May 23, 2022

Mr. Adam Kaufman, Director of Planning
Town of North Castle
Planning Department
17 Bedford Road
Armonk, New York 10504

RE: JMC Project 22021
26 Chestnut Ridge Road Improvements
26 Chestnut Ridge Road
Town of North Castle, New York

Response to comments included in a Kellard Sessions Memorandum to the Town of North Castle Planning Department, dated April 22, 2022.

Dear Mr. Kaufman:

This letter has been prepared to address comments included in a Kellard Sessions Memorandum to the Town of North Castle Planning Department, dated April 22, 2022.

To assist in your review of the revised documents, we are pleased to provide the following, which briefly restates the comments from the above referenced correspondence, followed by our responses:

Comment No. 1

Laboratory data from Phoenix Laboratories, Inc. indicates that certain soil parameters were present within samples taken. Parameters include detectable levels of arsenic, barium, cadmium, copper, mercury, manganese, nickel, lead, trivalent chromium, zinc, volatiles – tetrachloroethene, pesticides – 4.4'-DDT, semivolatiles – anthracene, benz (a) anthracene, benzo (a) pyrene, benzo (a) fluoranthene, benzo (b) fluoranthene, benzo (ghi) perylene, benzo (k) fluoranthene, chrysene, dibenz (a, h) anthracene, fluoranthene, indeno (1, 2, 3 – cd) pyrene, phenanthrene and pyrene.
No additional information was provided by the applicant explaining the results, their status in relation to acceptable residential use standards or an explanation of who delivered the material, when it was delivered and how these results relate to the fill which is on-site.

The Planning Board may wish to request additional clarification from the applicant and refer the information and laboratory results to HydroEnvironmental Solutions for their review and recommendations.

Response No. 1

The applicant has sampled the in-situ soil and has submitted the soil sample to Advanced Environmental in Elmsford, New York for further analysis and further clarification on the findings to ensure the safety of the applicant and surrounding properties. Via email, the laboratory has ensured the applicant that the soil adheres to all NYSDEC regulations for residential uses. The laboratory analysis has been included with this submission.

Comment No. 2

The applicant is proposing a stormwater detention system to mitigate the increase in runoff from proposed impervious surfaces. The applicant has provided stormwater calculations for the 100-year stormwater event only. Please provide confirmation that off-site discharge will not increase during less intense events. Calculations should also include the 1, 5, 10 and 25-year rainfall events.

Response No. 2

The 1, 5, 10 and 25-year rainfall events have now been included in the stormwater report and off-site discharge has been reduced from existing conditions to proposed conditions.

Comment No. 3

The applicant is proposing four (4) Stormtech 740 Units. The manufacturer's specifications indicate a total storage volume of 78.47 c.f. per unit with a 9" stone base, which would equate to 313.88 c.f. of total storage. A 6" stone base is proposed which would result in less storage volume. The design also includes an impermeable geotextile surrounding the units and gravel which extends to elevation 666.5. Stormwater calculations indicate a high water elevation of 667 during a 100-year event with 418 c.f. of storage. Approximately 100 c.f. or 33% more volume than the manufacturer indicates is provided. Please clarify.

Response No. 3

The stormwater calculations were performed using a stone base of 12 inches and 15 inches of stone cover on top of the system. The detail has been updated to reflect this. It should be noted that the system was not designed to store the entirety of the 100-year storm event but to detain the runoff as it enters the system over a 24-hour period and release the runoff slowly as to reduce the peak flow from existing conditions to proposed conditions. In the stormwater program that was used for the calculations provided (Pond Pack), a value entered by the user is identified as the "invert of the system". The design engineer was assuming the "invert of the system" was referring to the invert of the actual chambers but what it was actually referring to was the bottom of the stone base. In the original design, the bottom of the stone was mistakenly set at 662.50. With 12 inches of stone base, a 30-inch-tall chamber and 12 inches of stone cover, the top of the system would be 667.00, just over the high-water level of 666.96. This has been updated in the Pond Pack model. The system has been relocated based on the soils testing and all inverts above have been updated accordingly.

Comment No. 4

The stormwater calculations indicate that a 2.55 inch orifice is used to restrict outflow from the detention system. Stormwater plans do not include the orifice, but rather a 6" diameter inflow pipe and 6" diameter outflow pipe, both set at the bottom of the structures, elevation 662.5. Please clarify.

Response No. 4

A weir is now being proposed inside the inlet structure with the orifice mentioned above along with a low flow orifice to ensure the system will drain thoroughly.

Comment No. 5

It is understood that the system is not an infiltration system, however, the applicant shall perform deep soil testing at the location of the detention system to verify soil conditions will permit the installation of the system.

Response No. 5

Deep test pits were performed by JMC and witnessed by a representative of Kellard Sessions on April 26th, 2022. These test pit locations have been added to the Site Plans with depth of bedrock included in the labels of these test pits. The proposed stormwater system has been shifted slightly to align with test pit #2, to ensure it's constructability.

Comment No. 6

Please redirect the detention system outflow away from the proposed plantings along the neighboring property boundary. The preferred location would be below the proposed fill and embankment. Please provide a level spreader to dissipate the flows.

Response No. 6

The Site Plan has been updated to show the new outlet location below the proposed fill and embankment instead of its previous location.

Comment No. 7

Soil stabilization of the slope created by the fill should be stated as mandatory.

Response No. 7

Note #16 has been added to the Site Plan stating, "THE SLOPES CREATED BY THE IMPORT OF FILL SHALL BE STABILIZED TO ENSURE THE STABILITY OF THE SLOPE AFTER CONSTRUCTION".
We trust that the above, along with the enclosed documents and drawings, address violations received by the applicant from the Town on November 24th, 2021. We look forward to your continued review throughout the Building Permit process and discussing this matter with you

further. Should you have any questions or require additional information regarding the information provided above, please do not hesitate to contact our office at 914-273-5225.

Sincerely,

JMC Planning Engineering Landscape Architecture & Land Surveying, PLLC

Rick Bohlander, PE
Project Manager

p:\2022\22021\admin\ltcomment response 05-23-2022.docx

BUILDING PERMIT DRAWINGS

PROPOSED SITE IMPROVEMENTS

TAX MAP SECTION 94.04 | BLOCK 1 | LOT 39
WESTCHESTER COUNTY
26 CHESTNUT RIDGE ROAD
TOWN OF NORTH CASTLE, NEW YORK 10504

Applicant/Owner:
ANTHONY MARINO
26 CHESTNUT RIDGE ROAD
ARMONK, NEW YORK 10504
(646) 294-7258

Civil Engineer:
120 BEDFORD ROAD
ARMONK, NEW YORK 10504
(914) 273-5225

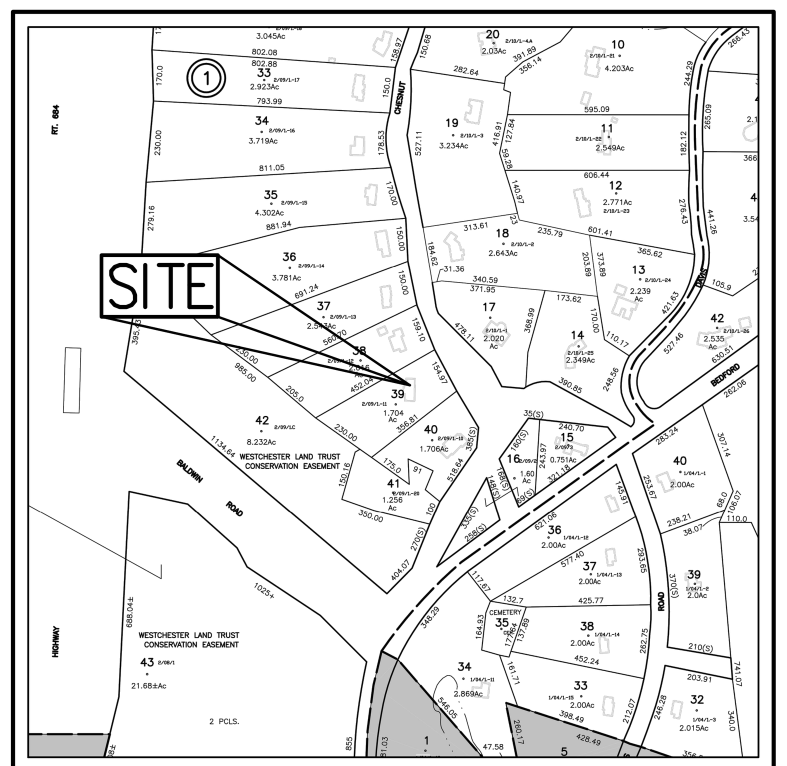
JMC Drawing List:

SITE AERIAL MAP
SCALE: 1" = 100'

TABLE OF LAND USE				
SECTION 94.04, BLOCK 1, LOT 39 ZONE "R-2A" – ONE FAMILY RESIDENCE DISTRICT (2 ACRES) PROPOSED USE: RESIDENTIAL FIRE DISTRICT: ARMONK FIRE DEPARTMENT SCHOOL DISTRICT: BYRAM HILLS				
DESCRIPTION		REQUIRED	EXISTING	PROPOSED
LOT AREA	(ACRES)	2 MIN.	1.704	1.704
LOT WIDTH	(FEET)	150 MIN.	179	179
LOT FRONTAGE	(FEET)	150 MIN.	154	154
LOT DEPTH	(FEET)	150 MIN.	402	402
BUILDING HEIGHT	(FEET)	30 MIN.	<30	<30
MAXIMUM GROSS FLOOR AREA	(SQUARE FEET)	9,478 (2)	3,501	3,501
LOT COVERAGE BY BUILDING	(PERCENT)	8 MAX.	3.4	3.4
DWELLING UNIT SIZE	(SQUARE FEET)	1,400 MIN.	2,498	2,498
MAXIMUM GROSS LAND COVERAGE	(SQUARE FEET)	12,620 (1)	5,558	7,358
YARDS				
FRONT BUILDING SETBACK	(FEET)	50 MIN.	101	101
REAR BUILDING SETBACK	(FEET)	50 MIN.	215	215
SIDE BUILDING SETBACK	(FEET)	30 MIN.	36	36

NOTES

(1) PER SECTION 355-26.C(1)(b)
(2) PER SECTION 355-26.B(4)



ZONING / VICINITY MAP
SCALE: 1" = 500'
SOURCE: TOWN OF NORTH CASTLE ZONING MAP

GENERAL CONSTRUCTION NOTES APPLY TO ALL WORK HEREIN:

1. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL CALL 811 "DIG SAFELY" (1-800-962-7962) TO HAVE UNDERGROUND UTILITIES LOCATED INCLUDING ARRANGING FOR A PRIVATE MARKOUT ON-SITE WHERE APPLICABLE. EXPLORATORY EXCAVATIONS SHALL COMPLY WITH CODE 753 REQUIREMENTS. NO WORK SHALL COMMENCE UNTIL ALL THE OPERATORS HAVE NOTIFIED THE CONTRACTOR THAT THEIR UTILITIES HAVE BEEN LOCATED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PRESERVATION OF ALL PUBLIC AND PRIVATE UNDERGROUND AND SURFACE UTILITIES AND STRUCTURES AT OR ADJACENT TO THE SITE OF CONSTRUCTION, INSOFAR AS THEY MAY BE ENDANGERED BY THE CONTRACTOR'S OPERATIONS. THIS SHALL HOLD TRUE WHETHER OR NOT THEY ARE SHOWN ON THE CONTRACT DRAWINGS. IF THEY ARE SHOWN ON THE DRAWINGS, THEIR LOCATIONS ARE NOT GUARANTEED EVEN THOUGH THE INFORMATION WAS OBTAINED FROM THE BEST AVAILABLE SOURCES, AND IN ANY EVENT, OTHER UTILITIES ON THESE PLANS MAY BE ENCOUNTERED IN THE FIELD. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, IMMEDIATELY REPAIR OR REPLACE ANY STRUCTURES OR UTILITIES THAT HE DAMAGES, AND SHALL CONSTANTLY PROCEED WITH CAUTION TO PREVENT UNDUE INTERRUPTION OF UTILITY SERVICE.
2. CONTRACTOR SHALL HAND DIG TEST PITS TO VERIFY THE LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR SHALL VERIFY EXISTING UTILITIES DEPTHS AND ADVISE OF ANY CONFLICTS WITH PROPOSED UTILITIES. IF CONFLICTS ARE PRESENT. THE OWNER'S FIELD REPRESENTATIVE, JMC, PLLC AND THE APPLICABLE MUNICIPALITY OR AGENCY SHALL BE NOTIFIED IN WRITING. THE EXISTING/PROPOSED UTILITIES RELOCATION SHALL BE DESIGNED BY JMC, PLLC.
3. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY AND ALL LOCAL PERMITS REQUIRED.
4. ALL WORK SHALL BE DONE IN STRICT COMPLIANCE WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES, STANDARDS, ORDINANCES, RULES, AND REGULATIONS. ALL CONSTRUCTION WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL SAFETY CODES. APPLICABLE SAFETY CODES MEAN THE LATEST EDITION INCLUDING ANY AND ALL AMENDMENTS, REVISIONS, AND ADDITIONS THERETO, TO THE FEDERAL DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION'S OCCUPATIONAL SAFETY AND HEALTH STANDARDS (OSHA); AND APPLICABLE SAFETY, HEALTH REGULATIONS AND BUILDING CODES FOR CONSTRUCTION IN THE STATE OF NEW YORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GUARDING AND PROTECTING ALL OPEN EXCAVATIONS IN ACCORDANCE WITH THE PROVISION OF SECTION 107-05 (SAFETY AND HEALTH REQUIREMENTS) OF THE NYSDOT STANDARD SPECIFICATIONS. IF THE CONTRACTOR PERFORMS ANY HAZARDOUS CONSTRUCTION PRACTICES, ALL OPERATIONS IN THE AFFECTED AREA SHALL BE DISCONTINUED AND IMMEDIATE ACTION SHALL BE TAKEN TO CORRECT THE SITUATION TO THE SATISFACTION OF THE APPROVAL AUTHORITY HAVING JURISDICTION.
5. CONTRACTOR SHALL MAINTAIN ACCESS TO ALL PROPERTIES AFFECTED BY THE SCOPE OF WORK SHOWN HEREON AT ALL TIMES TO THE SATISFACTION OF THE OWNERS REPRESENTATIVE. RAMPING CONSTRUCTION TO PROVIDE ACCESS MAY BE CONSTRUCTED WITH SUBBASE MATERIAL EXCEPT THAT TEMPORARY ASPHALT CONCRETE SHALL BE PLACED AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SAFE PEDESTRIAN ACCESS AT ALL TIMES.
6. CONTRACTOR SHALL MAINTAIN THE INTEGRITY OF EXISTING PAVEMENT TO REMAIN.

SUBSURFACE UTILITY LOCATIONS ARE BASED ON A COMPILATION OF FIELD EVIDENCE, AVAILABLE RECORD PLANS AND/OR UTILITY MARK-OUTS. THE LOCATION OR COMPLETENESS OF UNDERGROUND INFORMATION CANNOT BE GUARANTEED. VERIFY THE ACTUAL LOCATION OF ALL UTILITIES PRIOR TO EXCAVATION OR CONSTRUCTION.

811 Know what's below. Call before you dig.

ANY ALTERATION OF PLANS, SPECIFICATIONS, PLATS AND REPORTS BEARING THE SEAL OF A LICENSED PROFESSIONAL ENGINEER OR LICENSED LAND SURVEYOR IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW, EXCEPT AS PROVIDED FOR BY SECTION 7209, SUBSECTION 2.

APPROVED BY TOWN OF NORTH CASTLE PLANNING BOARD RESOLUTION, DATED ________

________________________ DATE: ________
CHRISTOPHER CARTHY, CHAIRMAN,
TOWN OF NORTH CASTLE PLANNING BOARD

ENGINEERING DRAWINGS REVIEWED BY TOWN CONSULTING ENGINEER

________________________ DATE: ________
JOSEPH M. CERMELE, P.E.
KELLARD SESSIONS CONSULTING, P.C.
CONSULTING TOWN ENGINEER

STATE OF NEW YORK ★ FREDERICK BOHLANDER ★ LICENSED PROFESSIONAL ENGINEER 100532-1

No.	Revision	Date	By
1.	PLANNING BOARD SUBMISSION	03/28/2022	RB
2.	RPRC SUBMISSION	05/02/2022	RB
3.	RESPOND TO COMMENTS	05/23/2022	RB
	Previous Editions Obsolete		

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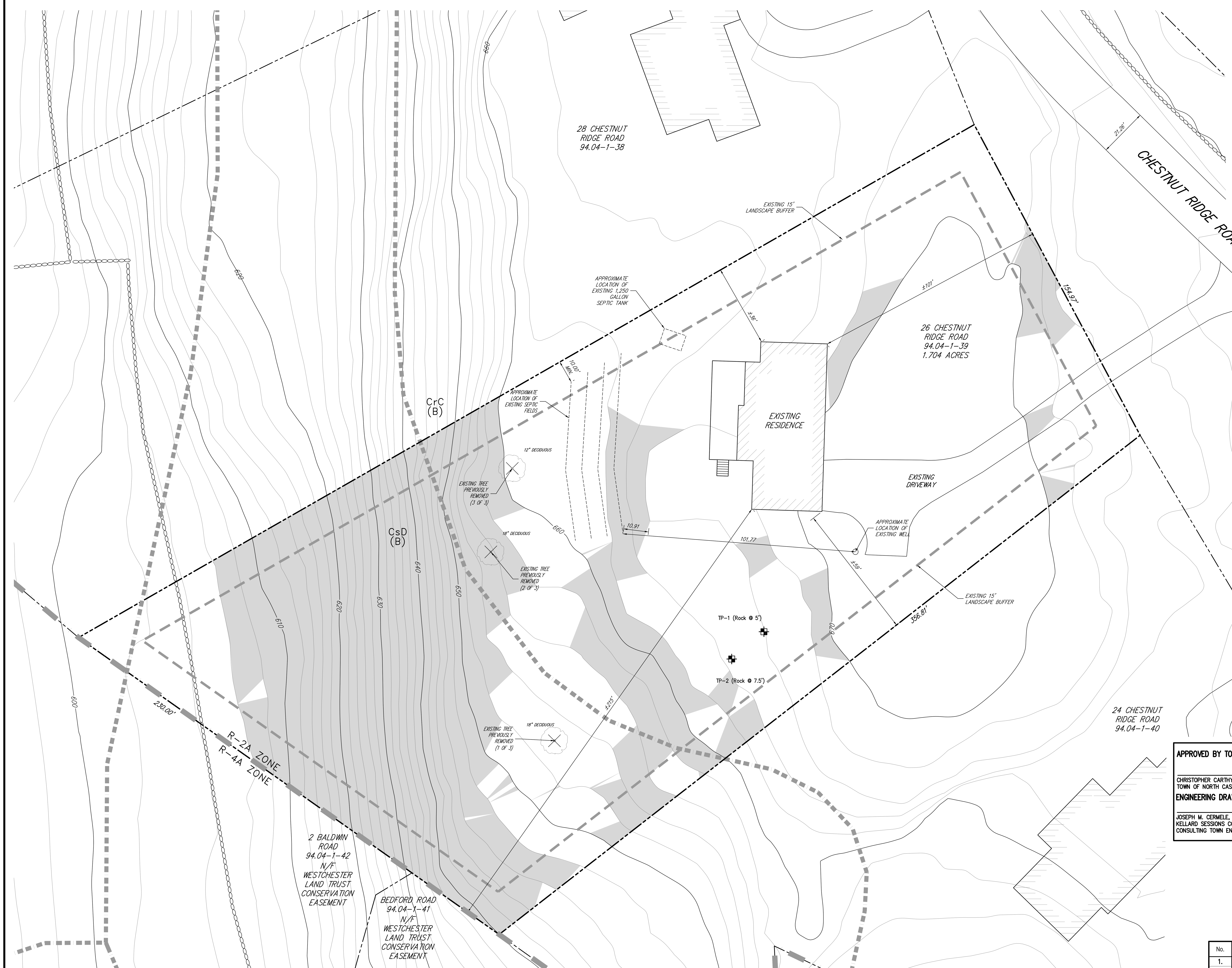
JMC Site Development Consultants, LLC
John Meyer Consulting, Inc.
120 BEDFORD ROAD • ARMONK, NY 10504
voice 914.273.5225 • fax 914.273.2102
www.jmcpllc.com

Drawn: RB	Approved: AN		
Scale:	NOT TO SCALE		
Date:	02/17/2022		
Project No:	22021		
Existing	COVER	COVER.scr	
Drawing No:	C-000		



LEGEND

	EXISTING PROPERTY LINE
	ADJACENT PROPERTY LINE
	EXISTING BUILDING LINE
	EXISTING PAVEMENT EDGE
664	EXISTING CONTOUR
660	EXISTING INDEX CONTOUR
	EXISTING STONE WALL
CrC (B)	EXISTING SOIL DIVIDE AND DESIGNATION
	SLOPES EQUAL TO OR GREATER THAN 15%

NOTES:

1. EXISTING CONDITIONS DEPICTED ON THIS PLAN HAVE BEEN TAKEN FROM THE SURVEY TITLED "PLAN OF SEWAGE SYSTEM AS BUILT FOR T.S.I. DEVELOPMENT CORP.", DATED JUNE 3, 1981 AND SUPPLEMENTED BY WESTCHESTER GIS INFORMATION. ALL TOPOGRAPHIC INFORMATION HAS BEEN TAKEN FROM WESTCHESTER COUNTY GIS INFORMATION.

APPROVED BY TOWN OF NORTH CASTLE PLANNING BOARD RESOLUTION, DATED ________

________ DATE: ________

CHRISTOPHER CARTHY, CHAIRMAN,
TOWN OF NORTH CASTLE PLANNING BOARD

ENGINEERING DRAWINGS REVIEWED BY TOWN CONSULTING ENGINEER

________ DATE: ________

JOSEPH M. CERMELE, P.E.
KELLARD SESSIONS CONSULTING, P.C.
CONSULTING TOWN ENGINEER

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STATE OF NEW YORK · FREDERICK BOHLANDER · 100532-1 · LICENSED PROFESSIONAL ENGINEER

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

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APPLICANT/OWNER:

ANTHONY MARINO
26 CHESTNUT RIDGE ROAD
ARMONK, NEW YORK 10504

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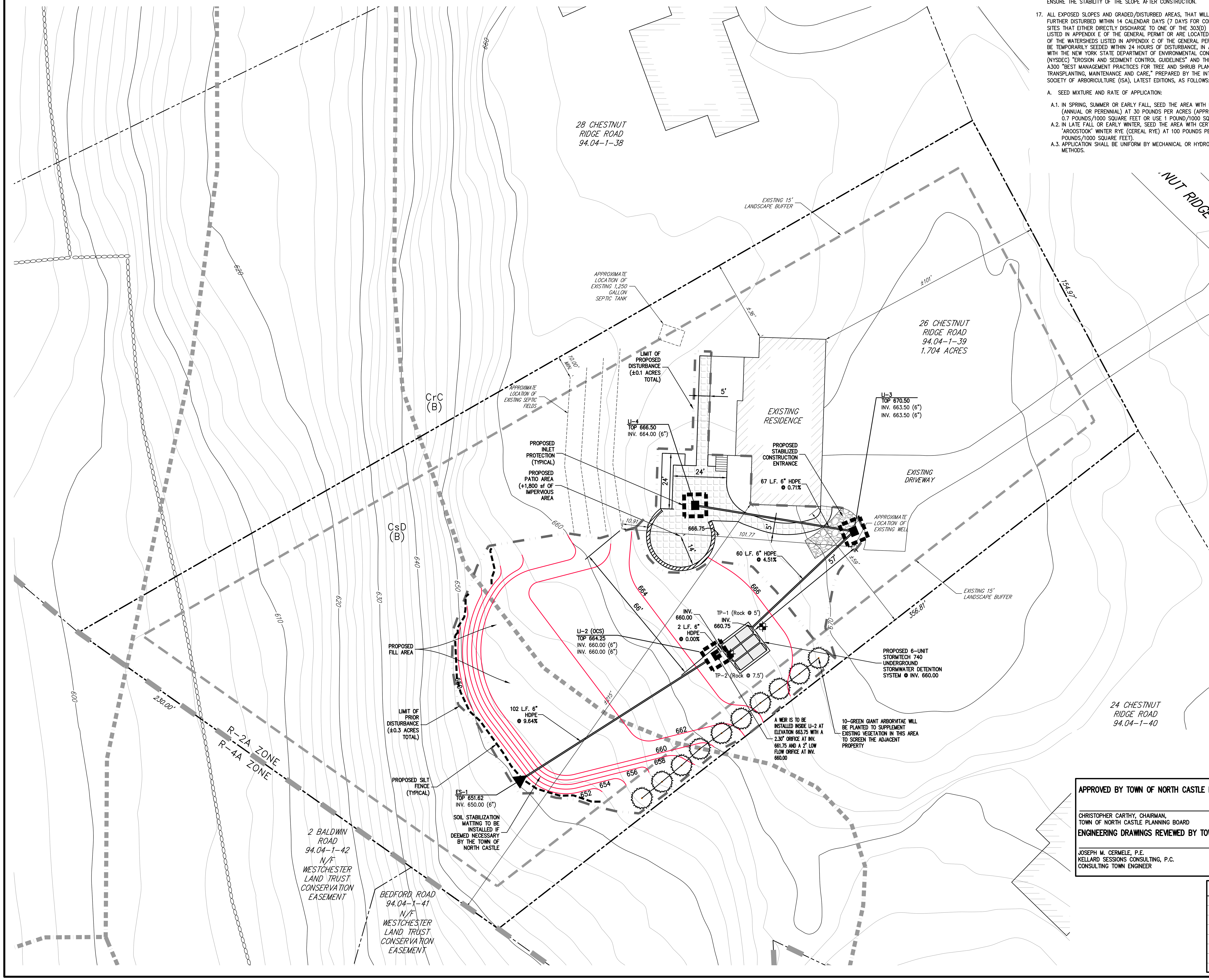
www.jmcpllc.com

EXISTING CONDITIONS MAP

PROPOSED SITE IMPROVEMENTS
26 CHESTNUT RIDGE ROAD
ARMONK, NEW YORK

Drawn: RB		Approved: AN	
Scale:	1" = 20'		
Date:	02/17/2022		
Project No:	22021		
Existing	EXIST	EXIST.scr	
Drawing No:	C-100		



13. ALL SEEDED AREAS SHALL BE FERTILIZED, RESEEDED, AND MULCHED AS NECESSARY TO MAINTAIN VIGOROUS, DENSE VEGETATIVE COVER.

14. TEMPORARY SEED MIXTURES SHALL NOT BE PLACED ON AREAS WHERE FINAL GRADE HAS BEEN ESTABLISHED AND TOPSOIL HAS BEEN PLACED UNLESS OTHERWISE DIRECTED BY THE PROJECT LANDSCAPE ARCHITECT.

15. ALL IMPORTED SOIL SHALL COMPLY WITH FEDERAL, STATE OR LOCAL REGULATIONS.

16. THE SLOPES CREATED BY THE IMPORT OF FILL SHALL BE STABILIZED TO ENSURE THE STABILITY OF THE SLOPE AFTER CONSTRUCTION.

17. ALL EXPOSED SLOPES AND GRADED/DISTURBED AREAS, THAT WILL NOT BE FURTHER DISTURBED WITHIN 14 CALENDAR DAYS (7 DAYS FOR CONSTRUCTION SITES THAT EITHER DIRECTLY DISCHARGE TO ONE OF THE 303(D) SEGMENTS LISTED IN APPENDIX E OF THE GENERAL PERMIT OR ARE LOCATED WITHIN ONE OF THE WATERSHEDS LISTED IN APPENDIX C OF THE GENERAL PERMIT), SHALL BE TEMPORARILY SEEDED WITHIN 24 HOURS OF DISTURBANCE, IN ACCORDANCE WITH THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) "EROSION AND SEDIMENT CONTROL GUIDELINES" AND THE ANSI A300 "BEST MANAGEMENT PRACTICES FOR TREE AND SHRUB PLANTING, TRANSPLANTING, MAINTENANCE AND CARE," PREPARED BY THE INTERNATIONAL SOCIETY OF ARBORICULTURE (ISA), LATEST EDITIONS, AS FOLLOWS:

A. SEED MIXTURE AND RATE OF APPLICATION:

A.1. IN SPRING, SUMMER OR EARLY FALL, SEED THE AREA WITH RYEGRASS (ANNUAL OR PERENNIAL) AT 30 POUNDS PER ACRES (APPROXIMATELY 0.7 POUNDS/1000 SQUARE FEET OR USE 1 POUND/1000 SQUARE FEET).
A.2. IN LATE FALL OR EARLY WINTER, SEED THE AREA WITH CERTIFIED 'AROOSTOOK' WINTER RYE (CEREAL RYE) AT 100 POUNDS PER ACRE (2.5 POUNDS/1000 SQUARE FEET).
A.3. APPLICATION SHALL BE UNIFORM BY MECHANICAL OR HYDROSEED METHODS.

LEGEND

- EXISTING PROPERTY LINE
- ADJACENT PROPERTY LINE
- EXISTING BUILDING LINE
- EXISTING PAVEMENT EDGE
- EXISTING CONTOUR
- EXISTING INDEX CONTOUR
- EXISTING STONE WALL
- CrC (B) — EXISTING SOIL DIVIDE AND DESIGNATION
- 670 — PROPOSED FINISHED GRADE
- 664 — PRIOR GRADING DONE WITHOUT BUILDING PERMIT
- LI — PROPOSED TYPE LI DRAIN LAWN INLET
- 6" HDPE — PROPOSED STORM DRAIN LINE & SIZE
- PROPOSED END SECTION
- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED STABILIZED CONSTRUCTION ENTRANCE
- PROPOSED SILT FENCE
- PROPOSED INLET PROTECTION
- PROPOSED PATIO AREA

NOTES:

1. EXISTING CONDITIONS DEPICTED ON THIS PLAN HAVE BEEN TAKEN FROM THE SURVEY TITLED "PLAN OF SEWAGE SYSTEM AS BUILT FOR T.S.I. DEVELOPMENT CORP.", DATED JUNE 3, 1981 AND SUPPLEMENTED BY WESTCHESTER GIS INFORMATION. ALL TOPOGRAPHIC INFORMATION HAS BEEN TAKEN FROM WESTCHESTER COUNTY GIS INFORMATION.

2. ALL STORMWATER MANAGEMENT PRACTICES SHALL REMAIN UNDISTURBED AND BE PROTECTED FROM HEAVY MACHINERY TRAFFIC DURING CONSTRUCTION. HOWEVER DURING CONSTRUCTION OF THE PRACTICE THE CONTRACTOR SHALL MINIMIZE AND AVOID HEAVY MACHINERY TRAFFIC TO THE MAXIMUM EXTENT PRACTICABLE. THERE SHALL BE NO STORAGE OF MATERIALS WITHIN AREAS TO BE USED FOR STORMWATER MANAGEMENT PRACTICES. THE CONTRACTOR SHALL INSTALL CONSTRUCTION FENCE AROUND THE PRACTICE TO DISCOURAGE VEHICLE TRAFFIC.

3. ALL FILLS SHALL BE COMPACTED TO PROVIDE STABILITY OF MATERIAL AND TO PREVENT SETTLEMENT.

4. EXCAVATIONS AND FILLS SHALL NOT ENDANGER ADJOINING PROPERTIES, NOR DIVERT WATER ONTO THE PROPERTY OF OTHERS AT ANY TIME DURING THE COURSE OF CONSTRUCTION.

5. CONTRACTOR SHALL REFER TO EROSION AND SEDIMENT CONTROL PLAN FOR FURTHER DIRECTION REGARDING SITE STABILIZATION THROUGHOUT THE COURSE OF CONSTRUCTION.

6. UNLESS OTHERWISE SPECIFIED, PIPE FOR STORM DRAINS SHALL BE HIGH DENSITY POLYETHYLENE PIPE (HDPE) WITH A SMOOTH INTERIOR AND ANNULAR EXTERIOR CORRUGATIONS IN ACCORDANCE WITH ASTM F-2648. JOINTS SHALL BE WATERTIGHT IN ACCORDANCE WITH ASTM D-3212.

7. PRIOR TO BEGINNING ANY CLEARING, GRUBBING OR EXCAVATION, ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH ALL THE PLANS AND SPECIFICATIONS. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL THE SITE IS STABILIZED. FINAL STABILIZATION OF LANDSCAPED AREAS SHALL BE IN ACCORDANCE WITH THE LANDSCAPE PLAN.

8. THE CONTRACTOR SHALL INSPECT AND MAINTAIN ON-SITE EROSION AND SEDIMENT CONTROL MEASURES ON A DAILY BASIS. ALL COLLECTED SEDIMENT WITHIN SEDIMENT BARRIERS SHALL BE REMOVED PERIODICALLY AS REQUIRED TO MAINTAIN THE FUNCTION OF THE SEDIMENT BARRIERS. ALL SEDIMENT COLLECTED SHALL BE RESPREAD ON-SITE WITHIN STABILIZED AREAS AS DIRECTED BY THE OWNERS REPRESENTATIVE.

9. THE CONTRACTOR SHALL INSPECT DOWNSTREAM CONDITIONS FOR EVIDENCE OF SEDIMENTATION ON A WEEKLY BASIS, AFTER EACH RAINSTORM, AND AS MAY BE REQUIRED OR DIRECTED BY ALL APPLICABLE APPROVALS AND PERMITS. THE CONTRACTOR SHALL IMMEDIATELY PROVIDE A WRITTEN REPORT ON FINDINGS OF SEDIMENT IN DOWNSTREAM AREAS TO ALL AUTHORITIES HAVING JURISDICTION AND MAKE REPAIRS AS REQUIRED OR DIRECTED.

10. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED BY THE CONTRACTOR AS REQUIRED/WARRANTED BY FIELD CONDITIONS AND AS DIRECTED BY THE OWNERS REPRESENTATIVE, JMC, AND/OR ANY AUTHORITY HAVING JURISDICTION.

11. STOCKPILING OF CONSTRUCTION MATERIAL SHALL BE PLACED ON-SITE IN THE AREA DESIGNATED ON THIS PLAN OR AS APPROVED BY THE OWNERS REPRESENTATIVE. STOCKPILED EXCAVATED MATERIAL SHALL HAVE TWO ROWS OF SILT FENCE LOCATED AROUND ITS PERIMETER. ALL STOCKPILED MATERIAL SHALL BE MAINTAINED IN AN ORDERLY MANNER SO AS NOT TO IMPEDE ON PEDESTRIAN AND/OR VEHICULAR TRAFFIC CIRCULATION ROUTES.

12. DUST SHALL BE CONTROLLED BY SPRINKLING OR OTHER APPROVED METHODS AS NECESSARY, OR AS DIRECTED BY THE OWNERS REPRESENTATIVE.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

APPROVED BY TOWN OF NORTH CASTLE PLANNING BOARD RESOLUTION, DATED ________

________ DATE: ________
CHRISTOPHER CARTHY, CHAIRMAN,
TOWN OF NORTH CASTLE PLANNING BOARD

ENGINEERING DRAWINGS REVIEWED BY TOWN CONSULTING ENGINEER

________ DATE: ________
JOSEPH M. CERMELE, P.E.
KELLARD SESSIONS CONSULTING, P.C.
CONSULTING TOWN ENGINEER

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STATE OF NEW YORK · FREDERICK BOHLANDER · 100532-1 · LICENSED PROFESSIONAL ENGINEER

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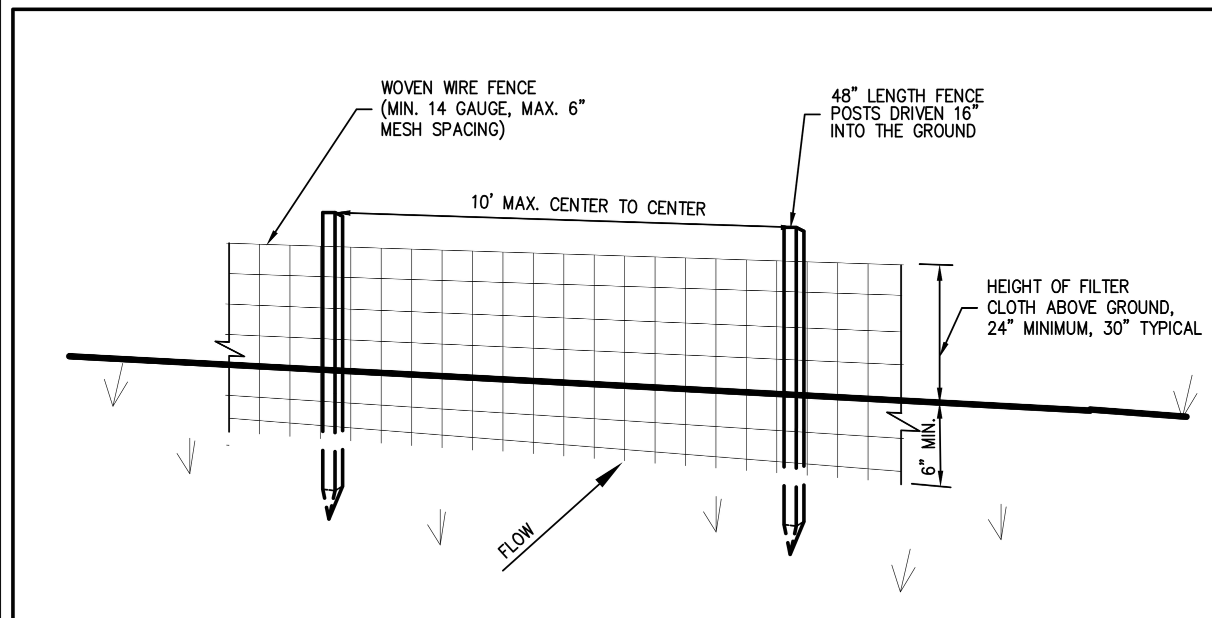
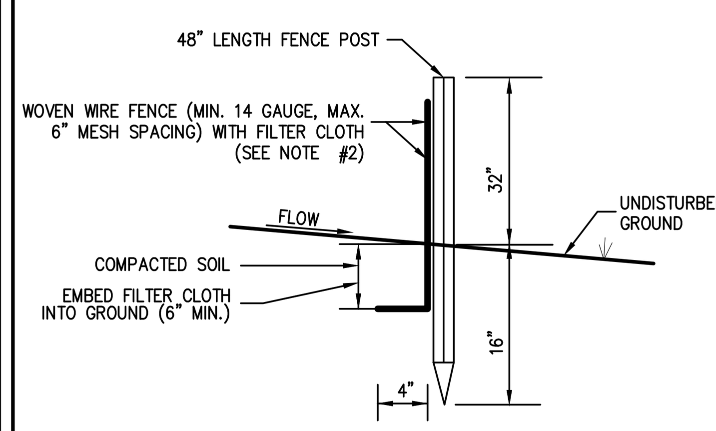
SITE PLAN

PROPOSED SITE IMPROVEMENTS
26 CHESTNUT RIDGE ROAD
ARMONK, NEW YORK

Drawn: RB	Approved: AN	
Scale: 1" = 20'		
Date: 02/17/2022		
Project No: 22021		
Existing	SITE	CSP.ls
Drawing No: C-200		



PERSPECTIVE VIEW



SECTION

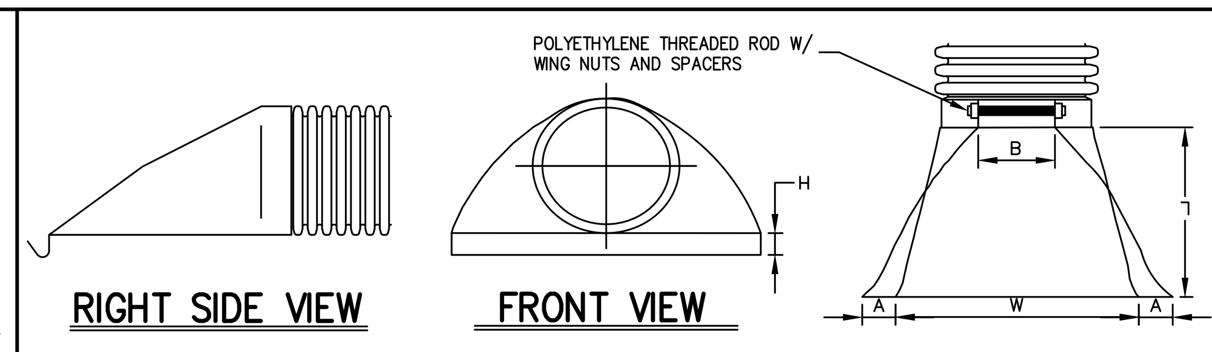
SLOPE	STEEPNESS	SLOPE LENGTH/FENCE LENGTH (FT.)
2–10%	50:1 TO 10:1	250/2000
10–20%	10:1 TO 5:1	150/1000
20–33%	5:1 TO 3:1	80/750
33–50%	3:1 TO 2:1	70/350
>50%	>2:1	30/175

*ALL SILT FENCES SHALL BE PLACED AS CLOSE TO THE DISTURBED AREA AS POSSIBLE, BUT AT LEAST 10 FEET FROM THE TOE OF A SLOPE STEEPER THAN 3H:1V, TO ALLOW FOR MAINTENANCE AND ROLL DOWN. THE AREA BEYOND THE FENCE MUST BE UNDISTURBED OR STABILIZED.

NOTES:

1. WOVEN WIRE FENCE SHALL BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL, EITHER T OR U TYPE OR HARDWOOD.
2. FILTER CLOTH SHALL BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABLINKA T140N, OR APPROVED EQUAL.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUAL.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED AND REPLACED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

SILT FENCE 1

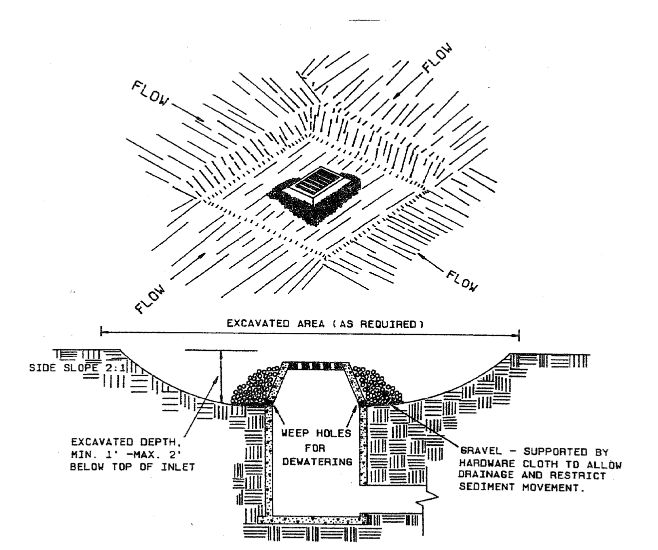


NOTES:

1. FASTENERS SHALL BE GALVANIZED STEEL.
2. ALL DIMENSIONS ARE NOMINAL.

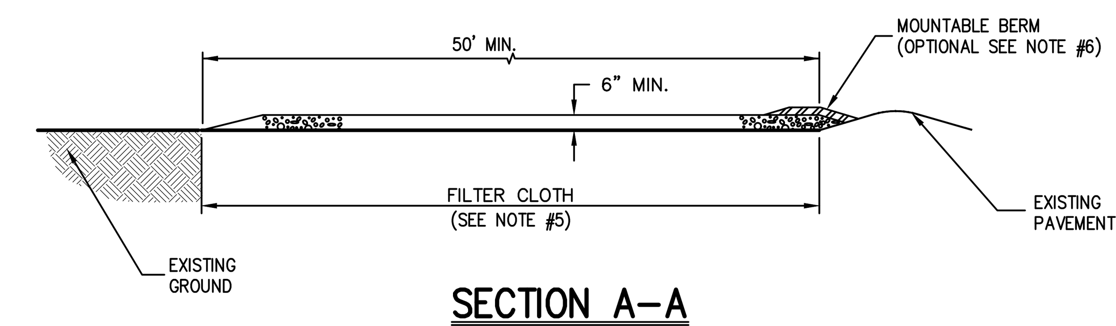
PIPE SIZE	A	B (MAX.)	H	L	W
12"	6.5"	10.0"	6.5"	25.0"	29.0"
15"	6.5"	10.0"	6.5"	25.0"	29.0"
18"	7.5"	15.0"	6.5"	32.0"	35.0"
24"	7.5"	18.0"	6.5"	36.0"	45.0"
30"	7.5"	12.0"	8.6"	58.0"	63.0"
36"	7.5"	25.0"	8.6"	58.0"	63.0"

END SECTION 2
(PLASTIC)

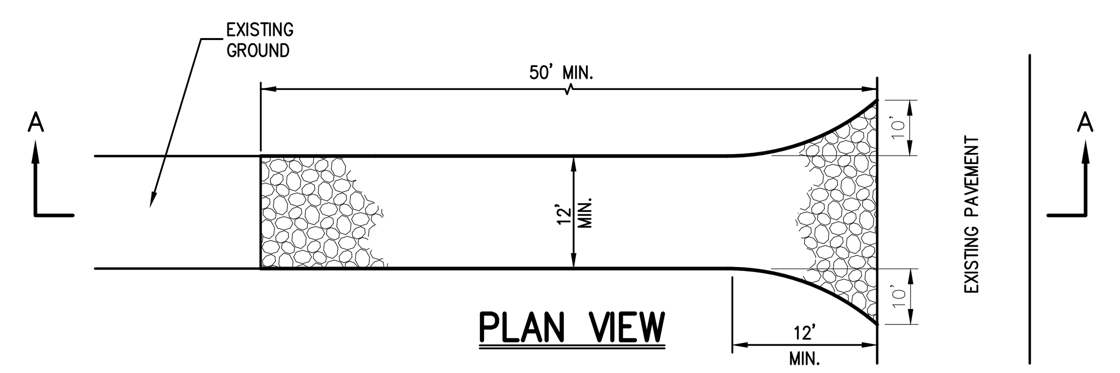


1. CLEAR THE AREA OF ALL DEBRIS THAT WILL HINDER EXCAVATION.
2. GRADE APPROACH TO THE INLET UNIFORMLY AROUND THE BASIN.
3. WEEP HOLES SHALL BE PROCTECTED BY/STONE.
4. PROVIDE FREQUENT INSPECTION AND MAINTENANCE. REMOVE ACCUMULATED SEDIMENT AND REPAIR OR REPLACE INLET PROTECTION TO MAINTAIN EFFECTIVENESS OF THE INSTALLATION.
5. UPON STABILIZATION OF CONTRIBUTING DRAINAGE AREA. SEAL WEEP HOLES FILL BASIN WITH STABLE SOIL TO FINAL GRADE. COMPACT IT PROPERLY AND STABILIZE WITH PERMANET SEEDING.

EXCAVATED DROP INLET PROTECTION 3



SECTION A–A

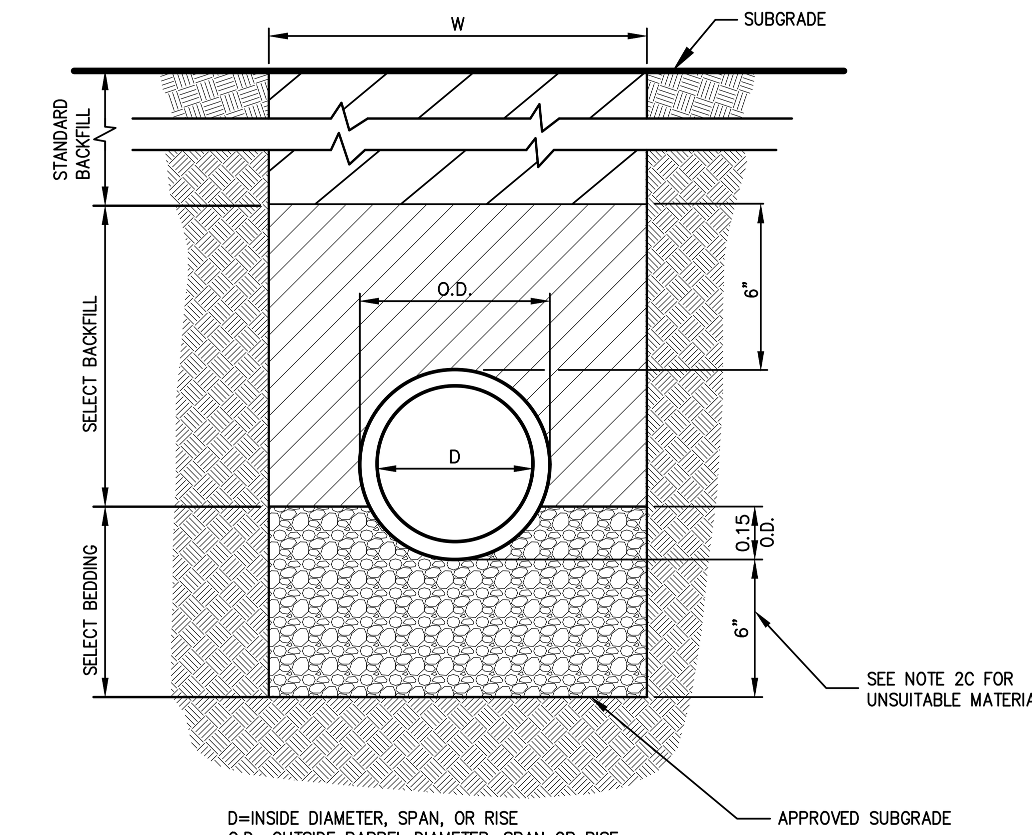


PLAN VIEW

NOTES

1. STONE SIZE – USE 1" TO 4" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH – AS REQUIRED, BUT NOT LESS THAN 50 FEET.
3. THICKNESS – NOT LESS THAN SIX (6) INCHES.
4. WIDTH – 12 FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. 24 FOOT MINIMUM IF SINGLE ENTRANCE TO SITE.
5. FILTER CLOTH TO BE PLACED OVER THE ENTIRE WIDTH AND LENGTH OF AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURE USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
8. WASHING – WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS–OF–WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

STABILIZED CONSTRUCTION ENTRANCE 4

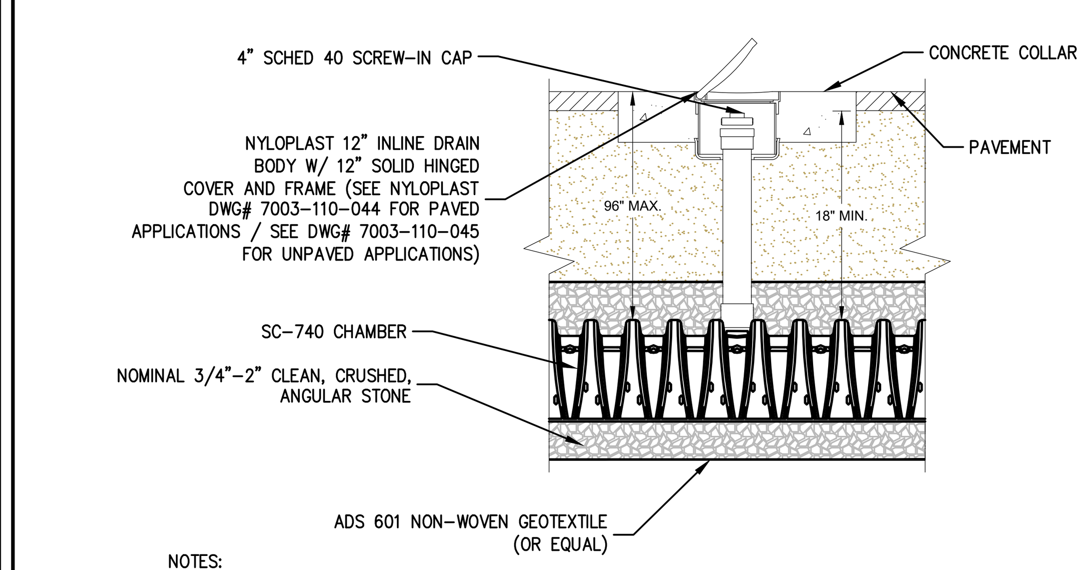


D=INSIDE DIAMETER, SPAN, OR RISE
O.D.=OUTSIDE BARREL DIAMETER, SPAN OR RISE
H.D.=OUTSIDE DIAMETER, SPAN, OR RISE @ BELL OR BAND
W=H.D. + 2.0' – FOR 48" OR SMALLER DIAMETER, SPAN, OR RISE
W=H.D. + 2.5' – FOR GREATER THAN 48" DIAMETER, SPAN, OR RISE

NOTES:

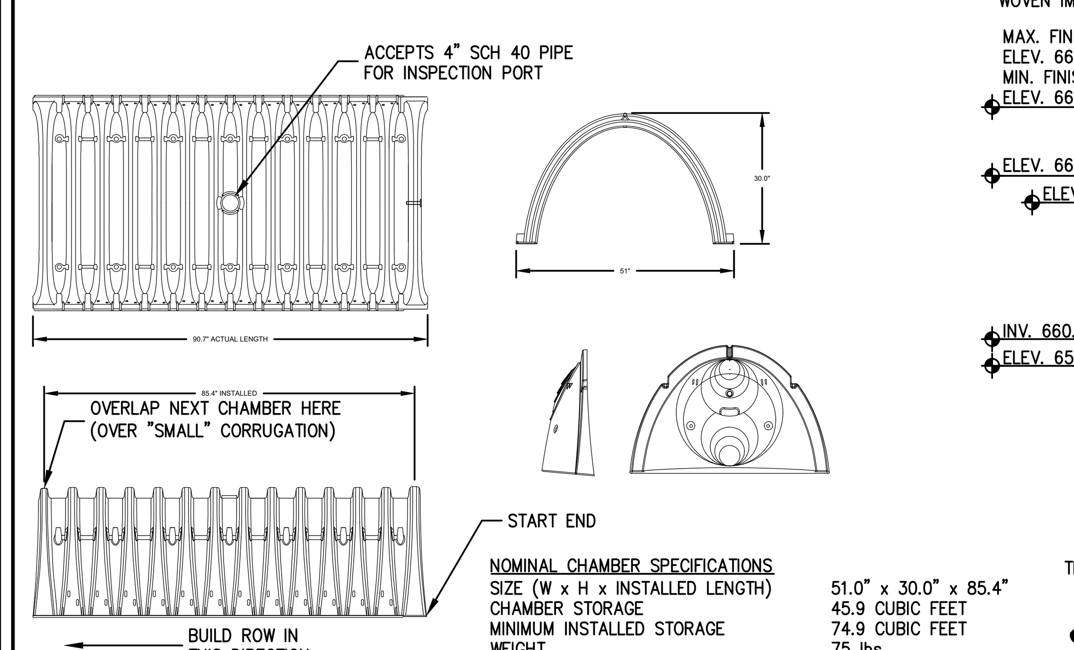
1. FOR TYPE II TRENCH, MATERIAL FOR SELECT BEDDING AND SELECT BACKFILL SHALL BE:
   A. EITHER SAND OR CRUSHED STONE IF NO WATER IS ENCOUNTERED IN TRENCH.
   B. 3/4"CRUSHED STONE IF WATER IS ENCOUNTERED IN TRENCH.
2. TYPE II TRENCH SHALL BE USED IN ALL OF THE FOLLOWING CASES:
   A. FOR ALL CORRUGATED POLYETHYLENE DRAIN PIPE (CPDP) AND PVC PIPE AND CONDUIT INSTALLATION.
   B. WHEN ROCK OR HARDPAN IS ENCOUNTERED IN BOTTOM OF TRENCH.
   C. WHEN UNSUITABLE MATERIAL IS ENCOUNTERED IN BOTTOM OF TRENCH. IN SUCH CASE DEPTH OF UNDERCUTTING SHALL BE AS DIRECTED BY THE ENGINEER WITH 6" MINIMUM.
3. FOR ALL TRENCH EXCAVATION IN FILL AREAS, ALL EMBANKMENTS SHALL BE CONSTRUCTED TO A MINIMUM OF 2 FEET ABOVE THE OUTSIDE TOP (AT THE BELL) OF THE PIPE PRIOR TO BEGINNING ANY TRENCH EXCAVATION.
4. BACKFILL FOR PIPE AND CONDUIT SHALL BE PLACED EVENLY AND CAREFULLY AROUND AND OVER THE PIPE OR CONDUIT IN SIX (6) INCH MAXIMUM LAYERS. EACH LAYER SHALL BE THOROUGHLY AND CAREFULLY COMPACTED UNTIL TWELVE (12) INCHES OF COVER EXISTS OVER THE PIPE OR CONDUIT. THE REMAINDER OF THE BACKFILL MAY THEN BE PLACED AND COMPACTED IN A MAXIMUM OF TWELVE (12) INCH LAYERS. EACH LAYER SHALL BE COMPACTED BY APPROVED MECHANICAL TAMPING MACHINES. UNLESS OTHERWISE SPECIFIED BACKFILL SHALL BE COMPACTED TO NOT LESS THAN 92% MAXIMUM MODIFIED DENSITY IN ACCORDANCE WITH ASTM DESIGNATION D–1557 IN THE MANNER HEREIN DESCRIBED. BACKFILL SHALL PROCEED UP TO THE LINES AND GRADES AS SHOWN ON THE DRAWINGS.

TYPE II TRENCH 5



NOTES:
1. INSPECTION PORT MUST BE CONNECTED THROUGH KNOCK–OUT LOCATED AT CENTER OF CHAMBER.
2. ALL SCHEDULE 40 FITTINGS TO BE SOLVENT CEMENTED.

INSPECTION PORT DETAIL



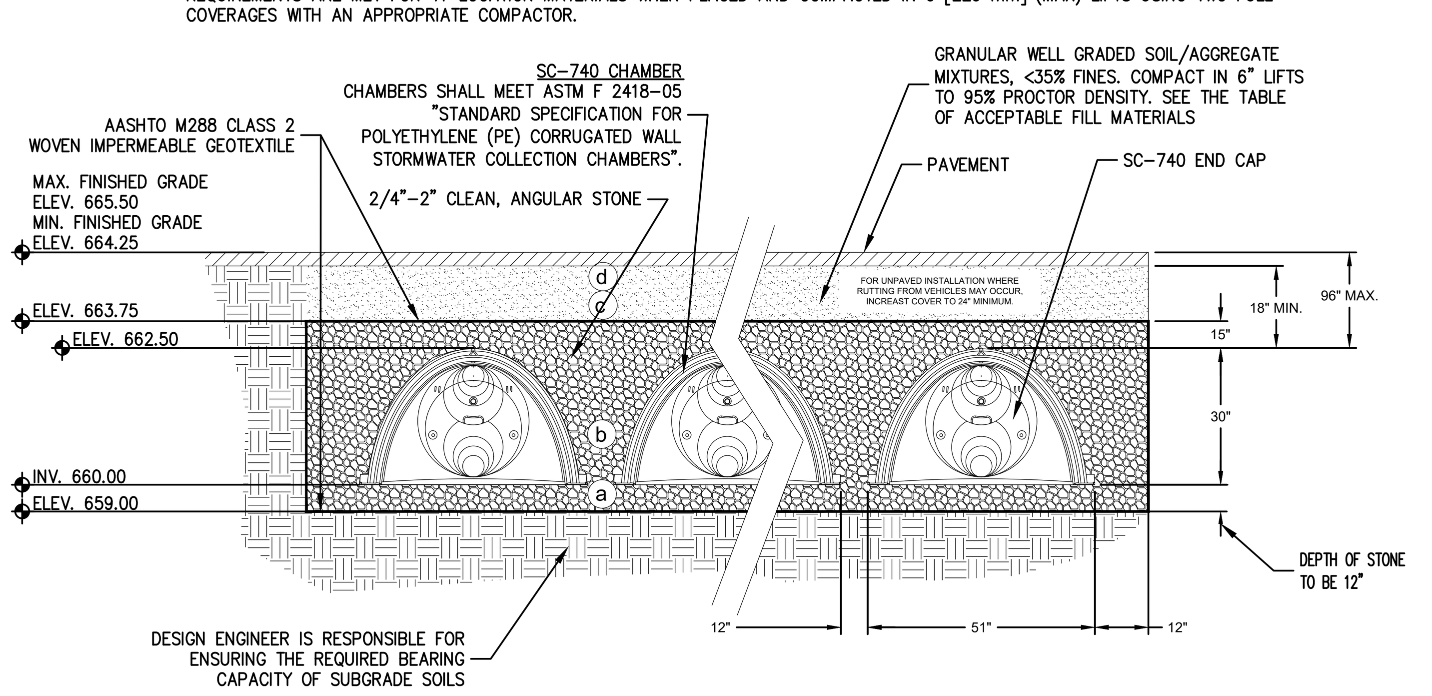
NOMINAL CHAMBER SPECIFICATIONS
SIZE (W x H x INSTALLED LENGTH) 51.0" x 30.0" x 85.4"
CHAMBER STORAGE 45.9 CUBIC FEET
MINIMUM INSTALLED STORAGE 74.9 CUBIC FEET
WEIGHT 75 lbs.

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO M43 DESIGNATION[1]	COMPACTION/DENSITY REQUIREMENT
(d) FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISH GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THIS LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
(c) FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THIS LAYER.	GRANULAR WELL–GRADED SOIL/AGGREGATE MIXTURES, < 35% FINES. MOST PAVEMENT SUB–BASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTION AFTER 12" OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" LIFTS TO A MIN. 95% STANDARD PROCTOR DENSITY. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs. DYNAMIC FORCE NOT TO EXCEED 20,000 lbs.
(b) EMBEDMENT STONE SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4 – 2 INCH	3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
(a) FOUNDATION STONE BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4 – 2 INCH	3, 35, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A 95% STANDARD PROCTOR DENSITY[2].

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".

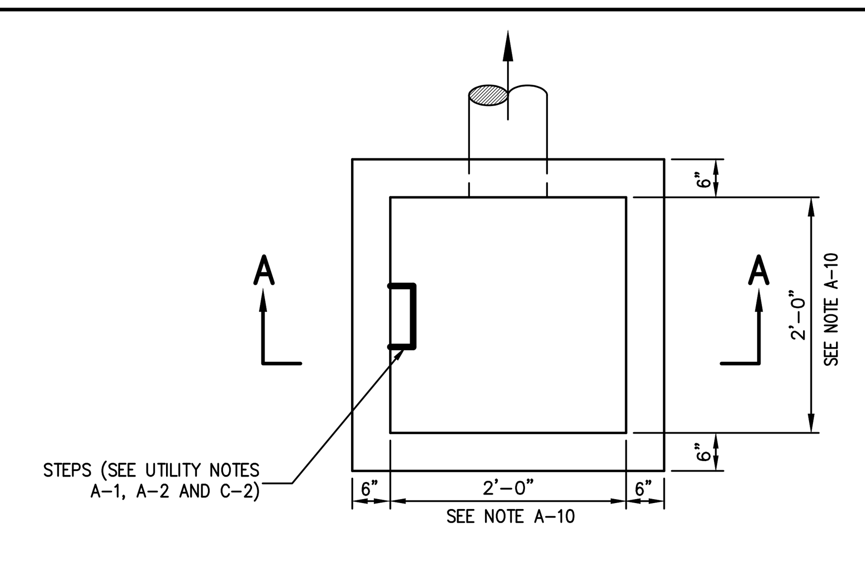
2. AS AN ALTERNATE TO PROCTOR TESTING AND FIELD DENSITY MEASUREMENTS ON OPEN GRADED STONE, STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9"[229 mm] (MAX) LIFTS USING TWO FULL COVERAGES WITH AN APPROPRIATE COMPACTOR.



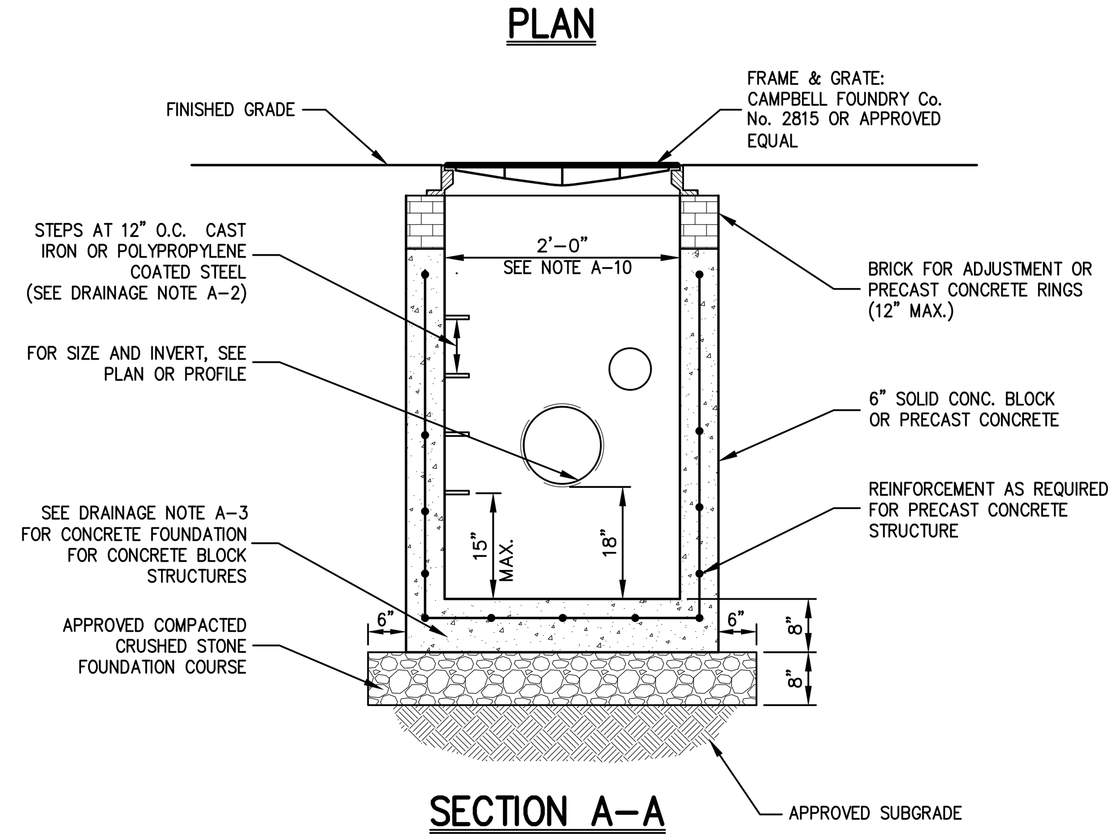
THIS CROSS SECTION DETAILS THE REQUIREMENTS NECESSARY TO SATISFY THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12 FOR EARTH AND LIVE LOADS USING STORMTECH CHAMBERS, WITH CONSIDERATION FOR IMPACT AND MUTIPLE VEHICLE PRESENCES.

SECTION AT DETENTION AND WATER QUALITY CONTROL

STORMTECH CHAMBERS SC–740 6



PLAN



SECTION A–A

NOTE
1. SEE NOTES PERTAINING TO DRAIN INLETS UNDER UTILITY NOTES ON THIS DRAWING.

LAWN INLET (TYPE LI) 7

NOTES PERTAINING TO DRAIN INLETS

- A–1 STEPS WILL NOT BE REQUIRED IN INLETS LESS THAN FOUR (4) FEET IN DEPTH. STEPS WILL BE REQUIRED IN INLETS FOUR (4) FEET OR GREATER IN DEPTH. DEPTHS FOR DRAIN INLETS SHALL BE MEASURED FROM FINISHED GRADE TO INSIDE BOTTOM OF STRUCTURE (INCLUDING SUMP AS APPLICABLE).
- A–2 WHEN STEPS ARE REQUIRED, STEPS SHALL COMPLY WITH THE SAME REQUIREMENTS OF ASTM STANDARD C–478, ARTICLE 13 ENTITLED "MANHOLE STEPS & LADDERS".
- A–3 FOR MASONRY STRUCTURES, THE FIRST COURSE OF MASONRY SHALL BE SET IN THE CONCRETE FOUNDATION BEFORE THE CONCRETE HAS SET. CONCRETE FOUNDATION SHALL BE CLASS "A"(4000 psi) CONCRETE, TWELVE (12) INCHES THICK AND SHALL EXTEND SIX (6) INCHES BEYOND THE OUTSIDE FACE THE STRUCTURE.
- A–4 IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FURNISH AND CONSTRUCT THE PROPER SIZE STRUCTURE INCLUDING THE NECESSARY OPENINGS TO ACCOMMODATE THE WORK AS SHOWN ON THE PLANS OR ORDERED BY THE ENGINEER, AT NO ADDITIONAL COST TO THE OWNER.
- A–5 ALL NECESSARY PATCHING FOR DRAIN STRUCTURES SHALL BE ACCOMPLISHED WITH NON–SHRINKING CEMENT MORTAR GROUT, APPROVED EQUAL TO SIKA–SET AS MANUFACTURED BY THE SIKA CHEMICAL CORP.
- A–6 FOUNDATIONS FOR PRECAST CONCRETE STRUCTURES SHALL BE SET ON A COMPACTED LAYER OF APPROVED CRUSHED STONE HAVING A MINIMUM COMPACTED THICKNESS OF EIGHT (8) INCHES.
- A–7 ALL PIPES SHALL BE CUT FLUSH WITH THE INSIDE WALL OF THE STRUCTURE.
- A–8 PROVIDE REINFORCED CONCRETE TOP SLAB FOR OVERSIZED DRAIN INLETS WITH PROPER SIZE OPENING TO ACCOMMODATE INSTALLATION OF FRAME & GRATE.
- A–9 FOR MASONRY STRUCTURES GREATER THAN TEN (10) FEET IN DEPTH, THICKNESS OF MASONRY WALLS SHALL BE INCREASED TO TWELVE (12) INCHES.
- A–10 FOR ALL STRUCTURES GREATER THAN 10 FEET IN DEPTH, STRUCTURES SHALL PROVIDE MINIMUM INSIDE DIMENSIONS OF 4 FEET X 4 FEET.

NOTES PERTAINING TO MANHOLES

- B–1 PRECAST CONCRETE MANHOLES SHALL COMPLY WITH ASTM STANDARD C–478. MANHOLE JOINTS SHALL COMPLY WITH ASTM STANDARD C–443.
- B–2 FOR PRECAST CONCRETE MANHOLES FIVE (5) FEET OR LESS IN HEIGHT, TOP CONE SECTION SHALL BE REPLACED WITH PRECAST REINFORCED CONCRETE SLAB (6" MIN. THICKNESS) WITH OPENING OF SUFFICIENT SIZE TO ACCOMMODATE MANHOLE CASTING.
- B–3 FOR MANHOLES 10 FEET OR MORE IN DEPTH, MANHOLE DIAMETER SHALL BE FIVE (5) FEET.
- B–4 TERMINAL MANHOLE FLOORS SHALL BE SLOPED TOWARD OUTFALL PIPE.
- B–5 INVERT CHANNELS FOR PRECAST CONCRETE MANHOLES SHALL BE CONSTRUCTED OF CONCRETE.
- B–6 NOTES A–1, A–2, A–4, A–5, A–6 & A–7 UNDER "NOTES PERTAINING TO DRAIN INLETS" ABOVE SHALL APPLY TO MANHOLES.

NOTES PERTAINING TO PRECAST CONCRETE STRUCTURES FOR STORM DRAINS, SANITARY SEWERS AND WATER LINES

- C–1 ALL PRECAST CONCRETE STRUCTURES SHALL BE DESIGNED TO ACCOMMODATE AN H–20 DESIGN LOAD.
- C–2 STEPS SHALL BE LOCATED WITHIN STRUCTURE TO AVOID PLACEMENT OVER PIPES WHEN PRACTICABLE.

APPROVED BY TOWN OF NORTH CASTLE PLANNING BOARD RESOLUTION, DATED ______

______ DATE: ______
CHRISTOPHER CARTHY, CHAIRMAN,
TOWN OF NORTH CASTLE PLANNING BOARD

ENGINEERING DRAWINGS REVIEWED BY TOWN CONSULTING ENGINEER

______ DATE: ______
JOSEPH M. CERMELE, P.E.
KELLARD SESSIONS CONSULTING, P.C.
CONSULTING TOWN ENGINEER

UTILITY NOTES 8

No.	Revision	Date
1.	PLANNING BOARD SUBMISSION	03/28/2022
2.	RPRC SUBMISSION	05/02/2022
3.	RESPOND TO COMMENTS	05/23/2022

Previous Editions Obsolete

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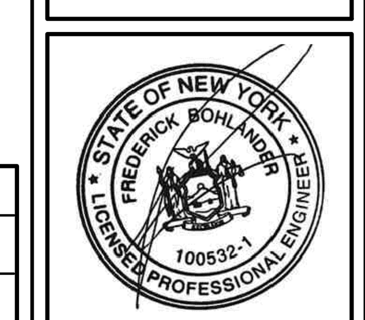
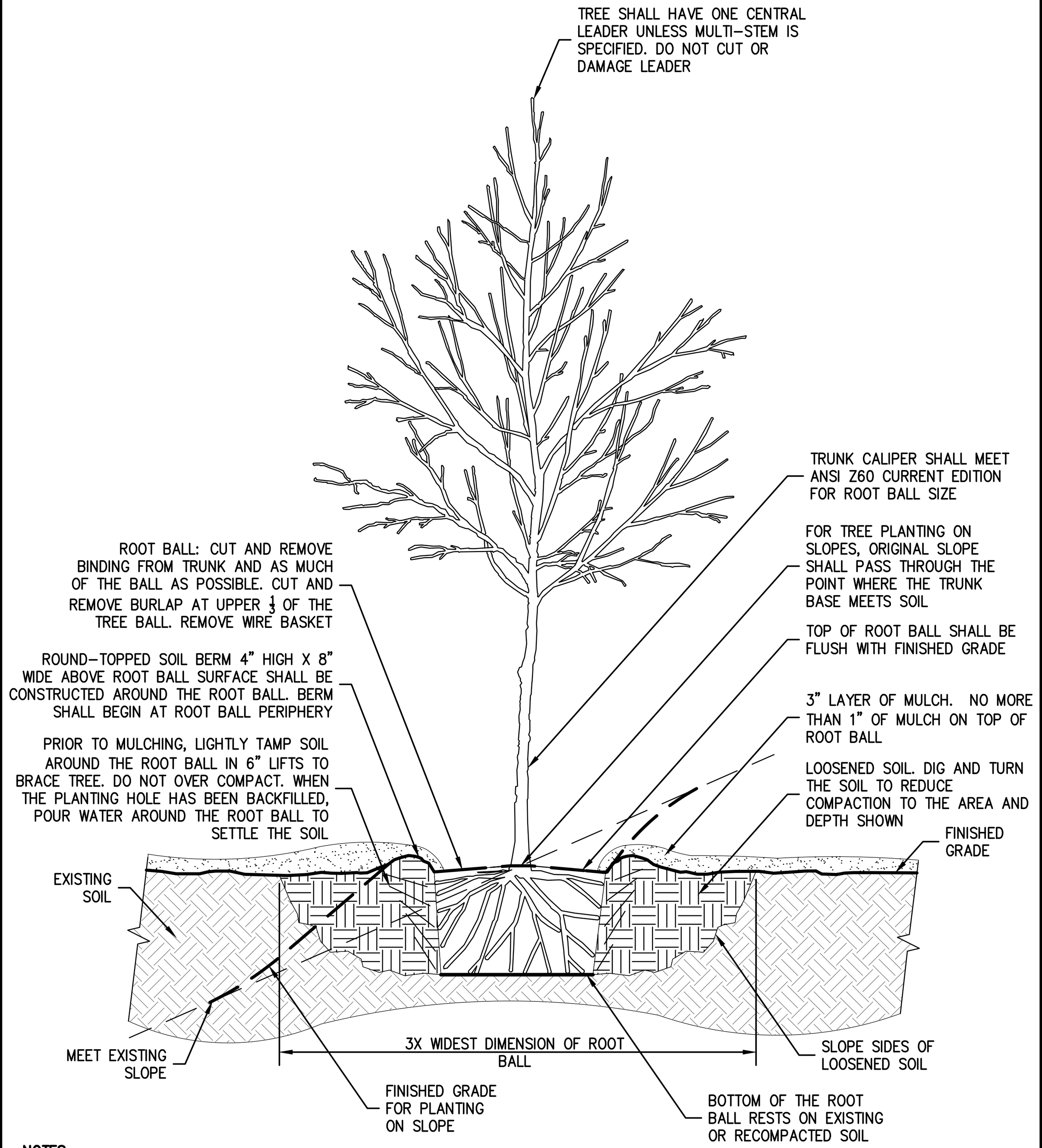
CONSTRUCTION DETAILS

PROPOSED SITE IMPROVEMENTS
26 CHESTNUT RIDGE ROAD
ARMONK, NEW YORK



Drawn: RB	Approved: AN
Scale: NOT TO SCALE	
Date: 02/17/2022	
Project No: 22021	
Details	MODEL –
Drawing No: C–900	

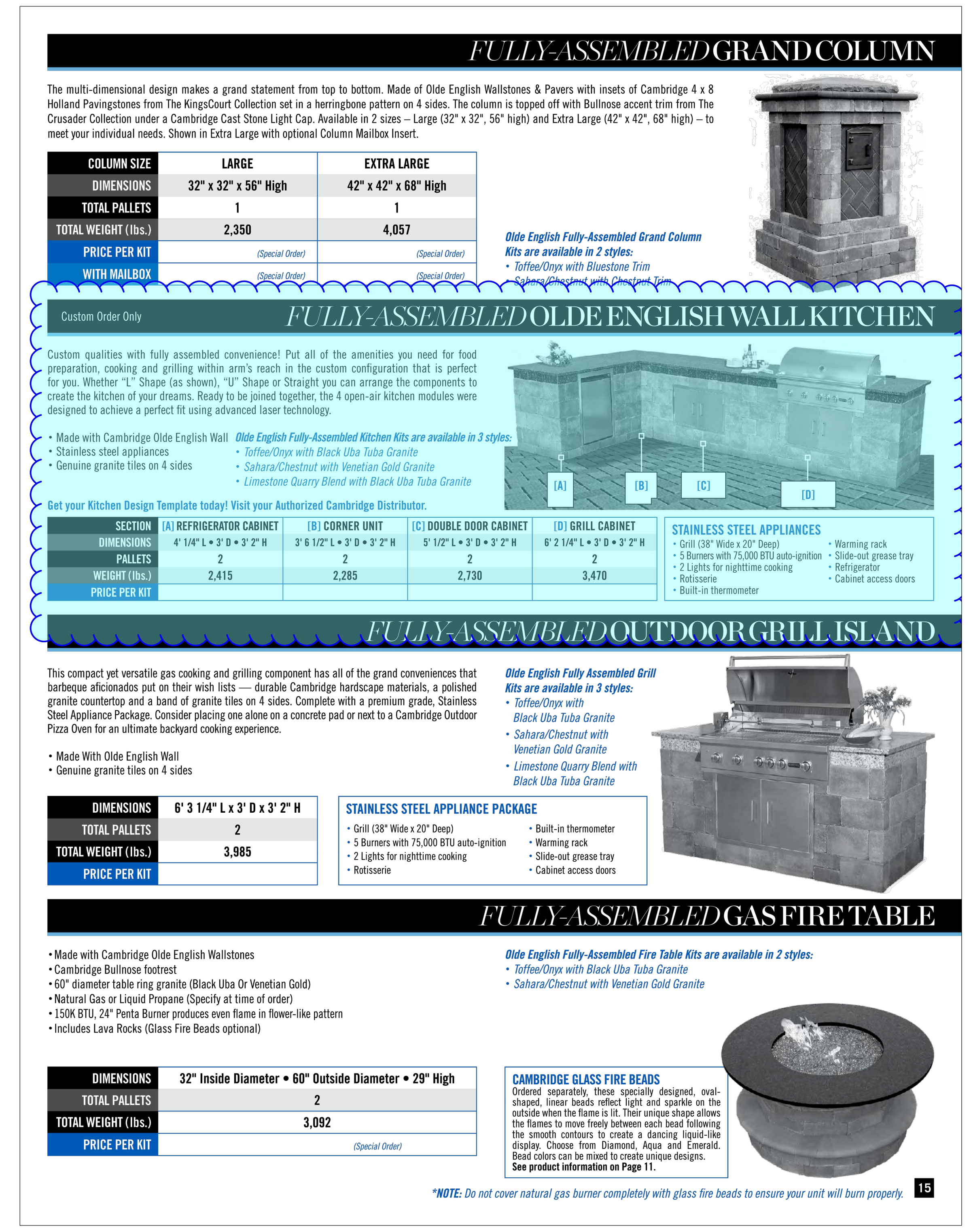


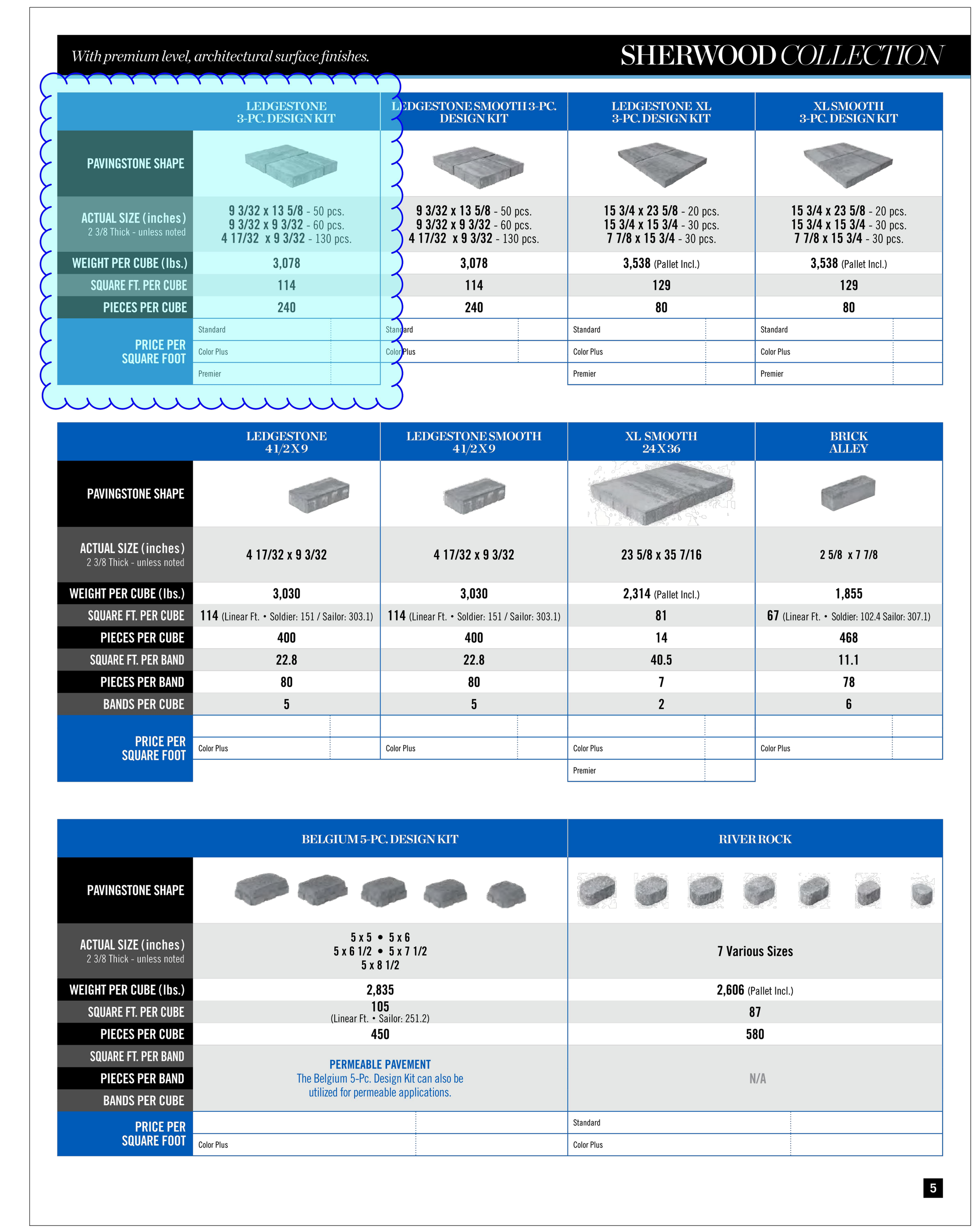
NOTES:

1. ALL PLANTING BEDS SHALL BE FREE OF WEEDS AND GRASS PRIOR TO AND FOLLOWING INSTALLATION OF PLANTS.
2. PLANTS IN CONTAINERS MUST HAVE THE FIBROUS ROOTS PULLED APART.
3. PROPOSED PLANT MATERIAL SHALL BEAR THE SAME RELATION TO FINISHED GRADE AS IT BORE TO PREVIOUS EXISTING GRADE.
4. SEE TREE STAKING DETAIL IF STAKING IS REQUIRED.

TREE PLANTING
(DECIDUOUS AND EVERGREEN)

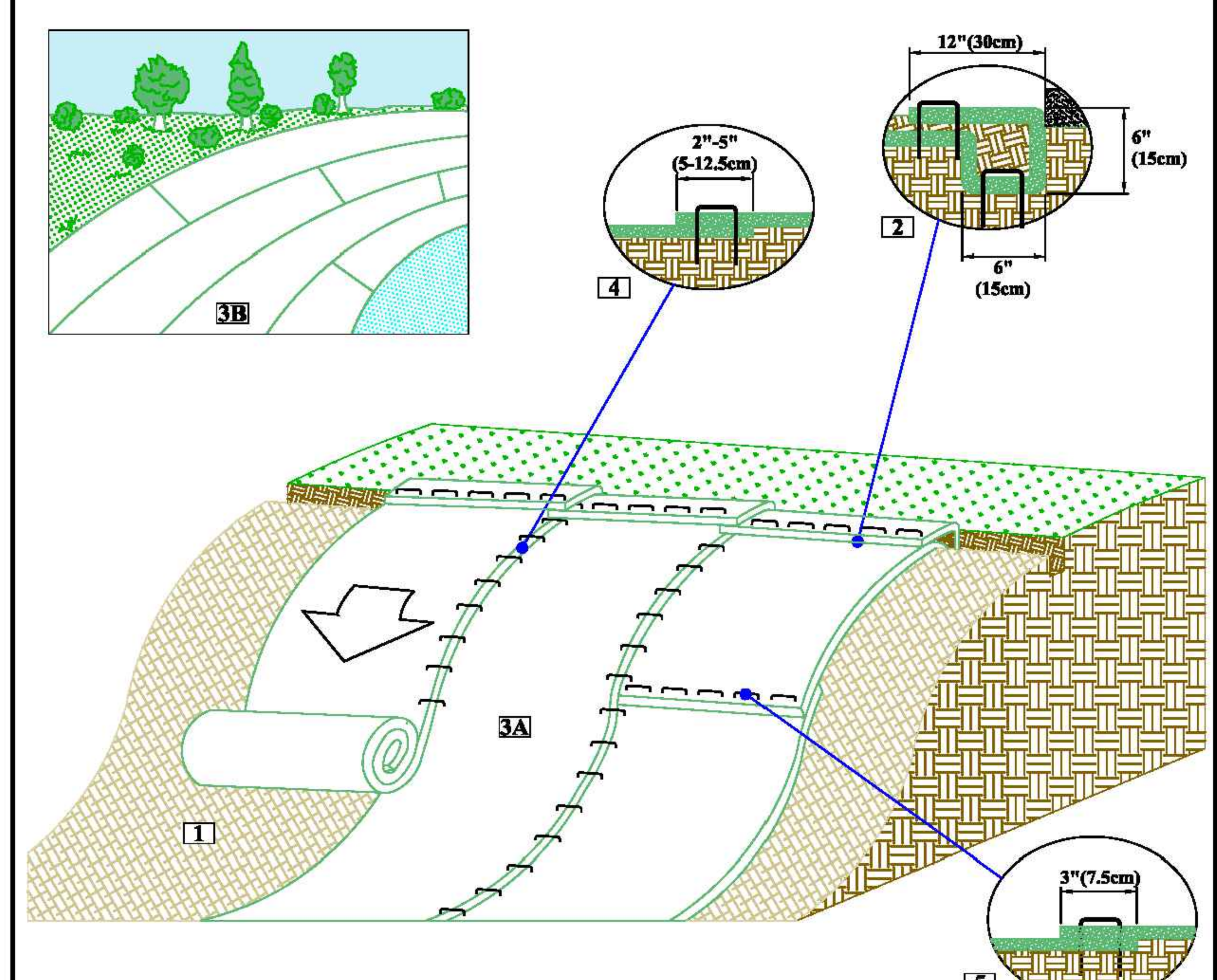
9





CAMBRIDGE PATIO

10



SLOPE INSTALLATION DETAIL

1. Prepare soil before installing rolled erosion control products (RECPs), including any necessary application of lime, fertilizer, and seed.
2. Begin at the top of the slope by anchoring the RECPs in a 6"(15cm) deep X 6"(15cm) wide trench with approximately 12" (30cm) of RECPs extended beyond the up-slope portion of the trench. Anchor the RECPs with a row of staples/stakes approximately 12" (30cm) apart in the bottom of the trench. Backfill and compact the trench after stapling. Apply seed to the compacted soil and fold the remaining 12"(30cm) portion of RECPs back over the seed and compacted soil. Secure RECPs over compacted soil with a row of staples/stakes spaced approximately 12"(30cm) apart across the width of the RECPs.
3. Roll the RECPs (A) down or (B) horizontally across the slope. RECPs will unroll with appropriate side against the soil surface. All RECPs must be securely fastened to soil surface by placing staples/stakes in appropriate locations as shown in the staple pattern guide.
4. The edges of parallel RECPs must be stapled with approximately 2" - 5" (5-12.5cm) overlap depending on the RECPs type.
5. Consecutive RECPs spliced down the slope must be end over end (Shingle style) with an approximate 3"(7.5cm) overlap. Staple through overlapped area, approximately 12"(30cm) apart across entire RECPs width.

*NOTE:
In loose soil conditions, the use of staple or stake lengths greater than 6"(15cm) may be necessary to properly secure the RECP's.

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Disclaimer:
The information presented herein is general design information only. For specific applications, consult an independent professional for further design guidance.

Drawn on: 3-16-11

TENSAR BIONET S150BN EROSION CONTROL BLANKET INSTALLATION

11

XX

XX

APPROVED BY TOWN OF NORTH CASTLE PLANNING BOARD RESOLUTION, DATED ______

DATE: ______

CHRISTOPHER CARTHY, CHAIRMAN,
TOWN OF NORTH CASTLE PLANNING BOARD

ENGINEERING DRAWINGS REVIEWED BY TOWN CONSULTING ENGINEER

DATE: ______

JOSEPH M. CERMELE, P.E.
KELLARD SESSIONS CONSULTING, P.C.
CONSULTING TOWN ENGINEER

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CONSTRUCTION DETAILS

PROPOSED SITE IMPROVEMENTS
26 CHESTNUT RIDGE ROAD
ARMONK, NEW YORK

ANY ALTERATION OF PLANS, SPECIFICATIONS, PLATS AND REPORTS BEARING THE SEAL OF A LICENSED PROFESSIONAL ENGINEER OR LICENSED LAND SURVEYOR IS A VIOLATION OF ARTICLE 145 OF THE NEW YORK STATE EDUCATION LAW, EXCEPT AS PROVIDED FOR BY SECTION 7209, SUBSECTION 2.

STATE OF NEW YORK • FREDERICK BOHLANDER • 100532-1 • LICENSED PROFESSIONAL ENGINEER

Drawn: RB	Approved: AN
Scale: NOT TO SCALE	
Date: 03/28/2022	
Project No: 22021	
Details	MODEL	-
Drawing No: C-901	

STORMWATER REPORT

JMC Project 22021
Marino Residence Improvements
26 Chestnut Ridge Road
Town of North Castle, New York
February 18, 2022
Revised May 19, 2022

I. INTRODUCTION

This stormwater report has been prepared to study the stormwater management aspects of the proposed 26 Chestnut Ridge Road improvements and subsequent proposed drainage improvements located at the above address. The development has been designed in accordance with the following:

- New York State Stormwater Management Design Manual, dated January 2015.
- Chapter 267, titled "Stormwater Management" of the North Castle Town Code.

The applicant is proposing site improvements that include the import of fill to level the front yard, the construction of a patio area located in the backyard along with stormwater improvements to mitigate the approximate increase of 1,800 sf of impervious area caused by these improvements. The stormwater improvements will include two lawn inlets with sumps that will convey runoff into an underground detention system made up of 6-Stormtech 740 units that will detain and release runoff slowly as to maintain peak runoff flows under proposed conditions as compared to existing conditions, despite the increase in impervious surfaces. A cut and fill analysis produced a net import of material of approximately 1,550 cy of material (which include material already brought to the Site that is shown in red on the plans).

A hydrologic analysis of the drainage area and its sub-drainage areas studied herein was prepared using the USDA Soil Conservation Service TR-55 "Urban Hydrology for Small Watersheds" methodology for the following rainfall events shown in Table 1:

Table 1
TR-55 24 Hour Rainfall Depths

Design Storm Recurrence Interval	Inches of Rainfall
1 Year Storm Event	**2.80**
5 Year Storm Event	**4.30**
10 Year Storm Event	**5.12**

25 Year Storm Event	**6.45**
100 Year Storm Event	**9.16**

Rainfall depths shown in the table above for the Town of Armonk in Westchester County are taken from the Extreme Precipitation Tables from the Northeast Regional Climate Center 24-hour rainfall frequency data from Cornell University's precip.net.

As detailed below, the project will result in a net increase in the overall impervious surfaces by approximately 1,800 sf.

Table 2
Pre- and Post-Construction Site Impervious Coverage Numbers

Pre-Construction Impervious Coverage (sf)	Post-Construction Impervious Coverage (sf)	Total Increase in Impervious Coverage (sf)
5,558	7,358	1,800

II. EXISTING CONDITIONS

Under existing conditions, the Site generally drains from east to west, towards the rear of the Site and eventually into drainage features running along Baldwin Road and Interstate 684. The rear property line has been designated as Design Line #1.

Existing Drainage Area 1 (EDA-1) is approximately 1.45 acres and includes the existing residence, associated walkways and landscaped areas, a portion of the driveway and a large, wooded area. As mentioned above, this drainage area generally drains from east to west, towards the rear of the Site and eventually into drainage features running along Baldwin Road and Interstate 684. The rear property line has been designated as Design Line #1, as shown on drawing DA-1, titled "Existing Drainage Area Map", provided in Appendix E of this report. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 62 and 7.68 minutes, respectively.

III. PROPOSED CONDITIONS

As mentioned above, the applicant is proposing site improvements that include the import of fill to level the front yard, the construction of a patio area located in the backyard along with stormwater improvements to mitigate the approximate increase of 1,800 sf of impervious area caused by these improvements. The stormwater improvements will include two lawn inlets with sumps that will convey runoff into an underground detention system made up of 6-Stormtech 740 units that will detain and release runoff slowly as to reduce peak runoff flows under proposed conditions as compared to existing conditions. A cut and fill analysis produced a net import of material of approximately 1,550 cy of material (which include material already brought to the Site that is shown in red on the plans.

Proposed Drainage Area 1 (PDA-1) is approximately 1.36 acres and includes the existing residence, associated walkways and landscaped areas, a portion of the driveway and a large, wooded area. This drainage area also contains a small portion of the new patio area and the regraded back yard area. As mentioned above, this drainage area generally drains from east to west, towards the rear of the Site and eventually into drainage features running along Baldwin Road and Interstate 684. The rear property line has been designated as Design Line #1, as shown on drawing DA-2, titled "Proposed Drainage Area Map", provided in Appendix E of this report. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 61 and 6.00 minutes, respectively.

Proposed Drainage Area 2 (PDA-2) is approximately 0.09 and contains much of the new patio area and some grass areas. Much of this new impervious area (patio area) and some grass areas will be collected by lawn inlets with sumps that will convey runoff into an underground detention system made up of 6-Stormtech 740 units that will detain and release runoff slowly as to maintain peak runoff flows under proposed conditions as compared to existing conditions, despite the increase in impervious surfaces. The rear property line has been designated as Design Line #1, as shown on drawing DA-2, titled "Proposed Drainage Area Map", provided in Appendix E of this report. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 88 and 5.70 minutes, respectively,

It should be noted that the underground stormwater mitigation system will be designed with no infiltration and simply as a detention system. It would be completely enclosed in an impermeable liner that will ensure zero infiltration.

Table 3 summarizes the peak rates of runoff under existing conditions compared to proposed conditions and the percent reduction. The numbers included in this table below were obtained from calculations included in Appendix A & B of this report.

Table 3
Percent Reductions in Peak Rates of Runoff (Existing vs. Proposed Conditions)
(Cubic Feet per Second)

Design Line	Storm Recurrence Frequency (Years)	Existing Peak Runoff Rate (cfs)	Total Proposed Peak Runoff Rate (cfs)	Percent Reduction (%)
1	1 year	0.27	0.26	3.7
	5 year	1.34	1.27	5.2
	10 year	2.05	1.99	2.9
	25 year	3.34	3.28	1.8
	100 year	6.36	6.36	0.0

IV. Sediment and Erosion Control

A potential impact of the proposed development on any soils or slopes will be that of erosion and transport of sediment during construction. An Erosion and Sediment Control Management Program will be established for the proposed development, beginning at the start of construction and continuing throughout its close, as outlined in the "New York State Standards and Specifications for Erosion and Sediment Control," November 2016. A continuing maintenance program will be implemented for the control of sediment transport and erosion control after construction and throughout the useful life of the project.

The Operator shall have a qualified professional conduct an assessment of the site prior to the commencement of construction and certify that the appropriate erosion and sediment controls, as shown on the Sediment & Erosion Control Plans, have been adequately installed to ensure overall preparedness of the site for the commencement of construction. In addition, the Operator shall have a qualified professional conduct one site inspection at least once every seven calendar days.

Soil Description

As provided by the United States Department of Agriculture, Soil Conservation Service "Web Soil Survey," soil classifications which exist on the subject site are described below.

Soils are placed into four hydrologic groups: A, B, C, and D. In the definitions of the classes, infiltration rate is the rate at which water enters the soil at the surface and is controlled by the surface conditions. Transmission rate is the rate at which water moves in the soil and is controlled by soil properties. Definitions of the classes are as follows:

A. (Low runoff potential). The soils have a high infiltration rate even when thoroughly wetted. They chiefly consist of deep, well drained to excessively drained sands or gravels. They have a high rate of water transmission.

B. The soils have a moderate infiltration rate when thoroughly wetted. They chiefly are moderately deep to deep, moderately well drained to well drained soils that have moderately fine to moderately coarse textures. They have a moderate rate of water transmission.

C. The soils have a slow infiltration rate when thoroughly wetted. They chiefly have a layer that impedes downward movement of water or have moderately fine to fine texture. They have a slow rate of water transmission.

D. (High runoff potential). The soils have a very slow infiltration rate when thoroughly wetted. They chiefly consist of clay soils that have a high swelling potential, soils that have a permanent highwater table, soils that have a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. They have a very slow rate of water transmission.

Per the USDA Web Soil Survey, the following soils listed below are present at the site. Following this list is a detailed description of each soil type found on the property:

SYM.	HYDRO. SOIL GROUP	DESCRIPTION
CrC	**B**	**Charlton-Chatfield Complex, 0-15% slopes, very rocky**
CsD	**B**	**Charlton-Chatfield Complex, 15-35% slopes, very rocky**

CrC, Charlton-Chatfield Complex, 0-15% slopes
This soil is well drained and the depth to the top of a seasonal highwater table is more than 6 feet. Hydrologic group: B

CsD, Charlton-Chatfield Complex, 15-35% slopes
This soil is well drained and the depth to the top of a seasonal highwater table is more than 6 feet. Hydrologic group: B

On-Site Pollution Prevention
There are temporary pollution prevention measures used to control litter and construction debris on site, such as:

- Silt Fence
- Stabilized Construction Entrance
- Silt Sack
- Excavated Drop Inlet Protection
- Stone & Block Drop Inlet Protection

Temporary Control Measures

Temporary control measures and facilities will include silt fences, stabilized construction access, temporary seeding and mulching.

Throughout the construction of the proposed improvements, temporary control facilities will be implemented to control on-site erosion and sediment transfer. Descriptions of the temporary sediment & erosion controls that will be used during the development of the site including silt fence, stabilized construction access, seeding, mulching and inlet protection are as follows:

1. Silt Fence is constructed using a geotextile fabric. The fence will be either 18 inches or 30 inches high. The height of the fence can be increased in the event of placing these devices on uncompacted fills or extremely loose undisturbed soils. The fences will not be placed in areas which receive concentrated flows such as ditches, swales and channels nor will the filter fabric material be placed across the entrance to pipes, culverts, spillway structures, sediment traps or basins.

2. Seeding will be used to create a vegetative surface to stabilize disturbed earth until at least 80% of the disturbed area has a perennial vegetative cover. This amount is

required to adequately function as a sediment and erosion control facility. Grass lining will also be used to line temporary channels and the surrounding disturbed areas.

3. Mulching is used as an anchor for seeding and disturbed areas to reduce soil loss due to storm events. These areas will be mulched with straw at a rate of 3 tons per acre such that the mulch forms a continuous blanket. Mulch must be placed after seeding or within 48 hours after seeding is completed.

4. Inlet Protection will be provided for all stormwater basins and inlets with the use of curb & gutter inlet protection and stone & block inlet protection structures, which will keep silt, sediment and construction debris out of the storm system. Existing structures within existing paved areas will be protected using "Silt Sacks" inside the structures.

5. Inlet Protection will be provided for all stormwater basins and inlets with the use of curb & gutter inlet protection and stone & block inlet protection structures or hay bale filters, which will keep silt, sediment, and construction debris out of the existing and proposed storm systems.

6. Stabilized Construction Entrance consists of AASHTO No. 1 rock. The rock entrance will be a minimum of 50 feet in length by 12 feet in width by 6 inches in depth.

The contractor shall be responsible for maintaining the temporary sediment and erosion control measures throughout construction. This maintenance will include, but not be limited to, the following tasks:

1. For dust control purposes, moisten all exposed graded areas with water at least twice a day in those areas where soil is exposed and cannot be planted with a temporary cover due to construction operations or the season (December through March).

2. Inspection of erosion and sediment control measures shall be performed at the end of each construction day and immediately following each rainfall event. All required repairs shall be immediately executed by the contractor.

3. Sediment deposits shall be removed when they reach approximately ⅓ the height of the silt fence. All such sediment shall be properly disposed of in fill areas on the site, as directed by the Owner's Field Representative. Fill shall be protected following disposal with mulch, temporary and/or permanent vegetation and be completely circumscribed on the downhill side by silt fence.

4. Rake all exposed areas parallel to the slope during earthwork operations.

5. Following final grading, the disturbed area shall be stabilized with a permanent surface treatment (i.e. turf grass, pavement or sidewalk). During rough grading, areas which are not to be disturbed for fourteen or more days shall be stabilized with the temporary

seed mixture, as defined on the plans. Seed all piles of dirt in exposed soil areas that will not receive a permanent surface treatment.

Solid Waste Management and Portable Sanitary Management

The purpose of this management measure is to prevent the potential for solid waste such as construction debris, trash, etc. from construction sites due to improper handling and storage. Debris and litter should be removed periodically from the BMP's and surrounding areas to prevent clogging of pipes and structures. All construction material shall be stored in designated staging areas. Roll-off containers shall be placed on site and all empty containers, construction debris and litter shall be placed in the containers.

Portable sanitary units may be utilized on-site, or bathrooms will be provided within construction trailers. A sanitation removal company will be hired to pump/remove any sanitary waste. In the event that portable sanitary units are used and then cleaned after being emptied, the rinse water may not be disposed of to the storm drain system. It shall be contained for later disposal if it can't be disposed of on-site. Remove paper and trash before cleaning the portable sanitary units. The portable sanitary units shall be located away from the storm drain system if possible. Provide overhead cover for wash areas if possible. Maintain spill response material and equipment on site to eliminate the potential for contaminants and wash water from entering the storm drain system.

Permanent Control Measures and Facilities for Long Term Protection

Towards the completion of construction, permanent sediment and erosion control measures will be developed for long term erosion protection. The following permanent control measures and facilities have been proposed to be implemented for the project:

1. Lawn Inlets will be used to remove some of the coarse sand and grit sediment before entering the drainage system. Each on site catch basin will be constructed with an 18-inch-deep sump.

2. Seeding of at least 70% perennial vegetative cover will be used to produce a permanent uniform erosion resistant surface. The seeded areas will be mulched with straw at a rate of 2 tons per acre such that the mulch forms a continuous blanket.

3. Underground Detention Basin will be made up of 4-StormTech 740 Recharge Chambers used to detain and mitigate the increase in peak rates of stormwater runoff. The StormTech 740 Recharge Chambers are domed shaped fully opened bottom corrugated chambers with perforated side walls. They are able to be used for residential, commercial or industrial applications and provide an easy way to detain stormwater runoff underground.

Specifications for Soil Restoration

Prior to the final stabilization of the disturbed areas, soil restoration will be required for all vegetated areas to recover the original properties and porosity of the soil. Soil Restoration Requirements are provided in the table on the following page:

<u>Soil Restoration Requirements</u>

<table>
<tr><th>Type of Soil Disturbance</th><th colspan="2">Soil Restoration Requirement</th><th>Comments/Examples</th></tr>
<tr><td>No soil disturbance</td><td colspan="2">Restoration not permitted</td><td>Preservation of Natural Features</td></tr>
<tr><td>Minimal soil disturbance</td><td colspan="2">Restoration not required</td><td>Clearing and grubbing</td></tr>
<tr><td rowspan="2">Areas where topsoil is stripped only – no change in grade</td><td>HSG A&B</td><td>HSG C&D</td><td rowspan="2">Protect area from any ongoing construction activities</td></tr>
<tr><td>apply 6 inches of topsoil</td><td>Aerate* and apply 6 inches of topsoil</td></tr>
<tr><td rowspan="2">Areas of cut or fill</td><td>HSG A&B</td><td>HSG C&D</td><td rowspan="2">Clearing and grubbing</td></tr>
<tr><td>Aerate and apply 6 inches of topsoil</td><td>Apply full Soil Restoration**</td></tr>
<tr><td>Heavy traffic areas on site (especially) in a zone 5-25 feet around buildings but not within a 5-foot perimeter around foundation walls)</td><td colspan="2">Apply full Soil Restoration (decompaction and compost enhancement)</td><td></td></tr>
<tr><td>Areas where Runoff Reduction and/or Infiltration practices are applied</td><td colspan="2">Restoration not required but may be applied to enhance the reduction specified for appropriate practices.</td><td>Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single-phase operation fence area.</td></tr>
<tr><td>Redevelopment projects</td><td colspan="2">Soil Restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.</td><td></td></tr>
</table>

* Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler.

** Per "Deep Ripping and De-compaction, DEC 2008."

During periods of relatively low to moderate subsoil moisture, the disturbed subsoils are returned to rough grade and the following full soil restoration steps applied:

1. Apply 3 inches of compost over subsoil.

2. Till compost into subsoil to a depth of at least 12 inches using a cat-mounted ripper, tractor-mounted disc, or tiller, mixing, and circulating air and compost into subsoils.

3. Rock-pick until uplifted stone/rock materials of four inches and larger size are cleaned off the site.

Specifications for Final Stabilization of Graded Areas

Final stabilization of graded areas consists of the placement of topsoil and installation of landscaping (unless the area is to be paved, or a building is to be constructed in the location). Topsoil is to be spread as soon as grading operations are completed. Topsoil is to be placed to a minimum depth of six inches on all embankments, planting areas and seeding/sod areas. The subgrade is to be scarified to a depth of two inches to provide a bond of the topsoil with the subsoil. Topsoil is to be raked to an even surface and cleared of all debris, roots, stones and other unsatisfactory material.

Planting operations shall be conducted under favorable weather conditions as follows:

- Permanent Lawns - April 15 (provided soil is frost-free and not excessively moist) to May 15; August 15 to October 15.
- Temporary Lawn Seeding - if outside of the time periods noted above, the areas shall be seeded immediately on completion of topsoil operations with annual ryegrass (Italian rye) at a rate of six pounds per 1,000 square feet. Temporary lawn installation is permitted provided the soil is frost-free and not excessively moist. The permanent lawn is to be installed the next planting season.

On slopes with a grade of 3 horizontal to 1 vertical or greater, and in swales, a geotextile netting or mat shall be installed for stabilization purposes as shown on the Plans. Seeded areas are to be mulched with straw or hay at an application rate of 70-90 pounds per 1,000 s.f. Straw or hay mulch must be spread uniformly and anchored immediately after spreading to prevent wind blowing. Mulches must be inspected periodically and in particular after rainstorms to check for erosion. If erosion is observed, additional mulch must be applied. Netting shall be inspected after rainstorms for dislocation or failure; any damage shall be repaired immediately.

All denuded surfaces which will be exposed for a period of over two months or more shall be temporarily hydroseeded with (a) perennial ryegrass at a rate of 40 lbs per acre (1.0 lb per 1000 square feet); (b) Certified "Aroostook" winter rye (cereal rye) @ 100 lb per acre (2.5 lb/1000 s.f.) to be used in the months of October and November.

Permanent turfgrass cover is to consist of a seed mixture as follows:

(a) <u>Sunny sites</u>

Kentucky Bluegrass	2.0-2.6 pounds/1000 square feet
Perennial Ryegrass	0.6-0.7 pounds/1000 square feet
Fine Fescue	0.4-0.6 pounds/1000 square feet

(b) <u>Shady sites</u>

Kentucky Bluegrass	0.8-1.0 pounds/1000 square feet
Perennial Ryegrass	0.6-0.7 pounds/1000 square feet
Fine Fescue	2.6-3.3 pounds/1000 square feet

All plant materials shall comply with the standards of the American Association Of Nurserymen with respect to height and caliper as described in its publication American Standard for Nursery Stock, latest edition.

V. CONCLUSION

The proposed Stormwater Management Report for the proposed improvements at 26 Chestnut Ridge Road in North Castle, New York demonstrates that the peak rate of runoff for the 1, 5, 10, 25 and 100-year storm events have been maintained when comparing post-development to pre-development conditions, despite the increase in impervious surfaces.

Based on the foregoing, it is our professional opinion that the proposed improvements will not have an adverse drainage impact to the site, adjacent properties, or downstream areas.

Respectfully Submitted,

JMC

Rick Bohlander, PE
Project Manager

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APPENDIX A

EXISTING HYDROLOGIC CALCULATIONS

Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

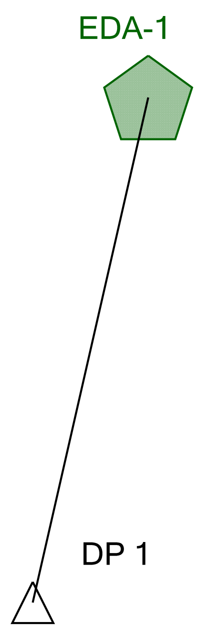

Table of Contents

Watershed

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)
EDA-1	26 Chestnut - Synthetic Curve, 1 yrs	1	1,699.000	12.150	0.27
EDA-1	26 Chestnut - Synthetic Curve, 5 yrs	5	5,411.000	12.150	1.34
EDA-1	26 Chestnut - Synthetic Curve, 10 yrs	10	7,988.000	12.150	2.05
EDA-1	26 Chestnut - Synthetic Curve, 25 yrs	25	12,691.000	12.150	3.34
EDA-1	26 Chestnut - Synthetic Curve, 100 yrs	100	23,632.000	12.100	6.36

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)
DP 1	26 Chestnut - Synthetic Curve, 1 yrs	1	1,699.000	12.150	0.27
DP 1	26 Chestnut - Synthetic Curve, 5 yrs	5	5,411.000	12.150	1.34
DP 1	26 Chestnut - Synthetic Curve, 10 yrs	10	7,988.000	12.150	2.05
DP 1	26 Chestnut - Synthetic Curve, 25 yrs	25	12,691.000	12.150	3.34
DP 1	26 Chestnut - Synthetic Curve, 100 yrs	100	23,632.000	12.100	6.36

Watershed

Subsection: Time-Depth Curve | Return Event: 1 years
Label: Armonk | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Time-Depth Curve: TypeIII 24hr (2.80 in)	
Label	TypeIII 24hr (2.80 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	1 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.00	0.01	0.01	0.01
0.500	0.01	0.02	0.02	0.02	0.03
1.000	0.03	0.03	0.03	0.04	0.04
1.500	0.04	0.04	0.05	0.05	0.05
2.000	0.06	0.06	0.06	0.06	0.07
2.500	0.07	0.07	0.08	0.08	0.08
3.000	0.09	0.09	0.09	0.10	0.10
3.500	0.10	0.11	0.11	0.11	0.12
4.000	0.12	0.12	0.13	0.13	0.14
4.500	0.14	0.14	0.15	0.15	0.15
5.000	0.16	0.16	0.17	0.17	0.18
5.500	0.18	0.18	0.19	0.19	0.20
6.000	0.20	0.21	0.21	0.22	0.22
6.500	0.23	0.23	0.24	0.24	0.25
7.000	0.25	0.26	0.27	0.27	0.28
7.500	0.28	0.29	0.30	0.30	0.31
8.000	0.32	0.33	0.33	0.34	0.35
8.500	0.36	0.37	0.38	0.39	0.40
9.000	0.41	0.42	0.43	0.44	0.45
9.500	0.46	0.48	0.49	0.50	0.52
10.000	0.53	0.54	0.56	0.57	0.59
10.500	0.61	0.62	0.64	0.66	0.68
11.000	0.70	0.72	0.75	0.77	0.80
11.500	0.83	0.88	0.95	1.05	1.16
12.000	1.40	1.64	1.75	1.85	1.92
12.500	1.97	2.00	2.03	2.05	2.08
13.000	2.10	2.12	2.14	2.16	2.18
13.500	2.19	2.21	2.23	2.24	2.26
14.000	2.27	2.28	2.30	2.31	2.32
14.500	2.34	2.35	2.36	2.37	2.38
15.000	2.39	2.40	2.41	2.42	2.43
15.500	2.44	2.45	2.46	2.47	2.47
16.000	2.48	2.49	2.50	2.50	2.51

Subsection: Time-Depth Curve
Return Event: 1 years
Label: Armonk
Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	2.52	2.52	2.53	2.53	2.54
17.000	2.55	2.55	2.56	2.56	2.57
17.500	2.57	2.58	2.58	2.59	2.59
18.000	2.60	2.60	2.61	2.61	2.62
18.500	2.62	2.62	2.63	2.63	2.64
19.000	2.64	2.65	2.65	2.65	2.66
19.500	2.66	2.66	2.67	2.67	2.68
20.000	2.68	2.68	2.69	2.69	2.69
20.500	2.70	2.70	2.70	2.71	2.71
21.000	2.71	2.72	2.72	2.72	2.73
21.500	2.73	2.73	2.74	2.74	2.74
22.000	2.75	2.75	2.75	2.75	2.76
22.500	2.76	2.76	2.77	2.77	2.77
23.000	2.77	2.78	2.78	2.78	2.79
23.500	2.79	2.79	2.79	2.80	2.80
24.000	2.80	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Time-Depth Curve | Return Event: 5 years
Label: Armonk | Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Time-Depth Curve: TypeIII 24hr (4.30 in)	
Label	TypeIII 24hr (4.30 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	5 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.00	0.01	0.01	0.02
0.500	0.02	0.03	0.03	0.03	0.04
1.000	0.04	0.05	0.05	0.06	0.06
1.500	0.06	0.07	0.07	0.08	0.08
2.000	0.09	0.09	0.09	0.10	0.10
2.500	0.11	0.11	0.12	0.12	0.13
3.000	0.13	0.14	0.14	0.15	0.15
3.500	0.16	0.16	0.17	0.17	0.18
4.000	0.18	0.19	0.20	0.20	0.21
4.500	0.21	0.22	0.23	0.23	0.24
5.000	0.24	0.25	0.26	0.26	0.27
5.500	0.28	0.28	0.29	0.30	0.30
6.000	0.31	0.32	0.32	0.33	0.34
6.500	0.35	0.35	0.36	0.37	0.38
7.000	0.39	0.40	0.41	0.42	0.43
7.500	0.44	0.45	0.46	0.47	0.48
8.000	0.49	0.50	0.51	0.53	0.54
8.500	0.55	0.57	0.58	0.60	0.61
9.000	0.63	0.64	0.66	0.68	0.70
9.500	0.71	0.73	0.75	0.77	0.79
10.000	0.81	0.83	0.86	0.88	0.91
10.500	0.93	0.96	0.99	1.01	1.04
11.000	1.08	1.11	1.15	1.19	1.23
11.500	1.28	1.35	1.46	1.61	1.79
12.000	2.15	2.51	2.69	2.84	2.95
12.500	3.02	3.07	3.11	3.15	3.19
13.000	3.23	3.26	3.29	3.31	3.34
13.500	3.37	3.39	3.42	3.44	3.47
14.000	3.49	3.51	3.53	3.55	3.57
14.500	3.59	3.60	3.62	3.64	3.66
15.000	3.67	3.69	3.70	3.72	3.73
15.500	3.75	3.76	3.77	3.79	3.80
16.000	3.81	3.82	3.83	3.84	3.85

Subsection: Time-Depth Curve | Return Event: 5 years

Label: Armonk | Storm Event: TypeIII 24hr (4.30 in)

Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	3.86	3.87	3.88	3.89	3.90
17.000	3.91	3.92	3.93	3.94	3.95
17.500	3.95	3.96	3.97	3.98	3.98
18.000	3.99	4.00	4.00	4.01	4.02
18.500	4.02	4.03	4.04	4.04	4.05
19.000	4.06	4.06	4.07	4.07	4.08
19.500	4.09	4.09	4.10	4.10	4.11
20.000	4.12	4.12	4.13	4.13	4.14
20.500	4.14	4.15	4.15	4.16	4.16
21.000	4.17	4.17	4.18	4.18	4.19
21.500	4.19	4.20	4.20	4.21	4.21
22.000	4.22	4.22	4.23	4.23	4.24
22.500	4.24	4.24	4.25	4.25	4.26
23.000	4.26	4.27	4.27	4.27	4.28
23.500	4.28	4.28	4.29	4.29	4.30
24.000	4.30	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Label: Armonk
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Return Event: 10 years
Storm Event: TypeIII 24hr (5.12 in)

Time-Depth Curve: TypeIII 24hr (5.12 in)	
Label	TypeIII 24hr (5.12 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	10 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.01	0.02	0.02
0.500	0.03	0.03	0.04	0.04	0.05
1.000	0.05	0.06	0.06	0.07	0.07
1.500	0.08	0.08	0.09	0.09	0.10
2.000	0.10	0.11	0.11	0.12	0.12
2.500	0.13	0.13	0.14	0.15	0.15
3.000	0.16	0.16	0.17	0.18	0.18
3.500	0.19	0.19	0.20	0.21	0.21
4.000	0.22	0.23	0.23	0.24	0.25
4.500	0.25	0.26	0.27	0.28	0.28
5.000	0.29	0.30	0.31	0.31	0.32
5.500	0.33	0.34	0.34	0.35	0.36
6.000	0.37	0.38	0.39	0.39	0.40
6.500	0.41	0.42	0.43	0.44	0.45
7.000	0.46	0.47	0.49	0.50	0.51
7.500	0.52	0.53	0.54	0.56	0.57
8.000	0.58	0.60	0.61	0.63	0.64
8.500	0.66	0.67	0.69	0.71	0.73
9.000	0.75	0.77	0.79	0.81	0.83
9.500	0.85	0.87	0.90	0.92	0.94
10.000	0.97	0.99	1.02	1.05	1.08
10.500	1.11	1.14	1.17	1.21	1.24
11.000	1.28	1.32	1.36	1.41	1.47
11.500	1.53	1.61	1.74	1.91	2.13
12.000	2.56	2.99	3.21	3.38	3.51
12.500	3.59	3.65	3.71	3.76	3.80
13.000	3.84	3.88	3.91	3.95	3.98
13.500	4.01	4.04	4.07	4.10	4.13
14.000	4.15	4.18	4.20	4.22	4.25
14.500	4.27	4.29	4.31	4.33	4.35
15.000	4.37	4.39	4.41	4.43	4.45
15.500	4.46	4.48	4.49	4.51	4.52
16.000	4.54	4.55	4.56	4.58	4.59

Watershed

Subsection: Time-Depth Curve | Return Event: 10 years
Label: Armonk | Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	4.60	4.61	4.62	4.63	4.65
17.000	4.66	4.67	4.68	4.69	4.70
17.500	4.71	4.72	4.73	4.73	4.74
18.000	4.75	4.76	4.77	4.78	4.78
18.500	4.79	4.80	4.81	4.81	4.82
19.000	4.83	4.84	4.84	4.85	4.86
19.500	4.87	4.87	4.88	4.89	4.89
20.000	4.90	4.91	4.91	4.92	4.93
20.500	4.93	4.94	4.94	4.95	4.96
21.000	4.96	4.97	4.98	4.98	4.99
21.500	4.99	5.00	5.00	5.01	5.02
22.000	5.02	5.03	5.03	5.04	5.04
22.500	5.05	5.05	5.06	5.06	5.07
23.000	5.07	5.08	5.08	5.09	5.09
23.500	5.10	5.10	5.11	5.11	5.12
24.000	5.12	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve — Return Event: 25 years
Label: Armonk — Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Time-Depth Curve: TypeIII 24hr (6.45 in)	
Label	TypeIII 24hr (6.45 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	25 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.01	0.02	0.03
0.500	0.03	0.04	0.05	0.05	0.06
1.000	0.06	0.07	0.08	0.08	0.09
1.500	0.10	0.10	0.11	0.12	0.12
2.000	0.13	0.14	0.14	0.15	0.16
2.500	0.16	0.17	0.18	0.18	0.19
3.000	0.20	0.21	0.21	0.22	0.23
3.500	0.24	0.24	0.25	0.26	0.27
4.000	0.28	0.29	0.29	0.30	0.31
4.500	0.32	0.33	0.34	0.35	0.36
5.000	0.37	0.38	0.38	0.39	0.40
5.500	0.41	0.42	0.43	0.44	0.45
6.000	0.46	0.47	0.49	0.50	0.51
6.500	0.52	0.53	0.54	0.56	0.57
7.000	0.58	0.60	0.61	0.63	0.64
7.500	0.66	0.67	0.69	0.70	0.72
8.000	0.74	0.75	0.77	0.79	0.81
8.500	0.83	0.85	0.87	0.89	0.92
9.000	0.94	0.96	0.99	1.02	1.04
9.500	1.07	1.10	1.13	1.16	1.19
10.000	1.22	1.25	1.29	1.32	1.36
10.500	1.40	1.44	1.48	1.52	1.57
11.000	1.61	1.66	1.72	1.78	1.85
11.500	1.92	2.03	2.19	2.41	2.68
12.000	3.23	3.77	4.04	4.26	4.42
12.500	4.53	4.60	4.67	4.73	4.79
13.000	4.84	4.88	4.93	4.97	5.01
13.500	5.05	5.09	5.13	5.16	5.20
14.000	5.23	5.26	5.29	5.32	5.35
14.500	5.38	5.41	5.43	5.46	5.49
15.000	5.51	5.53	5.56	5.58	5.60
15.500	5.62	5.64	5.66	5.68	5.70
16.000	5.71	5.73	5.75	5.76	5.78

Subsection: Time-Depth Curve Return Event: 25 years
Label: Armonk Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	5.79	5.81	5.82	5.84	5.85
17.000	5.87	5.88	5.89	5.91	5.92
17.500	5.93	5.94	5.95	5.96	5.98
18.000	5.99	6.00	6.01	6.02	6.03
18.500	6.04	6.05	6.06	6.07	6.07
19.000	6.08	6.09	6.10	6.11	6.12
19.500	6.13	6.14	6.15	6.16	6.16
20.000	6.17	6.18	6.19	6.20	6.21
20.500	6.21	6.22	6.23	6.24	6.25
21.000	6.25	6.26	6.27	6.28	6.28
21.500	6.29	6.30	6.30	6.31	6.32
22.000	6.33	6.33	6.34	6.35	6.35
22.500	6.36	6.37	6.37	6.38	6.39
23.000	6.39	6.40	6.40	6.41	6.42
23.500	6.42	6.43	6.43	6.44	6.44
24.000	6.45	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Time-Depth Curve | Return Event: 100 years
Label: Armonk | Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Time-Depth Curve: TypeIII 24hr (9.16 in)	
Label	TypeIII 24hr (9.16 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.02	0.03	0.04
0.500	0.05	0.05	0.06	0.07	0.08
1.000	0.09	0.10	0.11	0.12	0.13
1.500	0.14	0.15	0.16	0.16	0.17
2.000	0.18	0.19	0.20	0.21	0.22
2.500	0.23	0.24	0.25	0.26	0.27
3.000	0.28	0.29	0.30	0.31	0.32
3.500	0.34	0.35	0.36	0.37	0.38
4.000	0.39	0.41	0.42	0.43	0.44
4.500	0.46	0.47	0.48	0.49	0.51
5.000	0.52	0.53	0.55	0.56	0.57
5.500	0.59	0.60	0.62	0.63	0.64
6.000	0.66	0.67	0.69	0.71	0.72
6.500	0.74	0.76	0.77	0.79	0.81
7.000	0.83	0.85	0.87	0.89	0.91
7.500	0.93	0.95	0.97	1.00	1.02
8.000	1.04	1.07	1.09	1.12	1.15
8.500	1.18	1.21	1.24	1.27	1.30
9.000	1.34	1.37	1.41	1.44	1.48
9.500	1.52	1.56	1.60	1.64	1.69
10.000	1.73	1.78	1.83	1.88	1.93
10.500	1.98	2.04	2.10	2.16	2.22
11.000	2.29	2.36	2.44	2.53	2.62
11.500	2.73	2.88	3.11	3.42	3.81
12.000	4.58	5.35	5.74	6.05	6.28
12.500	6.43	6.54	6.63	6.72	6.80
13.000	6.87	6.94	7.00	7.06	7.12
13.500	7.18	7.23	7.28	7.33	7.38
14.000	7.43	7.47	7.52	7.56	7.60
14.500	7.64	7.68	7.72	7.75	7.79
15.000	7.82	7.86	7.89	7.92	7.95
15.500	7.98	8.01	8.04	8.07	8.09
16.000	8.12	8.14	8.16	8.19	8.21

Watershed

Subsection: Time-Depth Curve
Return Event: 100 years
Label: Armonk
Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	8.23	8.25	8.27	8.29	8.31
17.000	8.33	8.35	8.37	8.39	8.40
17.500	8.42	8.44	8.45	8.47	8.49
18.000	8.50	8.52	8.53	8.54	8.56
18.500	8.57	8.59	8.60	8.61	8.63
19.000	8.64	8.65	8.67	8.68	8.69
19.500	8.70	8.72	8.73	8.74	8.75
20.000	8.77	8.78	8.79	8.80	8.81
20.500	8.82	8.84	8.85	8.86	8.87
21.000	8.88	8.89	8.90	8.91	8.92
21.500	8.93	8.94	8.95	8.96	8.97
22.000	8.98	8.99	9.00	9.01	9.02
22.500	9.03	9.04	9.05	9.06	9.07
23.000	9.08	9.09	9.09	9.10	9.11
23.500	9.12	9.13	9.14	9.14	9.15
24.000	9.16	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Time of Concentration Calculations — Return Event: 1 years
Label: EDA-1 — Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.240
Slope	0.100 ft/ft
2 Year 24 Hour Depth	3.40 in
Average Velocity	0.23 ft/s
Segment Time of Concentration	0.121 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	203.00 ft
Is Paved?	False
Slope	0.268 ft/ft
Average Velocity	8.35 ft/s
Segment Time of Concentration	0.007 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.128 hours

==== SCS Channel Flow

Tc =
R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc =
Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Watershed

Subsection: Runoff CN-Area
Label: EDA-1
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Return Event: 1 years
Storm Event: TypeIII 24hr (2.80 in)

Runoff Curve Number Data

Soil/Surface Description	CN	Area (ft^2)	C (%)	UC (%)	Adjusted CN
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	42,031.000	0.0	0.0	61.000
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	4,576.000	0.0	0.0	98.000
Woods - good - Soil B	55.000	16,742.000	0.0	0.0	55.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	63,349.000	(N/A)	(N/A)	62.087

Unit Hydrograph Method (Computational Notes)
Definition of Terms

At	Total area (acres): At = Ai+Ap
Ai	Impervious area (acres)
Ap	Pervious area (acres)
CNi	Runoff curve number for impervious area
CNp	Runoff curve number for pervious area
fLoss	f loss constant infiltration (depth/time)
gKs	Saturated Hydraulic Conductivity (depth/time)
Md	Volumetric Moisture Deficit
Psi	Capillary Suction (length)
hK	Horton Infiltration Decay Rate (time^-1)
fo	Initial Infiltration Rate (depth/time)
fc	Ultimate(capacity)Infiltration Rate (depth/time)
Ia	Initial Abstraction (length)
dt	Computational increment (duration of unit excess rainfall) Default dt is smallest value of 0.1333Tc, rtm, and th (Smallest dt is then adjusted to match up with Tp)
UDdt	User specified override computational main time increment (only used if UDdt is => .1333Tc)
D(t)	Point on distribution curve (fraction of P) for time step t
K	2 / (1 + (Tr/Tp)): default K = 0.75: (for Tr/Tp = 1.67)
Ks	Hydrograph shape factor = Unit Conversions * K: = ((1hr/3600sec) * (1ft/12in) * ((5280ft)**2/sq.mi)) * K Default Ks = 645.333 * 0.75 = 484
Lag	Lag time from center of excess runoff (dt) to Tp: Lag = 0.6Tc
P	Total precipitation depth, inches
Pa(t)	Accumulated rainfall at time step t
Pi(t)	Incremental rainfall at time step t
qp	Peak discharge (cfs) for 1in. runoff, for 1hr, for 1 sq.mi. = (Ks * A * Q) / Tp (where Q = 1in. runoff, A=sq.mi.)
Qu(t)	Unit hydrograph ordinate (cfs) at time step t
Q(t)	Final hydrograph ordinate (cfs) at time step t
Rai(t)	Accumulated runoff (inches) at time step t for impervious area
Rap(t)	Accumulated runoff (inches) at time step t for pervious area
Rii(t)	Incremental runoff (inches) at time step t for impervious area
Rip(t)	Incremental runoff (inches) at time step t for pervious area
R(t)	Incremental weighted total runoff (inches)
Rtm	Time increment for rainfall table
Si	S for impervious area: Si = (1000/CNi) - 10
Sp	S for pervious area: Sp = (1000/CNp) - 10
t	Time step (row) number
Tc	Time of concentration
Tb	Time (hrs) of entire unit hydrograph: Tb = Tp + Tr
Tp	Time (hrs) to peak of a unit hydrograph: Tp = (dt/2) + Lag
Tr	Time (hrs) of receding limb of unit hydrograph: Tr = ratio of Tp

Subsection: Unit Hydrograph Equations

Unit Hydrograph Method
Computational Notes
Precipitation

Column (1)	Time for time step t
Column (2)	D(t) = Point on distribution curve for time step t
Column (3)	Pi(t) = Pa(t) - Pa(t-1): Col.(4) - Preceding Col.(4)
Column (4)	Pa(t) = D(t) x P: Col.(2) x P

Pervious Area Runoff (using SCS Runoff CN Method)

Column (5)	Rap(t) = Accumulated pervious runoff for time step t
	If (Pa(t) is <= 0.2Sp) then use: Rap(t) = 0.0
	If (Pa(t) is > 0.2Sp) then use:
	
	Rap(t) = (Col.(4)-0.2Sp)**2 / (Col.(4)+0.8Sp)

Column (6)	Rip(t) = Incremental pervious runoff for time step t Rip(t) = Rap(t) - Rap(t-1) Rip(t) = Col.(5) for current row - Col.(5) for preceding row.

Impervious Area Runoff

Column (7 & 8)...	Did not specify to use impervious areas.

Incremental Weighted Runoff

Column (9)	R(t) = (Ap/At) x Rip(t) + (Ai/At) x Rii(t) R(t) = (Ap/At) x Col.(6) + (Ai/At) x Col.(8)

SCS Unit Hydrograph Method

Column (10)	Q(t) is computed with the SCS unit hydrograph method using R(t) and Qu(t).

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 1 years
Label: EDA-1 | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Storm Event	TypeIII 24hr (2.80 in)
Return Event	1 years
Duration	35.000 hours
Depth	2.80 in
Time of Concentration (Composite)	0.128 hours
Area (User Defined)	63,349.000 ft²

Computational Time Increment	0.017 hours
Time to Peak (Computed)	12.165 hours
Flow (Peak, Computed)	0.27 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	0.27 ft³/s

Drainage Area	
SCS CN (Composite)	62.000
Area (User Defined)	63,349.000 ft²
Maximum Retention (Pervious)	6.13 in
Maximum Retention (Pervious, 20 percent)	1.23 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.32 in
Runoff Volume (Pervious)	1,698.252 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1,699.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.128 hours
Computational Time Increment	0.017 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 1 years

Label: EDA-1 | Storm Event: TypeIII 24hr (2.80 in)

Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

SCS Unit Hydrograph Parameters	
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	12.88 ft^3/s
Unit peak time, Tp	0.085 hours
Unit receding limb, Tr	0.341 hours
Total unit time, Tb	0.427 hours

Watershed

Subsection: Unit Hydrograph (Hydrograph Table) — Return Event: 1 years
Label: EDA-1 — Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Storm Event	TypeIII 24hr (2.80 in)
Return Event	1 years
Duration	35.000 hours
Depth	2.80 in
Time of Concentration (Composite)	0.128 hours
Area (User Defined)	63,349.000 ft²

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
11.950	0.00	0.02	0.09	0.19	0.27
12.200	0.26	0.25	0.24	0.23	0.21
12.450	0.19	0.16	0.14	0.12	0.10
12.700	0.10	0.09	0.09	0.09	0.08
12.950	0.08	0.08	0.07	0.07	0.07
13.200	0.07	0.07	0.07	0.07	0.07
13.450	0.07	0.07	0.06	0.06	0.06
13.700	0.06	0.06	0.06	0.06	0.06
13.950	0.06	0.06	0.06	0.05	0.05
14.200	0.05	0.05	0.05	0.05	0.05
14.450	0.05	0.05	0.05	0.05	0.05
14.700	0.05	0.05	0.05	0.05	0.05
14.950	0.05	0.05	0.05	0.05	0.04
15.200	0.04	0.04	0.04	0.04	0.04
15.450	0.04	0.04	0.04	0.04	0.04
15.700	0.04	0.04	0.04	0.04	0.04
15.950	0.04	0.03	0.03	0.03	0.03
16.200	0.03	0.03	0.03	0.03	0.03
16.450	0.03	0.03	0.03	0.03	0.03
16.700	0.03	0.03	0.03	0.03	0.03
16.950	0.03	0.03	0.03	0.03	0.03
17.200	0.03	0.03	0.03	0.03	0.03
17.450	0.03	0.03	0.03	0.02	0.02
17.700	0.02	0.02	0.02	0.02	0.02
17.950	0.02	0.02	0.02	0.02	0.02
18.200	0.02	0.02	0.02	0.02	0.02
18.450	0.02	0.02	0.02	0.02	0.02
18.700	0.02	0.02	0.02	0.02	0.02
18.950	0.02	0.02	0.02	0.02	0.02
19.200	0.02	0.02	0.02	0.02	0.02
19.450	0.02	0.02	0.02	0.02	0.02
19.700	0.02	0.02	0.02	0.02	0.02

Watershed

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 1 years
Label: EDA-1 Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
19.950	0.02	0.02	0.02	0.02	0.02
20.200	0.02	0.02	0.02	0.02	0.02
20.450	0.02	0.02	0.02	0.02	0.02
20.700	0.02	0.02	0.02	0.02	0.02
20.950	0.02	0.02	0.02	0.02	0.02
21.200	0.02	0.02	0.02	0.02	0.02
21.450	0.02	0.02	0.02	0.02	0.02
21.700	0.02	0.02	0.02	0.02	0.02
21.950	0.02	0.02	0.02	0.02	0.02
22.200	0.02	0.02	0.02	0.02	0.02
22.450	0.02	0.02	0.02	0.02	0.02
22.700	0.01	0.01	0.01	0.01	0.01
22.950	0.01	0.01	0.01	0.01	0.01
23.200	0.01	0.01	0.01	0.01	0.01
23.450	0.01	0.01	0.01	0.01	0.01
23.700	0.01	0.01	0.01	0.01	0.01
23.950	0.01	0.01	0.01	0.01	0.00
24.200	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 5 years
Label: EDA-1 | Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Storm Event	TypeIII 24hr (4.30 in)
Return Event	5 years
Duration	24.000 hours
Depth	4.30 in
Time of Concentration (Composite)	0.128 hours
Area (User Defined)	63,349.000 ft²

Computational Time Increment	0.017 hours
Time to Peak (Computed)	12.130 hours
Flow (Peak, Computed)	1.35 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	1.34 ft³/s

Drainage Area	
SCS CN (Composite)	62.000
Area (User Defined)	63,349.000 ft²
Maximum Retention (Pervious)	6.13 in
Maximum Retention (Pervious, 20 percent)	1.23 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.03 in
Runoff Volume (Pervious)	5,421.018 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	5,411.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.128 hours
Computational Time Increment	0.017 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

Watershed

Subsection: Unit Hydrograph Summary
Return Event: 5 years
Label: EDA-1
Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

SCS Unit Hydrograph Parameters	
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	12.88 ft^3/s
Unit peak time, Tp	0.085 hours
Unit receding limb, Tr	0.341 hours
Total unit time, Tb	0.427 hours

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 5 years
Label: EDA-1 Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Storm Event	TypeIII 24hr (4.30 in)
Return Event	5 years
Duration	24.000 hours
Depth	4.30 in
Time of Concentration (Composite)	0.128 hours
Area (User Defined)	63,349.000 ft²

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
11.450	0.00	0.00	0.01	0.02	0.03
11.700	0.06	0.09	0.14	0.20	0.29
11.950	0.44	0.74	1.03	1.26	1.34
12.200	1.14	0.97	0.86	0.78	0.69
12.450	0.61	0.51	0.43	0.36	0.31
12.700	0.29	0.28	0.26	0.25	0.24
12.950	0.23	0.22	0.21	0.20	0.20
13.200	0.19	0.19	0.19	0.19	0.18
13.450	0.18	0.18	0.18	0.17	0.17
13.700	0.17	0.17	0.16	0.16	0.16
13.950	0.15	0.15	0.15	0.15	0.14
14.200	0.14	0.14	0.14	0.14	0.14
14.450	0.13	0.13	0.13	0.13	0.13
14.700	0.13	0.13	0.12	0.12	0.12
14.950	0.12	0.12	0.12	0.12	0.11
15.200	0.11	0.11	0.11	0.11	0.11
15.450	0.10	0.10	0.10	0.10	0.10
15.700	0.10	0.09	0.09	0.09	0.09
15.950	0.09	0.09	0.08	0.08	0.08
16.200	0.08	0.08	0.08	0.08	0.08
16.450	0.08	0.08	0.08	0.08	0.08
16.700	0.07	0.07	0.07	0.07	0.07
16.950	0.07	0.07	0.07	0.07	0.07
17.200	0.07	0.07	0.07	0.06	0.06
17.450	0.06	0.06	0.06	0.06	0.06
17.700	0.06	0.06	0.06	0.06	0.06
17.950	0.06	0.05	0.05	0.05	0.05
18.200	0.05	0.05	0.05	0.05	0.05
18.450	0.05	0.05	0.05	0.05	0.05
18.700	0.05	0.05	0.05	0.05	0.05
18.950	0.05	0.05	0.05	0.05	0.05
19.200	0.05	0.05	0.05	0.05	0.05

Watershed

Subsection: Unit Hydrograph (Hydrograph Table)

Return Event: 5 years

Label: EDA-1

Storm Event: TypeIII 24hr (4.30 in)

Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
19.450	0.05	0.05	0.05	0.05	0.05
19.700	0.05	0.05	0.05	0.05	0.05
19.950	0.04	0.04	0.04	0.04	0.04
20.200	0.04	0.04	0.04	0.04	0.04
20.450	0.04	0.04	0.04	0.04	0.04
20.700	0.04	0.04	0.04	0.04	0.04
20.950	0.04	0.04	0.04	0.04	0.04
21.200	0.04	0.04	0.04	0.04	0.04
21.450	0.04	0.04	0.04	0.04	0.04
21.700	0.04	0.04	0.04	0.04	0.04
21.950	0.04	0.04	0.04	0.04	0.04
22.200	0.04	0.04	0.04	0.04	0.04
22.450	0.04	0.04	0.04	0.04	0.04
22.700	0.04	0.03	0.03	0.03	0.03
22.950	0.03	0.03	0.03	0.03	0.03
23.200	0.03	0.03	0.03	0.03	0.03
23.450	0.03	0.03	0.03	0.03	0.03
23.700	0.03	0.03	0.03	0.03	0.03
23.950	0.03	0.03	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 10 years
Label: EDA-1 | Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Storm Event	TypeIII 24hr (5.12 in)
Return Event	10 years
Duration	35.000 hours
Depth	5.12 in
Time of Concentration (Composite)	0.128 hours
Area (User Defined)	63,349.000 ft²

Computational Time Increment	0.017 hours
Time to Peak (Computed)	12.130 hours
Flow (Peak, Computed)	2.09 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	2.05 ft³/s

Drainage Area	
SCS CN (Composite)	62.000
Area (User Defined)	63,349.000 ft²
Maximum Retention (Pervious)	6.13 in
Maximum Retention (Pervious, 20 percent)	1.23 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.51 in
Runoff Volume (Pervious)	7,987.044 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	7,988.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.128 hours
Computational Time Increment	0.017 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

Watershed

Subsection: Unit Hydrograph Summary — Return Event: 10 years

Label: EDA-1 — Storm Event: TypeIII 24hr (5.12 in)

Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

SCS Unit Hydrograph Parameters	
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	12.88 ft³/s
Unit peak time, Tp	0.085 hours
Unit receding limb, Tr	0.341 hours
Total unit time, Tb	0.427 hours

Watershed

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 10 years
Label: EDA-1 Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Storm Event	TypeIII 24hr (5.12 in)
Return Event	10 years
Duration	35.000 hours
Depth	5.12 in
Time of Concentration (Composite)	0.128 hours
Area (User Defined)	63,349.000 ft²

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
10.900	0.00	0.00	0.00	0.01	0.01
11.150	0.01	0.02	0.02	0.03	0.04
11.400	0.04	0.05	0.06	0.08	0.10
11.650	0.13	0.19	0.25	0.34	0.44
11.900	0.56	0.80	1.27	1.69	1.99
12.150	2.05	1.72	1.45	1.27	1.14
12.400	1.00	0.87	0.72	0.61	0.51
12.650	0.45	0.41	0.39	0.37	0.36
12.900	0.34	0.33	0.31	0.30	0.29
13.150	0.28	0.27	0.27	0.26	0.26
13.400	0.26	0.25	0.25	0.25	0.24
13.650	0.24	0.23	0.23	0.23	0.22
13.900	0.22	0.21	0.21	0.20	0.20
14.150	0.20	0.20	0.19	0.19	0.19
14.400	0.19	0.19	0.18	0.18	0.18
14.650	0.18	0.18	0.17	0.17	0.17
14.900	0.17	0.17	0.16	0.16	0.16
15.150	0.16	0.15	0.15	0.15	0.15
15.400	0.15	0.14	0.14	0.14	0.14
15.650	0.13	0.13	0.13	0.13	0.12
15.900	0.12	0.12	0.12	0.12	0.11
16.150	0.11	0.11	0.11	0.11	0.11
16.400	0.11	0.11	0.11	0.10	0.10
16.650	0.10	0.10	0.10	0.10	0.10
16.900	0.10	0.10	0.09	0.09	0.09
17.150	0.09	0.09	0.09	0.09	0.09
17.400	0.09	0.09	0.08	0.08	0.08
17.650	0.08	0.08	0.08	0.08	0.08
17.900	0.08	0.08	0.07	0.07	0.07
18.150	0.07	0.07	0.07	0.07	0.07
18.400	0.07	0.07	0.07	0.07	0.07
18.650	0.07	0.07	0.07	0.07	0.07

Watershed

Subsection: Unit Hydrograph (Hydrograph Table) — Return Event: 10 years

Label: EDA-1 — Storm Event: TypeIII 24hr (5.12 in)

Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
18.900	0.07	0.07	0.07	0.07	0.07
19.150	0.07	0.07	0.06	0.06	0.06
19.400	0.06	0.06	0.06	0.06	0.06
19.650	0.06	0.06	0.06	0.06	0.06
19.900	0.06	0.06	0.06	0.06	0.06
20.150	0.06	0.06	0.06	0.06	0.06
20.400	0.06	0.06	0.06	0.06	0.06
20.650	0.06	0.06	0.06	0.06	0.06
20.900	0.06	0.06	0.06	0.06	0.05
21.150	0.05	0.05	0.05	0.05	0.05
21.400	0.05	0.05	0.05	0.05	0.05
21.650	0.05	0.05	0.05	0.05	0.05
21.900	0.05	0.05	0.05	0.05	0.05
22.150	0.05	0.05	0.05	0.05	0.05
22.400	0.05	0.05	0.05	0.05	0.05
22.650	0.05	0.05	0.05	0.05	0.05
22.900	0.05	0.05	0.05	0.05	0.04
23.150	0.04	0.04	0.04	0.04	0.04
23.400	0.04	0.04	0.04	0.04	0.04
23.650	0.04	0.04	0.04	0.04	0.04
23.900	0.04	0.04	0.04	0.03	0.02
24.150	0.01	0.00	0.00	(N/A)	(N/A)

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 25 years
Label: EDA-1 | Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Storm Event	TypeIII 24hr (6.45 in)
Return Event	25 years
Duration	35.000 hours
Depth	6.45 in
Time of Concentration (Composite)	0.128 hours
Area (User Defined)	63,349.000 ft²

Computational Time Increment	0.017 hours
Time to Peak (Computed)	12.130 hours
Flow (Peak, Computed)	3.44 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	3.34 ft³/s

Drainage Area

SCS CN (Composite)	62.000
Area (User Defined)	63,349.000 ft²
Maximum Retention (Pervious)	6.13 in
Maximum Retention (Pervious, 20 percent)	1.23 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	2.40 in
Runoff Volume (Pervious)	12,690.472 ft³

Hydrograph Volume (Area under Hydrograph curve)

Volume	12,691.000 ft³

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.128 hours
Computational Time Increment	0.017 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 25 years
Label: EDA-1 | Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

SCS Unit Hydrograph Parameters	
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	12.88 ft^3/s
Unit peak time, Tp	0.085 hours
Unit receding limb, Tr	0.341 hours
Total unit time, Tb	0.427 hours

Watershed

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 25 years
Label: EDA-1 Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Storm Event	TypeIII 24hr (6.45 in)
Return Event	25 years
Duration	35.000 hours
Depth	6.45 in
Time of Concentration (Composite)	0.128 hours
Area (User Defined)	63,349.000 ft²

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
10.100	0.00	0.00	0.00	0.01	0.01
10.350	0.01	0.02	0.02	0.02	0.03
10.600	0.03	0.03	0.04	0.04	0.05
10.850	0.05	0.06	0.06	0.07	0.07
11.100	0.08	0.09	0.10	0.11	0.12
11.350	0.14	0.15	0.17	0.18	0.21
11.600	0.26	0.33	0.44	0.57	0.72
11.850	0.89	1.10	1.49	2.26	2.90
12.100	3.32	3.34	2.76	2.29	1.99
12.350	1.77	1.54	1.34	1.11	0.93
12.600	0.77	0.68	0.62	0.59	0.56
12.850	0.54	0.51	0.49	0.47	0.45
13.100	0.43	0.42	0.41	0.40	0.39
13.350	0.39	0.38	0.38	0.37	0.36
13.600	0.36	0.35	0.35	0.34	0.33
13.850	0.33	0.32	0.31	0.31	0.30
14.100	0.30	0.29	0.29	0.29	0.28
14.350	0.28	0.28	0.27	0.27	0.27
14.600	0.26	0.26	0.26	0.25	0.25
14.850	0.25	0.24	0.24	0.24	0.24
15.100	0.23	0.23	0.23	0.22	0.22
15.350	0.22	0.21	0.21	0.21	0.20
15.600	0.20	0.20	0.19	0.19	0.18
15.850	0.18	0.18	0.17	0.17	0.17
16.100	0.17	0.16	0.16	0.16	0.16
16.350	0.16	0.16	0.15	0.15	0.15
16.600	0.15	0.15	0.15	0.15	0.14
16.850	0.14	0.14	0.14	0.14	0.14
17.100	0.13	0.13	0.13	0.13	0.13
17.350	0.13	0.13	0.12	0.12	0.12
17.600	0.12	0.12	0.12	0.11	0.11
17.850	0.11	0.11	0.11	0.11	0.11

Watershed

Subsection: Unit Hydrograph (Hydrograph Table)
Return Event: 25 years
Label: EDA-1
Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
18.100	0.10	0.10	0.10	0.10	0.10
18.350	0.10	0.10	0.10	0.10	0.10
18.600	0.10	0.10	0.10	0.10	0.10
18.850	0.10	0.10	0.10	0.10	0.10
19.100	0.09	0.09	0.09	0.09	0.09
19.350	0.09	0.09	0.09	0.09	0.09
19.600	0.09	0.09	0.09	0.09	0.09
19.850	0.09	0.09	0.09	0.09	0.09
20.100	0.09	0.08	0.08	0.08	0.08
20.350	0.08	0.08	0.08	0.08	0.08
20.600	0.08	0.08	0.08	0.08	0.08
20.850	0.08	0.08	0.08	0.08	0.08
21.100	0.08	0.08	0.08	0.08	0.08
21.350	0.08	0.08	0.08	0.08	0.08
21.600	0.07	0.07	0.07	0.07	0.07
21.850	0.07	0.07	0.07	0.07	0.07
22.100	0.07	0.07	0.07	0.07	0.07
22.350	0.07	0.07	0.07	0.07	0.07
22.600	0.07	0.07	0.07	0.07	0.07
22.850	0.07	0.07	0.07	0.07	0.06
23.100	0.06	0.06	0.06	0.06	0.06
23.350	0.06	0.06	0.06	0.06	0.06
23.600	0.06	0.06	0.06	0.06	0.06
23.850	0.06	0.06	0.06	0.06	0.05
24.100	0.03	0.01	0.00	0.00	0.00

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 100 years
Label: EDA-1 | Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Storm Event	TypeIII 24hr (9.16 in)
Return Event	100 years
Duration	35.000 hours
Depth	9.16 in
Time of Concentration (Composite)	0.128 hours
Area (User Defined)	63,349.000 ft²

Computational Time Increment	0.017 hours
Time to Peak (Computed)	12.130 hours
Flow (Peak, Computed)	6.48 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	6.36 ft³/s

Drainage Area	
SCS CN (Composite)	62.000
Area (User Defined)	63,349.000 ft²
Maximum Retention (Pervious)	6.13 in
Maximum Retention (Pervious, 20 percent)	1.23 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.48 in
Runoff Volume (Pervious)	23,630.841 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	23,632.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.128 hours
Computational Time Increment	0.017 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

Watershed

Subsection: Unit Hydrograph Summary
Return Event: 100 years
Label: EDA-1
Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

SCS Unit Hydrograph Parameters	
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	12.88 ft^3/s
Unit peak time, Tp	0.085 hours
Unit receding limb, Tr	0.341 hours
Total unit time, Tb	0.427 hours

Storm Event	TypeIII 24hr (9.16 in)
Return Event	100 years
Duration	35.000 hours
Depth	9.16 in
Time of Concentration (Composite)	0.128 hours
Area (User Defined)	63,349.000 ft²

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
8.750	0.00	0.00	0.00	0.01	0.01
9.000	0.01	0.01	0.02	0.02	0.02
9.250	0.03	0.03	0.03	0.04	0.04
9.500	0.04	0.05	0.05	0.06	0.06
9.750	0.06	0.07	0.07	0.08	0.08
10.000	0.09	0.09	0.10	0.10	0.11
10.250	0.12	0.12	0.13	0.14	0.15
10.500	0.15	0.16	0.17	0.18	0.19
10.750	0.20	0.21	0.22	0.23	0.24
11.000	0.25	0.26	0.28	0.30	0.32
11.250	0.34	0.37	0.40	0.43	0.46
11.500	0.50	0.56	0.68	0.84	1.09
11.750	1.35	1.67	1.99	2.38	3.14
12.000	4.58	5.70	6.36	6.26	5.08
12.250	4.17	3.57	3.16	2.73	2.36
12.500	1.94	1.62	1.34	1.17	1.08
12.750	1.02	0.97	0.93	0.89	0.85
13.000	0.80	0.77	0.73	0.71	0.70
13.250	0.69	0.67	0.66	0.65	0.64
13.500	0.63	0.62	0.61	0.60	0.59
13.750	0.58	0.56	0.55	0.54	0.53
14.000	0.52	0.51	0.50	0.49	0.49
14.250	0.48	0.47	0.47	0.46	0.46
14.500	0.45	0.45	0.44	0.44	0.43
14.750	0.43	0.42	0.42	0.41	0.40
15.000	0.40	0.39	0.39	0.38	0.38
15.250	0.37	0.36	0.36	0.35	0.35
15.500	0.34	0.34	0.33	0.32	0.32
15.750	0.31	0.31	0.30	0.30	0.29
16.000	0.28	0.28	0.27	0.27	0.27
16.250	0.26	0.26	0.26	0.26	0.25
16.500	0.25	0.25	0.25	0.24	0.24

Subsection: Unit Hydrograph (Hydrograph Table) Return Event: 100 years
Label: EDA-1 Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
16.750	0.24	0.24	0.23	0.23	0.23
17.000	0.23	0.22	0.22	0.22	0.22
17.250	0.21	0.21	0.21	0.21	0.20
17.500	0.20	0.20	0.20	0.19	0.19
17.750	0.19	0.19	0.18	0.18	0.18
18.000	0.18	0.17	0.17	0.17	0.17
18.250	0.17	0.17	0.17	0.17	0.16
18.500	0.16	0.16	0.16	0.16	0.16
18.750	0.16	0.16	0.16	0.16	0.16
19.000	0.16	0.16	0.15	0.15	0.15
19.250	0.15	0.15	0.15	0.15	0.15
19.500	0.15	0.15	0.15	0.15	0.15
19.750	0.14	0.14	0.14	0.14	0.14
20.000	0.14	0.14	0.14	0.14	0.14
20.250	0.14	0.14	0.14	0.14	0.14
20.500	0.13	0.13	0.13	0.13	0.13
20.750	0.13	0.13	0.13	0.13	0.13
21.000	0.13	0.13	0.13	0.13	0.13
21.250	0.13	0.13	0.13	0.12	0.12
21.500	0.12	0.12	0.12	0.12	0.12
21.750	0.12	0.12	0.12	0.12	0.12
22.000	0.12	0.12	0.12	0.12	0.12
22.250	0.11	0.11	0.11	0.11	0.11
22.500	0.11	0.11	0.11	0.11	0.11
22.750	0.11	0.11	0.11	0.11	0.11
23.000	0.11	0.11	0.10	0.10	0.10
23.250	0.10	0.10	0.10	0.10	0.10
23.500	0.10	0.10	0.10	0.10	0.10
23.750	0.10	0.10	0.10	0.09	0.09
24.000	0.09	0.08	0.04	0.02	0.01
24.250	0.00	0.00	(N/A)	(N/A)	(N/A)

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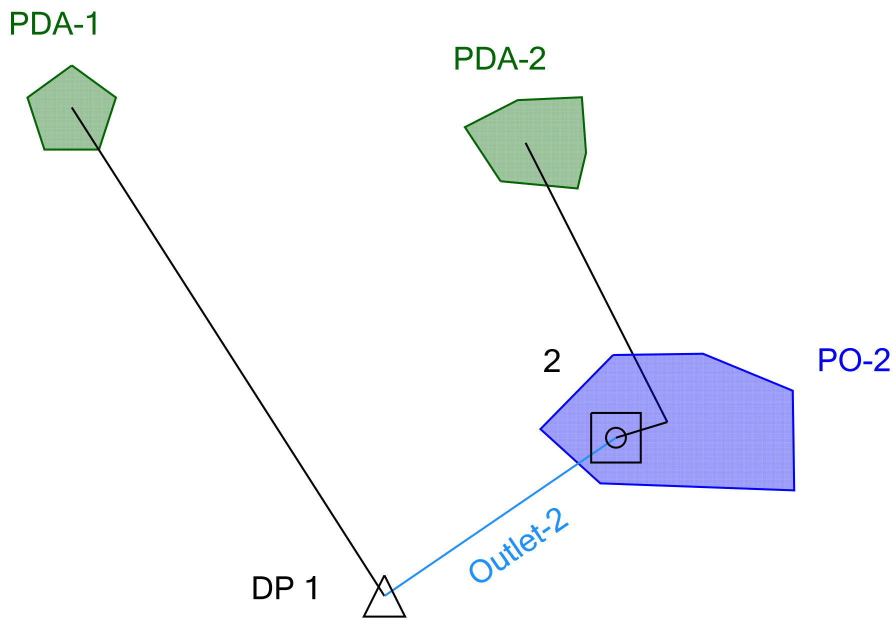
APPENDIX B

PROPOSED HYDROLOGIC CALCULATIONS

Scenario: 26 Chestnut - Synthetic Curve, 1 yrs



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Watershed

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)
PDA-1	26 Chestnut - Synthetic Curve, 1 yrs	1	1,450.000	12.150	0.22
PDA-1	26 Chestnut - Synthetic Curve, 5 yrs	5	4,799.000	12.100	1.19
PDA-1	26 Chestnut - Synthetic Curve, 10 yrs	10	7,148.000	12.100	1.89
PDA-1	26 Chestnut - Synthetic Curve, 25 yrs	25	11,465.000	12.100	3.16
PDA-1	26 Chestnut - Synthetic Curve, 100 yrs	100	21,575.000	12.100	6.06
PDA-2	26 Chestnut - Synthetic Curve, 1 yrs	1	526.000	12.100	0.15
PDA-2	26 Chestnut - Synthetic Curve, 5 yrs	5	963.000	12.100	0.26
PDA-2	26 Chestnut - Synthetic Curve, 10 yrs	10	1,212.000	12.100	0.33
PDA-2	26 Chestnut - Synthetic Curve, 25 yrs	25	1,622.000	12.100	0.43
PDA-2	26 Chestnut - Synthetic Curve, 100 yrs	100	2,469.000	12.100	0.64

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)
DP 1	26 Chestnut - Synthetic Curve, 1 yrs	1	1,857.000	12.150	0.26
DP 1	26 Chestnut - Synthetic Curve, 5 yrs	5	5,638.000	12.100	1.27
DP 1	26 Chestnut - Synthetic Curve, 10 yrs	10	8,242.000	12.100	1.99

Subsection: Master Network Summary

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)
DP 1	26 Chestnut - Synthetic Curve, 25 yrs	25	12,968.000	12.100	3.28
DP 1	26 Chestnut - Synthetic Curve, 100 yrs	100	23,926.000	12.100	6.36

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft³)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft³)
PO-2 (IN)	26 Chestnut - Synthetic Curve, 1 yrs	1	526.000	12.100	0.15	(N/A)	(N/A)
PO-2 (OUT)	26 Chestnut - Synthetic Curve, 1 yrs	1	408.000	12.400	0.05	660.46	217.000
PO-2 (IN)	26 Chestnut - Synthetic Curve, 5 yrs	5	963.000	12.100	0.26	(N/A)	(N/A)
PO-2 (OUT)	26 Chestnut - Synthetic Curve, 5 yrs	5	840.000	12.350	0.10	661.20	365.000
PO-2 (IN)	26 Chestnut - Synthetic Curve, 10 yrs	10	1,212.000	12.100	0.33	(N/A)	(N/A)
PO-2 (OUT)	26 Chestnut - Synthetic Curve, 10 yrs	10	1,094.000	12.400	0.12	661.62	444.000
PO-2 (IN)	26 Chestnut - Synthetic Curve, 25 yrs	25	1,622.000	12.100	0.43	(N/A)	(N/A)
PO-2 (OUT)	26 Chestnut - Synthetic Curve, 25 yrs	25	1,503.000	12.300	0.21	662.14	530.000
PO-2 (IN)	26 Chestnut - Synthetic Curve, 100 yrs	100	2,469.000	12.100	0.64	(N/A)	(N/A)
PO-2 (OUT)	26 Chestnut - Synthetic Curve, 100 yrs	100	2,351.000	12.250	0.36	663.45	693.000

Subsection: Time-Depth Curve | Return Event: 1 years
Label: Armonk | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Time-Depth Curve: TypeIII 24hr (2.80 in)	
Label	TypeIII 24hr (2.80 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	1 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.00	0.01	0.01	0.01
0.500	0.01	0.02	0.02	0.02	0.03
1.000	0.03	0.03	0.03	0.04	0.04
1.500	0.04	0.04	0.05	0.05	0.05
2.000	0.06	0.06	0.06	0.06	0.07
2.500	0.07	0.07	0.08	0.08	0.08
3.000	0.09	0.09	0.09	0.10	0.10
3.500	0.10	0.11	0.11	0.11	0.12
4.000	0.12	0.12	0.13	0.13	0.14
4.500	0.14	0.14	0.15	0.15	0.15
5.000	0.16	0.16	0.17	0.17	0.18
5.500	0.18	0.18	0.19	0.19	0.20
6.000	0.20	0.21	0.21	0.22	0.22
6.500	0.23	0.23	0.24	0.24	0.25
7.000	0.25	0.26	0.27	0.27	0.28
7.500	0.28	0.29	0.30	0.30	0.31
8.000	0.32	0.33	0.33	0.34	0.35
8.500	0.36	0.37	0.38	0.39	0.40
9.000	0.41	0.42	0.43	0.44	0.45
9.500	0.46	0.48	0.49	0.50	0.52
10.000	0.53	0.54	0.56	0.57	0.59
10.500	0.61	0.62	0.64	0.66	0.68
11.000	0.70	0.72	0.75	0.77	0.80
11.500	0.83	0.88	0.95	1.05	1.16
12.000	1.40	1.64	1.75	1.85	1.92
12.500	1.97	2.00	2.03	2.05	2.08
13.000	2.10	2.12	2.14	2.16	2.18
13.500	2.19	2.21	2.23	2.24	2.26
14.000	2.27	2.28	2.30	2.31	2.32
14.500	2.34	2.35	2.36	2.37	2.38
15.000	2.39	2.40	2.41	2.42	2.43
15.500	2.44	2.45	2.46	2.47	2.47
16.000	2.48	2.49	2.50	2.50	2.51

Watershed

Subsection: Time-Depth Curve | Return Event: 1 years
Label: Armonk | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	2.52	2.52	2.53	2.53	2.54
17.000	2.55	2.55	2.56	2.56	2.57
17.500	2.57	2.58	2.58	2.59	2.59
18.000	2.60	2.60	2.61	2.61	2.62
18.500	2.62	2.62	2.63	2.63	2.64
19.000	2.64	2.65	2.65	2.65	2.66
19.500	2.66	2.66	2.67	2.67	2.68
20.000	2.68	2.68	2.69	2.69	2.69
20.500	2.70	2.70	2.70	2.71	2.71
21.000	2.71	2.72	2.72	2.72	2.73
21.500	2.73	2.73	2.74	2.74	2.74
22.000	2.75	2.75	2.75	2.75	2.76
22.500	2.76	2.76	2.77	2.77	2.77
23.000	2.77	2.78	2.78	2.78	2.79
23.500	2.79	2.79	2.79	2.80	2.80
24.000	2.80	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Time-Depth Curve | Return Event: 5 years
Label: Armonk | Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Time-Depth Curve: TypeIII 24hr (4.30 in)	
Label	TypeIII 24hr (4.30 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	5 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.00	0.01	0.01	0.02
0.500	0.02	0.03	0.03	0.03	0.04
1.000	0.04	0.05	0.05	0.06	0.06
1.500	0.06	0.07	0.07	0.08	0.08
2.000	0.09	0.09	0.09	0.10	0.10
2.500	0.11	0.11	0.12	0.12	0.13
3.000	0.13	0.14	0.14	0.15	0.15
3.500	0.16	0.16	0.17	0.17	0.18
4.000	0.18	0.19	0.20	0.20	0.21
4.500	0.21	0.22	0.23	0.23	0.24
5.000	0.24	0.25	0.26	0.26	0.27
5.500	0.28	0.28	0.29	0.30	0.30
6.000	0.31	0.32	0.32	0.33	0.34
6.500	0.35	0.35	0.36	0.37	0.38
7.000	0.39	0.40	0.41	0.42	0.43
7.500	0.44	0.45	0.46	0.47	0.48
8.000	0.49	0.50	0.51	0.53	0.54
8.500	0.55	0.57	0.58	0.60	0.61
9.000	0.63	0.64	0.66	0.68	0.70
9.500	0.71	0.73	0.75	0.77	0.79
10.000	0.81	0.83	0.86	0.88	0.91
10.500	0.93	0.96	0.99	1.01	1.04
11.000	1.08	1.11	1.15	1.19	1.23
11.500	1.28	1.35	1.46	1.61	1.79
12.000	2.15	2.51	2.69	2.84	2.95
12.500	3.02	3.07	3.11	3.15	3.19
13.000	3.23	3.26	3.29	3.31	3.34
13.500	3.37	3.39	3.42	3.44	3.47
14.000	3.49	3.51	3.53	3.55	3.57
14.500	3.59	3.60	3.62	3.64	3.66
15.000	3.67	3.69	3.70	3.72	3.73
15.500	3.75	3.76	3.77	3.79	3.80
16.000	3.81	3.82	3.83	3.84	3.85

Subsection: Time-Depth Curve | Return Event: 5 years
Label: Armonk | Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	3.86	3.87	3.88	3.89	3.90
17.000	3.91	3.92	3.93	3.94	3.95
17.500	3.95	3.96	3.97	3.98	3.98
18.000	3.99	4.00	4.00	4.01	4.02
18.500	4.02	4.03	4.04	4.04	4.05
19.000	4.06	4.06	4.07	4.07	4.08
19.500	4.09	4.09	4.10	4.10	4.11
20.000	4.12	4.12	4.13	4.13	4.14
20.500	4.14	4.15	4.15	4.16	4.16
21.000	4.17	4.17	4.18	4.18	4.19
21.500	4.19	4.20	4.20	4.21	4.21
22.000	4.22	4.22	4.23	4.23	4.24
22.500	4.24	4.24	4.25	4.25	4.26
23.000	4.26	4.27	4.27	4.27	4.28
23.500	4.28	4.28	4.29	4.29	4.30
24.000	4.30	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time-Depth Curve
Return Event: 10 years
Label: Armonk
Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Time-Depth Curve: TypeIII 24hr (5.12 in)	
Label	TypeIII 24hr (5.12 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	10 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.01	0.02	0.02
0.500	0.03	0.03	0.04	0.04	0.05
1.000	0.05	0.06	0.06	0.07	0.07
1.500	0.08	0.08	0.09	0.09	0.10
2.000	0.10	0.11	0.11	0.12	0.12
2.500	0.13	0.13	0.14	0.15	0.15
3.000	0.16	0.16	0.17	0.18	0.18
3.500	0.19	0.19	0.20	0.21	0.21
4.000	0.22	0.23	0.23	0.24	0.25
4.500	0.25	0.26	0.27	0.28	0.28
5.000	0.29	0.30	0.31	0.31	0.32
5.500	0.33	0.34	0.34	0.35	0.36
6.000	0.37	0.38	0.39	0.39	0.40
6.500	0.41	0.42	0.43	0.44	0.45
7.000	0.46	0.47	0.49	0.50	0.51
7.500	0.52	0.53	0.54	0.56	0.57
8.000	0.58	0.60	0.61	0.63	0.64
8.500	0.66	0.67	0.69	0.71	0.73
9.000	0.75	0.77	0.79	0.81	0.83
9.500	0.85	0.87	0.90	0.92	0.94
10.000	0.97	0.99	1.02	1.05	1.08
10.500	1.11	1.14	1.17	1.21	1.24
11.000	1.28	1.32	1.36	1.41	1.47
11.500	1.53	1.61	1.74	1.91	2.13
12.000	2.56	2.99	3.21	3.38	3.51
12.500	3.59	3.65	3.71	3.76	3.80
13.000	3.84	3.88	3.91	3.95	3.98
13.500	4.01	4.04	4.07	4.10	4.13
14.000	4.15	4.18	4.20	4.22	4.25
14.500	4.27	4.29	4.31	4.33	4.35
15.000	4.37	4.39	4.41	4.43	4.45
15.500	4.46	4.48	4.49	4.51	4.52
16.000	4.54	4.55	4.56	4.58	4.59

Watershed

Subsection: Time-Depth Curve | Return Event: 10 years
Label: Armonk | Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	4.60	4.61	4.62	4.63	4.65
17.000	4.66	4.67	4.68	4.69	4.70
17.500	4.71	4.72	4.73	4.73	4.74
18.000	4.75	4.76	4.77	4.78	4.78
18.500	4.79	4.80	4.81	4.81	4.82
19.000	4.83	4.84	4.84	4.85	4.86
19.500	4.87	4.87	4.88	4.89	4.89
20.000	4.90	4.91	4.91	4.92	4.93
20.500	4.93	4.94	4.94	4.95	4.96
21.000	4.96	4.97	4.98	4.98	4.99
21.500	4.99	5.00	5.00	5.01	5.02
22.000	5.02	5.03	5.03	5.04	5.04
22.500	5.05	5.05	5.06	5.06	5.07
23.000	5.07	5.08	5.08	5.09	5.09
23.500	5.10	5.10	5.11	5.11	5.12
24.000	5.12	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Time-Depth Curve
Return Event: 25 years
Label: Armonk
Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Time-Depth Curve: TypeIII 24hr (6.45 in)	
Label	TypeIII 24hr (6.45 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	25 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.01	0.02	0.03
0.500	0.03	0.04	0.05	0.05	0.06
1.000	0.06	0.07	0.08	0.08	0.09
1.500	0.10	0.10	0.11	0.12	0.12
2.000	0.13	0.14	0.14	0.15	0.16
2.500	0.16	0.17	0.18	0.18	0.19
3.000	0.20	0.21	0.21	0.22	0.23
3.500	0.24	0.24	0.25	0.26	0.27
4.000	0.28	0.29	0.29	0.30	0.31
4.500	0.32	0.33	0.34	0.35	0.36
5.000	0.37	0.38	0.38	0.39	0.40
5.500	0.41	0.42	0.43	0.44	0.45
6.000	0.46	0.47	0.49	0.50	0.51
6.500	0.52	0.53	0.54	0.56	0.57
7.000	0.58	0.60	0.61	0.63	0.64
7.500	0.66	0.67	0.69	0.70	0.72
8.000	0.74	0.75	0.77	0.79	0.81
8.500	0.83	0.85	0.87	0.89	0.92
9.000	0.94	0.96	0.99	1.02	1.04
9.500	1.07	1.10	1.13	1.16	1.19
10.000	1.22	1.25	1.29	1.32	1.36
10.500	1.40	1.44	1.48	1.52	1.57
11.000	1.61	1.66	1.72	1.78	1.85
11.500	1.92	2.03	2.19	2.41	2.68
12.000	3.23	3.77	4.04	4.26	4.42
12.500	4.53	4.60	4.67	4.73	4.79
13.000	4.84	4.88	4.93	4.97	5.01
13.500	5.05	5.09	5.13	5.16	5.20
14.000	5.23	5.26	5.29	5.32	5.35
14.500	5.38	5.41	5.43	5.46	5.49
15.000	5.51	5.53	5.56	5.58	5.60
15.500	5.62	5.64	5.66	5.68	5.70
16.000	5.71	5.73	5.75	5.76	5.78

Watershed

Subsection: Time-Depth Curve | Return Event: 25 years
Label: Armonk | Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	5.79	5.81	5.82	5.84	5.85
17.000	5.87	5.88	5.89	5.91	5.92
17.500	5.93	5.94	5.95	5.96	5.98
18.000	5.99	6.00	6.01	6.02	6.03
18.500	6.04	6.05	6.06	6.07	6.07
19.000	6.08	6.09	6.10	6.11	6.12
19.500	6.13	6.14	6.15	6.16	6.16
20.000	6.17	6.18	6.19	6.20	6.21
20.500	6.21	6.22	6.23	6.24	6.25
21.000	6.25	6.26	6.27	6.28	6.28
21.500	6.29	6.30	6.30	6.31	6.32
22.000	6.33	6.33	6.34	6.35	6.35
22.500	6.36	6.37	6.37	6.38	6.39
23.000	6.39	6.40	6.40	6.41	6.42
23.500	6.42	6.43	6.43	6.44	6.44
24.000	6.45	(N/A)	(N/A)	(N/A)	(N/A)

Time-Depth Curve: TypeIII 24hr (9.16 in)	
Label	TypeIII 24hr (9.16 in)
Start Time	0.000 hours
Increment	0.100 hours
End Time	24.000 hours
Return Event	100 years

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
0.000	0.00	0.01	0.02	0.03	0.04
0.500	0.05	0.05	0.06	0.07	0.08
1.000	0.09	0.10	0.11	0.12	0.13
1.500	0.14	0.15	0.16	0.16	0.17
2.000	0.18	0.19	0.20	0.21	0.22
2.500	0.23	0.24	0.25	0.26	0.27
3.000	0.28	0.29	0.30	0.31	0.32
3.500	0.34	0.35	0.36	0.37	0.38
4.000	0.39	0.41	0.42	0.43	0.44
4.500	0.46	0.47	0.48	0.49	0.51
5.000	0.52	0.53	0.55	0.56	0.57
5.500	0.59	0.60	0.62	0.63	0.64
6.000	0.66	0.67	0.69	0.71	0.72
6.500	0.74	0.76	0.77	0.79	0.81
7.000	0.83	0.85	0.87	0.89	0.91
7.500	0.93	0.95	0.97	1.00	1.02
8.000	1.04	1.07	1.09	1.12	1.15
8.500	1.18	1.21	1.24	1.27	1.30
9.000	1.34	1.37	1.41	1.44	1.48
9.500	1.52	1.56	1.60	1.64	1.69
10.000	1.73	1.78	1.83	1.88	1.93
10.500	1.98	2.04	2.10	2.16	2.22
11.000	2.29	2.36	2.44	2.53	2.62
11.500	2.73	2.88	3.11	3.42	3.81
12.000	4.58	5.35	5.74	6.05	6.28
12.500	6.43	6.54	6.63	6.72	6.80
13.000	6.87	6.94	7.00	7.06	7.12
13.500	7.18	7.23	7.28	7.33	7.38
14.000	7.43	7.47	7.52	7.56	7.60
14.500	7.64	7.68	7.72	7.75	7.79
15.000	7.82	7.86	7.89	7.92	7.95
15.500	7.98	8.01	8.04	8.07	8.09
16.000	8.12	8.14	8.16	8.19	8.21

Watershed

Subsection: Time-Depth Curve
Return Event: 100 years
Label: Armonk
Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

CUMULATIVE RAINFALL (in)
Output Time Increment = 0.100 hours
Time on left represents time for first value in each row.

Time (hours)	Depth (in)	Depth (in)	Depth (in)	Depth (in)	Depth (in)
16.500	8.23	8.25	8.27	8.29	8.31
17.000	8.33	8.35	8.37	8.39	8.40
17.500	8.42	8.44	8.45	8.47	8.49
18.000	8.50	8.52	8.53	8.54	8.56
18.500	8.57	8.59	8.60	8.61	8.63
19.000	8.64	8.65	8.67	8.68	8.69
19.500	8.70	8.72	8.73	8.74	8.75
20.000	8.77	8.78	8.79	8.80	8.81
20.500	8.82	8.84	8.85	8.86	8.87
21.000	8.88	8.89	8.90	8.91	8.92
21.500	8.93	8.94	8.95	8.96	8.97
22.000	8.98	8.99	9.00	9.01	9.02
22.500	9.03	9.04	9.05	9.06	9.07
23.000	9.08	9.09	9.09	9.10	9.11
23.500	9.12	9.13	9.14	9.14	9.15
24.000	9.16	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Time of Concentration Calculations
Label: PDA-1
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Return Event: 1 years
Storm Event: TypeIII 24hr (2.80 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	0.240
Slope	0.190 ft/ft
2 Year 24 Hour Depth	3.40 in
Average Velocity	0.30 ft/s
Segment Time of Concentration	0.094 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	194.00 ft
Is Paved?	False
Slope	0.290 ft/ft
Average Velocity	8.69 ft/s
Segment Time of Concentration	0.006 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.100 hours

Subsection: Time of Concentration Calculations
Return Event: 1 years
Label: PDA-1
Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

==== SCS Channel Flow

Tc =

R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:

R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc =

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:

V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

Watershed

Subsection: Time of Concentration Calculations
Label: PDA-2
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Return Event: 1 years
Storm Event: TypeIII 24hr (2.80 in)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	54.00 ft
Manning's n	0.240
Slope	0.065 ft/ft
2 Year 24 Hour Depth	3.40 in
Average Velocity	0.17 ft/s
Segment Time of Concentration	0.088 hours

Segment #2: TR-55 Channel Flow	
Flow Area	0.2 ft²
Hydraulic Length	131.00 ft
Manning's n	0.012
Slope	0.032 ft/ft
Wetted Perimeter	1.57 ft
Average Velocity	5.50 ft/s
Segment Time of Concentration	0.007 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.095 hours

Subsection: Time of Concentration Calculations | Return Event: 1 years
Label: PDA-2 | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

==== SCS Channel Flow

Tc =	R = Qa / Wp V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n (Lf / V) / 3600
Where:	R= Hydraulic radius Aq= Flow area, square feet Wp= Wetted perimeter, feet V= Velocity, ft/sec Sf= Slope, ft/ft n= Manning's n Tc= Time of concentration, hours Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc =	(0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))
Where:	Tc= Time of concentration, hours n= Manning's n Lf= Flow length, feet P= 2yr, 24hr Rain depth, inches Sf= Slope, %

Watershed

Subsection: Runoff CN-Area | Return Event: 1 years
Label: PDA-1 | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Runoff Curve Number Data

Soil/Surface Description	CN	Area (ft²)	C (%)	UC (%)	Adjusted CN
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	39,443.000	0.0	0.0	61.000
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	3,318.000	0.0	0.0	98.000
Woods - good - Soil B	55.000	16,742.000	0.0	0.0	55.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	59,503.000	(N/A)	(N/A)	61.375

Watershed

Subsection: Runoff CN-Area | Return Event: 1 years
Label: PDA-2 | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Runoff Curve Number Data

Soil/Surface Description	CN	Area (ft²)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	2,767.000	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	1,079.000	0.0	0.0	61.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	3,846.000	(N/A)	(N/A)	87.620

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 1 years
Label: PDA-1 | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Storm Event	TypeIII 24hr (2.80 in)
Return Event	1 years
Duration	35.000 hours
Depth	2.80 in
Time of Concentration (Composite)	0.100 hours
Area (User Defined)	59,503.000 ft²

Computational Time Increment	0.013 hours
Time to Peak (Computed)	12.142 hours
Flow (Peak, Computed)	0.22 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	0.22 ft³/s

Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	59,503.000 ft²
Maximum Retention (Pervious)	6.39 in
Maximum Retention (Pervious, 20 percent)	1.28 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.29 in
Runoff Volume (Pervious)	1,449.962 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1,450.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.100 hours
Computational Time Increment	0.013 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

Watershed

Subsection: Unit Hydrograph Summary
Return Event: 1 years
Label: PDA-1
Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

SCS Unit Hydrograph Parameters	
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	15.48 ft^3/s
Unit peak time, Tp	0.067 hours
Unit receding limb, Tr	0.267 hours
Total unit time, Tb	0.333 hours

Watershed

Subsection: Unit Hydrograph Summary — Return Event: 5 years
Label: PDA-1 — Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Storm Event	TypeIII 24hr (4.30 in)
Return Event	5 years
Duration	24.000 hours
Depth	4.30 in
Time of Concentration (Composite)	0.100 hours
Area (User Defined)	59,503.000 ft²

Computational Time Increment	0.013 hours
Time to Peak (Computed)	12.129 hours
Flow (Peak, Computed)	1.24 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.19 ft³/s

Drainage Area

SCS CN (Composite)	61.000
Area (User Defined)	59,503.000 ft²
Maximum Retention (Pervious)	6.39 in
Maximum Retention (Pervious, 20 percent)	1.28 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	0.97 in
Runoff Volume (Pervious)	4,807.725 ft³

Hydrograph Volume (Area under Hydrograph curve)

Volume	4,799.000 ft³

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.100 hours
Computational Time Increment	0.013 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 5 years
Label: PDA-1 | Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

SCS Unit Hydrograph Parameters	
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	15.48 ft³/s
Unit peak time, Tp	0.067 hours
Unit receding limb, Tr	0.267 hours
Total unit time, Tb	0.333 hours

Watershed

Subsection: Unit Hydrograph Summary — Return Event: 10 years
Label: PDA-1 — Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Storm Event	TypeIII 24hr (5.12 in)
Return Event	10 years
Duration	35.000 hours
Depth	5.12 in
Time of Concentration (Composite)	0.100 hours
Area (User Defined)	59,503.000 ft²

Computational Time Increment	0.013 hours
Time to Peak (Computed)	12.116 hours
Flow (Peak, Computed)	1.94 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.89 ft³/s

Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	59,503.000 ft²
Maximum Retention (Pervious)	6.39 in
Maximum Retention (Pervious, 20 percent)	1.28 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.44 in
Runoff Volume (Pervious)	7,148.900 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	7,148.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.100 hours
Computational Time Increment	0.013 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 10 years

Label: PDA-1 | Storm Event: TypeIII 24hr (5.12 in)

Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

SCS Unit Hydrograph Parameters	
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	15.48 ft^3/s
Unit peak time, Tp	0.067 hours
Unit receding limb, Tr	0.267 hours
Total unit time, Tb	0.333 hours

Watershed

Subsection: Unit Hydrograph Summary — Return Event: 25 years
Label: PDA-1 — Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Storm Event	TypeIII 24hr (6.45 in)
Return Event	25 years
Duration	35.000 hours
Depth	6.45 in
Time of Concentration (Composite)	0.100 hours
Area (User Defined)	59,503.000 ft²

Computational Time Increment	0.013 hours
Time to Peak (Computed)	12.116 hours
Flow (Peak, Computed)	3.21 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	3.16 ft³/s

Drainage Area	
SCS CN (Composite)	61.000
Area (User Defined)	59,503.000 ft²
Maximum Retention (Pervious)	6.39 in
Maximum Retention (Pervious, 20 percent)	1.28 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.31 in
Runoff Volume (Pervious)	11,466.281 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	11,465.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.100 hours
Computational Time Increment	0.013 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

Watershed

Subsection: Unit Hydrograph Summary
Return Event: 25 years
Label: PDA-1
Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

SCS Unit Hydrograph Parameters	
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	15.48 ft^3/s
Unit peak time, Tp	0.067 hours
Unit receding limb, Tr	0.267 hours
Total unit time, Tb	0.333 hours

Watershed

Subsection: Unit Hydrograph Summary — Return Event: 100 years
Label: PDA-1 — Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Storm Event	TypeIII 24hr (9.16 in)
Return Event	100 years
Duration	35.000 hours
Depth	9.16 in
Time of Concentration (Composite)	0.100 hours
Area (User Defined)	59,503.000 ft²

Computational Time Increment	0.013 hours
Time to Peak (Computed)	12.116 hours
Flow (Peak, Computed)	6.12 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	6.06 ft³/s

Drainage Area

SCS CN (Composite)	61.000
Area (User Defined)	59,503.000 ft²
Maximum Retention (Pervious)	6.39 in
Maximum Retention (Pervious, 20 percent)	1.28 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	4.35 in
Runoff Volume (Pervious)	21,576.746 ft³

Hydrograph Volume (Area under Hydrograph curve)

Volume	21,575.000 ft³

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.100 hours
Computational Time Increment	0.013 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 100 years
Label: PDA-1 | Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

SCS Unit Hydrograph Parameters	
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	15.48 ft^3/s
Unit peak time, Tp	0.067 hours
Unit receding limb, Tr	0.267 hours
Total unit time, Tb	0.333 hours

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 1 years
Label: PDA-2 | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Storm Event	TypeIII 24hr (2.80 in)
Return Event	1 years
Duration	35.000 hours
Depth	2.80 in
Time of Concentration (Composite)	0.095 hours
Area (User Defined)	3,846.000 ft²

Computational Time Increment	0.013 hours
Time to Peak (Computed)	12.105 hours
Flow (Peak, Computed)	0.15 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.15 ft³/s

Drainage Area	
SCS CN (Composite)	88.000
Area (User Defined)	3,846.000 ft²
Maximum Retention (Pervious)	1.36 in
Maximum Retention (Pervious, 20 percent)	0.27 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.64 in
Runoff Volume (Pervious)	526.116 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	526.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.095 hours
Computational Time Increment	0.013 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 1 years
Label: PDA-2 | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

SCS Unit Hydrograph Parameters	
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.06 ft³/s
Unit peak time, Tp	0.063 hours
Unit receding limb, Tr	0.252 hours
Total unit time, Tb	0.315 hours

Watershed

Subsection: Unit Hydrograph Summary — Return Event: 5 years
Label: PDA-2 — Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Storm Event	TypeIII 24hr (4.30 in)
Return Event	5 years
Duration	24.000 hours
Depth	4.30 in
Time of Concentration (Composite)	0.095 hours
Area (User Defined)	3,846.000 ft²

Computational Time Increment	0.013 hours
Time to Peak (Computed)	12.105 hours
Flow (Peak, Computed)	0.27 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.26 ft³/s

Drainage Area

SCS CN (Composite)	88.000
Area (User Defined)	3,846.000 ft²
Maximum Retention (Pervious)	1.36 in
Maximum Retention (Pervious, 20 percent)	0.27 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	3.01 in
Runoff Volume (Pervious)	964.246 ft³

Hydrograph Volume (Area under Hydrograph curve)

Volume	963.000 ft³

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.095 hours
Computational Time Increment	0.013 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

Watershed

Subsection: Unit Hydrograph Summary — Return Event: 5 years
Label: PDA-2 — Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

SCS Unit Hydrograph Parameters	
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.06 ft³/s
Unit peak time, Tp	0.063 hours
Unit receding limb, Tr	0.252 hours
Total unit time, Tb	0.315 hours

Watershed

Subsection: Unit Hydrograph Summary — Return Event: 10 years
Label: PDA-2 — Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Storm Event	TypeIII 24hr (5.12 in)
Return Event	10 years
Duration	35.000 hours
Depth	5.12 in
Time of Concentration (Composite)	0.095 hours
Area (User Defined)	3,846.000 ft²

Computational Time Increment	0.013 hours
Time to Peak (Computed)	12.105 hours
Flow (Peak, Computed)	0.33 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.33 ft³/s

Drainage Area	
SCS CN (Composite)	88.000
Area (User Defined)	3,846.000 ft²
Maximum Retention (Pervious)	1.36 in
Maximum Retention (Pervious, 20 percent)	0.27 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.78 in
Runoff Volume (Pervious)	1,212.461 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1,212.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.095 hours
Computational Time Increment	0.013 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 10 years
Label: PDA-2 | Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

SCS Unit Hydrograph Parameters	
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.06 ft^3/s
Unit peak time, Tp	0.063 hours
Unit receding limb, Tr	0.252 hours
Total unit time, Tb	0.315 hours

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 25 years
Label: PDA-2 | Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Storm Event	TypeIII 24hr (6.45 in)
Return Event	25 years
Duration	35.000 hours
Depth	6.45 in
Time of Concentration (Composite)	0.095 hours
Area (User Defined)	3,846.000 ft²

Computational Time Increment	0.013 hours
Time to Peak (Computed)	12.105 hours
Flow (Peak, Computed)	0.43 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.43 ft³/s

Drainage Area	
SCS CN (Composite)	88.000
Area (User Defined)	3,846.000 ft²
Maximum Retention (Pervious)	1.36 in
Maximum Retention (Pervious, 20 percent)	0.27 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	5.06 in
Runoff Volume (Pervious)	1,621.802 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1,622.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.095 hours
Computational Time Increment	0.013 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 25 years
Label: PDA-2 | Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

SCS Unit Hydrograph Parameters	
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.06 ft^3/s
Unit peak time, Tp	0.063 hours
Unit receding limb, Tr	0.252 hours
Total unit time, Tb	0.315 hours

Subsection: Unit Hydrograph Summary | Return Event: 100 years
Label: PDA-2 | Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Storm Event	TypeIII 24hr (9.16 in)
Return Event	100 years
Duration	35.000 hours
Depth	9.16 in
Time of Concentration (Composite)	0.095 hours
Area (User Defined)	3,846.000 ft²

Computational Time Increment	0.013 hours
Time to Peak (Computed)	12.105 hours
Flow (Peak, Computed)	0.64 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.64 ft³/s

Drainage Area	
SCS CN (Composite)	88.000
Area (User Defined)	3,846.000 ft²
Maximum Retention (Pervious)	1.36 in
Maximum Retention (Pervious, 20 percent)	0.27 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	7.71 in
Runoff Volume (Pervious)	2,469.464 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	2,469.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.095 hours
Computational Time Increment	0.013 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749

Watershed

Subsection: Unit Hydrograph Summary | Return Event: 100 years
Label: PDA-2 | Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

SCS Unit Hydrograph Parameters	
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.06 ft³/s
Unit peak time, Tp	0.063 hours
Unit receding limb, Tr	0.252 hours
Total unit time, Tb	0.315 hours

Watershed

Subsection: Time vs. Elevation | Return Event: 1 years
Label: PO-2 (OUT) | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	659.00	659.00	659.00	659.00	659.00
0.250	659.00	659.00	659.00	659.00	659.00
0.500	659.00	659.00	659.00	659.00	659.00
0.750	659.00	659.00	659.00	659.00	659.00
1.000	659.00	659.00	659.00	659.00	659.00
1.250	659.00	659.00	659.00	659.00	659.00
1.500	659.00	659.00	659.00	659.00	659.00
1.750	659.00	659.00	659.00	659.00	659.00
2.000	659.00	659.00	659.00	659.00	659.00
2.250	659.00	659.00	659.00	659.00	659.00
2.500	659.00	659.00	659.00	659.00	659.00
2.750	659.00	659.00	659.00	659.00	659.00
3.000	659.00	659.00	659.00	659.00	659.00
3.250	659.00	659.00	659.00	659.00	659.00
3.500	659.00	659.00	659.00	659.00	659.00
3.750	659.00	659.00	659.00	659.00	659.00
4.000	659.00	659.00	659.00	659.00	659.00
4.250	659.00	659.00	659.00	659.00	659.00
4.500	659.00	659.00	659.00	659.00	659.00
4.750	659.00	659.00	659.00	659.00	659.00
5.000	659.00	659.00	659.00	659.00	659.00
5.250	659.00	659.00	659.00	659.00	659.00
5.500	659.00	659.00	659.00	659.00	659.00
5.750	659.00	659.00	659.00	659.00	659.00
6.000	659.00	659.00	659.00	659.00	659.00
6.250	659.00	659.00	659.00	659.00	659.00
6.500	659.00	659.00	659.00	659.00	659.00
6.750	659.00	659.00	659.00	659.00	659.00
7.000	659.00	659.00	659.00	659.00	659.00
7.250	659.00	659.00	659.00	659.00	659.00
7.500	659.00	659.00	659.00	659.00	659.00
7.750	659.00	659.00	659.00	659.00	659.00
8.000	659.00	659.00	659.00	659.01	659.01
8.250	659.01	659.01	659.01	659.01	659.01
8.500	659.01	659.01	659.01	659.02	659.02
8.750	659.02	659.02	659.02	659.03	659.03
9.000	659.03	659.03	659.03	659.04	659.04
9.250	659.04	659.05	659.05	659.05	659.06
9.500	659.06	659.06	659.07	659.07	659.07
9.750	659.08	659.08	659.09	659.09	659.10

Subsection: Time vs. Elevation | Return Event: 1 years
Label: PO-2 (OUT) | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.000	659.10	659.11	659.11	659.12	659.12
10.250	659.13	659.14	659.14	659.15	659.16
10.500	659.17	659.17	659.18	659.19	659.20
10.750	659.21	659.22	659.23	659.24	659.25
11.000	659.26	659.27	659.28	659.29	659.31
11.250	659.32	659.34	659.35	659.37	659.39
11.500	659.41	659.43	659.46	659.49	659.53
11.750	659.59	659.65	659.72	659.81	659.92
12.000	660.04	660.14	660.25	660.34	660.40
12.250	660.43	660.45	660.46	660.46	660.46
12.500	660.45	660.43	660.41	660.39	660.37
12.750	660.35	660.34	660.32	660.30	660.29
13.000	660.28	660.26	660.25	660.24	660.23
13.250	660.22	660.21	660.20	660.19	660.18
13.500	660.18	660.17	660.16	660.16	660.15
13.750	660.15	660.14	660.14	660.13	660.13
14.000	660.13	660.12	660.12	660.12	660.11
14.250	660.11	660.11	660.10	660.10	660.10
14.500	660.10	660.10	660.09	660.09	660.09
14.750	660.09	660.09	660.09	660.08	660.08
15.000	660.08	660.08	660.08	660.08	660.08
15.250	660.08	660.07	660.07	660.07	660.07
15.500	660.07	660.07	660.07	660.07	660.07
15.750	660.06	660.06	660.06	660.06	660.06
16.000	660.06	660.06	660.06	660.06	660.05
16.250	660.05	660.05	660.05	660.05	660.05
16.500	660.05	660.05	660.05	660.05	660.05
16.750	660.05	660.05	660.05	660.05	660.04
17.000	660.04	660.04	660.04	660.04	660.04
17.250	660.04	660.04	660.04	660.04	660.04
17.500	660.04	660.04	660.04	660.04	660.04
17.750	660.04	660.04	660.04	660.04	660.03
18.000	660.03	660.03	660.03	660.03	660.03
18.250	660.03	660.03	660.03	660.03	660.03
18.500	660.03	660.03	660.03	660.03	660.03
18.750	660.03	660.03	660.03	660.03	660.03
19.000	660.03	660.03	660.03	660.03	660.03
19.250	660.03	660.03	660.03	660.03	660.03
19.500	660.03	660.03	660.03	660.03	660.03
19.750	660.03	660.03	660.03	660.03	660.03
20.000	660.03	660.03	660.03	660.02	660.02

Watershed

Subsection: Time vs. Elevation | Return Event: 1 years
Label: PO-2 (OUT) | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.250	660.02	660.02	660.02	660.02	660.02
20.500	660.02	660.02	660.02	660.02	660.02
20.750	660.02	660.02	660.02	660.02	660.02
21.000	660.02	660.02	660.02	660.02	660.02
21.250	660.02	660.02	660.02	660.02	660.02
21.500	660.02	660.02	660.02	660.02	660.02
21.750	660.02	660.02	660.02	660.02	660.02
22.000	660.02	660.02	660.02	660.02	660.02
22.250	660.02	660.02	660.02	660.02	660.02
22.500	660.02	660.02	660.02	660.02	660.02
22.750	660.02	660.02	660.02	660.02	660.02
23.000	660.02	660.02	660.02	660.02	660.02
23.250	660.02	660.02	660.02	660.02	660.02
23.500	660.02	660.02	660.02	660.02	660.02
23.750	660.02	660.02	660.02	660.02	660.02
24.000	660.02	660.02	660.02	660.01	660.01
24.250	660.01	660.01	660.01	660.01	660.01
24.500	660.01	660.01	660.01	660.01	660.00
24.750	660.00	660.00	660.00	660.00	660.00
25.000	660.00	660.00	660.00	660.00	660.00
25.250	660.00	660.00	660.00	660.00	660.00
25.500	660.00	660.00	660.00	660.00	660.00
25.750	660.00	660.00	660.00	660.00	660.00
26.000	660.00	660.00	660.00	660.00	660.00
26.250	660.00	660.00	660.00	660.00	660.00
26.500	660.00	660.00	660.00	660.00	660.00
26.750	660.00	660.00	660.00	660.00	660.00
27.000	660.00	660.00	660.00	660.00	660.00
27.250	660.00	660.00	660.00	660.00	660.00
27.500	660.00	660.00	660.00	660.00	660.00
27.750	660.00	660.00	660.00	660.00	660.00
28.000	660.00	660.00	660.00	660.00	660.00
28.250	660.00	660.00	660.00	660.00	660.00
28.500	660.00	660.00	660.00	660.00	660.00
28.750	660.00	660.00	660.00	660.00	660.00
29.000	660.00	660.00	660.00	660.00	660.00
29.250	660.00	660.00	660.00	660.00	660.00
29.500	660.00	660.00	660.00	660.00	660.00
29.750	660.00	660.00	660.00	660.00	660.00
30.000	660.00	660.00	660.00	660.00	660.00
30.250	660.00	660.00	660.00	660.00	660.00

Watershed

Subsection: Time vs. Elevation
Return Event: 1 years
Label: PO-2 (OUT)
Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
30.500	660.00	660.00	660.00	660.00	660.00
30.750	660.00	660.00	660.00	660.00	660.00
31.000	660.00	660.00	660.00	660.00	660.00
31.250	660.00	660.00	660.00	660.00	660.00
31.500	660.00	660.00	660.00	660.00	660.00
31.750	660.00	660.00	660.00	660.00	660.00
32.000	660.00	660.00	660.00	660.00	660.00
32.250	660.00	660.00	660.00	660.00	660.00
32.500	660.00	660.00	660.00	660.00	660.00
32.750	660.00	660.00	660.00	660.00	660.00
33.000	660.00	660.00	660.00	660.00	660.00
33.250	660.00	660.00	660.00	660.00	660.00
33.500	660.00	660.00	660.00	660.00	660.00
33.750	660.00	660.00	660.00	660.00	660.00
34.000	660.00	660.00	660.00	660.00	660.00
34.250	660.00	660.00	660.00	660.00	660.00
34.500	660.00	660.00	660.00	660.00	660.00
34.750	660.00	660.00	660.00	660.00	660.00
35.000	660.00	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Time vs. Elevation | Return Event: 5 years
Label: PO-2 (OUT) | Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	659.00	659.00	659.00	659.00	659.00
0.250	659.00	659.00	659.00	659.00	659.00
0.500	659.00	659.00	659.00	659.00	659.00
0.750	659.00	659.00	659.00	659.00	659.00
1.000	659.00	659.00	659.00	659.00	659.00
1.250	659.00	659.00	659.00	659.00	659.00
1.500	659.00	659.00	659.00	659.00	659.00
1.750	659.00	659.00	659.00	659.00	659.00
2.000	659.00	659.00	659.00	659.00	659.00
2.250	659.00	659.00	659.00	659.00	659.00
2.500	659.00	659.00	659.00	659.00	659.00
2.750	659.00	659.00	659.00	659.00	659.00
3.000	659.00	659.00	659.00	659.00	659.00
3.250	659.00	659.00	659.00	659.00	659.00
3.500	659.00	659.00	659.00	659.00	659.00
3.750	659.00	659.00	659.00	659.00	659.00
4.000	659.00	659.00	659.00	659.00	659.00
4.250	659.00	659.00	659.00	659.00	659.00
4.500	659.00	659.00	659.00	659.00	659.00
4.750	659.00	659.00	659.00	659.00	659.00
5.000	659.00	659.00	659.00	659.00	659.00
5.250	659.00	659.00	659.00	659.00	659.00
5.500	659.00	659.00	659.00	659.00	659.00
5.750	659.00	659.00	659.00	659.00	659.00
6.000	659.00	659.00	659.00	659.00	659.00
6.250	659.00	659.01	659.01	659.01	659.01
6.500	659.01	659.01	659.01	659.01	659.01
6.750	659.01	659.02	659.02	659.02	659.02
7.000	659.02	659.02	659.03	659.03	659.03
7.250	659.03	659.03	659.04	659.04	659.04
7.500	659.04	659.05	659.05	659.05	659.06
7.750	659.06	659.06	659.06	659.07	659.07
8.000	659.08	659.08	659.08	659.09	659.09
8.250	659.10	659.10	659.10	659.11	659.11
8.500	659.12	659.13	659.13	659.14	659.14
8.750	659.15	659.16	659.16	659.17	659.18
9.000	659.19	659.19	659.20	659.21	659.22
9.250	659.23	659.24	659.25	659.26	659.27
9.500	659.28	659.29	659.30	659.31	659.32
9.750	659.33	659.34	659.36	659.37	659.38

Subsection: Time vs. Elevation | Return Event: 5 years
Label: PO-2 (OUT) | Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.000	659.39	659.41	659.42	659.44	659.45
10.250	659.47	659.48	659.50	659.52	659.53
10.500	659.55	659.57	659.59	659.61	659.63
10.750	659.65	659.67	659.70	659.72	659.74
11.000	659.77	659.79	659.82	659.85	659.87
11.250	659.91	659.94	659.97	660.01	660.03
11.500	660.05	660.07	660.09	660.12	660.15
11.750	660.19	660.24	660.29	660.35	660.43
12.000	660.55	660.70	660.86	661.00	661.10
12.250	661.16	661.18	661.20	661.20	661.18
12.500	661.15	661.11	661.07	661.02	660.97
12.750	660.92	660.88	660.84	660.79	660.75
13.000	660.71	660.67	660.63	660.60	660.56
13.250	660.53	660.50	660.47	660.44	660.42
13.500	660.39	660.37	660.36	660.34	660.32
13.750	660.31	660.29	660.28	660.27	660.26
14.000	660.25	660.24	660.23	660.22	660.21
14.250	660.21	660.20	660.19	660.19	660.18
14.500	660.18	660.17	660.17	660.17	660.16
14.750	660.16	660.15	660.15	660.15	660.14
15.000	660.14	660.14	660.14	660.13	660.13
15.250	660.13	660.13	660.12	660.12	660.12
15.500	660.12	660.12	660.11	660.11	660.11
15.750	660.11	660.11	660.10	660.10	660.10
16.000	660.10	660.10	660.09	660.09	660.09
16.250	660.09	660.09	660.09	660.09	660.08
16.500	660.08	660.08	660.08	660.08	660.08
16.750	660.08	660.08	660.08	660.07	660.07
17.000	660.07	660.07	660.07	660.07	660.07
17.250	660.07	660.07	660.07	660.07	660.07
17.500	660.06	660.06	660.06	660.06	660.06
17.750	660.06	660.06	660.06	660.06	660.06
18.000	660.06	660.06	660.06	660.05	660.05
18.250	660.05	660.05	660.05	660.05	660.05
18.500	660.05	660.05	660.05	660.05	660.05
18.750	660.05	660.05	660.05	660.05	660.05
19.000	660.05	660.05	660.05	660.05	660.05
19.250	660.05	660.05	660.04	660.04	660.04
19.500	660.04	660.04	660.04	660.04	660.04
19.750	660.04	660.04	660.04	660.04	660.04
20.000	660.04	660.04	660.04	660.04	660.04

Subsection: Time vs. Elevation | Return Event: 5 years
Label: PO-2 (OUT) | Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.250	660.04	660.04	660.04	660.04	660.04
20.500	660.04	660.04	660.04	660.04	660.04
20.750	660.04	660.04	660.04	660.04	660.04
21.000	660.04	660.04	660.04	660.04	660.04
21.250	660.04	660.04	660.04	660.04	660.04
21.500	660.04	660.04	660.04	660.04	660.04
21.750	660.04	660.04	660.03	660.03	660.03
22.000	660.03	660.03	660.03	660.03	660.03
22.250	660.03	660.03	660.03	660.03	660.03
22.500	660.03	660.03	660.03	660.03	660.03
22.750	660.03	660.03	660.03	660.03	660.03
23.000	660.03	660.03	660.03	660.03	660.03
23.250	660.03	660.03	660.03	660.03	660.03
23.500	660.03	660.03	660.03	660.03	660.03
23.750	660.03	660.03	660.03	660.03	660.03
24.000	660.03	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time vs. Elevation | Return Event: 10 years
Label: PO-2 (OUT) | Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	659.00	659.00	659.00	659.00	659.00
0.250	659.00	659.00	659.00	659.00	659.00
0.500	659.00	659.00	659.00	659.00	659.00
0.750	659.00	659.00	659.00	659.00	659.00
1.000	659.00	659.00	659.00	659.00	659.00
1.250	659.00	659.00	659.00	659.00	659.00
1.500	659.00	659.00	659.00	659.00	659.00
1.750	659.00	659.00	659.00	659.00	659.00
2.000	659.00	659.00	659.00	659.00	659.00
2.250	659.00	659.00	659.00	659.00	659.00
2.500	659.00	659.00	659.00	659.00	659.00
2.750	659.00	659.00	659.00	659.00	659.00
3.000	659.00	659.00	659.00	659.00	659.00
3.250	659.00	659.00	659.00	659.00	659.00
3.500	659.00	659.00	659.00	659.00	659.00
3.750	659.00	659.00	659.00	659.00	659.00
4.000	659.00	659.00	659.00	659.00	659.00
4.250	659.00	659.00	659.00	659.00	659.00
4.500	659.00	659.00	659.00	659.00	659.00
4.750	659.00	659.00	659.00	659.00	659.00
5.000	659.00	659.00	659.00	659.00	659.00
5.250	659.00	659.00	659.00	659.00	659.00
5.500	659.00	659.01	659.01	659.01	659.01
5.750	659.01	659.01	659.01	659.01	659.01
6.000	659.02	659.02	659.02	659.02	659.02
6.250	659.02	659.02	659.03	659.03	659.03
6.500	659.03	659.03	659.04	659.04	659.04
6.750	659.04	659.05	659.05	659.05	659.06
7.000	659.06	659.06	659.06	659.07	659.07
7.250	659.08	659.08	659.08	659.09	659.09
7.500	659.10	659.10	659.11	659.11	659.11
7.750	659.12	659.13	659.13	659.14	659.14
8.000	659.15	659.15	659.16	659.17	659.17
8.250	659.18	659.19	659.19	659.20	659.21
8.500	659.22	659.22	659.23	659.24	659.25
8.750	659.26	659.27	659.28	659.29	659.30
9.000	659.31	659.32	659.34	659.35	659.36
9.250	659.37	659.39	659.40	659.41	659.43
9.500	659.44	659.46	659.47	659.49	659.50
9.750	659.52	659.54	659.55	659.57	659.59

Watershed

Subsection: Time vs. Elevation
Return Event: 10 years
Label: PO-2 (OUT)
Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.000	659.61	659.63	659.64	659.66	659.68
10.250	659.71	659.73	659.75	659.77	659.80
10.500	659.82	659.85	659.87	659.90	659.93
10.750	659.95	659.98	660.01	660.02	660.04
11.000	660.05	660.06	660.08	660.09	660.10
11.250	660.11	660.13	660.14	660.15	660.16
11.500	660.18	660.19	660.21	660.24	660.27
11.750	660.32	660.37	660.43	660.50	660.60
12.000	660.76	660.95	661.16	661.35	661.48
12.250	661.55	661.59	661.61	661.62	661.60
12.500	661.56	661.51	661.46	661.40	661.34
12.750	661.28	661.23	661.17	661.11	661.06
13.000	661.00	660.95	660.90	660.86	660.81
13.250	660.77	660.73	660.69	660.65	660.61
13.500	660.58	660.55	660.52	660.49	660.46
13.750	660.44	660.41	660.39	660.37	660.36
14.000	660.34	660.32	660.31	660.30	660.29
14.250	660.27	660.26	660.25	660.25	660.24
14.500	660.23	660.22	660.22	660.21	660.21
14.750	660.20	660.19	660.19	660.19	660.18
15.000	660.18	660.17	660.17	660.17	660.16
15.250	660.16	660.16	660.15	660.15	660.15
15.500	660.15	660.14	660.14	660.14	660.13
15.750	660.13	660.13	660.13	660.13	660.12
16.000	660.12	660.12	660.12	660.11	660.11
16.250	660.11	660.11	660.11	660.10	660.10
16.500	660.10	660.10	660.10	660.10	660.10
16.750	660.09	660.09	660.09	660.09	660.09
17.000	660.09	660.09	660.09	660.09	660.08
17.250	660.08	660.08	660.08	660.08	660.08
17.500	660.08	660.08	660.08	660.08	660.07
17.750	660.07	660.07	660.07	660.07	660.07
18.000	660.07	660.07	660.07	660.07	660.07
18.250	660.06	660.06	660.06	660.06	660.06
18.500	660.06	660.06	660.06	660.06	660.06
18.750	660.06	660.06	660.06	660.06	660.06
19.000	660.06	660.06	660.06	660.06	660.06
19.250	660.06	660.05	660.05	660.05	660.05
19.500	660.05	660.05	660.05	660.05	660.05
19.750	660.05	660.05	660.05	660.05	660.05
20.000	660.05	660.05	660.05	660.05	660.05

Watershed

Subsection: Time vs. Elevation | Return Event: 10 years
Label: PO-2 (OUT) | Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.250	660.05	660.05	660.05	660.05	660.05
20.500	660.05	660.05	660.05	660.05	660.05
20.750	660.05	660.05	660.05	660.05	660.05
21.000	660.05	660.05	660.05	660.05	660.04
21.250	660.04	660.04	660.04	660.04	660.04
21.500	660.04	660.04	660.04	660.04	660.04
21.750	660.04	660.04	660.04	660.04	660.04
22.000	660.04	660.04	660.04	660.04	660.04
22.250	660.04	660.04	660.04	660.04	660.04
22.500	660.04	660.04	660.04	660.04	660.04
22.750	660.04	660.04	660.04	660.04	660.04
23.000	660.04	660.04	660.04	660.04	660.04
23.250	660.04	660.04	660.04	660.04	660.04
23.500	660.04	660.04	660.04	660.03	660.03
23.750	660.03	660.03	660.03	660.03	660.03
24.000	660.03	660.03	660.03	660.03	660.03
24.250	660.02	660.02	660.02	660.02	660.02
24.500	660.01	660.01	660.01	660.01	660.01
24.750	660.01	660.01	660.01	660.01	660.01
25.000	660.01	660.00	660.00	660.00	660.00
25.250	660.00	660.00	660.00	660.00	660.00
25.500	660.00	660.00	660.00	660.00	660.00
25.750	660.00	660.00	660.00	660.00	660.00
26.000	660.00	660.00	660.00	660.00	660.00
26.250	660.00	660.00	660.00	660.00	660.00
26.500	660.00	660.00	660.00	660.00	660.00
26.750	660.00	660.00	660.00	660.00	660.00
27.000	660.00	660.00	660.00	660.00	660.00
27.250	660.00	660.00	660.00	660.00	660.00
27.500	660.00	660.00	660.00	660.00	660.00
27.750	660.00	660.00	660.00	660.00	660.00
28.000	660.00	660.00	660.00	660.00	660.00
28.250	660.00	660.00	660.00	660.00	660.00
28.500	660.00	660.00	660.00	660.00	660.00
28.750	660.00	660.00	660.00	660.00	660.00
29.000	660.00	660.00	660.00	660.00	660.00
29.250	660.00	660.00	660.00	660.00	660.00
29.500	660.00	660.00	660.00	660.00	660.00
29.750	660.00	660.00	660.00	660.00	660.00
30.000	660.00	660.00	660.00	660.00	660.00
30.250	660.00	660.00	660.00	660.00	660.00

Subsection: Time vs. Elevation
Return Event: 10 years
Label: PO-2 (OUT)
Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
30.500	660.00	660.00	660.00	660.00	660.00
30.750	660.00	660.00	660.00	660.00	660.00
31.000	660.00	660.00	660.00	660.00	660.00
31.250	660.00	660.00	660.00	660.00	660.00
31.500	660.00	660.00	660.00	660.00	660.00
31.750	660.00	660.00	660.00	660.00	660.00
32.000	660.00	660.00	660.00	660.00	660.00
32.250	660.00	660.00	660.00	660.00	660.00
32.500	660.00	660.00	660.00	660.00	660.00
32.750	660.00	660.00	660.00	660.00	660.00
33.000	660.00	660.00	660.00	660.00	660.00
33.250	660.00	660.00	660.00	660.00	660.00
33.500	660.00	660.00	660.00	660.00	660.00
33.750	660.00	660.00	660.00	660.00	660.00
34.000	660.00	660.00	660.00	660.00	660.00
34.250	660.00	660.00	660.00	660.00	660.00
34.500	660.00	660.00	660.00	660.00	660.00
34.750	660.00	660.00	660.00	660.00	660.00
35.000	660.00	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Time vs. Elevation | Return Event: 25 years
Label: PO-2 (OUT) | Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	659.00	659.00	659.00	659.00	659.00
0.250	659.00	659.00	659.00	659.00	659.00
0.500	659.00	659.00	659.00	659.00	659.00
0.750	659.00	659.00	659.00	659.00	659.00
1.000	659.00	659.00	659.00	659.00	659.00
1.250	659.00	659.00	659.00	659.00	659.00
1.500	659.00	659.00	659.00	659.00	659.00
1.750	659.00	659.00	659.00	659.00	659.00
2.000	659.00	659.00	659.00	659.00	659.00
2.250	659.00	659.00	659.00	659.00	659.00
2.500	659.00	659.00	659.00	659.00	659.00
2.750	659.00	659.00	659.00	659.00	659.00
3.000	659.00	659.00	659.00	659.00	659.00
3.250	659.00	659.00	659.00	659.00	659.00
3.500	659.00	659.00	659.00	659.00	659.00
3.750	659.00	659.00	659.00	659.00	659.00
4.000	659.00	659.00	659.00	659.00	659.00
4.250	659.00	659.00	659.00	659.00	659.00
4.500	659.00	659.00	659.00	659.01	659.01
4.750	659.01	659.01	659.01	659.01	659.01
5.000	659.01	659.02	659.02	659.02	659.02
5.250	659.02	659.02	659.03	659.03	659.03
5.500	659.03	659.03	659.04	659.04	659.04
5.750	659.04	659.05	659.05	659.05	659.06
6.000	659.06	659.06	659.07	659.07	659.07
6.250	659.08	659.08	659.08	659.09	659.09
6.500	659.10	659.10	659.11	659.11	659.11
6.750	659.12	659.12	659.13	659.14	659.14
7.000	659.15	659.15	659.16	659.17	659.17
7.250	659.18	659.19	659.19	659.20	659.21
7.500	659.22	659.22	659.23	659.24	659.25
7.750	659.26	659.26	659.27	659.28	659.29
8.000	659.30	659.31	659.32	659.33	659.34
8.250	659.35	659.37	659.38	659.39	659.40
8.500	659.42	659.43	659.44	659.46	659.47
8.750	659.49	659.50	659.52	659.53	659.55
9.000	659.57	659.58	659.60	659.62	659.64
9.250	659.66	659.68	659.70	659.72	659.74
9.500	659.76	659.78	659.81	659.83	659.85
9.750	659.88	659.90	659.93	659.95	659.98

Subsection: Time vs. Elevation
Return Event: 25 years
Label: PO-2 (OUT)
Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.000	660.00	660.02	660.03	660.04	660.06
10.250	660.07	660.08	660.09	660.10	660.11
10.500	660.11	660.12	660.13	660.14	660.15
10.750	660.15	660.16	660.17	660.17	660.18
11.000	660.19	660.20	660.20	660.21	660.22
11.250	660.23	660.24	660.25	660.26	660.28
11.500	660.29	660.31	660.33	660.36	660.40
11.750	660.46	660.53	660.62	660.72	660.86
12.000	661.07	661.35	661.65	661.92	662.08
12.250	662.14	662.14	662.11	662.05	661.98
12.500	661.92	661.85	661.78	661.71	661.65
12.750	661.58	661.52	661.46	661.40	661.34
13.000	661.28	661.22	661.17	661.11	661.06
13.250	661.01	660.96	660.91	660.87	660.83
13.500	660.79	660.75	660.71	660.68	660.65
13.750	660.61	660.58	660.55	660.53	660.50
14.000	660.47	660.45	660.43	660.41	660.39
14.250	660.37	660.36	660.35	660.33	660.32
14.500	660.31	660.30	660.29	660.28	660.27
14.750	660.27	660.26	660.25	660.25	660.24
15.000	660.23	660.23	660.22	660.22	660.21
15.250	660.21	660.20	660.20	660.20	660.19
15.500	660.19	660.18	660.18	660.18	660.17
15.750	660.17	660.17	660.16	660.16	660.16
16.000	660.16	660.15	660.15	660.15	660.14
16.250	660.14	660.14	660.14	660.13	660.13
16.500	660.13	660.13	660.13	660.13	660.12
16.750	660.12	660.12	660.12	660.12	660.12
17.000	660.11	660.11	660.11	660.11	660.11
17.250	660.11	660.11	660.10	660.10	660.10
17.500	660.10	660.10	660.10	660.10	660.10
17.750	660.09	660.09	660.09	660.09	660.09
18.000	660.09	660.09	660.09	660.08	660.08
18.250	660.08	660.08	660.08	660.08	660.08
18.500	660.08	660.08	660.08	660.08	660.08
18.750	660.08	660.08	660.07	660.07	660.07
19.000	660.07	660.07	660.07	660.07	660.07
19.250	660.07	660.07	660.07	660.07	660.07
19.500	660.07	660.07	660.07	660.07	660.07
19.750	660.07	660.07	660.07	660.07	660.07
20.000	660.07	660.06	660.06	660.06	660.06

Watershed

Subsection: Time vs. Elevation　　Return Event: 25 years
Label: PO-2 (OUT)　　Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.250	660.06	660.06	660.06	660.06	660.06
20.500	660.06	660.06	660.06	660.06	660.06
20.750	660.06	660.06	660.06	660.06	660.06
21.000	660.06	660.06	660.06	660.06	660.06
21.250	660.06	660.06	660.06	660.06	660.06
21.500	660.06	660.06	660.06	660.06	660.05
21.750	660.05	660.05	660.05	660.05	660.05
22.000	660.05	660.05	660.05	660.05	660.05
22.250	660.05	660.05	660.05	660.05	660.05
22.500	660.05	660.05	660.05	660.05	660.05
22.750	660.05	660.05	660.05	660.05	660.05
23.000	660.05	660.05	660.05	660.05	660.05
23.250	660.05	660.05	660.05	660.05	660.05
23.500	660.05	660.05	660.04	660.04	660.04
23.750	660.04	660.04	660.04	660.04	660.04
24.000	660.04	660.04	660.04	660.04	660.03
24.250	660.03	660.03	660.02	660.02	660.02
24.500	660.02	660.02	660.01	660.01	660.01
24.750	660.01	660.01	660.01	660.01	660.01
25.000	660.01	660.01	660.01	660.00	660.00
25.250	660.00	660.00	660.00	660.00	660.00
25.500	660.00	660.00	660.00	660.00	660.00
25.750	660.00	660.00	660.00	660.00	660.00
26.000	660.00	660.00	660.00	660.00	660.00
26.250	660.00	660.00	660.00	660.00	660.00
26.500	660.00	660.00	660.00	660.00	660.00
26.750	660.00	660.00	660.00	660.00	660.00
27.000	660.00	660.00	660.00	660.00	660.00
27.250	660.00	660.00	660.00	660.00	660.00
27.500	660.00	660.00	660.00	660.00	660.00
27.750	660.00	660.00	660.00	660.00	660.00
28.000	660.00	660.00	660.00	660.00	660.00
28.250	660.00	660.00	660.00	660.00	660.00
28.500	660.00	660.00	660.00	660.00	660.00
28.750	660.00	660.00	660.00	660.00	660.00
29.000	660.00	660.00	660.00	660.00	660.00
29.250	660.00	660.00	660.00	660.00	660.00
29.500	660.00	660.00	660.00	660.00	660.00
29.750	660.00	660.00	660.00	660.00	660.00
30.000	660.00	660.00	660.00	660.00	660.00
30.250	660.00	660.00	660.00	660.00	660.00

Watershed

Subsection: Time vs. Elevation | Return Event: 25 years
Label: PO-2 (OUT) | Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
30.500	660.00	660.00	660.00	660.00	660.00
30.750	660.00	660.00	660.00	660.00	660.00
31.000	660.00	660.00	660.00	660.00	660.00
31.250	660.00	660.00	660.00	660.00	660.00
31.500	660.00	660.00	660.00	660.00	660.00
31.750	660.00	660.00	660.00	660.00	660.00
32.000	660.00	660.00	660.00	660.00	660.00
32.250	660.00	660.00	660.00	660.00	660.00
32.500	660.00	660.00	660.00	660.00	660.00
32.750	660.00	660.00	660.00	660.00	660.00
33.000	660.00	660.00	660.00	660.00	660.00
33.250	660.00	660.00	660.00	660.00	660.00
33.500	660.00	660.00	660.00	660.00	660.00
33.750	660.00	660.00	660.00	660.00	660.00
34.000	660.00	660.00	660.00	660.00	660.00
34.250	660.00	660.00	660.00	660.00	660.00
34.500	660.00	660.00	660.00	660.00	660.00
34.750	660.00	660.00	660.00	660.00	660.00
35.000	660.00	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Time vs. Elevation — Return Event: 100 years
Label: PO-2 (OUT) — Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	659.00	659.00	659.00	659.00	659.00
0.250	659.00	659.00	659.00	659.00	659.00
0.500	659.00	659.00	659.00	659.00	659.00
0.750	659.00	659.00	659.00	659.00	659.00
1.000	659.00	659.00	659.00	659.00	659.00
1.250	659.00	659.00	659.00	659.00	659.00
1.500	659.00	659.00	659.00	659.00	659.00
1.750	659.00	659.00	659.00	659.00	659.00
2.000	659.00	659.00	659.00	659.00	659.00
2.250	659.00	659.00	659.00	659.00	659.00
2.500	659.00	659.00	659.00	659.00	659.00
2.750	659.00	659.00	659.00	659.00	659.00
3.000	659.00	659.00	659.00	659.00	659.00
3.250	659.00	659.00	659.00	659.00	659.00
3.500	659.01	659.01	659.01	659.01	659.01
3.750	659.01	659.01	659.02	659.02	659.02
4.000	659.02	659.03	659.03	659.03	659.03
4.250	659.04	659.04	659.04	659.05	659.05
4.500	659.05	659.06	659.06	659.06	659.07
4.750	659.07	659.08	659.08	659.09	659.09
5.000	659.10	659.10	659.11	659.11	659.12
5.250	659.12	659.13	659.13	659.14	659.14
5.500	659.15	659.16	659.16	659.17	659.18
5.750	659.18	659.19	659.20	659.20	659.21
6.000	659.22	659.23	659.24	659.24	659.25
6.250	659.26	659.27	659.28	659.29	659.30
6.500	659.31	659.32	659.33	659.34	659.35
6.750	659.36	659.37	659.38	659.39	659.40
7.000	659.42	659.43	659.44	659.46	659.47
7.250	659.48	659.50	659.51	659.53	659.54
7.500	659.56	659.57	659.59	659.60	659.62
7.750	659.64	659.65	659.67	659.69	659.71
8.000	659.73	659.74	659.76	659.78	659.80
8.250	659.82	659.85	659.87	659.89	659.91
8.500	659.94	659.96	659.99	660.01	660.02
8.750	660.03	660.04	660.06	660.07	660.07
9.000	660.08	660.09	660.10	660.11	660.12
9.250	660.12	660.13	660.14	660.14	660.15
9.500	660.15	660.16	660.16	660.17	660.18
9.750	660.18	660.19	660.19	660.20	660.20

Subsection: Time vs. Elevation
Return Event: 100 years
Label: PO-2 (OUT)
Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
10.000	660.21	660.21	660.21	660.22	660.22
10.250	660.23	660.24	660.24	660.25	660.25
10.500	660.26	660.27	660.27	660.28	660.29
10.750	660.29	660.30	660.31	660.32	660.32
11.000	660.33	660.34	660.35	660.36	660.37
11.250	660.38	660.40	660.41	660.43	660.45
11.500	660.47	660.49	660.53	660.58	660.65
11.750	660.75	660.87	661.01	661.19	661.42
12.000	661.79	662.27	662.79	663.22	663.42
12.250	663.45	663.38	663.26	663.11	662.93
12.500	662.72	662.51	662.33	662.16	662.01
12.750	661.91	661.83	661.77	661.71	661.65
13.000	661.59	661.54	661.48	661.43	661.37
13.250	661.32	661.28	661.23	661.18	661.14
13.500	661.09	661.05	661.01	660.97	660.93
13.750	660.90	660.86	660.83	660.79	660.76
14.000	660.73	660.70	660.67	660.65	660.62
14.250	660.60	660.57	660.55	660.53	660.50
14.500	660.48	660.47	660.45	660.43	660.42
14.750	660.41	660.39	660.38	660.37	660.36
15.000	660.35	660.34	660.33	660.33	660.32
15.250	660.31	660.30	660.30	660.29	660.28
15.500	660.28	660.27	660.27	660.26	660.26
15.750	660.25	660.25	660.24	660.24	660.23
16.000	660.23	660.22	660.22	660.21	660.21
16.250	660.21	660.20	660.20	660.20	660.19
16.500	660.19	660.19	660.18	660.18	660.18
16.750	660.18	660.17	660.17	660.17	660.17
17.000	660.17	660.16	660.16	660.16	660.16
17.250	660.16	660.15	660.15	660.15	660.15
17.500	660.15	660.14	660.14	660.14	660.14
17.750	660.14	660.13	660.13	660.13	660.13
18.000	660.13	660.13	660.12	660.12	660.12
18.250	660.12	660.12	660.12	660.12	660.11
18.500	660.11	660.11	660.11	660.11	660.11
18.750	660.11	660.11	660.11	660.11	660.11
19.000	660.11	660.10	660.10	660.10	660.10
19.250	660.10	660.10	660.10	660.10	660.10
19.500	660.10	660.10	660.10	660.10	660.10
19.750	660.10	660.10	660.10	660.09	660.09
20.000	660.09	660.09	660.09	660.09	660.09

Watershed

Subsection: Time vs. Elevation | Return Event: 100 years
Label: PO-2 (OUT) | Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
20.250	660.09	660.09	660.09	660.09	660.09
20.500	660.09	660.09	660.09	660.09	660.09
20.750	660.09	660.09	660.09	660.09	660.09
21.000	660.08	660.08	660.08	660.08	660.08
21.250	660.08	660.08	660.08	660.08	660.08
21.500	660.08	660.08	660.08	660.08	660.08
21.750	660.08	660.08	660.08	660.08	660.08
22.000	660.08	660.08	660.08	660.08	660.08
22.250	660.08	660.07	660.07	660.07	660.07
22.500	660.07	660.07	660.07	660.07	660.07
22.750	660.07	660.07	660.07	660.07	660.07
23.000	660.07	660.07	660.07	660.07	660.07
23.250	660.07	660.07	660.07	660.07	660.07
23.500	660.07	660.07	660.06	660.06	660.06
23.750	660.06	660.06	660.06	660.06	660.06
24.000	660.06	660.06	660.06	660.05	660.05
24.250	660.04	660.04	660.04	660.03	660.03
24.500	660.03	660.02	660.02	660.02	660.02
24.750	660.02	660.01	660.01	660.01	660.01
25.000	660.01	660.01	660.01	660.01	660.01
25.250	660.01	660.01	660.00	660.00	660.00
25.500	660.00	660.00	660.00	660.00	660.00
25.750	660.00	660.00	660.00	660.00	660.00
26.000	660.00	660.00	660.00	660.00	660.00
26.250	660.00	660.00	660.00	660.00	660.00
26.500	660.00	660.00	660.00	660.00	660.00
26.750	660.00	660.00	660.00	660.00	660.00
27.000	660.00	660.00	660.00	660.00	660.00
27.250	660.00	660.00	660.00	660.00	660.00
27.500	660.00	660.00	660.00	660.00	660.00
27.750	660.00	660.00	660.00	660.00	660.00
28.000	660.00	660.00	660.00	660.00	660.00
28.250	660.00	660.00	660.00	660.00	660.00
28.500	660.00	660.00	660.00	660.00	660.00
28.750	660.00	660.00	660.00	660.00	660.00
29.000	660.00	660.00	660.00	660.00	660.00
29.250	660.00	660.00	660.00	660.00	660.00
29.500	660.00	660.00	660.00	660.00	660.00
29.750	660.00	660.00	660.00	660.00	660.00
30.000	660.00	660.00	660.00	660.00	660.00
30.250	660.00	660.00	660.00	660.00	660.00

Subsection: Time vs. Elevation | Return Event: 100 years
Label: PO-2 (OUT) | Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Time vs. Elevation (ft)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
30.500	660.00	660.00	660.00	660.00	660.00
30.750	660.00	660.00	660.00	660.00	660.00
31.000	660.00	660.00	660.00	660.00	660.00
31.250	660.00	660.00	660.00	660.00	660.00
31.500	660.00	660.00	660.00	660.00	660.00
31.750	660.00	660.00	660.00	660.00	660.00
32.000	660.00	660.00	660.00	660.00	660.00
32.250	660.00	660.00	660.00	660.00	660.00
32.500	660.00	660.00	660.00	660.00	660.00
32.750	660.00	660.00	660.00	660.00	660.00
33.000	660.00	660.00	660.00	660.00	660.00
33.250	660.00	660.00	660.00	660.00	660.00
33.500	660.00	660.00	660.00	660.00	660.00
33.750	660.00	660.00	660.00	660.00	660.00
34.000	660.00	660.00	660.00	660.00	660.00
34.250	660.00	660.00	660.00	660.00	660.00
34.500	660.00	660.00	660.00	660.00	660.00
34.750	660.00	660.00	660.00	660.00	660.00
35.000	660.00	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Time vs. Volume | Return Event: 1 years
Label: PO-2 | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.000	0.000	0.000
1.750	0.000	0.000	0.000	0.000	0.000
2.000	0.000	0.000	0.000	0.000	0.000
2.250	0.000	0.000	0.000	0.000	0.000
2.500	0.000	0.000	0.000	0.000	0.000
2.750	0.000	0.000	0.000	0.000	0.000
3.000	0.000	0.000	0.000	0.000	0.000
3.250	0.000	0.000	0.000	0.000	0.000
3.500	0.000	0.000	0.000	0.000	0.000
3.750	0.000	0.000	0.000	0.000	0.000
4.000	0.000	0.000	0.000	0.000	0.000
4.250	0.000	0.000	0.000	0.000	0.000
4.500	0.000	0.000	0.000	0.000	0.000
4.750	0.000	0.000	0.000	0.000	0.000
5.000	0.000	0.000	0.000	0.000	0.000
5.250	0.000	0.000	0.000	0.000	0.000
5.500	0.000	0.000	0.000	0.000	0.000
5.750	0.000	0.000	0.000	0.000	0.000
6.000	0.000	0.000	0.000	0.000	0.000
6.250	0.000	0.000	0.000	0.000	0.000
6.500	0.000	0.000	0.000	0.000	0.000
6.750	0.000	0.000	0.000	0.000	0.000
7.000	0.000	0.000	0.000	0.000	0.000
7.250	0.000	0.000	0.000	0.000	0.000
7.500	0.000	0.000	0.000	0.000	0.000
7.750	0.000	0.000	0.000	0.000	0.000
8.000	0.000	0.000	1.000	1.000	1.000
8.250	1.000	1.000	1.000	1.000	1.000
8.500	1.000	2.000	2.000	2.000	2.000
8.750	2.000	3.000	3.000	3.000	3.000
9.000	4.000	4.000	4.000	4.000	5.000
9.250	5.000	5.000	6.000	6.000	7.000
9.500	7.000	7.000	8.000	8.000	9.000
9.750	9.000	10.000	10.000	11.000	11.000

Subsection: Time vs. Volume
Return Event: 1 years
Label: PO-2
Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
10.000	12.000	13.000	13.000	14.000	15.000
10.250	15.000	16.000	17.000	18.000	19.000
10.500	20.000	21.000	22.000	23.000	24.000
10.750	25.000	26.000	27.000	28.000	29.000
11.000	31.000	32.000	33.000	35.000	37.000
11.250	38.000	40.000	42.000	44.000	46.000
11.500	49.000	51.000	55.000	58.000	63.000
11.750	70.000	77.000	86.000	96.000	109.000
12.000	127.000	149.000	171.000	190.000	202.000
12.250	210.000	214.000	216.000	217.000	216.000
12.500	213.000	210.000	206.000	202.000	198.000
12.750	194.000	190.000	187.000	183.000	180.000
13.000	177.000	174.000	171.000	169.000	167.000
13.250	164.000	162.000	161.000	159.000	157.000
13.500	156.000	154.000	153.000	152.000	151.000
13.750	150.000	149.000	148.000	147.000	146.000
14.000	145.000	145.000	144.000	143.000	143.000
14.250	142.000	141.000	141.000	140.000	140.000
14.500	139.000	139.000	139.000	138.000	138.000
14.750	137.000	137.000	137.000	137.000	136.000
15.000	136.000	136.000	135.000	135.000	135.000
15.250	135.000	134.000	134.000	134.000	134.000
15.500	133.000	133.000	133.000	133.000	132.000
15.750	132.000	132.000	132.000	131.000	131.000
16.000	131.000	131.000	131.000	130.000	130.000
16.250	130.000	130.000	130.000	129.000	129.000
16.500	129.000	129.000	129.000	129.000	129.000
16.750	128.000	128.000	128.000	128.000	128.000
17.000	128.000	128.000	128.000	128.000	127.000
17.250	127.000	127.000	127.000	127.000	127.000
17.500	127.000	127.000	127.000	127.000	126.000
17.750	126.000	126.000	126.000	126.000	126.000
18.000	126.000	126.000	126.000	126.000	125.000
18.250	125.000	125.000	125.000	125.000	125.000
18.500	125.000	125.000	125.000	125.000	125.000
18.750	125.000	125.000	125.000	125.000	125.000
19.000	125.000	125.000	125.000	124.000	124.000
19.250	124.000	124.000	124.000	124.000	124.000
19.500	124.000	124.000	124.000	124.000	124.000
19.750	124.000	124.000	124.000	124.000	124.000
20.000	124.000	124.000	124.000	124.000	124.000

Watershed

Subsection: Time vs. Volume | Return Event: 1 years
Label: PO-2 | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
20.250	124.000	124.000	124.000	124.000	124.000
20.500	124.000	124.000	124.000	124.000	124.000
20.750	124.000	124.000	124.000	123.000	123.000
21.000	123.000	123.000	123.000	123.000	123.000
21.250	123.000	123.000	123.000	123.000	123.000
21.500	123.000	123.000	123.000	123.000	123.000
21.750	123.000	123.000	123.000	123.000	123.000
22.000	123.000	123.000	123.000	123.000	123.000
22.250	123.000	123.000	123.000	123.000	123.000
22.500	123.000	123.000	123.000	123.000	123.000
22.750	123.000	123.000	123.000	123.000	123.000
23.000	123.000	123.000	123.000	123.000	122.000
23.250	122.000	122.000	122.000	122.000	122.000
23.500	122.000	122.000	122.000	122.000	122.000
23.750	122.000	122.000	122.000	122.000	122.000
24.000	122.000	122.000	122.000	122.000	121.000
24.250	121.000	121.000	121.000	120.000	120.000
24.500	120.000	120.000	120.000	120.000	120.000
24.750	119.000	119.000	119.000	119.000	119.000
25.000	119.000	119.000	119.000	119.000	119.000
25.250	119.000	119.000	119.000	119.000	119.000
25.500	119.000	119.000	119.000	119.000	119.000
25.750	119.000	119.000	119.000	119.000	119.000
26.000	119.000	119.000	119.000	119.000	119.000
26.250	119.000	119.000	119.000	119.000	119.000
26.500	119.000	119.000	119.000	119.000	119.000
26.750	119.000	119.000	119.000	119.000	119.000
27.000	119.000	119.000	119.000	119.000	119.000
27.250	119.000	119.000	119.000	119.000	119.000
27.500	119.000	119.000	119.000	119.000	119.000
27.750	119.000	119.000	119.000	119.000	119.000
28.000	119.000	119.000	119.000	119.000	119.000
28.250	119.000	119.000	119.000	119.000	119.000
28.500	119.000	119.000	119.000	119.000	119.000
28.750	119.000	119.000	119.000	119.000	119.000
29.000	119.000	119.000	119.000	119.000	119.000
29.250	119.000	119.000	119.000	119.000	119.000
29.500	119.000	119.000	119.000	119.000	119.000
29.750	119.000	119.000	119.000	119.000	119.000
30.000	119.000	119.000	119.000	119.000	119.000
30.250	119.000	119.000	119.000	119.000	119.000

Watershed

Subsection: Time vs. Volume | Return Event: 1 years
Label: PO-2 | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
30.500	119.000	119.000	119.000	119.000	119.000
30.750	119.000	119.000	119.000	119.000	119.000
31.000	119.000	119.000	119.000	119.000	119.000
31.250	119.000	119.000	119.000	119.000	119.000
31.500	119.000	119.000	119.000	119.000	119.000
31.750	119.000	119.000	119.000	119.000	119.000
32.000	119.000	119.000	119.000	119.000	119.000
32.250	119.000	119.000	119.000	119.000	119.000
32.500	119.000	119.000	119.000	119.000	119.000
32.750	119.000	119.000	119.000	119.000	119.000
33.000	119.000	119.000	119.000	119.000	119.000
33.250	119.000	119.000	119.000	119.000	119.000
33.500	119.000	119.000	119.000	119.000	119.000
33.750	119.000	119.000	119.000	119.000	119.000
34.000	119.000	119.000	119.000	119.000	119.000
34.250	119.000	119.000	119.000	119.000	119.000
34.500	119.000	119.000	119.000	119.000	119.000
34.750	119.000	119.000	119.000	119.000	119.000
35.000	119.000	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Time vs. Volume — Return Event: 5 years
Label: PO-2 — Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.000	0.000	0.000
1.750	0.000	0.000	0.000	0.000	0.000
2.000	0.000	0.000	0.000	0.000	0.000
2.250	0.000	0.000	0.000	0.000	0.000
2.500	0.000	0.000	0.000	0.000	0.000
2.750	0.000	0.000	0.000	0.000	0.000
3.000	0.000	0.000	0.000	0.000	0.000
3.250	0.000	0.000	0.000	0.000	0.000
3.500	0.000	0.000	0.000	0.000	0.000
3.750	0.000	0.000	0.000	0.000	0.000
4.000	0.000	0.000	0.000	0.000	0.000
4.250	0.000	0.000	0.000	0.000	0.000
4.500	0.000	0.000	0.000	0.000	0.000
4.750	0.000	0.000	0.000	0.000	0.000
5.000	0.000	0.000	0.000	0.000	0.000
5.250	0.000	0.000	0.000	0.000	0.000
5.500	0.000	0.000	0.000	0.000	0.000
5.750	0.000	0.000	0.000	0.000	0.000
6.000	0.000	0.000	0.000	0.000	0.000
6.250	1.000	1.000	1.000	1.000	1.000
6.500	1.000	1.000	1.000	1.000	2.000
6.750	2.000	2.000	2.000	2.000	2.000
7.000	3.000	3.000	3.000	3.000	4.000
7.250	4.000	4.000	4.000	5.000	5.000
7.500	5.000	6.000	6.000	6.000	7.000
7.750	7.000	7.000	8.000	8.000	8.000
8.000	9.000	9.000	10.000	10.000	11.000
8.250	11.000	12.000	12.000	13.000	14.000
8.500	14.000	15.000	16.000	16.000	17.000
8.750	18.000	19.000	19.000	20.000	21.000
9.000	22.000	23.000	24.000	25.000	26.000
9.250	27.000	28.000	29.000	30.000	31.000
9.500	33.000	34.000	35.000	36.000	38.000
9.750	39.000	41.000	42.000	44.000	45.000

Subsection: Time vs. Volume
Return Event: 5 years
Label: PO-2
Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
10.000	47.000	48.000	50.000	52.000	53.000
10.250	55.000	57.000	59.000	61.000	63.000
10.500	65.000	68.000	70.000	72.000	75.000
10.750	77.000	80.000	82.000	85.000	88.000
11.000	91.000	94.000	97.000	100.000	104.000
11.250	107.000	111.000	116.000	120.000	124.000
11.500	128.000	133.000	138.000	143.000	150.000
11.750	159.000	169.000	180.000	193.000	210.000
12.000	235.000	266.000	299.000	328.000	347.000
12.250	357.000	363.000	365.000	365.000	362.000
12.500	356.000	349.000	340.000	331.000	321.000
12.750	311.000	302.000	293.000	285.000	276.000
13.000	268.000	260.000	252.000	244.000	237.000
13.250	230.000	224.000	218.000	212.000	207.000
13.500	202.000	198.000	194.000	190.000	187.000
13.750	184.000	181.000	178.000	176.000	173.000
14.000	171.000	169.000	167.000	166.000	164.000
14.250	162.000	161.000	160.000	159.000	157.000
14.500	156.000	155.000	154.000	154.000	153.000
14.750	152.000	151.000	151.000	150.000	149.000
15.000	149.000	148.000	147.000	147.000	146.000
15.250	146.000	145.000	145.000	144.000	144.000
15.500	144.000	143.000	143.000	142.000	142.000
15.750	141.000	141.000	141.000	140.000	140.000
16.000	139.000	139.000	139.000	138.000	138.000
16.250	138.000	137.000	137.000	137.000	136.000
16.500	136.000	136.000	136.000	135.000	135.000
16.750	135.000	135.000	135.000	134.000	134.000
17.000	134.000	134.000	134.000	133.000	133.000
17.250	133.000	133.000	133.000	133.000	132.000
17.500	132.000	132.000	132.000	132.000	132.000
17.750	131.000	131.000	131.000	131.000	131.000
18.000	131.000	130.000	130.000	130.000	130.000
18.250	130.000	130.000	130.000	130.000	129.000
18.500	129.000	129.000	129.000	129.000	129.000
18.750	129.000	129.000	129.000	129.000	129.000
19.000	129.000	128.000	128.000	128.000	128.000
19.250	128.000	128.000	128.000	128.000	128.000
19.500	128.000	128.000	128.000	128.000	128.000
19.750	128.000	128.000	128.000	128.000	127.000
20.000	127.000	127.000	127.000	127.000	127.000

Subsection: Time vs. Volume | Return Event: 5 years
Label: PO-2 | Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
20.250	127.000	127.000	127.000	127.000	127.000
20.500	127.000	127.000	127.000	127.000	127.000
20.750	127.000	127.000	127.000	127.000	127.000
21.000	127.000	127.000	127.000	126.000	126.000
21.250	126.000	126.000	126.000	126.000	126.000
21.500	126.000	126.000	126.000	126.000	126.000
21.750	126.000	126.000	126.000	126.000	126.000
22.000	126.000	126.000	126.000	126.000	126.000
22.250	126.000	126.000	126.000	126.000	126.000
22.500	125.000	125.000	125.000	125.000	125.000
22.750	125.000	125.000	125.000	125.000	125.000
23.000	125.000	125.000	125.000	125.000	125.000
23.250	125.000	125.000	125.000	125.000	125.000
23.500	125.000	125.000	125.000	125.000	125.000
23.750	125.000	125.000	125.000	124.000	124.000
24.000	124.000	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Time vs. Volume | Return Event: 10 years
Label: PO-2 | Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.000	0.000	0.000
1.750	0.000	0.000	0.000	0.000	0.000
2.000	0.000	0.000	0.000	0.000	0.000
2.250	0.000	0.000	0.000	0.000	0.000
2.500	0.000	0.000	0.000	0.000	0.000
2.750	0.000	0.000	0.000	0.000	0.000
3.000	0.000	0.000	0.000	0.000	0.000
3.250	0.000	0.000	0.000	0.000	0.000
3.500	0.000	0.000	0.000	0.000	0.000
3.750	0.000	0.000	0.000	0.000	0.000
4.000	0.000	0.000	0.000	0.000	0.000
4.250	0.000	0.000	0.000	0.000	0.000
4.500	0.000	0.000	0.000	0.000	0.000
4.750	0.000	0.000	0.000	0.000	0.000
5.000	0.000	0.000	0.000	0.000	0.000
5.250	0.000	0.000	0.000	0.000	0.000
5.500	1.000	1.000	1.000	1.000	1.000
5.750	1.000	1.000	1.000	1.000	2.000
6.000	2.000	2.000	2.000	2.000	2.000
6.250	3.000	3.000	3.000	3.000	4.000
6.500	4.000	4.000	4.000	5.000	5.000
6.750	5.000	6.000	6.000	6.000	7.000
7.000	7.000	7.000	8.000	8.000	9.000
7.250	9.000	9.000	10.000	10.000	11.000
7.500	11.000	12.000	12.000	13.000	14.000
7.750	14.000	15.000	15.000	16.000	17.000
8.000	17.000	18.000	19.000	20.000	20.000
8.250	21.000	22.000	23.000	24.000	25.000
8.500	26.000	27.000	28.000	29.000	30.000
8.750	31.000	32.000	33.000	35.000	36.000
9.000	37.000	38.000	40.000	41.000	43.000
9.250	44.000	46.000	47.000	49.000	51.000
9.500	52.000	54.000	56.000	58.000	60.000
9.750	62.000	64.000	66.000	68.000	70.000

Watershed

Subsection: Time vs. Volume | Return Event: 10 years
Label: PO-2 | Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
10.000	72.000	74.000	76.000	79.000	81.000
10.250	84.000	86.000	89.000	92.000	94.000
10.500	97.000	100.000	103.000	107.000	110.000
10.750	113.000	117.000	120.000	123.000	126.000
11.000	129.000	132.000	135.000	137.000	140.000
11.250	142.000	145.000	148.000	151.000	153.000
11.500	156.000	159.000	163.000	169.000	176.000
11.750	186.000	197.000	210.000	225.000	246.000
12.000	277.000	316.000	357.000	394.000	419.000
12.250	432.000	440.000	443.000	444.000	441.000
12.500	435.000	426.000	416.000	404.000	393.000
12.750	382.000	371.000	360.000	349.000	338.000
13.000	327.000	317.000	307.000	297.000	288.000
13.250	279.000	271.000	263.000	255.000	248.000
13.500	241.000	234.000	228.000	222.000	216.000
13.750	211.000	206.000	202.000	198.000	194.000
14.000	191.000	187.000	184.000	182.000	179.000
14.250	177.000	175.000	173.000	171.000	169.000
14.500	167.000	166.000	165.000	163.000	162.000
14.750	161.000	160.000	159.000	158.000	157.000
15.000	156.000	155.000	155.000	154.000	153.000
15.250	152.000	152.000	151.000	151.000	150.000
15.500	149.000	149.000	148.000	148.000	147.000
15.750	147.000	146.000	146.000	145.000	145.000
16.000	144.000	144.000	143.000	143.000	142.000
16.250	142.000	141.000	141.000	141.000	140.000
16.500	140.000	140.000	139.000	139.000	139.000
16.750	139.000	138.000	138.000	138.000	138.000
17.000	137.000	137.000	137.000	137.000	136.000
17.250	136.000	136.000	136.000	136.000	135.000
17.500	135.000	135.000	135.000	135.000	134.000
17.750	134.000	134.000	134.000	134.000	133.000
18.000	133.000	133.000	133.000	133.000	132.000
18.250	132.000	132.000	132.000	132.000	132.000
18.500	132.000	131.000	131.000	131.000	131.000
18.750	131.000	131.000	131.000	131.000	131.000
19.000	131.000	131.000	130.000	130.000	130.000
19.250	130.000	130.000	130.000	130.000	130.000
19.500	130.000	130.000	130.000	130.000	130.000
19.750	130.000	130.000	129.000	129.000	129.000
20.000	129.000	129.000	129.000	129.000	129.000

Subsection: Time vs. Volume | Return Event: 10 years
Label: PO-2 | Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
20.250	129.000	129.000	129.000	129.000	129.000
20.500	129.000	129.000	129.000	129.000	129.000
20.750	129.000	128.000	128.000	128.000	128.000
21.000	128.000	128.000	128.000	128.000	128.000
21.250	128.000	128.000	128.000	128.000	128.000
21.500	128.000	128.000	128.000	128.000	128.000
21.750	128.000	128.000	128.000	127.000	127.000
22.000	127.000	127.000	127.000	127.000	127.000
22.250	127.000	127.000	127.000	127.000	127.000
22.500	127.000	127.000	127.000	127.000	127.000
22.750	127.000	127.000	127.000	127.000	127.000
23.000	127.000	126.000	126.000	126.000	126.000
23.250	126.000	126.000	126.000	126.000	126.000
23.500	126.000	126.000	126.000	126.000	126.000
23.750	126.000	126.000	126.000	126.000	126.000
24.000	126.000	126.000	125.000	125.000	124.000
24.250	124.000	123.000	123.000	122.000	122.000
24.500	122.000	121.000	121.000	121.000	121.000
24.750	120.000	120.000	120.000	120.000	120.000
25.000	120.000	120.000	119.000	119.000	119.000
25.250	119.000	119.000	119.000	119.000	119.000
25.500	119.000	119.000	119.000	119.000	119.000
25.750	119.000	119.000	119.000	119.000	119.000
26.000	119.000	119.000	119.000	119.000	119.000
26.250	119.000	119.000	119.000	119.000	119.000
26.500	119.000	119.000	119.000	119.000	119.000
26.750	119.000	119.000	119.000	119.000	119.000
27.000	119.000	119.000	119.000	119.000	119.000
27.250	119.000	119.000	119.000	119.000	119.000
27.500	119.000	119.000	119.000	119.000	119.000
27.750	119.000	119.000	119.000	119.000	119.000
28.000	119.000	119.000	119.000	119.000	119.000
28.250	119.000	119.000	119.000	119.000	119.000
28.500	119.000	119.000	119.000	119.000	119.000
28.750	119.000	119.000	119.000	119.000	119.000
29.000	119.000	119.000	119.000	119.000	119.000
29.250	119.000	119.000	119.000	119.000	119.000
29.500	119.000	119.000	119.000	119.000	119.000
29.750	119.000	119.000	119.000	119.000	119.000
30.000	119.000	119.000	119.000	119.000	119.000
30.250	119.000	119.000	119.000	119.000	119.000

Watershed

Subsection: Time vs. Volume
Label: PO-2
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Return Event: 10 years
Storm Event: TypeIII 24hr (5.12 in)

Time vs. Volume (ft^3)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft^3)	Volume (ft^3)	Volume (ft^3)	Volume (ft^3)	Volume (ft^3)
30.500	119.000	119.000	119.000	119.000	119.000
30.750	119.000	119.000	119.000	119.000	119.000
31.000	119.000	119.000	119.000	119.000	119.000
31.250	119.000	119.000	119.000	119.000	119.000
31.500	119.000	119.000	119.000	119.000	119.000
31.750	119.000	119.000	119.000	119.000	119.000
32.000	119.000	119.000	119.000	119.000	119.000
32.250	119.000	119.000	119.000	119.000	119.000
32.500	119.000	119.000	119.000	119.000	119.000
32.750	119.000	119.000	119.000	119.000	119.000
33.000	119.000	119.000	119.000	119.000	119.000
33.250	119.000	119.000	119.000	119.000	119.000
33.500	119.000	119.000	119.000	119.000	119.000
33.750	119.000	119.000	119.000	119.000	119.000
34.000	119.000	119.000	119.000	119.000	119.000
34.250	119.000	119.000	119.000	119.000	119.000
34.500	119.000	119.000	119.000	119.000	119.000
34.750	119.000	119.000	119.000	119.000	119.000
35.000	119.000	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Time vs. Volume | Return Event: 25 years
Label: PO-2 | Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.000	0.000	0.000
1.750	0.000	0.000	0.000	0.000	0.000
2.000	0.000	0.000	0.000	0.000	0.000
2.250	0.000	0.000	0.000	0.000	0.000
2.500	0.000	0.000	0.000	0.000	0.000
2.750	0.000	0.000	0.000	0.000	0.000
3.000	0.000	0.000	0.000	0.000	0.000
3.250	0.000	0.000	0.000	0.000	0.000
3.500	0.000	0.000	0.000	0.000	0.000
3.750	0.000	0.000	0.000	0.000	0.000
4.000	0.000	0.000	0.000	0.000	0.000
4.250	0.000	0.000	0.000	0.000	0.000
4.500	0.000	0.000	1.000	1.000	1.000
4.750	1.000	1.000	1.000	1.000	1.000
5.000	2.000	2.000	2.000	2.000	2.000
5.250	3.000	3.000	3.000	3.000	4.000
5.500	4.000	4.000	4.000	5.000	5.000
5.750	5.000	6.000	6.000	6.000	7.000
6.000	7.000	7.000	8.000	8.000	9.000
6.250	9.000	9.000	10.000	10.000	11.000
6.500	11.000	12.000	12.000	13.000	14.000
6.750	14.000	15.000	15.000	16.000	17.000
7.000	17.000	18.000	19.000	20.000	20.000
7.250	21.000	22.000	23.000	24.000	25.000
7.500	26.000	26.000	27.000	28.000	29.000
7.750	30.000	31.000	32.000	34.000	35.000
8.000	36.000	37.000	38.000	39.000	41.000
8.250	42.000	43.000	45.000	46.000	48.000
8.500	49.000	51.000	52.000	54.000	56.000
8.750	58.000	59.000	61.000	63.000	65.000
9.000	67.000	69.000	71.000	74.000	76.000
9.250	78.000	80.000	83.000	85.000	88.000
9.500	90.000	93.000	96.000	98.000	101.000
9.750	104.000	107.000	110.000	113.000	116.000

Watershed

Subsection: Time vs. Volume | Return Event: 25 years
Label: PO-2 | Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
10.000	119.000	122.000	125.000	128.000	130.000
10.250	133.000	135.000	137.000	139.000	141.000
10.500	143.000	144.000	146.000	148.000	149.000
10.750	151.000	153.000	154.000	156.000	157.000
11.000	158.000	160.000	161.000	163.000	165.000
11.250	167.000	169.000	172.000	174.000	177.000
11.500	180.000	183.000	188.000	195.000	204.000
11.750	216.000	231.000	249.000	270.000	298.000
12.000	341.000	394.000	450.000	496.000	522.000
12.250	530.000	530.000	526.000	518.000	508.000
12.500	496.000	484.000	472.000	460.000	449.000
12.750	438.000	426.000	415.000	403.000	392.000
13.000	381.000	370.000	359.000	348.000	338.000
13.250	328.000	318.000	309.000	300.000	292.000
13.500	284.000	276.000	268.000	261.000	255.000
13.750	248.000	242.000	236.000	230.000	224.000
14.000	219.000	214.000	210.000	205.000	202.000
14.250	198.000	195.000	192.000	189.000	187.000
14.500	184.000	182.000	180.000	178.000	176.000
14.750	175.000	173.000	172.000	171.000	169.000
15.000	168.000	167.000	166.000	165.000	164.000
15.250	163.000	162.000	161.000	160.000	159.000
15.500	159.000	158.000	157.000	156.000	156.000
15.750	155.000	154.000	153.000	153.000	152.000
16.000	152.000	151.000	150.000	150.000	149.000
16.250	149.000	148.000	148.000	147.000	147.000
16.500	146.000	146.000	145.000	145.000	145.000
16.750	144.000	144.000	144.000	143.000	143.000
17.000	143.000	142.000	142.000	142.000	142.000
17.250	141.000	141.000	141.000	140.000	140.000
17.500	140.000	140.000	139.000	139.000	139.000
17.750	139.000	138.000	138.000	138.000	138.000
18.000	137.000	137.000	137.000	137.000	136.000
18.250	136.000	136.000	136.000	136.000	135.000
18.500	135.000	135.000	135.000	135.000	135.000
18.750	135.000	134.000	134.000	134.000	134.000
19.000	134.000	134.000	134.000	134.000	134.000
19.250	134.000	133.000	133.000	133.000	133.000
19.500	133.000	133.000	133.000	133.000	133.000
19.750	133.000	133.000	133.000	133.000	132.000
20.000	132.000	132.000	132.000	132.000	132.000

Subsection: Time vs. Volume
Return Event: 25 years
Label: PO-2
Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
20.250	132.000	132.000	132.000	132.000	132.000
20.500	132.000	132.000	132.000	131.000	131.000
20.750	131.000	131.000	131.000	131.000	131.000
21.000	131.000	131.000	131.000	131.000	131.000
21.250	131.000	131.000	131.000	131.000	131.000
21.500	130.000	130.000	130.000	130.000	130.000
21.750	130.000	130.000	130.000	130.000	130.000
22.000	130.000	130.000	130.000	130.000	130.000
22.250	130.000	130.000	129.000	129.000	129.000
22.500	129.000	129.000	129.000	129.000	129.000
22.750	129.000	129.000	129.000	129.000	129.000
23.000	129.000	129.000	129.000	129.000	129.000
23.250	128.000	128.000	128.000	128.000	128.000
23.500	128.000	128.000	128.000	128.000	128.000
23.750	128.000	128.000	128.000	128.000	128.000
24.000	128.000	127.000	127.000	126.000	126.000
24.250	125.000	124.000	124.000	123.000	123.000
24.500	122.000	122.000	122.000	121.000	121.000
24.750	121.000	121.000	120.000	120.000	120.000
25.000	120.000	120.000	120.000	120.000	120.000
25.250	119.000	119.000	119.000	119.000	119.000
25.500	119.000	119.000	119.000	119.000	119.000
25.750	119.000	119.000	119.000	119.000	119.000
26.000	119.000	119.000	119.000	119.000	119.000
26.250	119.000	119.000	119.000	119.000	119.000
26.500	119.000	119.000	119.000	119.000	119.000
26.750	119.000	119.000	119.000	119.000	119.000
27.000	119.000	119.000	119.000	119.000	119.000
27.250	119.000	119.000	119.000	119.000	119.000
27.500	119.000	119.000	119.000	119.000	119.000
27.750	119.000	119.000	119.000	119.000	119.000
28.000	119.000	119.000	119.000	119.000	119.000
28.250	119.000	119.000	119.000	119.000	119.000
28.500	119.000	119.000	119.000	119.000	119.000
28.750	119.000	119.000	119.000	119.000	119.000
29.000	119.000	119.000	119.000	119.000	119.000
29.250	119.000	119.000	119.000	119.000	119.000
29.500	119.000	119.000	119.000	119.000	119.000
29.750	119.000	119.000	119.000	119.000	119.000
30.000	119.000	119.000	119.000	119.000	119.000
30.250	119.000	119.000	119.000	119.000	119.000

Subsection: Time vs. Volume | Return Event: 25 years
Label: PO-2 | Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
30.500	119.000	119.000	119.000	119.000	119.000
30.750	119.000	119.000	119.000	119.000	119.000
31.000	119.000	119.000	119.000	119.000	119.000
31.250	119.000	119.000	119.000	119.000	119.000
31.500	119.000	119.000	119.000	119.000	119.000
31.750	119.000	119.000	119.000	119.000	119.000
32.000	119.000	119.000	119.000	119.000	119.000
32.250	119.000	119.000	119.000	119.000	119.000
32.500	119.000	119.000	119.000	119.000	119.000
32.750	119.000	119.000	119.000	119.000	119.000
33.000	119.000	119.000	119.000	119.000	119.000
33.250	119.000	119.000	119.000	119.000	119.000
33.500	119.000	119.000	119.000	119.000	119.000
33.750	119.000	119.000	119.000	119.000	119.000
34.000	119.000	119.000	119.000	119.000	119.000
34.250	119.000	119.000	119.000	119.000	119.000
34.500	119.000	119.000	119.000	119.000	119.000
34.750	119.000	119.000	119.000	119.000	119.000
35.000	119.000	(N/A)	(N/A)	(N/A)	(N/A)

Watershed

Subsection: Time vs. Volume | Return Event: 100 years
Label: PO-2 | Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.000	0.000	0.000	0.000	0.000
0.500	0.000	0.000	0.000	0.000	0.000
0.750	0.000	0.000	0.000	0.000	0.000
1.000	0.000	0.000	0.000	0.000	0.000
1.250	0.000	0.000	0.000	0.000	0.000
1.500	0.000	0.000	0.000	0.000	0.000
1.750	0.000	0.000	0.000	0.000	0.000
2.000	0.000	0.000	0.000	0.000	0.000
2.250	0.000	0.000	0.000	0.000	0.000
2.500	0.000	0.000	0.000	0.000	0.000
2.750	0.000	0.000	0.000	0.000	0.000
3.000	0.000	0.000	0.000	0.000	0.000
3.250	0.000	0.000	0.000	0.000	1.000
3.500	1.000	1.000	1.000	1.000	1.000
3.750	2.000	2.000	2.000	2.000	2.000
4.000	3.000	3.000	3.000	4.000	4.000
4.250	4.000	5.000	5.000	5.000	6.000
4.500	6.000	7.000	7.000	8.000	8.000
4.750	9.000	9.000	10.000	10.000	11.000
5.000	11.000	12.000	12.000	13.000	14.000
5.250	14.000	15.000	16.000	16.000	17.000
5.500	18.000	19.000	19.000	20.000	21.000
5.750	22.000	23.000	23.000	24.000	25.000
6.000	26.000	27.000	28.000	29.000	30.000
6.250	31.000	32.000	33.000	34.000	35.000
6.500	36.000	37.000	39.000	40.000	41.000
6.750	42.000	44.000	45.000	47.000	48.000
7.000	49.000	51.000	52.000	54.000	56.000
7.250	57.000	59.000	61.000	62.000	64.000
7.500	66.000	68.000	70.000	72.000	74.000
7.750	76.000	78.000	80.000	82.000	84.000
8.000	86.000	88.000	91.000	93.000	95.000
8.250	98.000	100.000	103.000	106.000	108.000
8.500	111.000	114.000	117.000	120.000	123.000
8.750	125.000	128.000	130.000	132.000	134.000
9.000	136.000	138.000	140.000	141.000	143.000
9.250	145.000	146.000	147.000	149.000	150.000
9.500	151.000	152.000	153.000	155.000	156.000
9.750	157.000	158.000	159.000	160.000	161.000

Subsection: Time vs. Volume | Return Event: 100 years
Label: PO-2 | Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
10.000	162.000	163.000	164.000	165.000	166.000
10.250	167.000	169.000	170.000	171.000	172.000
10.500	174.000	175.000	177.000	178.000	180.000
10.750	181.000	183.000	184.000	186.000	187.000
11.000	189.000	191.000	193.000	195.000	197.000
11.250	200.000	203.000	206.000	210.000	214.000
11.500	218.000	223.000	230.000	241.000	256.000
11.750	276.000	300.000	329.000	363.000	408.000
12.000	474.000	548.000	615.000	666.000	690.000
12.250	693.000	685.000	671.000	653.000	631.000
12.500	607.000	581.000	556.000	533.000	512.000
12.750	495.000	481.000	470.000	460.000	450.000
13.000	440.000	430.000	419.000	409.000	399.000
13.250	389.000	380.000	371.000	362.000	353.000
13.500	345.000	336.000	328.000	320.000	313.000
13.750	305.000	298.000	292.000	285.000	278.000
14.000	272.000	266.000	260.000	255.000	249.000
14.250	244.000	239.000	234.000	230.000	225.000
14.500	221.000	217.000	214.000	211.000	208.000
14.750	205.000	202.000	200.000	197.000	195.000
15.000	193.000	191.000	189.000	188.000	186.000
15.250	184.000	183.000	181.000	180.000	179.000
15.500	177.000	176.000	175.000	174.000	173.000
15.750	172.000	171.000	170.000	169.000	168.000
16.000	167.000	166.000	165.000	164.000	163.000
16.250	162.000	161.000	161.000	160.000	159.000
16.500	159.000	158.000	158.000	157.000	157.000
16.750	156.000	155.000	155.000	155.000	154.000
17.000	154.000	153.000	153.000	152.000	152.000
17.250	151.000	151.000	151.000	150.000	150.000
17.500	149.000	149.000	149.000	148.000	148.000
17.750	148.000	147.000	147.000	146.000	146.000
18.000	146.000	145.000	145.000	145.000	144.000
18.250	144.000	144.000	143.000	143.000	143.000
18.500	143.000	143.000	142.000	142.000	142.000
18.750	142.000	142.000	141.000	141.000	141.000
19.000	141.000	141.000	141.000	141.000	140.000
19.250	140.000	140.000	140.000	140.000	140.000
19.500	140.000	140.000	139.000	139.000	139.000
19.750	139.000	139.000	139.000	139.000	139.000
20.000	138.000	138.000	138.000	138.000	138.000

Watershed

Subsection: Time vs. Volume | Return Event: 100 years
Label: PO-2 | Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
20.250	138.000	138.000	138.000	138.000	138.000
20.500	137.000	137.000	137.000	137.000	137.000
20.750	137.000	137.000	137.000	137.000	137.000
21.000	137.000	136.000	136.000	136.000	136.000
21.250	136.000	136.000	136.000	136.000	136.000
21.500	136.000	136.000	136.000	135.000	135.000
21.750	135.000	135.000	135.000	135.000	135.000
22.000	135.000	135.000	135.000	135.000	135.000
22.250	135.000	134.000	134.000	134.000	134.000
22.500	134.000	134.000	134.000	134.000	134.000
22.750	134.000	134.000	134.000	133.000	133.000
23.000	133.000	133.000	133.000	133.000	133.000
23.250	133.000	133.000	133.000	133.000	133.000
23.500	132.000	132.000	132.000	132.000	132.000
23.750	132.000	132.000	132.000	132.000	132.000
24.000	132.000	131.000	131.000	130.000	129.000
24.250	128.000	127.000	126.000	125.000	125.000
24.500	124.000	124.000	123.000	123.000	122.000
24.750	122.000	122.000	121.000	121.000	121.000
25.000	121.000	120.000	120.000	120.000	120.000
25.250	120.000	120.000	120.000	119.000	119.000
25.500	119.000	119.000	119.000	119.000	119.000
25.750	119.000	119.000	119.000	119.000	119.000
26.000	119.000	119.000	119.000	119.000	119.000
26.250	119.000	119.000	119.000	119.000	119.000
26.500	119.000	119.000	119.000	119.000	119.000
26.750	119.000	119.000	119.000	119.000	119.000
27.000	119.000	119.000	119.000	119.000	119.000
27.250	119.000	119.000	119.000	119.000	119.000
27.500	119.000	119.000	119.000	119.000	119.000
27.750	119.000	119.000	119.000	119.000	119.000
28.000	119.000	119.000	119.000	119.000	119.000
28.250	119.000	119.000	119.000	119.000	119.000
28.500	119.000	119.000	119.000	119.000	119.000
28.750	119.000	119.000	119.000	119.000	119.000
29.000	119.000	119.000	119.000	119.000	119.000
29.250	119.000	119.000	119.000	119.000	119.000
29.500	119.000	119.000	119.000	119.000	119.000
29.750	119.000	119.000	119.000	119.000	119.000
30.000	119.000	119.000	119.000	119.000	119.000
30.250	119.000	119.000	119.000	119.000	119.000

Subsection: Time vs. Volume
Return Event: 100 years
Label: PO-2
Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Time vs. Volume (ft³)

Output Time increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)	Volume (ft³)
30.500	119.000	119.000	119.000	119.000	119.000
30.750	119.000	119.000	119.000	119.000	119.000
31.000	119.000	119.000	119.000	119.000	119.000
31.250	119.000	119.000	119.000	119.000	119.000
31.500	119.000	119.000	119.000	119.000	119.000
31.750	119.000	119.000	119.000	119.000	119.000
32.000	119.000	119.000	119.000	119.000	119.000
32.250	119.000	119.000	119.000	119.000	119.000
32.500	119.000	119.000	119.000	119.000	119.000
32.750	119.000	119.000	119.000	119.000	119.000
33.000	119.000	119.000	119.000	119.000	119.000
33.250	119.000	119.000	119.000	119.000	119.000
33.500	119.000	119.000	119.000	119.000	119.000
33.750	119.000	119.000	119.000	119.000	119.000
34.000	119.000	119.000	119.000	119.000	119.000
34.250	119.000	119.000	119.000	119.000	119.000
34.500	119.000	119.000	119.000	119.000	119.000
34.750	119.000	119.000	119.000	119.000	119.000
35.000	119.000	(N/A)	(N/A)	(N/A)	(N/A)

Storage Chamber

ID	130	Notes	Created on 02/10/2010. Please check with the manufacturer for the latest data.
Label	SC-740 Chamber		

Storage Chamber

Effective Length	7.12 ft	Manufacturer	StormTech
Section Length Varies?	False	Default Spacing	0.50 ft

Depth-Incremental Volume Per Unit Length Curve

Depth (ft)	Incremental Volume Per Unit Length (ft^3/ft)
0.08	0.31
0.17	0.31
0.25	0.31
0.33	0.30
0.42	0.30
0.50	0.30
0.58	0.29
0.67	0.29
0.75	0.28
0.83	0.28
0.92	0.27
1.00	0.27
1.08	0.26
1.17	0.25
1.25	0.25
1.33	0.24
1.42	0.23
1.50	0.22
1.58	0.21
1.67	0.20
1.75	0.19
1.83	0.18
1.92	0.17
2.00	0.15
2.08	0.13
2.17	0.11
2.25	0.09

Subsection: Storage Chamber System
Label: PO-2
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Return Event: 1 years
Storm Event: TypeIII 24hr (2.80 in)

Depth-Incremental Volume Per Unit Length Curve

Depth (ft)	Incremental Volume Per Unit Length (ft³/ft)
2.33	0.04
2.42	0.02
2.50	0.01

Storage Chamber			
Storage Chamber Type	Incremental Volume Per Unit Length	Maximum Width	4.25 ft

Storage Chamber (Pond)	
Chamber System Invert	659.00 ft
Chamber System Rows	6
Chambers per Row	1
Chamber System Fill Void Space	40.0 %
Chamber System Row Spacing	12.00 in
Chamber System Side Fill	12.00 in
Chamber System Fill Cover Depth	15.00 in
Chamber System Fill Base Depth	12.00 in
Chamber System Fill Side Slope	0.000 H:V
Chamber System End Fill	12.00 in
Chamber System Includes Header?	False

Subsection: Storage Chamber System
Label: PO-2
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Return Event: 5 years
Storm Event: TypeIII 24hr (4.30 in)

Storage Chamber			
ID	130	Notes	Created on 02/10/2010. Please check with the manufacturer for the latest data.

Storage Chamber

Label	SC-740 Chamber

Storage Chamber

Effective Length	7.12 ft	Manufacturer	StormTech
Section Length Varies?	False	Default Spacing	0.50 ft

Depth-Incremental Volume Per Unit Length Curve

Depth (ft)	Incremental Volume Per Unit Length (ft³/ft)
0.08	0.31
0.17	0.31
0.25	0.31
0.33	0.30
0.42	0.30
0.50	0.30
0.58	0.29
0.67	0.29
0.75	0.28
0.83	0.28
0.92	0.27
1.00	0.27
1.08	0.26
1.17	0.25
1.25	0.25
1.33	0.24
1.42	0.23
1.50	0.22
1.58	0.21
1.67	0.20
1.75	0.19
1.83	0.18
1.92	0.17
2.00	0.15
2.08	0.13
2.17	0.11
2.25	0.09
2.33	0.04
2.42	0.02
2.50	0.01

Storage Chamber

Subsection: Storage Chamber System | Return Event: 5 years
Label: PO-2 | Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Storage Chamber

Storage Chamber Type	Incremental Volume Per Unit Length	Maximum Width	4.25 ft

Storage Chamber (Pond)

Chamber System Invert	659.00 ft
Chamber System Rows	6
Chambers per Row	1
Chamber System Fill Void Space	40.0 %
Chamber System Row Spacing	12.00 in
Chamber System Side Fill	12.00 in
Chamber System Fill Cover Depth	15.00 in
Chamber System Fill Base Depth	12.00 in
Chamber System Fill Side Slope	0.000 H:V
Chamber System End Fill	12.00 in
Chamber System Includes Header?	False

Subsection: Storage Chamber System | Return Event: 10 years
Label: PO-2 | Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Storage Chamber

ID	130	Notes	Created on 02/10/2010. Please check with the manufacturer for the latest data.
Label	SC-740 Chamber		

Storage Chamber

Effective Length	7.12 ft	Manufacturer	StormTech
Section Length Varies?	False	Default Spacing	0.50 ft

Depth-Incremental Volume Per Unit Length Curve

Subsection: Storage Chamber System
Return Event: 10 years
Label: PO-2
Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Depth-Incremental Volume Per Unit Length Curve

Depth (ft)	Incremental Volume Per Unit Length (ft^3/ft)
0.08	0.31
0.17	0.31
0.25	0.31
0.33	0.30
0.42	0.30
0.50	0.30
0.58	0.29
0.67	0.29
0.75	0.28
0.83	0.28
0.92	0.27
1.00	0.27
1.08	0.26
1.17	0.25
1.25	0.25
1.33	0.24
1.42	0.23
1.50	0.22
1.58	0.21
1.67	0.20
1.75	0.19
1.83	0.18
1.92	0.17
2.00	0.15
2.08	0.13
2.17	0.11
2.25	0.09
2.33	0.04
2.42	0.02
2.50	0.01

Storage Chamber

Storage Chamber Type	Incremental Volume Per Unit Length	Maximum Width	4.25 ft

Storage Chamber (Pond)

Chamber System Invert	659.00 ft
Chamber System Rows	6
Chambers per Row	1

Subsection: Storage Chamber System — Return Event: 10 years
Label: PO-2 — Storage Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Storage Chamber (Pond)	
Chamber System Fill Void Space	40.0 %
Chamber System Row Spacing	12.00 in
Chamber System Side Fill	12.00 in
Chamber System Fill Cover Depth	15.00 in
Chamber System Fill Base Depth	12.00 in
Chamber System Fill Side Slope	0.000 H:V
Chamber System End Fill	12.00 in
Chamber System Includes Header?	False

Subsection: Storage Chamber System — Return Event: 25 years
Label: PO-2 — Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Storage Chamber			
ID	130	Notes	Created on 02/10/2010. Please check with the manufacturer for the latest data.
Label	SC-740 Chamber		

Storage Chamber			
Effective Length	7.12 ft	Manufacturer	StormTech
Section Length Varies?	False	Default Spacing	0.50 ft

Depth-Incremental Volume Per Unit Length Curve

Depth (ft)	Incremental Volume Per Unit Length (ft^3/ft)
0.08	0.31
0.17	0.31
0.25	0.31
0.33	0.30
0.42	0.30
0.50	0.30
0.58	0.29

Subsection: Storage Chamber System | Return Event: 25 years
Label: PO-2 | Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Depth-Incremental Volume Per Unit Length Curve

Depth (ft)	Incremental Volume Per Unit Length (ft³/ft)
0.67	0.29
0.75	0.28
0.83	0.28
0.92	0.27
1.00	0.27
1.08	0.26
1.17	0.25
1.25	0.25
1.33	0.24
1.42	0.23
1.50	0.22
1.58	0.21
1.67	0.20
1.75	0.19
1.83	0.18
1.92	0.17
2.00	0.15
2.08	0.13
2.17	0.11
2.25	0.09
2.33	0.04
2.42	0.02
2.50	0.01

Storage Chamber

Storage Chamber Type	Incremental Volume Per Unit Length	Maximum Width	4.25 ft

Storage Chamber (Pond)

Chamber System Invert	659.00 ft
Chamber System Rows	6
Chambers per Row	1
Chamber System Fill Void Space	40.0 %
Chamber System Row Spacing	12.00 in
Chamber System Side Fill	12.00 in
Chamber System Fill Cover Depth	15.00 in

Subsection: Storage Chamber System
Label: PO-2
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (6.45 in)

Storage Chamber (Pond)	
Chamber System Fill Base Depth	12.00 in
Chamber System Fill Side Slope	0.000 H:V
Chamber System End Fill	12.00 in
Chamber System Includes Header?	False

Subsection: Storage Chamber System
Label: PO-2
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.16 in)

Storage Chamber			
ID	130	Notes	Created on 02/10/2010. Please check with the manufacturer for the latest data.
Label	SC-740 Chamber		

Storage Chamber			
Effective Length	7.12 ft	Manufacturer	StormTech
Section Length Varies?	False	Default Spacing	0.50 ft

Depth-Incremental Volume Per Unit Length Curve

Depth (ft)	Incremental Volume Per Unit Length (ft³/ft)
0.08	0.31
0.17	0.31
0.25	0.31
0.33	0.30
0.42	0.30
0.50	0.30
0.58	0.29
0.67	0.29
0.75	0.28
0.83	0.28
0.92	0.27
1.00	0.27
1.08	0.26
1.17	0.25

Subsection: Storage Chamber System | Return Event: 100 years
Label: PO-2 | Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Depth-Incremental Volume Per Unit Length Curve

Depth (ft)	Incremental Volume Per Unit Length (ft³/ft)
1.25	0.25
1.33	0.24
1.42	0.23
1.50	0.22
1.58	0.21
1.67	0.20
1.75	0.19
1.83	0.18
1.92	0.17
2.00	0.15
2.08	0.13
2.17	0.11
2.25	0.09
2.33	0.04
2.42	0.02
2.50	0.01

Storage Chamber

Storage Chamber Type	Incremental Volume Per Unit Length	Maximum Width	4.25 ft

Storage Chamber (Pond)

Chamber System Invert	659.00 ft
Chamber System Rows	6
Chambers per Row	1
Chamber System Fill Void Space	40.0 %
Chamber System Row Spacing	12.00 in
Chamber System Side Fill	12.00 in
Chamber System Fill Cover Depth	15.00 in
Chamber System Fill Base Depth	12.00 in
Chamber System Fill Side Slope	0.000 H:V
Chamber System End Fill	12.00 in
Chamber System Includes Header?	False

Watershed

Subsection: Composite Rating Curve — Return Event: 1 years

Label: OCS — Storm Event: TypeIII 24hr (2.80 in)

Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft³/s)	Tailwater Elevation (ft)	Convergence Error (ft)
659.00	0.00	(N/A)	0.00
659.50	0.00	(N/A)	0.00
660.00	0.00	(N/A)	0.00
660.50	0.06	(N/A)	0.00
661.00	0.09	(N/A)	0.00
661.50	0.12	(N/A)	0.00
661.75	0.13	(N/A)	0.00
662.00	0.19	(N/A)	0.00
662.50	0.26	(N/A)	0.00
663.00	0.32	(N/A)	0.00
663.50	0.36	(N/A)	0.00
663.75	0.38	(N/A)	0.00

Contributing Structures
(no Q: Orifice - 2,Orifice - 1,Weir - 1,C0)
(no Q: Orifice - 2,Orifice - 1,Weir - 1,C0)
(no Q: Orifice - 2,Orifice - 1,Weir - 1,C0)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)

Watershed

Subsection: Composite Rating Curve | Return Event: 5 years
Label: OCS | Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
659.00	0.00	(N/A)	0.00
659.50	0.00	(N/A)	0.00
660.00	0.00	(N/A)	0.00
660.50	0.06	(N/A)	0.00
661.00	0.09	(N/A)	0.00
661.50	0.12	(N/A)	0.00
661.75	0.13	(N/A)	0.00
662.00	0.19	(N/A)	0.00
662.50	0.26	(N/A)	0.00
663.00	0.32	(N/A)	0.00
663.50	0.36	(N/A)	0.00
663.75	0.38	(N/A)	0.00

Contributing Structures
(no Q: Orifice - 2,Orifice - 1,Weir - 1,C0)
(no Q: Orifice - 2,Orifice - 1,Weir - 1,C0)
(no Q: Orifice - 2,Orifice - 1,Weir - 1,C0)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)

Watershed

Subsection: Composite Rating Curve | Return Event: 10 years
Label: OCS | Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
659.00	0.00	(N/A)	0.00
659.50	0.00	(N/A)	0.00
660.00	0.00	(N/A)	0.00
660.50	0.06	(N/A)	0.00
661.00	0.09	(N/A)	0.00
661.50	0.12	(N/A)	0.00
661.75	0.13	(N/A)	0.00
662.00	0.19	(N/A)	0.00
662.50	0.26	(N/A)	0.00
663.00	0.32	(N/A)	0.00
663.50	0.36	(N/A)	0.00
663.75	0.38	(N/A)	0.00

Contributing Structures
(no Q: Orifice - 2,Orifice - 1,Weir - 1,C0)
(no Q: Orifice - 2,Orifice - 1,Weir - 1,C0)
(no Q: Orifice - 2,Orifice - 1,Weir - 1,C0)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)

Watershed

Subsection: Composite Rating Curve
Label: OCS
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (6.45 in)

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
659.00	0.00	(N/A)	0.00
659.50	0.00	(N/A)	0.00
660.00	0.00	(N/A)	0.00
660.50	0.06	(N/A)	0.00
661.00	0.09	(N/A)	0.00
661.50	0.12	(N/A)	0.00
661.75	0.13	(N/A)	0.00
662.00	0.19	(N/A)	0.00
662.50	0.26	(N/A)	0.00
663.00	0.32	(N/A)	0.00
663.50	0.36	(N/A)	0.00
663.75	0.38	(N/A)	0.00

Contributing Structures
(no Q: Orifice - 2,Orifice - 1,Weir - 1,C0)
(no Q: Orifice - 2,Orifice - 1,Weir - 1,C0)
(no Q: Orifice - 2,Orifice - 1,Weir - 1,C0)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)

Watershed

Subsection: Composite Rating Curve
Label: OCS
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.16 in)

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)	Contributing Structures
659.00	0.00	(N/A)	0.00	(no Q: Orifice - 2,Orifice - 1,Weir - 1,C0)
659.50	0.00	(N/A)	0.00	(no Q: Orifice - 2,Orifice - 1,Weir - 1,C0)
660.00	0.00	(N/A)	0.00	(no Q: Orifice - 2,Orifice - 1,Weir - 1,C0)
660.50	0.06	(N/A)	0.00	Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
661.00	0.09	(N/A)	0.00	Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
661.50	0.12	(N/A)	0.00	Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
661.75	0.13	(N/A)	0.00	Orifice - 2,C0 (no Q: Orifice - 1,Weir - 1)
662.00	0.19	(N/A)	0.00	Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
662.50	0.26	(N/A)	0.00	Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
663.00	0.32	(N/A)	0.00	Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
663.50	0.36	(N/A)	0.00	Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)
663.75	0.38	(N/A)	0.00	Orifice - 2,Orifice - 1,C0 (no Q: Weir - 1)

Watershed

Subsection: Elevation-Volume-Flow Table (Pond)
Label: PO-2
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Return Event: 1 years
Storm Event: TypeIII 24hr (2.80 in)

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	659.00 ft
Volume (Initial)	0.000 ft^3
Flow (Initial Outlet)	0.00 ft^3/s
Flow (Initial Infiltration)	0.00 ft^3/s
Flow (Initial, Total)	0.00 ft^3/s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft^3/s)	Storage (ft^3)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
659.00	0.00	0.000	0.000	0.00	0.00	0.00
659.50	0.00	59.280	0.000	0.00	0.00	0.66
660.00	0.00	118.560	0.000	0.00	0.00	1.32
660.50	0.06	224.593	0.000	0.00	0.06	2.55
661.00	0.09	326.858	0.000	0.00	0.09	3.72
661.50	0.12	423.355	0.000	0.00	0.12	4.82
661.75	0.13	467.131	0.000	0.00	0.13	5.32
662.00	0.19	510.907	0.000	0.00	0.19	5.87
662.50	0.26	580.517	0.000	0.00	0.26	6.71
663.00	0.32	639.797	0.000	0.00	0.32	7.42
663.50	0.36	699.077	0.000	0.00	0.36	8.13
663.75	0.38	728.717	0.000	0.00	0.38	8.48

Watershed

Subsection: Elevation-Volume-Flow Table (Pond)
Label: PO-2
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Return Event: 5 years
Storm Event: TypeIII 24hr (4.30 in)

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	659.00 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft³/s)	Storage (ft³)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
659.00	0.00	0.000	0.000	0.00	0.00	0.00
659.50	0.00	59.280	0.000	0.00	0.00	0.66
660.00	0.00	118.560	0.000	0.00	0.00	1.32
660.50	0.06	224.593	0.000	0.00	0.06	2.55
661.00	0.09	326.858	0.000	0.00	0.09	3.72
661.50	0.12	423.355	0.000	0.00	0.12	4.82
661.75	0.13	467.131	0.000	0.00	0.13	5.32
662.00	0.19	510.907	0.000	0.00	0.19	5.87
662.50	0.26	580.517	0.000	0.00	0.26	6.71
663.00	0.32	639.797	0.000	0.00	0.32	7.42
663.50	0.36	699.077	0.000	0.00	0.36	8.13
663.75	0.38	728.717	0.000	0.00	0.38	8.48

Watershed

Subsection: Elevation-Volume-Flow Table (Pond)
Label: PO-2
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Return Event: 10 years
Storm Event: TypeIII 24hr (5.12 in)

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	659.00 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft³/s)	Storage (ft³)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
659.00	0.00	0.000	0.000	0.00	0.00	0.00
659.50	0.00	59.280	0.000	0.00	0.00	0.66
660.00	0.00	118.560	0.000	0.00	0.00	1.32
660.50	0.06	224.593	0.000	0.00	0.06	2.55
661.00	0.09	326.858	0.000	0.00	0.09	3.72
661.50	0.12	423.355	0.000	0.00	0.12	4.82
661.75	0.13	467.131	0.000	0.00	0.13	5.32
662.00	0.19	510.907	0.000	0.00	0.19	5.87
662.50	0.26	580.517	0.000	0.00	0.26	6.71
663.00	0.32	639.797	0.000	0.00	0.32	7.42
663.50	0.36	699.077	0.000	0.00	0.36	8.13
663.75	0.38	728.717	0.000	0.00	0.38	8.48

Subsection: Elevation-Volume-Flow Table (Pond)
Label: PO-2
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (6.45 in)

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	659.00 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft³/s)	Storage (ft³)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
659.00	0.00	0.000	0.000	0.00	0.00	0.00
659.50	0.00	59.280	0.000	0.00	0.00	0.66
660.00	0.00	118.560	0.000	0.00	0.00	1.32
660.50	0.06	224.593	0.000	0.00	0.06	2.55
661.00	0.09	326.858	0.000	0.00	0.09	3.72
661.50	0.12	423.355	0.000	0.00	0.12	4.82
661.75	0.13	467.131	0.000	0.00	0.13	5.32
662.00	0.19	510.907	0.000	0.00	0.19	5.87
662.50	0.26	580.517	0.000	0.00	0.26	6.71
663.00	0.32	639.797	0.000	0.00	0.32	7.42
663.50	0.36	699.077	0.000	0.00	0.36	8.13
663.75	0.38	728.717	0.000	0.00	0.38	8.48

Subsection: Elevation-Volume-Flow Table (Pond)
Label: PO-2
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Return Event: 100 years
Storm Event: TypeIII 24hr (9.16 in)

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	659.00 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Elevation (ft)	Outflow (ft³/s)	Storage (ft³)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
659.00	0.00	0.000	0.000	0.00	0.00	0.00
659.50	0.00	59.280	0.000	0.00	0.00	0.66
660.00	0.00	118.560	0.000	0.00	0.00	1.32
660.50	0.06	224.593	0.000	0.00	0.06	2.55
661.00	0.09	326.858	0.000	0.00	0.09	3.72
661.50	0.12	423.355	0.000	0.00	0.12	4.82
661.75	0.13	467.131	0.000	0.00	0.13	5.32
662.00	0.19	510.907	0.000	0.00	0.19	5.87
662.50	0.26	580.517	0.000	0.00	0.26	6.71
663.00	0.32	639.797	0.000	0.00	0.32	7.42
663.50	0.36	699.077	0.000	0.00	0.36	8.13
663.75	0.38	728.717	0.000	0.00	0.38	8.48

Watershed

Subsection: Level Pool Pond Routing Summary | Return Event: 1 years
Label: PO-2 (IN) | Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	659.00 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.15 ft³/s	Time to Peak (Flow, In)	12.100 hours
Flow (Peak Outlet)	0.05 ft³/s	Time to Peak (Flow, Outlet)	12.400 hours

Elevation (Water Surface, Peak)	660.46 ft
Volume (Peak)	216.625 ft³

Mass Balance (ft³)	
Volume (Initial)	0.000 ft³
Volume (Total Inflow)	526.000 ft³
Volume (Total Infiltration)	0.000 ft³
Volume (Total Outlet Outflow)	408.000 ft³
Volume (Retained)	119.000 ft³
Volume (Unrouted)	0.000 ft³
Error (Mass Balance)	0.0 %

Subsection: Level Pool Pond Routing Summary | Return Event: 5 years
Label: PO-2 (IN) | Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	659.00 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.26 ft³/s	Time to Peak (Flow, In)	12.100 hours
Flow (Peak Outlet)	0.10 ft³/s	Time to Peak (Flow, Outlet)	12.350 hours

Elevation (Water Surface, Peak)	661.20 ft
Volume (Peak)	364.908 ft³

Mass Balance (ft³)	
Volume (Initial)	0.000 ft³
Volume (Total Inflow)	963.000 ft³
Volume (Total Infiltration)	0.000 ft³
Volume (Total Outlet Outflow)	840.000 ft³
Volume (Retained)	124.000 ft³
Volume (Unrouted)	0.000 ft³
Error (Mass Balance)	0.0 %

Watershed

Subsection: Level Pool Pond Routing Summary
Label: PO-2 (IN)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Return Event: 10 years
Storm Event: TypeIII 24hr (5.12 in)

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	659.00 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.33 ft³/s	Time to Peak (Flow, In)	12.100 hours
Flow (Peak Outlet)	0.12 ft³/s	Time to Peak (Flow, Outlet)	12.400 hours

Elevation (Water Surface, Peak)	661.62 ft
Volume (Peak)	443.565 ft³

Mass Balance (ft³)	
Volume (Initial)	0.000 ft³
Volume (Total Inflow)	1,212.000 ft³
Volume (Total Infiltration)	0.000 ft³
Volume (Total Outlet Outflow)	1,094.000 ft³
Volume (Retained)	119.000 ft³
Volume (Unrouted)	0.000 ft³
Error (Mass Balance)	0.0 %

Subsection: Level Pool Pond Routing Summary
Label: PO-2 (IN)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Return Event: 25 years
Storm Event: TypeIII 24hr (6.45 in)

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	659.00 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.43 ft³/s	Time to Peak (Flow, In)	12.100 hours
Flow (Peak Outlet)	0.21 ft³/s	Time to Peak (Flow, Outlet)	12.300 hours

Elevation (Water Surface, Peak)	662.14 ft
Volume (Peak)	530.108 ft³

Mass Balance (ft³)	
Volume (Initial)	0.000 ft³
Volume (Total Inflow)	1,622.000 ft³
Volume (Total Infiltration)	0.000 ft³
Volume (Total Outlet Outflow)	1,503.000 ft³
Volume (Retained)	119.000 ft³
Volume (Unrouted)	0.000 ft³
Error (Mass Balance)	0.0 %

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	659.00 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.64 ft³/s	Time to Peak (Flow, In)	12.100 hours
Flow (Peak Outlet)	0.36 ft³/s	Time to Peak (Flow, Outlet)	12.250 hours

Elevation (Water Surface, Peak)	663.45 ft
Volume (Peak)	692.588 ft³

Mass Balance (ft³)	
Volume (Initial)	0.000 ft³
Volume (Total Inflow)	2,469.000 ft³
Volume (Total Infiltration)	0.000 ft³
Volume (Total Outlet Outflow)	2,351.000 ft³
Volume (Retained)	119.000 ft³
Volume (Unrouted)	0.000 ft³
Error (Mass Balance)	0.0 %

Watershed

Subsection: Pond Routed Hydrograph (total out) Return Event: 1 years
Label: PO-2 (OUT) Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Peak Discharge	0.05 ft³/s
Time to Peak	12.400 hours
Hydrograph Volume	405.675 ft³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
11.950	0.00	0.00	0.02	0.03	0.04
12.200	0.05	0.05	0.05	0.05	0.05
12.450	0.05	0.05	0.05	0.05	0.05
12.700	0.04	0.04	0.04	0.04	0.04
12.950	0.03	0.03	0.03	0.03	0.03
13.200	0.03	0.03	0.02	0.02	0.02
13.450	0.02	0.02	0.02	0.02	0.02
13.700	0.02	0.02	0.02	0.02	0.02
13.950	0.02	0.01	0.01	0.01	0.01
14.200	0.01	0.01	0.01	0.01	0.01
14.450	0.01	0.01	0.01	0.01	0.01
14.700	0.01	0.01	0.01	0.01	0.01
14.950	0.01	0.01	0.01	0.01	0.01
15.200	0.01	0.01	0.01	0.01	0.01
15.450	0.01	0.01	0.01	0.01	0.01
15.700	0.01	0.01	0.01	0.01	0.01
15.950	0.01	0.01	0.01	0.01	0.01
16.200	0.01	0.01	0.01	0.01	0.01
16.450	0.01	0.01	0.01	0.01	0.01
16.700	0.01	0.01	0.01	0.01	0.01
16.950	0.01	0.01	0.01	0.01	0.01
17.200	0.00	0.00	0.00	0.00	0.00
17.450	0.00	0.00	0.00	0.00	0.00
17.700	0.00	0.00	0.00	0.00	0.00
17.950	0.00	0.00	0.00	0.00	0.00
18.200	0.00	0.00	0.00	0.00	0.00
18.450	0.00	0.00	0.00	0.00	0.00
18.700	0.00	0.00	0.00	0.00	0.00
18.950	0.00	0.00	0.00	0.00	0.00
19.200	0.00	0.00	0.00	0.00	0.00
19.450	0.00	0.00	0.00	0.00	0.00
19.700	0.00	0.00	0.00	0.00	0.00
19.950	0.00	0.00	0.00	0.00	0.00
20.200	0.00	0.00	0.00	0.00	0.00
20.450	0.00	0.00	0.00	0.00	0.00
20.700	0.00	0.00	0.00	0.00	0.00
20.950	0.00	0.00	0.00	0.00	0.00

Subsection: Pond Routed Hydrograph (total out) Return Event: 1 years
Label: PO-2 (OUT) Storm Event: TypeIII 24hr (2.80 in)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
21.200	0.00	0.00	0.00	0.00	0.00
21.450	0.00	0.00	0.00	0.00	0.00
21.700	0.00	0.00	0.00	0.00	0.00
21.950	0.00	0.00	0.00	0.00	0.00
22.200	0.00	0.00	0.00	0.00	0.00
22.450	0.00	0.00	0.00	0.00	0.00
22.700	0.00	0.00	0.00	0.00	0.00
22.950	0.00	0.00	0.00	0.00	0.00
23.200	0.00	0.00	0.00	0.00	0.00
23.450	0.00	0.00	0.00	0.00	0.00
23.700	0.00	0.00	0.00	0.00	0.00
23.950	0.00	0.00	0.00	0.00	0.00
24.200	0.00	0.00	0.00	0.00	0.00

Watershed

Subsection: Pond Routed Hydrograph (total out) | Return Event: 5 years
Label: PO-2 (OUT) | Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Peak Discharge	0.10 ft³/s
Time to Peak	12.350 hours
Hydrograph Volume	838.888 ft³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
11.400	0.00	0.00	0.01	0.01	0.01
11.650	0.01	0.02	0.02	0.03	0.03
11.900	0.04	0.05	0.06	0.07	0.08
12.150	0.09	0.10	0.10	0.10	0.10
12.400	0.10	0.10	0.10	0.10	0.10
12.650	0.09	0.09	0.09	0.08	0.08
12.900	0.08	0.08	0.07	0.07	0.07
13.150	0.07	0.06	0.06	0.06	0.06
13.400	0.05	0.05	0.05	0.04	0.04
13.650	0.04	0.04	0.04	0.03	0.03
13.900	0.03	0.03	0.03	0.03	0.03
14.150	0.03	0.03	0.02	0.02	0.02
14.400	0.02	0.02	0.02	0.02	0.02
14.650	0.02	0.02	0.02	0.02	0.02
14.900	0.02	0.02	0.02	0.02	0.02
15.150	0.02	0.02	0.02	0.01	0.01
15.400	0.01	0.01	0.01	0.01	0.01
15.650	0.01	0.01	0.01	0.01	0.01
15.900	0.01	0.01	0.01	0.01	0.01
16.150	0.01	0.01	0.01	0.01	0.01
16.400	0.01	0.01	0.01	0.01	0.01
16.650	0.01	0.01	0.01	0.01	0.01
16.900	0.01	0.01	0.01	0.01	0.01
17.150	0.01	0.01	0.01	0.01	0.01
17.400	0.01	0.01	0.01	0.01	0.01
17.650	0.01	0.01	0.01	0.01	0.01
17.900	0.01	0.01	0.01	0.01	0.01
18.150	0.01	0.01	0.01	0.01	0.01
18.400	0.01	0.01	0.01	0.01	0.01
18.650	0.01	0.01	0.01	0.01	0.01
18.900	0.01	0.01	0.01	0.01	0.01
19.150	0.01	0.01	0.01	0.01	0.01
19.400	0.01	0.01	0.01	0.01	0.01
19.650	0.01	0.01	0.01	0.01	0.01
19.900	0.01	0.00	0.00	0.00	0.00
20.150	0.00	0.00	0.00	0.00	0.00
20.400	0.00	0.00	0.00	0.00	0.00

Subsection: Pond Routed Hydrograph (total out) Return Event: 5 years
Label: PO-2 (OUT) Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
20.650	0.00	0.00	0.00	0.00	0.00
20.900	0.00	0.00	0.00	0.00	0.00
21.150	0.00	0.00	0.00	0.00	0.00
21.400	0.00	0.00	0.00	0.00	0.00
21.650	0.00	0.00	0.00	0.00	0.00
21.900	0.00	0.00	0.00	0.00	0.00
22.150	0.00	0.00	0.00	0.00	0.00
22.400	0.00	0.00	0.00	0.00	0.00
22.650	0.00	0.00	0.00	0.00	0.00
22.900	0.00	0.00	0.00	0.00	0.00
23.150	0.00	0.00	0.00	0.00	0.00
23.400	0.00	0.00	0.00	0.00	0.00
23.650	0.00	0.00	0.00	0.00	0.00
23.900	0.00	0.00	0.00	(N/A)	(N/A)

Watershed

Subsection: Pond Routed Hydrograph (total out) Return Event: 10 years
Label: PO-2 (OUT) Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Peak Discharge	0.12 ft³/s
Time to Peak	12.400 hours
Hydrograph Volume	1,091.973 ft³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
10.850	0.00	0.00	0.00	0.01	0.01
11.100	0.01	0.01	0.01	0.01	0.01
11.350	0.02	0.02	0.02	0.02	0.02
11.600	0.03	0.03	0.03	0.04	0.04
11.850	0.05	0.06	0.07	0.08	0.09
12.100	0.10	0.11	0.11	0.12	0.12
12.350	0.12	0.12	0.12	0.12	0.12
12.600	0.11	0.11	0.11	0.11	0.10
12.850	0.10	0.10	0.09	0.09	0.09
13.100	0.09	0.08	0.08	0.08	0.07
13.350	0.07	0.07	0.07	0.06	0.06
13.600	0.06	0.06	0.05	0.05	0.05
13.850	0.05	0.04	0.04	0.04	0.04
14.100	0.04	0.04	0.03	0.03	0.03
14.350	0.03	0.03	0.03	0.03	0.03
14.600	0.03	0.02	0.02	0.02	0.02
14.850	0.02	0.02	0.02	0.02	0.02
15.100	0.02	0.02	0.02	0.02	0.02
15.350	0.02	0.02	0.02	0.02	0.02
15.600	0.02	0.02	0.02	0.02	0.02
15.850	0.02	0.01	0.01	0.01	0.01
16.100	0.01	0.01	0.01	0.01	0.01
16.350	0.01	0.01	0.01	0.01	0.01
16.600	0.01	0.01	0.01	0.01	0.01
16.850	0.01	0.01	0.01	0.01	0.01
17.100	0.01	0.01	0.01	0.01	0.01
17.350	0.01	0.01	0.01	0.01	0.01
17.600	0.01	0.01	0.01	0.01	0.01
17.850	0.01	0.01	0.01	0.01	0.01
18.100	0.01	0.01	0.01	0.01	0.01
18.350	0.01	0.01	0.01	0.01	0.01
18.600	0.01	0.01	0.01	0.01	0.01
18.850	0.01	0.01	0.01	0.01	0.01
19.100	0.01	0.01	0.01	0.01	0.01
19.350	0.01	0.01	0.01	0.01	0.01
19.600	0.01	0.01	0.01	0.01	0.01
19.850	0.01	0.01	0.01	0.01	0.01

Watershed

Subsection: Pond Routed Hydrograph (total out) — Return Event: 10 years
Label: PO-2 (OUT) — Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
20.100	0.01	0.01	0.01	0.01	0.01
20.350	0.01	0.01	0.01	0.01	0.01
20.600	0.01	0.01	0.01	0.01	0.01
20.850	0.01	0.01	0.01	0.01	0.01
21.100	0.01	0.01	0.01	0.01	0.01
21.350	0.01	0.01	0.01	0.01	0.01
21.600	0.01	0.01	0.01	0.01	0.01
21.850	0.01	0.00	0.00	0.00	0.00
22.100	0.00	0.00	0.00	0.00	0.00
22.350	0.00	0.00	0.00	0.00	0.00
22.600	0.00	0.00	0.00	0.00	0.00
22.850	0.00	0.00	0.00	0.00	0.00
23.100	0.00	0.00	0.00	0.00	0.00
23.350	0.00	0.00	0.00	0.00	0.00
23.600	0.00	0.00	0.00	0.00	0.00
23.850	0.00	0.00	0.00	0.00	0.00
24.100	0.00	0.00	0.00	0.00	0.00
24.350	0.00	0.00	0.00	0.00	0.00
24.600	0.00	0.00	0.00	0.00	(N/A)

Watershed

Subsection: Pond Routed Hydrograph (total out) | Return Event: 25 years
Label: PO-2 (OUT) | Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Peak Discharge	0.21 ft³/s
Time to Peak	12.300 hours
Hydrograph Volume	1,501.446 ft³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
10.000	0.00	0.00	0.00	0.01	0.01
10.250	0.01	0.01	0.01	0.01	0.01
10.500	0.01	0.01	0.02	0.02	0.02
10.750	0.02	0.02	0.02	0.02	0.02
11.000	0.02	0.02	0.02	0.02	0.03
11.250	0.03	0.03	0.03	0.03	0.03
11.500	0.03	0.04	0.04	0.04	0.05
11.750	0.05	0.06	0.07	0.07	0.08
12.000	0.10	0.11	0.12	0.17	0.20
12.250	0.21	0.21	0.20	0.20	0.18
12.500	0.17	0.15	0.13	0.13	0.12
12.750	0.12	0.12	0.11	0.11	0.11
13.000	0.11	0.10	0.10	0.10	0.09
13.250	0.09	0.09	0.09	0.08	0.08
13.500	0.08	0.08	0.07	0.07	0.07
13.750	0.07	0.06	0.06	0.06	0.06
14.000	0.06	0.05	0.05	0.05	0.05
14.250	0.04	0.04	0.04	0.04	0.04
14.500	0.04	0.04	0.03	0.03	0.03
14.750	0.03	0.03	0.03	0.03	0.03
15.000	0.03	0.03	0.03	0.03	0.03
15.250	0.02	0.02	0.02	0.02	0.02
15.500	0.02	0.02	0.02	0.02	0.02
15.750	0.02	0.02	0.02	0.02	0.02
16.000	0.02	0.02	0.02	0.02	0.02
16.250	0.02	0.02	0.02	0.02	0.02
16.500	0.02	0.02	0.02	0.01	0.01
16.750	0.01	0.01	0.01	0.01	0.01
17.000	0.01	0.01	0.01	0.01	0.01
17.250	0.01	0.01	0.01	0.01	0.01
17.500	0.01	0.01	0.01	0.01	0.01
17.750	0.01	0.01	0.01	0.01	0.01
18.000	0.01	0.01	0.01	0.01	0.01
18.250	0.01	0.01	0.01	0.01	0.01
18.500	0.01	0.01	0.01	0.01	0.01
18.750	0.01	0.01	0.01	0.01	0.01
19.000	0.01	0.01	0.01	0.01	0.01

Watershed

Subsection: Pond Routed Hydrograph (total out) Return Event: 25 years
Label: PO-2 (OUT) Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
19.250	0.01	0.01	0.01	0.01	0.01
19.500	0.01	0.01	0.01	0.01	0.01
19.750	0.01	0.01	0.01	0.01	0.01
20.000	0.01	0.01	0.01	0.01	0.01
20.250	0.01	0.01	0.01	0.01	0.01
20.500	0.01	0.01	0.01	0.01	0.01
20.750	0.01	0.01	0.01	0.01	0.01
21.000	0.01	0.01	0.01	0.01	0.01
21.250	0.01	0.01	0.01	0.01	0.01
21.500	0.01	0.01	0.01	0.01	0.01
21.750	0.01	0.01	0.01	0.01	0.01
22.000	0.01	0.01	0.01	0.01	0.01
22.250	0.01	0.01	0.01	0.01	0.01
22.500	0.01	0.01	0.01	0.01	0.01
22.750	0.01	0.01	0.01	0.01	0.01
23.000	0.01	0.01	0.01	0.01	0.01
23.250	0.01	0.01	0.01	0.01	0.01
23.500	0.01	0.01	0.01	0.01	0.01
23.750	0.01	0.01	0.01	0.01	0.01
24.000	0.01	0.00	0.00	0.00	0.00
24.250	0.00	0.00	0.00	0.00	0.00
24.500	0.00	0.00	0.00	0.00	0.00
24.750	0.00	0.00	0.00	0.00	(N/A)

Subsection: Pond Routed Hydrograph (total out)　Return Event: 100 years
Label: PO-2 (OUT)　Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Peak Discharge	0.36 ft³/s
Time to Peak	12.250 hours
Hydrograph Volume	2,348.963 ft³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
8.650	0.00	0.00	0.00	0.01	0.01
8.900	0.01	0.01	0.01	0.01	0.01
9.150	0.01	0.01	0.01	0.02	0.02
9.400	0.02	0.02	0.02	0.02	0.02
9.650	0.02	0.02	0.02	0.02	0.02
9.900	0.02	0.02	0.02	0.02	0.03
10.150	0.03	0.03	0.03	0.03	0.03
10.400	0.03	0.03	0.03	0.03	0.03
10.650	0.03	0.03	0.03	0.04	0.04
10.900	0.04	0.04	0.04	0.04	0.04
11.150	0.04	0.04	0.05	0.05	0.05
11.400	0.05	0.05	0.06	0.06	0.06
11.650	0.06	0.07	0.08	0.08	0.09
11.900	0.10	0.11	0.14	0.23	0.29
12.150	0.34	0.35	0.36	0.35	0.34
12.400	0.33	0.31	0.29	0.26	0.24
12.650	0.21	0.19	0.17	0.15	0.13
12.900	0.13	0.12	0.12	0.12	0.12
13.150	0.11	0.11	0.11	0.11	0.10
13.400	0.10	0.10	0.10	0.09	0.09
13.650	0.09	0.09	0.09	0.08	0.08
13.900	0.08	0.08	0.07	0.07	0.07
14.150	0.07	0.07	0.07	0.06	0.06
14.400	0.06	0.06	0.06	0.06	0.05
14.650	0.05	0.05	0.05	0.05	0.05
14.900	0.04	0.04	0.04	0.04	0.04
15.150	0.04	0.04	0.04	0.04	0.04
15.400	0.03	0.03	0.03	0.03	0.03
15.650	0.03	0.03	0.03	0.03	0.03
15.900	0.03	0.03	0.03	0.03	0.03
16.150	0.03	0.02	0.02	0.02	0.02
16.400	0.02	0.02	0.02	0.02	0.02
16.650	0.02	0.02	0.02	0.02	0.02
16.900	0.02	0.02	0.02	0.02	0.02
17.150	0.02	0.02	0.02	0.02	0.02
17.400	0.02	0.02	0.02	0.02	0.02
17.650	0.02	0.02	0.02	0.02	0.02

Subsection: Pond Routed Hydrograph (total out)
Return Event: 100 years
Label: PO-2 (OUT)
Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

HYDROGRAPH ORDINATES (ft^3/s)
Output Time Increment = 0.050 hours
Time on left represents time for first value in each row.

Time (hours)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)	Flow (ft^3/s)
17.900	0.02	0.02	0.02	0.01	0.01
18.150	0.01	0.01	0.01	0.01	0.01
18.400	0.01	0.01	0.01	0.01	0.01
18.650	0.01	0.01	0.01	0.01	0.01
18.900	0.01	0.01	0.01	0.01	0.01
19.150	0.01	0.01	0.01	0.01	0.01
19.400	0.01	0.01	0.01	0.01	0.01
19.650	0.01	0.01	0.01	0.01	0.01
19.900	0.01	0.01	0.01	0.01	0.01
20.150	0.01	0.01	0.01	0.01	0.01
20.400	0.01	0.01	0.01	0.01	0.01
20.650	0.01	0.01	0.01	0.01	0.01
20.900	0.01	0.01	0.01	0.01	0.01
21.150	0.01	0.01	0.01	0.01	0.01
21.400	0.01	0.01	0.01	0.01	0.01
21.650	0.01	0.01	0.01	0.01	0.01
21.900	0.01	0.01	0.01	0.01	0.01
22.150	0.01	0.01	0.01	0.01	0.01
22.400	0.01	0.01	0.01	0.01	0.01
22.650	0.01	0.01	0.01	0.01	0.01
22.900	0.01	0.01	0.01	0.01	0.01
23.150	0.01	0.01	0.01	0.01	0.01
23.400	0.01	0.01	0.01	0.01	0.01
23.650	0.01	0.01	0.01	0.01	0.01
23.900	0.01	0.01	0.01	0.01	0.01
24.150	0.01	0.01	0.01	0.00	0.00
24.400	0.00	0.00	0.00	0.00	0.00
24.650	0.00	0.00	0.00	0.00	0.00
24.900	0.00	0.00	0.00	0.00	(N/A)

Subsection: Pond Inflow Summary
Label: PO-2 (IN)
Scenario: 26 Chestnut - Synthetic Curve, 1 yrs

Return Event: 1 years
Storm Event: TypeIII 24hr (2.80 in)

Summary for Hydrograph Addition at 'PO-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-2

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	PDA-2	526.088	12.100	0.15
Flow (In)	PO-2	526.088	12.100	0.15

Subsection: Pond Inflow Summary | Return Event: 5 years
Label: PO-2 (IN) | Storm Event: TypeIII 24hr (4.30 in)
Scenario: 26 Chestnut - Synthetic Curve, 5 yrs

Summary for Hydrograph Addition at 'PO-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-2

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	PDA-2	963.383	12.100	0.26
Flow (In)	PO-2	963.383	12.100	0.26

Subsection: Pond Inflow Summary
Return Event: 10 years
Label: PO-2 (IN)
Storm Event: TypeIII 24hr (5.12 in)
Scenario: 26 Chestnut - Synthetic Curve, 10 yrs

Summary for Hydrograph Addition at 'PO-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-2

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	PDA-2	1,212.429	12.100	0.33
Flow (In)	PO-2	1,212.429	12.100	0.33

Subsection: Pond Inflow Summary | Return Event: 25 years
Label: PO-2 (IN) | Storm Event: TypeIII 24hr (6.45 in)
Scenario: 26 Chestnut - Synthetic Curve, 25 yrs

Summary for Hydrograph Addition at 'PO-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-2

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	PDA-2	1,621.771	12.100	0.43
Flow (In)	PO-2	1,621.771	12.100	0.43

Subsection: Pond Inflow Summary | Return Event: 100 years
Label: PO-2 (IN) | Storm Event: TypeIII 24hr (9.16 in)
Scenario: 26 Chestnut - Synthetic Curve, 100 yrs

Summary for Hydrograph Addition at 'PO-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-2

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	PDA-2	2,469.435	12.100	0.64
Flow (In)	PO-2	2,469.435	12.100	0.64

Index

Watershed

APPENDIX C

STORMTECH 740 CALCULATION SHEET AND DESIGN MANUAL





SC-310 / SC-740 / DC-780

StormTech®

Detention • Retention • Water Quality

Design Manual

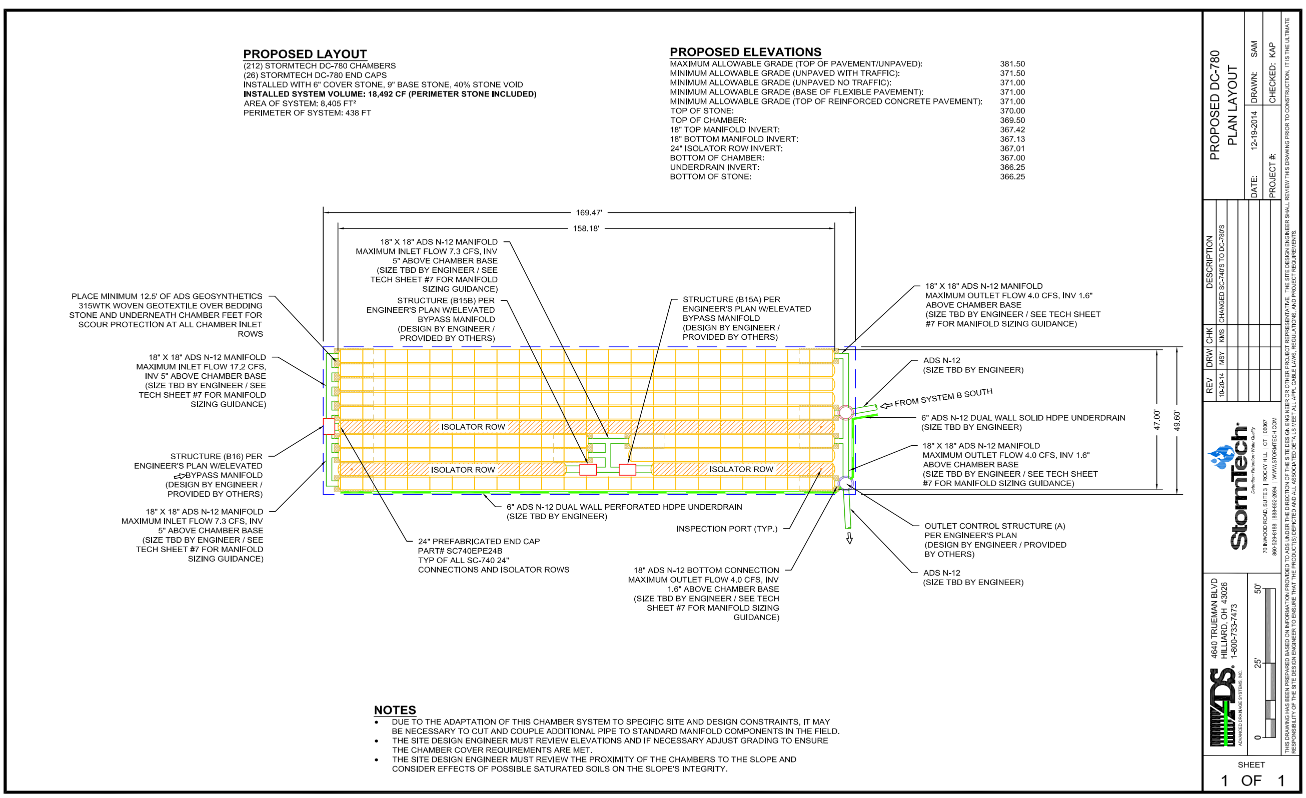
StormTech® Chamber Systems
for Stormwater Management

U.S. Green Building Council
Member

Table of Contents

* For MC-3500 and MC-4500 designs, please refer to the MC-3500/MC-4500 Design Manual

The StormTech Technical Services Department assists design professionals in specifying StormTech stormwater systems. This assistance includes the layout of chambers to meet the engineer's volume requirements and the connections to and from the chambers. The Technical Department can also assist converting and cost engineering projects currently specified with ponds, pipe, concrete and other manufactured stormwater detention/retention products. Please note that it is the responsibility of the design engineer to ensure that the chamber bed layout meets all design requirements and is in compliance with applicable laws and regulations governing this project.



This manual is exclusively intended to assist engineers in the design of subsurface stormwater systems using StormTech chambers.

1.0 Introduction

1.1 INTRODUCTION

StormTech stormwater management systems allow stormwater professionals to create more profitable, environmentally sound developments. Compared with other subsurface systems, StormTech systems offer lower overall installed cost, superior design flexibility and enhanced performance. Applications include commercial, residential, agricultural and highway drainage.

StormTech has invested over $10 million and many years in the development of StormTech chambers. These innovative products exceed the rigorous requirements of the standards governing the design of thermoplastic structures.

1.2 THE GOLD STANDARD IN STORMWATER MANAGEMENT

The advanced designs of StormTech chambers were created by implementing an aggressive research, development, design and manufacturing protocol. StormTech chamber products establish the new gold standard in stormwater management through:

- Collaborations with experts in the field of buried plastic structures and polyolefin materials
- The development and utilization of new testing methods and proprietary test methods
- The use of thermoformed prototypes to verify engineering models, perform in-ground testing and install observation sites
- The investment in custom-designed, injection molding equipment
- The utilization of polypropylene and polyethylene as manufacturing materials
- The design of molded-in features not possible with traditional thermoformed chambers

Section 3.0 of this design manual, *Structural Capabilities*, provides a detailed description of the research, development and design process.

Many of StormTech's unique chamber features can benefit a site developer, stormwater system designer, and installer. Where applicable, StormTech Product Specifications are referenced throughout this design manual. If StormTech's unique product benefits are important to a stormwater system design, consider including the applicable StormTech Product Specifications on the site plans. This can prevent substitutions with inferior products. Refer to Section 14.0, *StormTech Product Specifications.*

1.3 PRODUCT QUALITY AND DESIGN TO INTERNATIONAL STANDARDS

StormTech chambers are designed to meet the full scope of design requirements of Section 12.12 of the AASHTO LRFD Bridge Design Specifications and produced to the requirements of the American Society of Testing Materials (ASTM) International specifications F2418 (polypropylene chambers) and F2922 (polyethylene chambers).

StormTech chambers provide the full AASHTO safety factors for live loads and permanent earth loads. The two ASTM standards mentioned previously are linked to the AASHTO LRFD Bridge Design Specifications Section 12.12 design standard. Both ASTM standards require that the safety factors included in the AASHTO guidance are achieved as a prerequisite to meeting either ASTM F2418 or ASTM F2922. StormTech chambers are also designed in accordance with ASTM F2787, "Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers" which provides specific guidance on how to design thermoplastic chambers in accordance with AASHTO Section 12.12. These standards provide both the assurance of product quality and safe structural design.

For non-proprietary specifications for public bids that ensure high product quality and safe design, consider including the specification in Section 15.0 Chamber Specifications for Contract Documents.

1.4 TECHNICAL SUPPORT FOR PLAN REVIEWS

StormTech's in-house technical support staff is available to review proposed plans that incorporate StormTech chamber systems. They are also available to assist with plan conversions from existing products to StormTech. Not all plan sheets are necessary for StormTech's review. Required sheets include plan view sheet(s) with design contours, cross sections of the stormwater system including catch basins and drainage details.

When specifying StormTech chambers it is recommended that the following items are included in project plans: StormTech chamber system General Notes, applicable StormTech chamber illustrations and StormTech chamber system Product Specifications. These items are available in various formats and can be obtained by contacting StormTech at **1-860-529-8188** or may be downloaded at **www.stormtech.com.**

StormTech's plan review is limited to the sole purpose of determining whether plans meet StormTech chamber systems' minimum requirements. **It is the ultimate responsibility of the design engineer to assure that the stormwater system's design is in full compliance with all applicable laws and regulations.** StormTech products must be designed and installed in accordance with StormTech's minimum requirements.

SEND PLANS TO:

StormTech, Plan Review, 70 Inwood Road, Suite 3, Rocky Hill, CT 06067 E-mail: info@stormtech.com. File size should not exceed 10 MB.

2.0 Product Information

2.1 PRODUCT APPLICATIONS

StormTech chamber systems may function as stormwater detention, retention, first-flush storage, or some combination of these. The StormTech chambers can be used for commercial, municipal, industrial, recreational, and residential applications especially for installations under parking lots and commercial roadways.

One of the key advantages of the StormTech chamber system is its design flexibility. Chambers may be configured into beds or trenches of various sizes or shapes. They can be centralized or decentralized, and fit on nearly all sites. Chamber lengths enhance the ability to develop on both existing and pre-developed projects. The systems can be designed easily and efficiently around utilities, natural or man-made structures and any other limiting boundaries.

2.2 CHAMBERS FOR STORMWATER DETENTION

Chamber systems have been used effectively for stormwater detention for over 15 years. A detention system temporarily holds water while it is released at a defined rate through an outlet. While some infiltration may occur in a detention system, it is often considered an environmental benefit and a storage safety factor. Over 70% of StormTech's installations are non-watertight detention systems. There are only a few uncommon situations where a detention system might need to limit infiltration: the subgrade soil's bearing capacity is significantly affected by saturation such as with expansive clays or karst soils, and; in sensitive aquifer areas where the depth to groundwater does not meet local guidelines. Adequate pretreatment could eliminate concerns for the latter case. A thermoplastic liner may be considered for both situations to limit infiltration.

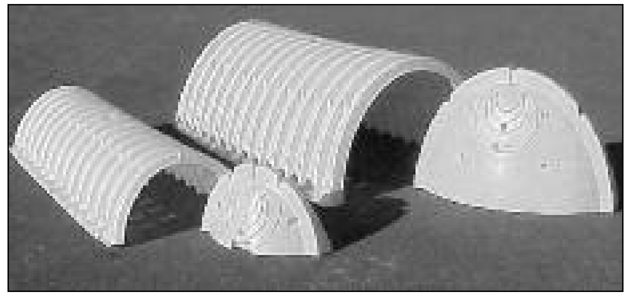
2.3 STONE POROSITY ASSUMPTION

A StormTech chamber system requires the application of clean, crushed, angular stone below, between and above the chambers. This stone serves as a structural component while allowing conveyance and storage of stormwater. Storage volume examples throughout this Design Manual are calculated with an assumption that the stone has an industry standard porosity of 40%. Actual stone porosity may vary. Contact StormTech for information on calculating stormwater volumes with varying stone porosity assumptions.

2.4 CHAMBER SELECTION

Primary considerations when selecting between the SC-310™, SC-740™ and DC-780™ chambers are the depth to restrictive layer, available area for subsurface storage, cover height and outfall restrictions.

The StormTech SC-310 chamber shown on page 4 is ideal for systems requiring low-rise and wide-span solutions. This low profile chamber allows the storage of large volumes, 1.3 ft³/ft² (0.40 m³/m²) [minimum], at minimum depths.



The SC-310 and SC-740 chambers and end plates.

StormTech systems can be integrated into retrofit and new construction projects.

Like the Stormtech SC-310, the StormTech SC-310-3 found on page 6 allows for a design option for sites with both limited cover and limited space. With only 3" of spacing between the chambers, the SC-310-3 still provides 1.3 ft³/ft² (0.40 m³/m²) [minimum] of storage.

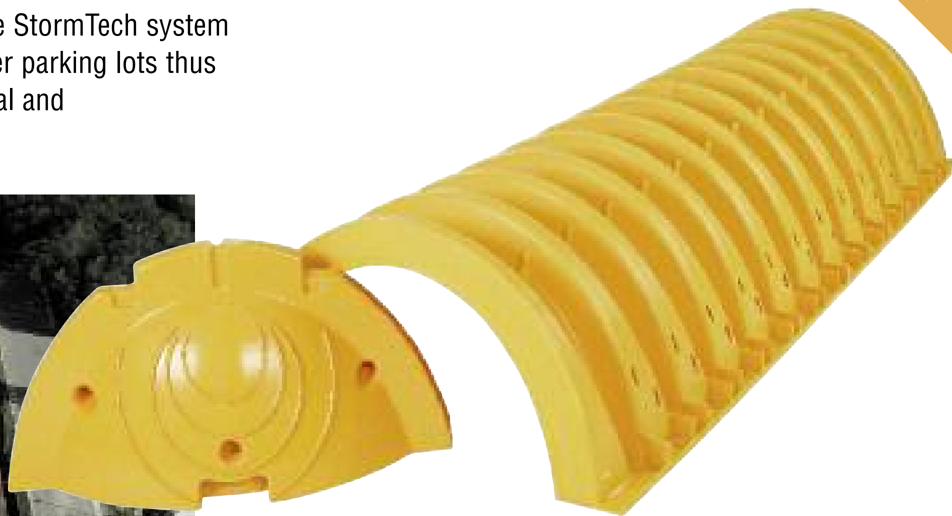
The StormTech SC-740 chamber shown on page 8 optimizes storage volumes in relatively small footprints. By providing 2.2 ft³/ft² (0.67 m³/m²) [minimum] of storage, the SC-740 chambers can minimize excavation, backfill and associated costs.

The DC-780 chamber shown on page 10 has been developed for those applications which exceed the maximum 8 ft (2.44 m) burial depth of the SC-740 and SC-310 chambers. The DC-780 is a modified version of the SC-740 allowing it to reach a maximum burial depth of 12 ft (3.66 m). The design of the DC-780 chamber, like other StormTech chambers, is designed and manufactured in accordance with the AASHTO LRFD Bridge Design Specifications as well as ASTM F 2418 and ASTM F 2787 ensuring structural adequacy for deeper systems.

The end corrugations of the DC-780 chamber have not been modified in order to allow connections to the SC-740 chamber. This will allow hybrid systems utilizing both chambers in one system design.

StormTech SC-310 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots thus maximizing land usage for commercial and municipal applications.

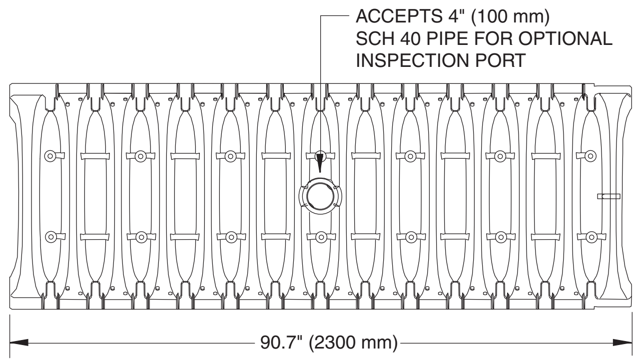


StormTech SC-310 Chamber (not to scale)

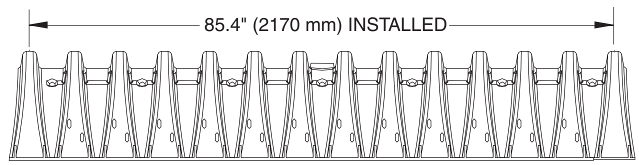
Nominal Chamber Specifications

Size (L x W x H)	85.4" x 34.0" x 16.0" (2170 x 864 x 406 mm)
Chamber Storage	14.7 ft^3 (0.42 m^3)
Min. Installed Storage*	31.0 ft^3 (0.88 m^3)
Weight	37.0 lbs (16.8 kg)

*Assumes 6" (150 mm) stone above, below and between chambers and 40% stone porosity.



SC-310 Chamber

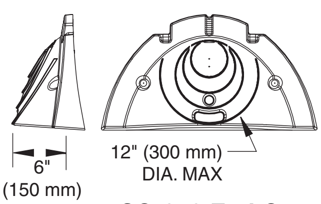


Shipping

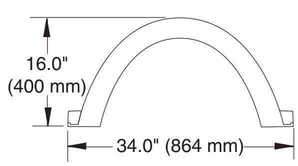
41 chambers/pallet

108 end caps/pallet

18 pallets/truck



SC-310 End Cap



StormTech SC-310 Chamber

SC-310 Cumulative Storage Volumes Per Chamber

Assumes 40% Stone Porosity. Calculations are Based Upon a 6" (150 mm) Stone Base Under the Chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft^3 (m^3)	Total System Cumulative Storage ft^3 (m^3)
28 (711)	↑ 14.70 (0.416)	31.00 (0.878)
27 (686)	14.70 (0.416)	30.21 (0.855)
26 (680)	Stone 14.70 (0.416)	29.42 (0.833)
25 (610)	Cover 14.70 (0.416)	28.63 (0.811)
24 (609)	14.70 (0.416)	27.84 (0.788)
23 (584)	↓ 14.70 (0.416)	27.05 (0.766)
22 (559)	14.70 (0.416)	26.26 (0.748)
21 (533)	14.64 (0.415)	25.43 (0.720)
20 (508)	14.49 (0.410)	24.54 (0.695)
19 (483)	14.22 (0.403)	23.58 (0.668)
18 (457)	13.68 (0.387)	22.47 (0.636)
17 (432)	12.99 (0.368)	21.25 (0.602)
16 (406)	12.17 (0.345)	19.97 (0.566)
15 (381)	11.25 (0.319)	18.62 (0.528)
14 (356)	10.23 (0.290)	17.22 (0.488)
13 (330)	9.15 (0.260)	15.78 (0.447)
12 (305)	7.99 (0.227)	14.29 (0.425)
11 (279)	6.78 (0.192)	12.77 (0.362)
10 (254)	5.51 (0.156)	11.22 (0.318)
9 (229)	4.19 (0.119)	9.64 (0.278)
8 (203)	2.83 (0.081)	8.03 (0.227)
7 (178)	1.43 (0.041)	6.40 (0.181)
6 (152)	↑ 0	4.74 (0.134)
5 (127)	0	3.95 (0.112)
4 (102)	0	3.16 (0.090)
3 (76)	Stone Foundation 0	2.37 (0.067)
2 (51)	0	1.58 (0.046)
1 (25)	↓ 0	0.79 (0.022)

Note: Add 0.79 cu. ft. (0.022 m^3) of storage for each additional inch (25 mm) of stone foundation.

Storage Volume Per Chamber ft^3 (m^3)

	Bare Chamber Storage	Chamber and Stone Stone Foundation Depth in. (mm)		
	ft^3 (m^3)	6 (150)	12 (300)	18 (450)
StormTech SC-310	14.7 (0.4)	31.0 (0.9)	35.7 (1.0)	40.4 (1.1)

Note: Assumes 6" (150 mm) of stone above chambers, 6" (150 mm) row spacing and 40% stone porosity.

Amount of Stone Per Chamber

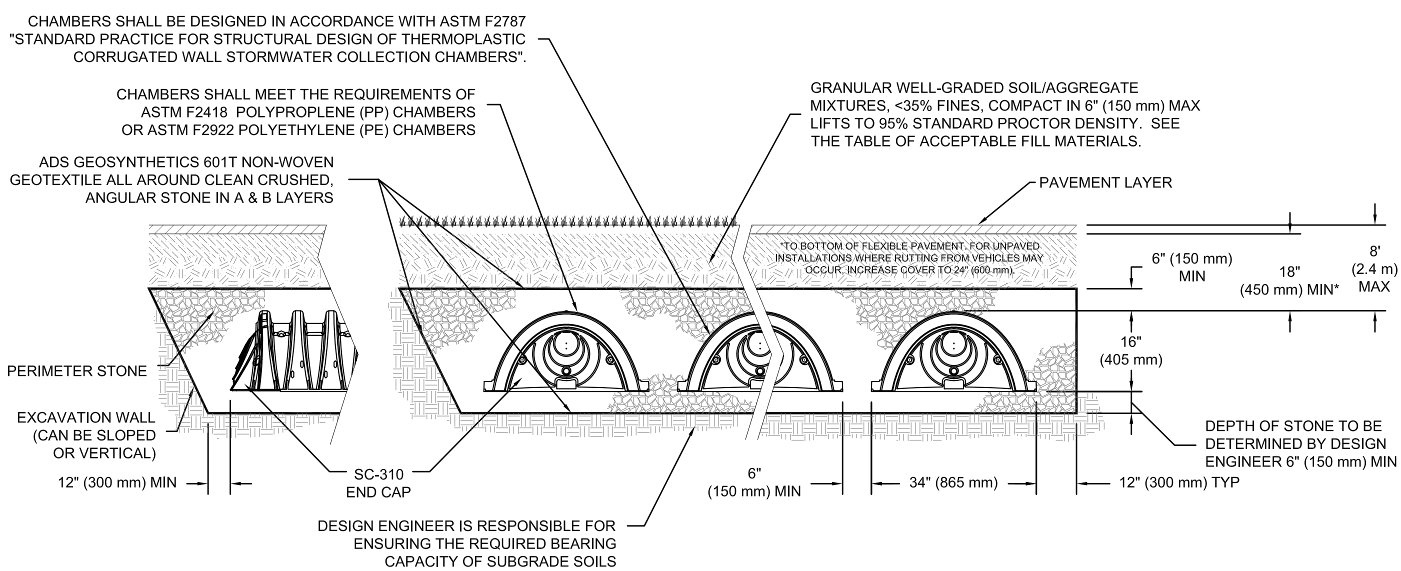
	Stone Foundation Depth		
ENGLISH TONS (yds^3)	**6"**	**12"**	**18"**
StormTech SC-310	2.1 (1.5 yd^3)	2.7 (1.9 yd^3)	3.4 (2.4 yd^3)
METRIC KILOGRAMS (m^3)	**150 mm**	**300 mm**	**450 mm**
StormTech SC-310	1830 (1.1 m^3)	2490 (1.5 m^3)	2990 (1.8 m^3)

Note: Assumes 6" (150 mm) of stone above, and between chambers.

Volume of Excavation Per Chamber yd^3 (m^3)

	Stone Foundation Depth		
	6" (150 mm)	**12" (300 mm)**	**18" (450 mm)**
StormTech SC-310	2.9 (2.2)	3.4 (2.6)	3.8 (2.9)

Note: Assumes 6" (150 mm) of row separation and 18" (450 mm) of cover. The volume of excavation will vary as the depth of the cover increases.



THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12 FOR EARTH AND LIVE LOADS, WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.

StormTech SC-310-3 Chamber

The proven strength and durability of the SC-310-3 Chamber allows for a design option for sites where limited cover, limited space, high water table and escalated aggregate cost are a factor. The SC-310-3 has a minimum cover requirement of 16" (400 mm) to bottom of pavement and reduces the spacing requirement between chambers by 50% to 3" (76 mm). This provides a reduced footprint overall and allows the designer to offer a traffic bearing application yet comply with water table separation regulations.

StormTech SC-310-3 Chamber (not to scale)

Nominal Chamber Specifications

Size (L x W x H)	85.4" x 34.0" x 16.0" (2170 x 864 x 406 mm)
Chamber Storage	14.7 ft³ (0.42 m³)
Min. Installed Storage*	29.3 ft³ (0.83 m³)
Weight	37.0 lbs (16.8 kg)

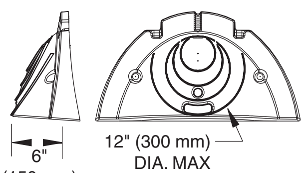
*Assumes 6" (150 mm) stone above and below chambers, 3" (76 mm) row spacing and 40% stone porosity.

Shipping

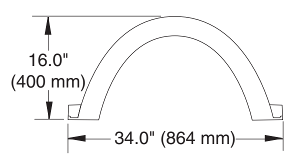
41 chambers/pallet

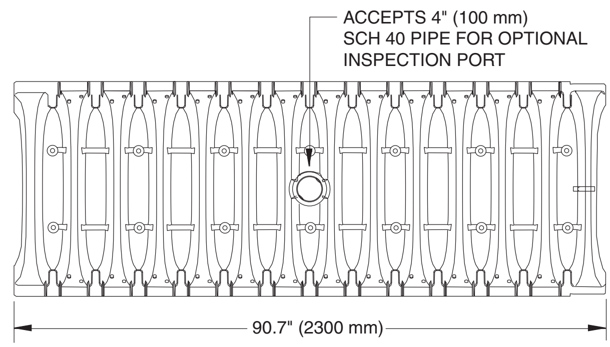
108 end caps/pallet

18 pallets/truck

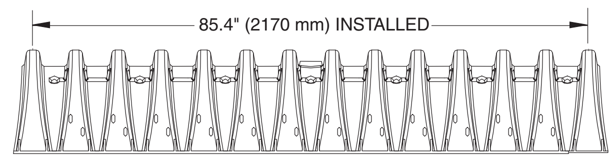


SC-310 End Cap

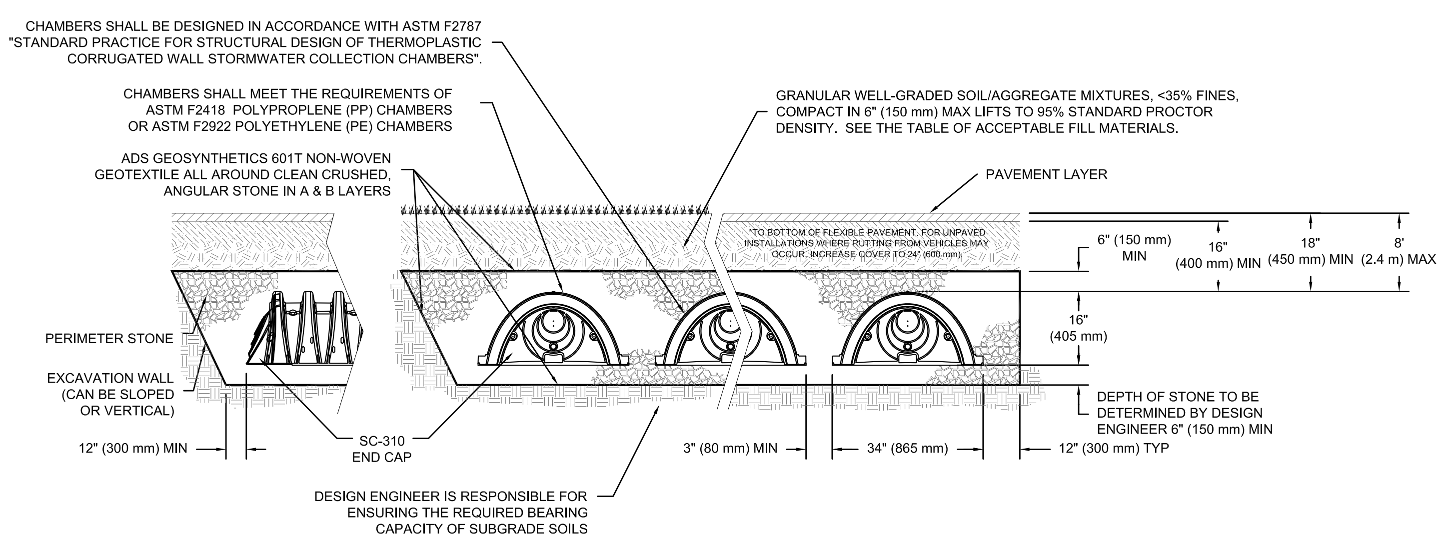




SC-310 Chamber



Typical Cross Section Detail



THE INSTALLED CHAMBER SYSTEM SHALL PROVIDE THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12 FOR EARTH AND LIVE LOADS, WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.

StormTech SC-310-3 Chamber

SC-310-3 Cumulative Storage Volume Per Chamber

Assumes 40% Stone Porosity. Calculations are Based Upon a 6" (150 mm) Stone Base Under the Chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
28 (711)	14.7 (0.416)	29.34 (0.831)
27 (686)	14.7 (0.416)	28.60 (0.810)
26 (660)	Stone 14.7 (0.416)	27.87 (0.789)
25 (635)	Cover 14.7 (0.416)	27.14 (0.769)
24 (610)	14.7 (0.416)	26.41 (0.748)
23 (584)	14.7 (0.416)	25.68 (0.727)
22 (559)	14.7 (0.416)	24.95 (0.707)
21 (533)	14.64 (0.415)	24.18 (0.685)
20 (508)	14.49 (0.410)	23.36 (0.661)
19 (483)	14.22 (0.403)	22.47 (0.636)
18 (457)	13.68 (0.387)	21.41 (0.606)
17 (432)	12.99 (0.368)	20.25 (0.573)
16 (406)	12.17 (0.345)	19.03 (0.539)
15 (381)	11.25 (0.319)	17.74 (0.502)
14 (356)	10.23 (0.290)	16.40 (0.464)
13 (330)	9.15 (0.260)	15.01 (0.425)
12 (305)	7.99 (0.226)	13.59 (0.385)
11 (279)	6.78 (0.192)	12.13 (0.343)
10 (254)	5.51 (0.156)	10.63 (0.301)
9 (229)	4.19 (0.119)	9.11 (0.258)
8 (203)	2.83 (0.080)	7.56 (0.214)
7 (178)	1.43 (0.040)	5.98 (0.169)
6 (152)	0	4.39 (0.124)
5 (127)	0	3.66 (0.104)
4 (102)	Stone Foundation 0	2.93 (0.083)
3 (76)	0	2.19 (0.062)
2 (51)	0	1.46 (0.041)
1 (25)	0	0.73 (0.021)

Note: Add 0.73 ft³ (0.021 m³) of storage for each additional inch (25 mm) of stone foundation.

Storage Volume per Chamber ft³ (m³)

	Bare Chamber Storage	Chamber and Stone Volume Stone Foundation Depth in. (mm)		
	ft³ (m³)	6 (150)	12 (300)	18 (450)
SC-310-3	14.7 (0.42)	29.3 (0.83)	33.7 (0.95)	38.1 (1.08)

Note: Assumes 6" (150 mm) of stone above chambers, 3" (76 mm) row spacing and 40% stone porosity.

Volume of Excavation Per Chamber yd³ (m³)

	Stone Foundation Depth		
	6" (150)	12" (300)	18" (450)
SC-310-3	2.6 (2.0)	3.0 (2.3)	3.4 (2.6)

Note: Assumes 3" (76 mm) of row separation, 6" (150 mm) of stone above the chambers and 16" (400 mm) of cover. The volume of excavation will vary as depth of cover increases.

Amount of Stone Per Chamber

	Stone Foundation Depth		
ENGLISH TONS (yd³)	**6"**	**12"**	**18"**
SC-310-3	1.9 (1.4)	2.5 (1.8)	3.1 (2.2)
METRIC KILOGRAMS (m³)	**150 mm**	**300 mm**	**450 mm**
SC-310-3	1724 (1.0)	2268 (1.3)	2812 (1.7)

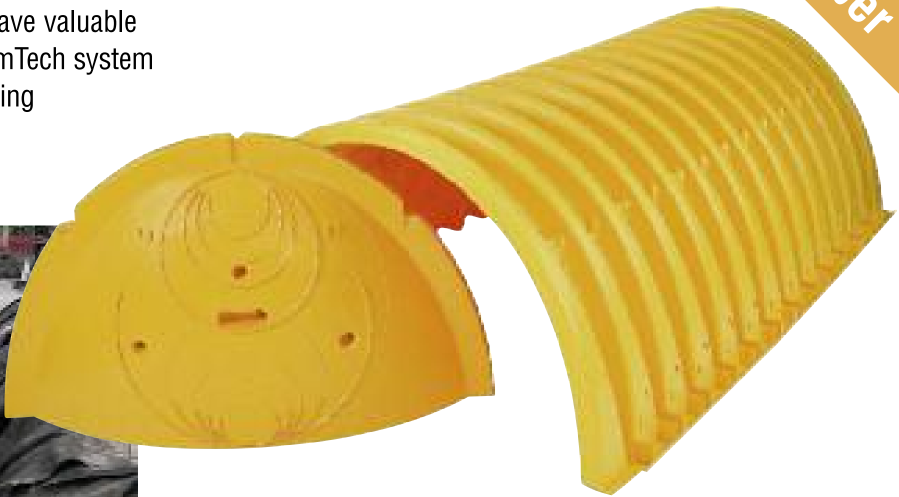
Note: Assumes 6" (150 mm) of stone above chambers and 3" (76 mm) row spacing.

Cover	Minimum Required Bearing Resistance for Service Loads ksf (kPa)										
ft (m)	3.0 (144)	2.9 (139)	2.8 (134)	2.7 (129)	2.6 (124)	2.5 (120)	2.4 (115)	2.3 (110)	2.2 (105)	2.1 (101)	2.0 (96)
1.5 (0.46)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)
2 (0.61)	6 152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)
2.5 (0.76)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)
3 (0.91)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)
3.5 (1.07)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	12 (305)
4 (1.22)	6 152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)
4.5 (1.37)	6 152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)
5 (1.52)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)
5.5 (1.68)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	12 (305)
6 (1.83)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)
6.5 (1.98)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)
7 (2.13)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)
7.5 (2.29)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)
8 (2.44)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	15 (381)

NOTE: The design engineer is solely responsible for assessing the bearing resistance (allowable bearing capacity) of the subgrade soils and determining the depth of foundation stone. Subgrade bearing resistance should be assessed with consideration for the range of soil moisture conditions expected under a stormwater system.

StormTech SC-740 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots thus maximizing land usage for commercial and municipal applications.



StormTech SC-740 Chamber (not to scale)

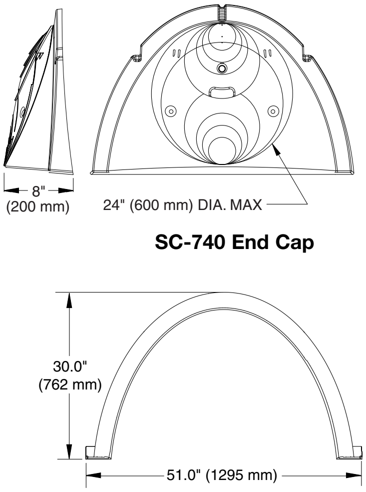
Nominal Chamber Specifications

Size (L x W x H)	85.4" x 51.0" x 30.0" (2170 x 1295 x 762 mm)
Chamber Storage	45.9 ft³ (1.30 m³)
Min. Installed Storage*	74.9 ft³ (2.12 m³)
Weight	74.0 lbs (33.6 kg)

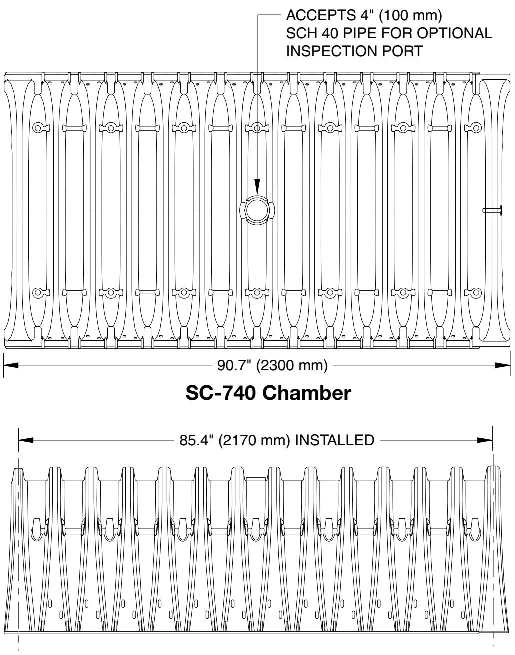
*Assumes 6" (150 mm) stone above, below and between chambers and 40% stone porosity.

Shipping

- 30 chambers/pallet
- 60 end caps/pallet
- 12 pallets/truck



SC-740 End Cap



SC-740 Chamber

StormTech SC-740 Chamber

SC-740 Cumulative Storage Volumes Per Chamber

Assumes 40% Stone Porosity. Calculations are Based Upon a 6" (150 mm) Stone Base Under the Chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage Ft³ (m³)	Total System Cumulative Storage Ft³ (m³)
42 (1067)	↑ 45.90 (1.300)	74.90 (2.121)
41 (1041)	45.90 (1.300)	73.77 (2.089)
40 (1016)	Stone 45.90 (1.300)	72.64 (2.057)
39 (991)	Cover 45.90 (1.300)	71.52 (2.025)
38 (965)	45.90 (1.300)	70.39 (1.993)
37 (948)	↓ 45.90 (1.300)	69.26 (1.961)
36 (914)	45.90 (1.300)	68.14 (1.929)
35 (889)	45.85 (1.298)	66.98 (1.897)
34 (864)	45.69 (1.294)	65.75 (1.862)
33 (838)	45.41 (1.286)	64.46 (1.825)
32 (813)	44.81 (1.269)	62.97 (1.783)
31 (787)	44.01 (1.246)	61.36 (1.737)
30 (762)	43.06 (1.219)	59.66 (1.689)
29 (737)	41.98 (1.189)	57.89 (1.639)
28 (711)	40.80 (1.155)	56.05 (1.587)
27 (686)	39.54 (1.120)	54.17 (1.534)
26 (660)	38.18 (1.081)	52.23 (1.479)
25 (635)	36.74 (1.040)	50.23 (1.422)
24 (610)	35.22 (0.977)	48.19 (1.365)
23 (584)	33.64 (0.953)	46.11 (1.306)
22 (559)	31.99 (0.906)	44.00 (1.246)
21 (533)	30.29 (0.858)	41.85 (1.185)
20 (508)	28.54 (0.808)	39.67 (1.123)
19 (483)	26.74 (0.757)	37.47 (1.061)
18 (457)	24.89 (0.705)	35.23 (0.997)
17 (432)	23.00 (0.651)	32.96 (0.939)
16 (406)	21.06 (0.596)	30.68 (0.869)
15 (381)	19.09 (0.541)	28.36 (0.803)
14 (356)	17.08 (0.484)	26.03 (0.737)
13 (330)	15.04 (0.426)	23.68 (0.670)
12 (305)	12.97 (0.367)	21.31 (0.608)
11 (279)	10.87 (0.309)	18.92 (0.535)
10 (254)	8.74 (0.247)	16.51 (0.468)
9 (229)	6.58 (0.186)	14.09 (0.399)

SC-740 Cumulative Storage Volumes Per Chamber (cont.)

Depth of Water in System Inches (mm)	Cumulative Chamber Storage Ft³ (m³)	Total System Cumulative Storage Ft³ (m³)
8 (203)	4.41 (0.125)	11.66 (0.330)
7 (178)	2.21 (0.063)	9.21 (0.264)
6 (152)	↑ 0	6.76 (0.191)
5 (127)	0	5.63 (0.160)
4 (102)	Stone Foundation 0	4.51 (0.125)
3 (76)	0	3.38 (0.095)
2 (51)	0	2.25 (0.064)
1 (25)	↓ 0	1.13 (0.032)

Note: Add 1.13 cu. ft. (0.032 m³) of storage for each additional inch (25 mm) of stone foundation.

Storage Volume Per Chamber ft³ (m³)

	Bare Chamber Storage	Chamber and Stone Stone Foundation Depth in. (mm)		
	ft³ (m³)	6 (150)	12 (300)	18 (450)
StormTech SC-740	45.9 (1.3)	74.9 (2.1)	81.7 (2.3)	88.4 (2.5)

Note: Assumes 6" (150 mm) of stone above chambers, 6" (150 mm) row spacing and 40% porosity.

Amount of Stone Per Chamber

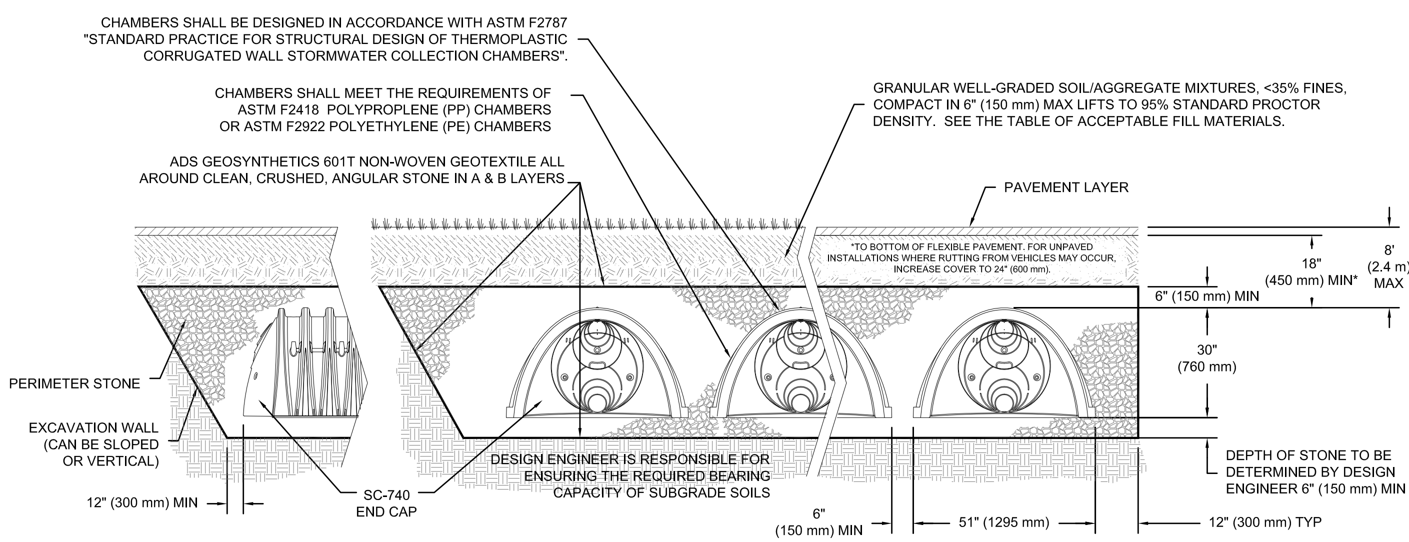
	Stone Foundation Depth		
ENGLISH TONS (yd³)	6"	12"	18"
StormTech SC-740	3.8 (2.8 yd³)	4.6 (3.3 yd³)	5.5 (3.9 yd³)
METRIC KILOGRAMS (m³)	150 mm	300 mm	450 mm
StormTech SC-740	3450 (2.1 m³)	4170 (2.5 m³)	4490 (3.0 m³)

Note: Assumes 6" (150 mm) of stone above, and between chambers.

Volume of Excavation Per Chamber yd³ (m³)

	Stone Foundation Depth		
	6" (150 mm)	12" (300 mm)	18" (450 mm)
StormTech SC-740	5.5 (4.2)	6.2 (4.7)	6.8 (5.2)

Note: Assumes 6" (150 mm) of row separation and 18" (450 mm) of cover. Volume of excavation will vary as depth of cover increases.



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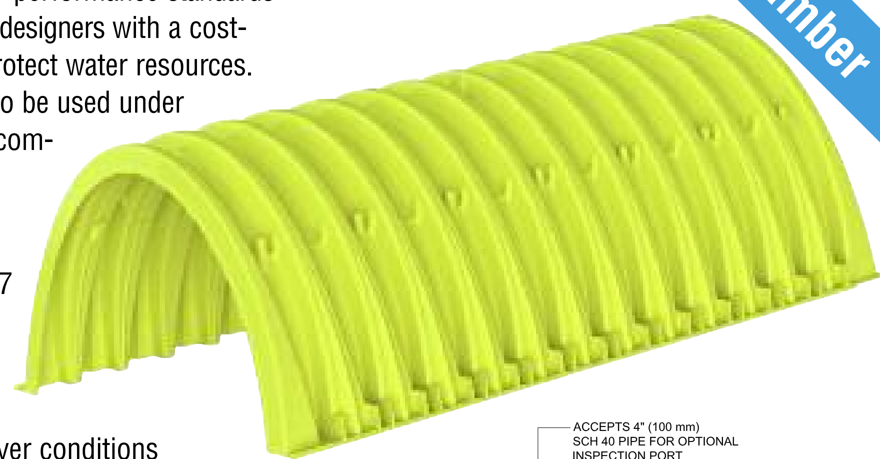
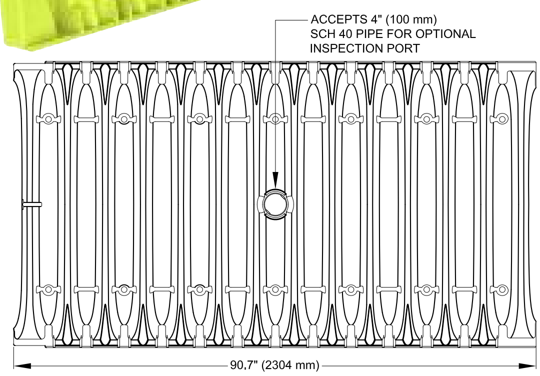
StormTech DC-780 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots thus maximizing land usage for commercial and municipal applications.

- 12' Deep Cover applications.
- Designed in accordance with ASTM F 2787 and produced to meet the ASTM F 2418 product standard.
- AASHTO safety factors provided for AASHTO Design Truck (H20) and deep cover conditions





StormTech DC-780 Chamber (not to scale)

Nominal Chamber Specifications

Size (L x W x H)	85.4" x 51.0" x 30.0" (2169 x 1295 x 762 mm)
Chamber Storage	46.2 ft³ (1.3 m³)
Min. Installed Storage*	78.4 ft³ (2.2 m³)

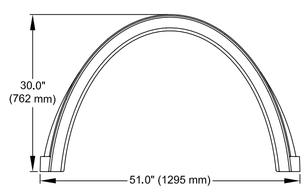
* Assumes 9" (230 mm) stone below, 6" (150 mm) stone above, 6" (150 mm) row spacing and 40% stone porosity.

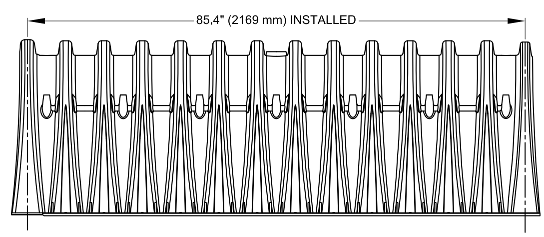
Shipping

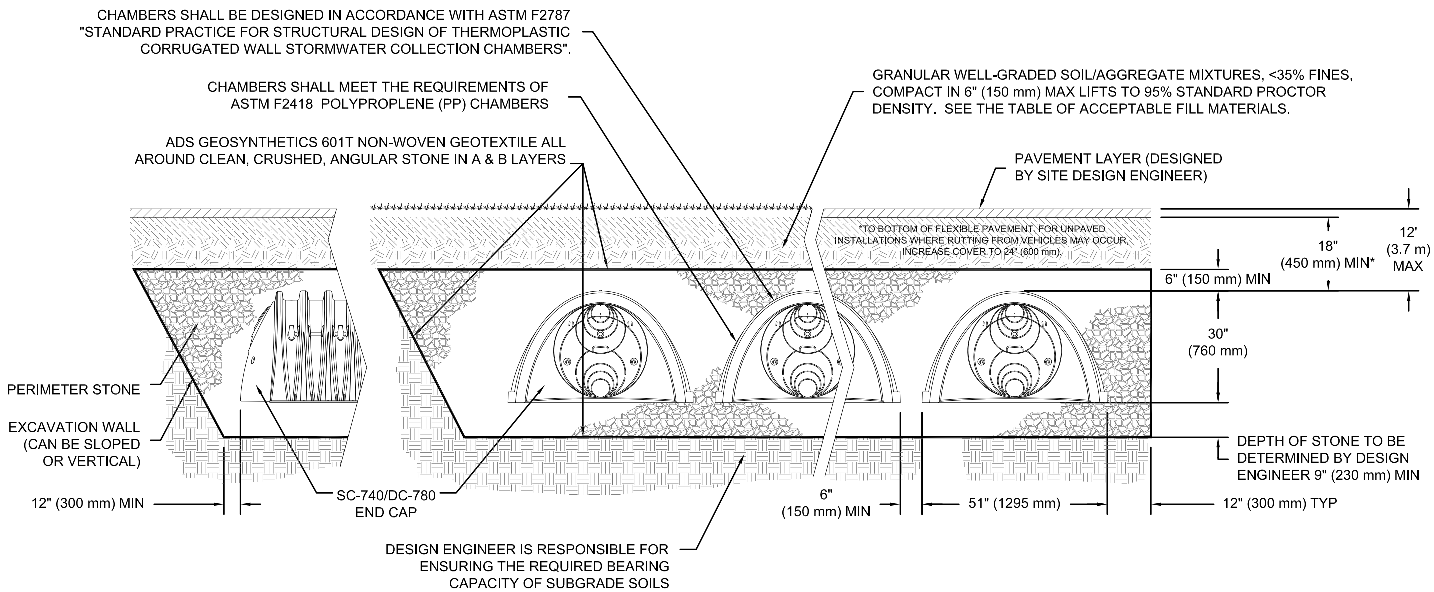
24 chambers/pallet

60 end caps/pallet

12 pallets/truck







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StormTech DC-780 Chamber

DC-780 Cumulative Storage Volumes Per Chamber

Assumes 40% Stone Porosity. Calculations are Based Upon a 9" (230 mm) Stone Base Under the Chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
45 (1143)	↑ 46.27 (1.310)	78.47 (2.222)
44 (1118)	46.27 (1.310)	77.34 (2.190)
43 (1092)	Stone 46.27 (1.310)	76.21 (2.158)
42 (1067)	Cover 46.27 (1.310)	75.09 (2.126)
41 (1041)	46.27 (1.310)	73.96 (2.094)
40 (1016)	↓ 46.27 (1.310)	72.83 (2.062)
39 (991)	46.27 (1.310)	71.71 (2.030)
38 (965)	46.21 (1.309)	70.54 (1.998)
37 (940)	46.04 (1.304)	69.32 (1.963)
36 (914)	45.76 (1.296)	68.02 (1.926)
35 (889)	45.15 (1.278)	66.53 (1.884)
34 (864)	44.34 (1.255)	64.91 (1.838)
33 (838)	43.38 (1.228)	63.21 (1.790)
32 (813)	42.29 (1.198)	61.43 (1.740)
31 (787)	41.11 (1.164)	59.59 (1.688)
30 (762)	39.83 (1.128)	57.70 (1.634)
29 (737)	38.47 (1.089)	55.76 (1.579)
28 (711)	37.01 (1.048)	53.76 (1.522)
27 (686)	35.49 (1.005)	51.72 (1.464)
26 (660)	33.90 (0.960)	49.63 (1.405)
25 (635)	32.24 (0.913)	47.52 (1.346)
24 (610)	30.54 (0.865)	45.36 (1.285)
23 (584)	28.77 (0.815)	43.18 (1.223)
22 (559)	26.96 (0.763)	40.97 (1.160)
21 (533)	25.10 (0.711)	38.72 (1.096)
20 (508)	23.19 (0.657)	36.45 (1.032)
19 (483)	21.25 (0.602)	34.16 (0.967)
18 (457)	19.26 (0.545)	31.84 (0.902)
17 (432)	17.24 (0.488)	29.50 (0.835)
16 (406)	15.19 (0.430)	27.14 (0.769)
15 (381)	13.10 (0.371)	24.76 (0.701)
14 (356)	10.98 (0.311)	22.36 (0.633)
13 (330)	8.83 (0.250)	19.95 (0.565)
12 (305)	6.66 (0.189)	17.52 (0.496)
11 (279)	4.46 (0.126)	15.07 (0.427)

DC-780 Cumulative Storage Volumes Per Chamber (cont.)

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
10 (254)	2.24 (0.064)	12.61 (0.357)
9 (229)	↑ 0	10.14 (0.287)
8 (203)	0	9.01 (0.255)
7 (178)	0	7.89 (0.223)
6 (152)	Stone 0	6.76 (0.191)
5 (127)	Foundation 0	5.63 (0.160)
4 (102)	0	4.51 (0.128)
3 (76)	0	3.38 (0.096)
2 (51)	0	2.25 (0.064)
1 (25)	↓ 0	1.13 (0.032)

Note: Add 1.13 cu. ft. (0.032 m³) of storage for each additional inch (25 mm) of stone foundation.

Storage Volume Per Chamber ft³ (m³)

	Bare Chamber Storage	Chamber and Stone Volume-Stone Foundation Depth inches (millimeters)		
	ft³ (m³)	9 (230)	12 (300)	18 (450)
StormTech DC-780	46.2 (1.3)	78.4 (2.2)	81.8 (2.3)	88.6 (2.5)

Note: Assumes 40% porosity for the stone, the bare chamber volume, 6" (150 mm) stone above, and 6" (150 mm) row spacing.

Amount of Stone Per Chamber

	Stone Foundation Depth		
ENGLISH TONS (YD³)	**9"**	**12"**	**18"**
StormTech DC-780	4.2 (3.0 yd³)	4.7 (3.3 yd³)	5.6 (3.9 yd³)
METRIC KILOGRAMS (M³)	**230 mm**	**300 mm**	**450 mm**
StormTech DC-780	3810 (2.3 m³)	4264 (2.5 m³)	5080 (3.0 m³)

Note: Assumes 6" (150 mm) of stone above, and between chambers.

Volume of Excavation Per Chamber yd³ (m³)

	Stone Foundation Depth		
	9" (230 mm)	**12" (300 mm)**	**18" (450 mm)**
StormTech DC-780	5.9 (4.5)	6.3 (4.8)	6.9 (5.3)

Note: Assumes 6" (150 mm) of separation between chamber rows and 18" (450 mm) of cover. The volume of excavation will vary as the depth of the cover increases.

2.5 STORMTECH CHAMBERS

StormTech chamber systems have unique features to improve site optimization and reduce product waste. The SC-740, SC-310 and DC-780 chambers can be cut at the job site in approximately 6.5" (165 mm) increments to shorten a chamber's length. Designing and constructing chamber rows around site obstacles is easily accomplished by including specific cutting instructions or a well placed "cut to fit" note on the design plans. The last chamber of a row can be cut in any of its corrugation's valleys. An end cap placed into the trimmed corrugation's crest completes the row. The trimmed-off piece of a StormTech chamber may then be used to start the next row. See **Figure 4**.

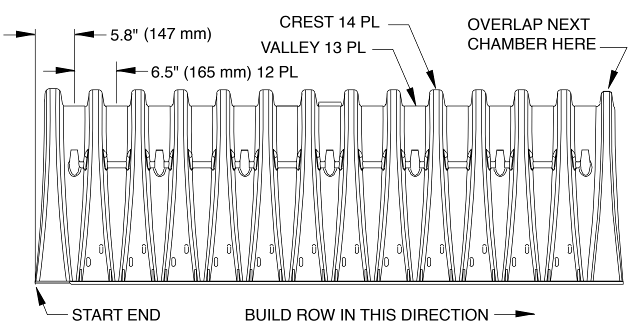
To assist the contractor, StormTech chambers are molded with simple assembly instructions and arrows that indicate the direction in which to build rows. Rows are formed by overlapping the next chamber's "Start End" corrugation with the previously laid chamber's end corrugation. Two people can safely and efficiently form rows of chambers without complicated connectors, special tools or heavy equipment.
Product Specifications: 2.2, 2.4, 2.5, 2.9 and 3.2

2.6 STORMTECH END CAPS

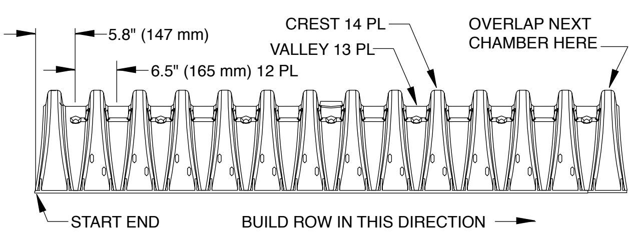
The StormTech end cap has features which make the chamber system simple to design, easy to build and more versatile than other products. StormTech end caps can be easily secured within any corrugation's crest. A molded-in handle makes attaching the end cap a one-person operation. Tools or fasteners are not required.

StormTech end caps are required at each end of a chamber row to prevent stone intrusion (two per row). The SC-740 and DC-780 end caps will accept up to a 24" (600 mm) HDPE inlet pipe. The SC-310 end cap will accept up to a 12" (300 mm) HDPE inlet pipe. See **Figure 5**.
Product Specifications: 3.1, 3.2, 3.3 and 3.4

Figure 4 – Distance Between Corrugations (not to scale)

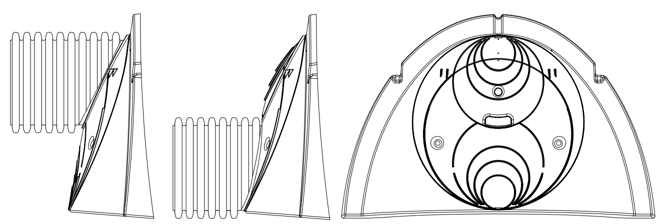


SC-740 chamber



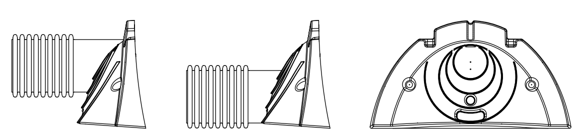
SC-310 chamber

Figure 5 – Chamber End Caps (not to scale)



SC-740/DC-780 CHAMBER FABRICATED END CAP (TOP AND BOTTOM FEED)
PIPES SIZES RANGE FROM 6" (150 mm) TO 24" (600 mm)
(INVERTS VARY WITH PIPE SIZE)

SC-740 / DC-780 end cap



SC-310 CHAMBER FABRICATED END CAP (TOP AND BOTTOM FEED)
PIPES SIZES RANGE FROM 6" (150 mm) TO 12" (300 mm)
(INVERTS VARY WITH PIPE SIZE)

SC-310 end cap

3.0 Structural Capabilities

3.1 STRUCTURAL DESIGN APPROACH

When installed per StormTech's minimum requirements, StormTech products are designed to exceed American Association of State Highway and Transportation Officials (AASHTO) LRFD recommended design factors for Earth loads and Vehicular live loads. AASHTO Vehicular live loads (previously HS-20) consist of two heavy axle configurations, that of a single 32 (142 kN) kip axle and that of tandem 25 (111 kN) kip axles. Factors for impact and multiple presences of vehicles ensure a conservative design where structural adequacy is assumed for a wide range of street legal vehicle weights and axle configurations.

Computer models of the chambers under shallow and deep conditions were developed. Utilizing design forces from computer models, chamber sections were evaluated using AASHTO procedures that consider thrust and moment, and check for local buckling capacity. The procedures also considered the time-dependent strength and stiffness properties of polypropylene and polyethylene. These procedures were developed in a research study conducted by the National Cooperative Highway Research Program (NCHRP) for AASHTO, and published as NCHRP Report 438 Recommended LRFD Specifications for Plastic Pipe and Culverts. *Product Specifications: 2.12.*

StormTech does not recommend installing StormTech products underneath buildings or parking garages. When specifying the StormTech products in close proximity to buildings, it is important to ensure that the StormTech products are not receiving any loads from these structures that may jeopardize the long term performance of the chambers.

3.2 FULL SCALE TESTING

After developing the StormTech chamber designs, the chambers were subjected to rigorous full-scale testing. The test programs verified the predicted safety factors of the designs by subjecting the chambers to more severe load conditions than anticipated during service life. Capacity under live loads and deep fill was investigated by conducting tests with a range of cover depths. Monitoring of long term deep fill installations has been done to validate the long term performance of the StormTech products.

3.3 INDEPENDENT EXPERT ANALYSIS

StormTech worked closely with the consulting firm Simpson Gumpertz & Heger Inc. (SGH) to develop and evaluate the SC-740, SC-310 and DC-780 chamber designs. SGH has world-renowned expertise in the design of buried drainage structures. The firm was the principal investigator for the NCHRP research program that developed the structural analysis and design methods adopted by AASHTO for thermoplastic culverts. SGH conducted design calculations and computer simulations of chamber performance under various installation and live load conditions. They worked with StormTech to design the full-scale test programs to verify the structural capacity of the chambers. SGH also observed all full-scale tests and inspected the chambers after completion of the tests. SGH continues to be StormTech's structural consultant.

3.4 INJECTION MOLDING

To comply with both the structural and design requirements of AASHTO's LRFD specifications and ASTM F 2787 as well as the product requirements of ASTM F 2418 or ASTM F2922, StormTech uses proprietary injection molding equipment to manufacture the chambers and end caps.

In addition to meeting structural goals, injection molding allows StormTech to design added features and advantages into StormTech's parts including:

- Precise control of wall thickness throughout parts
- Precise fit of joints and end caps
- Molded-in inspection port fitting
- Molded-in handles on end caps
- Molded-in pipe guides with blade starter slots
- Repeatability for Quality Control (See Section 3.6)

Product Specifications: 2.1, 3.1 and 3.3

3.5 POLYPROPYLENE AND POLYETHYLENE RESIN

StormTech chambers are injection molded from polypropylene and polyethylene. Polypropylene and polyethylene chambers are inherently resistant to chemicals typically found in stormwater run-off. StormTech chambers maintain a greater portion of their structural stiffness through higher installation and service temperatures.

StormTech polypropylene and polyethylene are virgin materials specially designed to achieve a high 75-year creep modulus that is necessary to provide a sound long-term structural design. Since the modulus remains high well beyond the 75-year value, StormTech chambers can exhibit a service life in excess of 75 years.

3.6 QUALITY CONTROL

StormTech chambers are manufactured under tight quality control programs. Materials are routinely tested in an environmentally controlled lab that is verified every six months via the external ASTM Proficiency Testing Program. The chamber material properties are measured and controlled with procedures following ISO 9001:2000 requirements.

Statistical Process Control (SPC) techniques are applied during manufacturing. Established upper and lower control limits are maintained on key manufacturing parameters to maintain consistent product.
Product Specifications: 2.13 and 3.6

4.0 Foundation for Chambers

4.1 FOUNDATION REQUIREMENTS

StormTech chamber systems and embedment stone may be installed in various native soil types. The subgrade bearing capacity and chamber cover height determine the required depth of clean, crushed, angular stone for the chamber foundation. The chamber foundation is the clean, crushed, angular stone placed between the subgrade soils and the feet of the chamber.

As cover height increases (top of chamber to top of finished grade) the chambers foundation requirements increase. Foundation strength is the product of the subgrade soils bearing capacity and the depth of clean, crushed, angular stone below the chamber foot. **Table 1** for the SC-740 and SC-310 and **Table 2** for the DC-780 specify the required minimum foundation depth for varying cover heights and subgrade bearing capacities.

4.2 WEAKER SOILS

For sub-grade soils with allowable bearing capacity less than 2000 pounds per square foot [(2.0 ksf) (96 kPa)], a geotechnical engineer should evaluate the specific conditions. These soils are often highly variable, may contain organic materials and could be more sensitive to moisture. A geotechnical engineer's recommendations may include increasing the stone foundation, improving the bearing capacity of the sub-grade soils through compaction, replacement, or other remedial measures including the use of geogrids. The use of a thermoplastic liner may also be considered for systems installed in subgrade soils that are highly affected by moisture. The project engineer is responsible for ensuring overall site settlement is within acceptable limits. A geotechnical engineer should always review installation of StormTech chambers on organic soils.

4.3 CHAMBER SPACING OPTION

StormTech always requires a minimum of 6" (150 mm) clear spacing between the feet of chambers rows for the SC-310, SC-740 and DC-780 chambers. However, increasing the spacing between chamber rows may allow the application of StormTech chambers with either less foundation stone or with weaker subgrade soils. This may be a good option where a vertical restriction on site prevents the use of a deeper foundation. Contact StormTech's Technical Service Department for more information on this option. In all cases, StormTech recommends consulting a geotechnical engineer for subgrade soils with a bearing capacity less than 2.0 ksf (96 kPa).

Table 1 – SC-310 and SC-740 Minimum Required Foundation Depth in inches (millimeters)

Cover Ht. ft. (m)	Minimum Required Bearing Resistance for Service Loads ksf (kPa)																					
	4.1 (196)	4.0 (192)	3.9 (187)	3.8 (182)	3.7 (177)	3.6 (172)	3.5 (168)	3.4 (163)	3.3 (158)	3.2 (153)	3.1 (148)	3.0 (144)	2.9 (139)	2.8 (134)	2.7 (129)	2.6 (124)	2.5 (120)	2.4 (115)	2.3 (110)	2.2 (105)	2.1 (101)	2.0 (96)
1.5 (0.46)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)
2 (0.61)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)
2.5 (0.76)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	18 (457)
3 (0.91)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)
3.5 (1.07)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	18 (457)	18 (457)	21 (533)
4 (1.22)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	18 (457)	18 (457)	21 (533)
4.5 (1.37)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	18 (457)	18 (457)	21 (533)
5 (1.52)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)	21 (533)
5.5 (1.68)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)	21 (533)
6 (1.83)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)	21 (533)	21 (533)
6.5 (1.98)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)	18 (457)	21 (533)	24 (610)
7 (2.13)	6 (152)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)	21 (533)	21 (533)	24 (610)
7.5 (2.29)	6 (152)	6 (152)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)	21 (533)	21 (533)	24 (610)	27 (686)
8 (2.44)	6 (152)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)	21 (533)	21 (533)	24 (610)	24 (610)	27 (686)

NOTE: The design engineer is solely responsible for assessing the bearing resistance (allowable bearing capacity) of the subgrade soils and determining the depth of foundation stone. Subgrade bearing resistance should be assessed with consideration for the range of soil moisture conditions expected under a stormwater system.

4.0 Foundation for Chambers/5.0 Cumulative Storage Volumes

Table 2 – DC-780 Minimum Required Foundation Depth in inches (millimeters)

Cover Ht. ft. (m)	Minimum Required Bearing Resistance for Service Loads ksf (kPa) 4.1 (196)	4.0 (192)	3.9 (187)	3.8 (182)	3.7 (177)	3.6 (172)	3.5 (168)	3.4 (163)	3.3 (158)	3.2 (153)	3.1 (148)	3.0 (144)	2.9 (139)	2.8 (134)	2.7 (129)	2.6 (124)	2.5 (120)	2.4 (115)	2.3 (110)	2.2 (105)	2.1 (101)	2.0 (96)
8.5 (2.59)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)	18 (457)	21 (533)	24 (610)	24 (610)	27 (686)	30 (762)
9.0 (2.74)	9 (229)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)	18 (457)	21 (533)	21 (533)	24 (610)	24 (610)	27 (686)	30 (762)
9.5 (2.90)	9 (229)	9 (229)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)	18 (457)	21 (533)	21 (533)	24 (610)	24 (610)	27 (686)	30 (762)	33 (838)
10.0 (3.05)	9 (229)	9 (229)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)	18 (457)	21 (533)	21 (533)	24 (610)	24 (610)	27 (686)	30 (762)	33 (838)	36 (915)
10.5 (3.20)	9 (229)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)	18 (457)	21 (533)	21 (533)	24 (610)	24 (610)	27 (686)	30 (762)	30 (762)	33 (838)	36 (915)
11.0 (3.35)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)	18 (457)	21 (533)	21 (533)	24 (610)	24 (610)	27 (686)	27 (686)	30 (762)	33 (838)	36 (915)	39 (991)
11.5 (3.50)	12 (305)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)	18 (457)	21 (533)	21 (533)	24 (610)	24 (610)	27 (686)	27 (686)	30 (762)	33 (838)	36 (915)	39 (991)	42 (1067)
12.0 (3.66)	12 (305)	12 (305)	12 (305)	15 (381)	15 (381)	15 (381)	15 (381)	18 (457)	18 (457)	18 (457)	21 (533)	21 (533)	21 (533)	24 (610)	24 (610)	27 (686)	30 (762)	30 (762)	33 (838)	36 (915)	39 (991)	42 (1067)

NOTE: The design engineer is solely responsible for assessing the bearing resistance (allowable bearing capacity) of the subgrade soils and determining the depth of foundation stone. Subgrade bearing resistance should be assessed with consideration for the range of soil moisture conditions expected under a stormwater system.

Tables 3, 4 and **5** provide cumulative storage volumes for the SC-310, SC-740 and DC-780 chamber systems. This information may be used to calculate a detention/retention system's stage storage volume. A spreadsheet is available at www.stormtech.com in which the number of chambers can be input for quick cumulative storage calculations. *Product Specifications: 1.1, 2.2, 2.3, 2.4, and 2.6*

Table 3 - SC-310 Cumulative Storage Volumes Per Chamber

Assumes 40% Stone Porosity. Calculations are Based Upon a 6" (150 mm) Stone Base Under the Chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft^3 (m^3)	Total System Cumulative Storage ft^3 (m^3)
28 (711)	↑ 14.70 (0.416)	31.00 (0.878)
27 (686)	14.70 (0.416)	30.21 (0.855)
26 (680)	Stone 14.70 (0.416)	29.42 (0.833)
25 (610)	Cover 14.70 (0.416)	28.63 (0.811)
24 (609)	14.70 (0.416)	27.84 (0.788)
23 (584)	↓ 14.70 (0.416)	27.05 (0.766)
22 (559)	14.70 (0.416)	26.26 (0.748)
21 (533)	14.64 (0.415)	25.43 (0.720)
20 (508)	14.49 (0.410)	24.54 (0.695)
19 (483)	14.22 (0.403)	23.58 (0.668)
18 (457)	13.68 (0.387)	22.47 (0.636)
17 (432)	12.99 (0.368)	21.25 (0.602)

Table 3 - SC-310 Cumulative Storage Volumes (cont.)

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft^3 (m^3)	Total System Cumulative Storage ft^3 (m^3)
16 (406)	12.17 (0.345)	19.97 (0.566)
15 (381)	11.25 (0.319)	18.62 (0.528)
14 (356)	10.23 (0.290)	17.22 (0.488)
13 (330)	9.15 (0.260)	15.78 (0.447)
12 (305)	7.99 (0.227)	14.29 (0.425)
11 (279)	6.78 (0.192)	12.77 (0.362)
10 (254)	5.51 (0.156)	11.22 (0.318)
9 (229)	4.19 (0.119)	9.64 (0.278)
8 (203)	2.83 (0.081)	8.03 (0.227)
7 (178)	1.43 (0.041)	6.40 (0.181)
6 (152)	↑ 0	4.74 (0.134)
5 (127)	0	3.95 (0.112)
4 (102)	Stone 0	3.16 (0.090)
3 (76)	Foundation 0	2.37 (0.067)
2 (51)	0	1.58 (0.046)
1 (25)	↓ 0	0.79 (0.022)

Note: Add 0.79 ft^3 (0.022 m^3) of storage for each additional inch (25 mm) of stone foundation.

5.0 Cumulative Storage Volumes

TABLE 4 – SC-740 Cumulative Storage Volumes Per Chamber
Assumes 40% Stone Porosity. Calculations are Based Upon a 6" (150 mm) Stone Base Under the Chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage Ft^3 (m^3)	Total System Cumulative Storage Ft^3 (m^3)
42 (1067)	45.90 (1.300)	74.90 (2.121)
41 (1041)	45.90 (1.300)	73.77 (2.089)
40 (1016)	Stone 45.90 (1.300)	72.64 (2.057)
39 (991)	Cover 45.90 (1.300)	71.52 (2.025)
38 (965)	45.90 (1.300)	70.39 (1.993)
37 (948)	45.90 (1.300)	69.26 (1.961)
36 (914)	45.90 (1.300)	68.14 (1.929)
35 (889)	45.85 (1.298)	66.98 (1.897)
34 (864)	45.69 (1.294)	65.75 (1.862)
33 (838)	45.41 (1.286)	64.46 (1.825)
32 (813)	44.81 (1.269)	62.97 (1.783)
31 (787)	44.01 (1.246)	61.36 (1.737)
30 (762)	43.06 (1.219)	59.66 (1.689)
29 (737)	41.98 (1.189)	57.89 (1.639)
28 (711)	40.80 (1.155)	56.05 (1.587)
27 (686)	39.54 (1.120)	54.17 (1.534)
26 (660)	38.18 (1.081)	52.23 (1.479)
25 (635)	36.74 (1.040)	50.23 (1.422)
24 (610)	35.22 (0.977)	48.19 (1.365)
23 (584)	33.64 (0.953)	46.11 (1.306)
22 (559)	31.99 (0.906)	44.00 (1.246)
21 (533)	30.29 (0.858)	41.85 (1.185)
20 (508)	28.54 (0.808)	39.67 (1.123)
19 (483)	26.74 (0.757)	37.47 (1.061)
18 (457)	24.89 (0.705)	35.23 (0.997)
17 (432)	23.00 (0.651)	32.96 (0.939)
16 (406)	21.06 (0.596)	30.68 (0.869)
15 (381)	19.09 (0.541)	28.36 (0.803)
14 (356)	17.08 (0.484)	26.03 (0.737)
13 (330)	15.04 (0.426)	23.68 (0.670)
12 (305)	12.97 (0.367)	21.31 (0.608)
11 (279)	10.87 (0.309)	18.92 (0.535)
10 (254)	8.74 (0.247)	16.51 (0.468)
9 (229)	6.58 (0.186)	14.09 (0.399)
8 (203)	4.41 (0.125)	11.66 (0.330)
7 (178)	2.21 (0.063)	9.21 (0.264)
6 (152)	0	6.76 (0.191)
5 (127)	0	5.63 (0.160)
4 (102)	Stone 0	4.51 (0.125)
3 (76)	Foundation 0	3.38 (0.095)
2 (51)	0	2.25 (0.064)
1 (25)	0	1.13 (0.032)

Note: Add 1.13 ft^3 (0.032 m^3) of storage for each additional inch (25 mm) of stone foundation.

Table 5 - DC-780 Cumulative Storage Volumes Per Chamber
Assumes 40% Stone Porosity. Calculations are Based Upon a 9" (230 mm) Stone Base Under the Chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage Ft^3 (m^3)	Total System Cumulative Storage Ft^3 (m^3)
45 (1143)	46.27 (1.310)	78.47 (2.222)
44 (1118)	46.27 (1.310)	77.34 (2.190)
43 (1092)	Stone 46.27 (1.310)	76.21 (2.158)
42 (1067)	Cover 46.27 (1.310)	75.09 (2.126)
41 (1041)	46.27 (1.310)	73.96 (2.094)
40 (1016)	46.27 (1.310)	72.83 (2.062)
39 (991)	46.27 (1.310)	71.71 (2.030)
38 (965)	46.21 (1.309)	70.54 (1.998)
37 (940)	46.04 (1.304)	69.32 (1.963)
36 (914)	45.76 (1.296)	68.02 (1.926)
35 (889)	45.15 (1.278)	66.53 (1.884)
34 (864)	44.34 (1.255)	64.91 (1.838)
33 (838)	43.38 (1.228)	63.21 (1.790)
32 (813)	42.29 (1.198)	61.43 (1.740)
31 (787)	41.11 (1.164)	59.59 (1.688)
30 (762)	39.83 (1.128)	57.70 (1.634)
29 (737)	38.47 (1.089)	55.76 (1.579)
28 (711)	37.01 (1.048)	53.76 (1.522)
27 (686)	35.49 (1.005)	51.72 (1.464)
26 (660)	33.90 (0.960)	49.63 (1.405)
25 (635)	32.24 (0.913)	47.52 (1.346)
24 (610)	30.54 (0.865)	45.36 (1.285)
23 (584)	28.77 (0.815)	43.18 (1.223)
22 (559)	26.96 (0.763)	40.97 (1.160)
21 (533)	25.10 (0.711)	38.72 (1.096)
20 (508)	23.19 (0.657)	36.45 (1.032)
19 (483)	21.25 (0.602)	34.16 (0.967)
18 (457)	19.26 (0.545)	31.84 (0.902)
17 (432)	17.24 (0.488)	29.50 (0.835)
16 (406)	15.19 (0.430)	27.14 (0.769)
15 (381)	13.10 (0.371)	24.76 (0.701)
14 (356)	10.98 (0.311)	22.36 (0.633)
13 (330)	8.83 (0.250)	19.95 (0.565)
12 (305)	6.66 (0.189)	17.52 (0.496)
11 (279)	4.46 (0.126)	15.07 (0.427)
10 (254)	2.24 (0.064)	12.61 (0.357)
9 (229)	0	10.14 (0.287)
8 (203)	0	9.01 (0.255)
7 (178)	Stone 0	7.89 (0.223)
6 (152)	Foundation 0	6.76 (0.191)
5 (127)	0	5.63 (0.160)
4 (102)	0	4.51 (0.128)
3 (76)	0	3.38 (0.096)
2 (51)	0	2.25 (0.064)
1 (25)	0	1.13 (0.032)

Note: Add 1.13 cu. ft. (0.032 m^3) of storage for each additional inch (25 mm) of stone foundation.

6.0 Required Materials/Row Separation

StormTech®

6.1 CHAMBER ROW SEPARATION

StormTech SC-740, SC-310 and DC-780 chambers must be specified with a minimum 6" (150 mm) space between the feet of adjacent parallel chamber rows. Increasing the space between rows is acceptable. This will increase the storage volume due to additional stone voids.

6.2 STONE SURROUNDING CHAMBERS

Refer to **Table 6** for acceptable stone materials. StormTech requires clean, crushed, angular stone below, between and above chambers as shown in **Figure 6**. Acceptable gradations are listed in **Table 6.** Subrounded and rounded stone are not acceptable.

6.3 GEOTEXTILE SEPARATION REQUIREMENT

A non-woven geotextile that meets AASHTO M288 Class 2 Separation requirements must be applied as a separation layer to prevent soil intrusion into the clean, crushed, angular stone as shown in **Figure 6**. The geotextile is required between the clean, crushed, angular stone and the subgrade soils, the excavation's sidewalls and the fill materials. The geotextile should completely envelope the clean, crushed, angular stone. Overlap adjacent geotextile rolls per AASHTO M288 separation guidelines. Contact StormTech for a list of acceptable geotextiles.

6.4 FILL ABOVE CHAMBERS

Refer to **Table 6** and **Figure 6** for acceptable fill material above the 6" (150 mm) of clean, crushed, angular stone. Minimum and maximum fill requirements for the SC-740, SC-310 and DC-780 chambers are shown in **Figure 6** below. StormTech requires a minimum of 24" (600 mm) of fill in non-paved installations where rutting from vehicles may occur. **Table 6** provides details on soil class and compaction requirements for suitable fill materials.

Table 6 – Acceptable Fill Materials

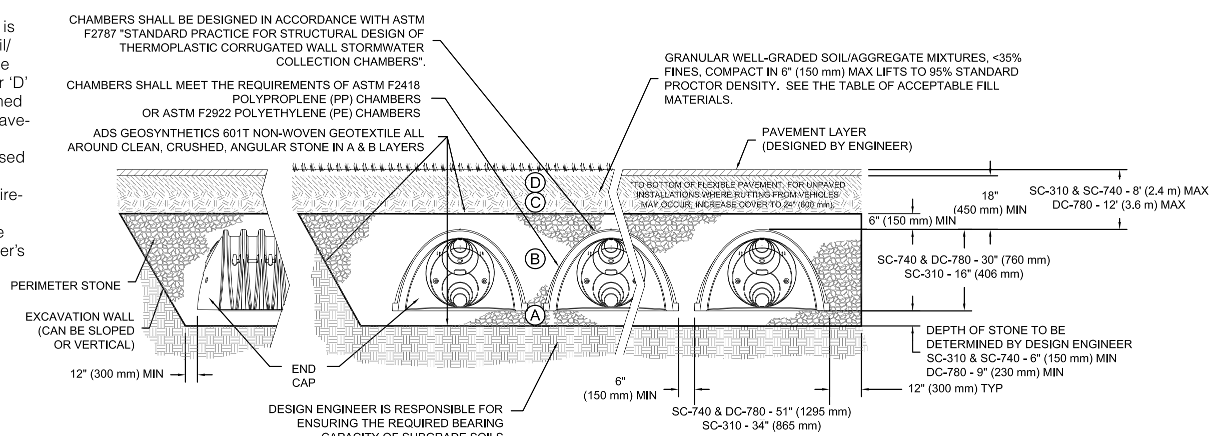
MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. [2 3]

PLEASE NOTE:

1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.

Figure 6 – Fill Material Locations

Once layer 'C' is placed any soil/material can be placed in layer 'D' up to the finished grade. Most pavement subbase soils can be used to replace the materials requirements of layer 'C' or 'D' at the design engineer's discretion.



7.0 Inletting the Chambers

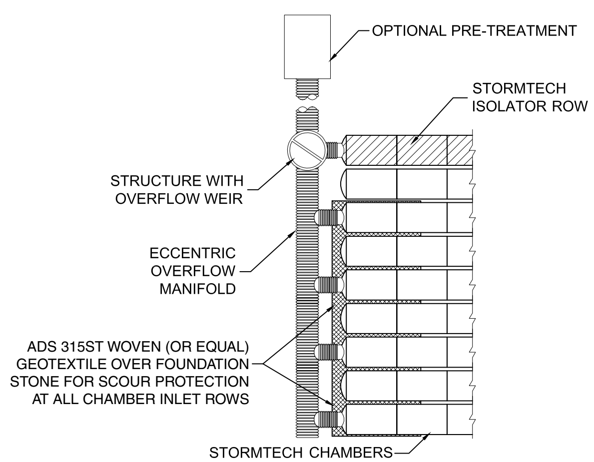
The design flexibility of a StormTech chamber system includes many inletting possibilities. Contact StormTech's Technical Service Department for guidance on designing an inlet system to meet specific site goals.

7.1 TREATMENT TRAIN

A properly designed inlet system can ensure good water quality, easy inspection and maintenance, and a long system service life. StormTech recommends a treatment train approach for inletting an underground stormwater management system under a typical commercial parking area. *Treatment train* is an industry term for a multi-tiered water quality network. As shown in **Figure 7**, a StormTech recommended inlet system can inexpensively have tiers of treatment upstream of the StormTech chambers:

Tier 1 – Pre-treatment (BMP)
Tier 2 - StormTech Isolator® Row
Tier 3 - Enhanced Treatment (BMP)

Figure 7 – Typical StormTech Treatment Train Inlet System



7.2 PRE-TREATMENT (BMP) – TREATMENT TIER 1

In some areas pre-treatment of the stormwater is required prior to entry into a stormwater system. By treating the stormwater prior to entry into the system, the service life of the system can be extended, pollutants such as hydrocarbons may be captured, and local regulations met. Pre-treatment options are often described as a Best Management Practice or simply a BMP.

Pre-treatment devices differ greatly in complexity, design and effectiveness. Depending on a site's characteristics and treatment goals, the simple, least expensive pre-treatment solutions can sometimes be just as effective as the complex systems. Options include a simple deep sumped manhole with a 90° bend on its outlet, baffle boxes, swirl concentrators, and devices that combine these processes. Some of the most effective pre-treatment options combine engineered site grading with vegetation such as bio-swales or grassy strips.

The type of pretreatment device specified as the first level of treatment up-stream of a StormTech chamber system can vary greatly throughout the country and from site-to-site. It is the responsibility of the design engineer to understand the water quality requirements and design a stormwater treatment system that will satisfy local regulators and follow applicable laws. A design engineer should apply their understanding of local weather conditions, site topography, local maintenance requirements, expected service life, etc…to select an appropriate stormwater pre-treatment system.

7.3 STORMTECH ISOLATOR ROW – TREATMENT TIER 2

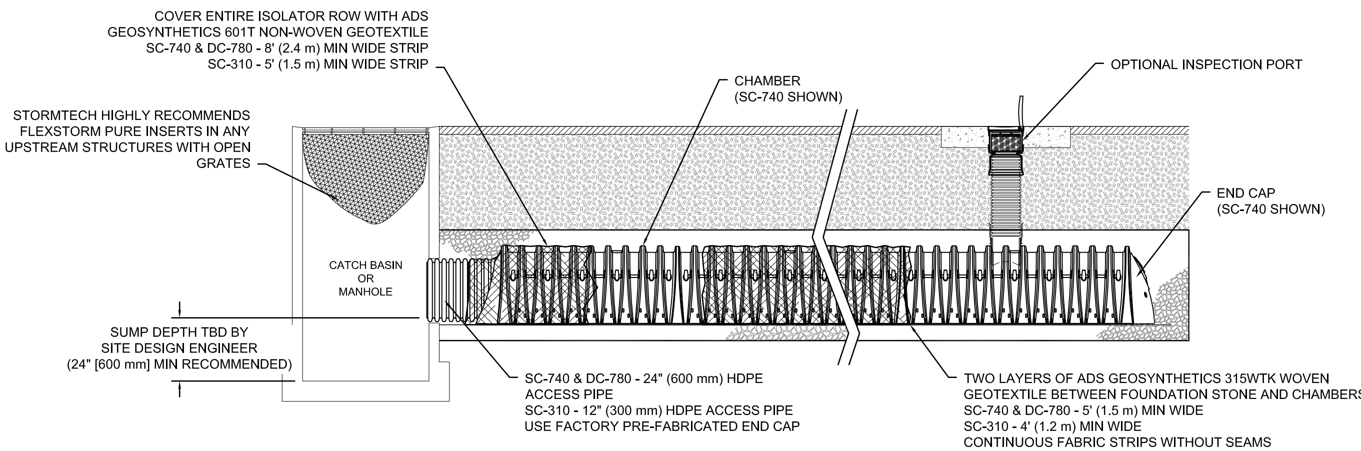
StormTech has a patented technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance. The StormTech Isolator Row is a row of standard StormTech chambers surrounded with appropriate filter fabrics and connected to a manhole for easy access. This application basically creates a filter/detention basin that allows water to egress through the surrounding filter fabric while sediment is trapped within. It may be best to think of the Isolator Row as a first-flush treatment device. *First-Flush* is a term typically used to describe the first ½" to 1" (13-25 mm) of rainfall or runoff on a site. The majority of stormwater pollutants are carried in the sediments of the first-flush, therefore the Isolator Row is an effective component of a treatment train.

The StormTech Isolator Row should be designed with a manhole with an overflow weir at its upstream end. The diversion manhole is multi-purposed. It can provide access to the Isolator Row for both inspection and maintenance and acts as a diversion structure. The manhole is connected to the Isolator Row with a short length of 12" (300 mm) pipe for the SC-310 chamber and 24" (600 mm) pipe for the SC-740 and DC-780 chambers. These pipes are connected to the Isolator Row with a 12" (300 mm) fabricated end cap for the SC-310 chamber and a 24" (600 mm) fabricated end cap for the SC-740 and DC-780 chambers. The overflow weir typically has its crest set between the top of the chamber and its midpoint. This allows stormwater in excess of the Isolator Row's storage/conveyance capacity to bypass into the chamber system through the downstream manifold system.

Specifying and installing proper geotextiles is essential for efficient operation and to prevent damage to the system during the JetVac maintenance process. In a typical configuration, two strips of woven geotextile that meet AASHTO M288 Class 1 requirements are required between the chambers and the stone foundation. This strong filter fabric traps sediments and protects the stone base during maintenance. A strip of non-woven

7.0 Inletting the Chambers

Figure 8 – StormTech Isolator Row Detail



Note: Non-woven geotextile over DC-780 Isolator Row chambers is not required.

AASHTO M288 Class 2 geotextile is draped over the Isolator chamber row. This 6-8 oz. (217-278 g/m^2) non-woven filter fabric prevents sediments from migrating out of the chamber perforations while allowing modest amounts of water to flow out of the Isolator Row. **Figure 8** is a detail of the Isolator Row that shows proper application of the geotextiles. Contact StormTech for a table of acceptable geotextiles.

Inspection is easily accomplished through the upstream manhole or optional inspection ports. Maintenance of an Isolator Row is fast and easy using the JetVac process through the upstream manhole. Section 12.0 explains the inspection and maintenance process in more detail.

Isolator Rows can be sized to accommodate either a water quality volume or a water quality flow rate requirement. The use of filter fabric around the Isolator Row chambers allows stormwater to egress out of the row during and between storm events. The rate of egression for design is dependent upon the chamber model and sediment accumulation on the geotextile. Contact StormTech's Technical Services Department for more information on Isolator Row sizing.

7.4 ENHANCED TREATMENT (BMP) – TREATMENT TIER 3

As regulations have become more stringent, requiring higher levels of containment removal, water quality systems may be required to treat higher flow rates, greater volumes or to provide a higher level of filtration or other more sophisticated treatment process. StormTech systems can easily be configured with enhanced treatment techniques located either upstream or down stream of the retention or detention chamber system. Located upstream of an infiltration bed, between the pretreatment device and the Isolator Row, enhanced treatment provides a high level of contaminant removal which protects groundwater or better preserves the infiltration surface. Located downstream of detention, enhanced treatment provides a higher level of contaminant removal prior to discharge to a receiving body.

Enhanced treatment BMPs are normally applied where specific regulations and specific water quality product approvals are in place. StormTech works closely with providers of enhanced treatment technologies to meet local requirements.

7.5 TREATMENT TRAIN CONCLUSION

The treatment train is a highly effective water-quality approach that may not add significant cost to a StormTech system being installed under commercial parking areas. The StormTech Isolator Row adds a significant level of treatment, easy inspection and maintenance, while maintaining storage volume credit for the cost of a modest amount of geotextile. Finally where higher levels of treatment are required, StormTech can integrate other technologies into the treatment train to provide the most cost effective treatment approach. This treatment train concept provides three levels of treatment, inspection and maintenance upstream and downsstream of the StormTech detention/retention bed.

7.0 Inletting the Chambers

7.6 OTHER INLET OPTIONS

While the three-tiered treatment train approach is the recommended method of inletting StormTech chambers for typical under-commercial parking applications, there are other effective inlet methods that may be considered. For instance, Isolator Rows, while adding an inexpensive level of confidence, are not always necessary. A header system with fewer inlets can be designed to further minimize the cost of a StormTech system. There may be applications where stormwater pre-treatment may not be necessary at all and the system can be inlet directly from the source. Contact StormTech's Technical Service Department to discuss inlet options.

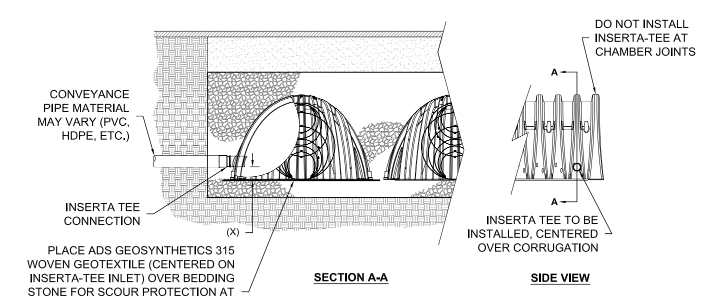
7.7 LATERAL FLOW RATES

The embedment stone surrounding the StormTech chambers allows the rapid conveyance of stormwater between chamber rows. Stormwater will rise and fall evenly within a bed of chambers. A single StormTech SC-740 chamber is able to release or accept stormwater at a rate of at least 0.5 cfs (14.2 l/s) through the surrounding stone.

7.8 INLETTING PERPENDICULAR TO A ROW OF CHAMBERS WITH INSERTA TEE

There is an easy, inexpensive method to perpendicularly inlet a row of chambers. Simply connect the inlet directly to the chamber with an Inserta Tee. **Figure 9** shows a typical detail along with the standard sizes offered for each chamber model.

Figure 9 – Inserta Tee Detail



CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

NOTE:
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.

7.9 MAXIMUM INLET PIPE VELOCITIES TO PREVENT SCOURING OF THE STONE FOUNDATION

The primary function of the inlet manifold is to convey and distribute flows to a sufficient number of rows in the chamber bed such that there is ample conveyance capacity to pass the peak flows without creating an unacceptable backwater condition in upstream piping or scour the foundation stone under the chambers.

Manifolds are connected to the end caps either at the top or bottom of the end cap. High inlet flow rates from either connection location produce a shear scour potential of the foundation stone. Inlet flows from top inlets also produce impingement scour potential. Scour potential is reduced when standing water is present over the foundation stone. However, for safe design across the wide range of applications, StormTech assumes minimal standing water at the time the design flow occurs.

To minimize scour potential, StormTech recommends the installation of woven scour protection fabric at each inlet row. This enables a protected transition zone from the concentrated flow coming out of the inlet pipe to a uniform flow across the entire width of the chamber for both top and bottom connections. Allowable flow rates for design are dependent upon: the elevation of inlet pipe, foundation stone size and scour protection. An appropriate scour protection geotextile is installed from the end cap to at least 10.5' (3.2 m) for the SC-310, SC-740 and DC 780 chambers for both top and bottom feeding inlet pipes.

See StormTech's Tech Sheet #7 for guidance on manifold sizing. ADS's Technical Services department can also assist with sizing inlet manifolds for the StormTech chamber systems.

Table 7A – Standard distances from base of chamber to invert of inlet and outlet manifolds on StormTech end caps.

SC-310 ENDCAPS				
	PIPE DIA.	**INV. (IN)**	**INV. (FT)**	**INV. (MM)**
TOP	6" (150 mm)	5.8"	0.48	146
	8" (200 mm)	3.5"	0.29	88
	10" (250 mm)	1.4"	0.12	37
BOTTOM	6" (150 mm)	0.5"	0.04	12
	8" (200 mm)	0.6"	0.05	15
	10" (250 mm)	0.7"	0.06	18
	12" (300 mm)	0.9"	0.08	24

SC-740 / DC-780 ENDCAPS				
	PIPE DIA.	**INV. (IN)**	**INV. (FT)**	**INV. (MM)**
TOP	6" (150 mm)	18.5"	1.54	469
	8" (200 mm)	16.5"	1.38	421
	10" (250 mm)	14.5"	1.21	369
	12" (300 mm)	12.5"	1.04	317
	15" (375 mm)	9"	0.75	229
	18" (450 mm)	5"	0.42	128
BOTTOM	6" (150 mm)	0.5"	0.04	12
	8" (200 mm)	0.6"	0.05	15
	10" (250 mm)	0.7"	0.06	18
	12" (300 mm)	1.2"	0.10	30
	15" (375 mm)	1.3"	0.11	34
	18" (450 mm)	1.6"	0.13	40
	24" (600 mm)	0.1"	0.01	3

See StormTech's Tech Sheet #7 for manifold sizing guidance

8.0 OUTLETS FOR STORMTECH CHAMBER SYSTEMS

The majority of StormTech installations are detention systems and have some type of outlet structure. An outlet manifold is generally designed to ensure that peak flows can be conveyed to the outlet structure.

To drain the system completely, an underdrain system is located at or below the bottom of the foundation stone. Some beds may be designed with a pitched base to ensure complete drainage of the system. A grade of ½% is usually satisfactory.

An outlet pipe may be located at a higher invert within a bed. This allows a designed volume of water to infiltrate while excess volumes are outlet as necessary. This is an excellent method of recharging groundwater, replicating a site's pre-construction hydraulics.

Depending on the bed layout and inverts, outlet pipes should be placed in the embedment stone along the bed's perimeter as shown in **Figures 10** and **11**. Solid outlet pipes should also be used to penetrate the StormTech end caps at the designed outlet invert as shown in **Figure 12**. An Isolator Row should not be directly penetrated with an outlet pipe. For systems requiring higher outlet flow rates, a combination of connections may be utilized as shown in **Figure 13**.

In detention and retention applications the discharge of water from the stormwater management system is determined based on the hydrology of the area and the hydraulic design of the system. It is the design engineer's responsibility to design an outlet system that meets their hydraulic objectives while following local laws and regulations.

Table 7B – Maximum outlet flow rate capacities from StormTech manifolds.

OUTLET FLOW		
PIPE DIA.	**FLOW (CFS)**	**FLOW (L/S)**
6" (150 mm)	0.4	11.3
8" (200 mm)	0.7	19.8
10" (250 mm)	1.0	28.3
12" (300 mm)	2.0	56.6
15" (375 mm)	2.7	76.5
18" (450 mm)	4.0	113.3
24" (600 mm)	7.0	198.2
30" (750 mm)	11.0	311.5
36" (900 mm)	16.0	453.1
42" (1050 mm)	22.0	623.0
48" (1200 mm)	28.0	792.9

Figure 10 – Underdrain Parallel

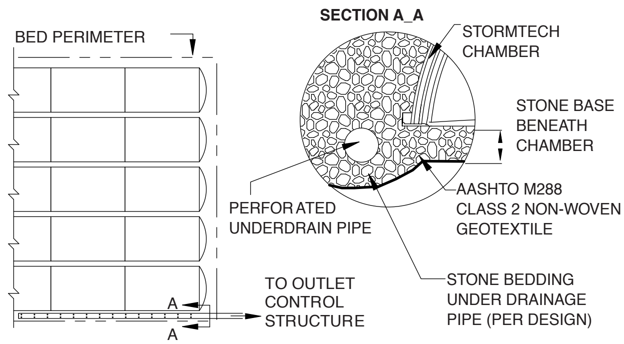


Figure 11 – Underdrain Perpendicular

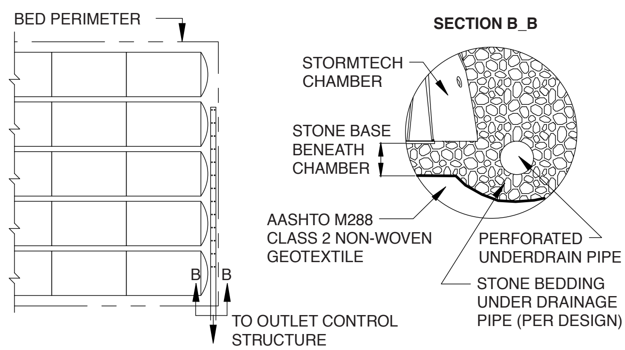


Figure 12 – Outlet Manifold

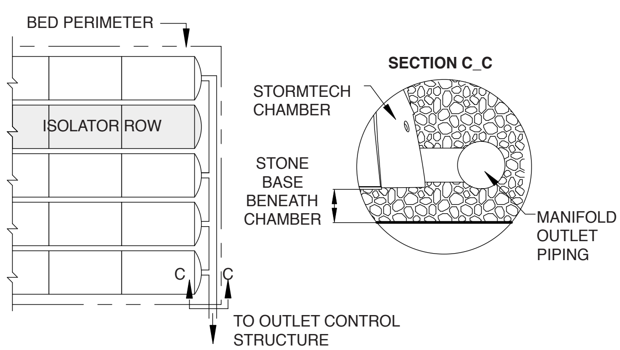
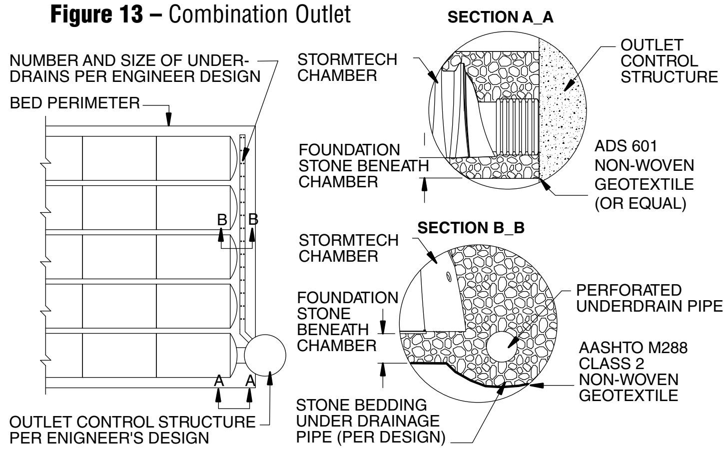


Figure 13 – Combination Outlet



9.1 EROSION CONTROL

Erosion and sediment control measures must be integrated into the plan to protect the stormwater system both during and after construction. These practices may have a direct impact on the system's infiltration performance and longevity. Vegetation, temporary sediment barriers (silt fences, hay bales, fabric-wrapped catch basin grates), and strategic stormwater runoff management may be used to control erosion and sedimentation. StormTech recommends the use of pipe plugs on the inlet pipe until the system is in service.

9.2 SITE IMPROVEMENT TECHNIQUES

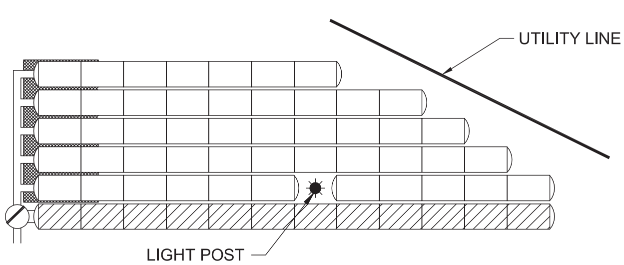
When site conditions are less than optimal, StormTech recognizes many methods for improving a site for construction. Some techniques include the removal and replacement of poor materials, the use of engineered subgrade materials, aggregates, chemical treatment, and mechanical treatments including the use of geosynthetics. StormTech recommends referring to AASHTO M 288 guidelines for the appropriate use of geotextiles.

StormTech also recognizes geogrid as a potential component of an engineered solution to improve site conditions or as a construction tool for the experienced contractor. StormTech chamber systems are compatible with the use of geosynthetics. The use of geosynthetics or any other site improvement method does not eliminate or modify any of StormTech's requirements. **It is the ultimate responsibility of the design engineer to ensure that site conditions are suitable for a StormTech chamber system.**

9.3 CONFORMING TO SITE CONSTRAINTS

StormTech chambers have the unique ability to conform to site constraints such as utility lines, light posts, large trees, etc. Rows of chambers can be ended short or interrupted by placing an end cap at the desired location, leaving the required number of chambers out of the row to get by the obstruction, then starting the row of chambers again with another end cap. See **Figure 14** for an example.

Figure 14 – Ability to Conform to Site Constraints



9.4 LINERS

StormTech chambers offer the distinct advantage and versatility that allow them to be designed as an open bottom detention or retention system. In fact, the vast majority of StormTech installations and designs are open bottom detention systems. Using an open bottom system enables treatment of the storm water through the underlying soils and provides a volume safety factor based on the infiltrative capacity of the underlying soils.

In some applications, however, open bottom detention systems may not be allowed. StormTech's Tech Sheet #2 provides guidance for the design and installation of thermoplastic liners for detention systems using StormTech chambers. The major points of the memo are:

- Infiltration of stormwater is generally a desirable stormwater management practice, often required by regulations. Lined systems should only be specified where unique site conditions preclude significant infiltration.
- Thermoplastic liners provide cost effective and viable means to contain stormwater in StormTech subsurface systems where infiltration is undesirable.
- PVC and LLDPE are the most cost effective, installed membrane materials.
- Enhanced puncture resistance from angular aggregate on the water side and from protrusions on the soil side can be achieved by placing a non-woven geotextile reinforcement on each side of the geomembrane. A sand underlayment in lieu of the geotextile reinforcement on the soil side may be considered when cost effective.
- StormTech does not design, fabricate, sell or install thermoplastic liners. StormTech recommends consulting with liner professionals for final design and installation advice.

Figure 15 – Chamber bed placed around light post.

10.0 System Sizing

*For quick calculations, refer to the Site Calculator on StormTech's website at **www.stormtech.com**.*

10.1 SYSTEM SIZING

The following steps provide the calculations necessary to size a system. If you need assistance determining the number of chambers per row or customizing the bed configuration to fit a specific site, call StormTech's Technical Services Department at **1-888-892-2694.**

1) Determine the amount of storage volume (V_S) required.

It is the design engineer's sole responsibility to determine the storage volume required by local codes.

TABLE 8 – Storage Volume Per Chamber ft³ (m³)

	Bare Chamber Storage	Chamber and Stone Foundation Depth in. (mm)		
	ft³ (m³)	6 (150)	12 (300)	18 (450)
StormTech SC-740	45.9 (1.3)	74.9 (2.1)	81.7 (2.3)	88.4 (2.5)
StormTech SC-310	14.7 (0.4)	31.0 (0.9)	35.7 (1.0)	40.4 (1.1)
	ft³ (m³)	**9 (230)**	**12 (300)**	**18 (450)**
StormTech DC-780	46.2 (1.3)	78.4 (2.2)	81.8 (2.3)	88.6 (2.5)

Note: Assumes 40% porosity for the stone plus the chamber volume.

2) Determine the number of chambers (C) required.

To calculate the number of chambers needed for adequate storage, divide the storage volume (Vs) by the volume of the selected chamber, as follows:
C = Vs / Volume per Chamber

3) Determine the required bed size (S).

To find the size of the bed, multiply the number of chambers needed (C) by either:

StormTech SC-740 / DC-780
bed area per chamber = 33.8 ft² (3.1 m³)

StormTech SC-310
bed area per chamber = 23.7 ft² (2.2 m³)

S = (C x bed area per chamber) +
[1 foot (0.3 m) x bed perimeter in feet (meters)]

NOTE: It is necessary to add one foot (0.3 m) around the perimeter of the bed for end caps and working space.

4) Determine the amount of clean, crushed, angular stone (Vst) required.

TABLE 9 – Amount of Stone Per Chamber

	Stone Foundation Depth		
ENGLISH tons (yd³)	**6"**	**12"**	**18"**
StormTech SC-740	3.8 (2.8)	4.6 (3.3)	5.5 (3.9)
StormTech SC-310	2.1 (1.5)	2.7 (1.9)	3.4 (2.4)
METRIC kg (m³)	**150 mm**	**300 mm**	**450 mm**
StormTech SC-740	3450 (2.1)	4170 (2.5)	4490 (3.0)
StormTech SC-310	1830 (1.1)	2490 (1.5)	2990 (1.8)
ENGLISH tons (yd³)	**9"**	**12"**	**18"**
StormTech DC-780	4.2 (3.0)	4.7 (3.3)	5.6 (3.9)
METRIC kg (m³)	**230 mm**	**300 mm**	**450 mm**
StormTech DC-780	3810 (2.3)	4264 (2.5)	5080 (3.0)

Note: Assumes 6" (150 mm) of stone above, and between chambers.

To calculate the total amount of clean, crushed, angular stone required, multiply the number of chambers (C) by the selected weight of stone from **Table 9.**
NOTE: Clean, crushed, angular stone is also required around the perimeter of the system.

5) Determine the volume of excavation (Ex) required.
6) Determine the area of filter fabric (F) required.

TABLE 10 – Volume of Excavation Per Chamber yd³ (m³)

	Stone Foundation Depth		
	6" (150 mm)	**12" (300 mm)**	**18" (450 mm)**
StormTech SC-740	5.5 (4.2)	6.2 (4.7)	6.8 (5.2)
StormTech SC-310	2.9 (2.2)	3.4 (2.6)	3.8 (2.9)
	9" (230 mm)	**12" (300 mm)**	**18" (457 mm)**
StormTech DC-780	5.9 (4.5)	6.3 (4.8)	6.9 (5.3)

Note: Assumes 6" (150 mm) of separation between chamber rows and 18" (450 mm) of cover. The volume of excavation will vary as the depth of the cover increases.

Each additional foot of cover will add a volume of excavation of 1.3 yds³ (1.0 m³) per SC-740 / DC-780 and 0.9 yds³ (0.7 m³) per SC-310 chamber.

The bottom and sides of the bed and the top of the embedment stone must be covered with ADS 601 (or equal) a non-woven geotextile (filter fabric). The area of the sidewalls must be calculated and a 2 foot (0.6 m) overlap must be included where two pieces of filter fabric are placed side-by-side or end-to-end. Geotextiles typically come in 15 foot (4.6 m) wide rolls.

7) Determine the number of end caps (E_C) required.

Each row of chambers requires two end caps.

E_C = number of rows x 2

11.0 Detail Drawings

Figure 16 – Inspection Port Detail

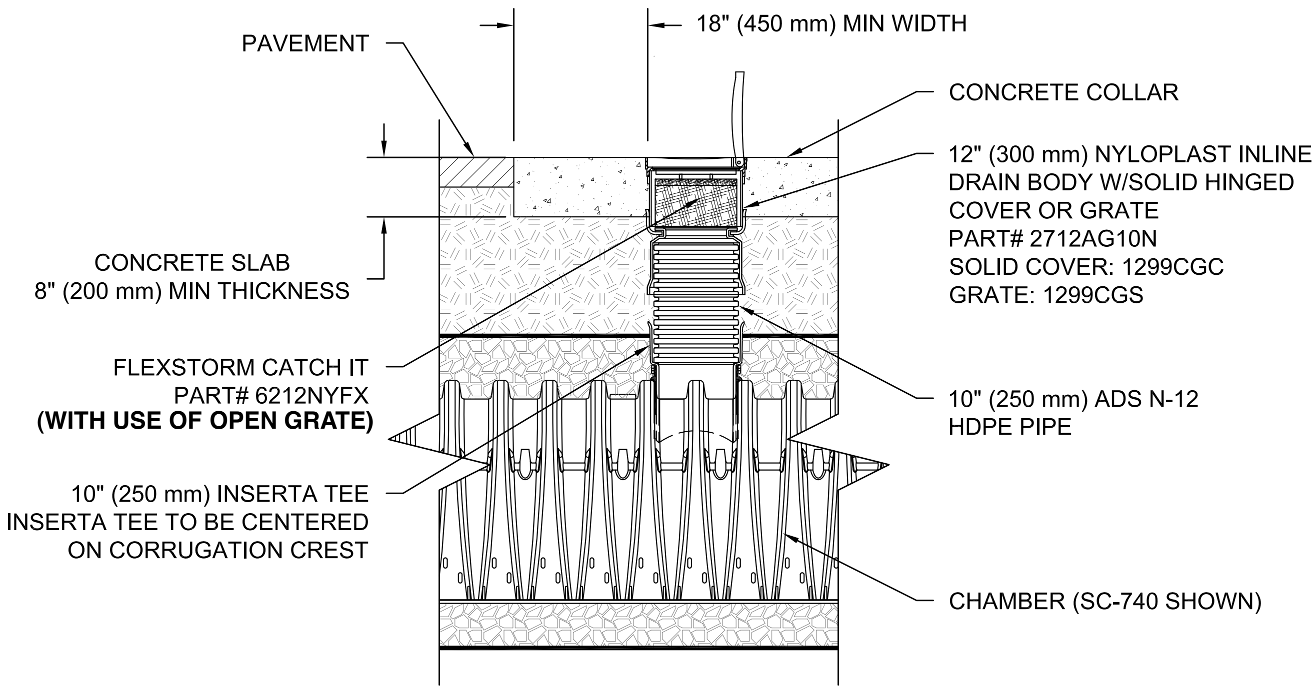
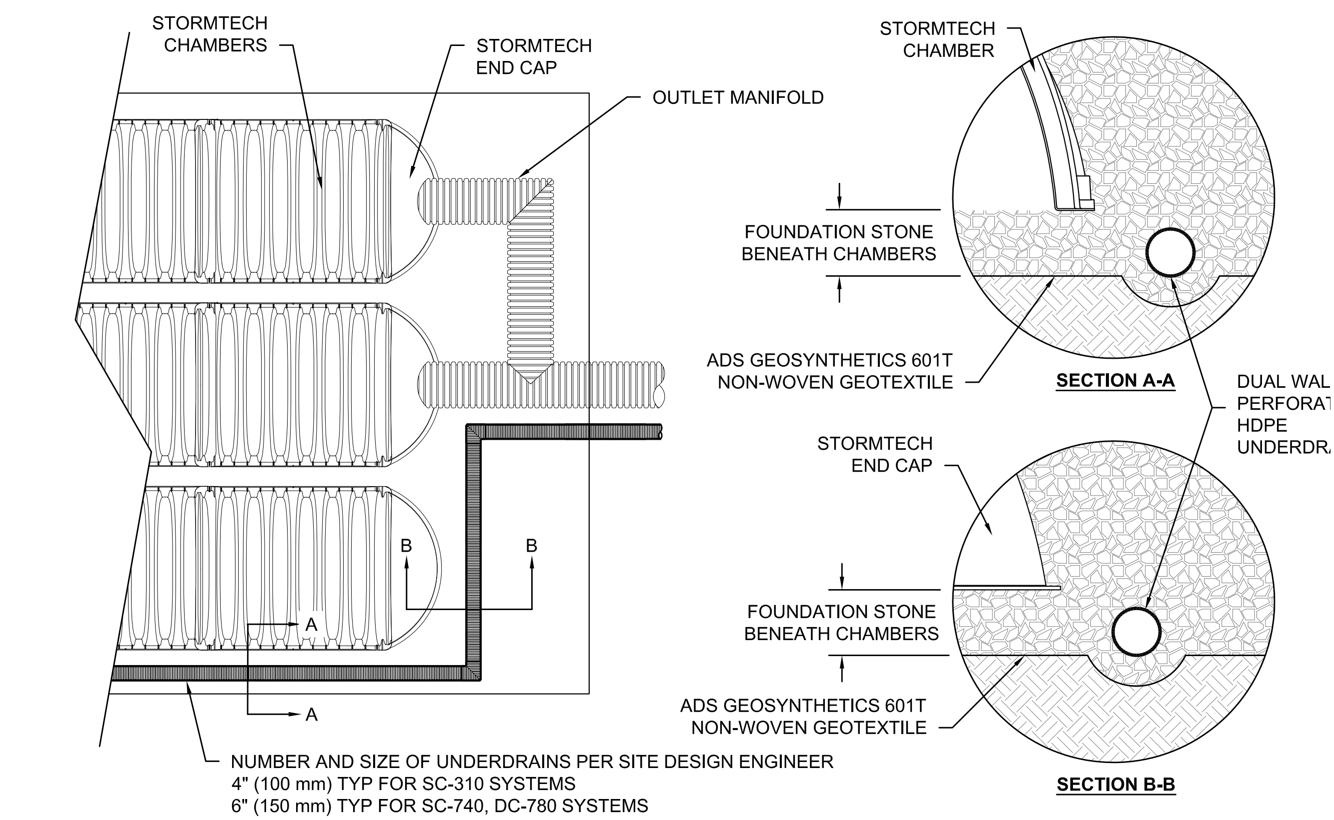


Figure 17 – Under Drain Detail



12.0 Inspection and Maintenance

12.1 ISOLATOR ROW INSPECTION

Regular inspection and maintenance are essential to assure a properly functioning stormwater system. Inspection is easily accomplished through the manhole or optional inspection ports of an Isolator Row. Please follow local and OSHA rules for a confined space entry.

Inspection ports can allow inspection to be accomplished completely from the surface without the need for a confined space entry. Inspection ports provide visual access to the system with the use of a flashlight. A stadia rod may be inserted to determine the depth of sediment. If upon visual inspection it is found that sediment has accumulated to an average depth exceeding 3" (76 mm), cleanout is required.

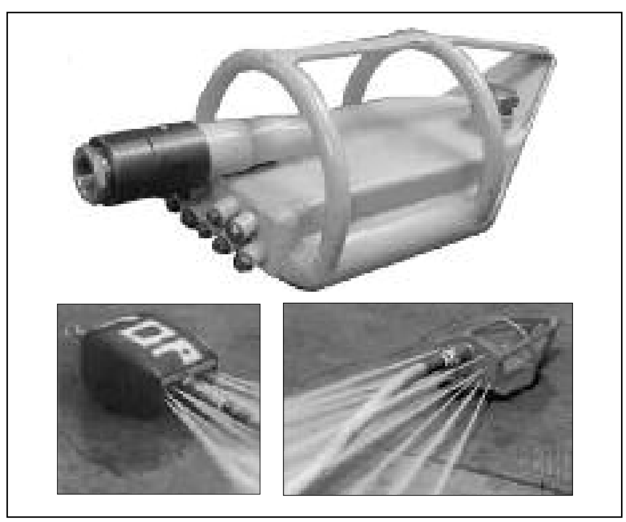
A StormTech Isolator Row should initially be inspected immediately after completion of the site's construction. While every effort should be made to prevent sediment from entering the system during construction, it is during this time that excess amounts of sediments are most likely to enter any stormwater system. Inspection and maintenance, if necessary, should be performed prior to passing responsibility over to the site's owner. Once in normal service, a StormTech Isolator Row should be inspected bi-annually until an understanding of the sites characteristics is developed. The site's maintenance manager can then revise the inspection schedule based on experience or local requirements.

12.2 ISOLATOR ROW MAINTENANCE

JetVac maintenance is recommended if sediment has been collected to an average depth of 3" (76 mm) inside the Isolator Row. More frequent maintenance may be required to maintain minimum flow rates through the Isolator Row. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, a wave of suspended sediments is flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/ JetVac combination vehicles. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" (1143 mm) are best. The JetVac process shall only be performed on StormTech Rows that have AASHTO class 1 woven geotextile over the foundation stone (ADS 315ST or equal).

Looking down the Isolator Row.

A typical JetVac truck. (This is not a StormTech product.)



Examples of culvert cleaning nozzles appropriate for Isolator Row maintenance. (These are not StormTech products.)

12.0 Inspection & Maintenance

STORMTECH ISOLATOR™ ROW - STEP-BY-STEP MAINTENANCE PROCEDURES

Step 1) Inspect Isolator Row for sediment

A) Inspection ports (if present)

i. Remove lid from floor box frame

ii. Remove cap from inspection riser

iii. Using a flashlight and stadia rod, measure depth of sediment

iv. If sediment is at, or above, 3" (76 mm) depth proceed to Step 2. If not proceed to Step 3.

B) All Isolator Rows

i. Remove cover from manhole at upstream end of Isolator Row

ii. Using a flashlight, inspect down Isolator Row through outlet pipe

1. Follow OSHA regulations for confined space entry if entering manhole

2. Mirrors on poles or cameras may be used to avoid a confined space entry

iii. If sediment is at or above the lower row of sidewall holes [approximately 3" (76 mm)] proceed to Step 2. If not proceed to Step 3.

Step 2) Clean out Isolator Row using the JetVac process

A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45" (1143 mm) or more is preferable

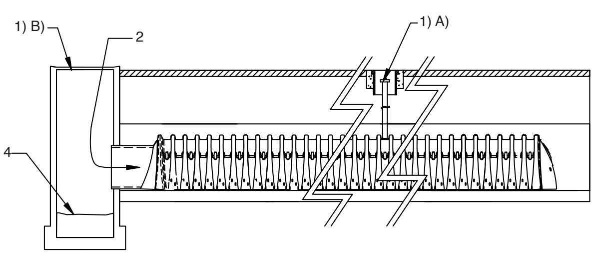
B) Apply multiple passes of JetVac until backflush water is clean

C) Vacuum manhole sump as required during jetting

Step 3) Replace all caps, lids and covers

Step 4) Inspect and clean catch basins and manholes upstream of the StormTech system following local guidelines.

Figure 20 – StormTech Isolator Row (not to scale)



12.3 ECCENTRIC PIPE HEADER INSPECTION

Theses guidelines do not supercede a pipe manufacturer's recommended I&M procedures. Consult with the manufacturer of the pipe header system for specific I&M procedures. Inspection of the header system should be carried out quarterly. On sites which generate higher levels of sediment more frequent inspections may be necessary. Headers may be accessed through risers, access ports or manholes. Measurement of sediment may be taken with a stadia rod or similar device. Cleanout of sediment should occur when the sediment volume has reduced the storage area by 25% or the depth of sediment has reached approximately 25% of the diameter of the structure.

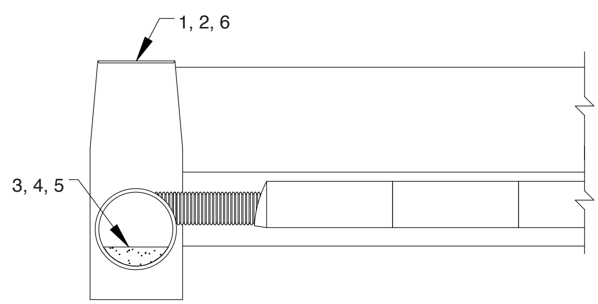
12.4 ECCENTRIC PIPE MANIFOLD MAINTENANCE

Cleanout of accumulated material should be accomplished by vacuum pumping the material from the header. Cleanout should be accomplished during dry weather. Care should be taken to avoid flushing sediments out through the outlet pipes and into the chamber rows.

Eccentric Header Step-by-Step Maintenance Procedures

1. Locate manholes connected to the manifold system
2. Remove grates or covers
3. Using a stadia rod, measure the depth of sediment
4. If sediment is at a depth of about 25% pipe volume or 25% pipe diameter proceed to step 5. If not proceed to step 6.
5. Vacuum pump the sediment. Do not flush sediment out inlet pipes.
6. Replace grates and covers
7. Record depth and date and schedule next inspection

Figure 21 – Eccentric Manifold Maintenance



Please contact StormTech's Technical Services Department at 888-892-2894 for a spreadsheet to estimate cleaning intervals.

13.0 General Notes

1. StormTech ("StormTech") requires installing contractors to use and understand StormTech's latest Installation Instructions prior to beginning system installation.
2. Our Technical Services Department offers installation consultations to installing contractors. Contact our Technical Service Representatives at least 30 days prior to system installation to arrange a pre-installation consultation. Our representatives can then answer questions or address comments on the StormTech chamber system and inform the Installing contractor of the minimum installation requirements before beginning the system's construction. Call **860-529-8188** to speak to a Technical Service Representative or visit **www.stormtech.com** to receive a copy of our Installation Instructions.
3. StormTech's requirements for systems with pavement design (asphalt, concrete pavers, etc.): Minimum cover for the SC-740, DC-780 and SC-310 chambers is 18" (457 mm) not including pavement; Maximum cover for the SC-740 and SC-310 chambers is 96" (2.4 m) including pavement design; Maximum cover for the DC-780 chamber is 12' (3.6 m) including pavement design. For installations that do not include pavement, where rutting from vehicles may occur, minimum required cover is 24" (610 mm), maximum cover is as stated above.
4. The contractor must report any discrepancies with the bearing capacity of the chamber foundation materials to the design engineer.
5. AASHTO M288 Class 2 non-woven geotextile (filter fabric) must be used as indicated in the project plans.
6. Stone placement between chamber rows and around perimeter must follow instructions as indicated in the most current version of StormTech's Installation Instructions.
7. Backfilling over the chambers must follow requirements as indicated in the most current version of StormTech's Installation Instructions.
8. The contractor must refer to StormTech's Installation Instructions for a Table of Acceptable Vehicle Loads at various depths of cover. This information is also available at StormTech's website: **www.stormtech.com.** The contractor is responsible for preventing vehicles that exceed StormTech's requirements from traveling across or parking over the stormwater system. Temporary fencing, warning tape and appropriately located signs are commonly used to prevent unauthorized vehicles from entering sensitive construction areas.
9. The contractor must apply erosion and sediment control measures to protect the stormwater system during all phases of site construction per local codes and design engineer's specifications.
10. STORMTECH PRODUCT WARRANTY IS LIMITED. Contact StormTech for warranty information.

14.0 StormTech Product Specifications

1.0 GENERAL

1.1 StormTech chambers are designed to control stormwater runoff. As a subsurface retention system, StormTech chambers retain and allow effective infiltration of water into the soil. As a subsurface detention system, StormTech chambers detain and allow for the metered flow of water to an outfall.

2.0 CHAMBER PARAMETERS

2.1 The Chamber shall be injection molded of an impact modified polypropylene or polyethylene copolymer to maintain adequate stiffness through higher temperatures experienced during installation and service.

2.2 The nominal chamber dimensions of the StormTech SC-740 and DC-780 shall be 30.0" (762 mm) tall, 51.0" (1295 mm) wide and 90.7" (2304 mm) long. The nominal chamber dimensions of the StormTech SC-310 shall be 16.0" (406 mm) tall, 34.0" (864 mm) wide and 90.7" (2304 mm) long. The installed length of a joined chamber shall be 85.4" (2169 mm).

2.3 The chamber shall have a continuously curved section profile.

2.4 The chamber shall be open-bottomed.

2.5 The chamber shall incorporate an overlapping corrugation joint system to allow chamber rows of almost any length to be created. The overlapping corrugation joint system shall be effective while allowing a chamber to be trimmed to shorten its overall length.

2.6 The nominal storage volume of all StormTech chambers includes the volume of the clean, crushed, angular stone with an assumed 40% porosity. The nominal storage volume of a joined StormTech SC-740 chamber shall be 74.9 ft^3 (2.1 m^3) per chamber when installed per StormTech's typical details. This equates to a storage volume per unit area of bed of 2.2 ft^3/ft^2 (0.67 m^3/m^2). The nominal storage volume of a joined StormTech DC-780 chamber shall be 78.4 ft^3 (2.2 m^3) per chamber when installed per StormTech's typical details. This equates to a storage volume per unit area of bed of 2.3 ft^3/ft^2 (0.70 m^3/m^2). The nominal storage volume of a joined StormTech SC-310 chamber shall be 31.0 ft^3 (0.88 m^3) per chamber when installed per StormTech's typical details. This equates to a storage volume per unit area of bed of 1.3 ft^3/ft^2 (0.40 m^3/m^2).

2.7 The SC-740 and SC-310 chambers shall have forty-eight orifices penetrating the sidewalls to allow for lateral conveyance of water.

2.8 The chamber shall have two orifices near its top to allow for equalization of air pressure between its interior and exterior.

2.9 The chamber shall have both of its ends open to allow for unimpeded hydraulic flows and visual inspections down a row's entire length.

2.10 The chamber shall have 14 corrugations.

2.11 The chamber shall have a circular, indented, flat surface on the top of the chamber for an optional 4" (100 mm) diameter (maximum) inspection port.

2.12 The chamber shall be analyzed and designed using AASHTO methods for thermoplastic culverts contained in the LRFD Bridge Design Specifications, 2nd Edition, including Interim Specifications through 2001. Design live load shall be the AASHTO design truck. Design shall consider earth and live loads as appropriate for the minimum to maximum specified depth of fill.

2.13 The chamber shall be manufactured in an ISO 9001:2000 certified facility.

3.0 END CAP PARAMETERS

3.1 The end cap shall be designed to fit into any corrugation of a chamber, which allows: capping a chamber that has its length trimmed; segmenting rows into storage basins of various lengths.

3.2 The end cap shall have saw guides to allow easy cutting for various diameters of pipe that may be used to inlet the system.

3.3 The end cap shall have excess structural adequacies to allow cutting an orifice of any size at any invert elevation.

3.4 The primary face of an end cap shall be curved outward to resist horizontal loads generated near the edges of beds.

3.5 The end cap shall be manufactured in an ISO 9001:2000 certified facility.

15.0 Chamber Specifications for Contract Documents

STORMWATER CHAMBER SPECIFICATIONS:

1. Chambers shall be StormTech SC-740, SC-310 or approved equal.
2. Chambers shall conform to the requirements of ASTM F 2922, "Standard Specification for Polyethylene (PE) Corrugated Wall Stormwater Collection Chambers."
3. Chamber rows shall provide continuous, unobstructed internal space with no internal support panels.
4. The structural design of the chambers, the structural backfill and the installation requirements shall ensure that the load factors specified in the AASHTO LRFD Bridge Design Specifications, Section 12.12 are met for: 1) long-duration dead loads and 2) short-duration live loads, based on the AASHTO Design Truck with consideration for impact and multiple vehicle presences.
5. Chambers shall conform to the requirements of ASTM F2787, "Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers."
6. Only chambers that are approved by the engineer will be allowed. The contractor shall submit (3 sets) of the following to the engineer for approval before delivering chambers to the project site:
    - A structural evaluation by a registered structural engineer that demonstrates that the load factors specified in the AASHTO LRFD Bridge Design Specifications, Section 12.12 are met. The 50-year creep modulus data specified in ASTM F2922 must be used as part of the AASHTO structural evaluation to verify long-term performance.
7. Chambers shall be produced at an ISO 9001 certified manufacturing facility.
8. All design specifications for chambers shall be in accordance with the manufacturer's latest design manual.
9. The installation of chambers shall be in accordance with the manufacturer's latest installation instructions.

STORMWATER CHAMBER SPECIFICATIONS:

1. Chambers shall be StormTech DC-780 or approved equal.
2. Chambers shall conform to the requirements of ASTM F 2418, "Standard Specification for Polypropylene (PP) Corrugated Wall Stormwater Collection Chambers."
3. Chamber rows shall provide continuous, unobstructed internal space with no internal support panels.
4. The structural design of the chambers, the structural backfill and the installation requirements shall ensure that the load factors specified in the AASHTO LRFD Bridge Design Specifications, Section 12.12 are met for: 1) long-duration dead loads and 2) short-duration live loads, based on the AASHTO Design Truck with consideration for impact and multiple vehicle presences.
5. Chambers shall conform to the requirements of ASTM F2787, "Standard Practice for Structural Design of Thermoplastic Corrugated Wall Stormwater Collection Chambers."
6. Only chambers that are approved by the engineer will be allowed. The contractor shall submit (3 sets) of the following to the engineer for approval before delivering chambers to the project site:
    - A structural evaluation by a registered structural engineer that demonstrates that the load factors specified in the AASHTO LRFD Bridge Design Specifications, Section 12.12 are met. The 50-year creep modulus data specified in ASTM F2418 must be used as part of the AASHTO structural evaluation to verify long-term performance.
7. Chambers shall be produced at an ISO 9001 certified manufacturing facility.
8. All design specifications for chambers shall be in accordance with the manufacturer's latest design manual.
9. The installation of chambers shall be in accordance with the manufacturer's latest installation instructions.

A Family of Products and Services for the Stormwater Industry:

- MC-3500 and MC-4500 Chambers and End Caps
- SC-310 and SC-740 Chambers and End Caps
- DC-780 Chambers and End Caps
- Fabricated End Caps
- Fabricated Manifold Fittings
- Patented Isolator Row for Maintenance and Water Quality
- Chamber Separation Spacers
- In-House System Layout Assistance
- On-Site Educational Seminars
- Worldwide Technical Sales Group
- Centralized Product Applications Department
- Research and Development Team
- Technical Literature, O&M Manuals and Detailed CAD drawings all downloadable via our Web Site

StormTech provides state of the art products and services that meet or exceed industry performance standards and expectations. We offer designers, regulators, owners and contractors the highest quality products and services for stormwater management that "Saves Valuable Land and Protects Water Resources."

Please contact one of our inside project application professionals or Engineered Product Managers (EPMs) to discuss your particular application. A wide variety of technical support material is available in print, electronic media or from our website at www.stormtech.com. For any questions, please call StormTech at 888-892-2694.

MC-4500 MC-3500 DC-780 SC-740 SC-310

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Isolator® Row O&M Manual

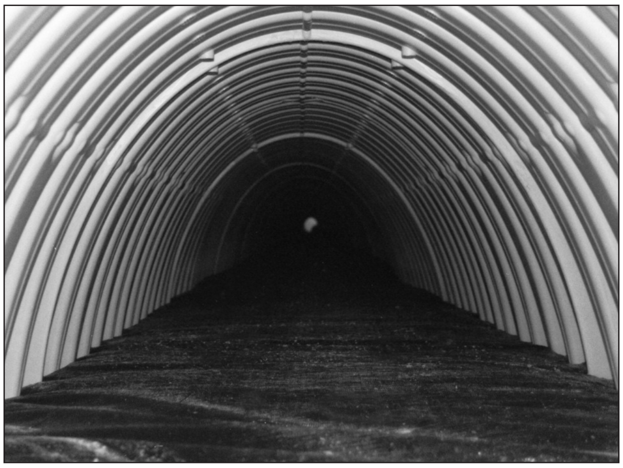
StormTech® Chamber System for Stormwater Management

U.S. GREEN BUILDING COUNCIL MEMBER

1.0 The Isolator® Row

1.1 INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a patented technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.



Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.

1.2 THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-4500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC-310-3 and SC-740 models) allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

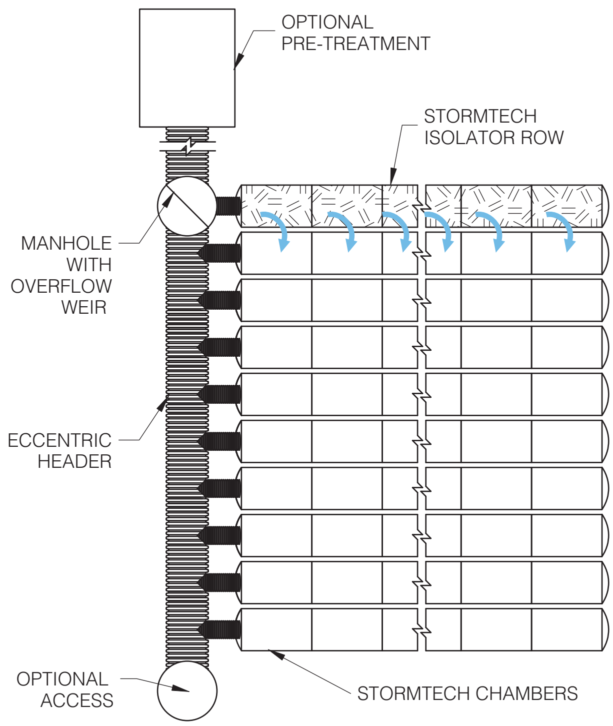
Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of the underlying stone and remain intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber. The non-woven fabric is not required over the DC-780, MC-3500 or MC-4500 models as these chambers do not have perforated side walls.

The Isolator Row is typically designed to capture the "first flush" and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but typically includes a high flow weir such that storm water flowrates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other chambers.

The Isolator Row may also be part of a treatment train. By treating storm water prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.

StormTech Isolator Row with Overflow Spillway
(not to scale)



2.0 Isolator Row Inspection/Maintenance

2.1 INSPECTION

The frequency of Inspection and Maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

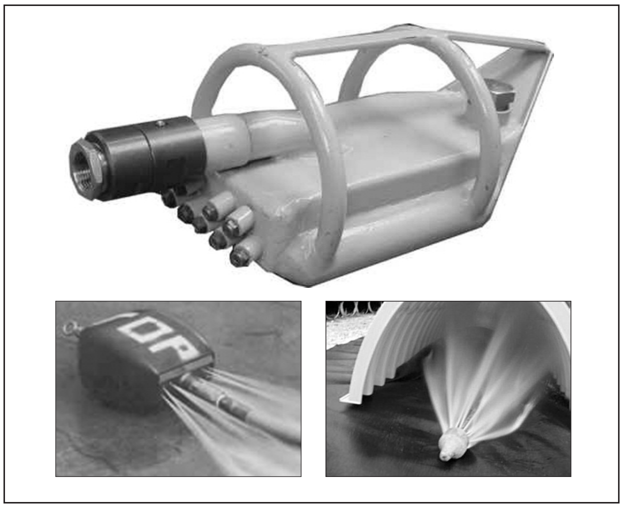
At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

2.2 MAINTENANCE

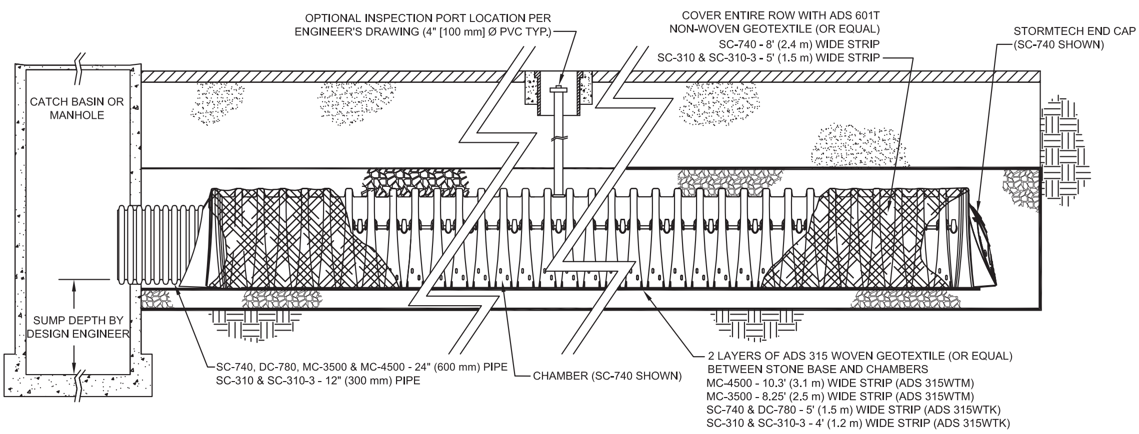
The Isolator Row was designed to reduce the cost of periodic maintenance. By “isolating” sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.



Examples of culvert cleaning nozzles appropriate for Isolator Row maintenance. (These are not StormTech products.)

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45” are best. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**

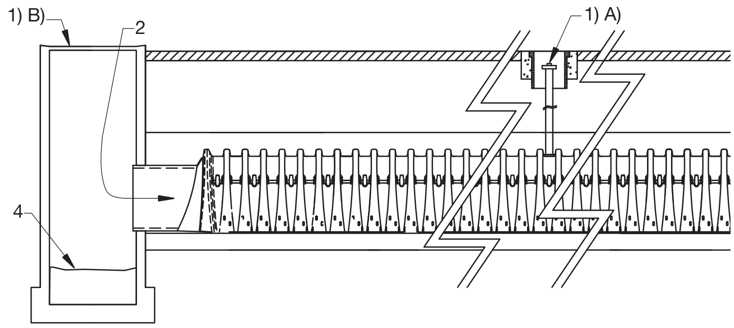
StormTech Isolator Row (not to scale)



NOTE: NON-WOVEN FABRIC IS ONLY REQUIRED OVER THE INLET PIPE CONNECTION INTO THE END CAP FOR DC-780, MC-3500 AND MC-4500 CHAMBER MODELS AND IS NOT REQUIRED OVER THE ENTIRE ISOLATOR ROW.

3.0 Isolator Row Step By Step Maintenance Procedures

StormTech Isolator Row (not to scale)



Step 1) Inspect Isolator Row for sediment

A) Inspection ports (if present)

i. Remove lid from floor box frame

ii. Remove cap from inspection riser

iii. Using a flashlight and stadia rod, measure depth of sediment and record results on maintenance log.

iv. If sediment is at, or above, 3 inch depth proceed to Step 2. If not proceed to step 3.

B) All Isolator Rows

i. Remove cover from manhole at upstream end of Isolator Row

ii. Using a flashlight, inspect down Isolator Row through outlet pipe

1. Mirrors on poles or cameras may be used to avoid a confined space entry
2. Follow OSHA regulations for confined space entry if entering manhole

iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches) proceed to Step 2. If not proceed to Step 3.

Step 2) Clean out Isolator Row using the JetVac process

A) A fixed culvert cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable

B) Apply multiple passes of JetVac until backflush water is clean

C) Vacuum manhole sump as required

Step 3) Replace all caps, lids and covers, record observations and actions

Step 4) Inspect & clean catch basins and manholes upstream of the StormTech system

Sample Maintenance Log

Date	Stadia Rod Readings		Sediment Depth (1) - (2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/01	6.3 ft.	none		New installation. Fixed point is CI frame at grade	djm
9/24/01		6.2	0.1 ft.	Some grit felt	sm
6/20/03		5.8	0.5 ft.	Mucky feel, debris visible in manhole and in Isolator row, maintenance due	rv
7/7/03	6.3 ft.		0	System jetted and vacuumed	djm

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Detention • Retention • Water Quality

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Maintenance Inspection Checklists

Subsurface Water Quality Structures Maintenance and Management Inspection
(Isolator Row)

Project: ____
Location: ____
Site Status: ____

Date: ______________________ Time: ______________________
Inspector Signature: ____

Inspector Name (printed): ____

Maintenance

The surface water quality structure should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities and rainfall frequencies.

Inspection

We recommend ongoing quarterly inspections of the accumulated sediment. Sediment deposition and transport may vary from year to year and quarterly inspections will help insure that systems are cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall).

Inspections should be performed more often in the winter months in climates where sanding operations may lead to rapid accumulations.

Should it be necessary to get inside the system to perform maintenance activities, all appropriate precautions regarding confined space entry and OSHA regulations should be followed.

Inspection Activities	**Suggested Schedule**
• After several storm events or an extreme storm event, inspect for: signs of blockages of the inlet and/or separation screen and sediment accumulation	As Needed
• Inspect for: trash and debris; signs of blockages of the inlet and/or separation screen and sediment accumulation; • Cracking; leakage	Annually
• Inspect that the downstream pipes are free of debris and are operational.	Annually
Maintenance Activities	**Suggested Schedule**
• Structural repairs to structure • Clean and remove debris from structures	As Needed

Cleaning

The Subsurface Water Quality Structure should be cleaned when the level of sediment has reached capacity based on specification from manufacturer in the isolated sump and/or when an appreciable level of hydrocarbons and trash has accumulated.

Cleaning of the Subsurface Water Quality Structure should be done during dry weather conditions when no flow is entering the system. Cleanout of the Subsurface Water Quality Structure with a vacuum truck is generally the most effective and convenient method of excavating pollutants from the system.

To perform cleaning, remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should be pumped out also if pollutant buildup exists in this area.

Subsurface Water Quality Structures Maintenance and Management Inspection Checklist

Project: ______________________________
Location: ______________________________

Site Status: ______________________________

Date: ______________________________ **Time:**
Inspector Signature: ____________________ **Inspector Name (printed):** ____________________

Structure Number: ______________________________

Inspection/Maintenance Items	Satisfactory (S) or Unsatisfactory (U)	Comments/Corrective Action
1. Inspection (Quarter-annually, After Major Storms)		
1. Clear of debris at the inlet and/or separation screen and structure functional?		
2. If confined space entry is required; OSHA regulations should be followed		
3. Sediment accumulation and document percentage (Maintenance/cleaning is needed when level of sediment has reached the capacity based on specification from manufacturer in the isolated sump)		
4. Condition of concrete/masonry?		
5. Outlet pipe free of debris?		
6. Manhole covers securely seated after Inspection?		
7. Other (describe)?		
2. Maintenance/cleaning (As Needed)		
1. Cleaning during dry weather conditions?		
2. If confined space entry is required; OSHA regulations should be followed		
3. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. (Continue on next page)		

4. Is system completely drained down and the sump fully evacuated of sediment?		
5. Is separation screen should be power washed to ensure it is free of trash and debris?		
6. Manhole covers securely seated after Maintenance/cleaning?		
7. Disposal of all material removed from the Subsurface Water Quality Structures should be done in accordance with local regulations		
8. Other (describe)?		
3. Sediment		
1. Depth of sediment (in inches)*		
2. Depth of oil (in inches)**		
3. Sediment and oil have been removed		

*If measured depth of sediment is greater than 12 inches, the system shall be cleaned as per manufacturer recommendations

**Any presence of oil shall be removed immediately

If any of the above inspection items are UNSATISFACTORY, list corrective actions and the corresponding completion dates below:

Corrective Action Needed	Due Date

Subsurface Water Quality Structures Maintenance and Inspection Log

(Isolator Row)

Project: ______________________________
Location: ______________________________

Site Status: ______________________________

Date: ______________________________ **Time:**
Inspector Signature: ____________________ **Inspector Name (printed):** ____________________

Structure Number: ______________________________

Date of Inspection	Depth of Sediment (in)	Accumulated Trash	Maintenance Performed	Maintenance Personnel Signature	Comments	Scheduled next Inspection Date

Underground Stormwater Infiltration System Maintenance and Management Inspection

Project: ___________________

Location:____

Site Status:____Date: _______________________

Inspector Signature: ____________________________________

Inspector Name (printed): ________________________________

Maintenance

Underground storm water detention and retention systems should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities and rainfall frequencies.

Inspection

We recommend ongoing quarterly inspections of the accumulated sediment. Sediment deposition and transport may vary from year to year and quarterly inspections will help insure that systems are cleaned out at the appropriate time.

Inspection Activities	Suggested Schedule
o After several storm events or an extreme storm event, inspect for: signs of clogging of the inlet or outlet structures and sediment accumulation.	As Needed
o Inspect for: trash and debris; clogging of the outlet structures and any pilot channels; o Excessive erosion; sediment accumulation in the basin and inlet/outlet structures; o Standing water where there should be none; o Differential settlement; o Cracking; leakage; o Inspect that the outlet structures, pipes, and downstream and pilot channels are free of debris and are operational. o Note signs of pollution, such as oil sheen, discolored water, or unpleasant odors o Check for sediment accumulation in the facility	Quarter-annually

Maintenance Activities	Suggested Schedule
o Perform structural repairs to inlet and outlets o Clean and remove debris from inlet and outlet structures	As needed

Inspections should be performed more often in the winter months in climates where sanding operations may lead to rapid accumulations, or in equipment washdown areas. It is very useful to keep a record of each inspection.

Systems should be cleaned when inspection reveals that accumulated sediment or trash is clogging the discharge orifice. Should it be necessary to get inside the system to perform maintenance activities, all appropriate precautions regarding confined space entry and OSHA regulations should be followed:

Cleaning

Maintaining an underground detention or retention system is easiest when there is no flow entering the system. For this reason, it is a good idea to schedule the cleanout during dry weather. Accumulated sediment and trash can typically be evacuated through the manhole over the outlet orifice. If maintenance is not performed as recommended, sediment and trash may accumulate in front of the outlet orifice. Manhole covers should be securely seated following cleaning activities.

Underground Stormwater Infiltration System Maintenance and Management Inspection Checklist

Project: ______________________________

Location: ______________________________

Site Status: ______________________________

Date: ____________________ Time: ____________________

Inspector Signature: ______________________________

Inspector Name (printed): ______________________________

Inspection/Maintenance Items	Satisfactory (S) or Unsatisfactory (U)	Comments/Corrective Action
1. Inlet/Outlet Structures (Quarter-annually, After Major Storms)		
1. Clear of debris and functional?		
2. Track rack and clear of debris functional?		
3. Sediment accumulation?		
4. Condition of concrete/masonry?		
5. Outfall channels function, not eroding?		
6. If confined space entry is required; OSHA regulations should be followed		
7. Other (describe)?		
2. Basin Bottom (Quarter-annually, After Major Storms)		
1. Excessive sedimentation?		
2. Any standing water?		
3. Structural Condition (Monthly or as needed)		
1. Structural repairs to inlet and outlets Needed?		
2. Any differential settlement?		
3. Other (describe)?		
4. Sediment		
1. Depth of sediment (in inches)*		
2. Depth of oil (in inches)**		
3. Sediment and oil have been removed		

* If measured depth of sediment is greater than 3 inches, the system shall be cleaned as per the manufacturer recommendations

** Any presence of oil shall be removed immediately.

If any of the above inspection items are UNSATISFACTORY, list corrective actions and the corresponding completion dates below:

Corrective Action Needed	Due Date

Underground Stormwater Infiltration System Maintenance and Inspection Log

Project: ______________________________

Location: ______________________________

Site Status: ______________________________

Date: ______________________________

Time: ______________________________

Inspector: ______________________________

Date of Inspection	Depth of Sediment (in)	Accumulated Trash	Maintenance Performed	Maintenance Personnel Signature	Comments	Scheduled next Inspection Date

APPENDIX D

NEW YORK STATE DEC EROSION AND SEDIMENT CONTROL MEASURES

FINAL

New York State Standards and Specifications for Erosion and Sediment Control

November 2016

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

STANDARD AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ACCESS

Definition & Scope

A stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area. The purpose of stabilized construction access is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

Conditions Where Practice Applies

A stabilized construction access shall be used at all points of construction ingress and egress.

Design Criteria

See Figure 2.1 on page 2.31 for details.

Aggregate Size: Use a matrix of 1-4 inch stone, or reclaimed or recycled concrete equivalent.

Thickness: Not less than six (6) inches.

Width: 12-foot minimum but not less than the full width of points where ingress or egress occurs. 24-foot minimum if there is only one access to the site.

Length: As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum would apply).

Geotextile: To be placed over the entire area to be covered with aggregate. Filter cloth will not be required on a single-family residence lot. Piping of surface water under entrance shall be provided as required. If piping is impossible, a mountable berm with 5:1 slopes will be permitted.

Criteria for Geotextile: The geotextile shall be woven or nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals, hydro-carbons, mildew, rot resistant, and conform to the fabric properties as shown:

Fabric Properties[3]	Light Duty[1] Roads Grade Sub-grade	Heavy Duty[2] Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Burst Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 Modified
Equivalent	40-80	40-80	US Std Sieve
Opening Size			CW-02215
Aggregate Depth	6	10	-

[1]Light Duty Road: Area sites that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Acceptable materials are Trevira Spunbond 1115, Mirafi 100X, Typar 3401, or equivalent.

[2]Heavy Duty Road: Area sites with only rough grading, and where most travel would be multi-axle vehicles. Acceptable materials are Trevira Spunbond 1135, Mirafi 600X, or equivalent.

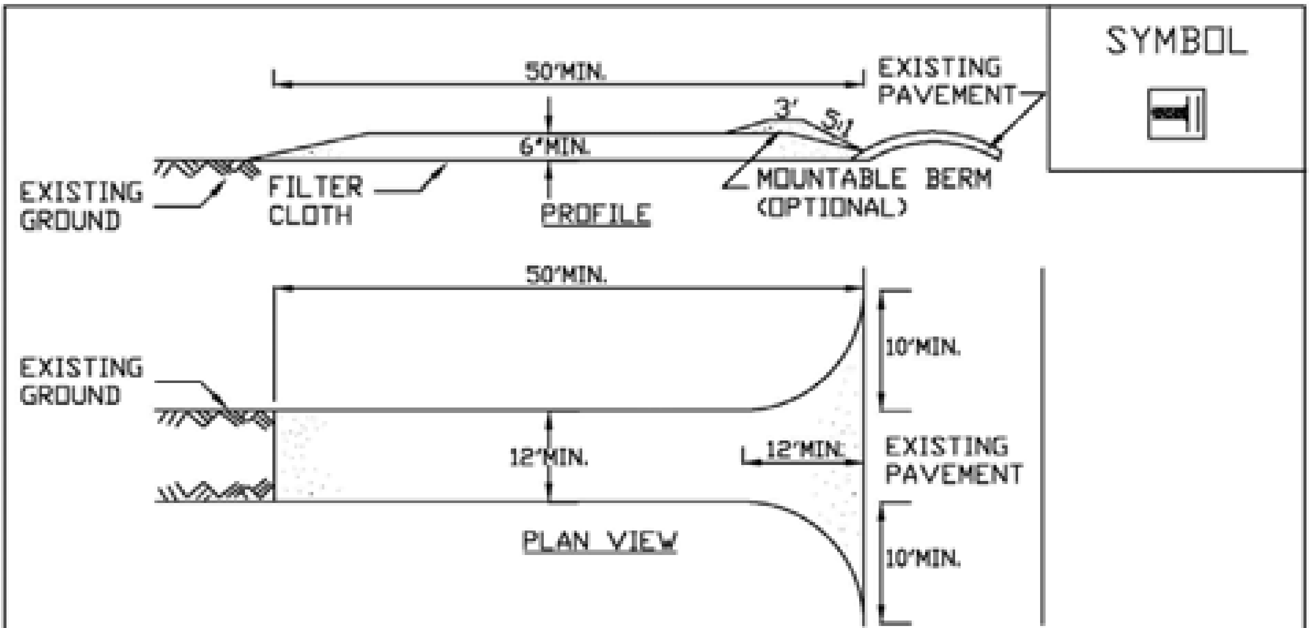
[3]Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.

Maintenance

The access shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way or streets. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately.

When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

Figure 2.1
Stabilized Construction Access



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 1-4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ACCESS SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON A AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STABILIZED CONSTRUCTION ACCESS

STANDARD AND SPECIFICATIONS FOR CONCRETE TRUCK WASHOUT

Definition & Scope

A temporary excavated or above ground lined constructed pit where concrete truck mixers and equipment can be washed after their loads have been discharged, to prevent highly alkaline runoff from entering storm drainage systems or leaching into soil.

Conditions Where Practice Applies

Washout facilities shall be provided for every project where concrete will be poured or otherwise formed on the site. This facility will receive highly alkaline wash water from the cleaning of chutes, mixers, hoppers, vibrators, placing equipment, trowels, and screeds. Under no circumstances will wash water from these operations be allowed to infiltrate into the soil or enter surface waters.

Design Criteria

Capacity: The washout facility should be sized to contain solids, wash water, and rainfall and sized to allow for the evaporation of the wash water and rainfall. Wash water shall be estimated at 7 gallons per chute and 50 gallons per hopper of the concrete pump truck and/or discharging drum. The minimum size shall be 8 feet by 8 feet at the bottom and 2 feet deep. If excavated, the side slopes shall be 2 horizontal to 1 vertical.

Location: Locate the facility a minimum of 100 feet from drainage swales, storm drain inlets, wetlands, streams and other surface waters. Prevent surface water from entering the structure except for the access road. Provide appropriate access with a gravel access road sloped down to the structure. Signs shall be placed to direct drivers to the facility after their load is discharged.

Liner: All washout facilities will be lined to prevent leaching of liquids into the ground. The liner shall be plastic sheeting with a minimum thickness of 10 mils with no holes or tears, and anchored beyond the top of the pit with an earthen berm, sand bags, stone, or other structural appurtenance except at the access point.

If pre-fabricated washouts are used they must ensure the capture and containment of the concrete wash and be sized based on the expected frequency of concrete pours. They shall be sited as noted in the location criteria.

Maintenance

- All concrete washout facilities shall be inspected daily. Damaged or leaking facilities shall be deactivated and repaired or replaced immediately. Excess rainwater that has accumulated over hardened concrete should be pumped to a stabilized area, such as a grass filter strip.
- Accumulated hardened material shall be removed when 75% of the storage capacity of the structure is filled. Any excess wash water shall be pumped into a containment vessel and properly disposed of off site.
- Dispose of the hardened material off-site in a construction/demolition landfill. On-site disposal may be allowed if this has been approved and accepted as part of the projects SWPPP. In that case, the material should be recycled as specified, or buried and covered with a minimum of 2 feet of clean compacted earthfill that is permanently stabilized to prevent erosion.
- The plastic liner shall be replaced with each cleaning of the washout facility.
- Inspect the project site frequently to ensure that no concrete discharges are taking place in non-designated areas.

STANDARD AND SPECIFICATIONS FOR DUST CONTROL

Definition & Scope

The control of dust resulting from land-disturbing activities, to prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and traffic safety problems.

Conditions Where Practice Applies

On construction roads, access points, and other disturbed areas subject to surface dust movement and dust blowing where off-site damage may occur if dust is not controlled.

Design Criteria

Construction operations should be scheduled to minimize the amount of area disturbed at one time. Buffer areas of vegetation should be left where practical. Temporary or permanent stabilization measures shall be installed. No specific design criteria is given; see construction specifications below for common methods of dust control.

Water quality must be considered when materials are selected for dust control. Where there is a potential for the material to wash off to a stream, ingredient information must be provided to the NYSDEC.

No polymer application shall take place without written approval from the NYSDEC.

Construction Specifications

A. **Non-driving Areas –** These areas use products and materials applied or placed on soil surfaces to prevent airborne migration of soil particles.

Vegetative Cover – For disturbed areas not subject to traffic, vegetation provides the most practical method of dust control (see Section 3).

Mulch (including gravel mulch) – Mulch offers a fast effective means of controlling dust. This can also include rolled erosion control blankets.

Spray adhesives – These are products generally composed of polymers in a liquid or solid form that are mixed with water to form an emulsion that is sprayed on the soil surface with typical hydroseeding equipment. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations for the specific soils on the site. In no case should the application of these adhesives be made on wet soils or if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators and others working with the material.

B. **Driving Areas** – These areas utilize water, polymer emulsions, and barriers to prevent dust movement from the traffic surface into the air.

Sprinkling – The site may be sprayed with water until the surface is wet. This is especially effective on haul roads and access route to provide short term limited dust control.

Polymer Additives – These polymers are mixed with water and applied to the driving surface by a water truck with a gravity feed drip bar, spray bar or automated distributor truck. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations. Incorporation of the emulsion into the soil will be done to the appropriate depth based on expected traffic. Compaction after incorporation will be by vibratory roller to a minimum of 95%. The prepared surface shall be moist and no application of the polymer will be made if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators working with the material.

Barriers – Woven geo-textiles can be placed on the driving surface to effectively reduce dust throw and particle migration on haul roads. Stone can also be used for construction roads for effective dust control.

Windbreak – A silt fence or similar barrier can control air currents at intervals equal to ten times the barrier height. Preserve existing wind barrier vegetation as much as practical.

Maintenance

Maintain dust control measures through dry weather periods until all disturbed areas are stabilized.

STANDARD AND SPECIFICATIONS FOR PROTECTING VEGETATION DURING CONSTRUCTION

Definition & Scope

The protection of trees, shrubs, ground cover and other vegetation from damage by construction equipment. In order to preserve existing vegetation determined to be important for soil erosion control, water quality protection, shade, screening, buffers, wildlife habitat, wetland protection, and other values.

Conditions Where Practices Applies

On planned construction sites where valued vegetation exists and needs to be preserved.

Design Criteria

1. Planning Considerations

A. Inventory:

1) Property boundaries, topography, vegetation and soils information should be gathered. Identify potentially high erosion areas, areas with tree windthrow potential, etc. A vegetative cover type map should be made on a copy of a topographic map which shows other natural and manmade features. Vegetation that is desirable to preserve because of its value for screening, shade, critical erosion control, endangered species, aesthetics, etc., should be identified and marked on the map.

2) Based upon this data, general statements should be prepared about the present condition, potential problem areas, and unique features of the property.

B. Planning:

1) After engineering plans (plot maps) are prepared, another field review should take place and recommendations made for the vegetation to be saved. Minor adjustments in location of roads, dwellings, and utilities may be needed. Construction on steep slopes, erodible soils, wetlands, and streams should be avoided. Clearing limits should be delineated (See “Determine Limits of Clearing and Grading” on page 2.2).

2) Areas to be seeded and planted should be identified. Remaining vegetation should blend with their surroundings and/or provide special function such as a filter strip, buffer zone, or screen.

3) Trees and shrubs of special seasonal interest, such as flowering dogwood, red maple, striped maple, serviceberry, or shadbush, and valuable potential shade trees should be identified and marked for special protective treatment as appropriate.

4) Trees to be cut should be marked on the plans. If timber can be removed for salable products, a forester should be consulted for marketing advice.

5) Trees that may become a hazard to people, personal property, or utilities should be removed. These include trees that are weak-wooded, disease-prone, subject to windthrow, or those that have severely damaged root systems.

6) The vigor of remaining trees may be improved by a selective thinning. A forester should be consulted for implementing this practice.

2. Measures to Protect Vegetation

A. Limit soil placement over existing tree and shrub roots to a maximum of 3 inches. Soils with loamy texture and good structure should be used.

B. Use retaining walls and terraces to protect roots of trees and shrubs when grades are lowered. Lowered grades should start no closer than the dripline of the tree. For narrow-canopied trees and shrubs, the stem diameter in inches is converted to feet and doubled, such that a 10 inch tree should be protected to 20 feet.

C. Trenching across tree root systems should be the same minimum distance from the trunk, as in “B”. Tunnels under root systems for underground utilities should start 18 inches or deeper below the normal ground surface. Tree roots which must be severed should be cut clean. Backfill material that will be in contact with the roots should be topsoil or a prepared planting soil mixture.

D. Construct sturdy fences, or barriers, of wood, steel, or other protective material around valuable vegetation for protection from construction equipment. Place barriers far enough away from trees, but not less than the specifications in "B", so that tall equipment such as backhoes and dump trucks do not contact tree branches.

E. Construction limits should be identified and clearly marked to exclude equipment.

F. Avoid spills of oil/gas and other contaminants.

G. Obstructive and broken branches should be pruned properly. The branch collar on all branches whether living or dead should not be damaged. The 3 or 4 cut method should be used on all branches larger than two inches at the cut. First cut about one-third the way through the underside of the limb (about 6-12 inches from the tree trunk). Then (approximately an inch further out) make a second cut through the limb from the upper side. When the branch is removed, there is no splintering of the main tree trunk. Remove the stub. If the branch is larger than 5-6 inches in diameter, use the four cut system. Cuts 1 and 2 remain the same and cut 3 should be from the underside of the limb, on the outside of the branch collar. Cut 4 should be from the top and in alignment with the 3rd cut. Cut 3 should be 1/4 to 1/3 the way through the limb. This will prevent the bark from peeling down the trunk. Do not paint the cut surface.

H. Penalties for damage to valuable trees, shrubs, and herbaceous plants should be clearly spelled out in the contract.

PROTECTING TREES IN HEAVY USE AREAS

The compaction of soil over the roots of trees and shrubs by the trampling of recreationists, vehicular traffic, etc., reduces oxygen, water, and nutrient uptake by feeder roots. This weakens and may eventually kill the plants. Table 2.6 rates the “Susceptibility of Tree Species to Compaction.”

Where heavy compaction is anticipated, apply and maintain a 3 to 4 inch layer of undecayed wood chips or 2 inches of No. 2 washed, crushed gravel. In addition, use of a wooden or plastic mat may be used to lessen compaction, if applicable.

Table 2.6
Susceptibility of Tree Species to Compaction[1]

Resistant:

Box elder………………	*Acer negundo*	Willows…………………	*Salix spp.*
Green ash……………..	*Fraxinus pennsylvanica*	Honey locust……………	*Gleditsia triacanthos*
Red elm………………..	*Ulmus rubra*	Eastern cottonwood…….	*Populus deltoides*
Hawthornes……………	*Crataegus spp.*	Swamp white oak……….	*Quercus bicolor*
Bur oak………………..	*Quercus macrocarpa*	Hophornbeam……………	*Ostrya virginiana*
Northern white cedar….	*Thuja occidentalis*		

Intermediate:

Red maple…………….	*Acer rubrum*	Sweetgum……………….	*Liquidambar styraciflua*
Silver maple…………..	*Acer saccharinum*	Norway maple………….	*Acer platanoides*
Hackberry…………….	*Celtis occidentalis*	Shagbark hickory……….	*Carya ovata*
Black gum……………	*Nyssa sylvatica*	London plane…………..	*Platanus x hybrida*
Red oak………………	*Quercus rubra*	Pin oak………………….	*Quercus palustris*
Basswood…………….	*Tilia americana*		

Susceptible:

Sugar maple…………….	*Acer saccharum*	Austrian Pine……………	*Pinus nigra*
White pine………………	*Pinus strobus*	White ash……………….	*Fraxinus americana*
Blue spruce……………..	*Picea pungens*	Paper birch……………..	*Betula papyrifera*
White oak………………	*Quercus alba*	Moutain ash…………….	*Sorbus aucuparia*
Red pine………………..	*Pinus resinosa*	Japanese maple………..	*Acer palmatum*

[1] If a tree species does not appear on the list, insufficient information is available to rate it for this purpose.

STANDARD AND SPECIFICATIONS FOR SITE POLLUTION PREVENTION

Definition & Scope

A collection of management practices intended to control non-sediment pollutants associated with construction activities to prevent the generation of pollutants due to improper handling, storage, and spills and prevent the movement of toxic substances from the site into surface waters.

Conditions Where Practice Applies

On all construction sites where the earth disturbance exceeds 5,000 square feet, and involves the use of fertilizers, pesticides, petroleum based chemicals, fuels and lubricants, as well as sealers, paints, cleared woody vegetation, garbage, and sanitary wastes.

Design Criteria

The variety of pollutants on a particular site and the severity of their impacts depend on factors such as the nature of the construction activity, the physical characteristics of the construction site, and the proximity of water bodies and conveyances to the pollutant source.

1. All state and federal regulations shall be followed for the storage, handling, application, usage, and disposal of pesticides, fertilizers, and petroleum products.

2. Vehicle and construction equipment staging and maintenance areas will be located away from all drainage ways with their parking areas graded so the runoff from these areas is collected, contained and treated prior to discharge from the site.

3. Provide sanitary facilities for on-site personnel.

4. Store, cover, and isolate construction materials including topsoil, and chemicals, to prevent runoff of pollutants and contamination of groundwater and surface waters.

5. Develop and implement a spill prevention and control plan. The plan should include NYSDEC's spill reporting and initial notification requirements.

6. Provide adequate disposal for solid waste including woody debris, stumps, and other construction waste and include these methods and directions in the construction details on the site construction drawings. Fill, woody debris, stumps and construction waste shall not be placed in regulated wetlands, streams or other surface waters.

7. Distribute or post informational material regarding proper handling, spill response, spill kit location, and emergency actions to be taken, to all construction personnel.

8. Refueling equipment shall be located at least 100 feet from all wetlands, streams and other surface waters.

STANDARD AND SPECIFICATIONS FOR LANDGRADING

Definition & Scope

Permanent reshaping of the existing land surface by grading in accordance with an engineering topographic plan and specification to provide for erosion control and vegetative establishment on disturbed, reshaped areas.

Design Criteria

The grading plan should be based upon the incorporation of building designs and street layouts that fit and utilize existing topography and desirable natural surrounding to avoid extreme grade modifications. Information submitted must provide sufficient topographic surveys and soil investigations to determine limitations that must be imposed on the grading operation related to slope stability, effect on adjacent properties and drainage patterns, measures for drainage and water removal, and vegetative treatment, etc.

Many municipalities and counties have regulations and design procedures already established for land grading and cut and fill slopes. Where these requirements exist, they shall be followed.

The plan must show existing and proposed contours of the area(s) to be graded. The plan shall also include practices for erosion control, slope stabilization, safe disposal of runoff water and drainage, such as waterways, lined ditches, reverse slope benches (include grade and cross section), grade stabilization structures, retaining walls, and surface and subsurface drains. The plan shall also include phasing of these practices. The following shall be incorporated into the plan:

1. Provisions shall be made to safely convey surface runoff to storm drains, protected outlets, or to stable water courses to ensure that surface runoff will not damage slopes or other graded areas; see standards and specifications for Grassed Waterway, Diversion, or Grade Stabilization Structure.

2. Cut and fill slopes that are to be stabilized with grasses shall not be steeper than 2:1. When slopes exceed 2:1, special design and stabilization consideration are required and shall be adequately shown on the plans. (Note: Where the slope is to be mowed, the slope should be no steeper than 3:1, although 4:1 is preferred because of safety factors related to mowing steep slopes.)

3. Reverse slope benches or diversion shall be provided whenever the vertical interval (height) of any 2:1 slope exceeds 20 feet; for 3:1 slope it shall be increased to 30 feet and for 4:1 to 40 feet. Benches shall be located to divide the slope face as equally as possible and shall convey the water to a stable outlet. Soils, seeps, rock outcrops, etc., shall also be taken into consideration when designing benches.

   A. Benches shall be a minimum of six feet wide to provide for ease of maintenance.

   B. Benches shall be designed with a reverse slope of 6:1 or flatter to the toe of the upper slope and with a minimum of one foot in depth. Bench gradient to the outlet shall be between 2 percent and 3 percent, unless accompanied by appropriate design and computations.

   C. The flow length within a bench shall not exceed 800 feet unless accompanied by appropriate design and computations; see Standard and Specifications for Diversion on page 3.9

4. Surface water shall be diverted from the face of all cut and/or fill slopes by the use of diversions, ditches and swales or conveyed downslope by the use of a designed structure, except where:

   A. The face of the slope is or shall be stabilized and the face of all graded slopes shall be protected from surface runoff until they are stabilized.

   B. The face of the slope shall not be subject to any concentrated flows of surface water such as from natural drainage ways, graded ditches, downspouts, etc.

   C. The face of the slope will be protected by anchored stabilization matting, sod, gravel, riprap, or other stabilization method.

5. Cut slopes occurring in ripable rock shall be serrated as shown in Figure 4.9 on page 4.26. The serrations shall be made with conventional equipment as the excavation is made. Each step or serration shall be constructed on the contour and will have steps cut at nominal two-foot intervals with nominal three-foot horizontal shelves. These steps will vary depending on the slope ratio or the cut slope. The nominal slope line is 1 ½: 1. These steps will weather and act to hold moisture, lime, fertilizer, and seed thus producing a much quicker and longer-lived vegetative cover and better slope stabilization. Overland flow shall be diverted from the top of all serrated cut slopes and carried to a suitable outlet.

6. Subsurface drainage shall be provided where necessary to intercept seepage that would otherwise adversely affect slope stability or create excessively wet site conditions.

7. Slopes shall not be created so close to property lines as to endanger adjoining properties without adequately protecting such properties against sedimentation, erosion, slippage, settlement, subsidence, or other related damages.

8. Fill material shall be free of brush, rubbish, rocks, logs, stumps, building debris, and other objectionable material. It should be free of stones over two (2) inches in diameter where compacted by hand or mechanical tampers or over eight (8) inches in diameter where compacted by rollers or other equipment. Frozen material shall not be placed in the fill nor shall the fill material be placed on a frozen foundation.

9. Stockpiles, borrow areas, and spoil shall be shown on the plans and shall be subject to the provisions of this Standard and Specifications.

10. All disturbed areas shall be stabilized structurally or vegetatively in compliance with the Permanent Construction Area Planting Standard on page 4.42.

Construction Specifications

See Figures 4.9 and 4.10 for details.

1. All graded or disturbed areas, including slopes, shall be protected during clearing and construction in accordance with the erosion and sediment control plan until they are adequately stabilized.

2. All erosion and sediment control practices and measures shall be constructed, applied and maintained in accordance with the erosion and sediment control plan and these standards.

3. Topsoil required for the establishment of vegetation shall be stockpiled in amount necessary to complete finished grading of all exposed areas.

4. Areas to be filled shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, or other objectionable material.

5. Areas that are to be topsoiled shall be scarified to a minimum depth of four inches prior to placement of topsoil.

6. All fills shall be compacted as required to reduce erosion, slippage, settlement, subsidence, or other related problems. Fill intended to support buildings, structures, and conduits, etc., shall be compacted in accordance with local requirements or codes.

7. All fill shall be placed and compacted in layers not to exceed 9 inches in thickness.

8. Except for approved landfills or nonstructural fills, fill material shall be free of frozen particles, brush, roots, sod, or other foreign objectionable materials that would interfere with, or prevent, construction of satisfactory fills.

9. Frozen material or soft, mucky or highly compressible materials shall not be incorporated into fill slopes or structural fills.

10. Fill shall not be placed on saturated or frozen surfaces.

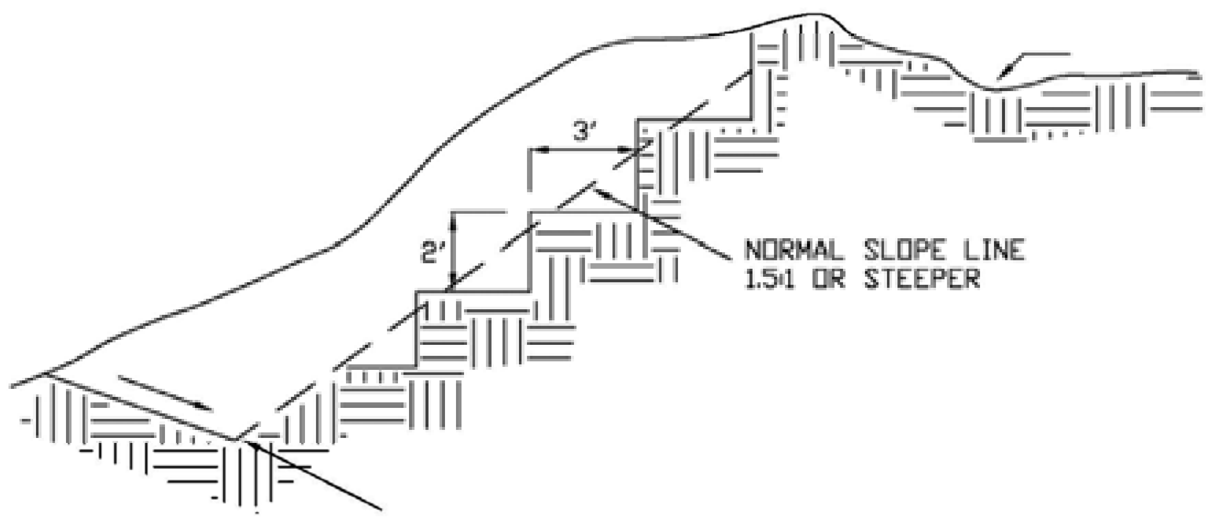
11. All benches shall be kept free of sediment during all phases of development.

12. Seeps or springs encountered during construction shall be handled in accordance with the Standard and Specification for Subsurface Drain on page 3.48 or other approved methods.

13. All graded areas shall be permanently stabilized immediately following finished grading.

14. Stockpiles, borrow areas, and spoil areas shall be shown on the plans and shall be subject to the provisions of this Standard and Specifications.

Figure 4.9
Typical Section of Serrated Cut Slope



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TYPICAL SECTION OF SERRATED CUT SLOPE

Figure 4.10
Landgrading

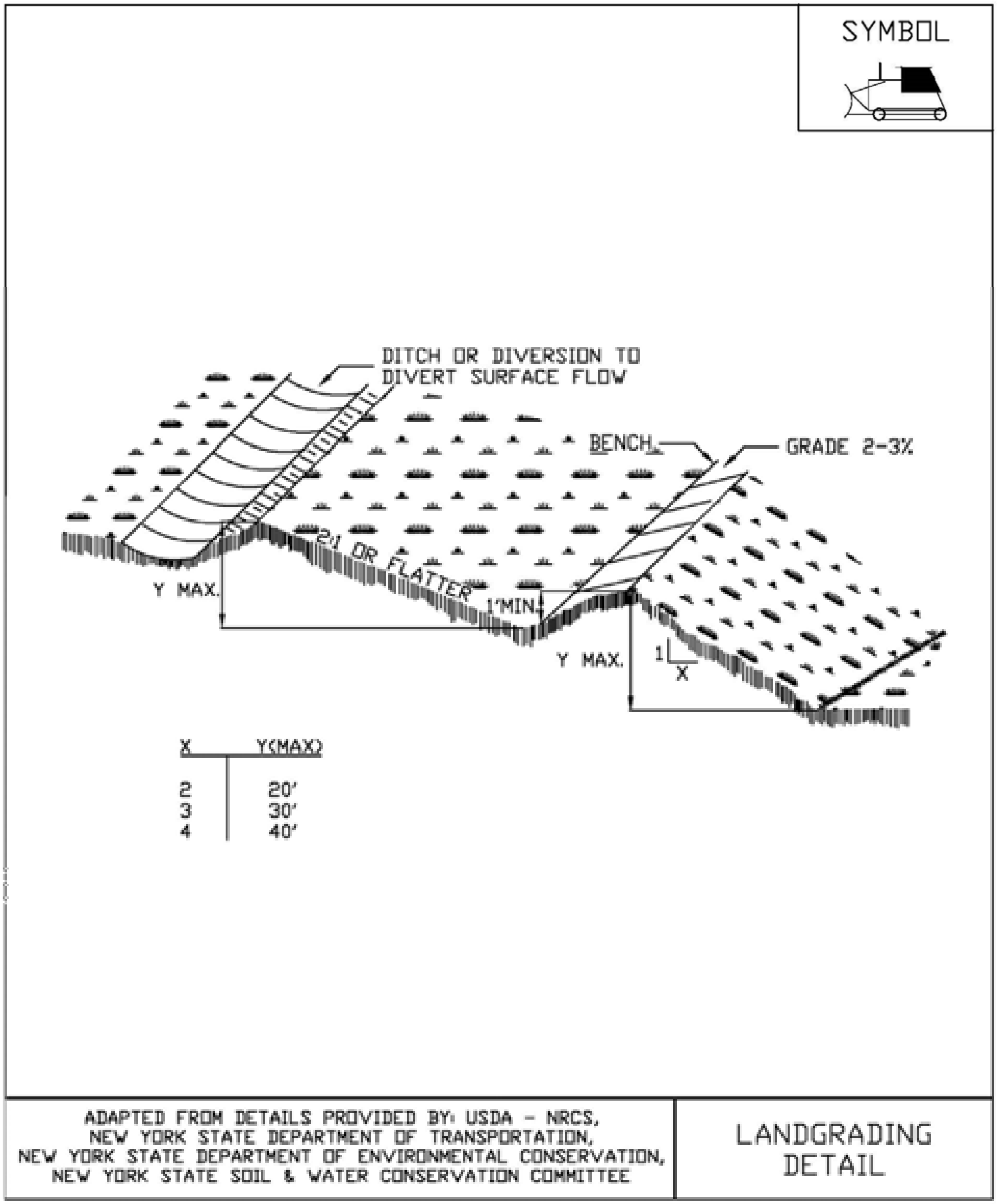


Figure 4.11
Landgrading - Construction Specifications

CONSTRUCTION SPECIFICATIONS

1. ALL GRADED OR DISTURBED AREAS INCLUDING SLOPES SHALL BE PROTECTED DURING CLEARING AND CONSTRUCTION IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN UNTIL THEY ARE PERMANENTLY STABILIZED.
2. ALL SEDIMENT CONTROL PRACTICES AND MEASURES SHALL BE CONSTRUCTED, APPLIED AND MAINTAINED IN ACCORDANCE WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.
3. TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED IN AMOUNT NECESSARY TO COMPLETE FINISHED GRADING OF ALL EXPOSED AREAS.
4. AREAS TO BE FILLED SHALL BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS OR OTHER OBJECTIONABLE MATERIAL.
5. AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF FOUR INCHES PRIOR TO PLACEMENT OF TOPSOIL.
6. ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.
7. ALL FILL SHALL BE PLACED AND COMPACTED IN LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.
8. EXCEPT FOR APPROVED LANDFILLS, FILL MATERIAL SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OTHER OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.
9. FROZEN MATERIALS OR SOFT, MUCKY OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED IN FILLS.
10. FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.
11. ALL BENCHES SHALL BE KEPT FREE OF SEDIMENT DURING ALL PHASES OF DEVELOPMENT.
12. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.
13. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY FOLLOWING FINISHED GRADING.
14. STOCKPILES, BORROW AREAS AND SPOIL AREAS SHALL BE SHOWN ON THE PLANS AND SHALL BE SUBJECT TO THE PROVISIONS OF THIS STANDARD AND SPECIFICATION.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	LANDGRADING SPECIFICATIONS

STANDARD AND SPECIFICATIONS FOR MULCHING

Definition and Scope

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch can also be used alone for temporary stabilization in non-growing months. Use of stone as a mulch could be more permanent and should not be limited to non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Hay mulch shall not be used in wetlands or in areas of permanent seeding. Clean straw mulch is preferred alternative in wetland application. Determine local availability.

Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.

Table 4.2
Guide to Mulch Materials, Rates, and Uses

Mulch Material	Quality Standards	per 1000 Sq. Ft.	per Acre	Depth of Application	Remarks
Wood chips or shavings	Air-dried. Free of objectionable coarse material	500-900 lbs.	10-20 tons	2-7”	Used primarily around shrub and tree plantings and recreation trails to inhibit weed competition. Resistant to wind blowing. Decomposes slowly.
Wood fiber cellulose (partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2,000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons of hay or straw.
Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A—1 1/2”	9 cu. yds.	405 cu. yds.	3”	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2,000 lbs./cu. yd.). Frequently used over filter fabric for better weed control.
Hay or Straw	Air-dried; free of undesirable seeds & coarse materials	90-100 lbs. 2-3 bales	2 tons (100-120 bales)	cover about 90% surface	Use small grain straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Provides the best micro-environment for germinating seeds.
Jute twisted yarn	Undyed, unbleached plain weave. Warp 78 ends/yd., Weft 41 ends/yd. 60-90 lbs./roll	48” x 50 yds. or 48” x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers specifications. Good for center line of concentrated water flow.
Excelsior wood fiber mats	Interlocking web of excelsior fibers with photodegradable plastic netting	4’ x 112.5’ or 8’ x 112.5’.	—	—	Use without additional mulch. Excellent for seeding establishment. Anchor as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two sided plastic for centerline of waterways.
Straw or coconut fiber, or combination	Photodegradable plastic net on one or two sides	Most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways, 60 sq. yds. per roll.

Table 4.3
Mulch Anchoring Guide

Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Peg and Twine	Hay or straw	After mulching, divide areas into blocks approximately 1 sq. yd. in size. Drive 4-6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more tight turns. Drive pegs flush with soil. Driving stakes into ground tightens the twine.
2. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3. Wood cellulose fiber	Hay or straw	Apply with hydroseeder immediately after mulching. Use 500 lbs. wood fiber per acre. Some products contain an adhesive material ("tackifier"), possibly advantageous.
4. Mulch anchoring tool	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
5. Tackifier	Hay or straw	Mix and apply polymeric and gum tackifiers according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperature higher than 45^0 Fahrenheit are required.

STANDARD AND SPECIFICATIONS FOR PERMANENT CONSTRUCTION AREA PLANTING

Definition & Scope

Establishing **permanent** grasses with other forbs and/or shrubs to provide a minimum 80% perennial vegetative cover on areas disturbed by construction and critical areas to reduce erosion and sediment transport. Critical areas may include but are not limited to steep excavated cut or fill slopes as well as eroding or denuded natural slopes and areas subject to erosion.

Conditions Where Practice Applies

This practice applies to all disturbed areas void of, or having insufficient, cover to prevent erosion and sediment transport. See additional standards for special situations such as sand dunes and sand and gravel pits.

Criteria

All water control measures will be installed as needed prior to final grading and seedbed preparation. Any severely compacted sections will require chiseling or disking to provide an adequate rooting zone, to a minimum depth of 12", see Soil Restoration Standard. The seedbed must be prepared to allow good soil to seed contact, with the soil not too soft and not too compact. Adequate soil moisture must be present to accomplish this. If surface is powder dry or sticky wet, postpone operations until moisture changes to a favorable condition. If seeding is accomplished within 24 hours of final grading, additional scarification is generally not needed, especially on ditch or stream banks. Remove all stones and other debris from the surface that are greater than 4 inches, or that will interfere with future mowing or maintenance.

Soil amendments should be incorporated into the upper 2 inches of soil when feasible. **The soil should be tested to determine the amounts of amendments needed.** Apply ground agricultural limestone to attain a pH of 6.0 in the upper 2 inches of soil. If soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply commercial fertilizer at 600 lbs. per acre of 5-5-10 or equivalent. If manure is used, apply a quantity to meet the nutrients of the above fertilizer. This requires an appropriate manure analysis prior to applying to the site. Do not use manure on sites to be planted with birdsfoot trefoil or in the path of concentrated water flow.

Seed mixtures may vary depending on location within the state and time of seeding. Generally, warm season grasses should only be seeded during early spring, April to May. These grasses are primarily used for vegetating excessively drained sands and gravels. See Standard and Specification for Sand and Gravel Mine Reclamation. Other grasses may be seeded any time of the year when the soil is not frozen and is workable. When legumes such as birdsfoot trefoil are included, spring seeding is preferred. See Table 4.4, "Permanent Construction Area Planting Mixture Recommendations" for additional seed mixtures.

General Seed Mix:	**Variety**	**lbs./ acre**	**lbs/1000 sq. ft.**
Red Clover[1] OR	Acclaim, Rally, Red Head II, Renegade	8[2]	0.20
Common white clover[1]	Common	8	0.20
PLUS			
Creeping Red Fescue	Common	20	0.45
PLUS			
Smooth Bromegrass OR	Common	2	0.05
Ryegrass (perennial)	Pennfine/Linn	5	0.10
[1] add inoculant immediately prior to seeding [2] Mix 4 lbs each of Empire and Pardee OR 4 lbs of Birdsfoot and 4 lbs white clover per acre. All seeding rates are given for Pure Live Seed (PLS)			

Pure Live Seed, or (PLS) refers to the amount of live seed in a lot of bulk seed. Information on the seed bag label includes the type of seed, supplier, test date, source of seed, purity, and germination. Purity is the percentage of pure seed. Germination is the percentage of pure seed that will produce normal plants when planted under favorable conditions.

To compute Pure Live Seed multiply the "germination percent" times the "purity" and divide that by 100 to get Pure Live Seed.

$$\text{Pure Live Seed (PLS)} = \frac{\text{\% Germination} \times \text{\% Purity}}{100}$$

For example, the PLS for a lot of Kentucky Blue grass with 75% purity and 96% germination would be calculated as follows:

$$\frac{(96) \times (75)}{100} = 72\% \text{ Pure Live Seed}$$

For 10lbs of PLS from this lot =

$$\frac{10}{0.72} = 13.9 \text{ lbs}$$

Therefore, 13.9 lbs of seed is the actual weight needed to meet 10lbs PSL from this specific seed lot.

Time of Seeding: The optimum timing for the general seed mixture is early spring. Permanent seedings may be made any time of year if properly mulched and adequate moisture is provided. Late June through early August is not a good time to seed, but may facilitate covering the land without additional disturbance if construction is completed. Portions of the seeding may fail due to drought and heat. These areas may need reseeding in late summer/fall or the following spring.

Method of seeding: Broadcasting, drilling, cultipack type seeding, or hydroseeding are acceptable methods. Proper soil to seed contact is key to successful seedings.

Mulching: Mulching is essential to obtain a uniform stand of seeded plants. Optimum benefits of mulching new seedings are obtained with the use of small grain straw applied at a rate of 2 tons per acre, and anchored with a netting or tackifier. See the Standard and Specifications for Mulching for choices and requirements.

Irrigation: Watering may be essential to establish a new seeding when a drought condition occurs shortly after a new seeding emerges. Irrigation is a specialized practice and care must be taken not to exceed the application rate for the soil or subsoil. When disconnecting irrigation pipe, be sure pipes are drained in a safe manor, not creating an erosion concern.

80% Perennial Vegetative Cover

50% Perennial Vegetative Cover

Table 4.4
Permanent Construction Area Planting Mixture Recommendations

Seed Mixture	Variety	Rate in lbs./acre (PLS)	Rate in lbs./ 1, 000 ft^2
Mix #1			
Creeping red fescue	Ensylva, Pennlawn, Boreal	10	.25
Perennial ryegrass	Pennfine, Linn	10	.25
*This mix is used extensively for shaded areas.			
Mix #2			
Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	20	.50
*This rate is in pure live seed, this would be an excellent choice along the upland edge of a wetland to filter runoff and provide wildlife benefits. In areas where erosion may be a problem, a companion seeding of sand lovegrass should be added to provide quick cover at a rate of 2 lbs. per acre (0.05 lbs. per 1000 sq. ft.).			
Mix #3			
Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	4	.10
Big bluestem	Niagara	4	.10
Little bluestem	Aldous or Camper	2	.05
Indiangrass	Rumsey	4	.10
Coastal panicgrass	Atlantic	2	.05
Sideoats grama	El Reno or Trailway	2	.05
Wildflower mix		.50	.01
*This mix has been successful on sand and gravel plantings. It is very difficult to seed without a warm season grass seeder such as a Truax seed drill. Broadcasting this seed is very difficult due to the fluffy nature of some of the seed, such as bluestems and indiangrass.			
Mix #4			
Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	10	.25
Coastal panicgrass	Atlantic	10	.25
*This mix is salt tolerant, a good choice along the upland edge of tidal areas and roadsides.			
Mix #5			
Saltmeadow cordgrass (Spartina patens)—This grass is used for tidal shoreline protection and tidal marsh restoration. It is planted by vegetative stem divisions. 'Cape' American beachgrass can be planted for sand dune stabilization above the saltmeadow cordgrass zone.			
Mix #6			
Creeping red fescue	Ensylva, Pennlawn, Boreal	20	.45
Chewings Fescue	Common	20	.45
Perennial ryegrass	Pennfine, Linn	5	.10
Red Clover	Common	10	.45
*General purpose erosion control mix. Not to be used for a turf planting or play grounds.			

STANDARD AND SPECIFICATIONS FOR RETAINING WALLS

Definition & Scope

A **permanent** structural wall constructed and located to prevent soil movement by retaining soil in place and preventing slope failures and movement of material down steep slopes.

Conditions Where Practice Applies

A retaining wall may be used where site constraints will not allow slope shaping and seeding to stabilize an area. Slope areas that demonstrate seepage problems or experience erosive conditions at the toe can utilize retaining walls to help stabilize these areas. Retaining walls can be built from mortared block or stone, cast-in-place concrete, railroad ties, gabions, and more recently, precast concrete modular units and segmented walls that form a gravity retaining wall (see Figure 4.16 and 4.17). These precast units allow for ease and quickness of installation while their granular backfill provides drainage. Selection of materials and type of wall should be based on hazard potential, load conditions, soil parameters, groundwater conditions, site constraints, and aesthetics.

Design Criteria

The design of any retaining wall structure must address the aspects of foundation bearing capacity, sliding, overturning, drainage and loading systems. **These are complex systems that should be designed by a licensed professional engineer.**

Bearing Capacity – A minimum factor of safety of 1.5 should be maintained as the ratio of the ultimate bearing capacity to the designed unit loading. Spread footers and other methods may be used to meet factor requirements.

Sliding – A minimum factor of 2.0 should be maintained against sliding. This factor can be reduced to 1.5 when passive pressures on the front of the wall are ignored.

Overturning – A minimum factor of safety of 1.5 should be used as the ratio of the resisting moment (that which tends to keep the wall in place) to the overturning moment.

Drainage – Unless adequate provisions are made to control both surface and groundwater behind the retaining wall, a substantial increase in active pressures tending to slide or overturn the wall will result. When backfill is sloped down to a retaining wall, surface drainage should be provided. Drainage systems with adequate outlets should be provided behind retaining walls that are placed in cohesive soils. Drains should be graded or protected by filters so soil material will not move through the drainfill.

Load systems – Several different loads or combination of loads need to be considered when designing a retaining wall. The minimum load is the level backfill that the wall is being constructed to retain. Its unit weight will vary depending on its composition.

Additional loads such as line loads, surcharge loads, or slope fills, will add to make the composite design load system for the wall.

Construction Specifications

Concrete Walls

1. Foundation will be prepared by excavating to the lines and grades shown on the drawings and removing all objectionable material.
2. Subgrade will be compacted and kept moist at least 2 hours prior to placement of concrete.
3. Steel reinforcing will be in accordance with the schedule on the drawings and kept free of rust, scale, or dirt.
4. Exposed edges will be chamfered ¾ inches.
5. Drainfill will meet the gradations shown on the drawings.

6. Weep holes will be provided as drain outlets as shown on the drawings.

7. Concrete will be poured and cured in accordance with American Concrete Institute (ACI) specifications.

Precast Units

1. Foundation will be prepared by excavating to the lines and grades shown on the drawings.
2. Subgrade will be compacted and trimmed to receive the leveling beam.
3. Precast units will be placed in accordance with the manufacturers recommendation.
4. Granular fill placed in the precast bins shall be placed in 3-foot lifts, leveled off and compacted with a plate vibrator.

Segmented Walls

1. Foundation will be prepared by excavating to the lines and grades shown on the drawings.
2. Sub-grade will be compacted and screeded to form the base for the first course of wall units.
3. Units will be placed in accordance with the manufacturers recommendations, with each succeeding lift anchored and pinned as specified.
4. Granular fill will be placed behind the segmented wall to provide drainage. It shall be compacted with a plate vibrator. A drainage outlet will be provided as specified on the construction drawings.

Gabions

1. Foundation will be prepared by excavating to the lines and grades shown on the drawings.
2. Subgrade will be compacted and leveled to receive first layer of gabions. The first row will be keyed into the existing grade at the toe, a minimum of 1.5 feet.
3. Gabions will be placed according to the manufacturers recommendations.
4. Gabions will be filled with stone or crushed rock from 4 to 8 inches in diameter.

Non-Mortared Stone Walls

1. Foundation will be prepared by excavating to the lines and grade shown on the drawings.
2. Subgrade will be compacted and leveled to receive monolithic stone. First row will be placed 1.0 feet below design toe elevation.
3. Stone will be placed horizontally with long dimension parallel to face of wall except at return ends.
4. Maximum of 3 lifts of stone each approximately 2' thick without pinning. Where stones do not fit in good ontact, pinning with two steel #8 re-bar dowels is required.
5. Backside of stone will be filled with a minimum of 2' of #1 and #2 stone between filter fabric against parent soil and rock to provide drainage.

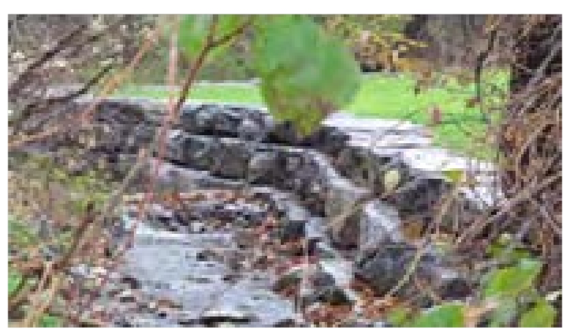
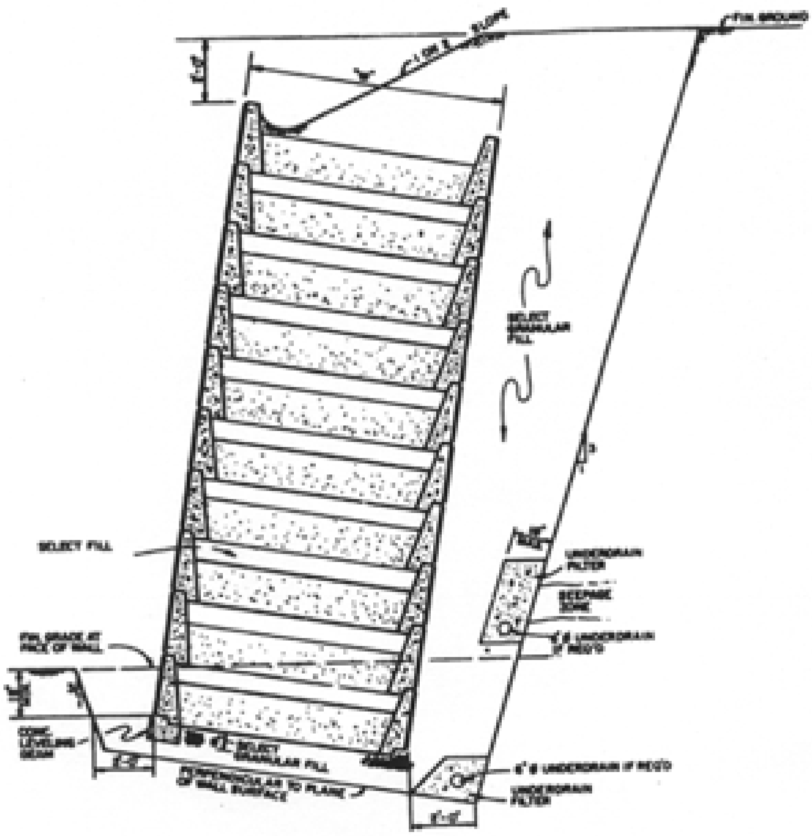
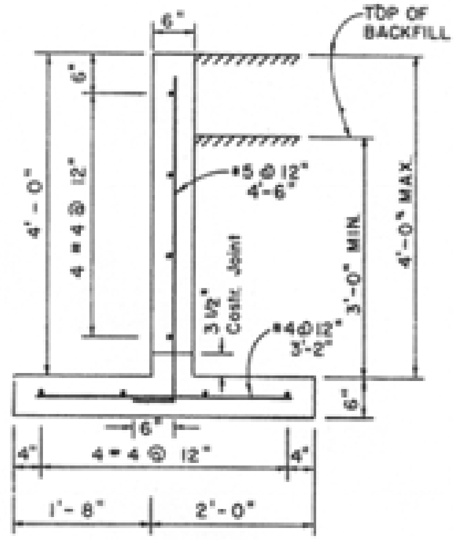


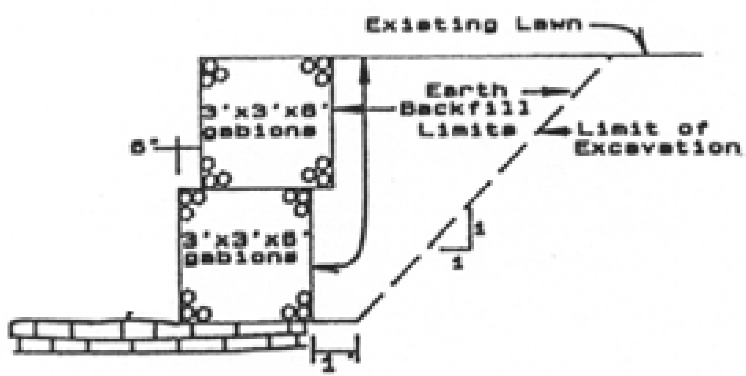
Figure 4.16
Typical Retaining Wall Examples
(Schematic only - not to be used for design)



Precast Units

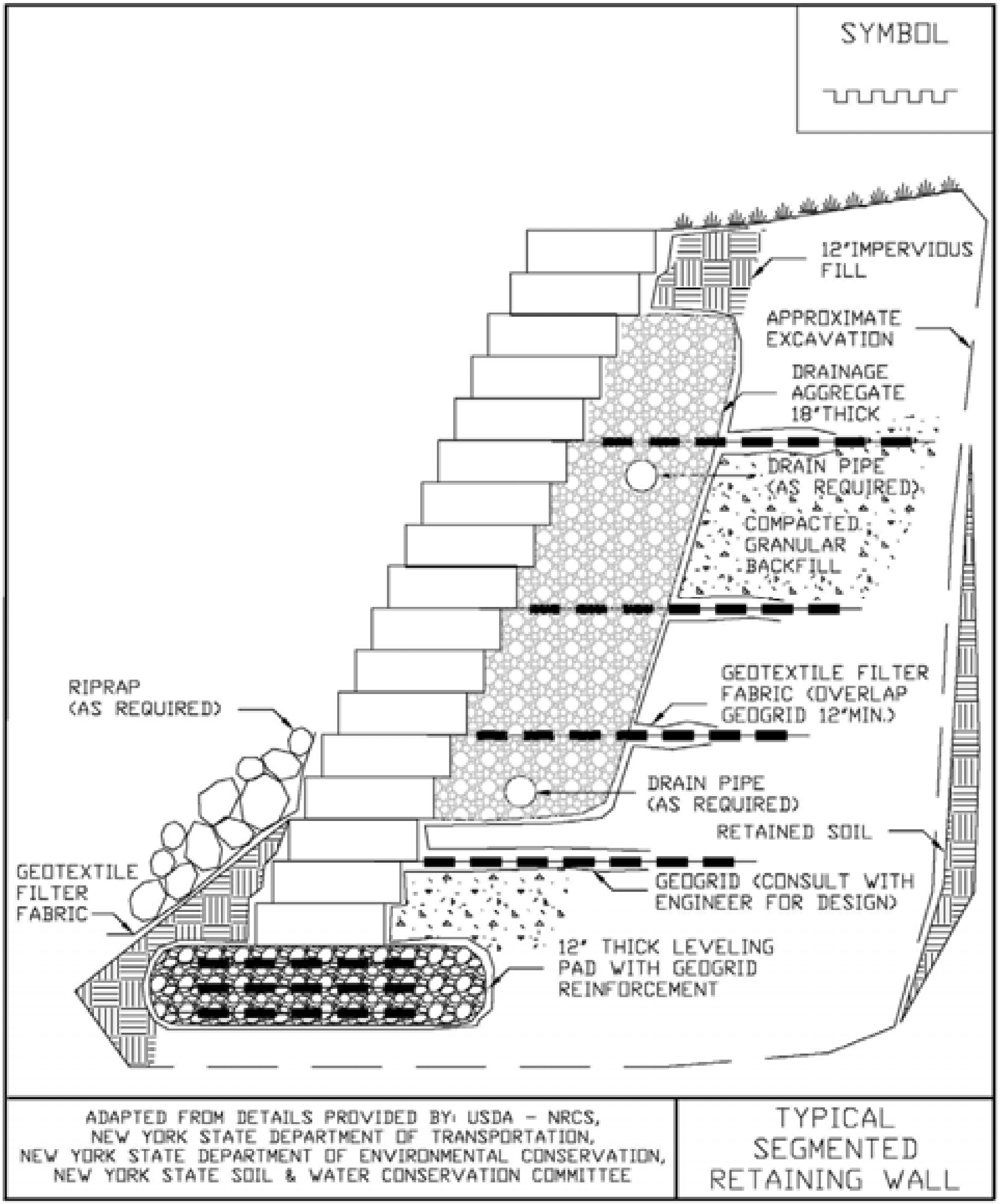


Cast In Place Concrete



Gabions

Figure 4.17
Typical Segmented Retaining Wall Example
(Schematic only - not to be used for design)



STANDARD AND SPECIFICATIONS FOR TOPSOILING

Definition & Scope

Spreading a specified quality and quantity of topsoil materials on graded or constructed subsoil areas to provide acceptable plant cover growing conditions, thereby reducing erosion; to reduce irrigation water needs; and to reduce the need for nitrogen fertilizer application.

Conditions Where Practice Applies

Topsoil is applied to subsoils that are droughty (low available moisture for plants), stony, slowly permeable, salty or extremely acid. It is also used to backfill around shrub and tree transplants. This standard does not apply to wetland soils.

Design Criteria

1. Preserve existing topsoil in place where possible, thereby reducing the need for added topsoil.
2. Conserve by stockpiling topsoil and friable fine textured subsoils that must be stripped from the excavated site and applied after final grading where vegetation will be established. Topsoil stockpiles must be stabilized. Stockpile surfaces can be stabilized by vegetation, geotextile or plastic covers. This can be aided by orientating the stockpile lengthwise into prevailing winds.
3. Refer to USDA Natural Resource Conservation Service soil surveys or soil interpretation record sheets for further soil texture information for selecting appropriate design topsoil depths.

Site Preparation

1. As needed, install erosion and sediment control practices such as diversions, channels, sediment traps, and stabilizing measures, or maintain if already installed.
2. Complete rough grading and final grade, allowing for depth of topsoil to be added.
3. Scarify all compact, slowly permeable, medium and fine textured subsoil areas. Scarify at approximately right angles to the slope direction in soil areas that are steeper than 5 percent. Areas that have been overly compacted shall be decompacted in accordance with the Soil Restoration Standard.
4. Remove refuse, woody plant parts, stones over 3 inches in diameter, and other litter.

Topsoil Materials

1. Topsoil shall have at least 6 percent by weight of fine textured stable organic material, and no greater than 20 percent. Muck soil shall not be considered topsoil.
2. Topsoil shall have not less than 20 percent fine textured material (passing the NO. 200 sieve) and not more than 15 percent clay.
3. Topsoil treated with soil sterilants or herbicides shall be so identified to the purchaser.
4. Topsoil shall be relatively free of stones over 1 1/2 inches in diameter, trash, noxious weeds such as nut sedge and quackgrass, and will have less than 10 percent gravel.
5. Topsoil containing soluble salts greater than 500 parts per million shall not be used.
6. Topsoil may be manufactured as a mixture of a mineral component and organic material such as compost.

Application and Grading

1. Topsoil shall be distributed to a uniform depth over the area. It shall not be placed when it is partly frozen, muddy, or on frozen slopes or over ice, snow, or standing water puddles.
2. Topsoil placed and graded on slopes steeper than 5 percent shall be promptly fertilized, seeded, mulched, and stabilized by "tracking" with suitable equipment.
3. Apply topsoil in the amounts shown in Table 4.7 below:

Table 4.7 - Topsoil Application Depth		
Site Conditions	**Intended Use**	**Minimum Topsoil Depth**
1. Deep sand or loamy sand	Mowed lawn	6 in.
	Tall legumes, unmowed	2 in.
	Tall grass, unmowed	1 in.
2. Deep sandy loam	Mowed lawn	5 in.
	Tall legumes, unmowed	2 in.
	Tall grass, unmowed	none
3. Six inches or more: silt loam, clay loam, loam, or silt	Mowed lawn	4 in.
	Tall legumes, unmowed	1 in.
	Tall grass, unmowed	1 in.

STANDARD AND SPECIFICATIONS FOR TREES, SHRUBS, AND VINES

Definition & Scope

Establishing trees, shrubs, and vines or selectively reducing stand density and trimming woody plants to protect the soil and plant resources, improve an area for recreation and increase the attractiveness and usefulness of areas.

Conditions Where Practice Applies

On any area planned for recreation or landscape use such as yard areas, leisure areas, picnic areas, and park lands providing outdoor recreational opportunities.

Criteria and Specifications

1. Planting nursery stock

   A. Select species to serve the intended purpose. See Appendix G, Table G.1**,** "Trees Suitable for Landscape and Conservation Plantings in New York." Where planting of trees is to be done in recreation areas, use those species resistant to compaction listed in Table G.2, "Susceptibility of Tree Species to Compaction" whenever possible.

   B. Plant Materials

   1) Plants shall conform to the species, variety, size, number, and conditions as stated in a conservation plan or on a plant list shown on landscape drawings. "American Standard for Nursery Stock," by American Association of Nurserymen, shall be used to develop the plant list for landscape drawings and to check quality of plant materials.

   2) Durable, legible labels with the scientific and common name and cultivar shall be securely attached to plants, bundles of seedlings, containers, and/or flats.

   C. Plant Protection

   Prior to delivery, the trunk, branches, and foliage of the plants shall be sprayed with non-toxic antidesiccant, applied according to the manufacturer's recommendations. This does not apply to state nursery seedlings.

   D. Planting Time

   Deciduous trees and shrubs: April 1 to June 1 and October 15 to December 15. Evergreen trees and shrubs: April 1 to June 1 and September 1 to November 15.

   E. Spacing

   Plant all trees and shrubs well back from buildings to allow for mature crown size. The following are guides for planning:

Large Trees	50-60 feet apart
Small Trees	20-30 feet apart
Columnar Species	6-8 feet apart
Hedges	1-4 feet apart
Shrubs	For clumps, plan spacing so mature shrubs will be touching or overlap-ping by only 1 or 2 feet

   F. Site Preparation

   1) Individual sites for planting seedlings can be prepared by scalping the sod away from a four foot square area where the seedling is to be planted.

   2) All planting beds shall be cultivated to a depth of 8 inches, or chemically treated for weed control. Remove objectionable objects that will interfere with maintenance of site.

   G. Planting

   1) Plants shall be located as shown on plans and/or drawings and, where necessary, located on the site by stakes, flags or other means.

   2) Prior to planting, remove galvanized wire basket securing root ball, untie and roll down burlap covering from around the stem.

3) The plants shall be set upright in holes as illustrated in Figure G.1 in Appendix G.

4) All plants shall be thoroughly watered on the same day of planting. Plants that have settled shall be reset to grade.

H. Wrapping

Immediately after planting, wrap deciduous tree trunks from the bottom to the first limb with a 4 inch wide bituminous impregnated, insect resistant tape or paper manufactured for that purpose. Tie with jute (bag strings) at top and bottom. The wrap should be removed per nursery recommendations.

I. Mulching

Mulch the disturbed area around individual trees and shrubs with a 2-3" layer of wood chips. Pull wood chips 1 inch away from the base of shrubs to avoid fungus development.

J. Pruning

After planting, prune to remove injured twigs and branches. The natural shape of the plant should not be changed.

K. Cleanup and Maintenance

1) After all work is complete, all excess soil, peat moss, debris, etc., shall be removed from the site.

2) Water plants two weeks after planting. For two years, water plants every two weeks during dry periods, which exceed three weeks without a good soaking rain, or water as needed in accordance with local conditions. Shrubs may require 5 to 10 gallons and trees, 20 to 30 gallons for each watering.

3) Remove trunk wrap per nursery recommendation.

2. Transplanting "Wild" Stock

Successful transplanting of wild stock will require heavy equipment and considerable labor as a large weight of soil must be moved with the roots.

A. Select trees and shrubs with good form and full crowns.

B. Transplant only when plants are dormant and soil is moist. Wrap soil ball with burlap to prevent soil from separating from roots.

C. Table 4.8 shows minimum diameter and approximate weight of soil ball that must be moved with each size plant.

D. Plant and maintain as described above for nursery stock.

PRUNING AND THINNING

Use	Cleared Width Each Side of Trail Tread (ft.)	Cleared Height (ft.)
<u>TRAILS</u>		
Hiking	1	8
Bicycle	2	10
Motorbike	2	10
Horse	2	12
X-Country Ski	Total: 3-12	12[1]
Snowmobile	Total: 6-12	12[1]
<u>PICNIC & CAMPING AREAS</u>		
Campfire/Grill	10 ft. diam.	15

[1] Includes allowance for snow depth and snow load on branches

1. Pruning

A. Remove trees, limbs, and limb stubs to the above widths and heights specified for the intended use.

B. Remove dead, diseased, or dying limbs that may fall.

C. Do not remove more than one-third of the live crown of a tree in a year.

D. Cut limbs flush to the branch bark ridge.

E. Use the 3 or 4 cut pruning method on all branches over 2 inches in diameter: First cut about one-third the way through the underside of the limb (about 6-12 inches from the tree trunk). Then (approximately an inch further out) make a second cut through the limb from the upper side. When the branch is removed, there is no splintering of the main tree trunk. Remove the stub. If the branch is larger than 5-6 inches in diameter, use the four cut system. Cuts 1 and 2 remain the same and cut 3 should be from the underside of the limb, on the outside of the branch collar. Cut 4 should be from the top and in alignment with the 3rd cut. Cut 3 should be 1/4 to 1/3 the way through the limb. This will prevent the bark from peeling down the trunk. Do not paint the cut surface.

2. Thinning

   A. Remove dead, diseased, dying, poorly anchored, or ice damaged trees that pose a hazard to recreationists or that interfere with intended use.

   B. To maintain grass cover in a wooded area, thin according to formula Dx3 (average diameter of the trunk of overstory trees, in inches, times three—the answer is the spacing between trees to be left, in feet). For example, for trees with average diameter of 6 inches, spacing after thinning should leave trees 18 feet apart on average. Crown cover after thinning should be about 50 percent.

   C. Selectively thin as needed to favor those trees that are most "resistant" to compaction around their roots. See Table G.2**,** "Susceptibility of Tree Species to Compaction" in Appendix G. If the soil on the site is naturally well drained, those species in the "intermediate" group may also be favored.

Table 4.8
Size and Weight of Earth Ball Required to Transplant Wild Stock

	Shade Trees (Maple, Ash, Oak, Birch, etc.)		Small Trees & Shrubs (Crabapple, Thornapple, Viburnum, Dogwood, etc.)		
Caliper[1] (Inches)	Minimum Diameter Ball (Inches)	Weight of Ball (lbs.)	Up to 6 ft. Height — 6 ft. and Caliper[1]	Minimum Diameter Ball (Inches)	Weight of Ball (lbs.)
1/2	14	88	2	12	55
3/4	16	130	3	14	88
1	18	186	4	16	130
1-1/4	20	227	5	18	186
1-1/2	22	302	3/4	18	186
1-3/4	24	390	1	20	227
2	28	621	1-1/2	22	302
3	32	836	1-3/4	24	390
3-1/2	38	1,400	2	28	621
4	42	1,887	2-1/2	32	836
			3	38	1,400

[1]Caliper is a diameter measurement of trees at a height of 6 inches above the ground.

STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition & Scope

A **temporary** barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil by temporarily ponding the sediment laden runoff allowing settling to occur. The maximum period of use is limited by the ultraviolet stability of the fabric (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope length and fence length will not exceed the limits shown in the Design Criteria for the specific type of silt fence used ; and

2. Maximum ponding depth of 1.5 feet behind the fence; and

3. Erosion would occur in the form of sheet erosion; and

4. There is no concentration of water flowing to the barrier; and

5. Soil conditions allow for proper keying of fabric, or other anchorage, to prevent blowouts.

Design Criteria

1. Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff.

2. All silt fences shall be placed as close to the disturbed area as possible, but at least 10 feet from the toe of a slope steeper than 3H:1V, to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.

3. The type of silt fence specified for each location on the plan shall not exceed the maximum slope length and maximum fence length requirements shown in the following table:

		Slope Length/Fence Length (ft.)		
Slope	Steepness	Standard	Reinforced	Super
<2%	< 50:1	300/1500	N/A	N/A
2-10%	50:1 to 10:1	125/1000	250/2000	300/2500
10-20%	10:1 to 5:1	100/750	150/1000	200/1000
20-33%	5:1 to 3:1	60/500	80/750	100/1000
33-50%	3:1 to 2:1	40/250	70/350	100/500
>50%	> 2:1	20/125	30/175	50/250

Standard Silt Fence (SF) is fabric rolls stapled to wooden stakes driven 16 inches in the ground.
Reinforced Silt Fence (RSF) is fabric placed against welded wire fabric with anchored steel posts driven 16 inches in the ground.
Super Silt Fence (SSF) is fabric placed against chain link fence as support backing with posts driven 3 feet in the ground.

4. Silt fence shall be removed as soon as the disturbed area has achieved final stabilization.

The silt fence shall be installed in accordance with the appropriate details. Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. Butt joints are not acceptable. A detail of the silt fence shall be shown on the plan. See Figure 5.30 on page 5.56 for Reinforced Silt Fence as an example of details to be provided.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	US Std Sieve ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.5 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot. Posts for super silt fence shall be standard chain link fence posts.

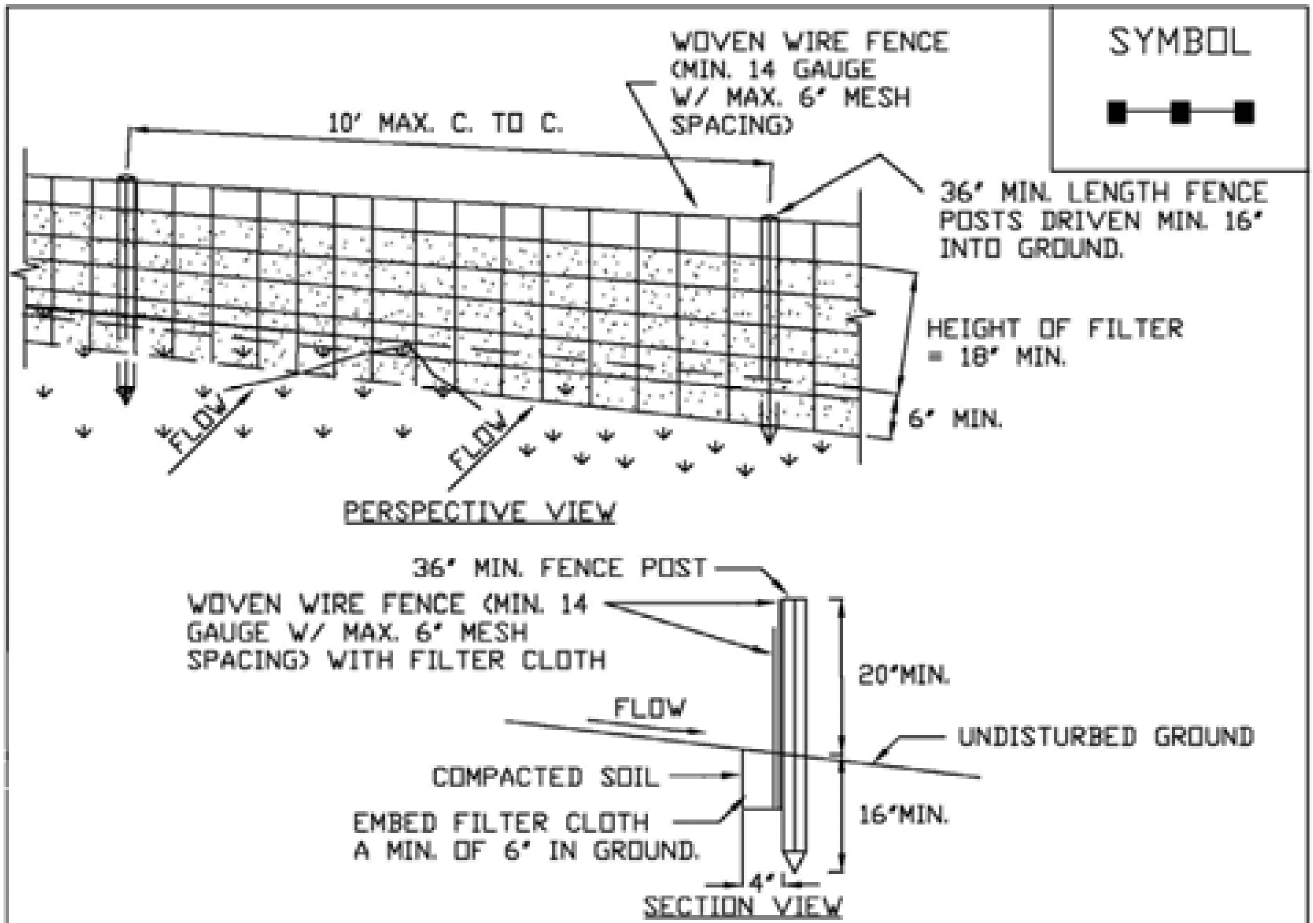
3. Wire Fence for reinforced silt fence: Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated silt fence is acceptable as long as all material specifications are met.

<u>Reinforced Silt Fence</u>

<u>Super Silt Fence</u>

Figure 5.30
Reinforced Silt Fence



CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL MEET THE MINIMUM REQUIREMENTS SHOWN.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	REINFORCED SILT FENCE

STANDARD AND SPECIFICATIONS FOR STORM DRAIN INLET PROTECTION

Definition & Scope

A **temporary** barrier with low permeability, installed around inlets in the form of a fence, berm or excavation around an opening, detaining water and thereby reducing the sediment content of sediment laden water by settling thus preventing heavily sediment laden water from entering a storm drain system.

Conditions Where Practice Applies

This practice shall be used where the drainage area to an inlet is disturbed, it is not possible to temporarily divert the storm drain outfall into a trapping device, and watertight blocking of inlets is not advisable. **It is not to be used in place of sediment trapping devices.** This practice shall be used with an upstream buffer strip if placed at a storm drain inlet on a paved surface. It may be used in conjunction with storm drain diversion to help prevent siltation of pipes installed with low slope angle.

Types of Storm Drain Inlet Practices

There are five (5) specific types of storm drain inlet protection practices that vary according to their function, location, drainage area, and availability of materials:

I. Excavated Drop Inlet Protection
II. Fabric Drop Inlet Protection
III. Stone & Block Drop Inlet Protection
IV. Paved Surface Inlet Protection
V. Manufactured Insert Inlet Protection

Design Criteria

Drainage Area – The drainage area for storm drain inlets shall not exceed one acre. Erosion control/temporary stabilization measures must be implemented on the disturbed drainage area tributary to the inlet. The crest elevations of these practices shall provide storage and minimize bypass flow.

Type I – Excavated Drop Inlet Protection

This practice is generally used during initial overlot grading after the storm drain trunk line is installed.

Limit the drainage area to the inlet device to 1 acre. Excavated side slopes shall be no steeper than 2:1. The minimum depth shall be 1 foot and the maximum depth 2 feet as measured from the crest of the inlet structure. Shape the excavated basin to fit conditions with the longest dimension oriented toward the longest inflow area to provide maximum trap efficiency. The capacity of the excavated basin should be established to contain 900 cubic feet per acre of disturbed area. Weep holes, protected by fabric and stone, should be provided for draining the temporary pool.

Inspect and clean the excavated basin after every storm. Sediment should be removed when 50 percent of the storage volume is achieved This material should be incorporated into the site in a stabilized manner.

Type II – Fabric Drop Inlet Protection

This practice is generally used during final elevation grading phases after the storm drain system is completed.

Limit the drainage area to 1 acre per inlet device. Land area slope immediately surrounding this device should not exceed 1 percent. The maximum height of the fabric above the inlet crest shall not exceed 1.5 feet unless reinforced.

The top of the barrier should be maintained to allow overflow to drop into the drop inlet and not bypass the inlet to unprotected lower areas. Support stakes for fabric shall be a minimum of 3 feet long, spaced a maximum 3 feet apart. They should be driven close to the inlet so any overflow drops into the inlet and not on the unprotected soil. Improved performance and sediment storage volume can be obtained by excavating the area.

Inspect the fabric barrier after each rain event and make repairs as needed. Remove sediment from the pool area as necessary with care not to undercut or damage the filter fabric. Upon stabilization of the drainage area, remove all materials and unstable sediment and dispose of properly. Bring the adjacent area of the drop inlet to grade, smooth and compact and stabilize in the appropriate manner to the site.

Type III – Stone and Block Drop Inlet Protection

This practice is generally used during the initial and intermediate overlot grading of a construction site.

Limit the drainage area to 1 acre at the drop inlet. The stone barrier should have a minimum height of 1 foot and a maximum height of 2 feet. Do not use mortar. The height should be limited to prevent excess ponding and bypass flow.

Recess the first course of blocks at least 2 inches below the crest opening of the storm drain for lateral support. Subsequent courses can be supported laterally if needed by placing a 2x4 inch wood stud through the block openings perpendicular to the course. The bottom row should have a few blocks oriented so flow can drain through the block to dewater the basin area.

The stone should be placed just below the top of the blocks on slopes of 2:1 or flatter. Place hardware cloth of wire mesh with ½ inch openings over all block openings to hold stone in place.

As an optional design, the concrete blocks may be omitted and the entire structure constructed of stone, ringing the outlet ("doughnut"). The stone should be kept at a 3:1 slope toward the inlet to keep it from being washed into the inlet. A level area 1 foot wide and four inches below the crest will further prevent wash. Stone on the slope toward the inlet should be at least 3 inches in size for stability and 1 inch or smaller away from the inlet to control flow rate. The elevation of the top of the stone crest must be maintained 6 inches lower than the ground elevation down slope from the inlet to ensure that all storm flows pass over the stone into the storm drain and not past the structure. Temporary diking should be used as necessary to prevent bypass flow.

The barrier should be inspected after each rain event and repairs made where needed. Remove sediment as necessary to provide for accurate storage volume for subsequent rains. Upon stabilization of contributing drainage area, remove all materials and any unstable soil and dispose of properly.

Bring the disturbed area to proper grade, smooth, compact and stabilize in a manner appropriate to the site.

Type IV – Paved Surface Inlet Protection

This practice is generally used after pavement construction has been done while final grading and soil stabilization is occurring. These practices should be used with upstream buffer strips in linear construction applications, and with temporary surface stabilization for overlot areas, to reduce the sediment load at the practice. This practice includes sand bags, compost filter socks, geo-tubes filled with ballast, and manufactured surface barriers. Pea gravel can also be used in conjunction with these practices to improve performance. When the inlet is not at a low point, and is offset from the pavement or gutter line, protection should be selected and installed so that flows are not diverted around the inlet.

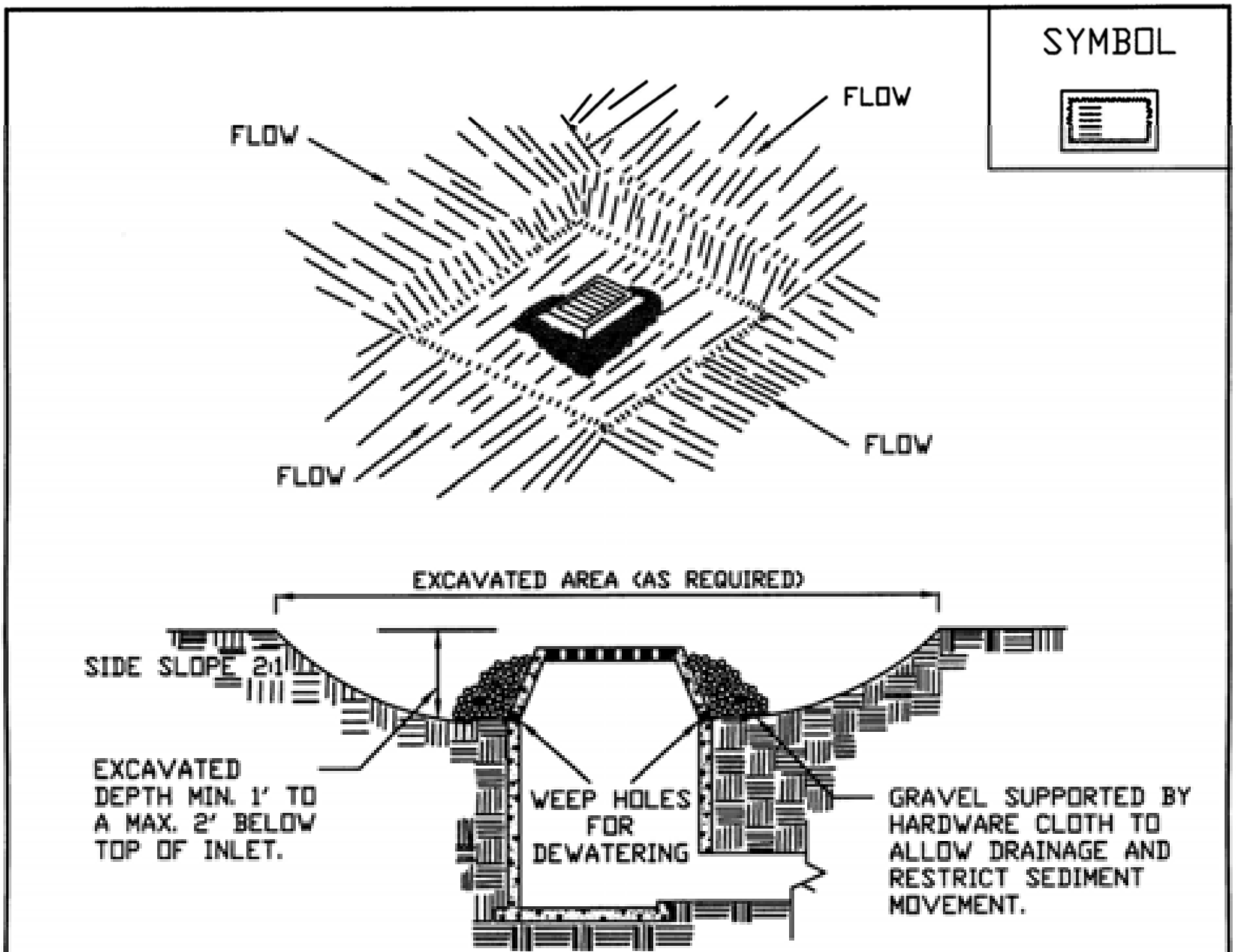
The drainage area should be limited to 1 acre at the drain inlet. All practices will be placed at the inlet perimeter or beyond to maximize the flow capacity of the inlet. Practices shall be weighted, braced, tied, or otherwise anchored to prevent movement or shifting of location on paved surfaces. Traffic safety shall be integrated with the use of this practice. All practices should be marked with traffic safety cones as appropriate. Structure height shall not cause flooding or by-pass flow that would cause additional erosion.

The structure should be inspected after every storm event. Any sediment should be removed and disposed of on the site. Any broken or damaged components should be replaced. Check all materials for proper anchorage and secure as necessary.

Type V - Manufactured Insert Inlet Protection

The drainage area shall be limited to 1 acre at the drain inlet. All inserts will be installed and anchored in accordance with the manufacturers recommendations and design details. The fabric portion of the structure will equal or exceed the performance standard for the silt fence fabric. The inserts will be installed to preserve a minimum of 50 percent of the open, unobstructed design flow area of the storm drain inlet opening to maintain capacity for storm events.

Figure 5.31
Excavated Drop Inlet Protection



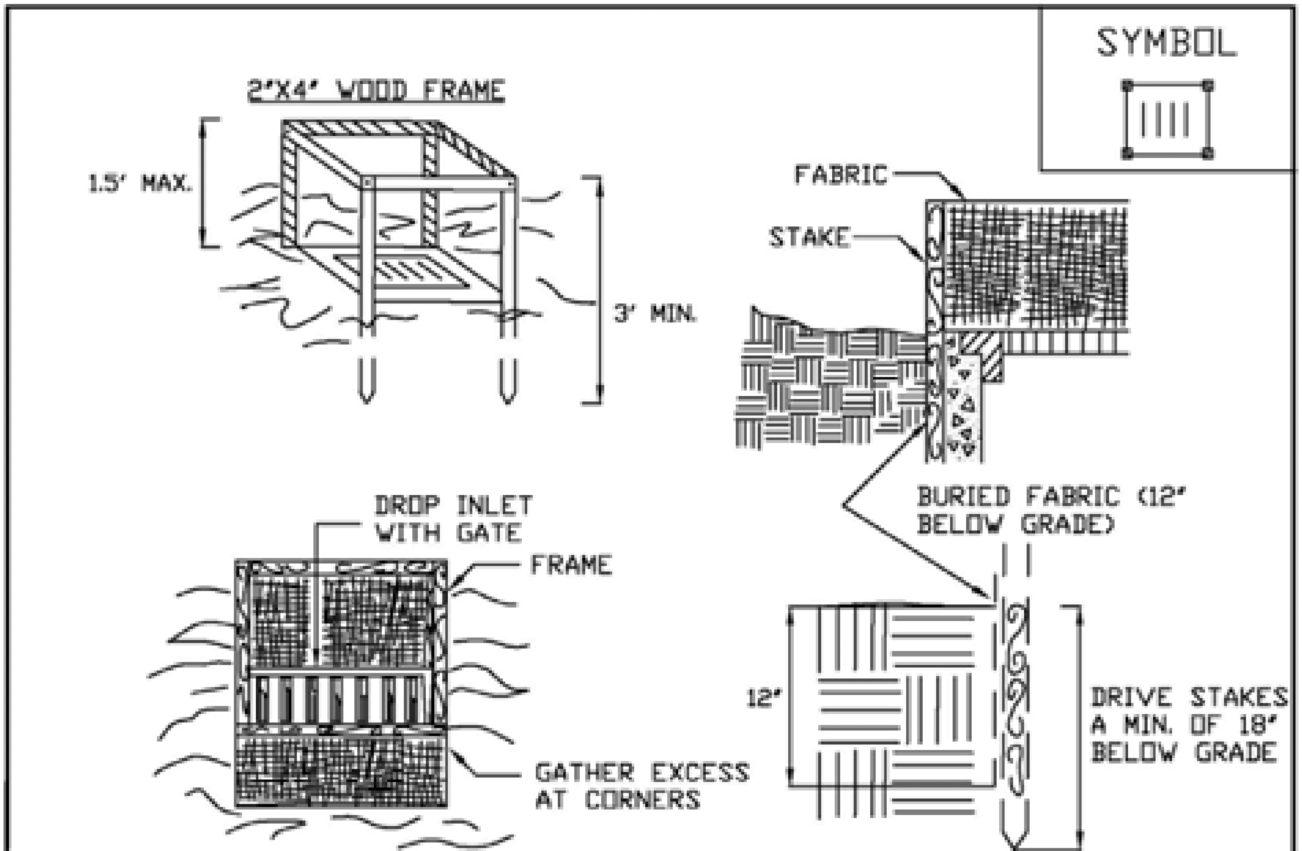
CONSTRUCTION SPECIFICATIONS

1. CLEAR THE AREA OF ALL DEBRIS THAT WILL HINDER EXCAVATION.
2. GRADE APPROACH TO THE INLET UNIFORMLY AROUND THE BASIN.
3. WEEP HOLES SHALL BE PROTECTED BY GRAVEL.
4. UPON STABILIZATION OF CONTRIBUTING DRAINAGE AREA, SEAL WEEP HOLES, FILL EXCAVATION WITH STABLE SOIL TO FINAL GRADE, COMPACT IT PROPERLY AND STABILIZE WITH PERMANENT SEEDING.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	EXCAVATED DROP INLET PROTECTION

Figure 5.32
Fabric Drop Inlet Protection



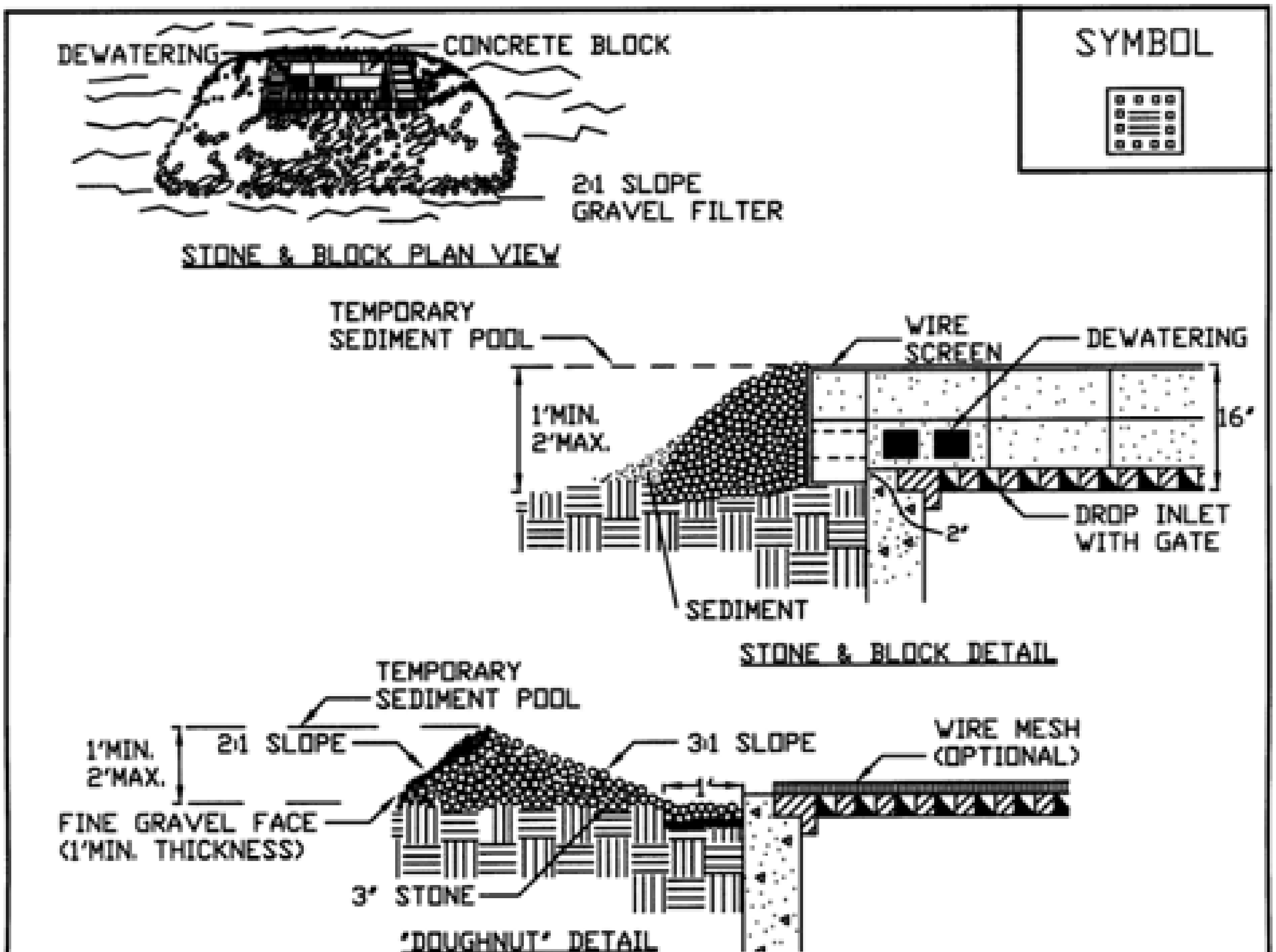
CONSTRUCTION SPECIFICATIONS

1. FABRIC SHALL HAVE AN EOS OF 40-85. BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.
2. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.
3. STAKE MATERIALS WILL BE STANDARD 2" x 4" WOOD OR EQUIVALENT. METAL WITH A MINIMUM LENGTH OF 3 FEET.
4. SPACE STAKES EVENLY AROUND INLET 3 FEET APART AND DRIVE A MINIMUM 18 INCHES DEEP. SPANS GREATER THAN 3 FEET MAY BE BRIDGED WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.
5. FABRIC SHALL BE EMBEDDED 1 FOOT MINIMUM BELOW GROUND AND BACKFILLED. IT SHALL BE SECURELY FASTENED TO THE STAKES AND FRAME.
6. A 2" x 4" WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVER FLOW STABILITY.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	FABRIC DROP INLET PROTECTION

Figure 5.33
Stone & Block Drop Inlet Protection



CONSTRUCTION SPECIFICATIONS

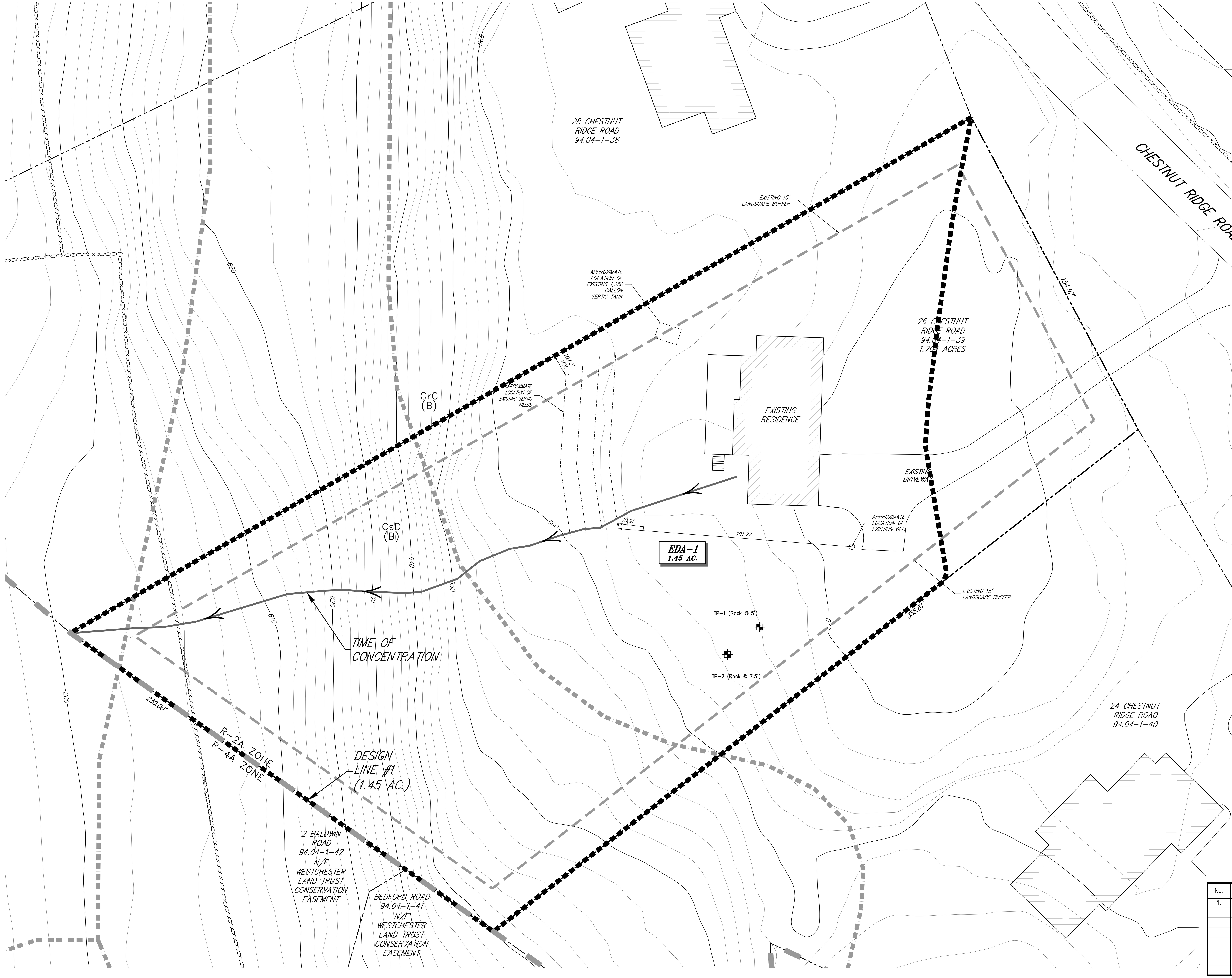
1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE FOR DEWATERING. FOUNDATION SHALL BE 2 INCHES MINIMUM BELOW REST OF INLET AND BLOCKS SHALL BE PLACED AGAINST INLET FOR SUPPORT.
2. HARDWARE CLOTH OR 1/2" WIRE MESH SHALL BE PLACED OVER BLOCK OPENINGS TO SUPPORT STONE.
3. USE CLEAN STONE OR GRAVEL 1/2-3/4 INCH IN DIAMETER PLACED 2 INCHES BELOW TOP OF THE BLOCK ON A 2:1 SLOPE OR FLATTER.
4. FOR STONE STRUCTURES ONLY, A 1 FOOT THICK LAYER OF THE FILTER STONE WILL BE PLACED AGAINST THE 3 INCH STONE AS SHOWN ON THE DRAWINGS.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE & BLOCK DROP INLET PROTECTION

APPENDIX E

DRAWINGS



LEGEND

— — — — —	EXISTING PROPERTY LINE
— - - — - - —	ADJACENT PROPERTY LINE
//////////	EXISTING BUILDING LINE
———	EXISTING PAVEMENT EDGE
664	EXISTING CONTOUR
660	EXISTING INDEX CONTOUR
ooooooooo	EXISTING STONE WALL
■ ■ ■ ■ CrC (B)	EXISTING SOIL DIVIDE AND DESIGNATION
■■■■■■	DRAINAGE DIVIDE
——<——	DRAINAGE PATH (TIME OF CONCENTRATION)

NOTES:

1. EXISTING CONDITIONS DEPICTED ON THIS PLAN HAVE BEEN TAKEN FROM THE SURVEY TITLED "PLAN OF SEWAGE SYSTEM AS BUILT FOR T.S.I. DEVELOPMENT CORP.", DATED JUNE 3, 1981 AND SUPPLEMENTED BY WESTCHESTER GIS INFORMATION. ALL TOPOGRAPHIC INFORMATION HAS BEEN TAKEN FROM WESTCHESTER COUNTY GIS INFORMATION.

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EXISTING DRAINAGE AREA MAP

PROPOSED SITE IMPROVEMENTS
26 CHESTNUT RIDGE ROAD
ARMONK, NEW YORK

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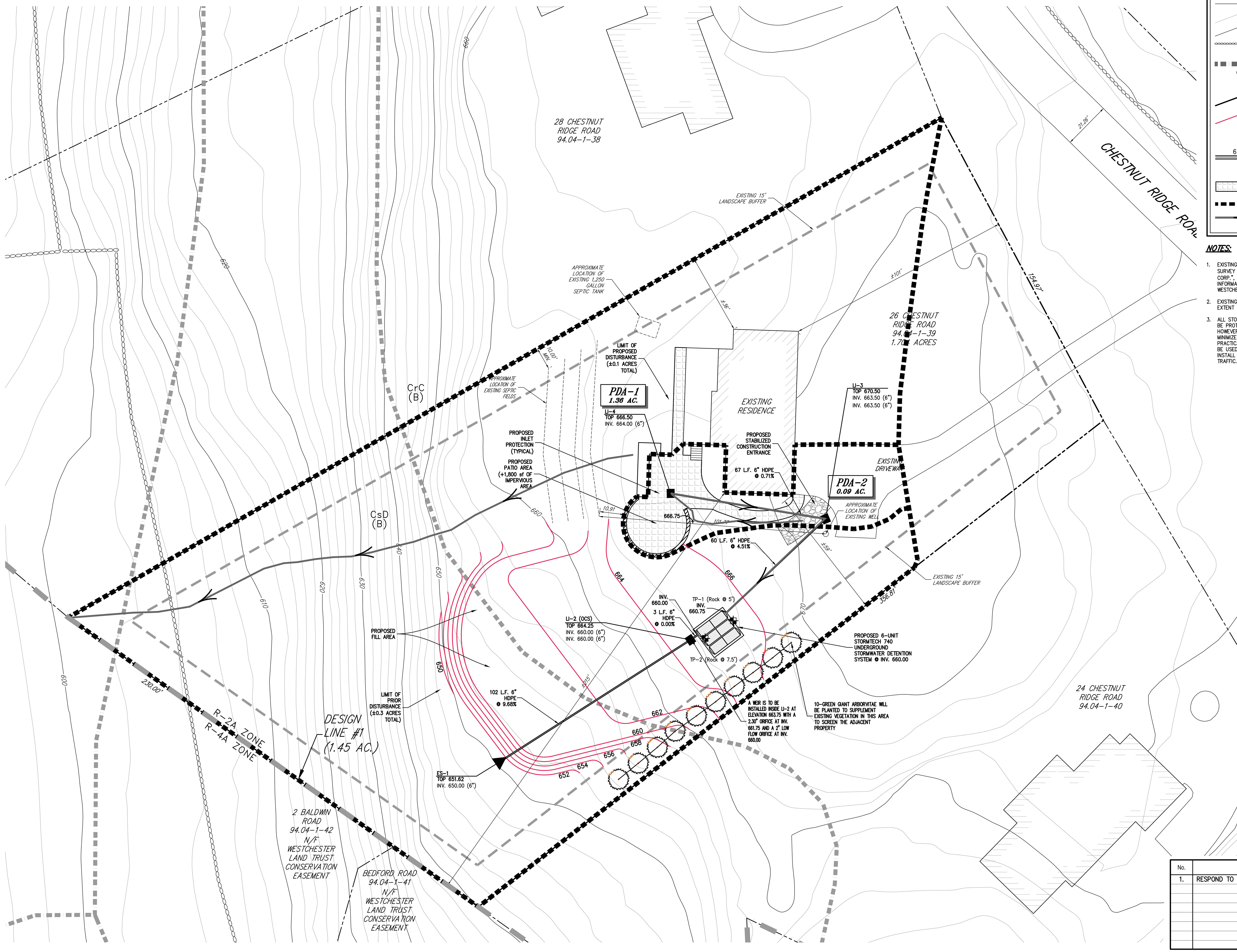
STATE OF NEW YORK • FREDERICK BOHLANDER • 100532-1 • LICENSED PROFESSIONAL ENGINEER

No.	Revision	Date	By
1.	RESPOND TO COMMENTS	05/23/2022	RB
	Previous Editions Obsolete		

Drawn: RB	Approved: AN
Scale:	1" = 20'
Date:	02/17/2022
Project No:	22021
Existing	SITE / EDA.ls
Drawing No:	DA-1

NOT FOR CONSTRUCTION



LEGEND

- EXISTING PROPERTY LINE
- ADJACENT PROPERTY LINE
- EXISTING BUILDING LINE
- EXISTING PAVEMENT EDGE
- EXISTING CONTOUR
- EXISTING INDEX CONTOUR
- EXISTING STONE WALL
- CrC (B) — EXISTING SOIL DIVIDE AND DESIGNATION
- 670 — PROPOSED FINISHED GRADE
- 664 — PRIOR GRADING DONE WITHOUT BUILDING PERMIT
- LI — PROPOSED TYPE LI DRAIN LAWN INLET
- 6" HDPE — PROPOSED STORM DRAIN LINE & SIZE
- PROPOSED END SECTION
- PROPOSED PATIO AREA
- DRAINAGE DIVIDE
- DRAINAGE PATH (TIME OF CONCENTRATION)

NOTES:

1. EXISTING CONDITIONS DEPICTED ON THIS PLAN HAVE BEEN TAKEN FROM THE SURVEY TITLED "PLAN OF SEWAGE SYSTEM AS BUILT FOR T.S.I. DEVELOPMENT CORP.", DATED JUNE 3, 1981 AND SUPPLEMENTED BY WESTCHESTER GIS INFORMATION. ALL TOPOGRAPHIC INFORMATION HAS BEEN TAKEN FROM WESTCHESTER COUNTY GIS INFORMATION.
2. EXISTING DRAINAGE PATTERNS ON SITE SHALL BE MAINTAINED TO THE MAXIMUM EXTENT PRACTICABLE.
3. ALL STORMWATER MANAGEMENT PRACTICES SHALL REMAIN UNDISTURBED AND BE PROTECTED FROM HEAVY MACHINERY TRAFFIC DURING CONSTRUCTION. HOWEVER DURING CONSTRUCTION OF THE PRACTICE THE CONTRACTOR SHALL MINIMIZE AND AVOID HEAVY MACHINERY TRAFFIC TO THE MAXIMUM EXTENT PRACTICABLE. THERE SHALL BE NO STORAGE OF MATERIALS WITHIN AREAS TO BE USED FOR STORMWATER MANAGEMENT PRACTICES. THE CONTRACTOR SHALL INSTALL CONSTRUCTION FENCE AROUND THE PRACTICE TO DISCOURAGE VEHICLE TRAFFIC.

APPLICANT/OWNER:
ANTHONY MARINO
26 CHESTNUT RIDGE ROAD
ARMONK, NEW YORK 10504

JMC Planning, Engineering, Landscape Architecture & Land Surveying, PLLC
JMC Site Development Consultants, LLC
John Meyer Consulting, Inc.
120 BEDFORD ROAD • ARMONK, NY 10504
voice 914.273.5225 • fax 914.273.2102
www.jmcpllc.com

PROPOSED DRAINAGE AREA MAP

PROPOSED SITE IMPROVEMENTS
26 CHESTNUT RIDGE ROAD
ARMONK, NEW YORK

No.	Revision	Date	By
1.	RESPOND TO COMMENTS	05/23/2022	RB
	Previous Editions Obsolete		

Drawn: RB	Approved: AN
Scale:	1" = 20'
Date:	02/17/2022
Project No:	22021
Existing	SITE PDA.ls
Drawing No:	DA-2

Technical Report

prepared for:

Advanced Environmental
33 Hayes Street
Elmsford NY, 10523
Attention: Ken Corsillo

Report Date: 05/09/2022
Client Project ID: Marino 26 Chestnut Ridge Rd Armonk NY 10504
York Project (SDG) No.: 22E0008

CT Cert. No. PH-0723 New Jersey Cert. No. CT005 and NY037 New York Cert. Nos. 10854 and 12058 PA Cert. No. 68-04440

120 RESEARCH DRIVE STRATFORD, CT 06615 ■ 132-02 89th AVENUE RICHMOND HILL, NY 11418
www.YORKLAB.com (203) 325-1371 FAX (203) 357-0166 ClientServices@yorklab.com

Report Date: 05/09/2022
Client Project ID: Marino 26 Chestnut Ridge Rd Armonk NY 10504
York Project (SDG) No.: 22E0008

Advanced Environmental
33 Hayes Street
Elmsford NY, 10523
Attention: Ken Corsillo

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on May 02, 2022 and listed below. The project was identified as your project: **Marino 26 Chestnut Ridge Rd Armonk NY 10504**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

York Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
22E0008-01	Clean fill	Soil	04/29/2022	05/02/2022

General Notes for York Project (SDG) No.: 22E0008

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
8. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: [signature] **Date:** 05/09/2022

Cassie L. Mosher
Laboratory Manager

Sample Information

Client Sample ID:	**Clean fill**		**York Sample ID:**	**22E0008-01**
York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
22E0008	Marino 26 Chestnut Ridge Rd Armonk NY 10504	Soil	April 29, 2022 3:00 pm	05/02/2022

Volatile Organics, CP-51 (formerly STARS) List **Log-in Notes:** VOA-CONT **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-63-6	1,2,4-Trimethylbenzene	ND		mg/kg dry	0.0027	0.0054	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	05/06/2022 09:00	05/06/2022 17:54	FTR
108-67-8	1,3,5-Trimethylbenzene	ND		mg/kg dry	0.0027	0.0054	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	05/06/2022 09:00	05/06/2022 17:54	FTR
71-43-2	Benzene	ND		mg/kg dry	0.0027	0.0054	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	05/06/2022 09:00	05/06/2022 17:54	FTR
100-41-4	Ethyl Benzene	ND		mg/kg dry	0.0027	0.0054	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	05/06/2022 09:00	05/06/2022 17:54	FTR
98-82-8	Isopropylbenzene	ND		mg/kg dry	0.0027	0.0054	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	05/06/2022 09:00	05/06/2022 17:54	FTR
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		mg/kg dry	0.0027	0.0054	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	05/06/2022 09:00	05/06/2022 17:54	FTR
91-20-3	Naphthalene	ND		mg/kg dry	0.0027	0.011	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	05/06/2022 09:00	05/06/2022 17:54	FTR
104-51-8	n-Butylbenzene	ND		mg/kg dry	0.0027	0.0054	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	05/06/2022 09:00	05/06/2022 17:54	FTR
103-65-1	n-Propylbenzene	ND		mg/kg dry	0.0027	0.0054	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	05/06/2022 09:00	05/06/2022 17:54	FTR
95-47-6	o-Xylene	ND		mg/kg dry	0.0027	0.0054	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,PADEP	05/06/2022 09:00	05/06/2022 17:54	FTR
179601-23-1	p- & m- Xylenes	ND		mg/kg dry	0.0027	0.0054	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,PADEP	05/06/2022 09:00	05/06/2022 17:54	FTR
99-87-6	p-Isopropyltoluene	ND		mg/kg dry	0.0027	0.0054	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	05/06/2022 09:00	05/06/2022 17:54	FTR
135-98-8	sec-Butylbenzene	ND		mg/kg dry	0.0027	0.0054	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	05/06/2022 09:00	05/06/2022 17:54	FTR
98-06-6	tert-Butylbenzene	ND		mg/kg dry	0.0027	0.0054	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	05/06/2022 09:00	05/06/2022 17:54	FTR
108-88-3	Toluene	ND		mg/kg dry	0.0027	0.0054	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	05/06/2022 09:00	05/06/2022 17:54	FTR
1330-20-7	Xylenes, Total	ND		mg/kg dry	0.0027	0.0054	1	EPA 8260C Certifications: CTDOH,NELAC-NY10854,NELAC-NY12058,NJDEP	05/06/2022 09:00	05/06/2022 17:54	FTR

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: SURR: 1,2-Dichloroethane-d4*	*99.6 %*	*77-125*
2037-26-5	*Surrogate: SURR: Toluene-d8*	*101 %*	*85-120*

Sample Information

Client Sample ID: **Clean fill** | **York Sample ID:** **22E0008-01**

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
22E0008	Marino 26 Chestnut Ridge Rd Armonk NY 10504	Soil	April 29, 2022 3:00 pm	05/02/2022

Volatile Organics, CP-51 (formerly STARS) List

Log-in Notes: VOA-CONT **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
460-00-4	*Surrogate: SURR: p-Bromofluorobenzene*	*111 %*			*76-130*						

Semi-Volatiles, CP-51 (formerly STARS) List

Log-in Notes: VOA-CONT **Sample Notes:**

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH
208-96-8	**Acenaphthylene**	**0.062**	J	mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH
120-12-7	**Anthracene**	**0.051**	J	mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH
56-55-3	**Benzo(a)anthracene**	**0.16**		mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH
50-32-8	**Benzo(a)pyrene**	**0.19**		mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH
205-99-2	**Benzo(b)fluoranthene**	**0.18**		mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH
191-24-2	**Benzo(g,h,i)perylene**	**0.16**		mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH
207-08-9	**Benzo(k)fluoranthene**	**0.13**		mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH
218-01-9	**Chrysene**	**0.14**		mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH
53-70-3	Dibenzo(a,h)anthracene	ND		mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH
206-44-0	**Fluoranthene**	**0.27**		mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH
86-73-7	Fluorene	ND		mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH
193-39-5	**Indeno(1,2,3-cd)pyrene**	**0.17**		mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH
91-20-3	Naphthalene	ND		mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH
85-01-8	**Phenanthrene**	**0.049**	J	mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH
129-00-0	**Pyrene**	**0.24**		mg/kg dry	0.044	0.088	2	EPA 8270D Certifications: CTDOH,NELAC-NY10854,NJDEP,PADEP	05/06/2022 07:58	05/06/2022 18:08	KH

	Surrogate Recoveries	Result	Acceptance Range
4165-60-0	*Surrogate: SURR: Nitrobenzene-d5*	*34.6 %*	*22-108*

Sample Information

Client Sample ID: **Clean fill** **York Sample ID:** **22E0008-01**

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
22E0008	Marino 26 Chestnut Ridge Rd Armonk NY 10504	Soil	April 29, 2022 3:00 pm	05/02/2022

Semi-Volatiles, CP-51 (formerly STARS) List

Log-in Notes: VOA-CONT **Sample Notes:**

Sample Prepared by Method: EPA 3546 SVOA

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
321-60-8	*Surrogate: SURR: 2-Fluorobiphenyl*	*39.8 %*			*21-113*						
1718-51-0	*Surrogate: SURR: Terphenyl-d14*	*44.6 %*			*24-116*						

Total Solids

Log-in Notes: VOA-CONT **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	*** % Solids**	**93.1**		%	0.100	1	SM 2540G Certifications: CTDOH	05/06/2022 08:10	05/06/2022 10:54	VR

Volatile Analysis Sample Containers

Lab ID	Client Sample ID	Volatile Sample Container
22E0008-01	Clean fill	2 oz. WM Clear Glass Cool to 4° C

Sample and Data Qualifiers Relating to This Work Order

VOA-CONT	Non-Compliant - the container(s) provided by the client for soil volatiles do not meet the requirements of EPA SW846-5035A. Results reported below 200 ug/kg may be biased low due to samples not being collected according to EPA SW846 5035A requirements.
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data are acceptable.
J	Detected below the Reporting Limit but greater than or equal to the Method Detection Limit (MDL/LOD) or in the case of a TIC, the result is an estimated concentration.

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon current NELAC/TNI Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.

YORK ANALYTICAL LABORATORIES INC

Field Chain-of-Custody Record

York Analytical Laboratories, Inc. (YORK)'s Standard Terms & Conditions are listed on the back side of this document. This document serves as your written authorization for YORK to proceed with the analyses requested below. Your signature binds you to YORK's Standard Terms & Conditions.

YORK Project No. 22E0008

120 Research Drive Stratford, CT 06615 | 132-02 89th Ave Queens, NY 11418 | clientservices@yorklab.com | www.yorklab.com | 800-306-YORK | 800-306-9675

Page ____ of ____

	YOUR Information	Report To:	Invoice To:
Company:	Advanced Environmental		Advanced Environmental
Address:	33 Hayes St Elmsford, NY 10523		33 Hayes St Elmsford, NY 10523
Phone:			
Contact:			
E-mail:			

YOUR Project Number:

YOUR Project Name: MARINO 26 Chestnut ridge RD Armonk NY 10504

YOUR PO#:

Turn-Around Time

- RUSH - Next Day
- RUSH - Two Day
- RUSH - Three Day
- RUSH - Four Day
- Standard (5-7 Day) ✓

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by YORK are resolved.

Declan McEnerney [signature]

Samples Collected by: (print AND sign your name)

Matrix Codes: S - soil / solid; GW - groundwater; DW - drinking water; WW - wastewater; O - Oil; Other

Samples From: New York ✓; New Jersey; Connecticut; Pennsylvania; Other:

Report / EDD Type (circle selections): Summary Report; QA Report; NY ASP A Package; NY ASP B Package; CT RCP; CT RCP DQA/DUE; NJDEP Reduced Deliverables; NJDKQP; Standard Excel EDD; EQuIS (Standard); NYSDEC EQuIS; NJDEP SRP HazSite; Other:

YORK Reg. Comp. Compared to the following Regulation(s): (please fill in)

Sample Identification	Sample Matrix	Date/Time Sampled	Analysis Requested	Container Description
Clean fill	S	4/29/22	Stars vols + Semi vols	8oz/2oz

Comments:

Samples iced/chilled at time of lab pickup? circle Yes or No

Preservation: (check all that apply) HCl ___ MeOH ___ HNO3 ___ H2SO4 ___ NaOH ___ ZnAc ___ Ascorbic Acid ___ Other: ___

Special Instruction: Field Filtered; Lab to Filter

	Date/Time		Date/Time		Date/Time
1. Samples Relinquished by / Company: Office 5-2-22	11:10	1. Samples Received by / Company: Chris C York 5-2-22	11:10	2. Samples Relinquished by / Company: Chris C York 5-2-22	1415
2. Samples Received by / Company:		3. Samples Relinquished by / Company:		3. Samples Received by / Company:	
4. Samples Relinquished by / Company:		4. Samples Received by / Company:		Samples Received in LAB by: [signature] 5/2/22	1415 — Temperature 3.3 Degrees C


Westchester Pavers LLC |


Westchester Pavers LLC |