 feet
 - 20+ acres of disturbance 100 feet, or
 - b. DEC consultation form sent to OPRHP, and copied to the NYS DEC Agency Historic Preservation Officer (APO), and
 - the State Environmental Quality Review (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or
 - (ii) documentation from OPRHP that the *construction activity* will result in No Impact; or
 - (iii) documentation from OPRHP providing a determination of No Adverse Impact; or
 - (iv) a Letter of Resolution signed by the owner/operator, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA); or
 - c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:
 - (i) No Affect
 - (ii) No Adverse Affect

- (iii) Executed Memorandum of Agreement, or
- d. Documentation that:
 - (i) SHPA Section 14.09 has been completed by NYS DEC or another state agency.
- Discharges from construction activities that are subject to an existing SPDES individual or general permit where a SPDES permit for construction activity has been terminated or denied; or where the owner or operator has failed to renew an expired individual permit.

Part II. OBTAINING PERMIT COVERAGE

A.Notice of Intent (NOI) Submittal

1. An owner or operator of a construction activity that is <u>not</u> subject to the requirements of a regulated, traditional land use control MS4 must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed NOI form to the Department in order to be authorized to discharge under this permit. An owner or operator shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (<u>http://www.dec.ny.gov/</u>). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address.

NOTICE OF INTENT NYS DEC, Bureau of Water Permits 625 Broadway, 4th Floor Albany, New York 12233-3505

2. An owner or operator of a construction activity that is subject to the requirements of a regulated, traditional land use control MS4 must first prepare a SWPPP in accordance with all applicable requirements of this permit and then have its SWPPP reviewed and accepted by the regulated, traditional land use control MS4 prior to submitting the NOI to the Department. The owner or operator shall have the "MS4 SWPPP Acceptance" form signed in accordance with Part VII.H., and then submit that form along with a completed NOI to the Department. An owner or operator shall use either the electronic (eNOI) or paper version of the NOI.

The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the address in Part II.A.1.

(Part II.A.2)

The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *MS4* prior to submitting the NOI to the Department does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.E. (Change of *Owner or Operator*) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4*.

- 3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.
- 4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

B. Permit Authorization

- 1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.
- 2. Authorization to *discharge* under this permit will be effective when the *owner* or operator has satisfied <u>all</u> of the following criteria:
 - a. project review pursuant to the State Environmental Quality Review Act ("SEQRA") have been satisfied, when SEQRA is applicable. See the Department's website (<u>http://www.dec.ny.gov/</u>) for more information,
 - b. where required, all necessary Department permits subject to the Uniform Procedures Act ("UPA") (see 6 NYCRR Part 621) have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). Owners or operators of construction activities that are required to obtain UPA permits must submit a preliminary SWPPP to the appropriate DEC Permit Administrator at the Regional Office listed in Appendix F at the time all other necessary UPA permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the construction activity qualifies for authorization under this permit,
 - c. the final SWPPP has been prepared, and
 - d. a complete NOI has been submitted to the Department in accordance with the requirements of this permit.
- 3. An owner or operator that has satisfied the requirements of Part II.B.2 above

(Part II.B.3)

will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

- a. For *construction activities* that are <u>not</u> subject to the requirements of a *regulated, traditional land use control MS4*:
 - (i) Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.; or
 - (ii) Sixty (60) business days from the date the Department receives a complete NOI (electronic or paper version) for *construction activities* with a SWPPP that has <u>not</u> been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C., the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, or;
 - (iii) Ten (10) business days from the date the Department receives a complete paper version of the NOI for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.
- b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:
 - (i) Five (5) business days from the date the Department receives both a complete electronic version of the NOI (eNOI) and signed "*MS4* SWPPP Acceptance" form, or
 - (ii) Ten (10) business days from the date the Department receives both a complete paper version of the NOI and signed "MS4 SWPPP Acceptance" form.
- 4. The Department may suspend or deny an owner's or operator's coverage

(Part II.B.4)

under this permit if the Department determines that the SWPPP does not meet the permit requirements. In accordance with statute, regulation, and the terms and conditions of this permit, the Department may deny coverage under this permit and require submittal of an application for an individual SPDES permit based on a review of the NOI or other information pursuant to Part II.

5. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department. The *owner or operator* shall not *commence construction activity* on the future or additional areas until their authorization to *discharge* under this permit goes into effect in accordance with Part II.B. of this permit.

C. General Requirements For Owners or Operators With Permit Coverage

- The owner or operator shall ensure that the provisions of the SWPPP are implemented from the commencement of construction activity until all areas of disturbance have achieved final stabilization and the Notice of Termination ("NOT") has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4. of this permit.
- 2. The owner or operator shall maintain a copy of the General Permit (GP-0-15-002), NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form, inspection reports, and all documentation necessary to demonstrate eligibility with this permit at the construction site until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.
- 3. The owner or operator of a construction activity shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a regulated, traditional land use control MS4, the regulated, traditional land use control MS4 (provided the regulated, traditional land use control MS4 is not the owner or operator of the construction activity). At a minimum, the owner or operator must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time: a. The owner or operator shall

(Part II.C.3.a)

have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. of this permit every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

- b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005.
- c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.
- d. The *owner or operator* shall install any additional site specific practices needed to protect water quality.
- e. The owner or operator shall include the requirements above in their SWPPP.
- 4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.
- 5. For construction activities that are subject to the requirements of a regulated, traditional land use control MS4, the owner or operator shall notify the regulated, traditional land use control MS4 in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the regulated, traditional land use control MS4, the owner or operator shall have the SWPPP amendments or modifications reviewed and accepted by the regulated, traditional land use control MS4 prior to commencing construction of the post-construction stormwater management practice

(Part II.D)

D. Permit Coverage for Discharges Authorized Under GP-0-10-001

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-10-001), an *owner or operator* of *a construction activity* with coverage under GP-0-10-001, as of the effective date of GP-0-15-002, shall be authorized to *discharge* in accordance with GP-0-15-002, unless otherwise notified by the Department.

An owner or operator may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-15-002.

E. Change of *Owner or Operator*

2. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original owner or operator must notify the new owner or operator, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department. Once the new owner or operator obtains permit coverage, the original owner or operator shall then submit a completed NOT with the name and permit identification number of the new owner or operator to the Department at the address in Part II.A.1. of this permit. If the original owner or operator maintains ownership of a portion of the permit.

Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or operator* was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*. (Part III)

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

- 1. A SWPPP shall be prepared and implemented by the *owner or operator* of each *construction activity* covered by this permit. The SWPPP must document the selection, design, installation, implementation and maintenance of the control measures and practices that will be used to meet the effluent limitations in Part I.B. of this permit and where applicable, the post-construction stormwater management practice requirements in Part I.C. of this permit. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*. A copy of the completed, final NOI shall be included in the SWPPP.
- 2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the *pollutants* in stormwater *discharges* and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.
- 3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.
- 4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP:
 - a. whenever the current provisions prove to be ineffective in minimizing *pollutants* in stormwater *discharges* from the site;
 - b. whenever there is a change in design, construction, or operation at the construction site that has or could have an effect on the *discharge* of *pollutants*; and
 - c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* the Department or other regulatory authority.
- 5. The Department may notify the owner or operator at any time that the

(Part III.A.5)

SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner* or operator shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the owner or operator does not respond to the Department's comments in the specified time frame, the Department may suspend the owner's or operator's coverage under this permit or require the owner or operator to obtain coverage under an individual SPDES permit in accordance with Part II.C.4. of this permit.

6. Prior to the commencement of construction activity, the owner or operator must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The owner or operator shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor*. The owner or operator shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

The owner or operator shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *discharges* from *construction activities* and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the

(Part III.A.6)

trained contractor responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The owner or operator shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the construction site. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

B. Required SWPPP Contents

- Erosion and sediment control component All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:
 - a. Background information about the scope of the project, including the location, type and size of project;
 - b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater *discharge*(s);
 - c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);
 - d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other

activity at the site that results in soil disturbance;

- e. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;
- f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;
- g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;
- h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;
- A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005;
- j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the stormwater *discharges*;
- k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the construction site; and
- Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005. Include the reason for the deviation or alternative design

and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. Post-construction stormwater management practice component – The owner or operator of any construction project identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the applicable sizing criteria in Part I.C.2.a., c. or d. of this permit and the performance criteria in the technical standard, New York State Stormwater Management Design Manual dated January 2015

Where post-construction stormwater management practices are not designed in conformance with the *performance criteria* in the technical standard, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

The post-construction stormwater management practice component of the SWPPP shall include the following:

- a. Identification of all post-construction stormwater management practices to be constructed as part of the project. Include the dimensions, material specifications and installation details for each post-construction stormwater management practice;
- b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;
- c. A Stormwater Modeling and Analysis Report that includes:
 - (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;
 - (ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and post-construction stormwater management practices;
 - (iii) Results of stormwater modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre and post-development runoff rates and volumes for the different storm events;
 - (iv) Summary table, with supporting calculations, which demonstrates

that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

- (v) Identification of any *sizing criteria* that is not required based on the requirements included in Part I.C. of this permit; and
- (vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the Design Manual. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the Design Manual;
- d. Soil testing results and locations (test pits, borings);
- e. Infiltration test results, when required; and
- f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.
- 3. Enhanced Phosphorus Removal Standards All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the applicable *sizing criteria* in Part I.C.2. b., c. or d. of this permit and the *performance criteria*, Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a 2.f. above.

C. Required SWPPP Components by Project Type

Unless otherwise notified by the Department, *owners or operators* of *construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1 of this permit. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3 of this permit.

(Part IV)

IV. Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

- 1. The owner or operator must ensure that all erosion and sediment control practices (including pollution prevention measures) and all post-construction stormwater management practices identified in the SWPPP are inspected and maintained in accordance with Part IV.B. and C. of this permit.
- 2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York, or protect the public health and safety and/or the environment.

B. Contractor Maintenance Inspection Requirements

- 1. The owner or operator of each construction activity identified in Tables 1 and 2 of Appendix B shall have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor shall begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.
- 2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections. The *trained contractor* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. of this permit as soon as soil disturbance activities resume.
- 3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

C. Qualified Inspector Inspection Requirements

(Part IV.C)

The owner or operator shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. and IV.B. of this permit **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- Registered Landscape Architect, or

- someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

- 1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, <u>with the exception of</u>:
 - a. the construction of a single family residential subdivision with 25% or less impervious cover at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;
 - b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E;
 - c. construction on agricultural property that involves a soil disturbance of one
 (1) or more acres of land but less than five (5) acres; and
 - d. *construction activities* located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.
- 2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:
 - a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.
 - b. For construction sites where soil disturbance activities are on-going and

the *owner or operator* has received authorization in accordance with Part II.C.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

- c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the qualified inspector shall conduct a site inspection at least once every thirty (30) calendar days. The owner or operator shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a regulated, traditional land use control MS4, the regulated, traditional land use control MS4 (provided the regulated, traditional land use control MS4 is not the owner or operator of the construction activity) in writing prior to reducing the frequency of inspections.
- d. For construction sites where soil disturbance activities have been shut down with partial project completion, the qualified inspector can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved final stabilization and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The owner or operator shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a regulated, traditional land use control MS4, the regulated, traditional land use control MS4 (provided the regulated, traditional land use control MS4 is not the owner or operator of the construction activity) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the owner or operator shall have the qualified inspector perform a final inspection and certify that all disturbed areas have achieved final stabilization, and all temporary, structural erosion and sediment control measures have been removed; and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "Final Stabilization" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The owner or operator shall then submit the completed NOT form to the address in Part II.A.1 of this permit.
- e. For construction sites that directly *discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall

be separated by a minimum of two (2) full calendar days.

- 3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization*, all points of *discharge* to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site, and all points of *discharge* from the construction site.
- 4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:
 - a. Date and time of inspection;
 - b. Name and title of person(s) performing inspection;
 - c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;
 - d. A description of the condition of the runoff at all points of *discharge* from the construction site. This shall include identification of any *discharges* of sediment from the construction site. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;
 - e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the construction site which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;
 - f. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;
 - g. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;
 - Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection;

(Part IV.C.4.i)

- i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;
- j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s);
- k. Identification and status of all corrective actions that were required by previous inspection; and
- I. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.
- 5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of this permit of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.
- 6. All inspection reports shall be signed by the *qualified inspector*. Pursuant to Part II.C.2. of this permit, the inspection reports shall be maintained on site with the SWPPP.

V. Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

1. An owner or operator that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.A.1 of this permit. The NOT form shall be one which is associated with this permit, signed in accordance with Part VII.H of this permit.

(Part V.A.2)

- 2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:
 - a. Total project completion All *construction activity* identified in the SWPPP has been completed; <u>and</u> all areas of disturbance have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;
 - b. Planned shutdown with partial project completion All soil disturbance activities have ceased; and all areas disturbed as of the project shutdown date have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all postconstruction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;
 - c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.E. of this permit.
 - d. The *owner or operator* obtains coverage under an alternative SPDES general permit or an individual SPDES permit.
- 3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice certification statements on the NOT, certify that all the requirements in Part V.A.2.a. or b. of this permit have been achieved.
- 4. For construction activities that are subject to the requirements of a regulated, traditional land use control MS4 and meet subdivision 2a. or 2b. of this Part, the owner or operator shall have the regulated, traditional land use control MS4 sign the "MS4 Acceptance" statement on the NOT in accordance with the requirements in Part VII.H. of this permit. The regulated, traditional land use control MS4 official, by signing this statement, has determined that it is acceptable for the owner or operator to submit the NOT in accordance with the requirements of this Part. The regulated, traditional land use control MS4 can make this determination by performing a final site inspection themselves or by accepting the qualified inspector's final site inspection certification(s) required in Part V.A.3. of this permit.

(Part V.A.5)

- 5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:
 - a. the post-construction stormwater management practice(s) and any rightof-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,
 - b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),
 - c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record,
 - d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility; the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

Part VI. REPORTING AND RETENTION OF RECORDS

A. Record Retention

The owner or operator shall retain a copy of the NOI, NOI

Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete NOT submitted in accordance with Part V. of this general permit.

B. Addresses

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.A.1 of this permit), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate DOW Water (SPDES) Program contact at the Regional Office listed in Appendix F.

(Part VII)

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

The owner or operator must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water Act (CWA) and the ECL and is grounds for an enforcement action against the owner or operator and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all construction activity at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the owner or operator.

If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE). *Construction activity* shall not resume until written permission to do so has been received from the RWE.

B. Continuation of the Expired General Permit

This permit expires five (5) years from the effective date. If a new general permit is not issued prior to the expiration of this general permit, an *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the terms and conditions of this general permit, if it is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, until a new general permit is issued.

C. Enforcement

Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to \$37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

(Part VII.E)

E. Duty to Mitigate

The owner or operator and its contractors and subcontractors shall take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. Duty to Provide Information

The owner or operator shall furnish to the Department, within a reasonable specified time period of a written request, all documentation necessary to demonstrate eligibility and any information to determine compliance with this permit or to determine whether cause exists for modifying or revoking this permit, or suspending or denying coverage under this permit, in accordance with the terms and conditions of this permit. The NOI, SWPPP and inspection reports required by this permit are public documents that the owner or operator must make available for review and copying by any person within five (5) business days of the owner or operator receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

G. Other Information

When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any of the documents required by this permit, or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or *impervious area*), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department using the contact information in Part II.A. of this permit. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. Signatory Requirements

- 1. All NOIs and NOTs shall be signed as follows:
 - a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:
 - (i) a president, secretary, treasurer, or vice-president of the

corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

- (ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental laws environmental compliance with and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;
- b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or
- c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:
 - (i) the chief executive officer of the agency, or
 - a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).
- 2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:
 - a. The authorization is made in writing by a person described in Part VII.H.1. of this permit;
 - b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of *equivalent* responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named

individual or any individual occupying a named position) and,

- c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.
- 3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.
- 4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

J. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any *owner or operator* authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any *discharger* authorized by a general permit to apply for an individual SPDES permit, it shall notify the *discharger* in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from *owner or operator* receipt of the notification letter, whereby the authorization to

(Part VII.K.1)

discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. When an individual SPDES permit is issued to a discharger authorized to *discharge* under a general SPDES permit for the same *discharge*(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. Proper Operation and Maintenance

The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. Inspection and Entry

The owner or operator shall allow an authorized representative of the Department, EPA, applicable county health department, or, in the case of a construction site which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

- 1. Enter upon the *owner's or operator's* premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
- 2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and
- 3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), practices or operations regulated or required by this permit.
- 4. Sample or monitor at reasonable times, for purposes of assuring permit compliance or as otherwise authorized by the Act or ECL, any substances or parameters at any location.

(Part VII.N)

N. Permit Actions

This permit may, at any time, be modified, suspended, revoked, or renewed by the Department in accordance with 6 NYCRR Part 621. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions

Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

- 1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with *construction activity* covered by this permit, the *owner or operator* of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.
- 2. Any Department initiated permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports

In accordance with 6NYCRR Part 750-2.4 and 750-2.5, any person who knowingly makes any false material statement, representation, or certification in any application, record, report or other document filed or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished in accordance with ECL §71-1933 and or Articles 175 and 210 of the New York State Penal Law.

R. Other Permits

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

VIII. APPENDIX A

Definitions

Alter Hydrology from Pre to Post-Development Conditions - means the postdevelopment peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer - means a sewer that is designed to collect and convey both "sewage" and "stormwater".

Commence (Commencement of) Construction Activities - means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for "*Construction Activity(ies)*" also.

Construction Activity(ies) - means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Direct Discharge (to a specific surface waterbody) - means that runoff flows from a construction site by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a construction site to a separate storm sewer system and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

Discharge(s) - means any addition of any pollutant to waters of the State through an outlet or point source.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Equivalent (Equivalence) – means that the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied

on all disturbed areas that are not covered by permanent structures, concrete or pavement.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the ECL authorizing a category of discharges.

Groundwater(s) - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Historic Property – means any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State

or National Registers of Historic Places.

Impervious Area (Cover) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – means not technologically possible, or not economically practicable and achievable in light of best industry practices.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct *construction activities* are occurring, or will occur, under one plan. The term "plan" in "larger common plan of development or sale" is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that *construction activities* may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same "common plan" is not concurrently being disturbed.

Minimize – means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters,

ditches, man-made

channels, or storm drains):

- (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State;
- (ii) Designed or used for collecting or conveying stormwater;
- (iii) Which is not a *combined sewer*, and
- (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

New Development – means any land disturbance that does meet the definition of Redevelopment Activity included in this appendix.

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from *construction activity*.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; and/or an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications.

Performance Criteria – means the design criteria listed under the "Required Elements" sections in Chapters 5, 6 and 10 of the technical standard, New York State Stormwater Management Design Manual, dated January 2015. It does not include the Sizing Criteria (i.e. WQv, RRv, Cpv, Qp and Qf) in Part I.C.2. of the permit.

Pollutant - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq.

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect supervision of the licensed Professional working under the direct supervision of the licensed Professional training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York..

Redevelopment Activity(ies) – means the disturbance and reconstruction of existing impervious area, including impervious areas that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is required to gain coverage under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s). **Routine Maintenance Activity -** means *construction activity* that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,

- Stream bank restoration projects (does not include the placement of spoil material),

- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,

- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),

- Placement of aggregate shoulder backing that makes the transition between the road shoulder and the ditch or embankment,

- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,

- Long-term use of equipment storage areas at or near highway maintenance facilities,

- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or embankment,

- Existing use of Canal Corp owned upland disposal sites for the canal, and

- Replacement of curbs, gutters, sidewalks and guide rail posts.

Site limitations – means site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical site limitations include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of site limitations shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – means the criteria included in Part I.C.2 of the permit that are used to size post-construction stormwater management control practices. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), Overbank Flood (Qp), and Extreme Flood (Qf).

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Steep Slope – means land area with a Soil Slope Phase that is identified as an E or F, or

the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture ("USDA") Soil Survey for the County where the disturbance will occur.

Surface Waters of the State - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – means that an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Loads (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for point source discharges, load allocations (LAs) for nonpoint sources, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* is responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part

621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B

Required SWPPP Components by Project Type

Table 1

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:				
•	Single family home <u>not</u> located in one of the watersheds listed in Appendix C or <u>not</u> <i>directly discharging</i> to one of the 303(d) segments listed in Appendix E Single family residential subdivisions with 25% or less impervious cover at total site build-out and <u>not</u> located in one of the watersheds listed in Appendix C and <u>not</u> directly discharging to one of the 303(d) segments listed in Appendix E Construction of a barn or other agricultural building, silo, stock yard or pen.			
The follow land:	ving construction activities that involve soil disturbances of one (1) or more acres of			
	Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects Bike paths and trails Sidewalk construction projects that are not part of a road/ highway construction or reconstruction project Slope stabilization projects Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics Spoil areas that will be covered with vegetation Land clearing and grading for the purposes of creating vegetated open space (i.e. recreational parks, lawns, meadows, fields), excluding projects that <i>alter hydrology from pre</i> <i>to post development</i> conditions Athletic fields (natural grass) that do not include the construction or reconstruction of <i>impervious area</i> <u>and</u> do not <i>alter hydrology from pre to post development</i> conditions Demolition project where vegetation will be established and no redevelopment is planned Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with <i>impervious cover</i> Structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State", excluding projects that involve soil disturbances of less than five acres and construction activities that include the construction or reconstruction of impervious area			
The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:				
•	All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.			

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Table 2

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

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The follow land:	ving construction activities that involve soil disturbances of one (1) or more acres of
	Single family home located in one of the watersheds listed in Appendix C or <i>directly</i> <i>discharging</i> to one of the 303(d) segments listed in Appendix E Single family residential subdivisions located in one of the watersheds listed in Appendix C or <i>directly discharging</i> to one of the 303(d) segments listed in Appendix E Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land Multi-family residential developments; includes townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
•	Airports
	Amusement parks
· ·	Campgrounds Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or <i>alter the hydrology from pre to post development</i> conditions Commercial developments
	Churches and other places of worship Construction of a barn or other agricultural building(e.g. silo) and structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" that include the construction or reconstruction of <i>impervious</i> <i>area</i> , excluding projects that involve soil disturbances of less than five acres. Golf courses
•	Institutional, includes hospitals, prisons, schools and colleges
•	Industrial facilities, includes industrial parks
•	Landfills Municipal facilities; includes highway garages, transfer stations, office buildings, POTW's and water treatment plants Office complexes
•	Sports complexes
	Racetracks, includes racetracks with earthen (dirt) surface Road construction or reconstruction
	Parking lot construction or reconstruction
	Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or alter the hydrology from pre to post development conditions
	Athletic fields with artificial turf Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with <i>impervious cover</i> , and constructed as part of an over-head electric transmission line project, wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
•	All other construction activities that include the construction or reconstruction of <i>impervious</i> area or alter the hydrology from pre to post development conditions, and are not listed in Table 1

APPENDIX C

Watersheds Where Enhanced Phosphorus Removal Standards Are Required

Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

- Entire New York City Watershed located east of the Hudson River Figure 1
- Onondaga Lake Watershed Figure 2
- Greenwood Lake Watershed -Figure 3
- Oscawana Lake Watershed Figure 4
- Kinderhook Lake Watershed Figure 5

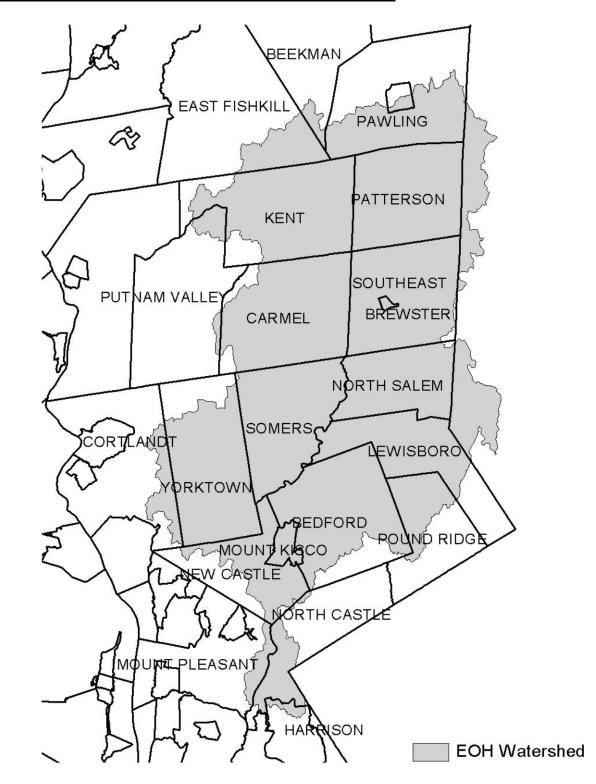


Figure 1 - New York City Watershed East of the Hudson

Figure 2 - Onondaga Lake Watershed



Figure 3 - Greenwood Lake Watershed

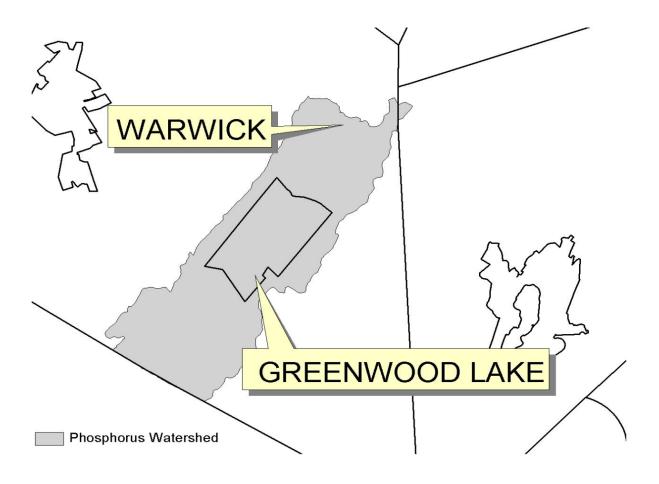
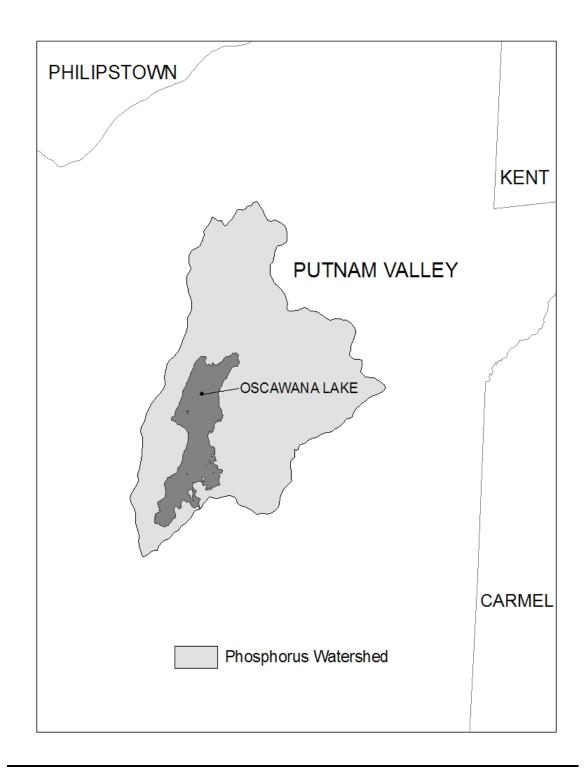


Figure 4 - Oscawana Lake Watershed



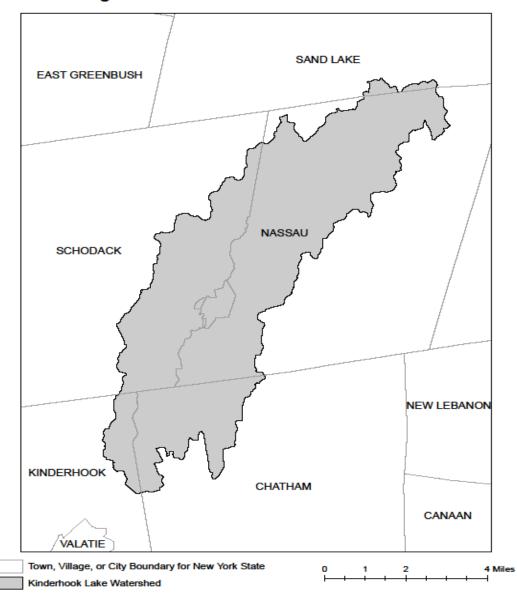


Figure 5: Kinderhook Lake Watershed

XI. APPENDIX D

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River - See Figure 1 in Appendix C

I. APPENDIX E

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015.

COUNTY WATERBODY		COUNTY WATERBODY	
Albany	Ann Lee (Shakers) Pond, Stump Pond	Greene	Sleepy Hollow Lake
Albany	Basic Creek Reservoir	Herkimer	Steele Creek tribs
Allegheny	Amity Lake, Saunders Pond	Kings	Hendrix Creek
Bronx	Van Cortlandt Lake	Lewis	Mill Creek/South Branch and tribs
Broome	Whitney Point Lake/Reservoir	Livingston	Conesus Lake
Broome	Fly Pond, Deer Lake	Livingston	Jaycox Creek and tribs
Broome	Minor Tribs to Lower Susquehanna	Livingston	Mill Creek and minor tribs
	(north)	Livingston	Bradner Creek and tribs
Cattaraugus	Allegheny River/Reservoir	Livingston	Christie Creek and tribs
Cattaraugus	Case Lake	Monroe	Lake Ontario Shoreline, Western
Cattaraugus	Linlyco/Club Pond	Monroe	Mill Creek/Blue Pond Outlet and tribs
Cayuga	Duck Lake	Monroe	Rochester Embayment - East
Chautauqua	Chautauqua Lake, North	Monroe	Rochester Embayment - West
Chautauqua	Chautauqua Lake, South	Monroe	Unnamed Trib to Honeoye Creek
Chautauqua	Bear Lake	Monroe	Genesee River, Lower, Main Stem
Chautauqua	Chadakoin River and tribs	Monroe	Genesee River, Middle, Main Stem
Chautauqua	Lower Cassadaga Lake	Monroe	Black Creek, Lower, and minor tribs
Chautauqua	Middle Cassadaga Lake	Monroe	Buck Pond
Chautauqua	Findley Lake	Monroe	Long Pond
Clinton	Great Chazy River, Lower, Main Stem	Monroe	Cranberry Pond
Columbia	Kinderhook Lake	Monroe	Mill Creek and tribs
Columbia	Robinson Pond	Monroe	Shipbuilders Creek and tribs
Dutchess	Hillside Lake	Monroe	Minor tribs to Irondequoit Bay
Dutchess	Wappinger Lakes	Monroe	Thomas Creek/White Brook and tribs
Dutchess	Fall Kill and tribs	Nassau	Glen Cove Creek, Lower, and tribs
Erie	Green Lake	Nassau	LI Tribs (fresh) to East Bay
Erie	Scajaquada Creek, Lower, and tribs	Nassau	East Meadow Brook, Upper, and tribs
Erie	Scajaquada Creek, Middle, and tribs	Nassau	Hempstead Bay
Erie	Scajaquada Creek, Upper, and tribs	Nassau	Hempstead Lake
Erie	Rush Creek and tribs	Nassau	Grant Park Pond
Erie	Ellicott Creek, Lower, and tribs	Nassau	Beaver Lake
Erie	Beeman Creek and tribs	Nassau	Camaans Pond
Erie	Murder Creek, Lower, and tribs	Nassau	Halls Pond
Erie	South Branch Smoke Cr, Lower, and	Nassau	LI Tidal Tribs to Hempstead Bay
	tribs	Nassau	Massapequa Creek and tribs
Erie	Little Sister Creek, Lower, and tribs	Nassau	Reynolds Channel, east
Essex	Lake George (primary county: Warren)	Nassau	Reynolds Channel, west
Genesee	Black Creek, Upper, and minor tribs	Nassau	Silver Lake, Lofts Pond
Genesee	Tonawanda Creek, Middle, Main Stem	Nassau	Woodmere Channel
Genesee	Oak Orchard Creek, Upper, and tribs	Niagara	Hyde Park Lake
Genesee	Bowen Brook and tribs	Niagara	Lake Ontario Shoreline, Western
Genesee	Bigelow Creek and tribs	Niagara	Bergholtz Creek and tribs
Genesee	Black Creek, Middle, and minor tribs	Oneida	Ballou, Nail Creeks
Genesee	LeRoy Reservoir	Onondaga	Ley Creek and tribs
Greene	Schoharie Reservoir	Onondaga	Onondaga Creek, Lower and tribs

APPENDIX E

List of 303(d) segments impaired by pollutants related to construction activity, cont'd.

COUNTY	WATERBODY	COUNTY	WATERBODY
Onondaga	Onondaga Creek, Middle and tribs	Suffolk	Great South Bay, West
Onondaga	Onondaga Creek, Upp, and minor tribs	Suffolk	Mill and Seven Ponds
Onondaga			Moriches Bay, East
Onondaga	Ninemile Creek, Lower, and tribs	Suffolk	Moriches Bay, West
Onondaga	Minor tribs to Onondaga Lake	Suffolk	Quantuck Bay
Onondaga	Onondaga Creek, Lower, and tribs	Suffolk	Shinnecock Bay (and Inlet)
Ontario	Honeoye Lake	Sullivan	Bodine, Montgomery Lakes
Ontario	Hemlock Lake Outlet and minor tribs	Sullivan	Davies Lake
Ontario	Great Brook and minor tribs	Sullivan	Pleasure Lake
Orange	Monhagen Brook and tribs	Sullivan	Swan Lake
Orange	Orange Lake	Tompkins	Cayuga Lake, Southern End
Orleans	Lake Ontario Shoreline, Western	Tompkins	Owasco Inlet, Upper, and tribs
Oswego	Pleasant Lake	Ulster	Ashokan Reservoir
Oswego	Lake Neatahwanta	Ulster	Esopus Creek, Upper, and minor
Putnam	Oscawana Lake		tribs
Putnam	Palmer Lake	Ulster	Esopus Creek, Lower, Main Stem
Putnam	Lake Carmel	Ulster	Esopus Creek, Middle, and minor
Queens	Jamaica Bay, Eastern, and tribs (Queens)		tribs
Queens	Bergen Basin	Warren	Lake George
Queens	Shellbank Basin	Warren	Tribs to L.George, Village of L
Rensselaer	Nassau Lake		George
Rensselaer	Snyders Lake	Warren	Huddle/Finkle Brooks and tribs
Richmond	Grasmere, Arbutus and Wolfes Lakes	Warren	Indian Brook and tribs
Rockland	Congers Lake, Swartout Lake	Warren	Hague Brook and tribs
Rockland	Rockland Lake	Washington	Tribs to L.George, East Shr Lk
Saratoga	Ballston Lake	J	George
Saratoga	Round Lake	Washington	Cossayuna Lake
Saratoga	Dwaas Kill and tribs	Washington	Wood Cr/Champlain Canal, minor
Saratoga	Tribs to Lake Lonely	J	tribs
Saratoga	Lake Lonely	Wayne	Port Bay
Schenectady	Collins Lake	Wayne	Marbletown Creek and tribs
Schenectady	Duane Lake	Westchester	Lake Katonah
Schenectady	Mariaville Lake	Westchester	Lake Mohegan
Schoharie	Engleville Pond	Westchester	Lake Shenorock
Schoharie	Summit Lake	Westchester	Reservoir No.1 (Lake Isle)
Schuyler	Cayuta Lake	Westchester	Saw Mill River, Middle, and tribs
St. Lawrence	Fish Creek and minor tribs	Westchester	Silver Lake
St. Lawrence	Black Lake Outlet/Black Lake	Westchester	Teatown Lake
Steuben	Lake Salubria	Westchester	Truesdale Lake
Steuben	Smith Pond	Westchester	Wallace Pond
Suffolk	Millers Pond	Westchester	Peach Lake
Suffolk	Mattituck (Marratooka) Pond	Westchester	Mamaroneck River, Lower
Suffolk	Tidal tribs to West Moriches Bay	Westchester	Mamaroneck River, Upp, and tribs
Suffolk	Canaan Lake	Westchester	Sheldrake River and tribs
Suffolk	Lake Ronkonkoma	Westchester	Blind Brook, Lower
Suffolk	Beaverdam Creek and tribs	Westchester	Blind Brook, Upper, and tribs
Suffolk	Big/Little Fresh Ponds	Westchester	Lake Lincolndale
Suffolk	Fresh Pond	Westchester	Lake Meahaugh
Suffolk	Great South Bay, East	Wyoming	Java Lake
Suffolk	Great South Bay, Middle	Wyoming	Silver Lake

Note: The list above identifies those waters from the final New York State "2014 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy", dated January 2015, that are impaired by silt, sediment or nutrients.

APPENDIX F

LIST OF NYS DEC REGIONAL OFFICES

<u>Region</u>	<u>Covering the</u> <u>Following</u> <u>Counties:</u>	DIVISION OF ENVIRONMENTAL PERMITS (DEP) <u>Permit Administrators</u>	DIVISION OF WATER (DOW) <u>Water (SPDES)</u> Program
1	NASSAU AND SUFFOLK	50 CIRCLE ROAD STONY BROOK, NY 11790 TEL. (631) 444-0365	50 CIRCLE ROAD STONY BROOK, NY 11790-3409 TEL. (631) 444-0405
2	BRONX, KINGS, NEW YORK, QUEENS AND RICHMOND	1 HUNTERS POINT PLAZA, 47-40 21ST ST. Long Island City, Ny 11101-5407 Tel. (718) 482-4997	1 HUNTERS POINT PLAZA, 47-40 21ST ST. Long Island City, Ny 11101-5407 Tel. (718) 482-4933
3	DUTCHESS, ORANGE, PUTNAM, Rockland, Sullivan, Ulster and Westchester	21 SOUTH PUTT CORNERS ROAD NEW PALTZ, NY 12561-1696 TEL. (845) 256-3059	100 HILLSIDE AVENUE, SUITE 1W WHITE PLAINS, NY 10603 TEL. (914) 428 - 2505
4	Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie	1150 North Westcott Road Schenectady, Ny 12306-2014 Tel. (518) 357-2069	1130 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 Tel. (518) 357-2045
5	CLINTON, ESSEX, FRANKLIN, Fulton, Hamilton, Saratoga, Warren and Washington	1115 STATE ROUTE 86, Ро Вох 296 Ray Brook, Ny 12977-0296 Tel. (518) 897-1234	232 GOLF COURSE ROAD WARRENSBURG, NY 12885-1172 Tel. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROAD AVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVE. BUFFALO, NY 14203-2999 TEL. (716) 851-7070

ATTACHMENT NO. 2

DEEP RIPPING & DECOMPACTION (APRIL 2008)



New York State DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water

Deep-Ripping and Decompaction

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April 2008

New York State Department of Environmental Conservation Document Prepared by:

John E. Lacey, Land Resource Consultant and Environmental Compliance Monitor (Formerly with the Division of Agricultural Protection and Development Services, NYS Dept. of Agriculture & Markets)

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Alternative Stormwater Management Deep-Ripping and Decompaction

Description

The two-phase practice of 1) "Deep Ripping;" and 2) "Decompaction" (deep subsoiling), of the soil material as a step in the cleanup and restoration/landscaping of a construction site, helps mitigate the physically induced impacts of soil compression; i.e.: soil compaction or the substantial increase in the bulk density of the soil material.

Deep Ripping and Decompaction are key factors which help in restoring soil pore space and permeability for water infiltration. Conversely, the physical actions of cut-and-fill work, land grading, the ongoing movement of construction equipment and the transport of building materials throughout a site alter the architecture and structure of the soil, resulting in: the mixing of layers (horizons) of soil materials, compression of those materials and diminished soil porosity which, if left unchecked, severely impairs the soil's water holding capacity and vertical drainage (rainfall infiltration), from the surface downward.

In a humid climate region, compaction damage on a site is virtually guaranteed over the duration of a project. Soil in very moist to wet condition when compacted, will have severely reduced permeability. Figure 1 displays the early stage of the deep-ripping phase (Note that all topsoil was stripped prior to construction access, and it remains stockpiled until the next phase – decompaction – is complete). A heavy-duty tractor is pulling a three-shank ripper on the first of several series of incrementally deepening passes through the construction access corridor's densely compressed subsoil material. Figure 2 illustrates the approximate volumetric composition of a loam surface soil when conditions are good for plant growth, with adequate natural pore space for fluctuating moisture conditions.



Fig. 1. A typical deep ripping phase of this practice, during the first in a series of progressively deeper "rips" through severely compressed subsoil.

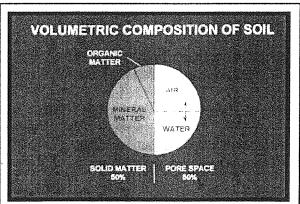


Fig. 2. About 50% of the volume of undisturbed loam surface soil is pore space, when soil is in good condition for plant growth. Brady, 2002.

Recommended Application of Practice

The objective of Deep Ripping and Decompaction is to effectively fracture (vertically and laterallly) through the thickness of the physically compressed subsoil material (see Figure 3), restoring soil porosity and permeability and aiding infiltration to help reduce runoff. Together with topsoil stripping, the "two-phase" practice of Deep Ripping and Decompaction first became established as a "best management practice" through ongoing success on commercial farmlands affected by heavy utility construction right-of-way projects (transmission pipelines and large power lines).

Fig. 3. Construction site with significant compaction of the deep basal till subsoil extends 24 inches below this exposed cutand-fill work surface.

Soil permeability, soil drainage and cropland productivity were restored. For broader

construction application, the two-phase practice of Deep Ripping and Decompaction is best adapted to areas impacted with significant soil compaction, on contiguous open portions of large construction sites and inside long, open construction corridors used as temporary access over the duration of construction. Each mitigation area should have minimal above-and-below-ground obstructions for the easy avoidance and maneuvering of a large tractor and ripping/decompacting implements. Conversely, the complete two-phase practice is not recommended in congested or obstructed areas due to the limitations on tractor and implement movement.

Benefits

Aggressive "deep ripping" through the compressed thickness of exposed subsoil before the replacement/respreading of the topsoil layer, followed by "decompaction," i.e.: "sub-soiling," through the restored topsoil layer down into the subsoil, offers the following benefits:

- Increases the project (larger size) area's direct surface infiltration of rainfall by providing the open site's mitigated soil condition and lowers the demand on concentrated runoff control structures
- Enhances direct groundwater recharge through greater dispersion across and through a broader surface than afforded by some runoff-control structural measures

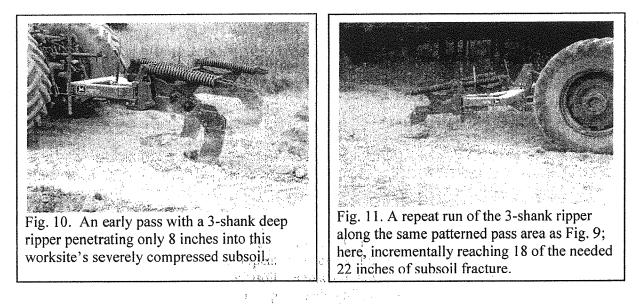
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- Decreases runoff volume generated and provides hydrologic source control
- May be planned for application in feasible open locations either alone or in

Depth and Patterns of Movement

As previously noted both Phase 1 Deep Ripping through significantly compressed, exposed subsoil and Phase 2 Decompaction (deep subsoiling) through the replaced topsoil and upper subsoil need to be performed at maximum capable depth of each implement. With an implement's guide wheels attached, some have a "normal" maximum operating depth of 18 inches, while others may go deeper. In many situations, however, the tractor/implement operator must first remove the guide wheels and other non essential elements from the implement. This adapts the ripper or the deep subsoiler for skillful pulling with its frame only a few inches above surface, while the shanks or legs, fracture the soil material 20-to-24 inches deep.

There may be construction sites where the depth of the exposed subsoil's compression is moderate, e.g.: 12 inches, rather than deep. This can be verified by using a ³/₄ inch cone penetrometer and a shovel to test the subsoil for its level of compaction, incrementally, every three inches of increasing depth. Once the full thickness of the subsoil's compacted zone is finally "pieced" and there is a significant drop in the psi measurements of the soil penetrometer, the depth/thickness of compaction is determined. This is repeated at several representative locations of the construction site. If the thickness of the site's subsoil compaction is verified as, for example, ten inches, then the Phase 1 Deep Ripping can be correspondingly reduced to the implement's minimum operable depth of 12 inches. However, the Phase 2 simultaneous Decompation (subsoiling) of an 11 inch thick layer of replaced topsoil and the upper subsoil should run at the subsoiling implements full operating depth.



Typically, three separate series (patterns) are used for both the Phase 1 Deep Ripping and the Phase 2 Decompaction on significantly compacted sites. For Phase 1, each series begins with a moderate depth of rip and, by repeat-pass, continues until full depth is reached. Phase 2 applies the full depth of Decompation (subsoiling), from the beginning.

Every separate series (pattern) consists of parallel, forward-and-return runs, with each progressive

pass of the implement's legs or shanks evenly staggered between those from the previous pass. This compensates for the shank or leg-spacing on the implement, e.g., with 24-to-30 inches between each shank or leg. The staggered return pass ensures lateral and vertical fracturing actuated every 12 to 15 inches across the densely compressed soil mass.

Large, Unobstructed Areas

For larger easy areas, use the standard patterns of movement:

- The first series (pattern) of passes is applied lengthwise, parallel with the longest spread of the site; gradually progressing across the site's width, with each successive pass.
- The second series runs obliquely, crossing the first series at an angle of about 45 degrees.
- The third series runs at right angle (or 90 degrees), to the first series to complete the fracturing and shattering on severely compacted sites, and avoid leaving large unbroken blocks of compressed soil material. (In certain instances, the third series may be optional, depending on how thoroughly the first two series loosen the material and eliminate large chunks/blocks of material as verified by tests with a $\frac{3}{4}$ -inch cone penetrometer.)



Fig. 12. Moderately dry topsoil is being replaced on the affected site now that Phase 1 deep ripping of the compressed subsoil is complete.

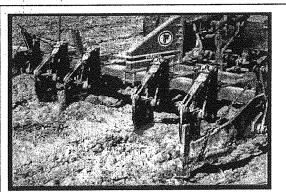


Fig. 13. The same deep, angled-leg subsoiler shown in Fig. 7 is engaged at maximum depth for Phase 2, decompaction (deep soiling), of the replaced topsoil and the upper subsoil materials.

Corridors

In long corridors of limited width and less maneuverability than larger sites, e.g.: along compacted areas used as temporary construction access, a modified series of pattern passes are used.

• First, apply the same initial lengthwise, parallel series of passes described above.

• A second series of passes makes a broad "S" shaped pattern of rips, continually and gradually alternating the "S" curves between opposite edges inside the compacted corridor.

• The third and final series again uses the broad, alternating S pattern, but it is "flip-flopped" to continually cross the previous S pattern along the corridor's centerline. This final series of the S pattern curves back along the edge areas skipped by the second series.

Maintenance and Cost

Once the two-phase practice of Deep Ripping and Decompation is completed, two items are essential for maintaining a site's soil porosity and permeability for infiltration. They are: planting and maintaining the appropriate ground cover with deep roots to maintain the soil structure (see Figure 15); and keeping the site free of traffic or other weight loads.

Note that site-specific choice of an appropriate vegetative ground-cover seed mix, including the proper seeding ratio of one or more perennial species with a deep taproot system and the proper amount of lime and soil nutrients (fertilizer mix) adapted to the soil-needs, are basic to the final practice of landscaping, i.e. surface tillage, seeding/planting/fertilizing and culti-packing or mulching is applied. The "maintenance" of an effectively deep-ripped and decompacted area is generally limited to the successful perennial (long-term) landscape ground cover; as long as no weight-bearing force of soil compaction is applied.

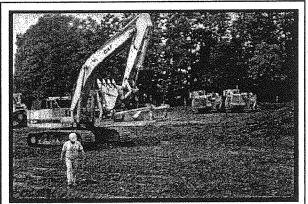


Fig. 14. The severely compacted soil of a temporary construction yard used daily by heavy equipment for four months; shown before deep ripping, topsoil replacement, and decompaction.



Fig. 15. The same site as Fig. 14 after deep ripping of the exposed subsoil, topsoil replacement, decompaction through the topsoil and upper subsoil and final surface tillage and revegetation to maintain soil permeability and infiltration.

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The Deep Ripping and Decompaction practice is, by necessity, more extensive than periodic subsoiling of farmland. The cost of deep ripping and decompacting (deep subsoiling), will vary according to the depth and severity of soil-material compression and the relative amount of tractor and implement time that is required. In some instances, depending on open maneuverability, two-to-three acres of compacted project area may be deep-ripped in one day. In other situations of more severe compaction and - or less maneuverability, as little as one acre may be fully ripped in a day. Generally, if the Phase 1) Deep Ripping is fully effective, the Phase 2) Decompaction should be completed in 2/3 to 3/4 of the time required for Phase 1.

Using the example of two acres of Phase 1) Deep Ripping in one day, at \$1800 per day, the net cost is \$900 per acre. If the Phase 2) Decompacting or deep subsoiling takes 3/4 the time as Phase 1, it costs \$675 per acre for a combined total of \$1575 per acre to complete the practice (these figures do not include the cost of the separate practice of topsoil stripping and replacement). Due to the many variables, it must be recognized that cost will be determined by the specific conditions or constraints of the site and the availability of proper equipment.

Resources

Publications:

- American Society of Agricultural Engineers. 1971. Compaction of Agricultural Soils. ASAE.
- Brady, N.C., and R.R. Weil. 2002. The Nature and Properties of Soils. 13th ed. Pearson Education, Inc.
- Baver, L.D. 1948. Soil Physics. John Wiley & Sons.
- Carpachi, N. 1987 (1995 fifth printing). Excavation and Grading Handbook, Revised. 2nd ed. Craftsman Book Company
- Ellis, B. (Editor). 1997. Safe & Easy Lawn Care: The Complete Guide to Organic Low Maintenance Lawn. Houghton Mifflin.
- Harpstead, M.I., T.J. Sauer, and W.F. Bennett. 2001. Soil Science Simplified. 4th ed. Iowa State University Press.
- Magdoff, F., and H. van Es. 2000. Building Soils for Better Crops. 2nd ed. Sustainable Agricultural Networks
- McCarthy, D.F. 1993. Essentials of Soil Mechanics and Foundations, Basic Geotechnics 4th ed. Regents/Prentice Hall.
- Plaster, E.J. 1992. Soil Science & Management. 3rd ed. Delmar Publishers.
- Union Gas Limited, Ontario, Canada. 1984. Rehabilitation of Agricultural Lands, Dawn-Kerwood Loop Pipeline; Technical Report. Ecological Services for Planning, Ltd.; Robinson, Merritt & Devries, Ltd. and Smith, Hoffman Associates, Ltd.
- US Department of Agriculture in cooperation with Cornell University Agricultural Experiment Station. Various years. Soil Survey of <u>(various names)</u> County, New York. USDA.

Internet Access:

• Examples of implements:

- <u>V-Rippers.</u> Access by internet search of John Deere Ag -New Equipment for 915 (larger-frame model) V-Rippe; and, for 913 (smaller-frame model) V-Ripper. <u>Deep, angled-leg subsoiler</u>. Access by internet search of: Bigham Brothers Shear Bolt Paratill-Subsoiler. http://salesmanual.deere.com/sales/salesmanual/en_NA/primary_tillage/2008/feature/rippers/915v_pattern_frame.html?sbu=a g&link=prodcat_Last visited March 08.
- Soils data of USDA Natural Resources Conservation Service. NRCS Web Soil Survey. <u>http://websoilsurvey.nrcs.usda.gov/app/</u> and USDA-NRCS Official Soil Series Descriptions; View by Name. <u>http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi</u>. Last visited Jan. 08.
- Soil penetrometer information. Access by internet searches of: Diagnosing Soil Compaction using a Penetrometer (soil compaction tester), PSU Extension; as well as Dickey-john Soil Compaction Tester. <u>http://www.dickey-johnproducts.com/pdf/SoilCompactionTest.pdf</u> and <u>http://cropsoil.psu.edu/Extension/Facts/uc178pdf</u> Last visited Sept. 07

ATTACHMENT NO. 3 CERTIFICATION OF CONTRACTOR

Contractor/Subcontractor SWPPP Certification

NOTE: This SWPPP identifies for each measure identified in the SWPPP, the contractor(s) and subcontractor(s) that will implement the measure. All contractors and subcontractors identified in the SWPPP must sign a copy of the certification statement. All certifications must be included in the SWPPP. Additionally, new contractors and subcontractors need to similarly certify. All contractors and subcontractors identified in a SWPPP shall sign a copy of this certification statement before undertaking any construction activity at the site identified in the SWPPP:

I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

SERVICES PROVIDED BY THIS CONTRACTOR/SUBCONTRACTOR:

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Phone Numbe	er/Fax Number of Entity (Constituting Contractor/Su	bcontractor (Print or
	· · · · · · · · · · · · · · · · · · ·	Type)	

Signatory Requirements – This SWPPP certification shall be signed as follows:

- a. For a corporation: by (1) a president, secretary, treasurer, or vice- president of the corporation in charge of a principal business function, or any other person authorized to and who performs similar policy or decision making functions for the corporation; or (2) the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25,000,000 (in second-quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;
- b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.

ATTACHMENT NO. 4

CERTIFICATION OF OWNER/DEVELOPER

Owner/Developer SWPPP Certification

I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

 Signature

 Name (Print or Type)

 Title (Print or Type)

 Name of Entity Constituting Owner/Developer (Print or Type)

 Address of Entity Constituting Owner/Developer (Print or Type)

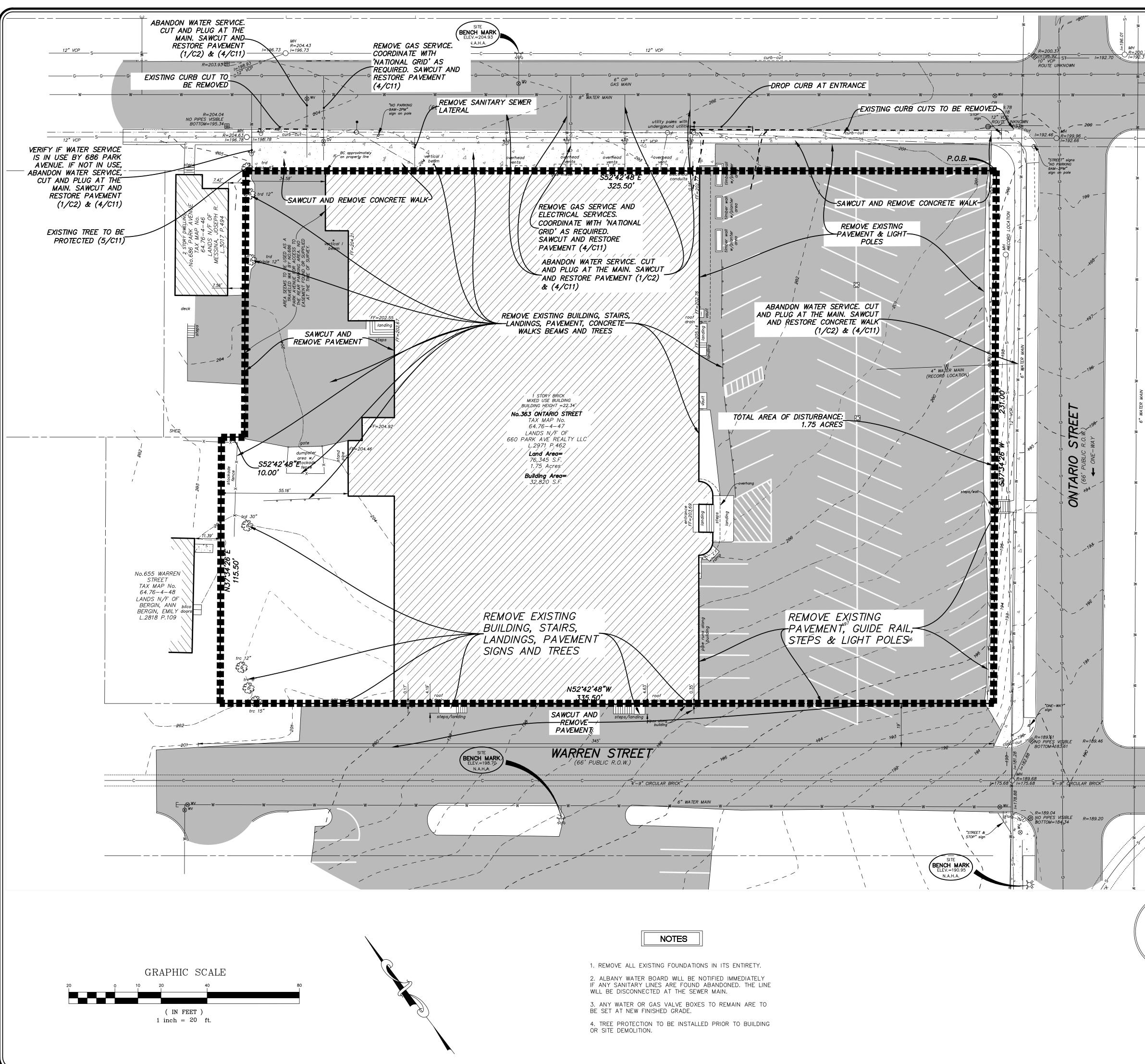
 Phone Number/Fax Number of Entity Constituting Owner/Developer (Print or Type)

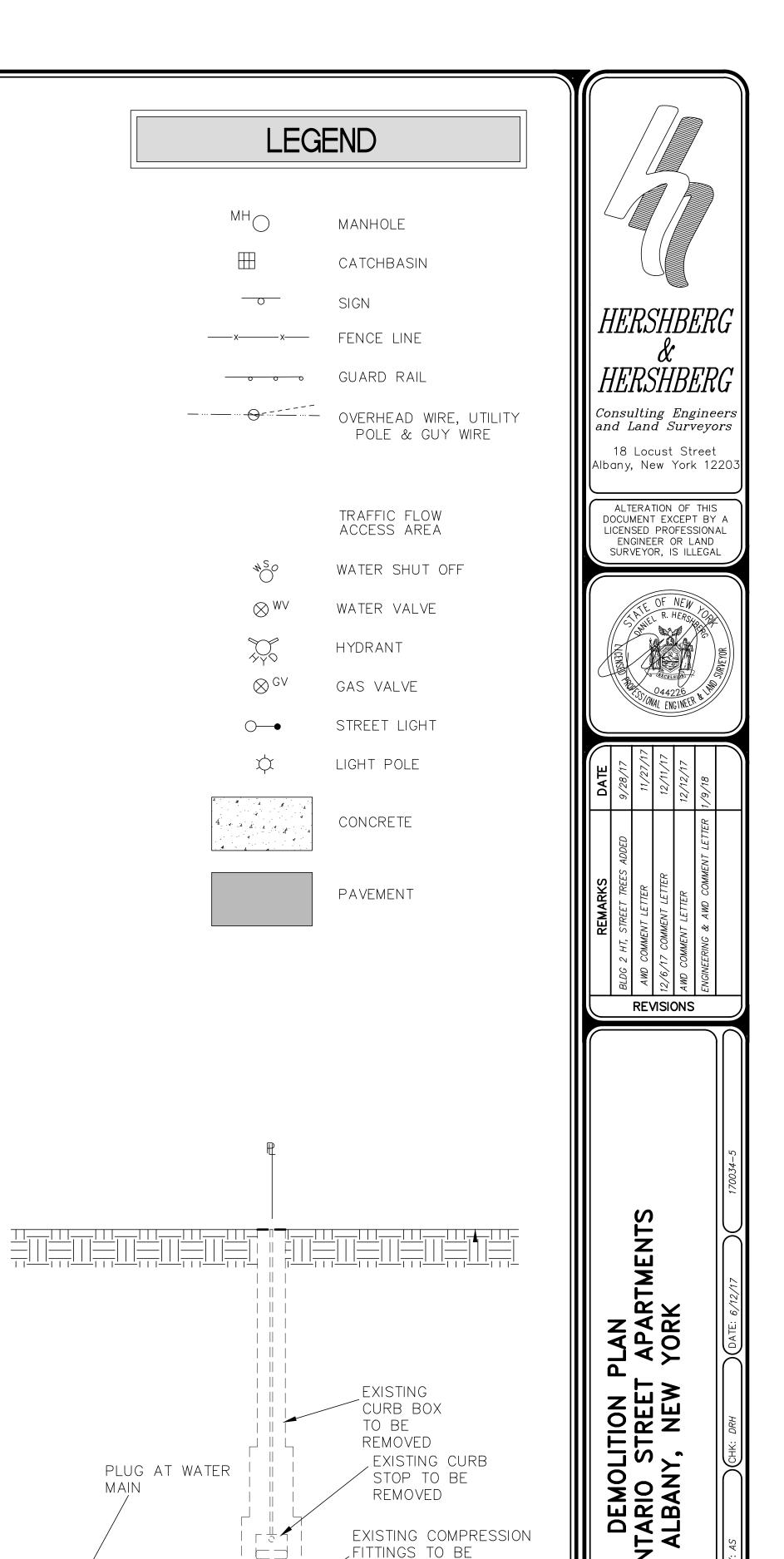
 Signatory Requirements – This SWPPP certification shall be signed as follows:

- a. For a corporation: by (1) a president, secretary, treasurer, or vicepresident of the corporation in charge of a principal business function, or any other person authorized to and who performs similar policy or decision making functions for the corporation; or (2) the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25,000,000 (in second-quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;
- b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.

MAP POCKET #1 SHEET C-2

DEMOLITION PLAN





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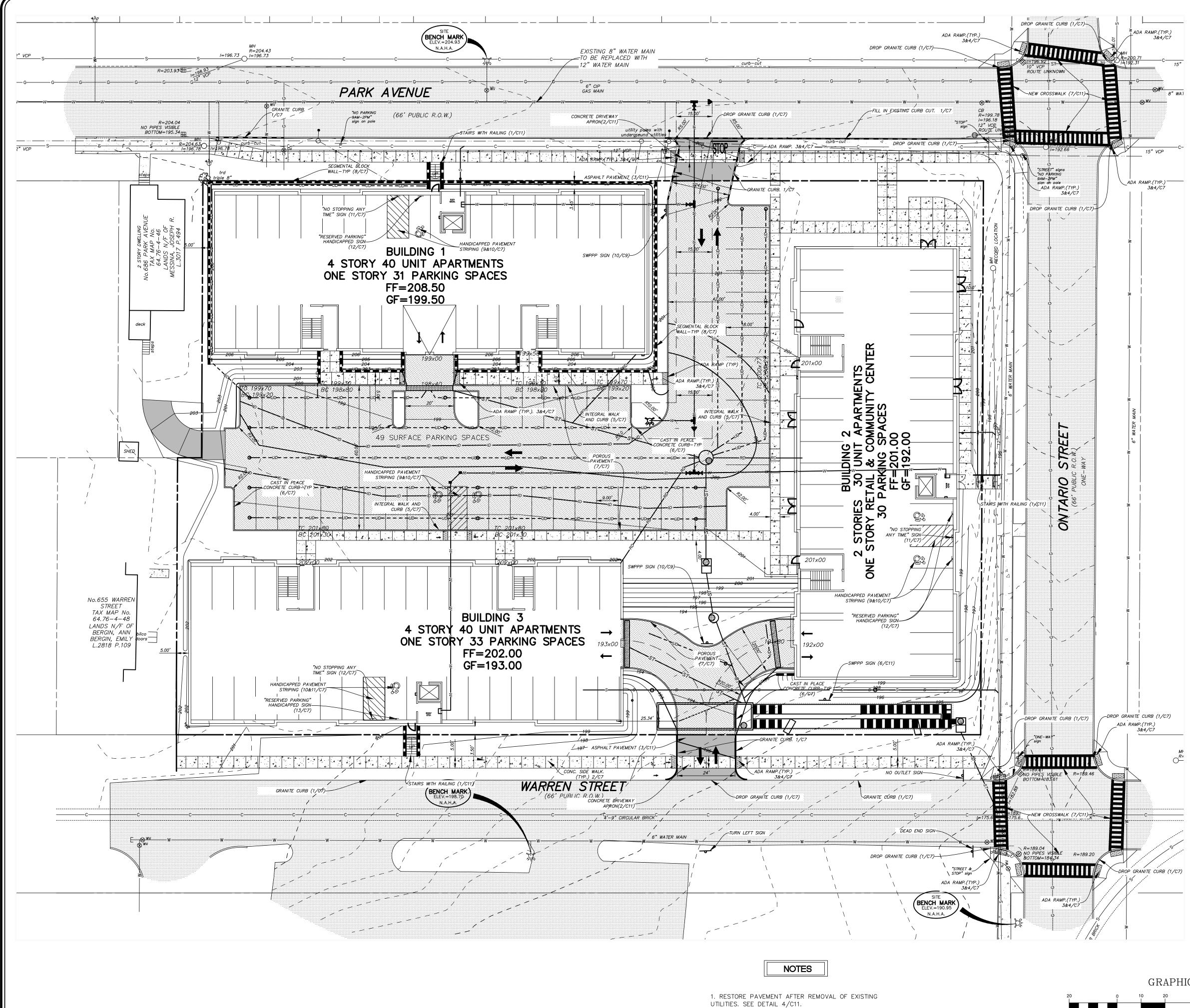
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C2

MAP POCKET #2

SHEET C-3

SITE PLAN



2. WATER AND GAS VALVE BOXES TO REMAIN ARE TO BE SET AT NEW FINISHED GRADE.

3. OWNER TO OBTAIN LICENSING AGREEMENT FOR MAINTENANCE OF STAIRS IN CITY OF ALBANY ROW.

4. RELOCATE ANY SIGNAGE IN CONFLICT WITH PROPOSED ADA DETECTABLE SURFACES.

5. KNOX BOX TO BE LOCATED AT EACH BUILDING ENTRANCE.

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s	EXISTING HYDRANT — EXISTING SEWER MAIN	GRASS & LANDSCAPING	8,987	0.21	12.00			
W	EXISTING MANHOLE	TOTAL IMPERVIOUS AREA	67,358	1.54	88.00			
W G	— EXISTING WATER MAIN — EXISTING GAS MAIN	TOTAL SITE AREA	76,345	1.75	100.00			
C	- EXISTING COMBINED SEWER							
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ı□ ▓	PROPOSED INTERNAL DAM PROPOSED HYDRANT & VALVE	GRASS & LANDSCAPING	19,255	0.44	25.14			
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GRAPHIC SCALE

(IN FEET) 1 inch = 20 ft.

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MAP POCKET #3

SHEET C-5

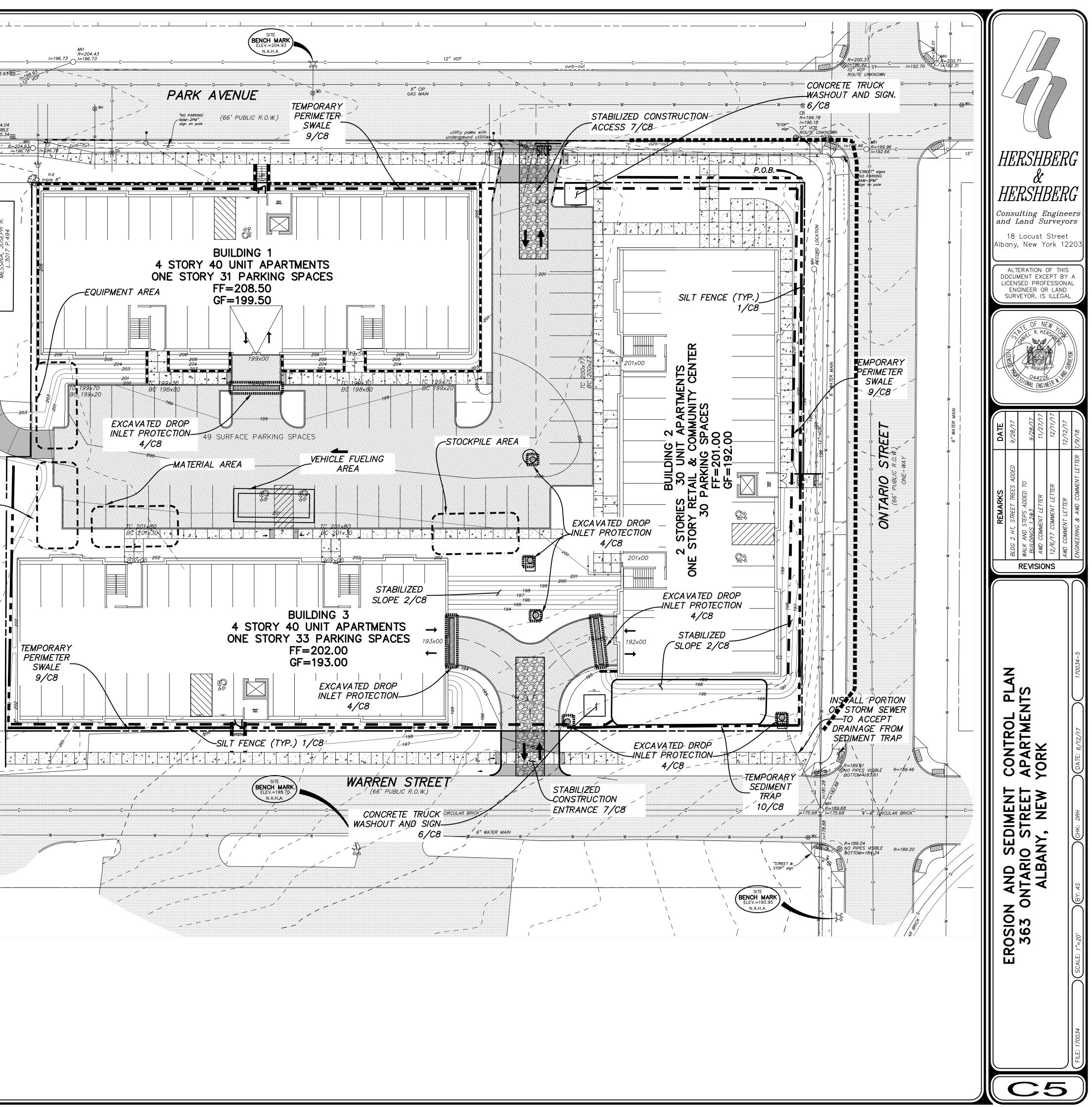
SEDIMENTATION AND EROSION CONTROL PLAN

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The construction sequence f indicated where applicable in	red following steps		U/T	-EXISTING TELPHONE	
Prior to commencement of 1.Assure that copy of SWMR COMMENCEMENT	& SWPPP is on th	e site. ON	w	_EXISTING CONTOURS -EXISTING WATER MAIN	CC
2.Establish Qualified Individua COMMENCEMENT 3.Inspections must be performe		ming site inspection. ON rofessional must be submitted to		EXISTING HYDRANT - EXISTING SEWER MAIN	
the MS4 Coordinator. FROM CO 4.Establish Trained Contracto Contractor must be on site	MMENCEMENT UNTIL I or who will be on si	PROJECT COMPLETE te. At least one Trained	W 	EXISTING MANHOLE – EXISTING WATER MAIN – PROPOSED CONTOURS	R=20 NO PIPES VIS BOTTOM=19
undertaken. ON COMMENCEMI 5. Establish contact person	ENT		200	- PROPOSED CONTOURS	
COMMENCEMENT 6. IN CASE OF ANY SPILLS (RESPONSE PLAN CONTAINED		ITE, EXECUTE SPILL	w	PROPOSED WATER MAIN PROPOSED HYDRANT & VALVE PROPOSED SEWER MAIN	steps
Construction Sequence 1. Install traffic controls as CONSTRUCTION		THE START OF ANY	st	PROPOSED STORM SEWER PROPOSED SANITARY SEWER MANHOLE	
2. Install construction fencing CONSTRUCTION	g as required. PRIO	R TO THE START OF ANY		PROPOSED STORM MANHOLE	
 Commence work on site. Undertake any utility reloc DEMOLITION 	cations or abandonr	nent required. PRIOR TO	STOP <u>S</u> IGN	STOP SIGN	AVENUE
5. Install sedimentation fence TO COMMENCEMENT OF ANY UNTIL ALL AREAS ARE STAB	GRADING -FENCE T	as indicated on the plan. PRIOR TO REMAIN IN PLACE		PROPOSED POROUS PAVEMENT	N A D WE
6. Grade and prepare construction ANY GRADING - CONSTRUCTIO	uction entrance. PR DN ENTRANCE TO RI				2 STORY 2 STORY 14X M 64.76 LANDS
UNTIL ALL AREAS ARE STAB 7. Demolish building and asp DEMOLITION REMOVE ITEMS T	halt pavement. UPC	ON COMPLETION OF OM SITE OR		PROPOSED CURB	No
STOCKPILE ON SITE FOR REU	ISE. the temporary sedir	nent trap and discharge pipe.		PROPOSED WALL	
RELOCATED AS CONSTRUCTIO 9. Establish fueling area. Reloc	DN TAKES PLACE> ate when required. M			PAVEMENT WITHIN CITY OF ALBANY R.O.W.	deck
onto any streets. CONTINUOL	st be kept swept c JSLY FROM INCEPTIO		PROPOSED SIDEWALK		steps
OF STABILIZATION OR UNTIL 11. Maintain this area clean materials listed below. Requi	of debris and verify	condition and safety of storage of]ŏ
INCEPTION UNTIL PROJECT IS 12. Any construction materia	S COMPLETE. Is, chemicals or co	nstruction debris must be stored in		HANDICAPPED PARKING	\
for installation (i.e., sand, e	tc.) must be surrou	prage piles of materials meant Inded by sedimentation fence. during construction is provided	WARKINGS		
below and must be updated CONTINUOUSLY FROM INCEPT ⁶ Select Fill	if any additional m ION UNTIL PROJECT	naterials are utilized: IS COMPLETE.		STOP BAR	
a Fencing Materials a Pipes a Pipe Solvents				TRAFFIC FLOW MARKING	
₀ Concrete Structures ₀ Reinforcing Steel					SHER
₀ Decorative Stone ₀ Brick ₀ Concrete Additives			280×90	FINISH GRADE SPOT ELEVATION)
6 Concrete Sealers 13.MSDS sheets must be ava site. CONTINUOUSLY FROM IN		II materials used or imported to the	€	PROPOSED BUILDING MOUNTED LIGHTS	RAGE AREA-
14. Any chemical spills must NYSDEC. CONTINUOUSLY FRO	be contained imme MINCEPTION TO FIL	ediately on site and reported to			AGE AREA
UNTIL PROJECT IS COMPLETE 15. Oil and grease spills from CONTINUOUSLY FROM INCEPT	n equipment shall b ION UNTIL PROJECT	IS COMPLETE.		SEDIMENT TRAP	
 Clean sediment trap as r UNTIL PROJECT IS COMPLETE Direct drainage to porous 	••				
REMOVAL OF TEMPORARY SE 18. Abandon sediment trap. PAVEMENT GOES ON LINE.	DIMENT TRAP.				A CAR
19. Complete construction of 20. Obtain approval of Project		the Department of Water & Water			ARREN
Supply,					T ' No. / 48 /
ER	OSION AND SEDIMENT (CONTROL NOTES			/F OF ANN bilco =MILY doors
ALL PERMIT CONDITIONS AND CERTIFY UNDE ALL EROSION CONTROLS DESCRIBED IN GP-	ERSTANDING OF THESE CONDIT -0-15-002, AND IT IS NOT T	UT NOT LIMITED TO: CLEARING, GRADING AND TRENCHING, TIONS, IN WRITING. IT IS THE CONTRACTOR'S RESPONSIBILIT HE INTENT OF THESE DRAWINGS TO REPLACE OR DISSEMIN HE DEDIT AT ALL THESE	Y TO IMPLEMENT	\mathbf{N}	?.109 <u> </u>
AND IMPLEMENTATION OF SOIL STABILIZATION	TES SHALL REMAIN LESS THAN ON MEASURES TO ENSURE CON	N 1 ACRE. THE CONTRACTOR SHALL COORDINATE EARTHWC WPLIANCE TO THIS PERMIT REQUIREMENT. THE SITE WILL BI	E MONITORED AT		
ORDER WILL ISSUED UNTIL THE SITE RECEIV	ES COVERAGE UNDER SPDES	THE SOIL DISTURBANCE EXCEEDS ONE ACRE AT ANY TIME GENERAL PERMIT FOR CONSTRUCTION ACTIVITY. UIPMENT ENTRANCE WHENEVER PRACTICABLE.	, A STOP WORK		
	EDING IN ACCORDANCE WITH	ETION OR SUSPENSION OF GRADING OPERATIONS.	IMENT CONTROL		
STANDARD AND SPECIFICATIONS WATER MANAGEMENT PRACTICES	FOR TEMPORARY CONSTRUCTION MUST BE INSTALLED AS APPR				
	OF THE SOIL SURFACE WILL E	BE NECESSARY PRIOR TO SEEDING.			
(APPROXIMATELY 0.7 LB./1000 S	Q. FT. OR USE 1 LB./1000 SC	,			
LBS./1000 SQ. FT.). ANY SEEDING METHOD MAY BE U		DSTOOK' WINTER RYE (CEREAL RYE) AT 1000 LBS. PER AC	·		
MULCH ALLOWABLE WILL BE DETE	RMINED BASED ON LONG TER	PROX. 90 LBS./1000 SQ. FT. OR 2 BALES). QUALITY OF H M USE AND VISUAL CONCERNS. MULCH ANCHORING WILL B	E REQUIRED		c
APPROVED FOR EROSION CONTRO	OL (NYLON WEB OR MESH) MA	NCERN. WOOD FIBER HYDROMULCH OR OTHER SPRAYABLE Y BE USED IF APPLIED ACCORDING TO MANUFACTURERS' S C PRODUCTS. THEY MAY BE DIFFICULT TO REMOVE PRIOR	PECIFICATIONS. TO FINAL	IC SCALE	
MULCH ANCHORING GUIDE - TAB	TAE	BLE 4.3 20 CHORING GUIDE	0 10 20	40 80	
ANCHORING METHOD OR MATERIAL	KIND OF MULCH TO BE ANCHORED	HOW TO APPLY	(IN	FEET)	
PEG AND TWINE	HAY OR STRAW	AFTER MULCHING, DIVIDE AREAS INTO BLOCKS APPROX SQ. YD. IN SIZE. DRIVE 4-6 PEGS PER BLOCK TO WI 3" OF SOIL SURFACE. SECURE MULCH TO SURFACE BY	IMATELY 1 1 inch : THIN 2" TO	= 20 ft.	
		STRETCHING TWINE BETWEEN PEGS IN CRISS-CROSS PA SECURE TWINE AROUND EACH PEG WITH 2 OR MORE T DRIVE PEGS FLUSH WITH SOIL. DRIVING STAKES INTO C	ATTERN ON IGHT TURNS.		
MULCH NETTING	HAY OR STRAW	THE TWINE. STAPLE THE LIGHT-WEIGHT PAPER, JUTE, WOOD FIBER, NETTINGS TO SOIL SURFACE ACCORDING TO MANUFACT RECOMMENDATIONS. SHOULD BE BIODEGRADABLE. MC	URER'S		
WOOD CELLULOSE FIBER	HAY OR STRAW	ARE NOT SUITABLE FOR FOOT TRAFFIC. APPLY WITH HYDROSEEDER IMMEDIATELY AFTER MULCH LBS. WOOD FIBER PER ACRE. SOME PRODUCTS CONTAI ADHESIVE MATERIAL ("TACKIFIER"), POSSIBLY ADVANTA	N AN		
MULCH ANCHORING TOOL	HAY OR STRAW	APPLY MULCH AND PULL A MULCH ANCHORING TOOL (STRAIGHT DISCS) OVER MULCH AS NEAR TO THE CONT POSSIBLE. MULCH MATERIAL SHOULD BE "TUCKED" INT	OUR AS		
TACKIFIER	HAY OR STRAW	SURFACE ABOUT 3". MIX AND APPLY POLYMERIC AND GUM TACKIFIERS ACC MANUFACTURER'S INSTRUCTIONS. AVOID APPLICATION D A 24-HOUR CURING PERIOD AND A SOIL TEMPERATUR	ORDING TO DURING RAIN.	· · · · · · · · · · · · · · · · · · ·	٦
6. INSTALL PERMANENT RIP-RAP AT ALL	PIPE END SECTIONS AT TIME	THAN 45° FAHRENHEIT ARE REQUIRED.		NOTES	

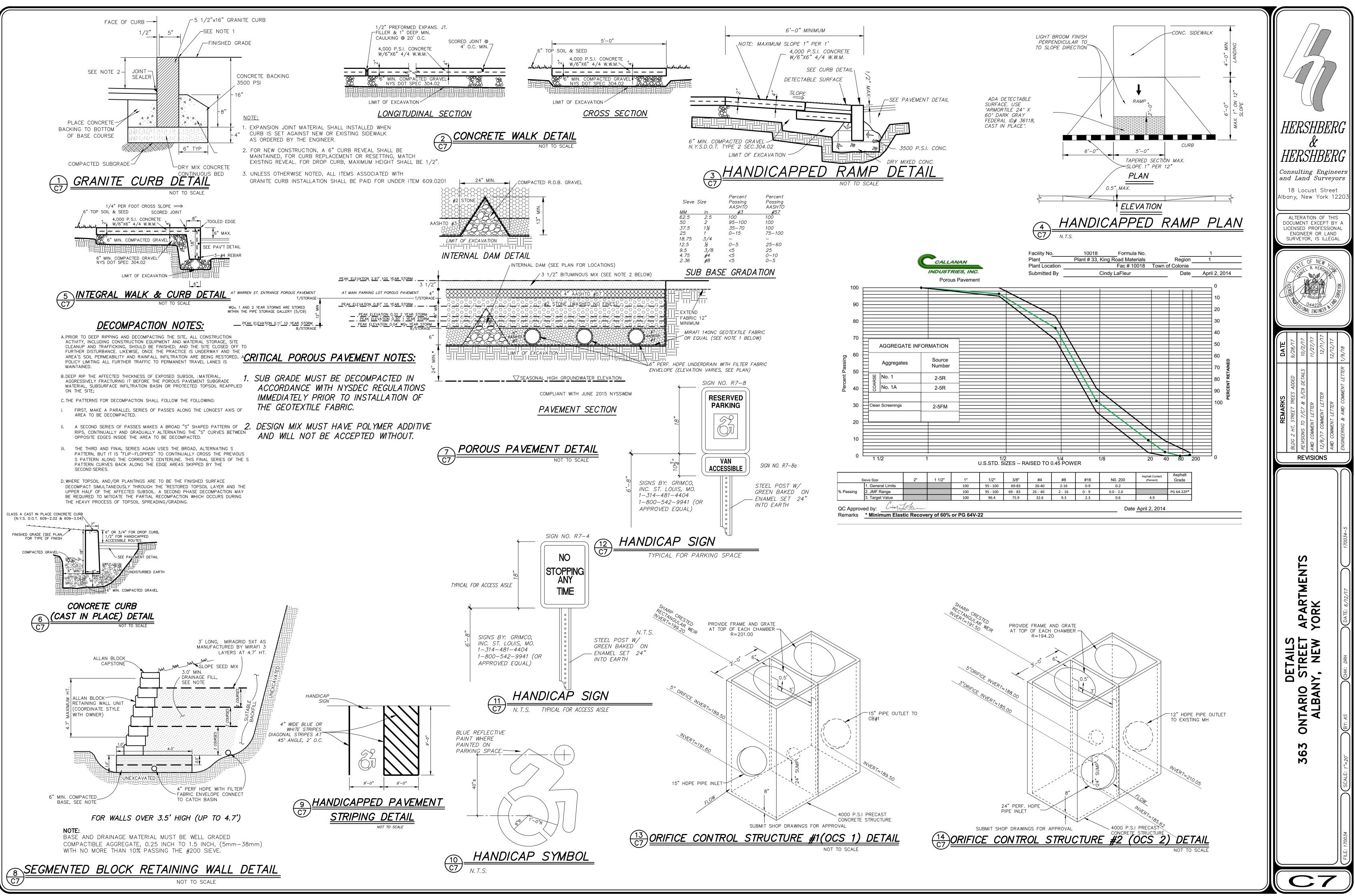
7. DURING EXCAVATION OF TEMPORARY SEDIMENT BASIN, FIELD VERIFY A MINIMUM OF 2' SEPARATION DISTANCE FROM GROUND WATER ELEVATION TO SURFACE SAND FILTERS WITH AN IMPERMEABLE BOTTOM AND 3' WITH A PERMEABLE BOTTOM. NOTIFY ENGINEER IMMEDIATELY IF THESE MINIMUM SEPARATION REQUIREMENTS DO NOT EXIST FOR ALTERNATIVE MEANS OF STORMWATER POLLUTION PREVENTION.

8. SEE REMAINDER OF PLANS FOR PERMANENT IMPROVEMENTS. PERMANENT IMPROVEMENTS SHOWN ON THIS PLAN ARE FOR REFERENCE ONLY.9. PAVED AREAS ARE TO BE SWEPT DAILY TO REMOVE ANY SEDIMENT AND ALL NEWLY PAVED AREAS SHALL BE DIRECTED TO THE TEMPORARY OR FINAL SEDIMENT CONTROL BASINS.

1. CONSTRUCTION WILL OCCUR ENTIRELY IN ONE PHASE



MAP POCKET #4 SHEET C-7 DETAILS

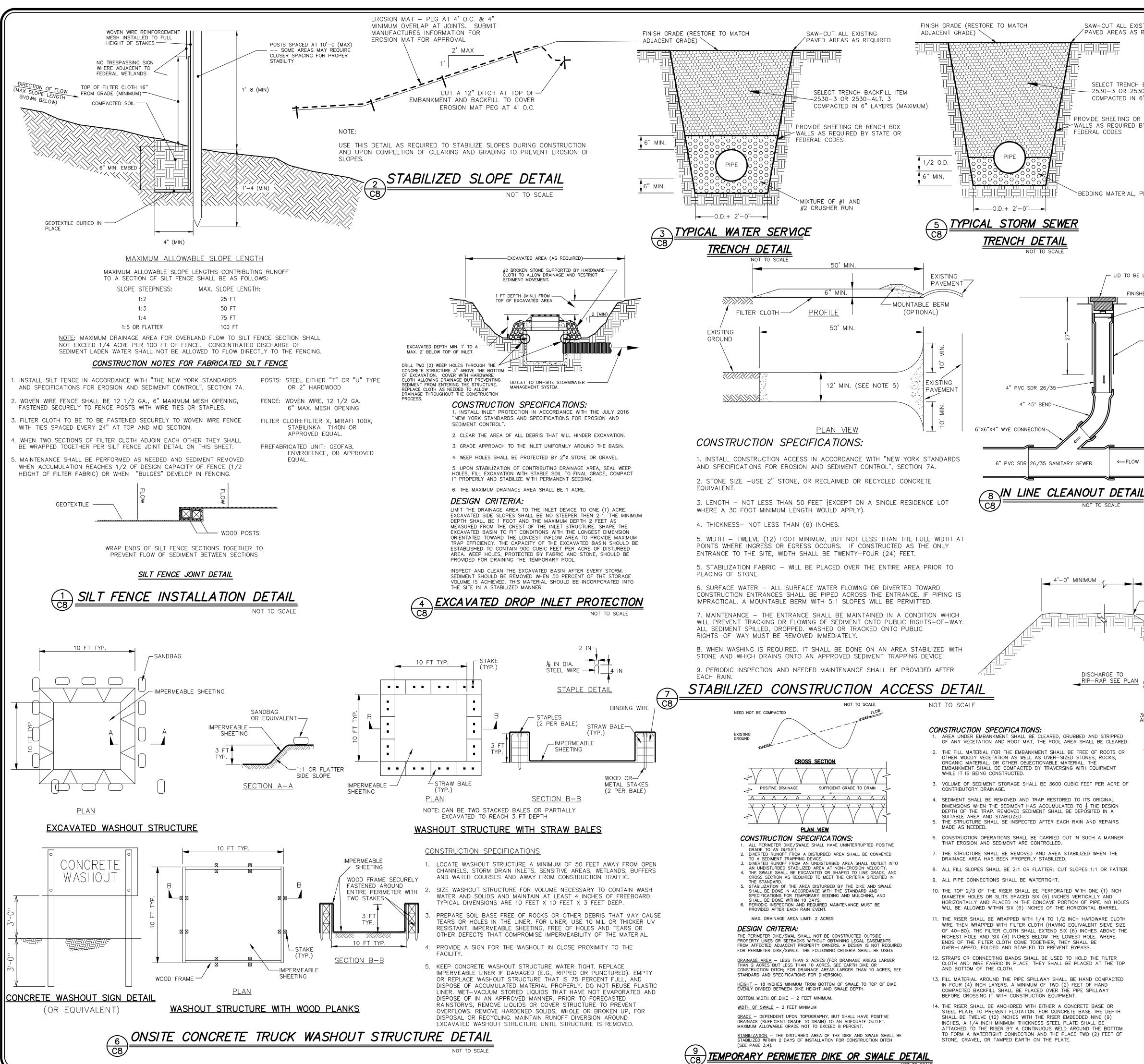


MAP POCKET #5

SHEET #C – 8

EROSION AND SEDIMENT CONTROL &

SITE DETAILS



XISTING S REQUIRED	GENERAL NOTES		
CH BACKFILL ITEM 2530–ALT. 3	1. ALL WORK SHALL BE DONE IN STRICT COMPLIANCE WITH ALL APPLICABLE NATIONAL, STATE AND LOCAL CODES, STANDARDS, ORDINANCES, RULES AND REGULATIONS. THE ENGINEER WILL PROVIDE AN ELECTRONIC FILE ON AUTOCAD FORMAT FOR SITE WORK LAYOUT. 2. EXISTING UTILITY INFORMATION SHOWN HEREON WAS OBTAINED FROM FIELD LOCATION WHERE		
OR RENCH BOX	POSSIBLE AND FROM RECORD DATA. THE LOCATION OF ALL UNDERGROUND UTILITIES ARE APPROXIMATE. ACTUAL LOCATION SHALL BE VERIFIED BY THE CONTRACTOR. CONTACT DIG SAFELY NEW YORK (1–800–962–7962) AND MUNICIPAL AGENCIES HAVING JURISDICTION 72 HOURS PRIOR TO ANY EXCAVATING AND/OR CONSTRUCTION TO HAVE UTILITIES MARKED ON SITE.		
D BY STATE OR	3. CONSTRUCTION OF STORM SEWERS MUST BEGIN AT ITS POINT OF CONNECTION TO THE EXISTING SEWER OR AT THE LOWEST POINT IN THE SYSTEM. RIMS, GRATES, INVERTS, CLEARANCES AND LOCATION AT CROSSINGS MUST BE VERIFIED PRIOR TO THE BEGINNING OF CONSTRUCTION. THE ENGINEER MUST BE NOTIFIED AT LEAST 24 HOURS IN ADVANCE OF ANY INSTALLATION SO THAT HE WILL BE ABLE TO PROVIDE SUPERVISION AS REQUIRED. THE CONTRACTOR MUST KEEP A RECORD OF ALL UNDERGROUND UTILITIES INSTALLED OR ENCOUNTERED SO THE ENGINEER WOULD BE ABLE TO USE THESE RECORDS FOR THE PREPARATION OF RECORD DRAWINGS AS REQUIRED BY THE LOCAL MUNICIPALITY.	HERSHBEI	RG
., PEA STONE.	4. ALL SANITARY SEWER LATERALS, STORM SEWERS AND APPURTENANCES TO BE CONSTRUCTED IN COMPLIANCE WITH THE LOCAL MUNICIPALITY'S CODES AND REGULATIONS GOVERNING THE INSTALLATION OF SUCH UTILITIES.	HERSHBEH	RG
	5. THE ENGINEER RESERVES THE RIGHT TO EXAMINE ANY WORK DONE ON THIS PROJECT AT ANY TIME TO DETERMINE THE CONFORMANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS OF THIS PROJECT, AS INTENDED AND INTERPRETED BY THE ENGINEER.	Consulting Engin and Land Survey	
	6. MISCELLANEOUS WORK NOT SPECIFICALLY SHOWN ON THE CONTRACT DRAWINGS SUCH AS PATCHING, BLOCKING, TRIMMING, ETC. SHALL BE PERFORMED AS REQUIRED TO MAKE THE WORK COMPLETE.	18 Locust Stree Albany, New York 1	
BE LABELED "SEWER"	 ALL DISTURBED AREA TO RECEIVE TOPSOIL AND SEED. EXCEPT AS OTHERWISE NOTED. THE CONTRACTOR SHALL: A. VERIFY ALL CONDITIONS IN THE FIELD PRIOR TO COMMENCEMENT OF WORK AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES. 	ALTERATION OF THI DOCUMENT EXCEPT B LICENSED PROFESSIOI ENGINEER OR LAND	Y A NAL
NISHED GRADE CLEANOUT ADAPTER & PLUG	 B. EXAMINE THE SITE AND INCLUDE IN HIS WORK THE EFFECT OF ALL EXISTING CONDITIONS ON THE WORK. C. PROVIDE AND INSTALL ALL MATERIALS AND PERFORM ALL WORK IN ACCORDANCE WITH RECOGNIZED GOOD STANDARD PRACTICE. D. COMMENCE WORK IMMEDIATELY UPON AWARDING OF THE CONTRACT AND PROCEED DILIGENTLY AND CONTINUALLY TO COMPLETION OF ALL WORK. E. PROVIDE CERTIFICATE OF INSURANCE ACCEPTABLE TO THE OWNER PRIOR TO 	SURVEYOR, IS ILLEG	
- VALVE BOX TOP SECTION	COMMENCEMENT OF THE WORK. F. HOLD THE OWNER HARMLESS AGAINST ANY AND ALL CLAIMS ARISING FROM WORK DONE BY THE CONTRACTOR ON THE SITE.	Z HIEL R. HERS	ž K
	9. ALL BACKFILL USED IN TRENCHES EXCAVATED IN EXISTING ROADWAYS SHALL BE PLACED IN MAXIMUM SIX (6) INCH LIFTS AND COMPACTED BY MEANS OF A MECHANICAL COMPACTOR BETWEEN LIFTS.	B 044226	SURVEYOR
	10. WHEN BACKFILLING AROUND PROPOSED OR EXISTING STRUCTURES, MATERIAL SHALL BE PLACED IN MAXIMUM SIX (6) INCH LIFTS AND COMPACTED BY MEANS OF A COMPACTOR BETWEEN LIFTS.	SJONAL ENGINEER &	
	11. ALL VEHICLES HAULING MATERIAL SHALL BE EQUIPPED WITH CANVAS COVERS TO PREVENT DUST AND LOOSE MATERIAL FROM EXISTING THE VEHICLE.	17	
	12. THE CONTRACTOR IS RESPONSIBLE FOR THE IMPLEMENTATION AND CONFORMANCE TO THE "NEW YORK STATE EROSION AND SEDIMENT CONTROL MANUAL, REVISED JULY 2016." THE CONTRACTOR IS RESPONSIBLE FOR INFORMING ALL CONSTRUCTION WORKERS INVOLVED IN THE SITE DEVELOPMENT OF THE IMPORTANCE AND ELEMENTS OF THE PLAN.	DATE 11/27/ 12/11/ 12/12/1 R 1/9/18	
W	13. ALL DISTURBED LAWN AREAS SHALL BE SEEDED AND MULCHED PROMPTLY TO MINIMIZE EROSION POTENTIAL.	T LETTER	
 4/L	14. ALL EXISTING DRAINAGE MUST BE MAINTAINED EXCEPT AS SHOWN. 15. FINISHED GRADES SHOWN HEREON DEPICT THE GRADE UPON COMPLETION OF CONSTRUCTION. FINISHED GRADES AT TIME OF RECLAMATION MAY BE LOWER DUE TO EXCAVATION FOR TOPSOIL, SUB—BASE MATERIAL AT ROADS, PARKING, CONCRETE SLABS, OR FLOOR SLABS.	EMARKS - LETTER HENT LETTER F LETTER & AWD COMMENT	
	16. CONTRACTOR SHALL USE DUST CONTROL MEASURES DURING CONSTRUCTION. 17. ALL LAYOUT TO BE PERFORMED BASED UPON ASSUMED COORDINATE SYSTEM WHICH IS		
	UNIQUE TO THIS PROJECT. 18. CONTOUR ELEVATION AND SPOT ELEVATION ARE BASED UPON AN NAVD 1988 DATUM. 19. WHENEVER A PORTION OF EXISTING PAVEMENT IS TO BE REMOVED IT SHALL FIRST BE	AWD COMMEN 12/6/17 COM AWD COMMEN ENCINEERING	
	SAWCUT TO FULL DEPTH. 20. SEEDING OF ALL CUT AND FILL AREAS SHALL BE DONE IMMEDIATELY AFTER CONSTRUCTION.	REVISIONS	
SEE TEMPORARY	SEDIMENT TRAP SUMMARY TABLE BELOW FOR LENGTH AND WIDTH DIMENSIONS		
TOP ELEVATION 194.00			
#2 STONE 90° BEND AND DISCHARGE PIPE TO BE SOLID	190.00 190.00 190.00 190.00 190.00 WRAP ASSEMBLY IN FILTER FABRIC. SECURE TO PIPE WITH WIRE TIES © 12" O.C. (VERTICALLY) #2 STONE ENDEED ENDEDDED 0" NITO	DETAILS	170034-5
AN 2-112" HDPE	#2 STONE #2 STONE *RISER EMBEDDED 9" INTO CONCRETE OR 1/4" METAL PLATE WELDED ALL AROUND	SITE IENTS	
36"x12" REDUCER AND COUPLING			5/12/17
	DIA. OF RISER + 24" BARRREL DIAMETER' RISER DIAMETER' MAXIMUM DRAINAGE AREA (INCHES) (INCHES) (ACRES) 12 15 1	PA PA V	DATE: 6
ACRES, OR THE TRAP IS IN PLA ANY OF THE ADDITIONAL DESIGN	PROPOSED TRAP LOCATION EXCEEDS 5 LE BEYOND ON CONSTRUCTION SEASON, OR N CRITERIA PRESENTED HERE CANNOT BE USED SEE STANDARD AND LI BAPREL DIAMETER MAY BE SAME SIZE AS RISER DIAMETER LI BAPREL DIAMETER MAY BE SAME SIZE AS RISER DIAMETER		$\left \right $

IF THE DRAINAGE AREA TO THE PROPOSED TRAP LOCATION EXCEEDS ACRES. OR THE TRAP IS IN PLACE BEYOND ON CONSTRUCTION SEASON, OR ANY OF THE ADDITIONAL DESIGN CRITERIA PRESENTED HERE CANNOT BE MET, A FULL SEDIMENT BASIN MUST BE USED. SEE STANDARD AND SPECIFICATION FOR SEDIMENT BASIN ON PAGE 5.19. $\underline{\text{DRAINAGE AREA}}$ – THE MAXIMUM DRAINAGE AREA FOR ALL SEDIMENT TRAPS SHALL BE 5 ACRES.

LOCATION – SEDIMENT TRAPS SHALL BE LOCATED SO THAT THEY CAN BE INSTALLED PRIOR TO GRADING OR FILLING IN THE DRAINAGE AREA THEY AI TO PROTECT. TRAPS MUST NOT BE LOCATED ANY CLOSER THAN 20 FEET FROM A PROPOSED BUILDING FOUNDATION IF THE TRAP IS TO FUNCTION DURING BUILDING CONSTRUCTION. LOCATE TRAPS TO OBTAIN MAXIMUM STORAGE BENEFIT FROM THE TERRAIN AND FOR EASE OF CLEANOUT AND DISPOSAL OF THE TRAPPED SEDIMENT.

 $\underline{\text{TRAP SIZE}}$ – THE VOLUME OF A SEDIMENT TRAP AS MEASURED AT THE ELEVATION OF THE CREST OF THE OUTLET SHALL BE AT LEAST 3,600 CUBIC EET PER ACRE OF DRAINAGE AREA. A MINIMUM LENGTH TO WIDTH RATIO OF 2:1 SHOULD BE PROVIDED. THE VOLUME OF A CONSTRUCTED TRAP SHALL BE CALCULATED USING STANDARD MATHEMATICAL PROCEDURES. THE VOLUME OF A NATURAL SEDIMENT TRAP MAY BE APPROXIMATED BY THE EQUATION: VOLUME (CU.FT.) = 0.4 X SURFACE AREA (SQ.FT.) X MAXIMUM DEPTH (FT.). TRAP CLEANOUT - SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO THE ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1 OF THE DESIGN DEPTH OF THE TRAP. SEDIMENT REMOVED FROM THE TRAP L BE DEPOSITED IN A PROTECTED AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.

EMBANKMENT - ALL EARTH EMBANKMENTS FOR SEDIMENT TRAPS SHALL NOT EXCEED FIVE (5) FEET IN HEIGHT AS MEASURED AT THE LOW POINT OF THE ORIGINAL GROUND ALONG THE CENTERLINE OF THE EMBANKMENT. EMBANKMENTS SHALL HAVE A MINIMUM FOUR (4) FOOT WIDE TOP AND SIDE SLOPES OF 2:1 OR FLATTER. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED. THE EMBANKMENT SHALL BE STABILIZED WITH SEED AND MULCH AS SOON AS IT IS COMPLETED.

THE ELEVATION OF THE TOP OF ANY DIKE DIRECTING WATER TO ANY SEDIMENT TRAP WILL EQUAL OR EXCEED THE MAXIMUM HEIGHT OF THE OUTLET STRUCTURE ALONG THE ENTIRE LENGTH OF THE TRAP. EXCAVATION - ALL EXCAVATION OPERATIONS SHALL BE CARRIED OUT IN UCH A MANNER THAT EROSION AND WATER POLLUTION SHALL BE MINIMA EXCAVATED PORTIONS OF SEDIMENT TRAPS SHALL HAVE 1:1 OR FLATTER

OUTLET - THE OUTLET SHALL BE DESIGNED, CONSTRUCTED, AND MAINTAINED IN SUCH A MANNER THAT SEDIMENT DOES NOT LEAVE THE TRAP AND THAT EROSION AT OR BELOW THE OUTLET DOES NOT OCCUR.

SEDIMENT TRAPS MUST OUTLET ONTO STABILIZED (PREFERABLE UNDISTURBED) GROUND, INTO A WATERCOURSE, STABILIZED CHANNEL, OR INTO A STORM DRAIN SYSTEM. DISTANCE BETWEEN INLET AND OUTLET SHOULD BE MAXIMIZED TO THE LONGEST LENGTH PRACTICABLE. ALL TRAPS MUST BE SEEDED AND MULCHED IMMEDIATELY AFTER CONSTRUCTION. CONSTRUCTION SEQUENCE SUMMARY TABLE DISTURBED AREA 1.75 ACRE

BARREL DIAMETER MAY BE SAME SIZE AS RISER DIAMETER

ONTR IREET NEW

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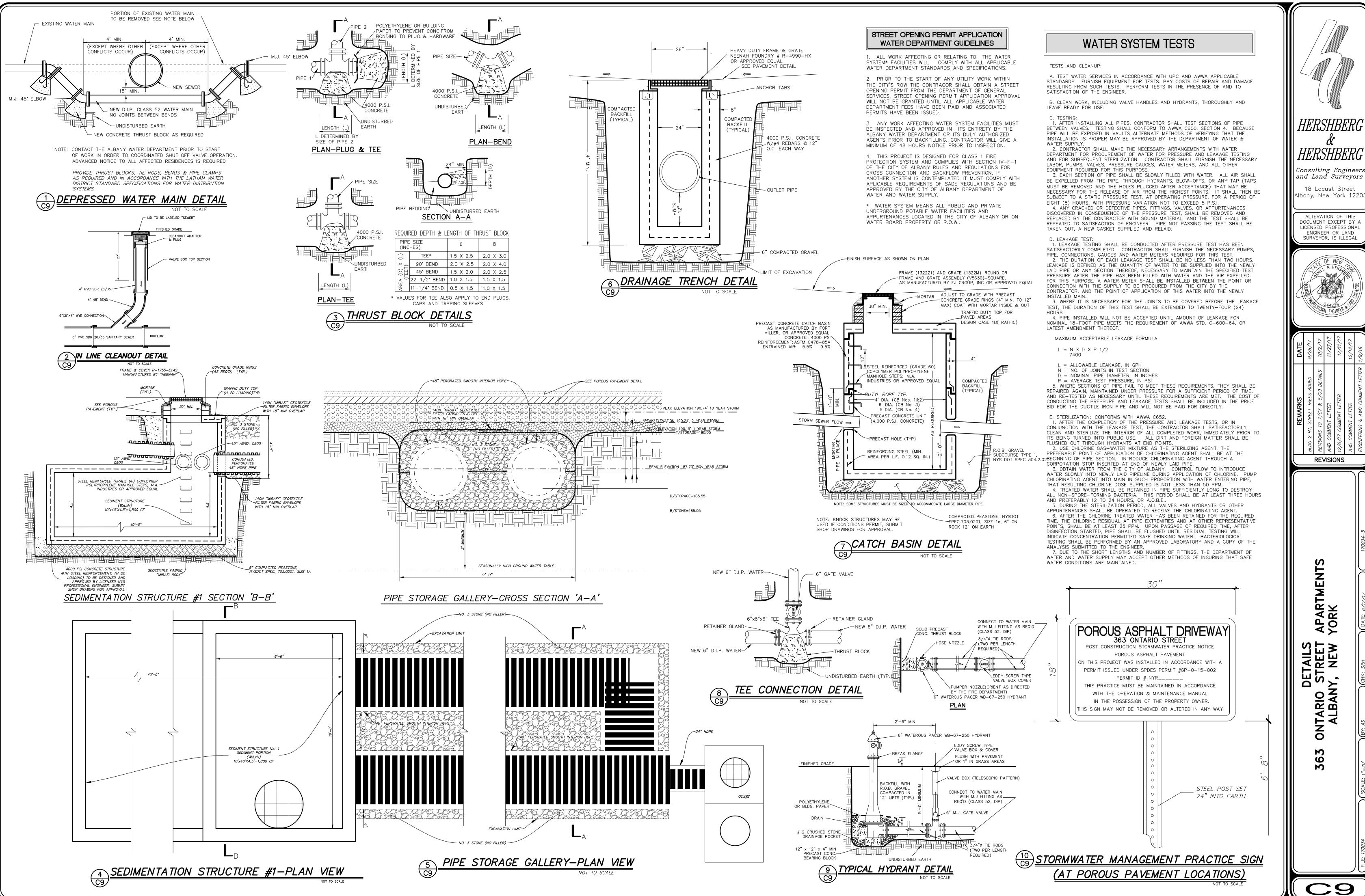
TEMPORARY SEDIMENT TRAP SUMMARY TABLE				
DESCRIPTION	TRAP No.1			
TYPE	Ι			
DRAINAGE AREA	1.75 ACRES			
STORAGE REQ'D	232 C.Y.			
STORAGE PROVIDED*	240 C.Y.			
PIPE OUTLET	12			
DEPTH BELOW OUTLET	12"			
ENBANKMENT HT.	10'			
50% CLEANOUT ELEVATION	187.50			
INVERT OUT ELEVATION	185.0			
LENGTH × WIDTH × HT*	65'x20'x5'			

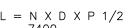
*STORAGE CAPACITY FROM THE TOP ELEVATION OF THE RISER PIPE OUTLET TO THE TRAP BOTTOM

<u>PIPE OUTLET SEDIMENT TRAP: ST-I DETAIL</u>

MAP POCKET #6 SHEET #C – 9

DETAILS





MAP POCKET #7 SHEET #C-11 DETAILS

