TOWNHOUSES at 32-34 WASHINGTON AVENUE

HASTINGS-ON-HUDSON, NY 10706

CHRISTINAGRIFFINARCHITECT
10 Spring Street, Hastings-on-Hudson, NY 10706

PLANNING BOARD SUBMISSION 8-11-15

OWNER	ARCHITECT	CIVIL ENGINEER
CCI Properties Andrew Cortese, President 52 Cedar Street Dobbs Ferry, NY 10522 914.447.3965 andrew@corteseconstruction.com	Christina Griffin Architect, PC Christina Griffin AIA LEED AP CPHC 10 Spring Street Hastings-on-Hudson, NY 10706 914.478.0799 cg@cgastudio.com	JMC John Meyer Consulting, PC 120 Bedford Road Armonk, NY, 10504 914.273.5225

LIST OF DRAWINGS

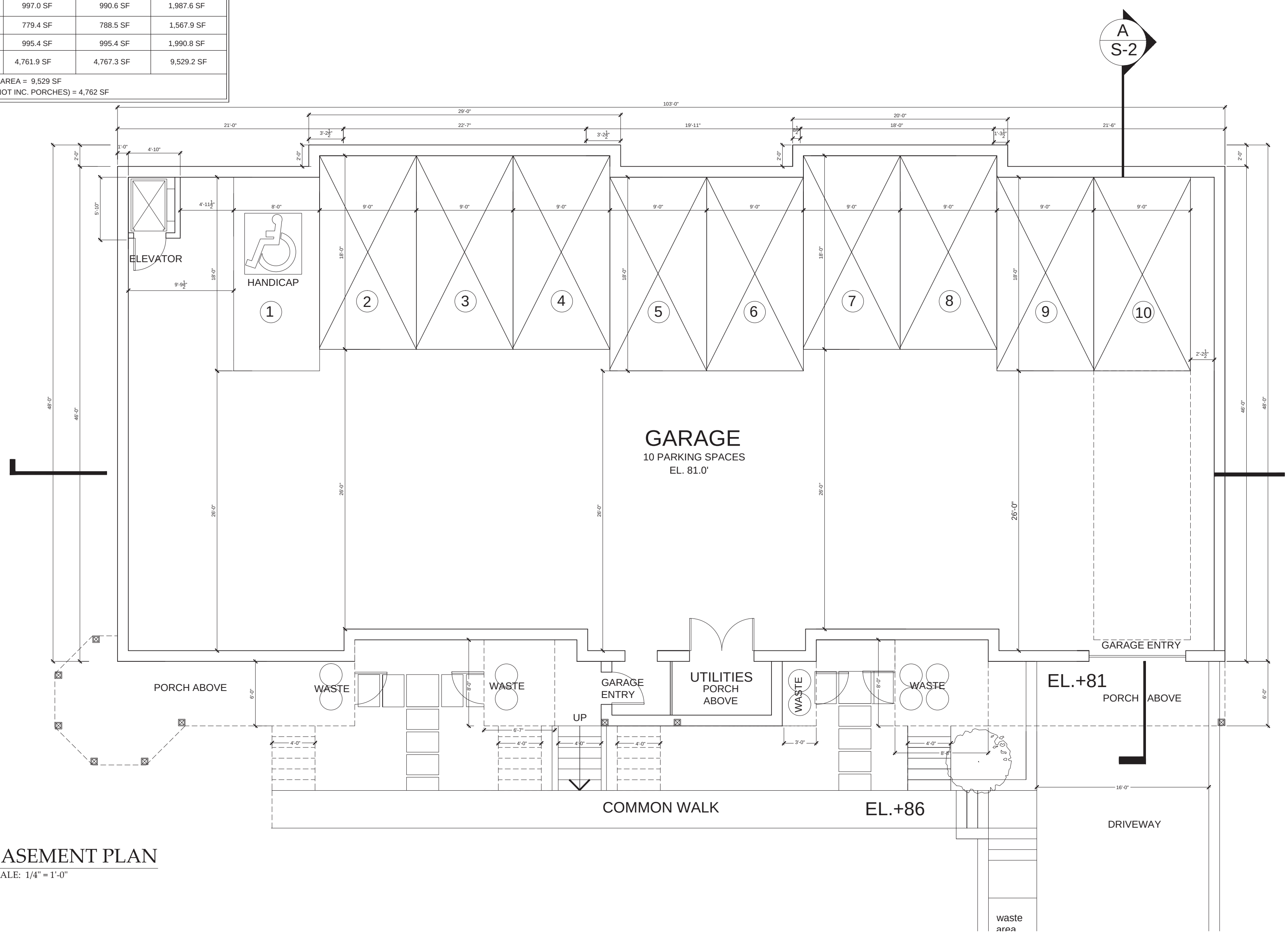
DATES

PRELIMINARY PLANNING BOARD SUBMISSION	2-19-15
PLANNING BOARD SUBMISSION	3-19-15
PLANNING BOARD SUBMISSION	4-15-15
PLANNING BOARD SUBMISSION	5-07-15
PLANNING BOARD SUBMISSION	6-30-15
WESTCHESTER COUNTY PLANNING SUBMISSION	7-28-15
PLANNING BOARD SUBMISSION	8-11-15

FLOOR AREA CALCULATIONS

	1ST FLOOR	2ND FLOOR	TOTAL 1ST & 2ND
UNIT 1	1,001.4 SF	995 SF	1,996.4 SF
UNIT 2	988.7 SF	997.8 SF	1,986.5 SF
UNIT 3	997.0 SF	990.6 SF	1,987.6 SF
UNIT 4	779.4 SF	788.5 SF	1,567.9 SF
UNIT 5	995.4 SF	995.4 SF	1,990.8 SF
TOTAL FLOOR AREA	4,761.9 SF	4,767.3 SF	9,529.2 SF

TOTAL BUILDING FLOOR AREA = 9,529 SF
BUILDING FOOTPRINT (NOT INC. PORCHES) = 4,762 SF



BASEMENT PLAN

SCALE: 1/4" = 1'-0"

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

CHRISTINA GRIFFIN ARCHITECT PC
10 Spring Street
Hastings-on-Hudson, New York 10706
914.478.0799 tel 914.478.0806 fax
www.christinagriffinarchitect.com

Drawing Title: BASEMENT PLAN

Scale: AS SHOWN

Date
PLANNING BD PRE-SUBMISSION 2-1-15
PLANNING BOARD SUBMISSION 3-19-15
PLANNING BOARD SUBMISSION 4-15-15
ZONING BOARD SUBMISSION 4-23-15
PLANNING BOARD SUBMISSION 5-07-15
PLANNING BOARD SUBMISSION 5-21-15
WESTCHESTER COUNTY PLANNING SUBMISSION 7-28-157-14-15
PLANNING BOARD SUBMISSION 8-11-15

A-1

FLOOR AREA CALCULATIONS

	1ST FLOOR	2ND FLOOR	TOTAL 1ST & 2ND
UNIT 1	1,001.4 SF	995 SF	1,996.4 SF
UNIT 2	988.7 SF	997.8 SF	1,986.5 SF
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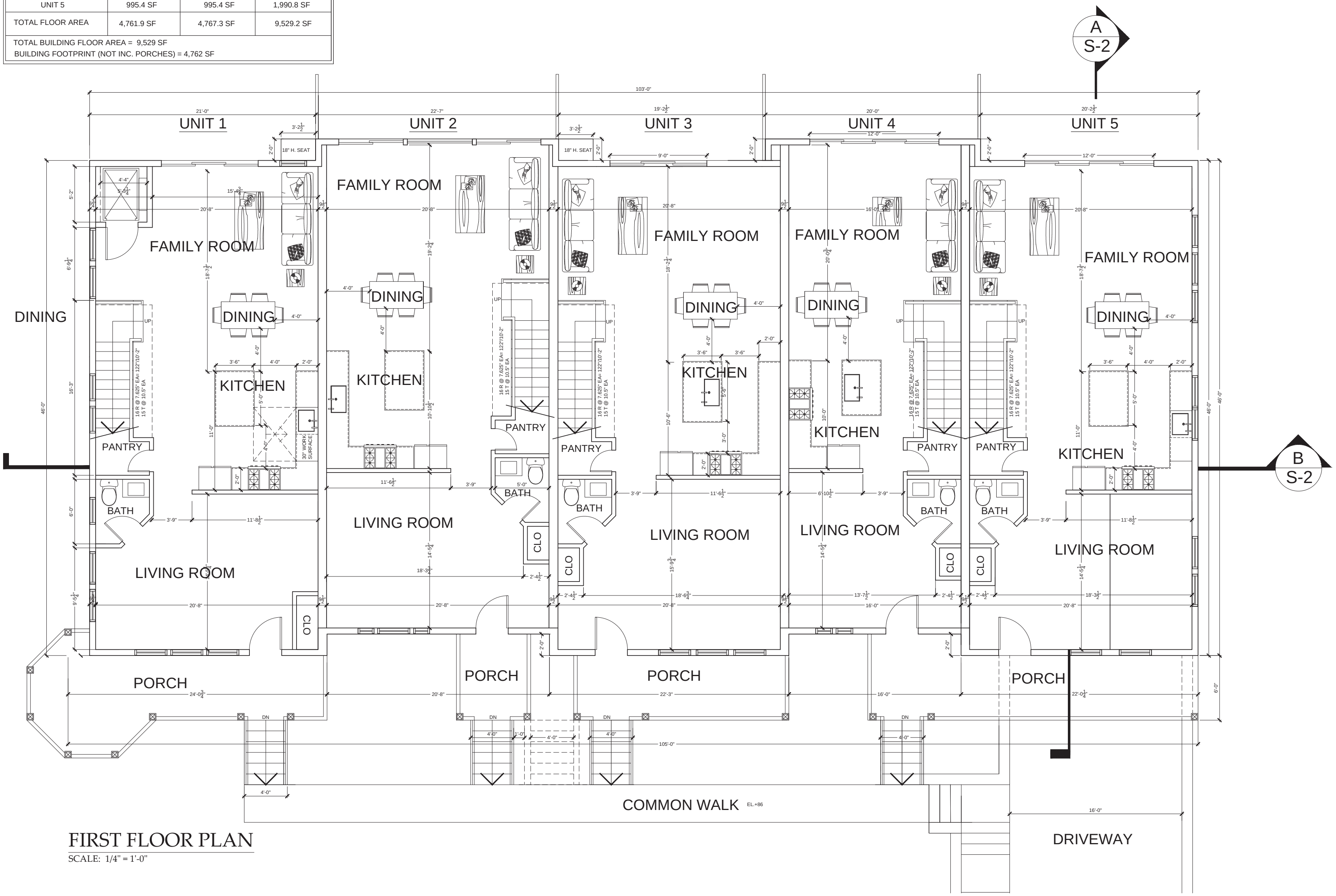

FIRST FLOOR PLAN

SCALE: 1/4" = 1'-0"

TOWNHOUSES at 32-34 WASHINGTON AVENUE

HASTINGS-ON-HUDSON, NY 10706

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914.478.0799 tel 914.478.0806 fax
www.christinagriffinarchitect.com

Drawing Title: FIRST FLOOR PLAN

Scale: AS SHOWN

Date:
PLANNING BD PRE-SUBMISSION 2-1-15
PLANNING BOARD SUBMISSION 3-19-15
PLANNING BOARD SUBMISSION 4-15-15
ZONING BOARD SUBMISSION 4-23-15
PLANNING BOARD SUBMISSION 5-07-15
PLANNING BOARD SUBMISSION 5-21-15
WESTCHESTER COUNTY PLANNING SUBMISSION 7-28-157-14-15
PLANNING BOARD SUBMISSION 8-11-15

A-2

FLOOR AREA CALCULATIONS

	1ST FLOOR	2ND FLOOR	TOTAL 1ST & 2ND
UNIT 1	1,001.4 SF	995 SF	1,996.4 SF
UNIT 2	988.7 SF	997.8 SF	1,986.5 SF
UNIT 3	997.0 SF	990.6 SF	1,987.6 SF
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TOTAL FLOOR AREA	4,761.9 SF	4,767.3 SF	9,529.2 SF

TOTAL BUILDING FLOOR AREA = 9,529 SF
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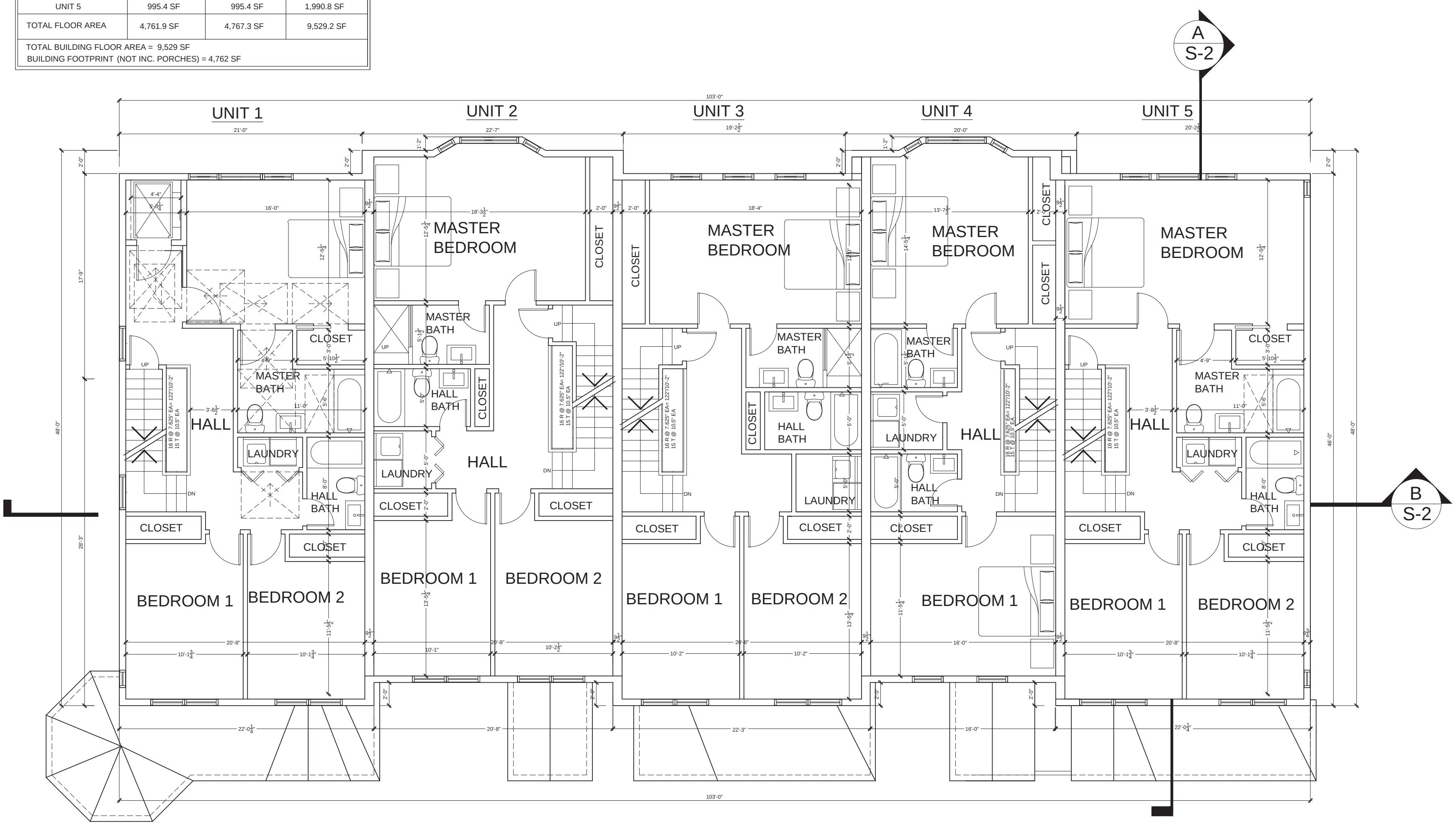

SECOND FLOOR PLAN

SCALE: 1/4" = 1'-0"

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

CHRISTINA GRIFFIN ARCHITECT PC
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914.478.0799 tel 914.478.0806 fax
www.christinagriffinarchitect.com

Drawing Title
SECOND FLOOR PLAN

Scale:
AS SHOWN

Date
PLANNING BD PRE-SUBMISSION 2-1-15
PLANNING BOARD SUBMISSION 3-19-15
PLANNING BOARD SUBMISSION 4-15-15
ZONING BOARD SUBMISSION 4-23-15
PLANNING BOARD SUBMISSION 5-07-15
PLANNING BOARD SUBMISSION 5-21-15
WESTCHESTER COUNTY PLANNING SUBMISSION 7-28-157-14-15
PLANNING BOARD SUBMISSION 8-11-15

A-3

FLOOR AREA CALCULATIONS

	1ST FLOOR	2ND FLOOR	TOTAL 1ST & 2ND
UNIT 1	1,001.4 SF	995 SF	1,996.4 SF
UNIT 2	988.7 SF	997.8 SF	1,986.5 SF
UNIT 3	997.0 SF	990.6 SF	1,987.6 SF
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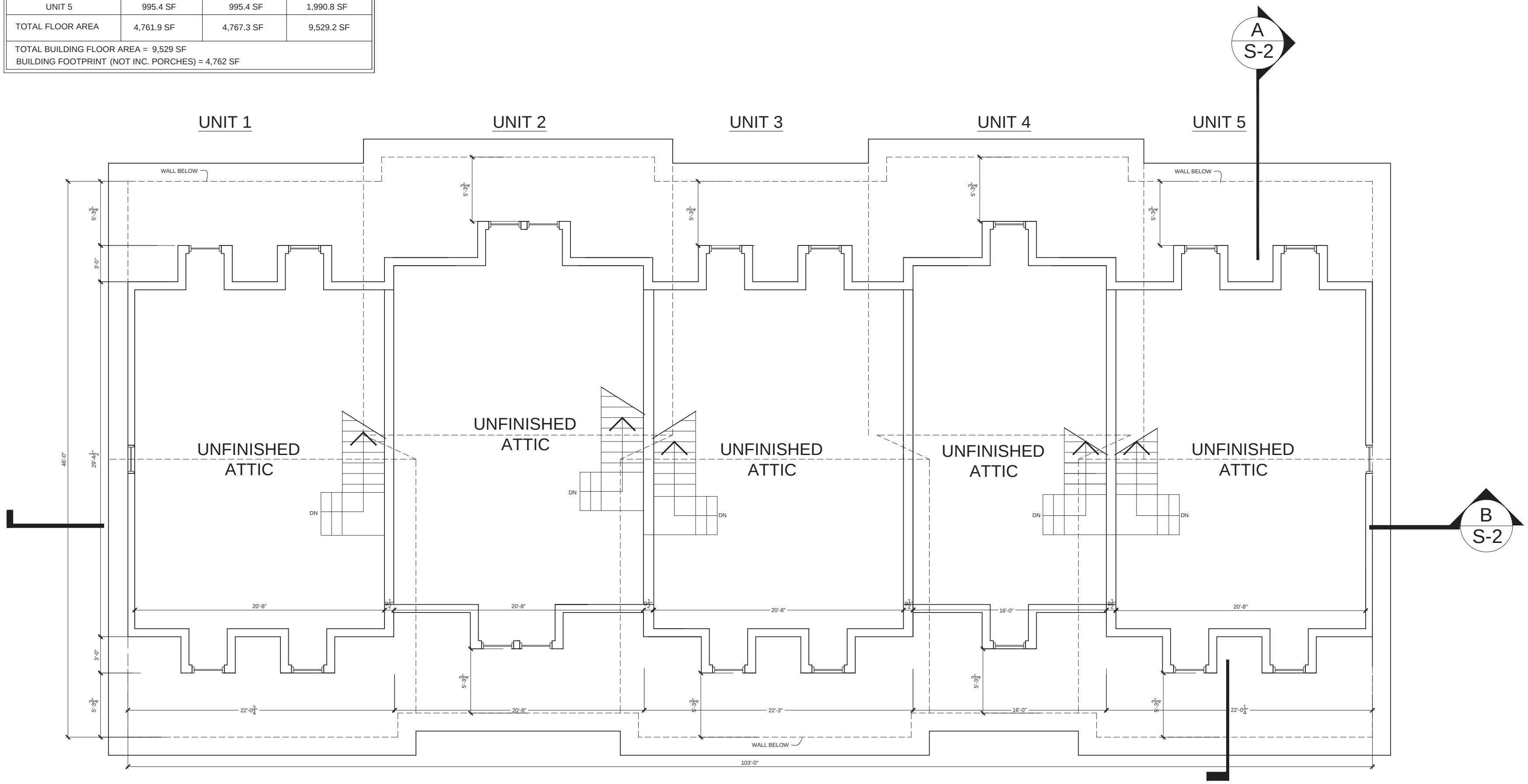

ATTIC PLAN

SCALE: 1/4" = 1'-0"

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

CHRISTINA GRIFFIN ARCHITECT PC
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Date
PLANNING BD PRE-SUBMISSION 2-1-15
PLANNING BOARD SUBMISSION 3-19-15
PLANNING BOARD SUBMISSION 4-15-15
ZONING BOARD SUBMISSION 4-23-15
PLANNING BOARD SUBMISSION 5-07-15
PLANNING BOARD SUBMISSION 5-21-15
WESTCHESTER COUNTY PLANNING SUBMISSION 7-28-157-14-15
PLANNING BOARD SUBMISSION 8-11-15

Drawing Title: ATTIC PLAN
Scale: AS SHOWN

A-4

WEST ELEVATION

SCALE: 1/4" = 1'-0"

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

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914.478.0799 tel 914.478.0806 fax
www.christinagriffinarchitect.com

Drawing Title
WEST ELEVATION

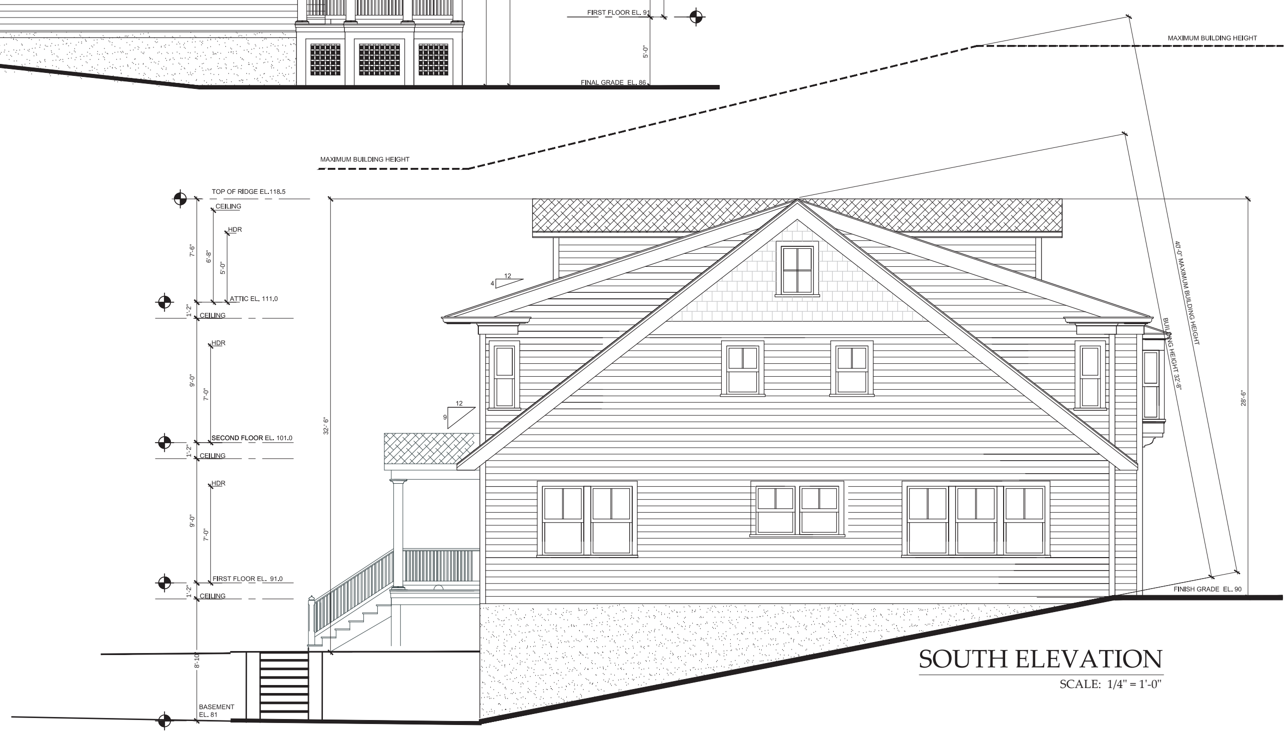
Scale:
AS SHOWN

Date
PLANNING BD PRE-SUBMISSION 2-1-15
PLANNING BOARD SUBMISSION 3-19-15
PLANNING BOARD SUBMISSION 4-15-15
ZONING BOARD SUBMISSION 4-23-15
PLANNING BOARD SUBMISSION 5-07-15
PLANNING BOARD SUBMISSION 5-21-15
WESTCHESTER COUNTY PLANNING SUBMISSION 7-28-15/7-14-15
PLANNING BOARD SUBMISSION 8-11-15

A-5

NORTH ELEVATION

SCALE: 1/4" = 1'-0"



SOUTH ELEVATION

SCALE: 1/4" = 1'-0"

TOWNHOUSES at

32-34 WASHINGTON AVENUE

HASTINGS-ON-HUDSON, NY 10706

CHRISTINA GRIFFIN ARCHITECT PC

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Drawing Title: NORTH & SOUTH ELEVATIONS

Scale: AS SHOWN

Date	
PLANNING BD PRE-SUBMISSION	2-1-15
PLANNING BOARD SUBMISSION	3-19-15
PLANNING BOARD SUBMISSION	4-15-15
ZONING BOARD SUBMISSION	4-23-15
PLANNING BOARD SUBMISSION	5-07-15
PLANNING BOARD SUBMISSION	5-21-15
WESTCHESTER COUNTY PLANNING SUBMISSION	7-28-157-14-15
PLANNING BOARD SUBMISSION	8-11-15

A-6

EAST ELEVATION

SCALE: 1/4" = 1'-0"

TOWNHOUSES at
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Date

PLANNING BD PRE-SUBMISSION	2-1-15
PLANNING BOARD SUBMISSION	3-19-15
PLANNING BOARD SUBMISSION	4-15-15
ZONING BOARD SUBMISSION	4-23-15
PLANNING BOARD SUBMISSION	5-07-15
PLANNING BOARD SUBMISSION	5-21-15
WESTCHESTER COUNTY PLANNING SUBMISSION	7-28-157-14-15
PLANNING BOARD SUBMISSION	8-11-15

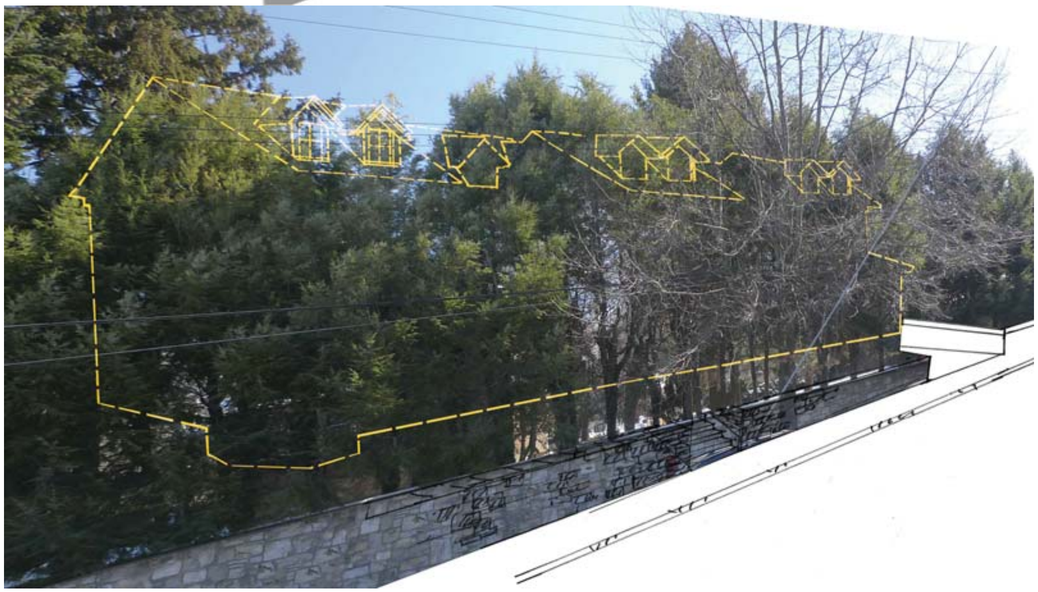
Drawing Title
EAST ELEVATION

Scale:
AS SHOWN

A-7

VIEWS of SITE

PERSPECTIVE VIEW from WARBURTON AVENUE SHOWN WITHOUT EXISTING TREES



PERSPECTIVE VIEW from WARBURTON AVENUE SHOWN WITH EXISTING TREES

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

CHRISTINA GRIFFIN ARCHITECT PC
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Hastings-on-Hudson, New York 10706
914.478.0799 tel 914.478.0806 fax
www.christinagriffinarchitect.com

Drawing Title: PERSPECTIVE VIEW FROM WARBURTON AVE

Scale: AS SHOWN

Date	
PLANNING BD PRE-SUBMISSION	2-1-15
PLANNING BOARD SUBMISSION	3-19-15
PLANNING BOARD SUBMISSION	4-15-15
ZONING BOARD SUBMISSION	4-23-15
PLANNING BOARD SUBMISSION	5-07-15
PLANNING BOARD SUBMISSION	6-30-15
PLANNING BOARD SUBMISSION	8-11-15

A-8

KEY PLAN

N

BEFORE
VIEW from
NEIGHBORING PROPERTY
on WILLIAM STREET

1

AFTER
VIEW from
NEIGHBORING PROPERTY
on WILLIAM STREET

1

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

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Hastings-on-Hudson, New York 10706
914.478.0799 tel 914.478.0806 fax
www.christinagriffinarchitect.com

Date

PLANNING BD PRE-SUBMISSION	2-1-15
PLANNING BOARD SUBMISSION	3-19-15
ZONING BOARD SUBMISSION	4-23-15
PLANNING BOARD SUBMISSION	6-30-15
PLANNING BOARD SUBMISSION	8-11-15

Drawing Title
VIEWS from
WILLIAM STREET

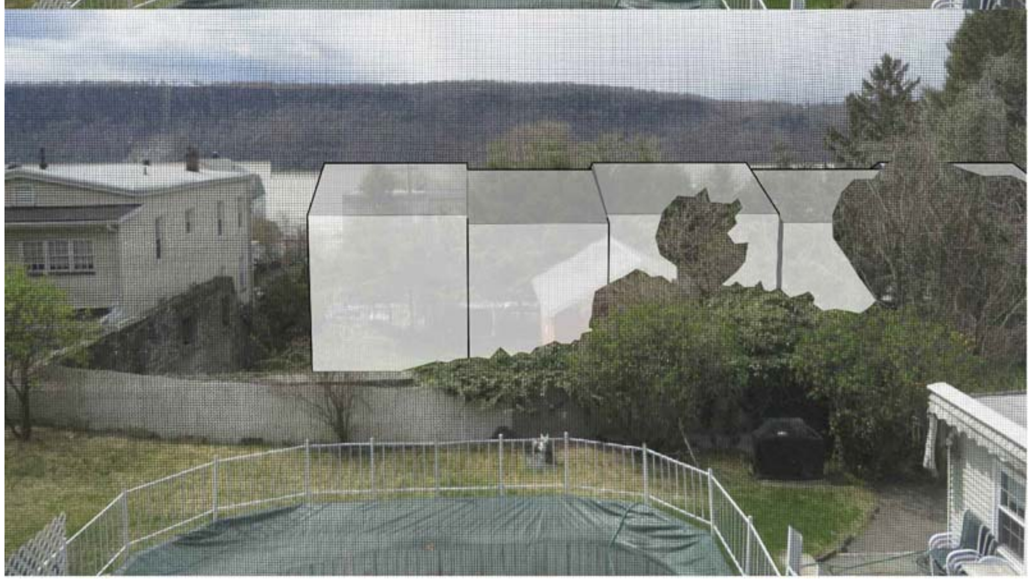
Scale:
AS SHOWN

A-9

KEY PLAN

BEFORE VIEW
from FIRST FLOOR
at 15 WILLIAM STREET

2



AFTER VIEW from
the FIRST FLOOR
at 15 WILLIAM STREET

2

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

CHRISTINA GRIFFIN ARCHITECT PC
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Date

PLANNING BD PRE-SUBMISSION	2-1-15
PLANNING BOARD SUBMISSION	3-19-15
ZONING BOARD SUBMISSION	4-23-15
PLANNING BOARD SUBMISSION	6-30-15
PLANNING BOARD SUBMISSION	8-11-15

Drawing Title
VIEWS from
15 WILLIAM STREET

Scale:
AS SHOWN

A-10

KEY PLAN

N

BEFORE VIEW (2A)
from SECOND FLOOR
at 15 WILLIAM STREET

AFTER VIEW (2A)
from SECOND FLOOR
at 15 WILLIAM STREET

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

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Date

PLANNING BD PRE-SUBMISSION	2-1-15
PLANNING BOARD SUBMISSION	3-19-15
ZONING BOARD SUBMISSION	4-23-15
PLANNING BOARD SUBMISSION	6-30-15
PLANNING BOARD SUBMISSION	8-11-15

Drawing Title
VIEWS from
15 WILLIAM STREET

Scale:
AS SHOWN

A-11

BEFORE VIEW from (3)
NEIGHBORING PROPERTY
on WILLIAM STREET

AFTERVIEW from (3)
NEIGHBORING PROPERTY
on WILLIAM STREET

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

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www.christinagriffinarchitect.com

Date

PLANNING BD PRE-SUBMISSION	2-1-15
PLANNING BOARD SUBMISSION	3-19-15
ZONING BOARD SUBMISSION	4-23-15
PLANNING BOARD SUBMISSION	6-30-15
PLANNING BOARD SUBMISSION	8-11-15

Drawing Title
VIEWS from
WILLIAM STREET

Scale:
AS SHOWN

A-12

BEFORE VIEW from (4)
NEIGHBORING PROPERTY
on WASHINGTON AVENUE

AFTERVIEW from (4)
NEIGHBORING PROPERTY
on WASHINGTON AVENUE

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

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Date
PLANNING BD PRE-SUBMISSION 2-1-15
PLANNING BOARD SUBMISSION 3-19-15
ZONING BOARD SUBMISSION 4-23-15
PLANNING BOARD SUBMISSION 6-30-15
PLANNING BOARD SUBMISSION 8-11-15

Drawing Title
VIEWS from
WILLIAMS STREET

Scale:
AS SHOWN

A-13

KEY PLAN

BEFORE VIEW from (5)
NEIGHBORING PROPERTY
on WASHINGTON AVENUE

AFTERVIEW from (5)
NEIGHBORING PROPERTY
on WASHINGTON AVENUE

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

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Date
PLANNING BD PRE-SUBMISSION 2-1-15
PLANNING BOARD SUBMISSION 3-19-15
ZONING BOARD SUBMISSION 4-23-15
PLANNING BOARD SUBMISSION 6-30-15
PLANNING BOARD SUBMISSION 8-11-15

Drawing Title
VIEWS from
WILLIAMS STREET

Scale:
AS SHOWN

A-14

VIEWS of SITE

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

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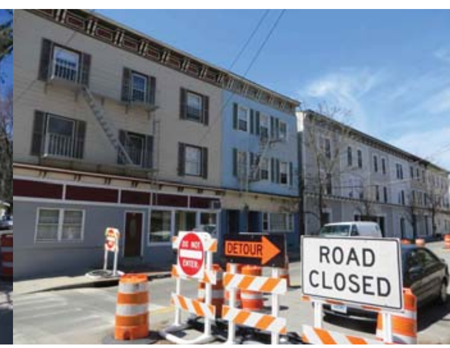
Date	
PLANNING BD PRE-SUBMISSION	2-1-15
PLANNING BOARD SUBMISSION	3-19-15
PLANNING BOARD SUBMISSION	4-15-15
ZONING BOARD SUBMISSION	4-23-15
PLANNING BOARD SUBMISSION	5-07-15
PLANNING BOARD SUBMISSION	6-30-15
PLANNING BOARD SUBMISSION	8-11-15

Drawing Title
VIEWS of SITE

Scale:
AS SHOWN

A-15



VIEWS of NEIGHBORHOOD

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

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Date	
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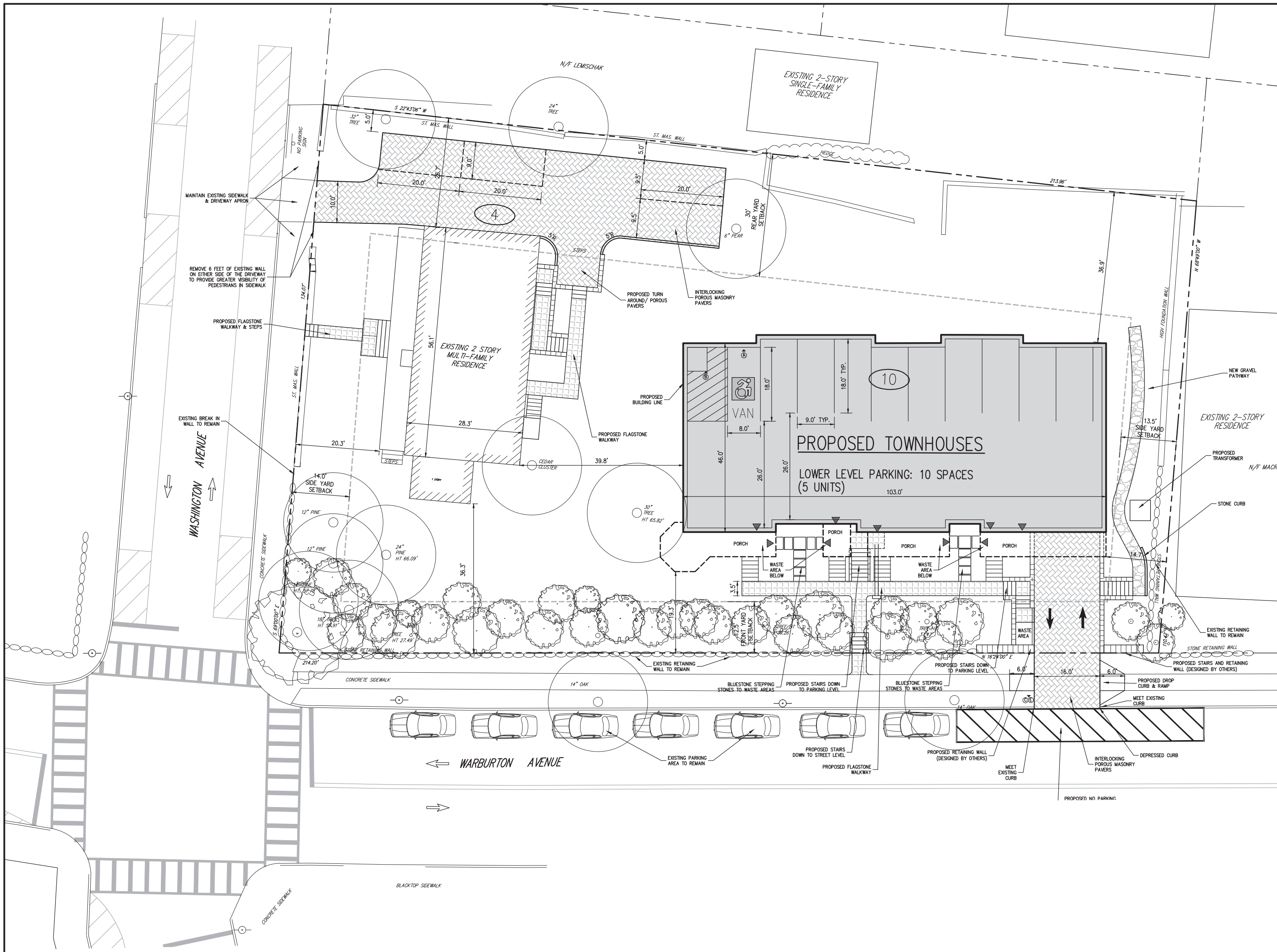
PLANNING BOARD SUBMISSION	3-19-15
PLANNING BOARD SUBMISSION	4-15-15
ZONING BOARD SUBMISSION	4-23-15
PLANNING BOARD SUBMISSION	5-07-15
PLANNING BOARD SUBMISSION	6-30-15
PLANNING BOARD SUBMISSION	8-11-15

Drawing Title
VIEWS of SITE

Scale:
AS SHOWN

A-16



NO.	REVISION	DATE	BY
1.	GENERAL REVISIONS	04/02/2015	EH
2.	GENERAL REVISIONS	05/07/2015	EH
3.	GENERAL REVISIONS	05/21/2015	EH
4.	GENERAL REVISIONS	06/30/2015	PD
5.	GENERAL REVISIONS	07/27/2015	EH
6.	PLANNING BOARD SUBMISSION	08/11/2015	EH

Previous Editions Obsolete

LEGEND

- EXISTING PROPERTY LINE
- ADJACENT PROPERTY LINE
- PROPOSED PROPERTY LINE
- SETBACK LINE
- EXISTING BUILDING LINE
- EXISTING PAVEMENT EDGE
- EXISTING CURB LINE
- EXISTING STONE WALL
- EXISTING RETAINING WALL
- EXISTING FENCE
- EXISTING TREE AND DESIGNATION
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING SIGN
- PROPOSED BUILDING LINE
- PROPOSED CONCRETE CURB
- PROPOSED PARKING SPACES WITH NUMBER OF SPACES INDICATED
- PROPOSED HANDICAPPED PARKING SPACES WITH NUMBER OF SPACES INDICATED
- PROPOSED FLAGSTONE WALK
- PROPOSED POROUS PAVERS
- PROPOSED DROP CURB AND RAMP
- PROPOSED RETAINING WALL (DESIGN BY OTHERS)
- TRAFFIC SIGN LOCATION & DESIGNATION

NOTES:

1. EXISTING CONDITIONS DEPICTED ON THIS PLAN HAVE BEEN TAKEN FROM SURVEY TITLED, "TOPOGRAPHIC SURVEY", PREPARED BY WARD CARPENTER ENGINEERS, INC, DATED APRIL 23, 2015.
2. PLEASE REFER TO L-1 "LANDSCAPE PLAN" PREPARED BY CHRISTINA GRIFFIN ARCHITECT PC. FOR PROPOSED LANDSCAPING INFORMATION.

SIGN TABLE

DESIGNATION NUMBER	SIGN	SIZE	DESCRIPTION	MOUNTING TYPE	MOUNTING HEIGHT	REGULATORY	REFLECTORIZED
A		12"X18" 12"X6"	GREEN & BLUE ON WHITE	WALL MOUNTED	7'-0"	R7-8	X
B	NO PARKING ANY TIME	12"X18"	RED ON WHITE	STEEL CHANNEL	7'-0"	NYP1-2	X
C	RIGHT TURN ONLY	24"X30"	BLACK ON WHITE	STEEL CHANNEL	BELOW "STOP" SIGN (6'-0" MIN. HEIGHT)	NYR3-20	X
D		24"X24"	BLACK ON RED AND WHITE	STEEL CHANNEL	7'-0"	R3-2	X
E	STOP	30"X30"	WHITE ON RED	STEEL CHANNEL	7'-0"	R1-1	X

APPLICANT/OWNER: CCI PROPERTIES, LLC
52 CEDAR STREET
DOBBS FERRY, NY 10522

ARCHITECT: CHRISTINA GRIFFIN ARCHITECT, PC
10 SPRING STREET
HASTINGS-ON-HUDSON, NY 10706

JMC
JOHN MEYER CONSULTING
120 Bedford Road
Armonk, NY 10504
voice 914.273.5225 • fax 914.273.2102
www.jmcpllc.com

LAYOUT PLAN

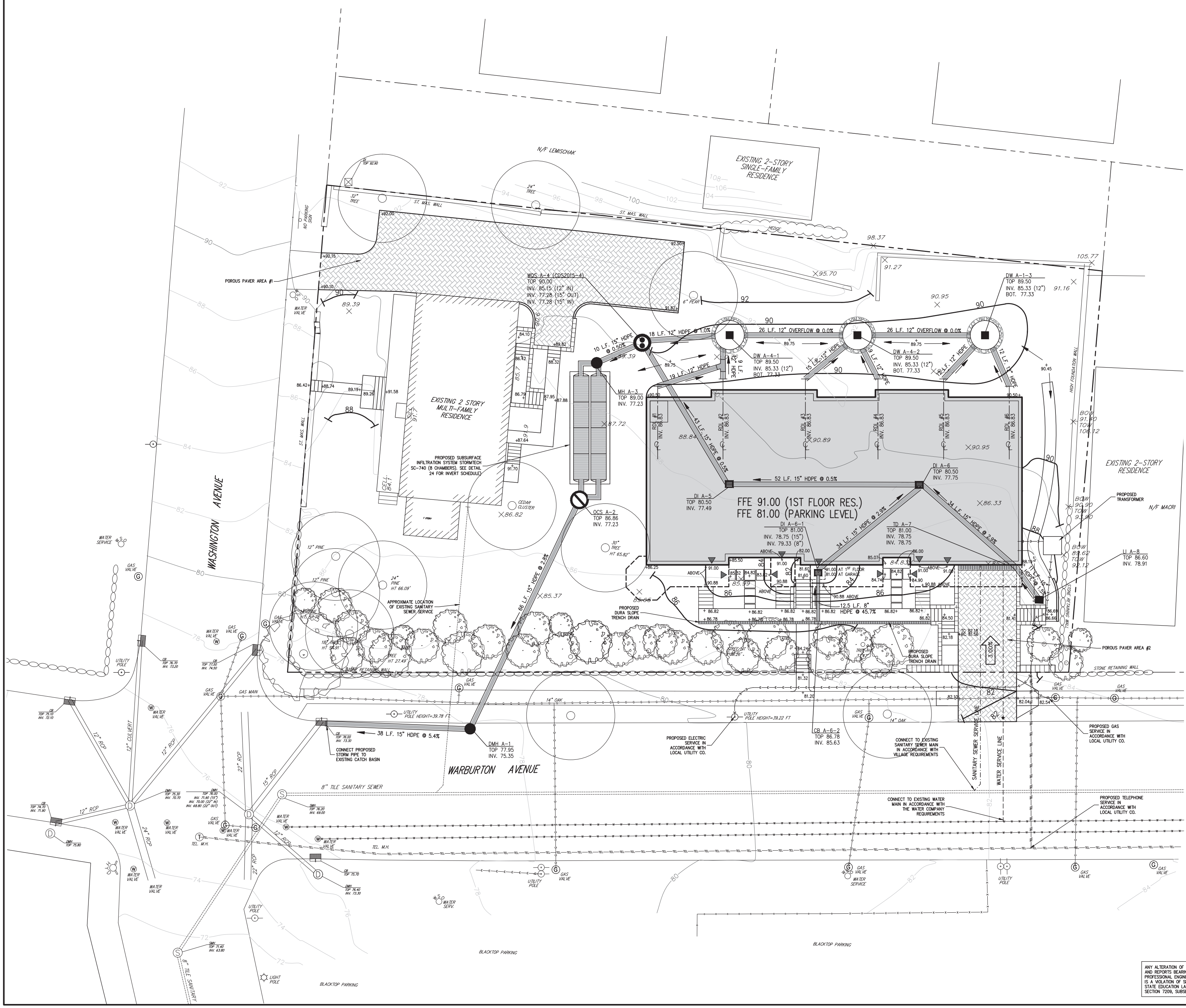
TOWNHOUSES AT 32-34 WASHINGTON AVENUE
32-34 WASHINGTON AVENUE
HASTING-ON-HUDSON, NY

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.

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

NOT FOR CONSTRUCTION

DRAWN: ED APPROVED: RR
SCALE: 1" = 10'
DATE: 03/19/2015
PROJECT No: 13180
DWG: 13180-SITE TAB: LAYOUT+COVER SCR: LAYOUT
DRAWING No: C-1



LEGEND

- EXISTING PROPERTY LINE
- ADJACENT PROPERTY LINE
- PROPOSED PROPERTY LINE
- EXISTING BUILDING LINE
- EXISTING PAVEMENT EDGE
- EXISTING CURB LINE
- EXISTING CONTOUR
- EXISTING INDEX CONTOUR
- EXISTING STONE WALL
- EXISTING RETAINING WALL
- EXISTING FENCE
- EXISTING DRAIN INLET
- EXISTING MANHOLE
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING SIGN
- PROPOSED BUILDING LINE
- PROPOSED CONCRETE CURB
- PROPOSED CONCRETE SIDEWALK
- PROPOSED POROUS PAVERS
- PROPOSED FINISHED GRADE
- PROPOSED SPOT GRADE
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED TYPE CI DRAIN INLET
- PROPOSED TYPE LI DRAIN INLET
- PROPOSED STORM DRAIN LINE & SIZE
- PROPOSED SANITARY SEWER LINE & SIZE
- PROPOSED WATER LINE & SIZE
- PROPOSED GAS LINE
- PROPOSED ELECTRIC/TELEPHONE/CABLE
- PROPOSED WATER VALVE
- PROPOSED GAS VALVE
- PROPOSED RETAINING WALL (DESIGN BY OTHERS)
- TRENCH DRAIN
- DRY WELL
- CDS WATER QUALITY STRUCTURE
- OUTLET CONTROL STRUCTURE

NOTES:

1. EXISTING CONDITIONS DEPICTED ON THIS PLAN HAVE BEEN TAKEN FROM SURVEY TITLED, "TOPOGRAPHIC SURVEY", PREPARED BY WARD CARPENTER ENGINEERS, INC, DATED APRIL 23, 2015.
2. 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.
3. UNLESS OTHERWISE SPECIFIED, PIPE FOR SANITARY SEWER GRAVITY LINES SHALL BE POLYVINYL CHLORIDE PIPE (PVCP), SDR-35, WITH PUSH-ON JOINTS IN ACCORDANCE WITH ASTM D-3034 AND D-3212.
4. UNLESS OTHERWISE SPECIFIED, PIPE FOR WATER LINES SHALL BE DOUBLE CEMENT-LINED DUCTILE IRON PIPE (DIP), CLASS 52, WITH PUSH ON JOINTS IN ACCORDANCE WITH AWWA C-150, C-151, C-104 AND C-111.
5. ELECTRIC, TELEPHONE, FIRE ALARM AND CABLE TELEVISION LINES SHALL BE INSTALLED UNDERGROUND IN CONDUIT IN ACCORDANCE WITH THE REQUIREMENTS OF THE UTILITY COMPANY HAVING JURISDICTION.

GRAPHIC SCALE

(IN FEET)
1 inch = 10 ft.

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NOT FOR CONSTRUCTION

NO.	REVISION	DATE	BY
1.	GENERAL REVISIONS	04/02/2015	EH
2.	GENERAL REVISIONS	05/07/2015	EH
3.	GENERAL REVISIONS	05/21/2015	EH
4.	GENERAL REVISIONS	06/30/2015	PD
5.	GENERAL REVISIONS	07/27/2015	EH
6.	PLANNING BOARD SUBMISSION	08/11/2015	EH

Previous Editions Obsolete

APPLICANT/OWNER:
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ARCHITECT:
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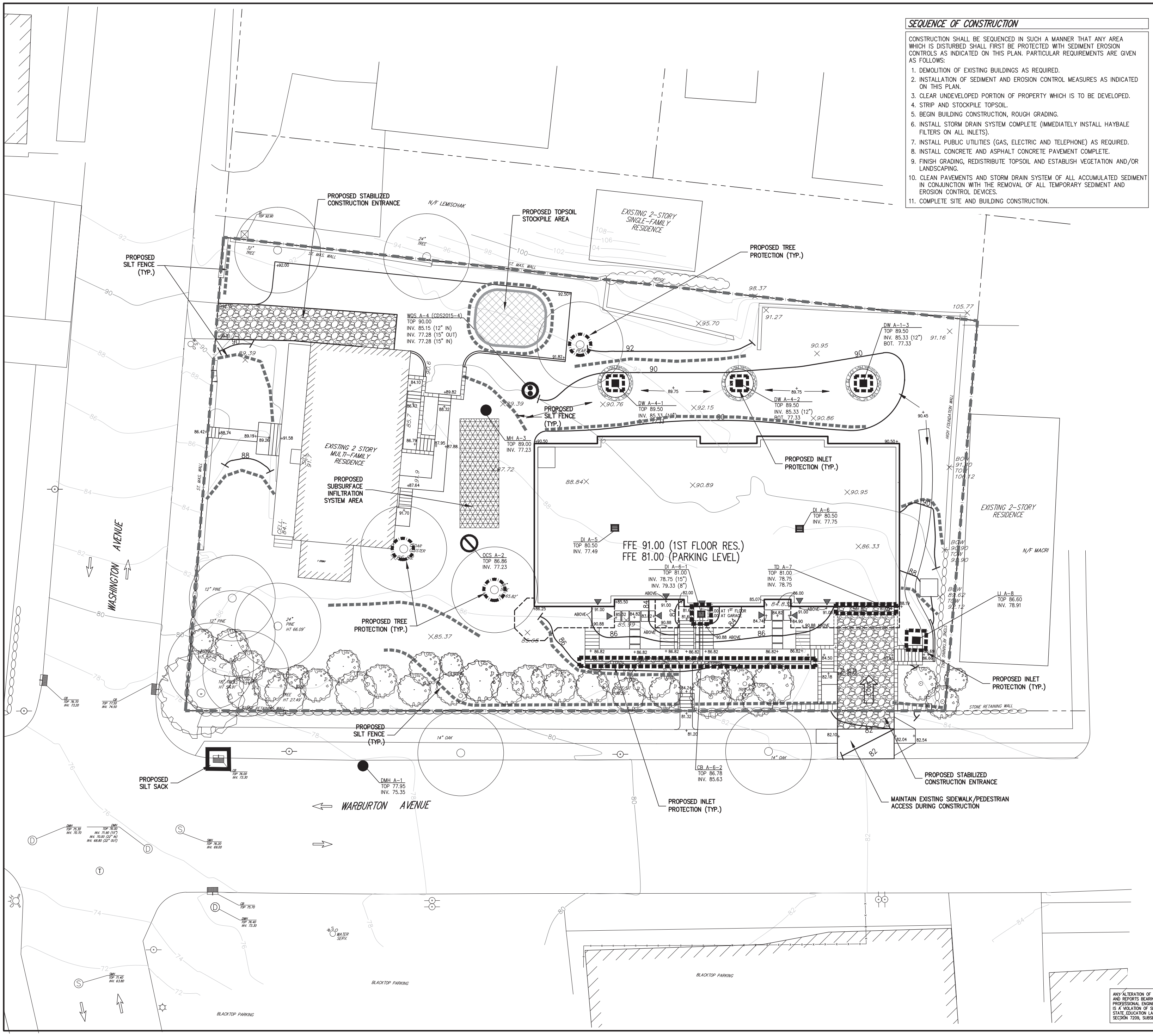
GRADING & UTILITIES PLAN

TOWNHOUSES AT 32-34 WASHINGTON AVENUE
32-34 WASHINGTON AVENUE
HASTING-ON-HUDSON, NY

DRAWN: ED	APPROVED: RR
SCALE: 1" = 10'	
DATE: 03/19/2015	
PROJECT No: 13180	
DWG: 13180-SITE	TAB: GRAD & UTIL / SCR: GRADING
DRAWING No: C-2	



SEQUENCE OF CONSTRUCTION

CONSTRUCTION SHALL BE SEQUENCED IN SUCH A MANNER THAT ANY AREA WHICH IS DISTURBED SHALL FIRST BE PROTECTED WITH SEDIMENT EROSION CONTROLS AS INDICATED ON THIS PLAN. PARTICULAR REQUIREMENTS ARE GIVEN AS FOLLOWS:

1. DEMOLITION OF EXISTING BUILDINGS AS REQUIRED.
2. INSTALLATION OF SEDIMENT AND EROSION CONTROL MEASURES AS INDICATED ON THIS PLAN.
3. CLEAR UNDEVELOPED PORTION OF PROPERTY WHICH IS TO BE DEVELOPED.
4. STRIP AND STOCKPILE TOPSOIL.
5. BEGIN BUILDING CONSTRUCTION, ROUGH GRADING.
6. INSTALL STORM DRAIN SYSTEM COMPLETE (IMMEDIATELY INSTALL HAYBALE FILTERS ON ALL INLETS).
7. INSTALL PUBLIC UTILITIES (GAS, ELECTRIC AND TELEPHONE) AS REQUIRED.
8. INSTALL CONCRETE AND ASPHALT CONCRETE PAVEMENT COMPLETE.
9. FINISH GRADING, REDISTRIBUTE TOPSOIL AND ESTABLISH VEGETATION AND/OR LANDSCAPING.
10. CLEAN PAVEMENTS AND STORM DRAIN SYSTEM OF ALL ACCUMULATED SEDIMENT IN CONJUNCTION WITH THE REMOVAL OF ALL TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES.
11. COMPLETE SITE AND BUILDING CONSTRUCTION.

LEGEND

- PROPOSED INLET PROTECTION
- PROPOSED SILT FENCE
- PROPOSED STABILIZED CONSTRUCTION ENTRANCE
- PROPOSED SILT SACK
- PROPOSED TREE PROTECTION
- PROPOSED LIMIT OF DISTURBANCE
- PROPOSED STOCKPILE AREA
- PROPOSED SUBSURFACE INFILTRATION SYSTEM

NOTES:

1. EXISTING CONDITIONS DEPICTED ON THIS PLAN HAVE BEEN TAKEN FROM SURVEY TITLED, "TOPOGRAPHIC SURVEY", PREPARED BY WARD CARPENTER ENGINEERS, INC, DATED APRIL 23, 2015.
2. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH ALL THE PLANS, PRIOR TO BEGINNING ANY CLEARING, GRUBBING OR EXCAVATION.
3. EXPOSED SLOPES AND ALL GRADED AREAS SHALL BE SEEDED WITH THE FOLLOWING GRASS MIX IMMEDIATELY UPON COMPLETION OF ITS CONSTRUCTION AT A RATE OF 6 POUNDS PER 1000 S.F. IN THE FOLLOWING PROPORTIONS:
   CREEPING RED FESCUE 30 %
   PERENNIAL RYE GRASS 70 %
4. GRASS SEED MIX FOR EROSION AND SEDIMENT CONTROL MAY BE APPLIED BY EITHER MECHANICAL OR HYDROSEEDING METHODS. HYDROSEEDING SHALL BE PERFORMED IN ACCORDANCE WITH THE AMERICAN ASSOCIATION OF NURSERYMEN, AMERICAN STANDARD FOR NURSERY STOCK, LATEST EDITION.
5. SEEDED AREAS SHALL BE MULCHED WITH STRAW AT A RATE OF 2 TONS PER ACRE (90 LBS. PER 1,000 S.F.)SUCH THAT THE MULCH FORMS A CONTINUOUS BLANKET.
6. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED ON A DAILY BASIS BY THE CONTRACTOR. ALL COLLECTED SEDIMENT WITHIN SEDIMENT BARRIERS SHALL BE REMOVED PERIODICALLY TO MAINTAIN THE FUNCTION OF THE SEDIMENT BARRIER. ALL SEDIMENT COLLECTED SHALL BE RESPREAD ON-SITE WITHIN STABILIZED AREAS AS DIRECTED BY THE OWNERS FIELD REPRESENTATIVE.
7. DUST SHALL BE CONTROLLED BY SPRINKLING OR OTHER APPROVED METHODS AS NECESSARY, OR AS DIRECTED BY THE TOWN ENGINEER.
8. CUT AND FILLS SHALL NOT ENDANGER ADJOINING PROPERTIES, NOR DIVERT WATER ONTO THE PROPERTY OF OTHERS.
9. ALL FILLS SHALL BE COMPACTED TO PROVIDE STABILITY OF MATERIAL AND TO PREVENT SETTLEMENT.
10. THE CONTRACTOR SHALL INSPECT DOWNSTREAM CONDITIONS FOR EVIDENCE OF SEDIMENTATION ON A WEEKLY BASIS AND AFTER RAINSTORMS.
11. AS WARRANTED BY FIELD CONDITIONS, SPECIAL ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED BY THE CONTRACTOR AS REQUIRED.
12. STOCKPILING OF CONSTRUCTION MATERIAL SHALL BE PLACED ON-SITE IN THE AREA DESIGNATED. STOCKPILED EXCAVATED MATERIAL SHALL HAVE SILT FENCE LOCATED AROUND PERIMETER. ALL STOCKPILED MATERIAL SHALL BE MAINTAINED IN AN ORDERLY MANNER SO AS NOT TO IMPEDE ON EXISTING TRAFFIC CIRCULATION ROUTES.

NO.	REVISION	DATE	BY
1.	GENERAL REVISIONS	04/02/2015	EH
2.	GENERAL REVISIONS	05/07/2015	EH
3.	GENERAL REVISIONS	06/30/2015	PD
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SEDIMENT & EROSION CONTROL PLAN

TOWNHOUSES AT 32-34 WASHINGTON AVENUE
32-34 WASHINGTON AVENUE
HASTING-ON-HUDSON, NY

GRAPHIC SCALE
(IN FEET)
1 inch = 10 ft.

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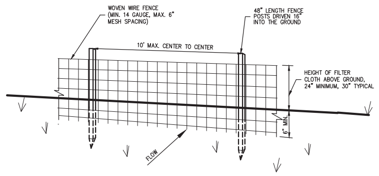
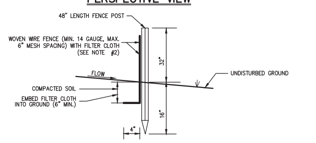
NOT FOR CONSTRUCTION

DRAWN: ED	APPROVED: RR
SCALE: 1" = 10'	
DATE: 03/19/2015	
PROJECT No: 13180	
DWG: 13180-SITE	TAB: S&E · SCR: SE
DRAWING No: C-3	



PERSPECTIVE VIEW

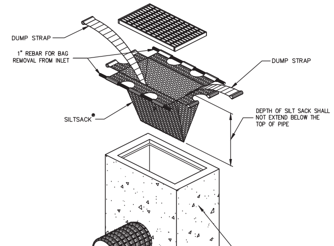


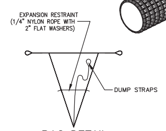
SECTION

NOTES:

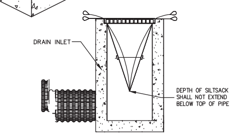
1. WOVEN WIRE FENCE SHALL BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL, EITHER T OR U TYPE OR HARDWOOD.
2. FILTER CLOTH SHALL BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
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





BAG DETAIL



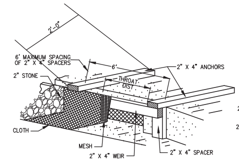
INSTALLATION DETAIL

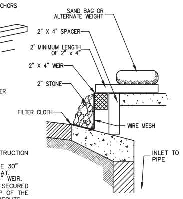
HI-FLOW SILT SACK AS MANUFACTURED BY
ACF ENVIRONMENTAL OR APPROVED EQUAL®

(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	135 LBS
MULLEN BURST	ASTM D-3786	420 PSI
TRAPEZOID TEAR	ASTM D-4533	45 LBS
UV RESISTANCE	ASTM D-4355	90 %
APPARENT OPENING SIZE	ASTM D-4751	20 US SIEVE
FLOW RATE	ASTM D-4491	200 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	1.5 SEC -1

SILT SACK 2



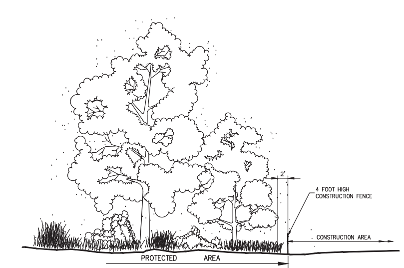


NOTES:

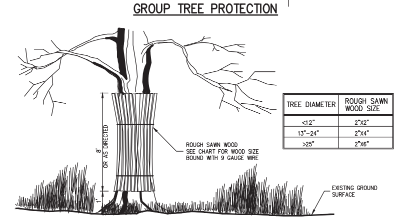
1. FILTER FABRIC SHALL HAVE AN EOS OF 40-85.
2. WOODEN FRAME SHALL BE CONSTRUCTED OF 2" X 4" CONSTRUCTION GRADE LUMBER.
3. WIRE MESH ACROSS THROAT SHALL BE A CONTINUOUS PIECE 30" MINIMUM WIDTH WITH A LENGTH 4' LONGER THAN THE THROAT. IT SHALL BE SHAPED AND SECURELY NAILED TO A 2" X 4" WEIR.
4. THE ASSEMBLY SHALL BE PLACED AGAINST THE INLET AND SECURED BY 2" X 4" ANCHORS 2' LONG EXTENDING ACROSS THE TOP OF THE INLET AND HELD IN PLACE BY SANDBAGS OR ALTERNATE WIEGHTS.
5. INLET PROTECTION SHALL BE INSPECTED FREQUENTLY, MAINTAINED, REPAIRED OR REPLACED TO MAINTAIN EFFECTIVENESS OF INSTALLATION.
6. INLET PROTECTION SHALL BE REMOVED WHEN DIRECTED BY THE OWNER'S FIELD REPRESENTATIVE.
7. IF A SIDEWALK EXISTS, THE CONTRACTOR SHALL PROVIDE PROTECTIVE FENCING (SEE DETAIL) TO PROTECT THE PUBLIC.
8. THE WEIR SHALL BE SECURELY NAILED TO 2" X 4" SPACERS 9 INCHES LONG SPACED NO MORE THAN 6 FEET APART.

MAXIMUM DRAINAGE AREA 1 ACRE

CURB DROP INLET PROTECTION STRUCTURE 3



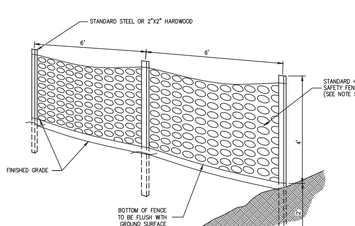
GROUP TREE PROTECTION

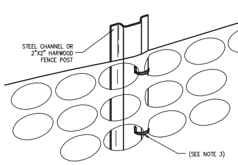


TREE DIAMETER	ROUGH SAWN WOOD SIZE
<12"	2"x2"
13"-24"	2"x4"
>25"	2"x6"

INDIVIDUAL TREE PROTECTION (ARMOR TYPE)

TREE PROTECTION 4

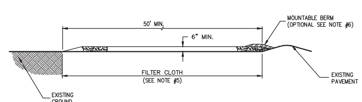




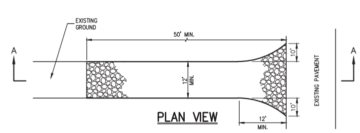
NOTES:

1. SPACE SUPPORT FENCE POSTS AT 6 FOOT INTERVALS.
2. DRIVE SUPPORT POSTS 2 FEET INTO GROUND.
3. FIRMLY FASTEN FENCE MATERIAL IN PLACE BY WIRING TO FENCE POST WHILE MAINTAINING TENSION ACROSS FULL HEIGHT OF FENCE. WIRING SHALL BE DONE IN A MANNER THAT WILL PREVENT SAGGING OF FENCE MATERIAL.
4. PROVIDE PERIODIC INSPECTION AND MAINTENANCE OF FENCE INCLUDING REPAIRS AS NECESSARY AND REQUIRED.
5. PLASTIC FENCE SHALL BE INTERNATIONAL ORANGE COLOR, AS MANUFACTURED BY ADPI ENTERPRISES, INC. OR APPROVED EQUAL.
6. REMOVE CONSTRUCTION FENCE AS DIRECTED BY THE OWNER'S FIELD REPRESENTATIVE.

CONSTRUCTION FENCE 5



SECTION A-A

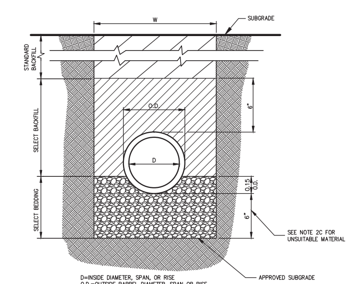


PLAN VIEW

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 6

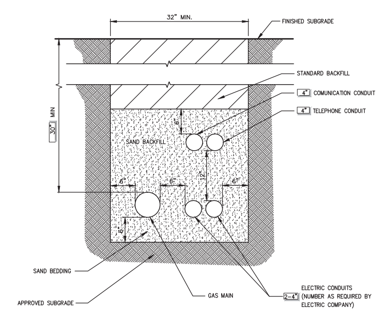


D=INSIDE DIAMETER, SPAN, OR RISE
O.D.=OUTSIDE BARREL DIAMETER, SPAN OR RISE
H.D.=OUTSIDE DIAMETER, SPAN, OR RISE @ BELL OR BAND
W=H.D. + 2.0' – FOR 48" OR SMALLER DIAMETER, SPAN, OR RISE
W=H.D. + 2.5' – FOR GREATER THAN 48" DIAMETER, SPAN, OR RISE

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 7



NOTES:

1. UTILITIES TO BE INSTALLED IN ACCORDANCE WITH THE REGULATIONS AND REQUIREMENTS OF THE UTILITY COMPANY HAVING JURISDICTION.
2. 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 SPESIFIED 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.

UTILITY TRENCH DETAIL 8

NO.	REVISION	DATE	BY
1	GENERAL REVISIONS	5/7/2015	EH

Previous Editions Obsolete

CLIENT: CCI PROPERTIES, LLC
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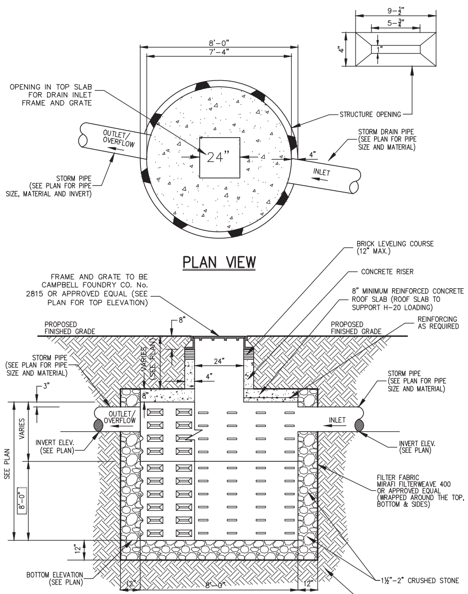
CONSTRUCTION DETAILS

TOWNHOUSES AT 32-34 WASHINGTON AVENUE
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY

DRAWN: ED	APPROVED: RR
SCALE: NTS	
DATE: 03/19/2015	
PROJ. NO: 13180	
13180-DETAILS.dwg	SP-7.tab –
DRAWING NO: C-4	

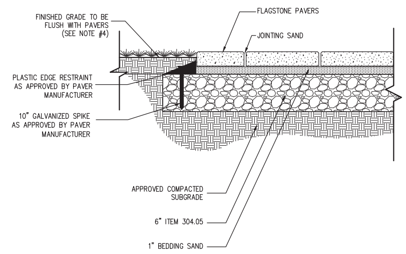
NOT FOR CONSTRUCTION



NOTES:

1. CONCRETE TO TEST 4000 PSI AT 28 DAYS. WELDED WIRE MESH TO COMPLY WITH ASTM A185.
2. NOTES A-4, A-5, A-6 & A-7 UNDER "UTILITY NOTES" SHALL APPLY TO ALL DRAINAGE STRUCTURES.
3. MANUFACTURER SHALL PROVIDE NECESSARY OPENINGS IN PROPER LOCATIONS AND PROPER SIZES FOR INLET & OUTLET PIPES.
4. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF THE STRUCTURE FOR THE ENGINEER'S REVIEW.

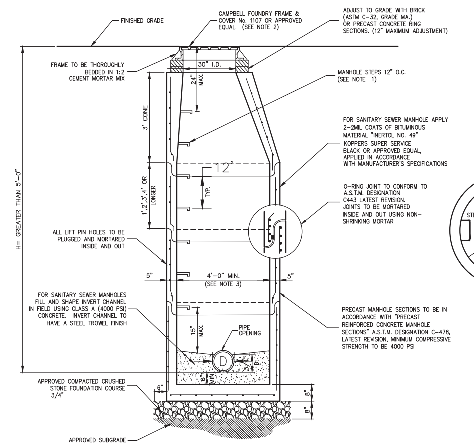
8 FOOT DIAMETER DRY WELL — 10

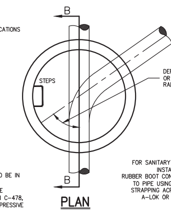


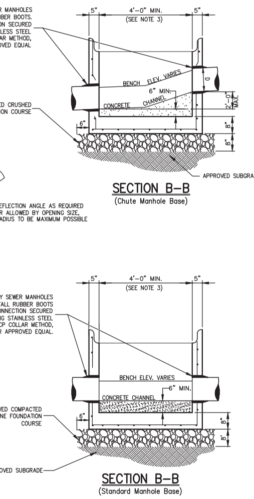
NOTES:

1. MINIMUM CROSS SLOPE SHALL BE 1/4" PER FOOT UNLESS OTHERWISE INDICATED ON DRAWINGS.
2. THICKNESSES INDICATED REFER TO COMPACTED MEASURE.
3. ALL DISTURBED AREAS ADJACENT TO SIDEWALKS SHALL BE TOPSOILED (4" DEPTH) AND SEEDED WITH GRASS.

FLAGSTONE PAVER WALKWAY — 11





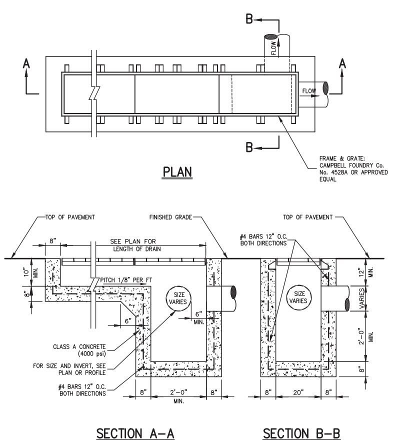


NOTES:

1. MANHOLE STEPS SHALL BE CAST IRON NEENAH No. R-1981-0 OR CAMPBELL FOUNDRY No. 2588-1 OR POLYPROPYLENE COATED STEEL (SEE SPECIFICATIONS) OR APPROVED EQUAL.
2. UNLESS OTHERWISE SPECIFIED, SANITARY SEWER MANHOLES SHALL HAVE LETTERS "SEWER" AND STORM DRAIN MANHOLES SHALL HAVE LETTERS "DRAIN" CAST ON COVER. THE COVERS SHALL HAVE VENT HOLES.
3. MANHOLES WITH DEPTH (h) 10' OR GREATER SHALL BE FIVE (5) FEET IN DIAMETER.
4. MANHOLES SHALL MEET OR EXCEED A.S.T.M. AND O.S.H.A. REQUIREMENTS.
5. SEE "NOTES PERTAINING TO MANHOLES" UNDER "UTILITY NOTES" ON DRAWING SP-8

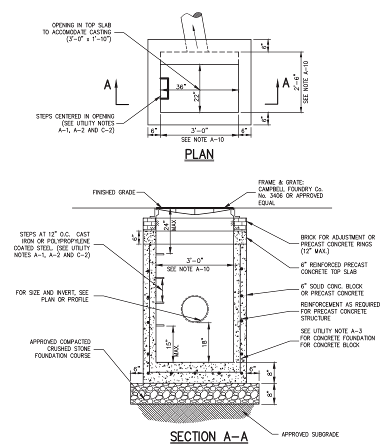
MANHOLE (TYPE B) — 12

(H > 5'-0"<10'-0")



TRENCH DRAIN — 13

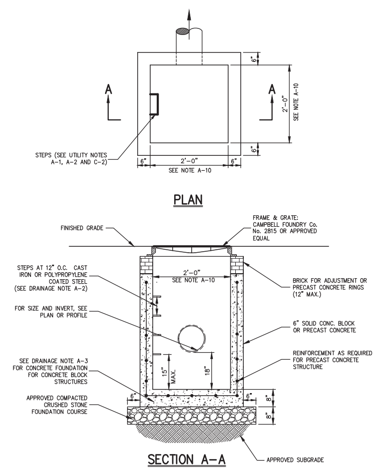
(END OUTLET)



NOTE

1. REINFORCE PRECAST CONCRETE TOP SLAB AND REINFORCE PRECAST CONCRETE STRUCTURE SHALL BE DESIGNED TO ACCOMMODATE AN H-20 DESIGN LOAD.
2. SEE NOTES PERTAINING TO DRAIN INLETS UNDER UTILITY NOTES ON DRAWING C-5

DRAIN INLET (TYPE DI) — 14



NOTE

1. SEE NOTES PERTAINING TO DRAIN INLETS UNDER UTILITY NOTES ON DRAWING C-5

LAWN INLET — 15

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.

UTILITY NOTES — 16

NO.	REVISION	DATE	BY
1	GENERAL REVISIONS	5/7/2015	EH
2	PLANNING BOARD SUBMISSION	08/11/2015	EH

Previous Editions Obsolete

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CONSTRUCTION DETAILS

TOWNHOUSES AT 32-34 WASHINGTON AVENUE
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY

DRAWN: ED	APPROVED: RR
SCALE: NTS	
DATE: 03/19/2015	
PROJ. NO: 13180	
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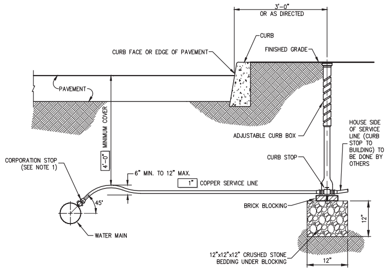
DRAWING NO: C-5	

NOT FOR CONSTRUCTION



SERVICE LINE REQUIREMENTS

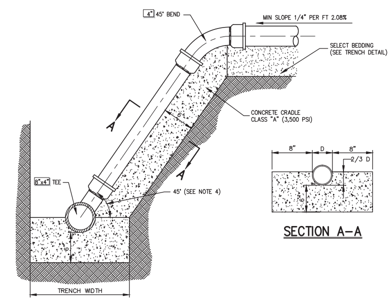
SIZE	SERVICE LINE(MATERIALS)	CORPORATION STOP	CURB STOP	CURB BOX	ENLARGED BASE
3/4"	COPPER, TYPE K	H-15008	H-15214	H-10308	Not Applicable
1"	COPPER, TYPE K	H-15008	H-15214	H-10308	Not Applicable
1-1/2"	COPPER, TYPE K	H-15013	H-15214	H-10310	Not Applicable
2"	COPPER, TYPE K	H-15013	H-15214	H-10310	H-10349

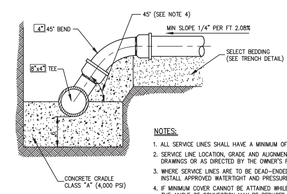
NOTES:

1. INSTALLATION OF 1-1/2" AND 2" CORPORATION STOPS SHALL BE MADE IN THE UPPER PIPE QUADRANT, BUT MAY BE MADE AT ANGLES LESS THAN 45° IF APPROVED BY THE OWNER'S FIELD REPRESENTATIVE.
2. SERVICE LINE SHALL HAVE NO JOINTS BETWEEN THE WATER MAIN AND CURB STOP.
3. CORPORATION STOP, CURB STOP, CURB BOX AND ENLARGED BASE FOR CURB BOX SHALL BE MUELLER COMPANY OR APPROVED EQUAL. CATALOG NUMBERS SHOWN REFER TO MUELLER COMPANY.

WATER SERVICE CONNECTION
(2" OR LESS)

17



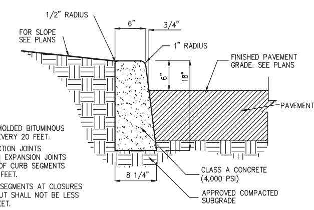


NOTES:

1. ALL SERVICE LINES SHALL HAVE A MINIMUM OF FOUR (4) FEET OF COVER.
2. SERVICE LINE LOCATION, GRADE AND ALIGNMENT SHALL BE AS SHOWN ON DRAWINGS OR AS DIRECTED BY THE OWNER'S FIELD REPRESENTATIVE.
3. WHERE SERVICE LINES ARE TO BE DEAD-ENDED, CONTRACTOR SHALL INSTALL APPROVED WATERTIGHT AND PRESSURE-TIGHT PLUGS.
4. IF MINIMUM COVER CANNOT BE ATTAINED WHILE MAINTAINING MINIMUM SLOPE, THE ANGLE OF CONNECTION MAY BE REDUCED TO 22.5°, IF APPROVED BY THE OWNER'S FIELD REPRESENTATIVE AND GOVERNING BODY WITH JURISDICTION.
5. SANITARY SEWER SERVICE LINE INCLUDING FITTINGS SHALL BE PVC, SDR 35.

SANITARY SEWER SERVICE CONNECTION

18

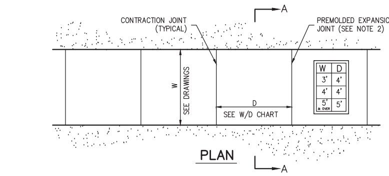


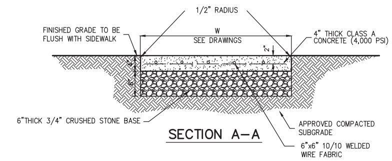
NOTES:

1. INSTALL 1/2" PREMOLDED BITUMINOUS EXPANSION JOINT EVERY 20 FEET.
2. INSTALL CONSTRUCTION JOINTS MID-WAY BETWEEN EXPANSION JOINTS SO THAT LENGTH OF CURB SEGMENTS WILL BE TEN (10) FEET.
3. LENGTH OF CURB SEGMENTS AT CLOSURES MAY BE VARIED BUT SHALL NOT BE LESS THAN FOUR (4) FEET.
4. WHEN INSTALLED ADJACENT TO SIDEWALK OR CONCRETE PAVEMENT, MATCH EXPANSION JOINTS.

CAST-IN-PLACE CONCRETE CURB

19



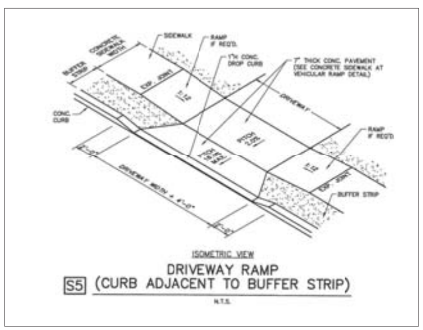


NOTES:

1. SIDEWALK CROSS SLOPE SHALL BE 1% MIN. TO 2% MAX.
2. PROVIDE 1/2" PREMOLDED EXPANSION JOINTS AT 20' INTERVALS UNLESS OTHERWISE DIRECTED.
3. REINFORCING SHALL NOT EXTEND THROUGH EXPANSION JOINTS.
4. SIDEWALK SHALL HAVE LIGHT BROOM FINISH

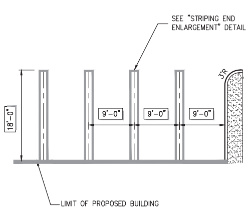
CONCRETE SIDEWALK

20



DRIVEWAY RAMP

21

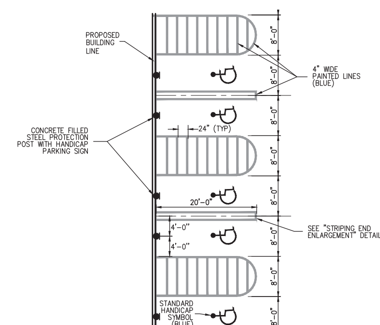


NOTES

1. COLOR OF PAINT SHALL BE WHITE
2. OUTSIDE RADIUS MAY VARY DEPENDING ON SHAPE OF ISLAND. RADIUS SHALL BE AS SHOWN ON LAYOUT PLAN.

90° PARKING
(DOUBLE STRIPING - CURBED END)

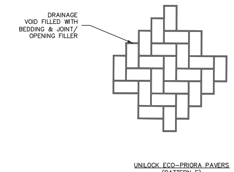
22

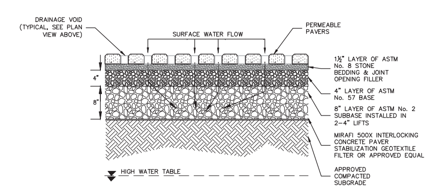


NOTE: SLOPES IN HANDICAP PARKING AREAS SHALL NOT EXCEED 2%.

HANDICAP PARKING
(DOUBLE STRIPING - CURBLINE ALIGNMENT - W/O SIDEWALK)
(NEW YORK)

23





CRUSHED STONE FILLER, BEDDING, BASE & SUBBASE

A. CRUSHED STONE WITH 90% FRACTURED FACES, LA ABRASION <40 PER ASTM C 131, MINIMUM CBR OF 80% PER ASTM D 1883.
B. DO NOT USE ROUNDED RIVER GRAVEL.
C. ALL STONE MATERIALS SHALL BE WASHED WITH LESS THAN 1% PASSING THE No. 200 SIEVE.
D. JOINT/OPENING FILLER, BEDDING, BASE AND SUBBASE: CONFORMING TO ASTM D 448 GRADATION AS SHOWN IN TABLES 1, 2 AND 3 BELOW:

NOTE: No. 89 OR FINER GRADATION MAY BE USED TO FILL PERMEABLE PAVERS WITH NARROW JOINTS.

TABLE 1
ASTM No. 8 GRADING REQUIREMENTS BEDDING & JOINT/OPENING FILLER

SIEVE SIZE	PERCENT PASSING
12.5 mm (1/2")	100
9.5 mm (3/8")	85 TO 100
4.75 mm (No.4)	10 TO 30
2.36 mm (No.8)	0 TO 10
1.16 mm (No.16)	0 TO 5

TABLE 2
ASTM No. 57 BASE GRADING REQUIREMENTS

SIEVE SIZE	PERCENT PASSING
37.5 mm (1-1/2")	100
25 mm (1")	95 TO 100
12.5 mm (1/2")	25 TO 60
4.75 mm (No.4)	0 TO 10
2.36 mm (No.8)	0 TO 5

TABLE 3
GRADING REQUIREMENTS FOR ASTM No.2 SUBBASE

SIEVE SIZE	PERCENT PASSING
75 mm (3")	100
63 mm (2-1/2")	90 TO 100
50 mm (2")	35 TO 70
37.5 mm (1-1/2")	0 TO 15
19 mm (3/4")	0 TO 5

POROUS PAVERS

24

NO.	REVISION	DATE	BY
1	GENERAL REVISIONS	5/7/2015	EH
2	PLANNING BOARD SUBMISSION	08/11/2015	EH

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PROJ. NO: 13180
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DRAWING NO: C-6

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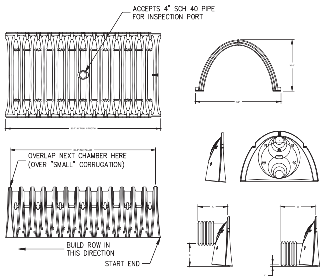
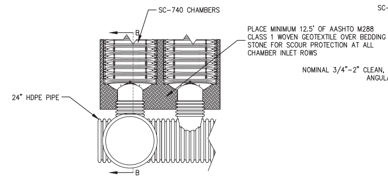


NOMINAL CHAMBER SPECIFICATIONS

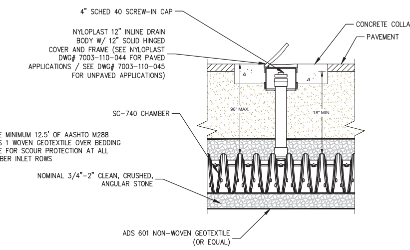
SIZE (W x H x INSTALLED LENGTH)	51.0" x 30.0" x 85.4"
CHAMBER STORAGE	45.9 CUBIC FEET
MINIMUM INSTALLED STORAGE	74.9 CUBIC FEET
WEIGHT	75 lbs.

SCHEDULE OF INVERTS

DESIGNATION	Ⓐ FOUNDATION BOTTOM	Ⓑ CHAMBER BOTTOM	Ⓒ MANIFOLD & INLET STUB INVERT
IB-1	76.73	77.23	77.23



PLAN VIEW



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

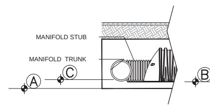
INSPECTION PORT DETAIL

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

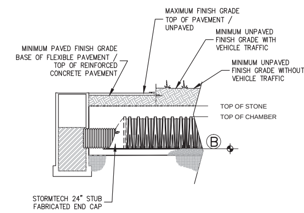
MATERIAL LOCATION	DESCRIPTION	AASHTO M43 DESIGNATION[1]	COMPACTION/DENSITY REQUIREMENT
ⓓ FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISH GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THIS LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE 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.
ⓒ 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.
ⓑ 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.
ⓐ 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".

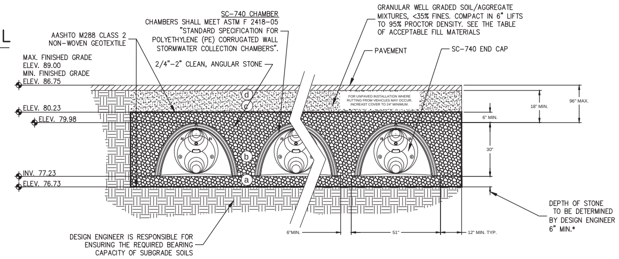
2. AS AN ALTERNATE TO PROCTOR TESTING AND FIELD DENSITY MEASUREMENTS ON OPEN GRADED STONE, STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9"[229 mm] (MAX) LIFTS USING TWO FULL COVERAGES WITH AN APPROPRIATE COMPACTOR.



SECTION B-B



SECTION A-A

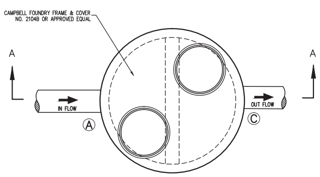


THIS CROSS SECTION DETAILS THE REQUIREMENTS NECESSARY TO SATISFY THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS SECTION 12.12 FOR EARTH AND LIVE LOADS USING STORMTECH CHAMBERS, WITH CONSIDERATION FOR IMPACT AND MUTIPLE VEHICLE PRESENCES.

SECTION AT DETENTION AND WATER QUALITY CONTROL

STORMTECH CHAMBERS SC-740

25

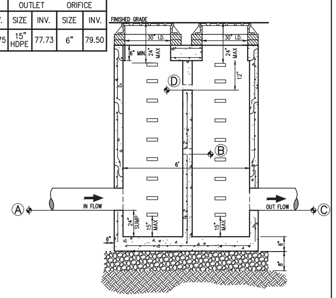


PLAN VIEW
N.T.S.

NOTES:
1. STEPS SHALL BE CAST IRON NEENAH No. R-1981-0 OR CAMPBELL FOUNDRY No. 2588-1 OR POLYPROPYLENE COATED STEEL (SEE SPECIFICATIONS) OR APPROVED EQUAL.
2. STRUCTURES SHALL MEET OR EXCEED A.S.T.M. AND O.S.H.A. REQUIREMENTS.
3. STRUCTURES SHALL BE DESIGNED TO ACCOMMODATE H-20 LOADING.
3. SEE UTILITY NOTES ON DRAWING CD 7 AND CD 8.

SCHEDULE OF INVERTS

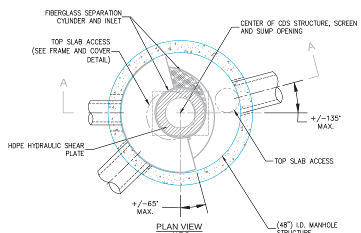
DESIGNATION	Ⓐ INLET		Ⓑ ORIFICE		Ⓒ OUTLET		Ⓓ ORIFICE	
	SIZE	INV.	SIZE	INV.	SIZE	INV.	SIZE	INV.
OCS 1A-2	15" HDPE	77.73	6"	77.75	15" HDPE	77.73	6"	79.50



SECTION A-A
N.T.S.

OULET CONTROL STRUCTURE

26



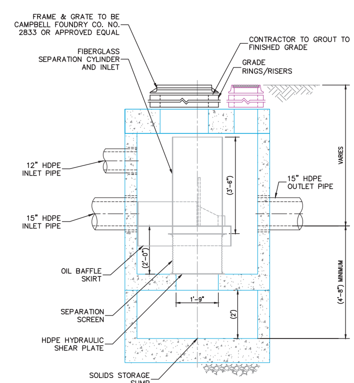
PLAN VIEW
N.T.S.

CDS2015-4 DESIGN NOTES

CDS2015-4 RATED TREATMENT CAPACITY IS 0.7 CFS, OR PER LOCAL REGULATIONS. MAXIMUM HYDRAULIC INTERNAL BYPASS CAPACITY IS 10.0 CFS. IF THE SITE CONDITIONS EXCEED 10.0 CFS, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

THE STANDARD CDS2015-4 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

DESIGNATION (MODEL SUFFIX)	CONFIGURATION DESCRIPTION
G	GRATED INLET ONLY (NO INLET PIPE)
GP	GRATED INLET WITH INLET PIPE OR PIPES
K	CURB INLET ONLY (NO INLET PIPE)
KP	CURB INLET WITH INLET PIPE OR PIPES



SECTION A-A
N.T.S.

GENERAL NOTES
1. WATER QUALITY STRUCTURES SHALL BE CDS MODEL CDS2015-4 BY CONTECH OR APPROVED EQUAL
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH STORMWATER SOLUTIONS REPRESENTATIVE. www.contechstormwater.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. HDPE HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

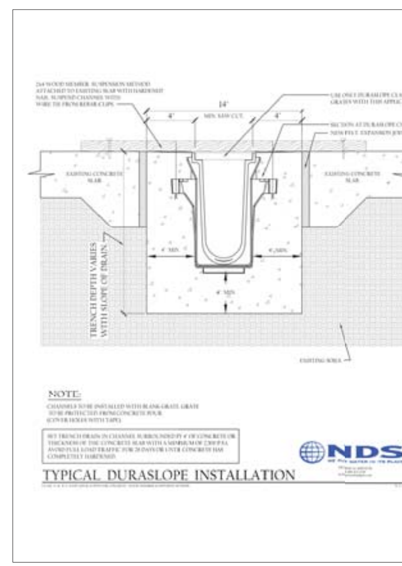
INSTALLATION NOTES
1. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
2. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
3. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
4. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
5. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			WQS-A-4
WATER QUALITY FLOW RATE (CFS)			0.7
PEAK FLOW RATE (CFS)			0.7
RETURN PERIOD OF PEAK FLOW (YRS)			100
SCREEN APERTURE (2400 OR 4700)			2400
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE	85.15	HDPE	12"
INLET PIPE	77.28	HDPE	15"
OUTLET PIPE	77.28	HDPE	15"
RIM ELEVATION			90.00
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		WIDTH	HEIGHT
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

WATER QUALITY CDS 2015-4

27



DURA SLOPE TRENCH DRAIN

28

NOT FOR CONSTRUCTION

NO.	REVISION	DATE	BY

Previous Editions Obsolete

CLIENT: CCI PROPERTIES, LLC
52 CEDAR STREET
DOBBS FERRY, NY 10522

ARCHITECT: CHRISTINA GRIFFIN ARCHITECT, PC
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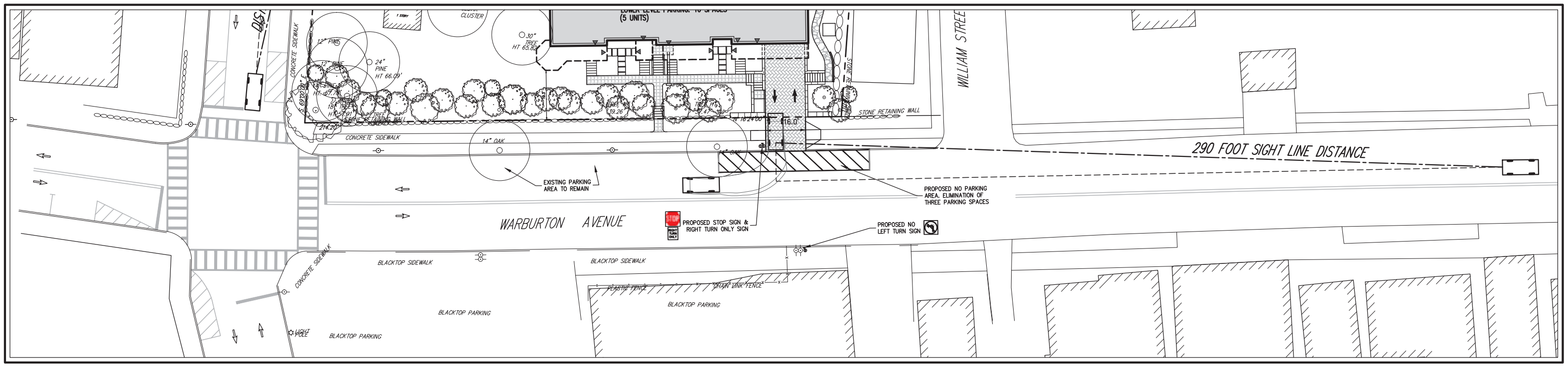
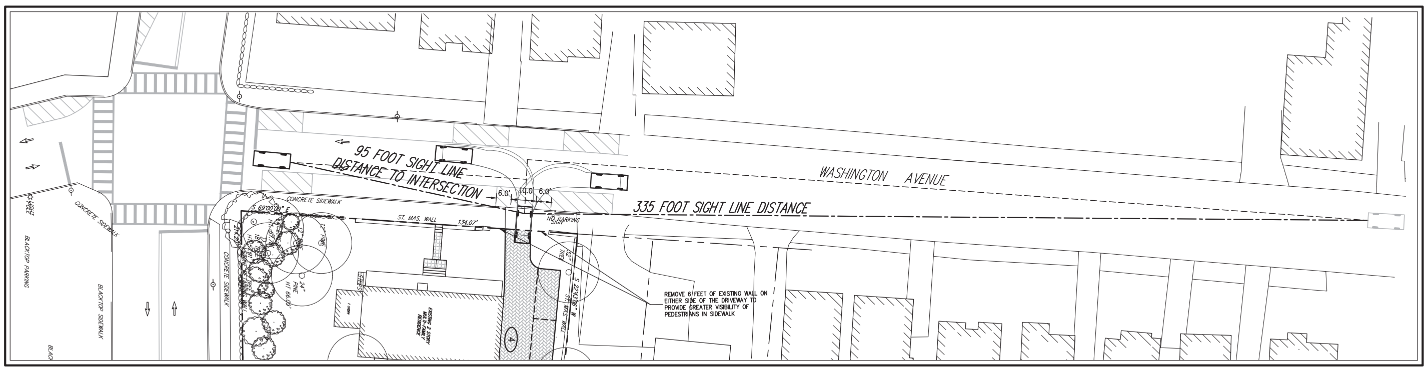
CONSTRUCTION DETAILS
TOWNHOUSES AT 32-34 WASHINGTON AVENUE
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY

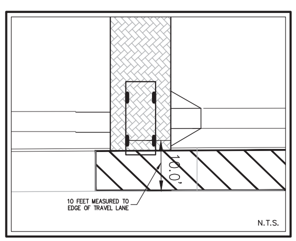
DRAWN: EH	APPROVED: RR
SCALE:	NTS
DATE:	08/11/2015
PROJ. NO:	13180
13180-DETAILS.dwg	SP-9.tab / -
DRAWING NO:	C-6A



SIGHT LINE DISTANCE FROM PROPOSED DRIVEWAY ONTO WARBURTON AVENUE



SIGHT LINE DISTANCE FROM EXISTING DRIVEWAY ONTO WASHINGTON AVENUE



EXITING VEHICLE DECISION LOCATION

LEGEND

- EXISTING PROPERTY LINE
- ADJACENT PROPERTY LINE
- PROPOSED PROPERTY LINE
- SETBACK LINE
- EXISTING BUILDING LINE
- EXISTING PAVEMENT EDGE
- EXISTING CURB LINE
- EXISTING STONE WALL
- EXISTING RETAINING WALL
- EXISTING FENCE
- EXISTING TREE AND DESIGNATION
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING SIGN
- PROPOSED BUILDING LINE
- PROPOSED CONCRETE CURB
- PROPOSED PARKING SPACES WITH NUMBER OF SPACES INDICATED
- PROPOSED HANDICAPPED PARKING SPACES WITH NUMBER OF SPACES INDICATED
- PROPOSED FLAGSTONE WALK
- PROPOSED PERMEABLE PAVERS
- PROPOSED DROP CURB AND RAMP
- PROPOSED RETAINING WALL (DESIGN BY OTHERS)
- TRAFFIC SIGN LOCATION & DESIGNATION

NOTES:

1. EXISTING CONDITIONS DEPICTED ON THIS PLAN HAVE BEEN TAKEN FROM SURVEY TITLED, "TOPOGRAPHIC SURVEY", PREPARED BY WARD CARPENTER ENGINEERS, INC, DATED APRIL 23, 2015.
2. EXISTING CONDITIONS OFF SITE DEPICTED ON THIS PLAN HAVE BEEN OBTAINED FROM WESTCHESTER COUNTY GEOGRAPHIC INFORMATION SYSTEMS AND SHOULD BE CONSIDERED APPROXIMATE AND USED FOR PLANNING PURPOSES ONLY.
3. FOR SITE STRUCTURE DETAILS, SEE DRAWINGS C-1 THROUGH C-6A.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

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.

NOT FOR CONSTRUCTION

NO.	REVISION	DATE	BY
1.	GENERAL REVISIONS	07/27/2015	EH

Previous Editions Obsolete

APPLICANT/OWNER:
CCI PROPERTIES, LLC
52 CEDAR STREET
DOBBS FERRY, NY 10522

ARCHITECT:
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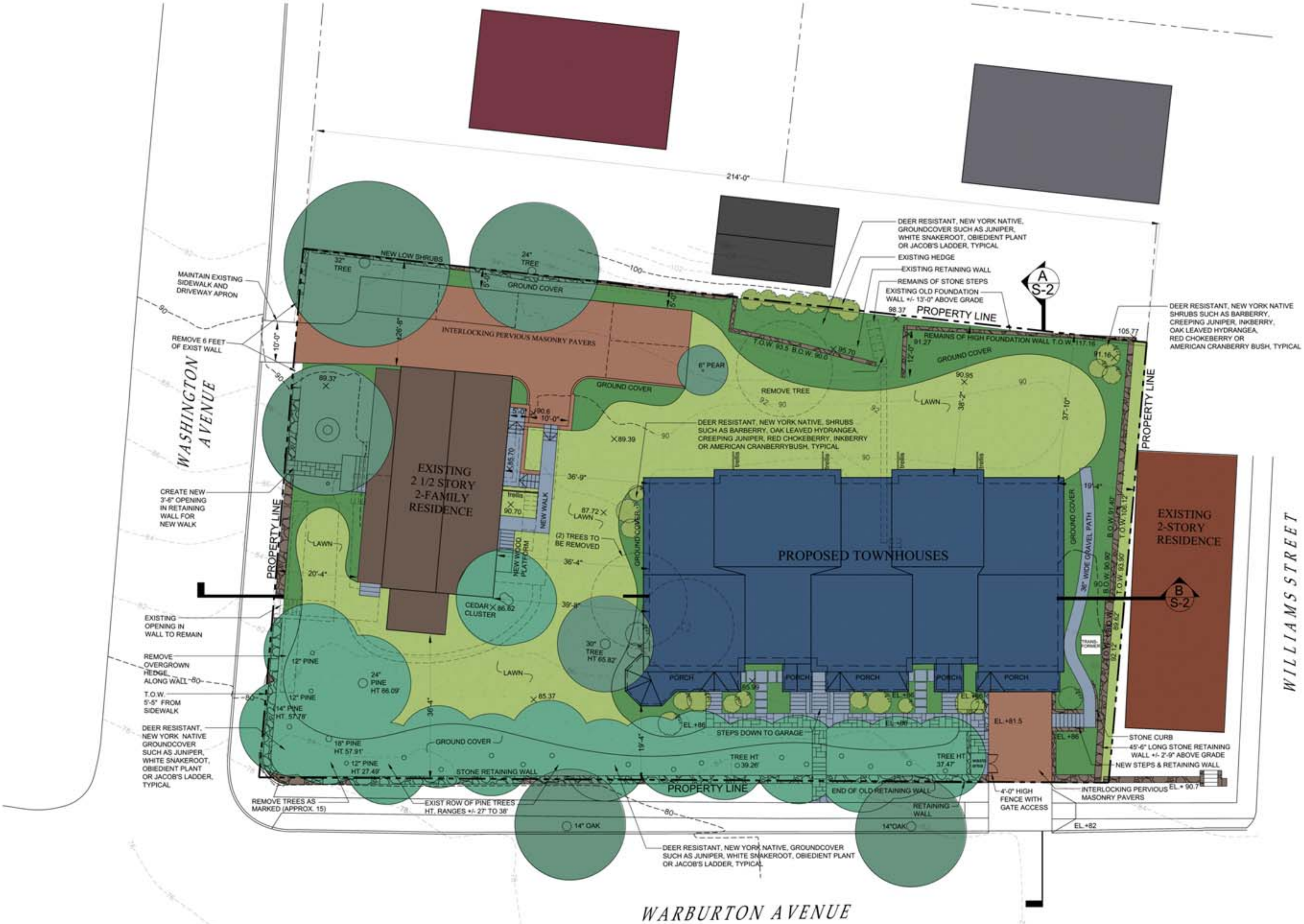
SIGHT LINE DISTANCE PLAN

TOWNHOUSES AT 32-34 WASHINGTON AVENUE
32-34 WASHINGTON AVENUE
HASTING-ON-HUDSON, NY

DRAWN: EH	APPROVED: RR
SCALE: 1" = 20'	
DATE: 5/21/2015	
PROJECT No: 13180	
DWG: 13180-SITE	TAB: SIGHT DIST
LS: SIGHT.LS	
DRAWING No: C-7	



LANDSCAPE PLAN

SCALE: 3/32" = 1'-0"

SEE C-1 FOR LAYOUT INFORMATION
SEE C-2 FOR GRADING AND UTILITIES INFORMATION

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

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Drawing Title: LANDSCAPE PLAN

Scale: AS SHOWN

Date	
PLANNING BD PRE-SUBMISSION	2-1-15
PLANNING BOARD SUBMISSION	3-19-15
PLANNING BOARD SUBMISSION	4-15-15
ZONING BOARD SUBMISSION	4-23-15
PLANNING BOARD SUBMISSION	5-07-15
PLANNING BOARD SUBMISSION	6-30-15
PLANNING BOARD SUBMISSION	7-14-15
WESTCHESTER COUNTY PLANNING SUBMISSION 7-28-157-14-15	
PLANNING BOARD SUBMISSION	8-11-15

L-1

COVERAGE CALCULATIONS

LOT AREA	26,126 SF / 0.60 AC
WALLS	686 SF (2.6%)
SIDEWALKS & STEPS	1,010 SF (3.8%)
EXTERIOR PARKING	741 SF (2.8%)
DRIVEWAY (OVER 960 SF)	765 SF (2.9%)
BUILDING (NOT INCL. PORCHES)	6,500 SF (25%) (1,738 SF EXIST. + 4,762 SF NEW)
PORCHES	934 SF (3.6%) (339 SF EXIST. + 595 SF NEW)
TOTAL DEVELOPMENT COVERAGE	10,636 SF (40.7%)
TOTAL BUILDING COVERAGE (BUILDING AND PORCHES ONLY)	7,434 SF (28.5%)

TABLE OF ZONING DATA

ZONING DISTRICT: MR 1.5 TAX DESIGNATION: SECTION 4.75, BLOCK 53, LOT 11

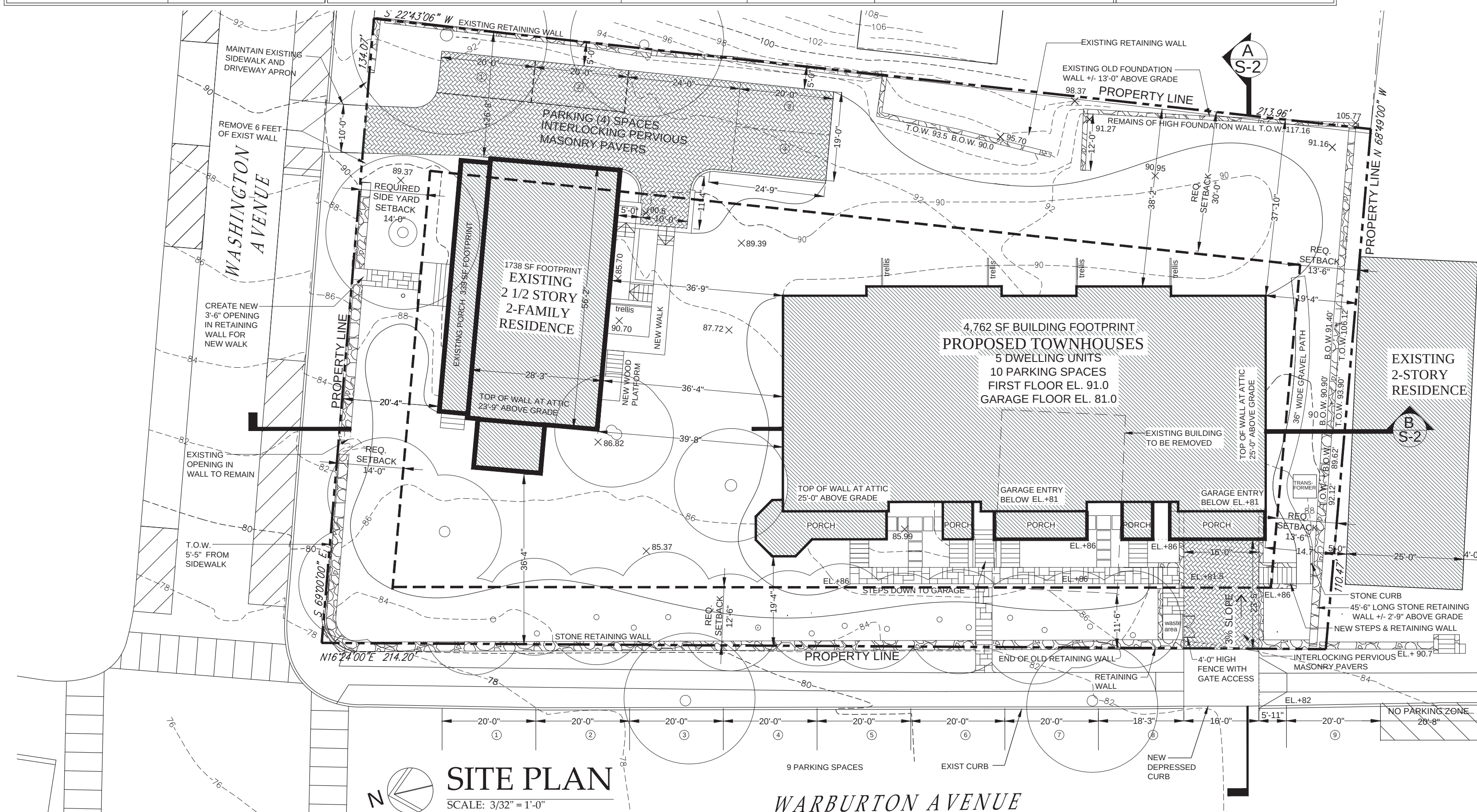
	REQUIRED	EXISTING	PROPOSED
LOT AREA	1,500 SF / .034 AC	26,126.47 SF / 0.6 AC	26,126.47 SF / 0.6 AC
NUMBER OF DWELLING UNITS	TO BE DETERMINED	2	7
MINIMUM LOT AREA PER DWELLING UNIT (DENSITY)	1,500 SF PER UNIT	13,063 SF PER UNIT	3,732 SF PER UNIT
MAXIMUM DEVELOPMENT COVERAGE	15% / 1,491 SF	12% / 3,018 SF	40% / 10,430 SF **VARIANCE REQUIRED**
TOTAL BUILDING COVERAGE (BLDG. & PORCHES ONLY)	-	-	28.5% / 7,434 SF
OPEN SPACE	1,600 SF FOR EXISTING 2-FAMILY HOUSE, 2,800 SF FOR NEW TOWNHOUSES	20,613 SF -	2,135 SF AT EXISTING 2- FAMILY HOUSE, 5,628 SF AT TOWNHOUSES, 7,800 SF COMMON SPACE
MINIMUM LOT WIDTH FRONTAGE	25	134	134
MAXIMUM BUILDING HEIGHT	3 STORIES / 40 FT	2 1/2 STORIES / 34.75 FT	2 1/2 STORIES / 32.6 FT at NEW BUILDING
MAXIMUM DRIVEWAY SLOPE	3%	--	3%
MAXIMUM CURB CUT	24.0 FT	10.0 FT	22.0 FT
FRONT YARD SETBACK	12.5 FT	36.33 FT	19.33 SF
REAR YARD SETBACK	30.0 FT	26.66 FT	26.66 FT at OLD HOUSE, 37.83 FT at NEW BUILDING
SIDE ONE	13.5 FT	159.00 FT	14.70 FT
SIDE TWO	14.0 FT	20.33 FT	20.33 FT
TOTAL OF TWO SIDES	27.5 FT	179.33 FT	35.03 FT
FRONT PARKING SETBACK	10 FT	--	--
REAR PARKING SETBACK	5 FT	+/- 2 FT	5 FT
SIDE PARKING SETBACK	5 FT	0 FT	0 FT
PARKING SUMMARY - TOTAL SPACES PROVIDED	4 SPACES	+/- 2 SPACES	14 SPACES

ZONING NOTES

1. PER ZONING CODE (295-71A), OPEN SPACE IS CALCULATED 200 SQUARE FEET FOR EACH BEDROOM:
NEW TOWNHOUSES: (4) 3-BEDROOM UNITS AND (1) 2-BEDROOM UNIT = 14 BEDROOMS X 200 = 2800 SF
EXISTING 2-FAMILY HOUSE: 8 BEDROOMS X 200 = 1,600 SF

2. PER ZONING CODE (295-72E), FRONT AND SIDE YARD IS AT LEAST 12 FEET OR 1/2 OF THE HEIGHT OF THE BUILDING WALL NEAREST THE SIDE LOT LINE, WHICHEVER IS GREATER, PLUS 1 FOOT FOR EACH 10 FEET LENGTH IN EXCESS OF 50 FEET.

3. A BUILDING WALL HEIGHT OF 25 FEET WAS USED TO CALCULATE THE FRONT AND SIDE YARD SETBACK. BASED ON INTERPRETATION PROVIDED BY HASTINGS BUILDING DEPARTMENT, BUILDING WALL HEIGHT IS FROM GRADE TO TOP OF ATTIC FLOOR.



SITE PLAN

SCALE: 3/32" = 1'-0"

SEE C-1 FOR LAYOUT INFORMATION
SEE C-2 FOR GRADING AND UTILITIES INFORMATION

TOWNHOUSES at 32-34 WASHINGTON AVENUE

HASTINGS-ON-HUDSON, NY 10706

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Hastings-on-Hudson, New York 10706
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Date	
PLANNING BD PRE-SUBMISSION	2-1-15
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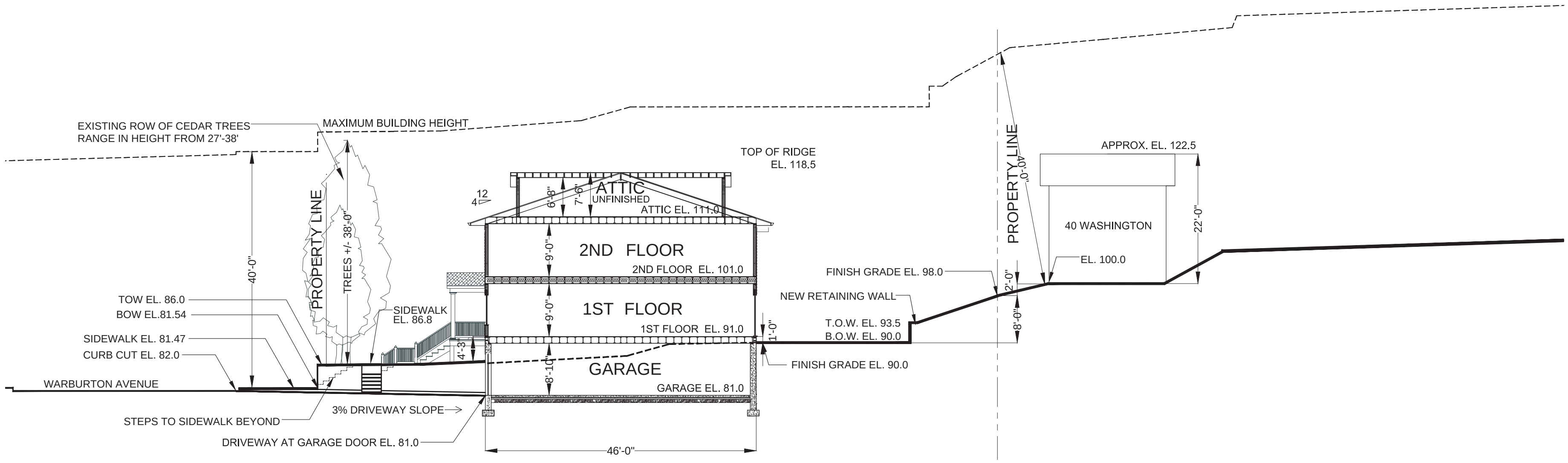
PLANNING BOARD SUBMISSION	7-14-15
WESTCHESTER COUNTY PLANNING SUBMISSION	7-28-157-14-15
PLANNING BOARD SUBMISSION	8-11-15

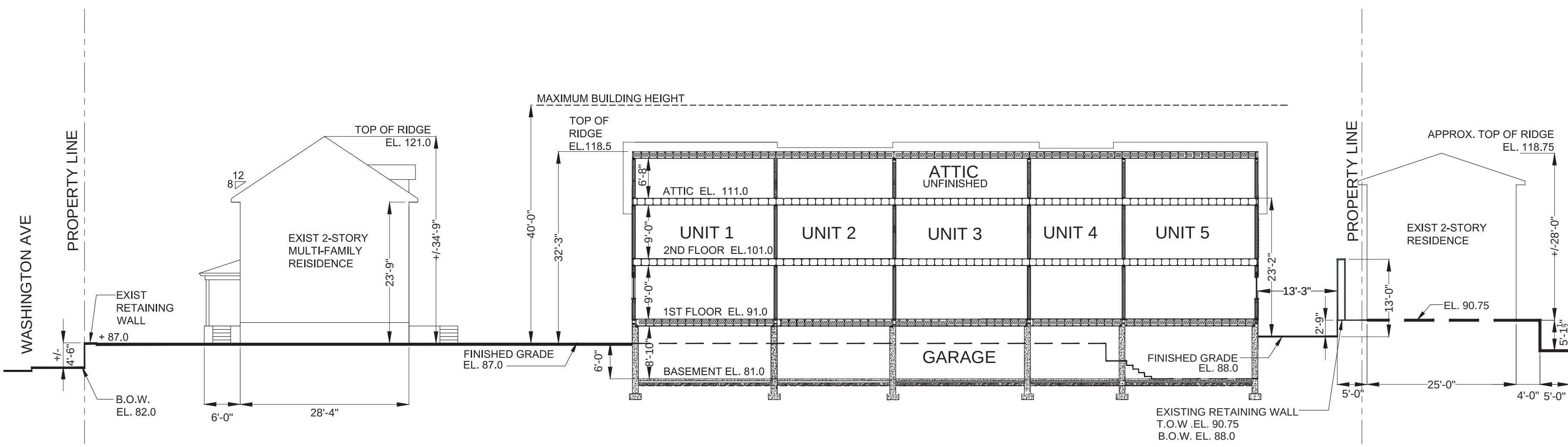
Drawing Title: SITE PLAN

Scale: AS SHOWN

S-1



A S-2 SECTION through SITE
SCALE: 1/8" = 1'-0"



B S-2 SECTION through SITE
SCALE: 1/8" = 1'-0"

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

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Date

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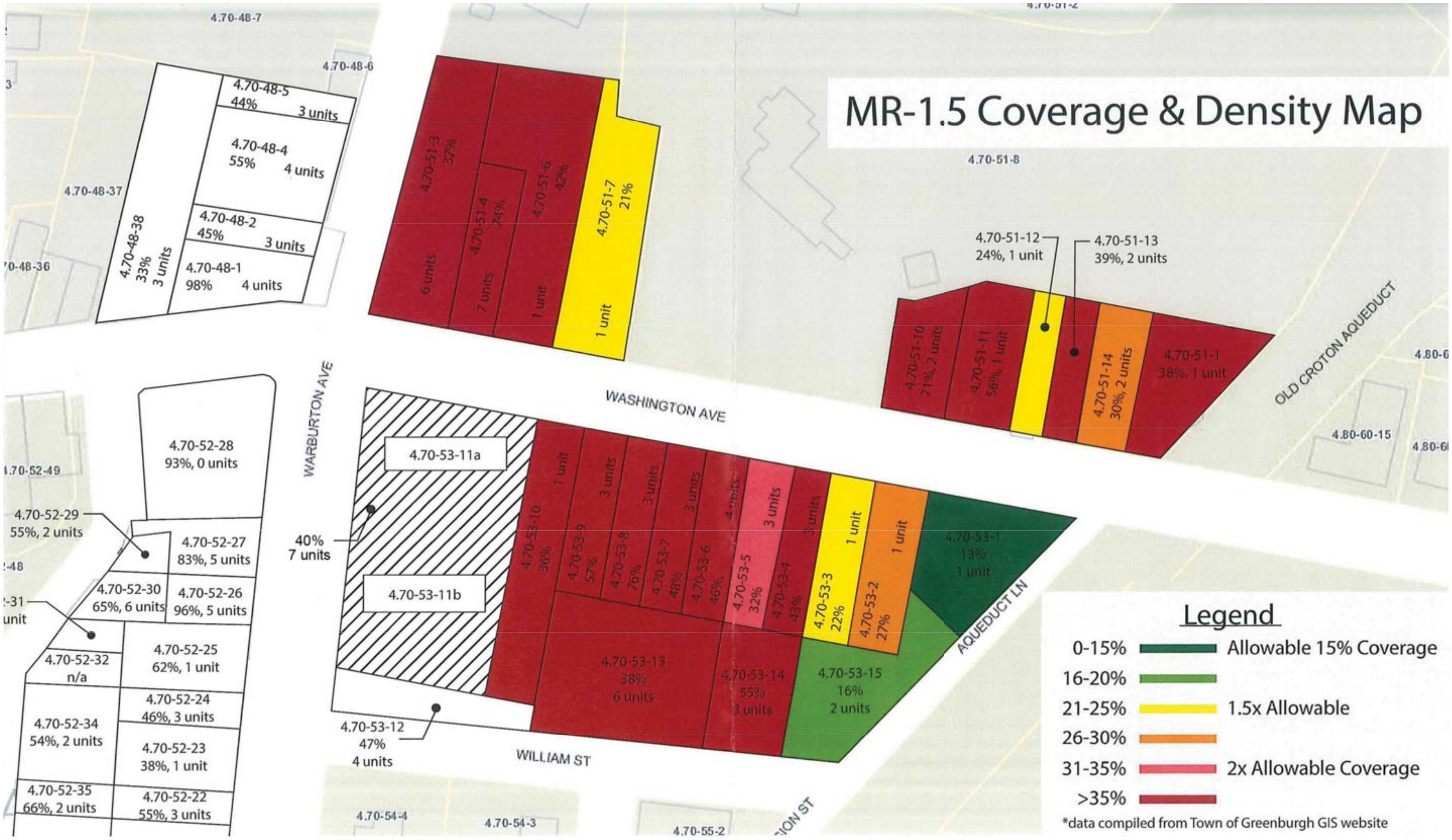
PLANNING BOARD SUBMISSION	5-07-15
WESTCHESTER COUNTY PLANNING SUBMISSION	7-28-157-14-15
PLANNING BOARD SUBMISSION	8-11-15

Drawing Title
SECTION
THROUGH SITE

Scale:
AS SHOWN

S-2



AVERAGE DEVELOPMENT COVERAGE OF 24 PROPERTIES ON WASHINGTON AVENUE & WILLIAM STREET, EXCLUDING CROPSEY ESTATE IS 41%

N

COVERAGE & DENSITY MAP

SCALE: N.T.S.

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

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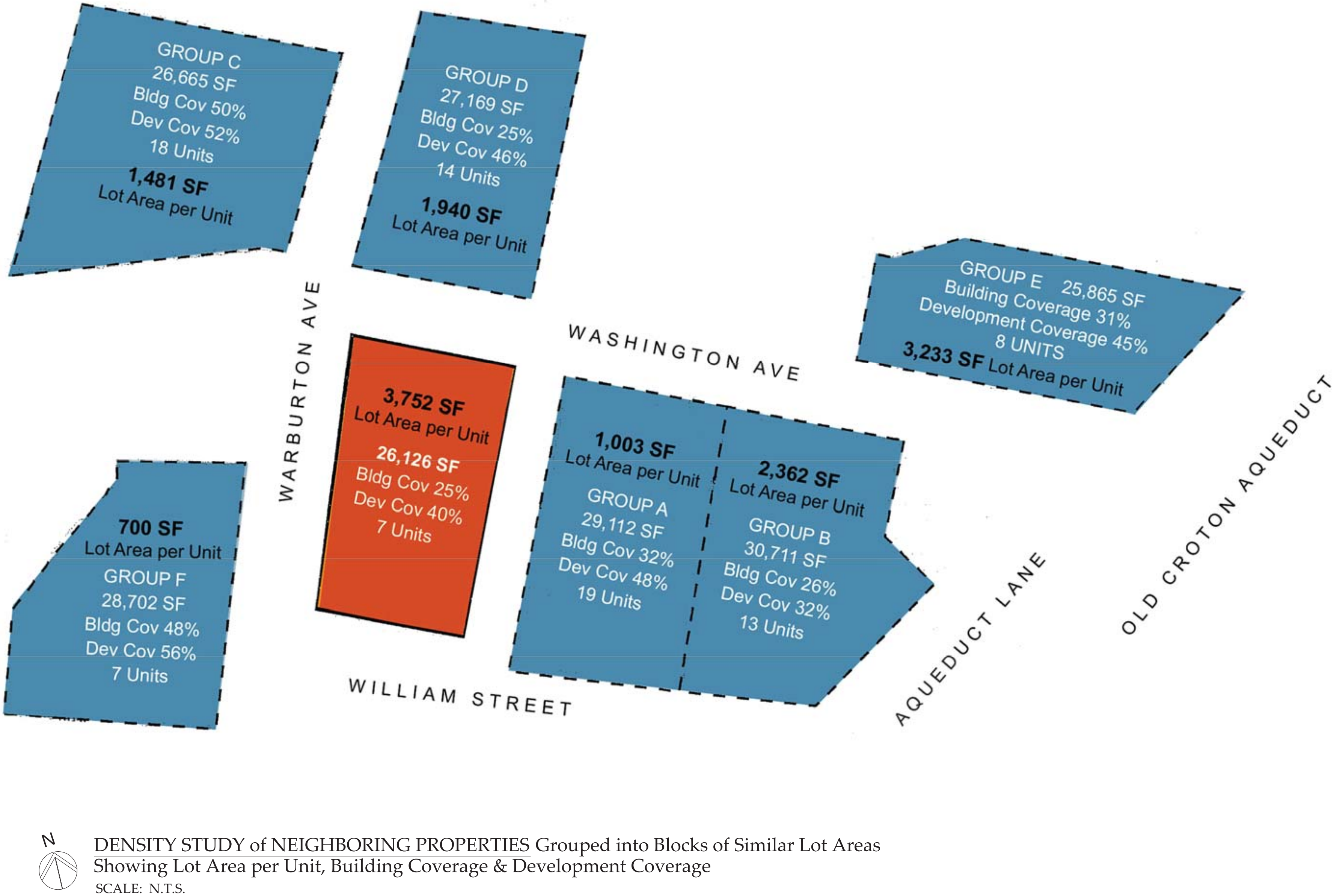
Date:
PLANNING BD PRE-SUBMISSION 2-1-15
PLANNING BOARD SUBMISSION 3-19-15
PLANNING BOARD SUBMISSION 4-15-15
ZONING BOARD SUBMISSION 4-29-15
PLANNING BOARD SUBMISSION 5-27-15
PLANNING BOARD SUBMISSION 6-30-15
WESTCHESTER COUNTY PLANNING SUBMISSION 7-28-15 7-14-15
PLANNING BOARD SUBMISSION 8-11-15

Drawing Title: COVERAGE & DENSITY MAP

Scale: AS SHOWN

S-3



DENSITY STUDY of NEIGHBORING PROPERTIES Grouped into Blocks of Similar Lot Areas
Showing Lot Area per Unit, Building Coverage & Development Coverage
SCALE: N.T.S.

TOWNHOUSES at
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NY 10706

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Drawing Title
DENSITY STUDY

Scale:
AS SHOWN

Date
PLANNING BD PRE-SUBMISSION 2-1-15
PLANNING BOARD SUBMISSION 3-19-15
PLANNING BOARD SUBMISSION 4-15-15
ZONING BOARD SUBMISSION 4-23-15
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WESTCHESTER COUNTY PLANNING SUBMISSION 7-28-157-14-15
PLANNING BOARD SUBMISSION 8-11-15

S-4

Full Environmental Assessment Form
Part 1 - Project and Setting

Instructions for Completing Part 1

Part 1 is to be completed by the applicant or project sponsor. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification.

Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information; indicate whether missing information does not exist, or is not reasonably available to the sponsor; and, when possible, generally describe work or studies which would be necessary to update or fully develop that information.

Applicants/sponsors must complete all items in Sections A & B. In Sections C, D & E, most items contain an initial question that must be answered either "Yes" or "No". If the answer to the initial question is "Yes", complete the sub-questions that follow. If the answer to the initial question is "No", proceed to the next question. Section F allows the project sponsor to identify and attach any additional information. Section G requires the name and signature of the project sponsor to verify that the information contained in Part 1is accurate and complete.

A. Project and Sponsor Information.

Name of Action or Project: Townhouses at 32-34 Washington Avenue		
Project Location (describe, and attach a general location map): 32-34 Washington Avenue		
Brief Description of Proposed Action (include purpose or need): Site Plan approval for the renovation of an existing 2 1/2 story, 2 family apartment building with a new area for 4 parking spaces and a reconstructed curb cut onto Washington Avenue in the northern portion of the property and Site Plan approval for the construction of a new 4,762 sf. footprint 5 unit Townhouse (9,529 sf. total building floor area) with 3 floors (partially buried lower level for parking), 10 parking spaces, new utility services and a new curb cut onto Warburton Avenue.		
Name of Applicant/Sponsor: CCI Properties, LLC (Mr. Andrew Cortese)	Telephone: (914) 447-3965 E-Mail: andrew@corteseconstruction.com	
Address: 52 Cedar Street		
City/PO: Dobbs Ferry	State: NY	Zip Code: 10522
Project Contact (if not same as sponsor; give name and title/role): -same as sponsor-	Telephone: E-Mail:	
Address:		
City/PO:	State:	Zip Code:
Property Owner (if not same as sponsor): -same as sponsor-	Telephone: E-Mail:	
Address:		
City/PO:	State:	Zip Code:

B. Government Approvals

B. Government Approvals Funding, or Sponsorship. ("Funding" includes grants, loans, tax relief, and any other forms of financial assistance.)

Government Entity		If Yes: Identify Agency and Approval(s) Required	Application Date (Actual or projected)
a. City Council, Town Board, or Village Board of Trustees	☐ Yes ☒ No		
b. City, Town or Village Planning Board or Commission	☐ Yes ☐ No	Planning Board; Site Plan Approval	August 13, 2015
c. City Council, Town or Village Zoning Board of Appeals	☒ Yes ☐ No	ZBA; 1. §295-72E(2), variance for max. development coverage 2. §295-18D, variance to allow two permitted uses on one lot 3. §295-41B, variance to exceed the max. allowed curbcut width of 24'	August 13, 2015
d. Other local agencies	☒ Yes ☐ No	Architectural Review Board (interested agency): ARB review & View Preservation	August 13, 2015
e. County agencies	☒ Yes ☐ No	WCDPW; curb cut, utility trenching, sewer service connection	August 13, 2015
f. Regional agencies	☐ Yes ☒ No		
g. State agencies	☒ Yes ☐ No	NYSDEC (interested agency)	August 13, 2015
h. Federal agencies	☐ Yes ☐ No		

i. Coastal Resources.

i. Is the project site within a Coastal Area, or the waterfront area of a Designated Inland Waterway? ☒ Yes ☐ No

If Yes,

ii. Is the project site located in a community with an approved Local Waterfront Revitalization Program? ☐ Yes ☒ No

iii. Is the project site within a Coastal Erosion Hazard Area? ☐ Yes ☒ No

C. Planning and Zoning

C.1. Planning and zoning actions.

Will administrative or legislative adoption, or amendment of a plan, local law, ordinance, rule or regulation be the only approval(s) which must be granted to enable the proposed action to proceed? ☐ Yes ☒ No

- **If Yes,** complete sections C, F and G.
- **If No,** proceed to question C.2 and complete all remaining sections and questions in Part 1

C.2. Adopted land use plans.

a. Do any municipally- adopted (city, town, village or county) comprehensive land use plan(s) include the site where the proposed action would be located? ☒ Yes ☐ No

If Yes, does the comprehensive plan include specific recommendations for the site where the proposed action would be located? ☒ Yes ☐ No

b. Is the site of the proposed action within any local or regional special planning district (for example: Greenway Brownfield Opportunity Area (BOA); designated State or Federal heritage area; watershed management plan; or other?) ☐ Yes ☒ No

If Yes, identify the plan(s):

c. Is the proposed action located wholly or partially within an area listed in an adopted municipal open space plan, or an adopted municipal farmland protection plan? ☐ Yes ☒ No

If Yes, identify the plan(s):

C.3. Zoning

a. Is the site of the proposed action located in a municipality with an adopted zoning law or ordinance. ☒ Yes ☐ No
If Yes, what is the zoning classification(s) including any applicable overlay district?
Multi-Family Residence District (MR-1.5). View Preservation Overlay District

b. Is the use permitted or allowed by a special or conditional use permit? ☒ Yes ☐ No

c. Is a zoning change requested as part of the proposed action? ☐ Yes ☒ No
If Yes,
i. What is the proposed new zoning for the site? ____________

C.4. Existing community services.

a. In what school district is the project site located? Hastings-on-Hudson

b. What police or other public protection forces serve the project site?
Hastings-on-Hudson Police Department

c. Which fire protection and emergency medical services serve the project site?
Hastings-on-Hudson, Hastings EMS

d. What parks serve the project site?
Old Croton Trailways State Park, Draper Park

D. Project Details

D.1. Proposed and Potential Development

a. What is the general nature of the proposed action (e.g., residential, industrial, commercial, recreational; if mixed, include all components)?
Residential

b. a. Total acreage of the site of the proposed action? 0.60 acres
b. Total acreage to be physically disturbed? 0.40 acres
c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor? 0.60 acres

c. Is the proposed action an expansion of an existing project or use? ☐ Yes ☒ No
i. If Yes, what is the approximate percentage of the proposed expansion and identify the units (e.g., acres, miles, housing units, square feet)? % ____________ Units: ____________

d. Is the proposed action a subdivision, or does it include a subdivision? ☐ Yes ☒ No
If Yes,
i. Purpose or type of subdivision? (e.g., residential, industrial, commercial; if mixed, specify types)
____
ii. Is a cluster/conservation layout proposed? ☐ Yes ☐ No
iii. Number of lots proposed? ________
iv. Minimum and maximum proposed lot sizes? Minimum ________ Maximum ________

e. Will proposed action be constructed in multiple phases? ☐ Yes ☒ No
i. If No, anticipated period of construction: 8 months
ii. If Yes:
- Total number of phases anticipated ____
- Anticipated commencement date of phase 1 (including demolition) ____ month ____ year
- Anticipated completion date of final phase ____ month ____ year
- Generally describe connections or relationships among phases, including any contingencies where progress of one phase may determine timing or duration of future phases: ____________

f. Does the project include new residential uses? ☒ Yes ☐ No
If Yes, show numbers of units proposed.

	One Family	Two Family	Three Family	Multiple Family (four or more)
Initial Phase				
At completion of all phases				5 3-bedroom units

g. Does the proposed action include new non-residential construction (including expansions)? ☐ Yes ☒ No
If Yes,
i. Total number of structures ___________
ii. Dimensions (in feet) of largest proposed structure: ________height; ________width; and _______ length
iii. Approximate extent of building space to be heated or cooled: ______________________ square feet

h. Does the proposed action include construction or other activities that will result in the impoundment of any liquids, such as creation of a water supply, reservoir, pond, lake, waste lagoon or other storage? ☐ Yes ☒ No
If Yes,
i. Purpose of the impoundment: ________________________________
ii. If a water impoundment, the principal source of the water: ☐ Ground water ☐ Surface water streams ☐ Other specify: ________________________________
iii. If other than water, identify the type of impounded/contained liquids and their source.
____
iv. Approximate size of the proposed impoundment. Volume: ____________ million gallons; surface area: ____________ acres
v. Dimensions of the proposed dam or impounding structure: ________ height; _______ length
vi. Construction method/materials for the proposed dam or impounding structure (e.g., earth fill, rock, wood, concrete):
____

D.2. Project Operations

a. Does the proposed action include any excavation, mining, or dredging, during construction, operations, or both? ☒ Yes ☐ No
(Not including general site preparation, grading or installation of utilities or foundations where all excavated materials will remain onsite)
If Yes:
i .What is the purpose of the excavation or dredging? to construct a new multi-family building
ii. How much material (including rock, earth, sediments, etc.) is proposed to be removed from the site?
- Volume (specify tons or cubic yards): approx. 1,300 cy
- Over what duration of time? approx. 4 months

iii. Describe nature and characteristics of materials to be excavated or dredged, and plans to use, manage or dispose of them.
material excavated is needed to provide the projects parking garage beneath the building at the garage level. Portion of the excavated area includes the existing garage to be demolished. Excavated material is located in an area that contains fills from previous developments. No unsuitable, or contaminated material is expected.
iv. Will there be onsite dewatering or processing of excavated materials? ☐ Yes ☒ No
If yes, describe. ________________________________

v. What is the total area to be dredged or excavated? approx. 0.1 acres
vi. What is the maximum area to be worked at any one time? approx. 0.1 acres
vii. What would be the maximum depth of excavation or dredging? approx. 10 feet
viii. Will the excavation require blasting? ☐ Yes ☒ No
ix. Summarize site reclamation goals and plan: Within all areas of disturbance, topsoil will be striped and stockpiled for reuse in all newly disturbed areas. Excess material not needed to meet proposed grades will be disposed of off-site in accordance with all applicable laws and rules.

b. Would the proposed action cause or result in alteration of, increase or decrease in size of, or encroachment into any existing wetland, waterbody, shoreline, beach or adjacent area? ☐ Yes ☒ No
If Yes:
i. Identify the wetland or waterbody which would be affected (by name, water index number, wetland map number or geographic description): ________________________________

ii. Describe how the proposed action would affect that waterbody or wetland, e.g. excavation, fill, placement of structures, or alteration of channels, banks and shorelines. Indicate extent of activities, alterations and additions in square feet or acres: ______

iii. Will proposed action cause or result in disturbance to bottom sediments? ☐ Yes ☐ No
If Yes, describe: ______

iv. Will proposed action cause or result in the destruction or removal of aquatic vegetation? ☐ Yes ☐ No
If Yes:
- acres of aquatic vegetation proposed to be removed: ______
- expected acreage of aquatic vegetation remaining after project completion: ______
- purpose of proposed removal (e.g. beach clearing, invasive species control, boat access): ______
- proposed method of plant removal: ______
- if chemical/herbicide treatment will be used, specify product(s): ______

v. Describe any proposed reclamation/mitigation following disturbance: ______

c. Will the proposed action use, or create a new demand for water? ☒ Yes ☐ No
If Yes:
i. Total anticipated water usage/demand per day: 750 gallons/day
ii. Will the proposed action obtain water from an existing public water supply? ☒ Yes ☐ No
If Yes:
- Name of district or service area: United Water New Rochelle-West
- Does the existing public water supply have capacity to serve the proposal? ☒ Yes ☐ No
- Is the project site in the existing district? ☒ Yes ☐ No
- Is expansion of the district needed? ☐ Yes ☒ No
- Do existing lines serve the project site? ☒ Yes ☐ No

iii. Will line extension within an existing district be necessary to supply the project? (Service line only, not an extension of a supply main) ☐ Yes ☒ No
If Yes:
- Describe extensions or capacity expansions proposed to serve this project: ______
- Source(s) of supply for the district: ______

iv. Is a new water supply district or service area proposed to be formed to serve the project site? ☐ Yes ☒ No
If, Yes:
- Applicant/sponsor for new district: ______
- Date application submitted or anticipated: ______
- Proposed source(s) of supply for new district: ______

v. If a public water supply will not be used, describe plans to provide water supply for the project: ______

vi. If water supply will be from wells (public or private), maximum pumping capacity: ______ gallons/minute.

d. Will the proposed action generate liquid wastes? ☒ Yes ☐ No
If Yes:
i. Total anticipated liquid waste generation per day: 750 gallons/day
ii. Nature of liquid wastes to be generated (e.g., sanitary wastewater, industrial; if combination, describe all components and approximate volumes or proportions of each): ______
Sanitary wastewater; anticipated usage volume is 750 gpd

iii. Will the proposed action use any existing public wastewater treatment facilities? ☒ Yes ☐ No
If Yes:
- Name of wastewater treatment plant to be used: Yonkers Wastewater Treatment Facility
- Name of district: North Yonkers Sewer District
- Does the existing wastewater treatment plant have capacity to serve the project? ☒ Yes ☐ No
- Is the project site in the existing district? ☒ Yes ☐ No
- Is expansion of the district needed? ☐ Yes ☒ No

- Do existing sewer lines serve the project site? ☒ Yes ☐ No
- Will line extension within an existing district be necessary to serve the project? ☐ Yes ☒ No

  If Yes:
  - Describe extensions or capacity expansions proposed to serve this project: ______

iv. Will a new wastewater (sewage) treatment district be formed to serve the project site? ☐ Yes ☒ No

If Yes:
- Applicant/sponsor for new district: ______
- Date application submitted or anticipated: ______
- What is the receiving water for the wastewater discharge? ______

v. If public facilities will not be used, describe plans to provide wastewater treatment for the project, including specifying proposed receiving water (name and classification if surface discharge, or describe subsurface disposal plans): ______

vi. Describe any plans or designs to capture, recycle or reuse liquid waste: ______

---

e. Will the proposed action disturb more than one acre and create stormwater runoff, either from new point sources (i.e. ditches, pipes, swales, curbs, gutters or other concentrated flows of stormwater) or non-point source (i.e. sheet flow) during construction or post construction? ☐ Yes ☒ No

If Yes:

i. How much impervious surface will the project create in relation to total size of project parcel?

_____ Square feet or _____ acres (impervious surface)

_____ Square feet or _____ acres (parcel size)

ii. Describe types of new point sources. ______

iii. Where will the stormwater runoff be directed (i.e. on-site stormwater management facility/structures, adjacent properties, groundwater, on-site surface water or off-site surface waters)? ______

- If to surface waters, identify receiving water bodies or wetlands: ______
- Will stormwater runoff flow to adjacent properties? ☐ Yes ☐ No

iv. Does proposed plan minimize impervious surfaces, use pervious materials or collect and re-use stormwater? ☐ Yes ☐ No

---

f. Does the proposed action include, or will it use on-site, one or more sources of air emissions, including fuel combustion, waste incineration, or other processes or operations? ☒ Yes ☐ No

If Yes, identify:

i. Mobile sources during project operations (e.g., heavy equipment, fleet or delivery vehicles)

`Heavy equipment, occasional delivery vehicles`

ii. Stationary sources during construction (e.g., power generation, structural heating, batch plant, crushers)

power generators

iii. Stationary sources during operations (e.g., process emissions, large boilers, electric generation)

N/A

---

g. Will any air emission sources named in D.2.f (above), require a NY State Air Registration, Air Facility Permit, or Federal Clean Air Act Title IV or Title V Permit? ☐ Yes ☒ No

If Yes:

i. Is the project site located in an Air quality non-attainment area? (Area routinely or periodically fails to meet ambient air quality standards for all or some parts of the year) ☐ Yes ☒ No

ii. In addition to emissions as calculated in the application, the project will generate:
- ______Tons/year (short tons) of Carbon Dioxide (CO_2)
- ______Tons/year (short tons) of Nitrous Oxide (N_2O)
- ______Tons/year (short tons) of Perfluorocarbons (PFCs)
- ______Tons/year (short tons) of Sulfur Hexafluoride (SF_6)
- ______Tons/year (short tons) of Carbon Dioxide equivalent of Hydroflourocarbons (HFCs)
- ______Tons/year (short tons) of Hazardous Air Pollutants (HAPs)

h. Will the proposed action generate or emit methane (including, but not limited to, sewage treatment plants, landfills, composting facilities)? ☐ Yes ☒ No

If Yes:

i. Estimate methane generation in tons/year (metric): ______

ii. Describe any methane capture, control or elimination measures included in project design (e.g., combustion to generate heat or electricity, flaring): ______

i. Will the proposed action result in the release of air pollutants from open-air operations or processes, such as quarry or landfill operations? ☐ Yes ☒ No

If Yes: Describe operations and nature of emissions (e.g., diesel exhaust, rock particulates/dust):

______

j. Will the proposed action result in a substantial increase in traffic above present levels or generate substantial new demand for transportation facilities or services? ☐ Yes ☒ No

If Yes:

i. When is the peak traffic expected (Check all that apply): ☐ Morning ☐ Evening ☐ Weekend
☐ Randomly between hours of ______ to ______.

ii. For commercial activities only, projected number of semi-trailer truck trips/day: ______

iii. Parking spaces: Existing ______ Proposed ______ Net increase/decrease ______

iv. Does the proposed action include any shared use parking? ☐ Yes ☐ No

v. If the proposed action includes any modification of existing roads, creation of new roads or change in existing access, describe:

The project proposes a new residential driveway curb cut onto Warburton Ave., a Westchester County Roadway. This driveway will eliminate one existing parking space along Warburton. Also, the project proposes to modify an existing driveway curb cut on Washington Ave. Both curb cuts occur were their is only one lane in each direction in Washington & Warburton Avenues.

vi. Are public/private transportation service(s) or facilities available within ½ mile of the proposed site? ☐ Yes ☐ No

vii Will the proposed action include access to public transportation or accommodations for use of hybrid, electric or other alternative fueled vehicles? ☐ Yes ☐ No

viii. Will the proposed action include plans for pedestrian or bicycle accommodations for connections to existing pedestrian or bicycle routes? ☐ Yes ☐ No

k. Will the proposed action (for commercial or industrial projects only) generate new or additional demand for energy? ☐ Yes ☒ No

If Yes:

i. Estimate annual electricity demand during operation of the proposed action: ______

ii. Anticipated sources/suppliers of electricity for the project (e.g., on-site combustion, on-site renewable, via grid/local utility, or other):

______

iii. Will the proposed action require a new, or an upgrade to, an existing substation? ☐ Yes ☐ No

l. Hours of operation. Answer all items which apply.

i. During Construction:

- Monday - Friday: 7:30 am to 8:00 pm
- Saturday: 7:30 am to 8:00 pm
- Sunday: no work anticipated on Sundays
- Holidays: no work anticipated on Holidays

ii. During Operations:

- Monday - Friday: Residential Development
- Saturday: ______
- Sunday: ______
- Holidays: ______

m. Will the proposed action produce noise that will exceed existing ambient noise levels during construction, operation, or both? ☐ Yes ☒ No

If yes:

i. Provide details including sources, time of day and duration: ____________

ii. Will proposed action remove existing natural barriers that could act as a noise barrier or screen? ☐ Yes ☐ No

Describe: ____________

n.. Will the proposed action have outdoor lighting? ☒ Yes ☐ No

If yes:

i. Describe source(s), location(s), height of fixture(s), direction/aim, and proximity to nearest occupied structures:

Porch lights & building light above garage door

ii. Will proposed action remove existing natural barriers that could act as a light barrier or screen? ☐ Yes ☒ No

Describe: ____________

o. Does the proposed action have the potential to produce odors for more than one hour per day? ☐ Yes ☒ No

If Yes, describe possible sources, potential frequency and duration of odor emissions, and proximity to nearest occupied structures: ____________

p. Will the proposed action include any bulk storage of petroleum (combined capacity of over 1,100 gallons) or chemical products (185 gallons in above ground storage or any amount in underground storage)? ☐ Yes ☒ No

If Yes:

i. Product(s) to be stored ____________

ii. Volume(s) ______ per unit time ____________ (e.g., month, year)

iii. Generally describe proposed storage facilities: ____________

q. Will the proposed action (commercial, industrial and recreational projects only) use pesticides (i.e., herbicides, insecticides) during construction or operation? ☐ Yes ☒ No

If Yes:

i. Describe proposed treatment(s): ____________

ii. Will the proposed action use Integrated Pest Management Practices? ☐ Yes ☐ No

r. Will the proposed action (commercial or industrial projects only) involve or require the management or disposal of solid waste (excluding hazardous materials)? (Project is a Residential Development) ☒ Yes ☐ No

If Yes:

i. Describe any solid waste(s) to be generated during construction or operation of the facility:

- Construction: TBD tons per ____________ (unit of time)
- Operation : 0.56 tons per month (unit of time)

ii. Describe any proposals for on-site minimization, recycling or reuse of materials to avoid disposal as solid waste:

- Construction: TBD
- Operation: Recycling pick-up service in Village available and is taken to a recycling/garbage transfer station.

iii. Proposed disposal methods/facilities for solid waste generated on-site:

- Construction: TBD
- Operation: Garbage pick-up service in Village available and is taken to a recycling/garbage transfer station.

s. Does the proposed action include construction or modification of a solid waste management facility? ☐ Yes ☒ No

If Yes:

i. Type of management or handling of waste proposed for the site (e.g., recycling or transfer station, composting, landfill, or other disposal activities): ____

ii. Anticipated rate of disposal/processing:

- ________ Tons/month, if transfer or other non-combustion/thermal treatment, or
- ________ Tons/hour, if combustion or thermal treatment

iii. If landfill, anticipated site life: ________ years

t. Will proposed action at the site involve the commercial generation, treatment, storage, or disposal of hazardous waste? ☐ Yes ☒ No

If Yes:

i. Name(s) of all hazardous wastes or constituents to be generated, handled or managed at facility: ____

ii. Generally describe processes or activities involving hazardous wastes or constituents: ____

iii. Specify amount to be handled or generated _____ tons/month

iv. Describe any proposals for on-site minimization, recycling or reuse of hazardous constituents: ____

v. Will any hazardous wastes be disposed at an existing offsite hazardous waste facility? ☐ Yes ☐ No

If Yes: provide name and location of facility: ____

If No: describe proposed management of any hazardous wastes which will not be sent to a hazardous waste facility:

None to be generated.

E. Site and Setting of Proposed Action

E.1. Land uses on and surrounding the project site

a. Existing land uses.

i. Check all uses that occur on, adjoining and near the project site.

☐ Urban ☐ Industrial ☒ Commercial ☒ Residential (suburban) ☐ Rural (non-farm)

☐ Forest ☐ Agriculture ☐ Aquatic ☐ Other (specify): ____

ii. If mix of uses, generally describe:

Along Warburton Ave.; tavern, multi-family residences, one family residences, auto body repair shop. Along Washington Ave.; multi-family residences, one family residences, small shops and Jasper Cropsey House.

b. Land uses and covertypes on the project site.

Land use or Covertype	Current Acreage	Acreage After Project Completion	Change (Acres +/-)
• Roads, buildings, and other paved or impervious surfaces	0.07	0.22	+0.15
• Forested	0	0	
• Meadows, grasslands or brushlands (non-agricultural, including abandoned agricultural)	0.53	0.38	-0.15
• Agricultural (includes active orchards, field, greenhouse etc.)	0	0	N/A
• Surface water features (lakes, ponds, streams, rivers, etc.)	0	0	N/A
• Wetlands (freshwater or tidal)	0	0	N/A
• Non-vegetated (bare rock, earth or fill)			
• Other Describe: ____			

c. Is the project site presently used by members of the community for public recreation? ☐ Yes ☒ No

i. If Yes: explain: ____

d. Are there any facilities serving children, the elderly, people with disabilities (e.g., schools, hospitals, licensed day care centers, or group homes) within 1500 feet of the project site? ☒ Yes ☐ No

If Yes,

i. Identify Facilities:

Hastings Youth Advocate Program, Hastings Busy Bees Junior Club, Hastings-on-Hudson Public Library

e. Does the project site contain an existing dam? ☐ Yes ☒ No

If Yes:

i. Dimensions of the dam and impoundment:

- Dam height: ____ feet
- Dam length: ____ feet
- Surface area: ____ acres
- Volume impounded: ____ gallons OR acre-feet

ii. Dam's existing hazard classification: ____

iii. Provide date and summarize results of last inspection:

f. Has the project site ever been used as a municipal, commercial or industrial solid waste management facility, or does the project site adjoin property which is now, or was at one time, used as a solid waste management facility? ☐ Yes ☒ No

If Yes:

i. Has the facility been formally closed? ☐ Yes ☐ No

- If yes, cite sources/documentation: ____

ii. Describe the location of the project site relative to the boundaries of the solid waste management facility:

iii. Describe any development constraints due to the prior solid waste activities: ____

g. Have hazardous wastes been generated, treated and/or disposed of at the site, or does the project site adjoin property which is now or was at one time used to commercially treat, store and/or dispose of hazardous waste? ☐ Yes ☒ No

If Yes:

i. Describe waste(s) handled and waste management activities, including approximate time when activities occurred:

h. Potential contamination history. Has there been a reported spill at the proposed project site, or have any remedial actions been conducted at or adjacent to the proposed site? ☐ Yes ☒ No

If Yes:

i. Is any portion of the site listed on the NYSDEC Spills Incidents database or Environmental Site Remediation database? Check all that apply: ☐ Yes ☐ No

☐ Yes – Spills Incidents database Provide DEC ID number(s): ____

☐ Yes – Environmental Site Remediation database Provide DEC ID number(s): ____

☐ Neither database

ii. If site has been subject of RCRA corrective activities, describe control measures: ____

iii. Is the project within 2000 feet of any site in the NYSDEC Environmental Site Remediation database? ☒ Yes ☐ No

If yes, provide DEC ID number(s): 360022, V00728, 360015

iv. If yes to (i), (ii) or (iii) above, describe current status of site(s):

360022: Harbor at Hastings, River St. Hastings-on-Hudson, State Superfund Program, still a threat to environment

V00728: CE-Hastings Gas Works, 8-12 Washington Ave., Hastings-on-Hudson, Voluntary Clean-up Program

360015: Tappan Terminal (Eastern Portion), Railroad Ave., Hastings-on-Hudson, State Superfund Program *v.* Is the project site subject to an institutional control limiting property uses? ☐ Yes ☒ No

- If yes, DEC site ID number: ____
- Describe the type of institutional control (e.g., deed restriction or easement): ____
- Describe any use limitations: ____
- Describe any engineering controls: ____
- Will the project affect the institutional or engineering controls in place? ☐ Yes ☐ No
- Explain: ____

E.2. Natural Resources On or Near Project Site

a. What is the average depth to bedrock on the project site? >7.0 feet

b. Are there bedrock outcroppings on the project site? ☐ Yes ☒ No
If Yes, what proportion of the site is comprised of bedrock outcroppings? ____%

c. Predominant soil type(s) present on project site: UvC-Urban Land Riverhead Complex 100 %
____ ____%
____ ____%

d. What is the average depth to the water table on the project site? Average: >6.56 feet

e. Drainage status of project site soils: ☐ Well Drained: ____% of site
☐ Moderately Well Drained: ____% of site No rating for UvC
☐ Poorly Drained ____% of site

f. Approximate proportion of proposed action site with slopes: ☒ 0-10%: 95 % of site
☒ 10-15%: 5 % of site
☐ 15% or greater: ____% of site

g. Are there any unique geologic features on the project site? ☐ Yes ☒ No
If Yes, describe: ____

h. Surface water features.
i. Does any portion of the project site contain wetlands or other waterbodies (including streams, rivers, ponds or lakes)? ☐ Yes ☒ No
ii. Do any wetlands or other waterbodies adjoin the project site? ☐ Yes ☒ No
If Yes to either *i* or *ii*, continue. If No, skip to E.2.i.
iii. Are any of the wetlands or waterbodies within or adjoining the project site regulated by any federal, state or local agency? ☐ Yes ☒ No
iv. For each identified regulated wetland and waterbody on the project site, provide the following information:

- Streams: Name ____ Classification ____
- Lakes or Ponds: Name ____ Classification ____
- Wetlands: Name ____ Approximate Size ____
- Wetland No. (if regulated by DEC) ____

v. Are any of the above water bodies listed in the most recent compilation of NYS water quality-impaired waterbodies? ☐ Yes ☒ No
If yes, name of impaired water body/bodies and basis for listing as impaired: ____

i. Is the project site in a designated Floodway? ☐ Yes ☒ No

j. Is the project site in the 100 year Floodplain? ☐ Yes ☒ No

k. Is the project site in the 500 year Floodplain? ☐ Yes ☒ No

l. Is the project site located over, or immediately adjoining, a primary, principal or sole source aquifer? ☐ Yes ☒ No
If Yes:
i. Name of aquifer: ____

m. Identify the predominant wildlife species that occupy or use the project site: Site is located in a built landscape habitat and has wildlife species commonly associated with such an environment including, small mammals, birds, and amphibians.

n. Does the project site contain a designated significant natural community? ☐ Yes ☒ No
If Yes:
i. Describe the habitat/community (composition, function, and basis for designation): ____
ii. Source(s) of description or evaluation: ____
iii. Extent of community/habitat:
- Currently: ____ acres
- Following completion of project as proposed: ____ acres
- Gain or loss (indicate + or -): ____ acres

o. Does project site contain any species of plant or animal that is listed by the federal government or NYS as endangered or threatened, or does it contain any areas identified as habitat for an endangered or threatened species? ☒ Yes ☐ No

Project site is located within a rare plant and rare animal area.

p. Does the project site contain any species of plant or animal that is listed by NYS as rare, or as a species of special concern? ☒ Yes ☐ No

Project site is located within a rare plant and rare animal area.

q. Is the project site or adjoining area currently used for hunting, trapping, fishing or shell fishing? ☐ Yes ☒ No
If yes, give a brief description of how the proposed action may affect that use: ____

E.3. Designated Public Resources On or Near Project Site

a. Is the project site, or any portion of it, located in a designated agricultural district certified pursuant to Agriculture and Markets Law, Article 25-AA, Section 303 and 304? ☐ Yes ☒ No
If Yes, provide county plus district name/number: ____

b. Are agricultural lands consisting of highly productive soils present? ☐ Yes ☒ No
i. If Yes: acreage(s) on project site? ____
ii. Source(s) of soil rating(s): ____

c. Does the project site contain all or part of, or is it substantially contiguous to, a registered National Natural Landmark? ☐ Yes ☒ No
If Yes:
i. Nature of the natural landmark: ☐ Biological Community ☐ Geological Feature
ii. Provide brief description of landmark, including values behind designation and approximate size/extent: ____

d. Is the project site located in or does it adjoin a state listed Critical Environmental Area? ☒ Yes ☐ No
If Yes:
i. CEA name: County & State Park Lands, Hudson River
ii. Basis for designation: Exceptional or unique character
iii. Designating agency and date: Westchester County, 01/31/1990

e. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on, or has been nominated by the NYS Board of Historic Preservation for inclusion on, the State or National Register of Historic Places? ☒ Yes ☐ No

If Yes:

i. Nature of historic/archaeological resource: ☐ Archaeological Site ☒ Historic Building or District

ii. Name: Old Croton Aqueduct, Crapsey, Jasper F., House and Studio

iii. Brief description of attributes on which listing is based:
Historic architecture and infrastructure

f. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory? ☐ Yes ☒ No

g. Have additional archaeological or historic site(s) or resources been identified on the project site? ☐ Yes ☒ No

If Yes:

i. Describe possible resource(s): ____

ii. Basis for identification: ____

h. Is the project site within 5 miles of any officially designated and publicly accessible federal, state, or local scenic or aesthetic resource? ☒ Yes ☐ No

If Yes:

i. Identify resource: Saw Mill River Parkway

ii. Nature of, or basis for, designation (e.g., established highway overlook, state or local park, state historic trail or scenic byway, etc.): NYS Scenic Byway

iii. Distance between project and resource: 0.97 miles.

i. Is the project site located within a designated river corridor under the Wild, Scenic and Recreational Rivers Program 6 NYCRR 666? ☐ Yes ☒ No

If Yes:

i. Identify the name of the river and its designation: ____

ii. Is the activity consistent with development restrictions contained in 6NYCRR Part 666? ☐ Yes ☐ No

F. Additional Information

Attach any additional information which may be needed to clarify your project.

If you have identified any adverse impacts which could be associated with your proposal, please describe those impacts plus any measures which you propose to avoid or minimize them.

G. Verification

I certify that the information provided is true to the best of my knowledge.

Applicant/Sponsor Name James A. Ryan, RLA Date 8/13/2015

Signature [signature] Title JMC Principal (owner agent)

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TOWNHOUSES AT 32-34 WASHINGTON AVE
WASHINGTON AVE HASTINGS-ON-HUDSON

SITE LOCATION MAP

DATE: 03/19/2015 JMC PROJECT: 13180

FIGURE: SLM-1 SCALE: 1" = 1,000'

JMC
SITE DEVELOPMENT CONSULTANTS
120 BEDFORD ROAD • ARMONK, NY 10504
voice 914.273.5225 • fax 914.273.2102
www.jmcpllc.com

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Laser Scanning

August 11, 2015

Mr. Andrew Cortese
CCI Properties, LLC
52 Cedar Street
Dobbs Ferry, NY 10522

RE: JMC Project 13180
Washington Avenue Residences
32-34 Washington Avenue
Village of Hasting-On-Hudson, NY

<u>Trip Generation Analysis</u>

Dear Mr. Cortese:

This letter has been prepared to assess traffic generation and associated impacts of the proposed 5 additional townhouses located at 32-34 Washington Avenue.

We have projected traffic volumes associated with the additional townhouses of the Washington Avenue Residences redevelopment based on information contained in "Trip Generation Manual, 9th Edition" published by the Institute of Transportation Engineers (ITE). The ITE publication is an industry standard to project traffic volumes generated by specific land uses. For our analysis, we utilized the Residential Condominium/Townhouse (ITE Code 230) land use to calculate the projected traffic volumes. The proposed 5 additional townhouses which will be accessed via Warburton Avenue are anticipated to generate 1 entering trip and 4 exiting trips, for a total of 5 trips during the peak weekday morning hour, which is based on data from 59 studies. During the peak weekday afternoon hour, the additional townhouses are anticipated to generate 3 entering trips and 2 exiting trips, for a total of 5 trips based on data from 62 studies.

The 5 total trips generated by the additional townhouses average 1 trip every 12 minutes during the peak hours. Since the site is located near the downtown central business district and the train station, the additional trips will likely be less than projected since future residents will have the opportunity to walk rather than drive. It is the professional opinion of JMC that the low volume of additional traffic related to the 5 or fewer additional townhouses will not have a perceptible impact on the operations of the Warburton Avenue and Washington Avenue intersection.

Sincerely,

JMC Planning Engineering Landscape Architecture & Land Surveying, PLLC

Marc Petroro, PE
Project Manager

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STORMWATER POLLUTION PREVENTION PLAN

TOWNHOUSES AT 32-34 WASHINGTON AVENUE

32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON, NEW YORK

Applicant/Operator/ Owner: **CCI Properties, LLC**
914-478-4250

Prepared by: JMC

JMC Project 13180

Draft: 08/11/2015

TABLE OF CONTENTS

APPENDICES

REFERENCED DRAWINGS FOR SWPPP DESIGN AND DETAILS

JMC SITE PLANS

Dwg. No.	Title	Rev. No./Date
C-1	Layout Plan	6/08-11-2015
C-2	Grading & Utilities Plan	6/08-11-2015
C-3	Sediment & Erosion Control Plan	5/08-11-2015
C-4	Construction Details	03/19/2015
C-5	Construction Details	2/08-11-2015
C-6	Construction Details	2/08-11-2015
C-6A	Construction Details	08-11-2015

I. INTRODUCTION

This Stormwater Pollution Prevention Plan has been prepared for the 0.60 acre Washington Avenue Residence site, located in the Hastings-on-Hudson, Westchester County, New York (hereinafter referred to as the "Site"). The site is bordered by Washington Avenue to the north, residential uses to the south and east, and Warburton Avenue to the west. The development has been designed in accordance with the following:

- Chapter 250 "Stormwater Management, Erosion and Water Pollution Control" of the Hastings-on-Hudson Zoning Code
- New York State Stormwater Management Design Manual.

This project entails the construction of a new 4,762 sf footprint (9,529 sf floor area), 5-unit townhouse and the renovation of an existing 2-1/2 story, two-family building. The proposed development also includes an expansion of the site's existing parking, the reconstruction of the existing curb cut on Washington Avenue, and a new curb cut onto Warburton Avenue.

II. STORMWATER MANAGEMENT PLANNING

As part of the Hastings-on-Hudson site plan approval process, A Stormwater Pollution Prevention Plan (SWPPP) has been prepared for this project because it is a construction activity that involves the disturbance of 26,126 sf of land, which exceeds the Hastings-on-Hudson threshold of 10,000 sf. This SWPPP includes stormwater management practices (SMP's) from the "New York State Stormwater Management Design Manual," last revised January 2015.

The proposed stormwater facilities have been designed such that the quantity and quality of stormwater runoff during and after construction are not adversely altered or are enhanced when compared to pre-development conditions.

The Five Step Process for Stormwater Site Planning and Practice Selection

Stormwater management using green infrastructure is summarized in the five step process described below. The five step process was adhered to when developing this SWPPP.

TOWNHOUSES AT 32-34 WASHINGTON AVE

WASHINGTON AVE HASTINGS-ON-HUDSON

SITE LOCATION MAP

DATE: 08/11/2015 JMC PROJECT: 13180

FIGURE: SLM-1 SCALE: 1" = 1,000'

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Information is provided in this SWPPP which documents compliance with the required process as follows:

Step 1: Site Planning

Implement planning practices that protect natural resources and utilize the hydrology of the site. Strong consideration must be given to reducing impervious cover to aid in the preservation of natural resources including protecting natural areas, avoiding sensitive areas and minimizing grading and soil disturbance.

Step 2: Determine Water Quality Treatment Volume (WQv)

Determine the required WQv for the site based on the site layout, impervious areas and sub-catchments. This initial calculation of WQv will have to be revised after green infrastructure techniques are applied. The following method has been used to calculate the WQv.

- **90% Rule -** According to the New York State Stormwater Design Manual, Section 4.1, the water quality volume is determined from the 90% rule. The method is based on 90% of the average annual stormwater runoff volume, which must be provided due to impervious surfaces. The Water Quality Volume (denoted as the WQv) is designed to improve water quality sizing to capture and treat 90% of the average annual stormwater runoff volume. The WQv is directly related to the amount of impervious cover created at a site. The average rainfall storm depth for 90% of storms in New York State in one year is used to calculate a volume of runoff. The rainfall depth depends on the location of the site within the state. From this depth of rainfall, the required water quality volume is calculated.

The project is a redevelopment and therefore will comply with the strategies outlined within Chapter 9: Redevelopment Projects of the Design Manual. There are different options to control water quality depending on the redevelopment.

Since the redevelopment results in the creation of additional impervious area, Water Quality Treatment Option II will be utilized which requires treatment for 25% of the existing impervious area, plus 100% of the additional, new impervious area.

The plan proposes that a minimum of 25% of the water quality volume (WQv) from the disturbed area is captured and treated by the implementation of standard practices. When utilizing structural stormwater management practices, these practices should be targeted to treat areas with the greatest pollutant generation potential (e.g. parking areas, service stations, etc).

The NYSDEC Redevelopment Standards include specific criteria for the implementation of surface water quality improvements. A combination of standard and non-standard practices are proposed and all facilities will treat the required water quality volume from the entire contributing area. Therefore, Water Quality Treatment Options II & III will be utilized. According to Option III of the Redevelopment Standards, alternative or non-standard practices such as manufactured treatment devices are acceptable if they treat 75% of the water quality volume from the disturbed areas as well as any additional runoff directed to the practice. According to Option II, standard practices such as subsurface infiltration systems can be sized to treat the water quality volume generated from 25% of the existing impervious area plus 100% of the new impervious area. Green practices such as green roofs and porous pavement can be used towards credit in meeting the water quality volume requirements.

Proposed standard SMP’s will effectively treat 100% of the 1 year storm for all existing and new impervious areas and the proposed alternative SMP’s will also treat 100% of the 1 year storm for all existing impervious areas which is above and beyond the water quality requirements for Redevelopment Projects.

<u>Step 3: Runoff Reduction Volumes (RRv) by Applying Green Infrastructure Techniques and Standard SMP's</u>

RRv is not required for this project.

Green infrastructure techniques or standard SMP's with RRv capacity can potentially reduce the required WQv by incorporating combinations of green infrastructure techniques and standard SMP's within each drainage area on the site.

Green infrastructure techniques are grouped into two categories:

- Practices resulting in a reduction of contributing area such as preservation/restoration of conservation areas, vegetated channels, etc.
- Practices resulting in a reduction of contributing volume such as green roofs, stormwater planters, and rain gardens.

Apply a combination of green infrastructure techniques and standard SMPs with RRv capacity to provide 100% of the WQv calculated in Step 2. If the RRv calculated in this step is greater than or equal to the WQv in Step 2, the RRv requirement has been met and Step 4 can be skipped. If the RRv provided cannot meet or exceed 100% of the WQv, the project must, at a minimum, reduce a percentage of the runoff from impervious areas to be constructed on the site. The percent reduction is based on the Hydrologic Soil Group(s) (HSG) of the site and is defined as Specific Reduction Factor (S).

The following green infrastructure techniques and practices are provided in the Design Manual:

- **Porous Paving**
    - This practice is being utilized at the proposed driveway for the proposed residential building and at the expanded driveway for the existing driveway. Porous pavement can be used to provide RRv because the soil on-site is classified as hydrologic soil group B. However, no RRv credit is taken by utilizing porous pavement since RRv is not required for this site.
- **Standard Practices with RRv Capacity**
    - **Infiltration Practices –** A subsurface infiltration system is proposed to treat and retain runoff from the majority of the site and three dry wells area proposed to treat and retain runoff from the roof area. No RRv credit is taken by utilizing infiltration practices

Step 4: Apply Standard Stormwater Management Practices & Green Practices to Address Water Quality Volume

- **Infiltration Practices –** A subsurface infiltration system and three drywells are proposed to treat and retain runoff from the majority of the site.
- **Porous Pavement –** Porous pavers are proposed at the proposed driveway and the existing driveway to treat and retain runoff from these areas.

Step 5: Apply Volume and Peak Rate Control Practices to Meet Water Quantity Requirements

The Channel Protection Volume (CPv), Overbank Flood Control (Qp) and Extreme Flood Control (Qf) must be met for the plan to be completed. This is accomplished by using practices such as infiltration basins, dry detention basins, etc. to meet water quantity requirements. The following standards must be met:

1. **Stream Channel Protection (CPv)**

   Stream Channel Protection Volume Requirements (CPv) are designed to protect stream channels from erosion. In New York State this goal is accomplished by providing 24-hour extended detention of the one-year, 24-hour storm event, remained from runoff reduction. Reduction of runoff for meeting stream channel protection objectives, where site conditions allow, is encouraged and the volume reduction achieved through green infrastructure can be deducted from CPv. Trout waters may be exempted from the 24-hour ED requirement, with only 12 hours of extended detention required to meet this criterion. Detention time may be calculated using either a center of mass method or plug flow calculation method.

   - CPv is not required because reduction of the entire CPv volume is achieved at a site through green infrastructure or infiltration systems.
   - CPv for a redevelopment project is not required if there is no increase in impervious area or changes to hydrology that increase the discharge rate. This criterion, as defined in Chapter 4 of New York State Stormwater Design Manual, is not based on a pre versus post-development comparison. However, for a redevelopment project this requirement is relaxed. If the hydrology and hydraulic study shows that the post-

construction 1-year 24 hour discharge rate and velocity are less than or equal to the pre-construction discharge rate, providing 24 hour detention of the 1-year storm to meet the channel protection criteria is not required.

2. **Overbank Flood (Qp) which is the 10 year storm.**

   Overbank control requires storage to attenuate the post development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates.

   The overbank flood control requirement (Qp) does not apply in certain conditions, including:

   - The site discharges directly tidal waters or fifth order (fifth downstream) or larger streams.
   - A downstream analysis reveals that overbank control is not needed.
   - If redevelopment results in an increase in impervious area or changes to hydrology that increase the discharge rate from the site, the ten year criteria does not apply.

3. **Extreme Storm (Qf) which is the 100 year storm.**

   100 Year Control requires storage to attenuate the post development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates.

   The 100-year storm control requirement can be waived if:

   - The site discharges directly tidal waters or fifth order (fifth downstream) or larger streams.
   - Development is prohibited within the ultimate 100-year floodplain
   - A downstream analysis reveals that 100-year control is not needed.
   - If redevelopment results in no increase in impervious area or changes to hydrology that increase the discharge rate from the site the hundred-year criteria does not apply.

Based on the foregoing, this project is eligible for coverage under NYSDEC SPDES General Permit No. GP-0-15-002.

III. STUDY METHODOLOGY

Runoff rates were calculated based upon the standards set forth by the United States Department of Agriculture Natural Resources Conservation Service Technical Release 55, Urban Hydrology for Small Watersheds (TR-55), dated June 1986. The methodology set forth in TR-55 considers a multitude of characteristics for watershed areas including soil types, soil permeability, vegetative cover, time of concentration, topography, rainfall intensity, ponding areas, etc.

The 1, 10, 100 year storm recurrence intervals were reviewed in the design of the stormwater management facilities (see Appendices A & B Existing/Proposed Hydrologic Calculations).

Anticipated drainage conditions were analyzed taking into account the rate of runoff which will result from the construction of buildings, parking areas and other impervious surfaces associated with the site development.

Base Data and Design Criteria

For the stormwater management analysis, the following base information and methodology were used:

1. The site drainage patterns and outfall facilities were reviewed by JMC personnel for the purpose of gathering background data and confirming existing mapping of the watershed areas.

2. An Existing Drainage Area Map was developed from the topographical survey. The drainage area map reflects the existing conditions within and around the project area.

3. A Proposed Drainage Area Map was developed from the proposed grading design superimposed over the topographical survey. The drainage area map reflects the proposed

conditions within the project area and the existing conditions to remain in the surrounding area.

4. The United States Department of Agriculture (USDA) Web Soil Survey of the site available on its website at http://websoilsurvey.nrcd.usda.gov.

5. The United States Department of Agriculture Natural Resources Conservation Service National Engineering Handbook, Section 4 - Hydrology", dated March 1985.

6. The United States Department of Agriculture Natural Resources Conservation Service Technical Report No. 55, Urban Hydrology for Small Watersheds (TR-55), dated June 1986.

7. United States Department of Commerce Weather Bureau Technical Release No. 40 Rainfall Frequency Atlas of the United States.

The time of concentration was calculated using the methods described in Chapter 3 of TR-55, Second Edition, June 1986. Manning's kinematics wave equation was used to determine the travel time of sheet flow. The 2-year 24 hour precipitation amount of 3.42 inches was used in the equation for all storm events. The travel time for shallow concentrated flow was computed using Figure 3-1 and Table 3-1 of TR-55. Manning's Equation was used to determine the travel time for channel reaches.

8. All hydrologic calculations were performed with the Bentley PondPack software package version 10.0.

9. The New York State Stormwater Management Design Manual, revised January 2015.

10. New York Standards and Specifications for Erosion and Sediment Control, August 2005.

11. The storm flows for the 1, 10, and 100 year recurrence interval storms were analyzed for the total watershed areas. The Type III distribution design storm for a 24 hour duration was

used and the mass rainfall for each design storm was taken from the Extreme Precipitation in New York & New England developed by the Natural Resource Conservation Service (NRCS) and the Northeast Regional Climate Center (NRCC) as follows:

24 Hour Rainfall Amounts

Design Storm Recurrence Interval	Inches of Rainfall
1 Year	**2.82**
10 Year	**5.06**
100 Year	**8.90**

IV. EXISTING CONDITIONS

The existing conditions of the project site consists of a residential dwelling with accessory driveway, detached garage, decks, and walkways. Stone retaining walls and the remnants of an old building foundation surround the site, and a row of cedar trees flank the northwest property line. The site primarily drains from the southeast corner of the lot to the northwest. Stormwater runoff that flows overland off the site travels northwest and is collected via an existing catch basin located along Warburton Avenue.

The following natural features, conservation areas, resource areas and drainage patterns of the project site have been identified and utilized to develop Drawing DA-1 “Existing Drainage Area Map” which is included in Appendix H:

- Forest, vegetative cover
- Topography (contour lines, existing flow paths, steep slopes, etc.)
- Soil (hydrologic soil groups, highly erodible soils, etc.)

Based on the USDA Web soil survey, all on-site soils are classified as Urban land-Riverhead complex, are well drained. The soil types, boundaries and drainage areas/designations are depicted on Drawing DA-1 within Appendix H.

One Design Point (DP-1) was identified for comparing peak rates of runoff in existing and proposed conditions. Design Point 1 is located at the existing catch basin located along

Warburton Avenue just northwest of the site. Similarly, one drainage area (EDA-1) was identified in existing conditions based on the existing drainage divides at the site. The numbers included in the name of each drainage area correspond to the Design Point they drain towards.

The following is a description of each of the drainage areas analyzed in the existing conditions analysis:

Existing Drainage Area 1 (EDA-1) is 0.60 acres in size and encompasses the entire site. This area consists of an asphalt/gravel driveway, two buildings, sidewalks, lawn, retaining walls, and a small wooded area. This drainage area drains towards the northwest corner of the site. Stormwater runoff from this area overland flows off the site and is collected into the existing catch basin located along Warburton Avenue.

The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 70 and 9.54, respectively. Refer to Drawing DA-1 in Appendix H.

The peak rates of runoff to the design points from the drainage areas for each storm are shown in the table below:

Table 1
Summary of Peak Rates of Runoff in Existing Conditions
(Cubic Feet per Second)

Storm Recurrence Interval	DP-1
1 year	0.31
10 year	1.18
100 year	2.98

The volumes of runoff to DP-1 for each storm are shown in the table below:

Table 2

Summary of Runoff Volumes in Existing Conditions
(Cubic Feet)

Storm Recurrence Interval	DP-1
1 year	1,339
10 year	4,522
100 year	11,407

V. PROPOSED CONDITIONS

The proposed improvements consist of minimal renovations to the existing two-family home, an expansion of the existing driveway, and the development of a new 5-unit townhome with an associated driveway and walkways. The proposed development aims to minimize the impact to existing trees on site as well as existing retaining/foundation walls. Under proposed conditions the site will continue to drain towards the northwest corner of the property and be collected in an existing catch basin on Warburton Avenue, however, the property has been divided into six smaller drainage areas with various stormwater management practices throughout.

The proposed drainage improvements include a variety of stormwater practices, such as dry wells, a subsurface infiltration system and the use of porous pavers.

This section describes the design and analysis of the proposed conditions used to demonstrate that the SWPPP meets the requirements of the General Permit.

The Five Step Process For Stormwater Site Planning and Practice Selection

Step 1: Site Planning

The following practices and site features were incorporated in the site design:

- Preserving hydrology - Maintaining drainage divides
- Reduction of impervious surfaces such as:
    i. New and expanded driveways to be porous pavers.

- Forest, vegetative cover – The maximum amount of forest and vegetative cover has been maintained and/or provided.
- Topography (contour lines, existing flow paths, steep slopes, etc.) has been maintained or disturbed to the minimum extent practicable.
- Soil (hydrologic soil groups, highly erodible soils, etc.)
- Bedrock, significant geology features have been accounted for.

Step 2: Determine Water Quality Treatment Volume (WQv)

Step 3: Runoff Reduction Volumes (RRv) by Applying Green Infrastructure Techniques and Standard SMP's

- RRv is not required for this site.

Step 4: Apply Standard Stormwater Management Practices to Address Remaining Water Quality Volume

- **Infiltration Systems**

  Dry Well (1-3) - An infiltration practice similar in design to the infiltration trench, and best suited for treatment of rooftop runoff.

- **Non Standard/Alternative SMP's to Address Remaining Water Quality Volume (for Redevelopment Projects)**

  Underground Infiltration Systems – A system of underground chambers that detains the water quality volume and allows it to infiltrate into the ground.

  Porous Pavement- Pervious types of pavements that provide an alternative to conventional paved surfaces, designed to infiltrate rainfall through the surface, thereby reducing stormwater runoff from a site and providing some pollutant uptake in the underlying soils.

Step 5: Apply Volume and Peak Rate Control Practices to Meet Water Quantity Requirements

Underground Infiltration System - A system of underground chambers that detains stormwater runoff and slowing releases water that is not infiltrated into the ground.

Dry Well (1-3) - An infiltration practice similar in design to the infiltration trench, and best suited for treatment of rooftop runoff.

All practices exceed the required elements of SMP criteria as outlined in Chapter 6 of the NYS Stormwater Management Design Manual. A summary of each category is provided below.

1. Feasibility – Ponds are designed based upon unique physical environmental considerations noted in the NYS Stormwater Management Design Manual (NYSSMDM) Table 7.2 "Physical Feasibility Matrix".

2. Conveyance – The design conveys runoff to the designed pond in a manner that is safe, minimizes erosion and disruption to natural drainage channel and promotes filtering and infiltration.

3. Pretreatment – All pond provide pretreatment in accordance with NYSSMDM design guidelines.

4. Treatment Geometry – The plan provides water quality treatment in accordance with NYSSMDM guidelines noted Table 6.1 "Water Quality Volume Distributing in Pond Design".

5. Environmental/Landscaping –Extensive landscaping has been provided for each proposed practice to enhance pollutant removal and provide aesthetic enhancement to the property.

6. Maintenance – Maintenance for the environment practices has been provided and is detain the SWPPP Report as required. Maintenance access is provided in the design plans.

In order to determine the post-development rates of runoff generated on-site, the following drainage areas were analyzed in the post-development conditions. These areas are graphically depicted on Drawing DA-2 "Proposed Drainage Area Map" located in Appendix "H".

One Design Points (DP-1) was identified for comparing peak rates of runoff in existing and proposed conditions. Similarly, five separate drainage areas were identified in proposed conditions based on the proposed drainage divides at the site. The numbers included in the name of each drainage area correspond to the Design Point they drain towards.

The following is a description of each of the drainage areas analyzed in the proposed conditions analysis:

<u>Proposed Drainage Area 1A (PDA-1A)</u> is 0.32 acres in size and is located along the Washington Avenue property line and the Warburton Avenue property line. This area consists of the wooden area, lawn area, the existing dwelling, associated walkways, and the expanded existing driveway. Stormwater runoff from this area overland flows towards the north and is collected at the existing catch basin located at the corner of Washington Avenue and Warburton Avenue. The total water quality volume required for this drainage area due to the increase in impervious area associated with expanding the existing driveway will be provided by the use of porous pavers. The expanded existing driveway will be constructed using porous pavers. Runoff that flows overland onto the porous pavers will slowly dissipate through the porous pavers infiltration layers into the ground.

The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 74 and 7.86 minutes, respectively.

<u>Proposed Drainage Area 1B (PDA-1B)</u> is 0.06 acres in size and is in the eastern portion of the site. This area consists of the northern third of the proposed roof area and lawn area. Stormwater runoff from the roof will be collected via roof drain leaders and be conveyed into proposed drywell via a proposed underground piping system. Stormwater from the lawn area will overland flow to and will be collected via the open grate top of the same proposed dry well. The dry well will capture and temporarily store the water quality volume from the rooftops before allowing it to infiltration into the ground. An overflow pipe will convey overflow from larger storms into a proposed hydrodynamic treatment unit and then into and subsurface infiltration chamber system. The overflow conveyed to this system will be released into an outlet pipe and be released into the

existing drainage system located at DP-1.

The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 81 and 8.70 minutes, respectively.

Proposed Drainage Area 1C (PDA-1C) is 0.07 acres in size and is in the eastern portion of the site. This area consists of lawn area and the middle third of the roof area. Stormwater runoff from the roof will be collected via roofdrain leaders and be conveyed into proposed drywell via a proposed underground piping system. Stormwater from the lawn area will overland flow to and be collected via the open grate top of the same proposed dry well. The dry well will capture and temporarily store the water quality volume from the rooftops before allowing it to infiltration into the ground. An overflow pipe will convey overflow from larger storms into the adjacent dry well described under PDA 1B. Like runoff in PDA 1B overflow will be conveyed to the hydrodynamic treatment unit and the subsurface infiltration chamber system.

The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 82 and 4.98 minutes, respectively.

Proposed Drainage Area 1D (PDA-1D) is 0.07 acres in size and is in the southern portion of the site. This area consists of lawn area and the southern third portion of the roof area. Stormwater runoff from the roof will be collected via roof drain leaders and be conveyed into proposed drywell via a proposed underground piping system. Stormwater from the lawn area will overland flow to and be collected via the open grate top of the same proposed dry well. The dry well will capture and temporarily store the water quality volume from the rooftops before allowing it to infiltration into the ground. An overflow pipe will convey overflow from larger storms into the adjacent dry well described under PDA 1C. Like runoff in PDA 1C overflow will be conveyed to adjacent dry well. Overflow from this dry like in PDA 1B will be conveyed to the hydrodynamic treatment unit and the subsurface infiltration chamber system.

The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 79 and 4.98 minutes, respectively.

Proposed Drainage Area 1E (PDA-1E) is 0.08 acres in size and located along the south western property line and the area in front of the proposed building. This area consists of lawn area, gravel path, existing walls, the proposed driveway, the proposed walkway in front of the proposed building, and the basement parking garage. The new driveway will be constructed using porous pavers. Runoff that flows overland onto the porous pavers will slowly dissipate through the porous pavers infiltration layers into the ground. Any additional runoff from the driveway will drain to a trench drain at the entrance and be conveyed via the proposed underground piping system. This and other stormwater runoff from this area is collected via the proposed underground piping system and is conveyed into to a hydrodynamic treatment unit (Contech CDS 2015-4-C). This unit will provide the required pretreatment and water quality flow for this all runoff conveyed through this device. The water is then discharged into a proposed subsurface infiltration system consisting of 8 chambers (SC-740 StormTech Chambers). The total water quality volume required for this drainage area will be infiltrated into the soil. The infiltration rate used for the design is a conservative rate of 3 in/hr, which has been determined by using a safety of factor of 2 from the rate provided by the USDA web soil survey. An outlet control structure with a 6” orifice at elevation 77.75 and 6” orifice at elevation 79.50 slowly releases the detained runoff into an outlet pipe. This outlet pipe will convey the released stormwater runoff into the existing underground piping system at DP-1.

The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 81 and 8.70 minutes, respectively.

Refer to Drawing DA-2 in Appendix H.

The peak rates of runoff to the design point of each of the analyzed drainage areas for each storm are shown on the table below

Table 3
Summary of Proposed Peak Rates of Runoff in Proposed Conditions
(Cubic Feet per Second)

Storm Recurrence Interval	DP-1
1 year	0.24
10 year	0.86
100 year	2.32

The reductions in peak rates of runoff from proposed to existing conditions are shown on the table below:

Table 4
Percent Reductions in Peak Rates of Runoff (Existing vs. Proposed Conditions)
(Cubic Feet per Second)

Design Point	Storm Recurrence Frequency (Years)	Existing Peak Runoff Rate (cfs)	Proposed Peak Runoff Rate (cfs)	Percent Reduction (%)
1	1 year	0.31	0.24	22.6
	10 year	1.18	0.86	27.1
	100 year	2.98	2.32	22.2

As demonstrated in Table 4, the proposed stormwater improvements will result in significant reductions of peak rates of runoff for all storms at the design point analyzed.

The volumes of runoff to each design point are shown in the following Table, as well as the total volume of runoff produced by the entire site area:

Table 5
Summary of Runoff Volumes in Proposed Conditions
(Cubic Feet)

Storm Recurrence Interval	DP-1
1 year	923
10 year	3,027
100 Year	9,545

The Reductions in Runoff Volumes when comparing in existing and proposed conditions are shown in the Table 6, below:

Table 6
Summary of Runoff Volumes (Existing & Proposed Conditions)
(Cubic Feet)

Design Point	Storm Recurrence Frequency (Years)	Total Existing Volume (cf)	Total Proposed Volume (cf)	Percent Reduction (%)
1	1 year	1,339	923	31.1
	10 year	4,522	3,027	33.1
	10 year	11,407	9,545	16.3

As demonstrated in Table 6, the proposed stormwater improvements will result in significant reductions of runoff volumes for all storms at the design point analyzed.

VI. SOIL EROSION & SEDIMENT 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 course, as outlined in the "New York State Standards and Specifications for Erosion and Sediment Control," dated August 2005. 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 every seven calendar days and at least two site inspections every seven calendar days when greater than five acres of soil is disturbed at any one time.

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

<u>Soil Description</u>

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 high water 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.

A soil's tendency to erode is also described in the USDA web soil survey. The ratings in this interpretation indicate the hazard of soil loss from unsurfaced areas. The ratings are based on soil erosion factor K, slope, and content of rock fragments. The hazard is described as "slight," "moderate," or "SEVERE." A rating of "slight" indicates that little or no erosion is likely; "moderate" indicates that some erosion is likely, that the temporarily unsurfaced / unstabilized during construction may require occasional maintenance, and that simple erosion-control measures are needed; and "SEVERE" indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that erosion-control measures are needed.

Per the 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
UvC	**B**	**Urban Land-Riverhead, 8-15% slopes**

This soil consists of loam, sandy loam, and loamy sand. It is composed of 50% urban land, 25% riverhead and similar soils, and 25% minor components. Depth to the top of a seasonal high water table is greater than 80 inches. The available water capacity is 5.95 inches/hour.

Hydrologic group: B

Erosion Hazard Rating: NOT RATED

On-Site Pollution Prevention

There are temporary pollution prevention measures used to control litter and construction debris on site, such as:

- Silt Fence
- Silt Sack
- Excavated Drop Inlet Protection
- Curb Drop Inlet Protection

There will be inlet protection provided for all storm drains and inlets with the use of curb gutter inlet protection structures and stone & block drop inlet protection, which keep silt, sediment and construction litter and debris out of the on-site stormwater drainage system.

Temporary Control Measures

Temporary control measures and facilities will include silt fences, interceptor swales, stabilized construction entrances, temporary seeding, mulching and sediment traps with temporary riser and anti-vortex devices.

Throughout the construction of the proposed redevelopment temporary control facilities will be implemented to control on-site erosion and sediment transfer. Interceptor swales, if required, will be used to direct stormwater runoff to temporary sediment traps for settlement. The sediment traps will be constructed as part of this project will serve as temporary sediment basins to remove sediment and pollutants from the stormwater runoff produced during construction.
Descriptions of the temporary sediment & erosion controls that will be used during the development of the site including silt fence, stabilized construction entrance, 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. Stabilized Construction Entrance consists of AASHTO No. 1 rock. The rock entrance will be a minimum of 50 feet in length by 20 feet in width by 8 inches in depth.

3. Seeding will be used to create a vegetative surface to stabilize disturbed earth until at least 70% 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.

4. 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.

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, 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.

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.

Concrete Material and Equipment Management

Concrete washouts shall be used to contain concrete and liquids when the chutes of concrete mixers and hoppers of concrete pumps are rinsed out after delivery. The washout facilities consolidate solid for easier disposal and prevent runoff of liquids. The wash water is alkaline and contains high levels of chromium, which can leach into the ground and contaminate groundwater. It can also migrate to a storm drain, which can increase the pH of area waters and harm aquatic life. Solids that are improperly disposed of can clog storm drain pipes and cause flooding. Installing concrete washout facilities not only prevents pollution but also is a matter of good housekeeping at your construction site.

Prefabricated concrete washout containers can be delivered to the site to provide maintenance and disposal of materials. Regular pick-ups of solid and liquid waste materials will be necessary. To prevent leaks on the job site, ensure that prefabricated washout containers are watertight. A self installed concrete washout facility can be utilized although they are much less reliable than prefabricated containers and are prone to leaks. There are many design options for the washout, but they are preferably built below-grade to prevent breaches and reduce the likelihood of runoff. Above-grade structures can also be used if they are sized and constructed correctly and are diligently maintained. One of the most common problems with self-installed concrete washout facilities is that they can leak or be breached as a result of constant use, therefore the contractor shall be sure to use quality materials and inspect the facilities on a daily basis.

Washouts must be sized to handle solids, wash water, and rainfall to prevent overflow. Concrete Washout Systems, Inc. estimates that 7 gallons of wash water are used to wash one truck chute and 50 gallons are used to wash out the hopper of a concrete pump truck.

For larger sites, a below-grade washout should be at least 10 feet wide and sized to contain all liquid and solid waste expected to be generated in between cleanout periods. A minimum of 12-inches of freeboard must be provided. The pit must be lined with plastic sheeting of at least 10-mil thickness without holes or tears to prevent leaching of liquids into the ground. Concrete wash water should never be placed in a pit that is connected to the storm drain system or that drains to nearby waterways.

An above-grade washout can be constructed at least 10 feet wide by 10 feet long and sized to contain all liquid and solid waste expected to be generated in between cleanout periods. A minimum of 4-inches of freeboard must be provided. The washout structures can be constructed with staked straw bales or sandbags double-or triple lined with plastic sheeting of at least 10-mil thickness without holes or tears.

Concrete washout facilities shall not be located within 50 feet of storm drains, open ditches, or water bodies and should be placed in locations that allow for convenient access for concrete trucks. The contractor shall check all concrete washout facilities daily to determine if they have been filled to 75 percent capacity, which is when materials need to be removed. Both above-and below-ground self-installed washouts should be inspected daily to ensure that plastic linings are intact and sidewalls have not been damaged by construction activities. Prefabricated washout containers should be inspected daily as well as to ensure the container is not leaking or nearing 75 percent capacity. Inspectors should also note whether the facilities are being used regularly. Additional signage for washouts may be needed in more convenient locations if concrete truck operators are not utilizing them.

The washout structures must be drained or covered prior to predicted rainstorms to prevent overflows. Hardened solids either whole or broken must be removed and then they may be reused onsite or hauled away for recycling.

Once materials are removed from the concrete washout, a new structure must be built or excavated, or if the previous structure is still intact, inspect it for signs of weakening or damage and make any necessary repairs. Line the structure with new plastic that is free of holes or tears and replace signage if necessary. It is very important that new plastic be used after every cleaning because pumps and concrete removal equipment can damage the existing liner.

Construction Site Chemical Control

The purpose of this management measure is to prevent the generation of nonpoint source pollution from construction sites due to improper handling and usage of nutrients and toxic substances, and to prevent the movement of toxic substances from the construction site.

Many potential pollutants other than sediment are associated with construction activities. These pollutants include pesticides; fertilizers used for vegetative stabilization; petrochemicals; construction chemicals such as concrete products, sealers, and paints; wash water associated with these products; paper; wood; garbage; and sanitary waste.

Disposal of excess pesticides and pesticide-related wastes should conform to registered label directions for the disposal and storage of pesticides and pesticide containers set forth in applicable Federal, State and local regulations that govern their usage, handling, storage, and disposal.

Pesticides should be disposed of through either a licensed waste management firm or a treatment, storage and disposal (TSD) facility. Containers should be triple-rinsed before disposal, and rinse waters should be reused as product.

Other practices include setting aside a locked storage area, tightly closing lids, storing in a cool, dry place, checking containers periodically for leaks or deterioration, maintaining a list of products in storage, using plastic sheeting to line the storage areas, and notifying neighboring property owners prior to spraying.

When storing petroleum products, follow these guidelines:

- Create a shelter around the area with cover and wind protection;
- Line the storage area with a double layer of plastic sheeting or similar material;
- Create an impervious berm around the perimeter with a capacity of 110 percent greater than that of the largest container;
- Clearly label all products;
- Keep tanks off the ground; and
- Keep lids securely fastened.

Post spill procedure information and have persons trained in spill handling on site or on call at all times. Materials for cleaning up spills should be kept on site and easily available. Spills should be cleaned up immediately and the contaminated material properly disposed of. Maintain and wash equipment and machinery in confined areas specifically designed to control runoff.

Thinners or solvents should not be discharged into sanitary or storm systems when cleaning machinery. Use alternative methods for cleaning larger equipment parts, such as high-pressure, high-temperature water washes, or steam cleaning. Equipment-washing detergents can be used, and wash water may be discharged into sanitary sewers if solids are removed from the solution first. (This practice should be verified with the local sewer authority.) Small parts can be cleaned with degreasing solvents, which can then be reused or recycled.

<u>Solid Waste Management and Portable Sanitary Management</u>

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 over head 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. CDS Water Quality Structure will be used to provide pretreatment of the water quality flow rate for separating sediment, debris, floatables, etc. from the runoff prior to discharge to the SMP's.

2. Infiltration System (I-2) which is a standard SMP that will be used to treat the runoff volume generated from a portion of the developed area and provide additional water quality and runoff volume reduction. The smaller storms will be retained and the higher storms will be released gradually. Refer to the Proposed Hydrologic Calculations and Runoff Reduction and Water Quality Volume Sizing Calculations, in Appendices 'B' **and 'C'**.

   The StormTech SC-740 Recharge Chambers are domed shaped fully opened bottom corrugated chambers with perforated side walls. Chambers allow stormwater to be stored within the dome void until it can infiltrate into the ground. They are able to be used for residential, commercial or industrial applications and provide an easy way to treat and dispose of stormwater runoff underground. Water is infiltrated into the ground through the chambers and surrounding crushed stone and will replenish the groundwater as a natural condition.

3. <u>Catch Basins</u> will be used to remove some of the coarse sand and grit sediment before entering the drainage system. Each catch basin will be constructed with an 18 inch deep sump.

4. <u>Seeding</u> 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.

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 on Table 7 below:

Table 7

Soil Restoration Requirements

<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) Sunny sites

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) Shady sites

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.

VII. CONSTRUCTION PHASE AND POST-CONSTRUCTION MAINTENANCE

During the construction phase and following construction of the project, a number of maintenance measures will be taken with respect to the site maintenance. Measures to be taken included the following:

1. During Construction

A comprehensive sediment and erosion control plan will be in place during the construction period. Maintenance measures for sediment and erosion controls will include:

A qualified professional acceptable to the municipality will be hired by the owner or operator to monitor the installation and maintenance of the sediment and erosion control plans. The qualified professional shall report directly to the Engineering Consultant and shall be responsible for ensuring compliance with the design of the sediment and erosion control plans.

The qualified professional so hired will inspect all sediment and erosion control measures at least every seven calendar days. In the event that there has been a variance with the design of the sediment and erosion control measures so that the ability of the measures to adequately perform the intended function is lessened or compromised and/or the facilities are not adequately maintained, the qualified professional shall be required to report such variance to the Engineering Consultant within 48 hours and shall be empowered to order immediate repairs to the sediment and erosion control measures.

The qualified professional will also be responsible for observing the adequacy of the vegetation growth (trees, shrubs, groundcovers and turfgrasses) in newly graded areas and for ordering additional plantings in the event that the established plant materials do not adequately protect the ground surface from erosion.

2. Following Construction

Site maintenance activities on the property will include:

- Grounds maintenance, including mowing of lawns;

- Planting of trees, shrubs and groundcovers; pruning of trees and shrubs;
- Application of fertilizer and herbicides;
- Maintenance of stormwater management area;

Grounds maintenance on the site will be performed by landscaping contractor.

Fertilizer is typically applied twice in the year - once in the spring and once in the fall. The application of fertilizer is usually necessary to maintain healthy lawn growth due to competition for nutrients with trees and shrubs and since the clippings are often removed. It is not recommended that fertilizer be applied during the summer. It is at this time that lawns are typically dormant.

Fertilizers come in three basic types: (1) Organic; (2) Soluble synthetic and (3) Slow release.

Organic fertilizers are derived from plant or animal waste. Since they are heavier and bulkier than other fertilizers, it is necessary to apply a much greater amount at one time. Soluble synthetic fertilizers are predictable with determining the exact impact on a lawn. However more applications are necessary since their effect is often short term. Slow release fertilizers have a high percentage of nitrogen so quantities that need be handled at one time are smaller. Slow release fertilizers will be utilized by the project.

A complete fertilizer contains all three of the primary nutrients - nitrogen (N), phosphorus (P) and potassium in the form of potash (K). Typically, a 3-1-2 ratio of nutrients (N-P-K) is used for lawn applications.

Fertilizer shall be applied by the landscape contractor in accordance with the manufacturer's instructions. The application of fertilizer does require some skill on the part of the operator. Should there be a spill of fertilizer, the landscape contractor shall be required to scrape or vacuum it up. The area will then be watered in accordance with the manufacturer's instructions to ensure that the fertilizer becomes soluble and available to plants and does not run off.

Owner will be responsible for the long-term operation and maintenance of the permanent stormwater management practices. The permanent stormwater management practices shall be maintained in accordance with the Maintenance Inspection Checklists provided in Appendix G.

VIII. CONCLUSION

This Stormwater Pollution Prevention Plan has been prepared to describe the project’s pre and post-development stormwater management improvements and its sediment and erosion control improvements to be utilized during construction. The proposed permanent improvements and the interim improvements to be utilized during construction have been designed in accordance with the requirements of the:

- Chapter 250 "Stormwater Management, Erosion and Water Pollution Control" of the Hastings-on-Hudson Zoning Code.
- New York State Stormwater Management Design Manual.

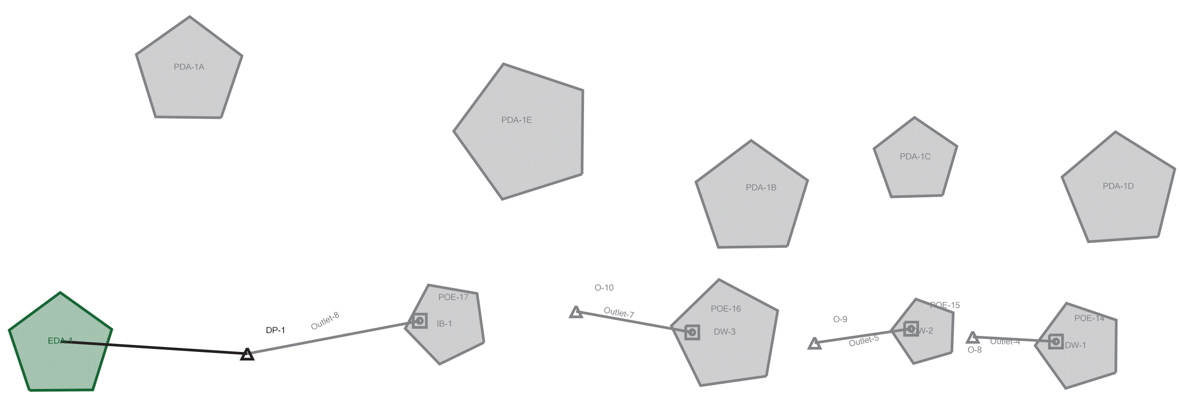
The project employs a variety of practices to enhance stormwater quality and reduce peak rates of runoff associated with the proposed improvements. These measures include porous pavers, dry wells, and subsurface stormwater management/infiltration chambers. These improvements will also mitigate runoff volumes from the proposed improvements as runoff volumes will be slightly reduced or maintained in all the analyzed storms.

Based on the foregoing, it is our professional opinion that the proposed improvements will provide water quantity and quality enhancements which exceed the above mentioned requirements and are not anticipated to have any adverse impacts to the site or any surrounding areas.

APPENDIX A

EXISTING HYDROLOGIC CALCULATIONS

Scenario: Pre-Development



Project Summary

Title	TOWNHOUSES AT 32-34 WASHINGTON AVENUE
Engineer	EH
Company	JMC
Date	8/11/2015

Notes

Table of Contents

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft^3)	Time to Peak (hours)	Peak Flow (ft^3/s)
EDA-1	Pre-Development-1 yr	1	1,339.000	12.150	0.3073
EDA-1	Pre-Development-10 yr	10	4,522.000	12.150	1.1799
EDA-1	Pre-Development-100 yr	100	11,407.000	12.150	2.9779

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft^3)	Time to Peak (hours)	Peak Flow (ft^3/s)
DP-1	Pre-Development-1 yr	1	1,339.000	12.150	0.3073
DP-1	Pre-Development-10 yr	10	4,522.000	12.150	1.1799
DP-1	Pre-Development-100 yr	100	11,407.000	12.150	2.9779

Time-Depth Curve: 1 YR	
Label	1 YR
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	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.0	0.0	0.0
1.500	0.0	0.0	0.0	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.1	0.1	0.1
3.500	0.1	0.1	0.1	0.1	0.1
4.000	0.1	0.1	0.1	0.1	0.1
4.500	0.1	0.1	0.1	0.2	0.2
5.000	0.2	0.2	0.2	0.2	0.2
5.500	0.2	0.2	0.2	0.2	0.2
6.000	0.2	0.2	0.2	0.2	0.2
6.500	0.2	0.2	0.2	0.2	0.2
7.000	0.3	0.3	0.3	0.3	0.3
7.500	0.3	0.3	0.3	0.3	0.3
8.000	0.3	0.3	0.3	0.3	0.4
8.500	0.4	0.4	0.4	0.4	0.4
9.000	0.4	0.4	0.4	0.4	0.5
9.500	0.5	0.5	0.5	0.5	0.5
10.000	0.5	0.5	0.6	0.6	0.6
10.500	0.6	0.6	0.6	0.7	0.7
11.000	0.7	0.7	0.8	0.8	0.8
11.500	0.8	0.9	1.0	1.1	1.2
12.000	1.4	1.6	1.8	1.9	1.9
12.500	2.0	2.0	2.0	2.1	2.1
13.000	2.1	2.1	2.2	2.2	2.2
13.500	2.2	2.2	2.2	2.3	2.3
14.000	2.3	2.3	2.3	2.3	2.3
14.500	2.4	2.4	2.4	2.4	2.4
15.000	2.4	2.4	2.4	2.4	2.4
15.500	2.5	2.5	2.5	2.5	2.5
16.000	2.5	2.5	2.5	2.5	2.5
16.500	2.5	2.5	2.5	2.6	2.6
17.000	2.6	2.6	2.6	2.6	2.6
17.500	2.6	2.6	2.6	2.6	2.6

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)
18.000	2.6	2.6	2.6	2.6	2.6
18.500	2.6	2.6	2.6	2.7	2.7
19.000	2.7	2.7	2.7	2.7	2.7
19.500	2.7	2.7	2.7	2.7	2.7
20.000	2.7	2.7	2.7	2.7	2.7
20.500	2.7	2.7	2.7	2.7	2.7
21.000	2.7	2.7	2.7	2.7	2.7
21.500	2.8	2.8	2.8	2.8	2.8
22.000	2.8	2.8	2.8	2.8	2.8
22.500	2.8	2.8	2.8	2.8	2.8
23.000	2.8	2.8	2.8	2.8	2.8
23.500	2.8	2.8	2.8	2.8	2.8
24.000	2.8	(N/A)	(N/A)	(N/A)	(N/A)

Time-Depth Curve: 10 YR	
Label	10 YR
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	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.2	0.2	0.2	0.2
4.000	0.2	0.2	0.2	0.2	0.2
4.500	0.3	0.3	0.3	0.3	0.3
5.000	0.3	0.3	0.3	0.3	0.3
5.500	0.3	0.3	0.3	0.3	0.4
6.000	0.4	0.4	0.4	0.4	0.4
6.500	0.4	0.4	0.4	0.4	0.4
7.000	0.5	0.5	0.5	0.5	0.5
7.500	0.5	0.5	0.5	0.6	0.6
8.000	0.6	0.6	0.6	0.6	0.6
8.500	0.6	0.7	0.7	0.7	0.7
9.000	0.7	0.8	0.8	0.8	0.8
9.500	0.8	0.9	0.9	0.9	0.9
10.000	1.0	1.0	1.0	1.0	1.1
10.500	1.1	1.1	1.2	1.2	1.2
11.000	1.3	1.3	1.3	1.4	1.4
11.500	1.5	1.6	1.7	1.9	2.1
12.000	2.5	3.0	3.2	3.3	3.5
12.500	3.6	3.6	3.7	3.7	3.8
13.000	3.8	3.8	3.9	3.9	3.9
13.500	4.0	4.0	4.0	4.1	4.1
14.000	4.1	4.1	4.2	4.2	4.2
14.500	4.2	4.2	4.3	4.3	4.3
15.000	4.3	4.3	4.4	4.4	4.4
15.500	4.4	4.4	4.4	4.5	4.5
16.000	4.5	4.5	4.5	4.5	4.5
16.500	4.5	4.6	4.6	4.6	4.6
17.000	4.6	4.6	4.6	4.6	4.6
17.500	4.7	4.7	4.7	4.7	4.7

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)
18.000	4.7	4.7	4.7	4.7	4.7
18.500	4.7	4.7	4.8	4.8	4.8
19.000	4.8	4.8	4.8	4.8	4.8
19.500	4.8	4.8	4.8	4.8	4.8
20.000	4.8	4.8	4.9	4.9	4.9
20.500	4.9	4.9	4.9	4.9	4.9
21.000	4.9	4.9	4.9	4.9	4.9
21.500	4.9	4.9	4.9	5.0	5.0
22.000	5.0	5.0	5.0	5.0	5.0
22.500	5.0	5.0	5.0	5.0	5.0
23.000	5.0	5.0	5.0	5.0	5.0
23.500	5.0	5.0	5.0	5.1	5.1
24.000	5.1	(N/A)	(N/A)	(N/A)	(N/A)

Time-Depth Curve: 100 YR	
Label	100 YR
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	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.1	0.1	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.2	0.2	0.2
2.000	0.2	0.2	0.2	0.2	0.2
2.500	0.2	0.2	0.2	0.3	0.3
3.000	0.3	0.3	0.3	0.3	0.3
3.500	0.3	0.3	0.3	0.4	0.4
4.000	0.4	0.4	0.4	0.4	0.4
4.500	0.4	0.5	0.5	0.5	0.5
5.000	0.5	0.5	0.5	0.5	0.6
5.500	0.6	0.6	0.6	0.6	0.6
6.000	0.6	0.7	0.7	0.7	0.7
6.500	0.7	0.7	0.8	0.8	0.8
7.000	0.8	0.8	0.8	0.9	0.9
7.500	0.9	0.9	0.9	1.0	1.0
8.000	1.0	1.0	1.1	1.1	1.1
8.500	1.1	1.2	1.2	1.2	1.3
9.000	1.3	1.3	1.4	1.4	1.4
9.500	1.5	1.5	1.6	1.6	1.6
10.000	1.7	1.7	1.8	1.8	1.9
10.500	1.9	2.0	2.0	2.1	2.2
11.000	2.2	2.3	2.4	2.5	2.6
11.500	2.7	2.8	3.0	3.3	3.7
12.000	4.4	5.2	5.6	5.9	6.1
12.500	6.2	6.3	6.4	6.5	6.6
13.000	6.7	6.7	6.8	6.9	6.9
13.500	7.0	7.0	7.1	7.1	7.2
14.000	7.2	7.3	7.3	7.3	7.4
14.500	7.4	7.5	7.5	7.5	7.6
15.000	7.6	7.6	7.7	7.7	7.7
15.500	7.8	7.8	7.8	7.8	7.9
16.000	7.9	7.9	7.9	8.0	8.0
16.500	8.0	8.0	8.0	8.1	8.1
17.000	8.1	8.1	8.1	8.1	8.2
17.500	8.2	8.2	8.2	8.2	8.2

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)
18.000	8.3	8.3	8.3	8.3	8.3
18.500	8.3	8.3	8.4	8.4	8.4
19.000	8.4	8.4	8.4	8.4	8.4
19.500	8.5	8.5	8.5	8.5	8.5
20.000	8.5	8.5	8.5	8.6	8.6
20.500	8.6	8.6	8.6	8.6	8.6
21.000	8.6	8.6	8.6	8.7	8.7
21.500	8.7	8.7	8.7	8.7	8.7
22.000	8.7	8.7	8.7	8.8	8.8
22.500	8.8	8.8	8.8	8.8	8.8
23.000	8.8	8.8	8.8	8.8	8.9
23.500	8.9	8.9	8.9	8.9	8.9
24.000	8.9	(N/A)	(N/A)	(N/A)	(N/A)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	28.00 ft
Manning's n	(N/A)
Slope	0.056 ft/ft
2 Year 24 Hour Depth	3.4 in
Average Velocity	1.66 ft/s
Segment Time of Concentration	0.005 hours

Segment #2: TR-55 Sheet Flow	
Hydraulic Length	122.00 ft
Manning's n	(N/A)
Slope	0.098 ft/ft
2 Year 24 Hour Depth	3.4 in
Average Velocity	0.24 ft/s
Segment Time of Concentration	0.143 hours

Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	6.70 ft
Is Paved?	True
Slope	0.043 ft/ft
Average Velocity	4.19 ft/s
Segment Time of Concentration	0.000 hours

Segment #4: TR-55 Shallow Concentrated Flow	
Hydraulic Length	136.00 ft
Is Paved?	False
Slope	0.043 ft/ft
Average Velocity	3.33 ft/s
Segment Time of Concentration	0.011 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.159 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

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	17,019.000	0.0	0.0	61.000
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	6,412.000	0.0	0.0	98.000
Woods - fair - Soil B	60.000	2,695.000	0.0	0.0	60.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	26,126.000	(N/A)	(N/A)	69.978

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

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).

Storm Event	1 YR
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.159 hours
Area (User Defined)	26,126.000 ft²

Computational Time Increment	0.021 hours
Time to Peak (Computed)	12.150 hours
Flow (Peak, Computed)	0.3075 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	0.3073 ft³/s

Drainage Area

SCS CN (Composite)	70.000
Area (User Defined)	26,126.000 ft²
Maximum Retention (Pervious)	4.3 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	0.6 in
Runoff Volume (Pervious)	1,342.420 ft³

Hydrograph Volume (Area under Hydrograph curve)

Volume	1,339.000 ft³

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.159 hours
Computational Time Increment	0.021 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.2655 ft³/s
Unit peak time, Tp	0.106 hours

Subsection: Unit Hydrograph Summary
Label: EDA-1

Return Event: 1 years
Storm Event: 1 YR

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.425 hours
Total unit time, Tb	0.531 hours

Storm Event	1 YR
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.159 hours
Area (User Defined)	26,126.000 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)
11.600	0.0002	0.0015	0.0050	0.0110	0.0205
11.850	0.0332	0.0503	0.0798	0.1368	0.2065
12.100	0.2698	0.3073	0.2892	0.2537	0.2259
12.350	0.2049	0.1833	0.1620	0.1385	0.1168
12.600	0.0984	0.0850	0.0769	0.0720	0.0684
12.850	0.0654	0.0625	0.0599	0.0571	0.0546
13.100	0.0525	0.0508	0.0497	0.0489	0.0482
13.350	0.0475	0.0469	0.0462	0.0456	0.0449
13.600	0.0443	0.0436	0.0429	0.0422	0.0415
13.850	0.0408	0.0400	0.0393	0.0385	0.0378
14.100	0.0372	0.0366	0.0362	0.0358	0.0355
14.350	0.0351	0.0348	0.0345	0.0341	0.0337
14.600	0.0334	0.0331	0.0327	0.0323	0.0320
14.850	0.0316	0.0312	0.0308	0.0305	0.0301
15.100	0.0297	0.0293	0.0289	0.0285	0.0281
15.350	0.0277	0.0273	0.0269	0.0265	0.0261
15.600	0.0257	0.0253	0.0248	0.0244	0.0240
15.850	0.0236	0.0231	0.0227	0.0223	0.0219
16.100	0.0215	0.0212	0.0210	0.0207	0.0206
16.350	0.0204	0.0202	0.0200	0.0198	0.0197
16.600	0.0195	0.0193	0.0191	0.0189	0.0187
16.850	0.0185	0.0184	0.0182	0.0180	0.0178
17.100	0.0176	0.0174	0.0172	0.0170	0.0168
17.350	0.0167	0.0164	0.0162	0.0161	0.0159
17.600	0.0157	0.0155	0.0153	0.0151	0.0149
17.850	0.0147	0.0145	0.0143	0.0141	0.0139
18.100	0.0137	0.0136	0.0135	0.0135	0.0134
18.350	0.0133	0.0133	0.0132	0.0132	0.0131
18.600	0.0131	0.0130	0.0130	0.0129	0.0128
18.850	0.0128	0.0127	0.0127	0.0126	0.0126
19.100	0.0125	0.0124	0.0124	0.0123	0.0123
19.350	0.0122	0.0122	0.0121	0.0121	0.0120
19.600	0.0119	0.0119	0.0118	0.0118	0.0117
19.850	0.0117	0.0116	0.0115	0.0115	0.0114
20.100	0.0114	0.0113	0.0113	0.0112	0.0112

Subsection: Unit Hydrograph (Hydrograph Table)
Label: EDA-1

Return Event: 1 years
Storm Event: 1 YR

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)
20.350	0.0111	0.0111	0.0110	0.0110	0.0110
20.600	0.0109	0.0109	0.0108	0.0108	0.0107
20.850	0.0107	0.0107	0.0106	0.0106	0.0106
21.100	0.0105	0.0104	0.0104	0.0103	0.0103
21.350	0.0103	0.0102	0.0102	0.0101	0.0101
21.600	0.0100	0.0100	0.0099	0.0099	0.0099
21.850	0.0098	0.0098	0.0097	0.0097	0.0096
22.100	0.0096	0.0095	0.0095	0.0094	0.0094
22.350	0.0093	0.0093	0.0093	0.0092	0.0092
22.600	0.0091	0.0091	0.0090	0.0090	0.0089
22.850	0.0089	0.0088	0.0088	0.0088	0.0087
23.100	0.0086	0.0086	0.0085	0.0085	0.0085
23.350	0.0084	0.0084	0.0084	0.0083	0.0082
23.600	0.0082	0.0081	0.0081	0.0080	0.0080
23.850	0.0079	0.0079	0.0078	0.0078	(N/A)

Storm Event	10 YR
Return Event	10 years
Duration	24.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.159 hours
Area (User Defined)	26,126.000 ft²

Computational Time Increment	0.021 hours
Time to Peak (Computed)	12.150 hours
Flow (Peak, Computed)	1.1799 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	1.1799 ft³/s

Drainage Area

SCS CN (Composite)	70.000
Area (User Defined)	26,126.000 ft²
Maximum Retention (Pervious)	4.3 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	2.1 in
Runoff Volume (Pervious)	4,530.502 ft³

Hydrograph Volume (Area under Hydrograph curve)

Volume	4,522.000 ft³

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.159 hours
Computational Time Increment	0.021 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.2655 ft³/s
Unit peak time, Tp	0.106 hours

Subsection: Unit Hydrograph Summary
Label: EDA-1

Return Event: 10 years
Storm Event: 10 YR

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.425 hours
Total unit time, Tb	0.531 hours

Storm Event	10 YR
Return Event	10 years
Duration	24.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.159 hours
Area (User Defined)	26,126.000 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)
9.750	0.0008	0.0015	0.0022	0.0029	0.0037
10.000	0.0046	0.0054	0.0063	0.0073	0.0083
10.250	0.0093	0.0105	0.0117	0.0129	0.0142
10.500	0.0156	0.0170	0.0184	0.0199	0.0215
10.750	0.0231	0.0248	0.0266	0.0284	0.0302
11.000	0.0321	0.0343	0.0369	0.0399	0.0437
11.250	0.0478	0.0524	0.0572	0.0625	0.0680
11.500	0.0740	0.0831	0.0994	0.1231	0.1592
11.750	0.2024	0.2551	0.3136	0.3825	0.4983
12.000	0.7197	0.9533	1.1208	1.1799	1.0528
12.250	0.8845	0.7598	0.6696	0.5857	0.5085
12.500	0.4287	0.3577	0.2985	0.2560	0.2301
12.750	0.2143	0.2023	0.1927	0.1835	0.1751
13.000	0.1664	0.1587	0.1520	0.1467	0.1431
13.250	0.1404	0.1380	0.1358	0.1336	0.1315
13.500	0.1293	0.1272	0.1250	0.1229	0.1207
13.750	0.1185	0.1162	0.1140	0.1117	0.1095
14.000	0.1072	0.1051	0.1031	0.1015	0.1001
14.250	0.0990	0.0978	0.0967	0.0957	0.0946
14.500	0.0935	0.0924	0.0914	0.0903	0.0892
14.750	0.0881	0.0870	0.0859	0.0848	0.0836
15.000	0.0825	0.0814	0.0803	0.0791	0.0780
15.250	0.0769	0.0757	0.0745	0.0734	0.0723
15.500	0.0711	0.0699	0.0687	0.0676	0.0664
15.750	0.0652	0.0640	0.0629	0.0616	0.0604
16.000	0.0592	0.0582	0.0572	0.0564	0.0556
16.250	0.0550	0.0545	0.0540	0.0535	0.0529
16.500	0.0524	0.0520	0.0514	0.0509	0.0504
16.750	0.0499	0.0493	0.0488	0.0483	0.0478
17.000	0.0473	0.0467	0.0462	0.0458	0.0452
17.250	0.0446	0.0441	0.0436	0.0431	0.0425
17.500	0.0420	0.0415	0.0410	0.0404	0.0399
17.750	0.0394	0.0388	0.0383	0.0378	0.0373
18.000	0.0367	0.0362	0.0357	0.0354	0.0352
18.250	0.0350	0.0348	0.0346	0.0345	0.0344

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)
18.500	0.0342	0.0340	0.0339	0.0338	0.0336
18.750	0.0334	0.0333	0.0331	0.0330	0.0328
19.000	0.0326	0.0325	0.0323	0.0322	0.0320
19.250	0.0319	0.0317	0.0315	0.0314	0.0313
19.500	0.0311	0.0309	0.0308	0.0306	0.0305
19.750	0.0303	0.0301	0.0300	0.0298	0.0296
20.000	0.0295	0.0294	0.0292	0.0290	0.0290
20.250	0.0289	0.0287	0.0286	0.0284	0.0283
20.500	0.0282	0.0281	0.0280	0.0279	0.0277
20.750	0.0276	0.0275	0.0274	0.0273	0.0271
21.000	0.0271	0.0270	0.0268	0.0267	0.0265
21.250	0.0264	0.0263	0.0262	0.0261	0.0260
21.500	0.0258	0.0256	0.0256	0.0255	0.0253
21.750	0.0252	0.0251	0.0251	0.0249	0.0248
22.000	0.0246	0.0245	0.0244	0.0243	0.0242
22.250	0.0240	0.0238	0.0237	0.0236	0.0235
22.500	0.0234	0.0233	0.0232	0.0231	0.0230
22.750	0.0228	0.0227	0.0225	0.0224	0.0223
23.000	0.0222	0.0221	0.0219	0.0217	0.0217
23.250	0.0216	0.0214	0.0213	0.0212	0.0211
23.500	0.0210	0.0208	0.0207	0.0206	0.0204
23.750	0.0203	0.0202	0.0201	0.0199	0.0197
24.000	0.0196	(N/A)	(N/A)	(N/A)	(N/A)

Storm Event	100 YR
Return Event	100 years
Duration	24.000 hours
Depth	8.9 in
Time of Concentration (Composite)	0.159 hours
Area (User Defined)	26,126.000 ft²

Computational Time Increment	0.021 hours
Time to Peak (Computed)	12.129 hours
Flow (Peak, Computed)	3.0058 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	2.9779 ft³/s

Drainage Area

SCS CN (Composite)	70.000
Area (User Defined)	26,126.000 ft²
Maximum Retention (Pervious)	4.3 in
Maximum Retention (Pervious, 20 percent)	0.9 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	5.2 in
Runoff Volume (Pervious)	11,423.513 ft³

Hydrograph Volume (Area under Hydrograph curve)

Volume	11,407.000 ft³

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.159 hours
Computational Time Increment	0.021 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.2655 ft³/s
Unit peak time, Tp	0.106 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.425 hours
Total unit time, Tb	0.531 hours

Storm Event	100 YR
Return Event	100 years
Duration	24.000 hours
Depth	8.9 in
Time of Concentration (Composite)	0.159 hours
Area (User Defined)	26,126.000 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)
7.450	0.0008	0.0013	0.0018	0.0024	0.0031
7.700	0.0037	0.0044	0.0050	0.0057	0.0064
7.950	0.0071	0.0079	0.0086	0.0094	0.0103
8.200	0.0112	0.0121	0.0131	0.0142	0.0153
8.450	0.0164	0.0176	0.0188	0.0201	0.0214
8.700	0.0227	0.0241	0.0255	0.0270	0.0285
8.950	0.0301	0.0317	0.0333	0.0350	0.0367
9.200	0.0385	0.0402	0.0421	0.0440	0.0459
9.450	0.0479	0.0499	0.0519	0.0540	0.0561
9.700	0.0583	0.0605	0.0628	0.0650	0.0674
9.950	0.0697	0.0721	0.0746	0.0774	0.0804
10.200	0.0838	0.0874	0.0912	0.0950	0.0990
10.450	0.1030	0.1072	0.1114	0.1158	0.1202
10.700	0.1248	0.1294	0.1342	0.1390	0.1439
10.950	0.1489	0.1540	0.1599	0.1677	0.1771
11.200	0.1890	0.2020	0.2164	0.2309	0.2467
11.450	0.2624	0.2795	0.3069	0.3583	0.4326
11.700	0.5439	0.6714	0.8200	0.9765	1.1527
11.950	1.4463	2.0064	2.5617	2.9107	2.9779
12.200	2.6024	2.1479	1.8166	1.5808	1.3686
12.450	1.1781	0.9868	0.8189	0.6805	0.5815
12.700	0.5209	0.4838	0.4557	0.4330	0.4117
12.950	0.3920	0.3719	0.3542	0.3386	0.3265
13.200	0.3180	0.3115	0.3058	0.3006	0.2954
13.450	0.2904	0.2853	0.2803	0.2752	0.2702
13.700	0.2650	0.2601	0.2548	0.2497	0.2445
13.950	0.2394	0.2341	0.2293	0.2248	0.2211
14.200	0.2180	0.2153	0.2126	0.2102	0.2077
14.450	0.2053	0.2027	0.2002	0.1978	0.1954
14.700	0.1928	0.1903	0.1878	0.1854	0.1828
14.950	0.1803	0.1777	0.1753	0.1727	0.1702
15.200	0.1676	0.1651	0.1625	0.1600	0.1574
15.450	0.1550	0.1523	0.1497	0.1471	0.1446
15.700	0.1420	0.1394	0.1368	0.1343	0.1316
15.950	0.1290	0.1264	0.1241	0.1220	0.1202

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)
16.200	0.1185	0.1172	0.1161	0.1150	0.1138
16.450	0.1126	0.1115	0.1105	0.1093	0.1081
16.700	0.1070	0.1060	0.1048	0.1036	0.1025
16.950	0.1015	0.1002	0.0991	0.0980	0.0970
17.200	0.0957	0.0945	0.0934	0.0924	0.0912
17.450	0.0900	0.0889	0.0878	0.0866	0.0854
17.700	0.0843	0.0833	0.0820	0.0808	0.0797
17.950	0.0787	0.0774	0.0763	0.0753	0.0746
18.200	0.0742	0.0738	0.0734	0.0730	0.0727
18.450	0.0724	0.0720	0.0717	0.0714	0.0711
18.700	0.0707	0.0703	0.0700	0.0697	0.0693
18.950	0.0690	0.0686	0.0683	0.0680	0.0676
19.200	0.0673	0.0670	0.0666	0.0662	0.0659
19.450	0.0656	0.0652	0.0649	0.0646	0.0643
19.700	0.0639	0.0635	0.0632	0.0629	0.0625
19.950	0.0621	0.0618	0.0615	0.0611	0.0608
20.200	0.0607	0.0605	0.0602	0.0598	0.0595
20.450	0.0593	0.0590	0.0588	0.0586	0.0583
20.700	0.0579	0.0576	0.0575	0.0573	0.0570
20.950	0.0567	0.0565	0.0564	0.0561	0.0557
21.200	0.0554	0.0552	0.0549	0.0547	0.0545
21.450	0.0542	0.0538	0.0535	0.0533	0.0532
21.700	0.0529	0.0526	0.0524	0.0523	0.0519
21.950	0.0516	0.0513	0.0510	0.0508	0.0506
22.200	0.0503	0.0501	0.0497	0.0494	0.0492
22.450	0.0490	0.0487	0.0484	0.0483	0.0481
22.700	0.0478	0.0474	0.0471	0.0469	0.0466
22.950	0.0464	0.0462	0.0459	0.0455	0.0452
23.200	0.0450	0.0449	0.0445	0.0442	0.0441
23.450	0.0439	0.0436	0.0433	0.0430	0.0427
23.700	0.0425	0.0422	0.0420	0.0417	0.0413
23.950	0.0410	0.0407	(N/A)	(N/A)	(N/A)

Subsection: Addition Summary
Label: DP-1

Return Event: 1 years
Storm Event: 1 YR

Summary for Hydrograph Addition at 'DP-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-1

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	EDA-1	1,339.057	12.150	0.3073
Flow (In)	DP-1	1,339.057	12.150	0.3073

Summary for Hydrograph Addition at 'DP-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-1

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	EDA-1	4,522.211	12.150	1.1799
Flow (In)	DP-1	4,522.211	12.150	1.1799

Summary for Hydrograph Addition at 'DP-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	EDA-1

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	EDA-1	11,406.562	12.150	2.9779
Flow (In)	DP-1	11,406.562	12.150	2.9779

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APPENDIX B

PROPOSED HYDROLOGIC CALCULATIONS

Project Summary

Title	TOWNHOUSES AT 32-34 WASHINGTON AVENUE
Engineer	EH
Company	JMC
Date	8/11/2015

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Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft^3)	Time to Peak (hours)	Peak Flow (ft^3/s)
PDA-1A	POST-DEVELOPMENT -1 YR	1	923.000	12.150	0.2360
PDA-1A	POST-DEVELOPMENT -10 YR	10	2,797.000	12.100	0.7500
PDA-1A	POST-DEVELOPMENT -100 YR	100	6,656.000	12.100	1.7808
PDA-1B	POST-DEVELOPMENT -1 YR	1	275.000	12.100	0.0790
PDA-1B	POST-DEVELOPMENT -10 YR	10	696.000	12.100	0.1972
PDA-1B	POST-DEVELOPMENT -100 YR	100	1,493.000	12.100	0.4068
PDA-1E	POST-DEVELOPMENT -1 YR	1	332.000	12.150	0.0877
PDA-1E	POST-DEVELOPMENT -10 YR	10	858.000	12.100	0.2253
PDA-1E	POST-DEVELOPMENT -100 YR	100	1,864.000	12.100	0.4786
PDA-1C	POST-DEVELOPMENT -1 YR	1	351.000	12.100	0.1008
PDA-1C	POST-DEVELOPMENT -10 YR	10	869.000	12.100	0.2452
PDA-1C	POST-DEVELOPMENT -100 YR	100	1,841.000	12.100	0.4990
PDA-1D	POST-DEVELOPMENT -1 YR	1	264.000	12.100	0.0751
PDA-1D	POST-DEVELOPMENT -10 YR	10	711.000	12.100	0.2033
PDA-1D	POST-DEVELOPMENT -100 YR	100	1,583.000	12.100	0.4377

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft^3)	Time to Peak (hours)	Peak Flow (ft^3/s)
DP-1	POST-DEVELOPMENT -1 YR	1	923.000	12.150	0.2360
DP-1	POST-DEVELOPMENT -10 YR	10	3,027.000	12.150	0.8598
DP-1	POST-DEVELOPMENT -100 YR	100	9,545.000	12.150	2.3188

Pond Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft^3)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft^3)
DW-1 (IN)	POST-DEVELOPMENT-1 YR	1	264.000	12.100	0.0751	(N/A)	(N/A)
DW-1 (OUT)	POST-DEVELOPMENT-1 YR	1	0.000	10.000	0.0000	85.33	628.000
DW-1 (IN)	POST-DEVELOPMENT-10 YR	10	711.000	12.100	0.2033	(N/A)	(N/A)
DW-1 (OUT)	POST-DEVELOPMENT-10 YR	10	0.000	0.000	0.0000	83.50	484.000
DW-1 (IN)	POST-DEVELOPMENT-100 YR	100	1,583.000	12.100	0.4377	(N/A)	(N/A)
DW-1 (OUT)	POST-DEVELOPMENT-100 YR	100	646.000	12.200	0.3447	85.63	652.000
DW-2 (IN)	POST-DEVELOPMENT-1 YR	1	351.000	12.100	0.1008	(N/A)	(N/A)
DW-2 (OUT)	POST-DEVELOPMENT-1 YR	1	0.000	0.000	0.0000	79.81	194.000
DW-2 (IN)	POST-DEVELOPMENT-10 YR	10	869.000	12.100	0.2452	(N/A)	(N/A)
DW-2 (OUT)	POST-DEVELOPMENT-10 YR	10	0.000	0.000	0.0000	85.19	617.000
DW-2 (IN)	POST-DEVELOPMENT-100 YR	100	2,487.000	12.200	0.6418	(N/A)	(N/A)
DW-2 (OUT)	POST-DEVELOPMENT-100 YR	100	1,533.000	12.250	0.5510	85.81	666.000
DW-3 (IN)	POST-DEVELOPMENT-1 YR	1	275.000	12.100	0.0790	(N/A)	(N/A)
DW-3 (OUT)	POST-DEVELOPMENT-1 YR	1	0.000	0.000	0.0000	79.11	139.000
DW-3 (IN)	POST-DEVELOPMENT-10 YR	10	696.000	12.100	0.1972	(N/A)	(N/A)

Subsection: Master Network Summary

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft^3)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft^3)
DW-3 (OUT)	POST-DEVELOPMENT-10 YR	10	0.000	0.000	0.0000	83.31	469.000
DW-3 (IN)	POST-DEVELOPMENT-100 YR	100	3,026.000	12.100	0.8227	(N/A)	(N/A)
DW-3 (OUT)	POST-DEVELOPMENT-100 YR	100	2,082.000	12.200	0.8569	85.88	671.000
IB-1 (IN)	POST-DEVELOPMENT-1 YR	1	332.000	12.150	0.0877	(N/A)	(N/A)
IB-1 (OUT)	POST-DEVELOPMENT-1 YR	1	0.000	0.000	0.0000	77.48	112.000
IB-1 (IN)	POST-DEVELOPMENT-10 YR	10	858.000	12.100	0.2253	(N/A)	(N/A)
IB-1 (OUT)	POST-DEVELOPMENT-10 YR	10	230.000	12.200	0.1540	77.92	214.000
IB-1 (IN)	POST-DEVELOPMENT-100 YR	100	3,946.000	12.200	1.2490	(N/A)	(N/A)
IB-1 (OUT)	POST-DEVELOPMENT-100 YR	100	2,889.000	12.250	0.9648	79.06	447.000

Time-Depth Curve: 1 YR	
Label	1 YR
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	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.0	0.0	0.0	0.0	0.0
1.500	0.0	0.0	0.0	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.1	0.1	0.1	0.1	0.1
3.500	0.1	0.1	0.1	0.1	0.1
4.000	0.1	0.1	0.1	0.1	0.1
4.500	0.1	0.1	0.1	0.2	0.2
5.000	0.2	0.2	0.2	0.2	0.2
5.500	0.2	0.2	0.2	0.2	0.2
6.000	0.2	0.2	0.2	0.2	0.2
6.500	0.2	0.2	0.2	0.2	0.2
7.000	0.3	0.3	0.3	0.3	0.3
7.500	0.3	0.3	0.3	0.3	0.3
8.000	0.3	0.3	0.3	0.3	0.4
8.500	0.4	0.4	0.4	0.4	0.4
9.000	0.4	0.4	0.4	0.4	0.5
9.500	0.5	0.5	0.5	0.5	0.5
10.000	0.5	0.5	0.6	0.6	0.6
10.500	0.6	0.6	0.6	0.7	0.7
11.000	0.7	0.7	0.8	0.8	0.8
11.500	0.8	0.9	1.0	1.1	1.2
12.000	1.4	1.6	1.8	1.9	1.9
12.500	2.0	2.0	2.0	2.1	2.1
13.000	2.1	2.1	2.2	2.2	2.2
13.500	2.2	2.2	2.2	2.3	2.3
14.000	2.3	2.3	2.3	2.3	2.3
14.500	2.4	2.4	2.4	2.4	2.4
15.000	2.4	2.4	2.4	2.4	2.4
15.500	2.5	2.5	2.5	2.5	2.5
16.000	2.5	2.5	2.5	2.5	2.5
16.500	2.5	2.5	2.5	2.6	2.6
17.000	2.6	2.6	2.6	2.6	2.6
17.500	2.6	2.6	2.6	2.6	2.6

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)
18.000	2.6	2.6	2.6	2.6	2.6
18.500	2.6	2.6	2.6	2.7	2.7
19.000	2.7	2.7	2.7	2.7	2.7
19.500	2.7	2.7	2.7	2.7	2.7
20.000	2.7	2.7	2.7	2.7	2.7
20.500	2.7	2.7	2.7	2.7	2.7
21.000	2.7	2.7	2.7	2.7	2.7
21.500	2.8	2.8	2.8	2.8	2.8
22.000	2.8	2.8	2.8	2.8	2.8
22.500	2.8	2.8	2.8	2.8	2.8
23.000	2.8	2.8	2.8	2.8	2.8
23.500	2.8	2.8	2.8	2.8	2.8
24.000	2.8	(N/A)	(N/A)	(N/A)	(N/A)

Time-Depth Curve: 10 YR	
Label	10 YR
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	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.0	0.0	0.0	0.0
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.1	0.1	0.1
2.000	0.1	0.1	0.1	0.1	0.1
2.500	0.1	0.1	0.1	0.1	0.1
3.000	0.2	0.2	0.2	0.2	0.2
3.500	0.2	0.2	0.2	0.2	0.2
4.000	0.2	0.2	0.2	0.2	0.2
4.500	0.3	0.3	0.3	0.3	0.3
5.000	0.3	0.3	0.3	0.3	0.3
5.500	0.3	0.3	0.3	0.3	0.4
6.000	0.4	0.4	0.4	0.4	0.4
6.500	0.4	0.4	0.4	0.4	0.4
7.000	0.5	0.5	0.5	0.5	0.5
7.500	0.5	0.5	0.5	0.6	0.6
8.000	0.6	0.6	0.6	0.6	0.6
8.500	0.6	0.7	0.7	0.7	0.7
9.000	0.7	0.8	0.8	0.8	0.8
9.500	0.8	0.9	0.9	0.9	0.9
10.000	1.0	1.0	1.0	1.0	1.1
10.500	1.1	1.1	1.2	1.2	1.2
11.000	1.3	1.3	1.3	1.4	1.4
11.500	1.5	1.6	1.7	1.9	2.1
12.000	2.5	3.0	3.2	3.3	3.5
12.500	3.6	3.6	3.7	3.7	3.8
13.000	3.8	3.8	3.9	3.9	3.9
13.500	4.0	4.0	4.0	4.1	4.1
14.000	4.1	4.1	4.2	4.2	4.2
14.500	4.2	4.2	4.3	4.3	4.3
15.000	4.3	4.3	4.4	4.4	4.4
15.500	4.4	4.4	4.4	4.5	4.5
16.000	4.5	4.5	4.5	4.5	4.5
16.500	4.5	4.6	4.6	4.6	4.6
17.000	4.6	4.6	4.6	4.6	4.6
17.500	4.7	4.7	4.7	4.7	4.7

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)
18.000	4.7	4.7	4.7	4.7	4.7
18.500	4.7	4.7	4.8	4.8	4.8
19.000	4.8	4.8	4.8	4.8	4.8
19.500	4.8	4.8	4.8	4.8	4.8
20.000	4.8	4.8	4.9	4.9	4.9
20.500	4.9	4.9	4.9	4.9	4.9
21.000	4.9	4.9	4.9	4.9	4.9
21.500	4.9	4.9	4.9	5.0	5.0
22.000	5.0	5.0	5.0	5.0	5.0
22.500	5.0	5.0	5.0	5.0	5.0
23.000	5.0	5.0	5.0	5.0	5.0
23.500	5.0	5.0	5.0	5.1	5.1
24.000	5.1	(N/A)	(N/A)	(N/A)	(N/A)

Time-Depth Curve: 100 YR	
Label	100 YR
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	0.0	0.0	0.0	0.0	0.0
0.500	0.0	0.1	0.1	0.1	0.1
1.000	0.1	0.1	0.1	0.1	0.1
1.500	0.1	0.1	0.2	0.2	0.2
2.000	0.2	0.2	0.2	0.2	0.2
2.500	0.2	0.2	0.2	0.3	0.3
3.000	0.3	0.3	0.3	0.3	0.3
3.500	0.3	0.3	0.3	0.4	0.4
4.000	0.4	0.4	0.4	0.4	0.4
4.500	0.4	0.5	0.5	0.5	0.5
5.000	0.5	0.5	0.5	0.5	0.6
5.500	0.6	0.6	0.6	0.6	0.6
6.000	0.6	0.7	0.7	0.7	0.7
6.500	0.7	0.7	0.8	0.8	0.8
7.000	0.8	0.8	0.8	0.9	0.9
7.500	0.9	0.9	0.9	1.0	1.0
8.000	1.0	1.0	1.1	1.1	1.1
8.500	1.1	1.2	1.2	1.2	1.3
9.000	1.3	1.3	1.4	1.4	1.4
9.500	1.5	1.5	1.6	1.6	1.6
10.000	1.7	1.7	1.8	1.8	1.9
10.500	1.9	2.0	2.0	2.1	2.2
11.000	2.2	2.3	2.4	2.5	2.6
11.500	2.7	2.8	3.0	3.3	3.7
12.000	4.4	5.2	5.6	5.9	6.1
12.500	6.2	6.3	6.4	6.5	6.6
13.000	6.7	6.7	6.8	6.9	6.9
13.500	7.0	7.0	7.1	7.1	7.2
14.000	7.2	7.3	7.3	7.3	7.4
14.500	7.4	7.5	7.5	7.5	7.6
15.000	7.6	7.6	7.7	7.7	7.7
15.500	7.8	7.8	7.8	7.8	7.9
16.000	7.9	7.9	7.9	8.0	8.0
16.500	8.0	8.0	8.0	8.1	8.1
17.000	8.1	8.1	8.1	8.1	8.2
17.500	8.2	8.2	8.2	8.2	8.2

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)
18.000	8.3	8.3	8.3	8.3	8.3
18.500	8.3	8.3	8.4	8.4	8.4
19.000	8.4	8.4	8.4	8.4	8.4
19.500	8.5	8.5	8.5	8.5	8.5
20.000	8.5	8.5	8.5	8.6	8.6
20.500	8.6	8.6	8.6	8.6	8.6
21.000	8.6	8.6	8.6	8.7	8.7
21.500	8.7	8.7	8.7	8.7	8.7
22.000	8.7	8.7	8.7	8.8	8.8
22.500	8.8	8.8	8.8	8.8	8.8
23.000	8.8	8.8	8.8	8.8	8.9
23.500	8.9	8.9	8.9	8.9	8.9
24.000	8.9	(N/A)	(N/A)	(N/A)	(N/A)

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	(N/A)
Slope	0.083 ft/ft
2 Year 24 Hour Depth	3.4 in
Average Velocity	0.21 ft/s
Segment Time of Concentration	0.130 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	12.00 ft
Is Paved?	True
Slope	0.042 ft/ft
Average Velocity	4.17 ft/s
Segment Time of Concentration	0.001 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.131 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

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	32.00 ft
Manning's n	(N/A)
Slope	0.259 ft/ft
2 Year 24 Hour Depth	3.4 in
Average Velocity	0.27 ft/s
Segment Time of Concentration	0.033 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 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

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	37.00 ft
Manning's n	(N/A)
Slope	0.230 ft/ft
2 Year 24 Hour Depth	3.4 in
Average Velocity	0.26 ft/s
Segment Time of Concentration	0.039 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 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

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	37.00 ft
Manning's n	(N/A)
Slope	0.048 ft/ft
2 Year 24 Hour Depth	3.4 in
Average Velocity	0.14 ft/s
Segment Time of Concentration	0.073 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 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

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	100.00 ft
Manning's n	(N/A)
Slope	0.083 ft/ft
2 Year 24 Hour Depth	3.4 in
Average Velocity	0.21 ft/s
Segment Time of Concentration	0.130 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	12.00 ft
Is Paved?	True
Slope	0.042 ft/ft
Average Velocity	4.17 ft/s
Segment Time of Concentration	0.001 hours

Segment #3: TR-55 Shallow Concentrated Flow	
Hydraulic Length	21.00 ft
Is Paved?	False
Slope	0.070 ft/ft
Average Velocity	4.27 ft/s
Segment Time of Concentration	0.001 hours

Segment #4: TR-55 Shallow Concentrated Flow	
Hydraulic Length	73.00 ft
Is Paved?	False
Slope	0.010 ft/ft
Average Velocity	1.61 ft/s
Segment Time of Concentration	0.013 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.145 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

Runoff Curve Number Data

Soil/Surface Description	CN	Area (ft^2)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	4,833.000	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	6,457.000	0.0	0.0	61.000
Woods - fair - Soil B	60.000	2,644.000	0.0	0.0	60.000
Impervious Areas - Gravel (w/ right-of-way) - Soil B	85.000	1.000	0.0	0.0	85.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	13,935.000	(N/A)	(N/A)	73.644

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	1,525.000	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	1,143.000	0.0	0.0	61.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	2,668.000	(N/A)	(N/A)	82.149

Runoff Curve Number Data

Soil/Surface Description	CN	Area (ft^2)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	1,934.000	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	1,298.000	0.0	0.0	61.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	3,232.000	(N/A)	(N/A)	83.140

Subsection: Runoff CN-Area
Label: PDA-1D

Return Event: 1 years
Storm Event: 1 YR

Runoff Curve Number Data

Soil/Surface Description	CN	Area (ft^2)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	1,421.000	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	1,572.000	0.0	0.0	61.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	2,993.000	(N/A)	(N/A)	78.567

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	1,691.000	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	1,500.000	0.0	0.0	61.000
Impervious Areas - Gravel (w/ right-of-way) - Soil B	85.000	204.000	0.0	0.0	85.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	3,395.000	(N/A)	(N/A)	80.871

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

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).

Storm Event	1 YR
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.131 hours
Area (User Defined)	13,935.000 ft²

Computational Time Increment	0.017 hours
Time to Peak (Computed)	12.134 hours
Flow (Peak, Computed)	0.2397 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	0.2360 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	13,935.000 ft²
Maximum Retention (Pervious)	3.5 in
Maximum Retention (Pervious, 20 percent)	0.7 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.8 in
Runoff Volume (Pervious)	924.525 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	923.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.131 hours
Computational Time Increment	0.017 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	2.7721 ft³/s
Unit peak time, Tp	0.087 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.349 hours
Total unit time, Tb	0.436 hours

Storm Event	1 YR
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.131 hours
Area (User Defined)	13,935.000 ft^2

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)
11.150	0.0006	0.0011	0.0016	0.0023	0.0030
11.400	0.0038	0.0047	0.0057	0.0073	0.0098
11.650	0.0134	0.0192	0.0263	0.0360	0.0471
11.900	0.0615	0.0883	0.1404	0.1894	0.2266
12.150	0.2360	0.1996	0.1686	0.1482	0.1332
12.400	0.1172	0.1025	0.0851	0.0717	0.0597
12.650	0.0523	0.0483	0.0459	0.0437	0.0420
12.900	0.0401	0.0384	0.0365	0.0349	0.0335
13.150	0.0326	0.0320	0.0315	0.0310	0.0306
13.400	0.0301	0.0297	0.0292	0.0288	0.0283
13.650	0.0279	0.0274	0.0269	0.0264	0.0260
13.900	0.0254	0.0250	0.0244	0.0240	0.0236
14.150	0.0233	0.0230	0.0228	0.0225	0.0223
14.400	0.0221	0.0219	0.0216	0.0214	0.0211
14.650	0.0209	0.0206	0.0204	0.0202	0.0199
14.900	0.0197	0.0194	0.0192	0.0189	0.0187
15.150	0.0184	0.0182	0.0179	0.0176	0.0174
15.400	0.0171	0.0169	0.0166	0.0163	0.0161
15.650	0.0158	0.0155	0.0152	0.0150	0.0147
15.900	0.0144	0.0142	0.0139	0.0136	0.0134
16.150	0.0132	0.0131	0.0130	0.0128	0.0127
16.400	0.0126	0.0125	0.0124	0.0123	0.0121
16.650	0.0120	0.0119	0.0118	0.0117	0.0115
16.900	0.0114	0.0113	0.0112	0.0111	0.0110
17.150	0.0108	0.0107	0.0106	0.0105	0.0104
17.400	0.0102	0.0101	0.0100	0.0099	0.0097
17.650	0.0096	0.0095	0.0094	0.0092	0.0091
17.900	0.0090	0.0089	0.0087	0.0086	0.0085
18.150	0.0084	0.0084	0.0084	0.0083	0.0083
18.400	0.0083	0.0082	0.0082	0.0081	0.0081
18.650	0.0081	0.0080	0.0080	0.0080	0.0079
18.900	0.0079	0.0079	0.0078	0.0078	0.0077
19.150	0.0077	0.0077	0.0077	0.0076	0.0076
19.400	0.0075	0.0075	0.0075	0.0074	0.0074
19.650	0.0074	0.0073	0.0073	0.0072	0.0072

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)
19.900	0.0072	0.0071	0.0071	0.0071	0.0070
20.150	0.0070	0.0070	0.0070	0.0069	0.0069
20.400	0.0069	0.0068	0.0068	0.0068	0.0068
20.650	0.0067	0.0067	0.0066	0.0066	0.0066
20.900	0.0066	0.0065	0.0065	0.0065	0.0065
21.150	0.0064	0.0064	0.0064	0.0064	0.0063
21.400	0.0063	0.0063	0.0062	0.0062	0.0062
21.650	0.0062	0.0061	0.0061	0.0061	0.0061
21.900	0.0060	0.0060	0.0060	0.0059	0.0059
22.150	0.0059	0.0058	0.0058	0.0058	0.0057
22.400	0.0057	0.0057	0.0057	0.0056	0.0056
22.650	0.0056	0.0056	0.0055	0.0055	0.0055
22.900	0.0054	0.0054	0.0054	0.0053	0.0053
23.150	0.0053	0.0053	0.0052	0.0052	0.0052
23.400	0.0052	0.0051	0.0051	0.0051	0.0050
23.650	0.0050	0.0050	0.0049	0.0049	0.0049
23.900	0.0048	0.0048	0.0048	(N/A)	(N/A)

Storm Event	10 YR
Return Event	10 years
Duration	24.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.131 hours
Area (User Defined)	13,935.000 ft²

Computational Time Increment	0.017 hours
Time to Peak (Computed)	12.134 hours
Flow (Peak, Computed)	0.7658 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.7500 ft³/s

Drainage Area

SCS CN (Composite)	74.000
Area (User Defined)	13,935.000 ft²
Maximum Retention (Pervious)	3.5 in
Maximum Retention (Pervious, 20 percent)	0.7 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	2.4 in
Runoff Volume (Pervious)	2,801.178 ft³

Hydrograph Volume (Area under Hydrograph curve)

Volume	2,797.000 ft³

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.131 hours
Computational Time Increment	0.017 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	2.7721 ft³/s
Unit peak time, Tp	0.087 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.349 hours
Total unit time, Tb	0.436 hours

Storm Event	10 YR
Return Event	10 years
Duration	24.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.131 hours
Area (User Defined)	13,935.000 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)
9.050	0.0009	0.0012	0.0015	0.0019	0.0022
9.300	0.0026	0.0030	0.0034	0.0038	0.0043
9.550	0.0047	0.0052	0.0056	0.0061	0.0066
9.800	0.0071	0.0076	0.0082	0.0087	0.0092
10.050	0.0098	0.0105	0.0111	0.0119	0.0126
10.300	0.0135	0.0143	0.0152	0.0161	0.0170
10.550	0.0180	0.0190	0.0200	0.0211	0.0221
10.800	0.0232	0.0244	0.0256	0.0267	0.0280
11.050	0.0294	0.0314	0.0336	0.0364	0.0393
11.300	0.0427	0.0459	0.0496	0.0532	0.0573
11.550	0.0646	0.0782	0.0966	0.1249	0.1550
11.800	0.1927	0.2308	0.2774	0.3647	0.5324
12.050	0.6684	0.7500	0.7440	0.6084	0.4994
12.300	0.4288	0.3783	0.3280	0.2837	0.2335
12.550	0.1954	0.1617	0.1410	0.1296	0.1226
12.800	0.1165	0.1115	0.1061	0.1014	0.0960
13.050	0.0917	0.0879	0.0853	0.0834	0.0820
13.300	0.0806	0.0794	0.0780	0.0768	0.0754
13.550	0.0742	0.0728	0.0716	0.0702	0.0690
13.800	0.0675	0.0663	0.0649	0.0636	0.0621
14.050	0.0610	0.0598	0.0589	0.0582	0.0575
14.300	0.0568	0.0562	0.0556	0.0550	0.0543
14.550	0.0537	0.0530	0.0524	0.0517	0.0511
14.800	0.0504	0.0498	0.0490	0.0484	0.0477
15.050	0.0471	0.0464	0.0457	0.0450	0.0444
15.300	0.0437	0.0430	0.0423	0.0417	0.0410
15.550	0.0403	0.0396	0.0389	0.0382	0.0375
15.800	0.0368	0.0362	0.0354	0.0348	0.0340
16.050	0.0335	0.0329	0.0325	0.0320	0.0317
16.300	0.0314	0.0312	0.0308	0.0305	0.0302
16.550	0.0300	0.0296	0.0293	0.0290	0.0288
16.800	0.0284	0.0281	0.0278	0.0275	0.0272
17.050	0.0269	0.0266	0.0263	0.0260	0.0257
17.300	0.0254	0.0251	0.0247	0.0244	0.0241
17.550	0.0239	0.0235	0.0232	0.0229	0.0226

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)
17.800	0.0223	0.0220	0.0217	0.0214	0.0210
18.050	0.0207	0.0205	0.0203	0.0202	0.0202
18.300	0.0200	0.0199	0.0199	0.0198	0.0197
18.550	0.0196	0.0195	0.0194	0.0193	0.0192
18.800	0.0191	0.0191	0.0189	0.0189	0.0188
19.050	0.0187	0.0186	0.0185	0.0184	0.0183
19.300	0.0182	0.0181	0.0180	0.0180	0.0179
19.550	0.0178	0.0177	0.0176	0.0175	0.0174
19.800	0.0173	0.0172	0.0171	0.0170	0.0169
20.050	0.0169	0.0167	0.0167	0.0166	0.0166
20.300	0.0165	0.0164	0.0163	0.0163	0.0162
20.550	0.0161	0.0161	0.0160	0.0159	0.0158
20.800	0.0158	0.0157	0.0156	0.0156	0.0155
21.050	0.0155	0.0154	0.0153	0.0152	0.0152
21.300	0.0151	0.0150	0.0150	0.0149	0.0148
21.550	0.0147	0.0147	0.0146	0.0145	0.0144
21.800	0.0144	0.0144	0.0143	0.0142	0.0141
22.050	0.0140	0.0140	0.0139	0.0138	0.0138
22.300	0.0136	0.0136	0.0135	0.0135	0.0134
22.550	0.0133	0.0133	0.0132	0.0131	0.0130
22.800	0.0130	0.0129	0.0128	0.0128	0.0127
23.050	0.0126	0.0125	0.0124	0.0124	0.0124
23.300	0.0122	0.0122	0.0121	0.0121	0.0120
23.550	0.0119	0.0118	0.0118	0.0117	0.0116
23.800	0.0116	0.0115	0.0114	0.0113	0.0112

Storm Event	100 YR
Return Event	100 years
Duration	24.000 hours
Depth	8.9 in
Time of Concentration (Composite)	0.131 hours
Area (User Defined)	13,935.000 ft²

Computational Time Increment	0.017 hours
Time to Peak (Computed)	12.116 hours
Flow (Peak, Computed)	1.8019 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	1.7808 ft³/s

Drainage Area

SCS CN (Composite)	74.000
Area (User Defined)	13,935.000 ft²
Maximum Retention (Pervious)	3.5 in
Maximum Retention (Pervious, 20 percent)	0.7 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	5.7 in
Runoff Volume (Pervious)	6,663.158 ft³

Hydrograph Volume (Area under Hydrograph curve)

Volume	6,656.000 ft³

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.131 hours
Computational Time Increment	0.017 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	2.7721 ft³/s
Unit peak time, Tp	0.087 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.349 hours
Total unit time, Tb	0.436 hours

Storm Event	100 YR
Return Event	100 years
Duration	24.000 hours
Depth	8.9 in
Time of Concentration (Composite)	0.131 hours
Area (User Defined)	13,935.000 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)
6.700	0.0010	0.0012	0.0015	0.0018	0.0021
6.950	0.0024	0.0027	0.0030	0.0034	0.0037
7.200	0.0040	0.0044	0.0048	0.0051	0.0055
7.450	0.0059	0.0063	0.0067	0.0071	0.0075
7.700	0.0080	0.0084	0.0088	0.0093	0.0097
7.950	0.0102	0.0107	0.0112	0.0117	0.0123
8.200	0.0130	0.0136	0.0144	0.0151	0.0159
8.450	0.0166	0.0175	0.0183	0.0191	0.0200
8.700	0.0209	0.0218	0.0228	0.0237	0.0247
8.950	0.0257	0.0267	0.0277	0.0289	0.0299
9.200	0.0311	0.0322	0.0334	0.0345	0.0357
9.450	0.0369	0.0382	0.0394	0.0407	0.0420
9.700	0.0433	0.0447	0.0460	0.0474	0.0488
9.950	0.0502	0.0516	0.0532	0.0550	0.0568
10.200	0.0591	0.0612	0.0636	0.0659	0.0685
10.450	0.0709	0.0735	0.0760	0.0787	0.0813
10.700	0.0841	0.0868	0.0897	0.0924	0.0954
10.950	0.0982	0.1013	0.1050	0.1103	0.1163
11.200	0.1244	0.1324	0.1415	0.1502	0.1600
11.450	0.1692	0.1797	0.1996	0.2377	0.2885
11.700	0.3655	0.4439	0.5394	0.6309	0.7399
11.950	0.9451	1.3373	1.6310	1.7808	1.7278
12.200	1.3906	1.1254	0.9551	0.8348	0.7185
12.450	0.6178	0.5062	0.4220	0.3483	0.3028
12.700	0.2777	0.2621	0.2486	0.2377	0.2258
12.950	0.2154	0.2036	0.1944	0.1860	0.1803
13.200	0.1761	0.1730	0.1698	0.1671	0.1641
13.450	0.1614	0.1584	0.1557	0.1527	0.1500
13.700	0.1469	0.1442	0.1411	0.1383	0.1353
13.950	0.1325	0.1294	0.1269	0.1244	0.1225
14.200	0.1209	0.1195	0.1180	0.1166	0.1152
14.450	0.1139	0.1124	0.1110	0.1096	0.1083
14.700	0.1068	0.1054	0.1040	0.1027	0.1011
14.950	0.0998	0.0983	0.0970	0.0955	0.0941
15.200	0.0926	0.0913	0.0897	0.0884	0.0869

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)
15.450	0.0856	0.0840	0.0827	0.0812	0.0798
15.700	0.0782	0.0769	0.0754	0.0740	0.0725
15.950	0.0711	0.0696	0.0684	0.0672	0.0663
16.200	0.0654	0.0648	0.0642	0.0636	0.0628
16.450	0.0622	0.0616	0.0611	0.0603	0.0597
16.700	0.0591	0.0586	0.0578	0.0572	0.0566
16.950	0.0560	0.0553	0.0547	0.0541	0.0535
17.200	0.0528	0.0521	0.0516	0.0510	0.0502
17.450	0.0496	0.0490	0.0484	0.0477	0.0471
17.700	0.0465	0.0459	0.0451	0.0445	0.0439
17.950	0.0433	0.0426	0.0420	0.0415	0.0412
18.200	0.0410	0.0408	0.0406	0.0404	0.0402
18.450	0.0400	0.0398	0.0396	0.0394	0.0393
18.700	0.0390	0.0389	0.0387	0.0385	0.0383
18.950	0.0381	0.0379	0.0378	0.0375	0.0373
19.200	0.0372	0.0370	0.0368	0.0366	0.0364
19.450	0.0363	0.0360	0.0358	0.0357	0.0355
19.700	0.0353	0.0351	0.0349	0.0347	0.0345
19.950	0.0343	0.0341	0.0340	0.0337	0.0336
20.200	0.0335	0.0334	0.0332	0.0330	0.0329
20.450	0.0327	0.0326	0.0325	0.0323	0.0322
20.700	0.0319	0.0318	0.0317	0.0316	0.0314
20.950	0.0313	0.0312	0.0311	0.0309	0.0307
21.200	0.0306	0.0304	0.0303	0.0302	0.0301
21.450	0.0299	0.0297	0.0295	0.0294	0.0293
21.700	0.0291	0.0290	0.0289	0.0288	0.0286
21.950	0.0284	0.0283	0.0281	0.0280	0.0279
22.200	0.0278	0.0276	0.0274	0.0272	0.0271
22.450	0.0270	0.0268	0.0267	0.0266	0.0265
22.700	0.0263	0.0261	0.0260	0.0258	0.0257
22.950	0.0256	0.0254	0.0253	0.0250	0.0249
23.200	0.0248	0.0247	0.0245	0.0244	0.0243
23.450	0.0242	0.0240	0.0238	0.0236	0.0235
23.700	0.0234	0.0233	0.0231	0.0230	0.0227
23.950	0.0226	0.0224	(N/A)	(N/A)	(N/A)

Storm Event	1 YR
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2,668.000 ft²

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.111 hours
Flow (Peak, Computed)	0.0796 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.0790 ft³/s

Drainage Area	
SCS CN (Composite)	82.000
Area (User Defined)	2,668.000 ft²
Maximum Retention (Pervious)	2.2 in
Maximum Retention (Pervious, 20 percent)	0.4 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.2 in
Runoff Volume (Pervious)	275.435 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	275.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.8328 ft³/s
Unit peak time, Tp	0.056 hours

Subsection: Unit Hydrograph Summary
Label: PDA-1B

Return Event: 1 years
Storm Event: 1 YR

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Storm Event	1 YR
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2,668.000 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)
10.300	0.0010	0.0011	0.0012	0.0013	0.0014
10.550	0.0015	0.0016	0.0017	0.0018	0.0019
10.800	0.0020	0.0021	0.0022	0.0023	0.0024
11.050	0.0026	0.0028	0.0030	0.0033	0.0036
11.300	0.0039	0.0043	0.0046	0.0050	0.0054
11.550	0.0065	0.0080	0.0104	0.0134	0.0168
11.800	0.0205	0.0247	0.0293	0.0442	0.0640
12.050	0.0731	0.0790	0.0677	0.0501	0.0430
12.300	0.0382	0.0338	0.0293	0.0247	0.0200
12.550	0.0168	0.0140	0.0129	0.0123	0.0118
12.800	0.0113	0.0108	0.0103	0.0098	0.0093
13.050	0.0089	0.0086	0.0084	0.0083	0.0082
13.300	0.0080	0.0079	0.0078	0.0077	0.0075
13.550	0.0074	0.0073	0.0071	0.0070	0.0069
13.800	0.0067	0.0066	0.0065	0.0063	0.0062
14.050	0.0061	0.0060	0.0059	0.0059	0.0058
14.300	0.0057	0.0057	0.0056	0.0055	0.0055
14.550	0.0054	0.0053	0.0053	0.0052	0.0051
14.800	0.0051	0.0050	0.0049	0.0049	0.0048
15.050	0.0047	0.0047	0.0046	0.0045	0.0045
15.300	0.0044	0.0043	0.0043	0.0042	0.0041
15.550	0.0041	0.0040	0.0039	0.0038	0.0038
15.800	0.0037	0.0036	0.0036	0.0035	0.0034
16.050	0.0034	0.0033	0.0033	0.0032	0.0032
16.300	0.0032	0.0032	0.0031	0.0031	0.0031
16.550	0.0030	0.0030	0.0030	0.0029	0.0029
16.800	0.0029	0.0028	0.0028	0.0028	0.0027
17.050	0.0027	0.0027	0.0027	0.0026	0.0026
17.300	0.0026	0.0025	0.0025	0.0025	0.0024
17.550	0.0024	0.0024	0.0023	0.0023	0.0023
17.800	0.0022	0.0022	0.0022	0.0022	0.0021
18.050	0.0021	0.0021	0.0021	0.0021	0.0021
18.300	0.0020	0.0020	0.0020	0.0020	0.0020
18.550	0.0020	0.0020	0.0020	0.0020	0.0020
18.800	0.0020	0.0019	0.0019	0.0019	0.0019

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)
19.050	0.0019	0.0019	0.0019	0.0019	0.0019
19.300	0.0019	0.0018	0.0018	0.0018	0.0018
19.550	0.0018	0.0018	0.0018	0.0018	0.0018
19.800	0.0018	0.0018	0.0017	0.0017	0.0017
20.050	0.0017	0.0017	0.0017	0.0017	0.0017
20.300	0.0017	0.0017	0.0017	0.0017	0.0017
20.550	0.0016	0.0016	0.0016	0.0016	0.0016
20.800	0.0016	0.0016	0.0016	0.0016	0.0016
21.050	0.0016	0.0016	0.0016	0.0016	0.0015
21.300	0.0015	0.0015	0.0015	0.0015	0.0015
21.550	0.0015	0.0015	0.0015	0.0015	0.0015
21.800	0.0015	0.0015	0.0015	0.0014	0.0014
22.050	0.0014	0.0014	0.0014	0.0014	0.0014
22.300	0.0014	0.0014	0.0014	0.0014	0.0014
22.550	0.0014	0.0014	0.0014	0.0013	0.0013
22.800	0.0013	0.0013	0.0013	0.0013	0.0013
23.050	0.0013	0.0013	0.0013	0.0013	0.0013
23.300	0.0012	0.0012	0.0012	0.0012	0.0012
23.550	0.0012	0.0012	0.0012	0.0012	0.0012
23.800	0.0012	0.0012	0.0012	0.0012	0.0012

Storm Event	10 YR
Return Event	10 years
Duration	24.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2,668.000 ft^2

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.111 hours
Flow (Peak, Computed)	0.1972 ft^3/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.1972 ft^3/s

Drainage Area

SCS CN (Composite)	82.000
Area (User Defined)	2,668.000 ft^2
Maximum Retention (Pervious)	2.2 in
Maximum Retention (Pervious, 20 percent)	0.4 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	3.1 in
Runoff Volume (Pervious)	696.524 ft^3

Hydrograph Volume (Area under Hydrograph curve)

Volume	696.000 ft^3

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.8328 ft^3/s
Unit peak time, Tp	0.056 hours

Subsection: Unit Hydrograph Summary
Label: PDA-1B

Return Event: 10 years
Storm Event: 10 YR

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Storm Event	10 YR
Return Event	10 years
Duration	24.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2,668.000 ft^2

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)
8.150	0.0010	0.0011	0.0012	0.0012	0.0013
8.400	0.0014	0.0015	0.0016	0.0016	0.0017
8.650	0.0018	0.0019	0.0020	0.0021	0.0022
8.900	0.0023	0.0024	0.0025	0.0026	0.0027
9.150	0.0028	0.0029	0.0031	0.0032	0.0033
9.400	0.0034	0.0035	0.0037	0.0038	0.0039
9.650	0.0041	0.0042	0.0044	0.0045	0.0046
9.900	0.0048	0.0049	0.0051	0.0053	0.0054
10.150	0.0057	0.0059	0.0061	0.0064	0.0066
10.400	0.0069	0.0071	0.0074	0.0077	0.0080
10.650	0.0082	0.0085	0.0088	0.0091	0.0094
10.900	0.0097	0.0100	0.0103	0.0109	0.0114
11.150	0.0122	0.0131	0.0140	0.0149	0.0159
11.400	0.0169	0.0179	0.0190	0.0226	0.0270
11.650	0.0345	0.0432	0.0525	0.0625	0.0730
11.900	0.0842	0.1225	0.1707	0.1882	0.1972
12.150	0.1652	0.1202	0.1016	0.0894	0.0785
12.400	0.0676	0.0567	0.0456	0.0382	0.0317
12.650	0.0293	0.0279	0.0267	0.0255	0.0243
12.900	0.0232	0.0220	0.0208	0.0200	0.0192
13.150	0.0188	0.0185	0.0182	0.0179	0.0176
13.400	0.0173	0.0170	0.0167	0.0164	0.0160
13.650	0.0157	0.0154	0.0151	0.0148	0.0145
13.900	0.0142	0.0139	0.0136	0.0133	0.0131
14.150	0.0129	0.0128	0.0126	0.0125	0.0123
14.400	0.0122	0.0120	0.0119	0.0117	0.0116
14.650	0.0114	0.0113	0.0111	0.0110	0.0108
14.900	0.0107	0.0105	0.0104	0.0102	0.0101
15.150	0.0099	0.0098	0.0096	0.0095	0.0093
15.400	0.0092	0.0090	0.0089	0.0087	0.0086
15.650	0.0084	0.0082	0.0081	0.0079	0.0078
15.900	0.0076	0.0075	0.0073	0.0072	0.0071
16.150	0.0070	0.0069	0.0069	0.0068	0.0067
16.400	0.0067	0.0066	0.0066	0.0065	0.0064
16.650	0.0063	0.0063	0.0062	0.0061	0.0061

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)
16.900	0.0060	0.0059	0.0059	0.0058	0.0057
17.150	0.0057	0.0056	0.0055	0.0055	0.0054
17.400	0.0053	0.0053	0.0052	0.0051	0.0050
17.650	0.0050	0.0049	0.0049	0.0048	0.0047
17.900	0.0047	0.0046	0.0045	0.0045	0.0044
18.150	0.0044	0.0044	0.0043	0.0043	0.0043
18.400	0.0043	0.0043	0.0042	0.0042	0.0042
18.650	0.0042	0.0042	0.0041	0.0041	0.0041
18.900	0.0041	0.0041	0.0041	0.0040	0.0040
19.150	0.0040	0.0040	0.0039	0.0039	0.0039
19.400	0.0039	0.0039	0.0038	0.0038	0.0038
19.650	0.0038	0.0038	0.0037	0.0037	0.0037
19.900	0.0037	0.0037	0.0036	0.0036	0.0036
20.150	0.0036	0.0036	0.0036	0.0035	0.0035
20.400	0.0035	0.0035	0.0035	0.0035	0.0035
20.650	0.0034	0.0034	0.0034	0.0034	0.0034
20.900	0.0034	0.0033	0.0033	0.0033	0.0033
21.150	0.0033	0.0033	0.0033	0.0032	0.0032
21.400	0.0032	0.0032	0.0032	0.0032	0.0032
21.650	0.0031	0.0031	0.0031	0.0031	0.0031
21.900	0.0031	0.0030	0.0030	0.0030	0.0030
22.150	0.0030	0.0030	0.0029	0.0029	0.0029
22.400	0.0029	0.0029	0.0029	0.0029	0.0029
22.650	0.0028	0.0028	0.0028	0.0028	0.0028
22.900	0.0027	0.0027	0.0027	0.0027	0.0027
23.150	0.0027	0.0027	0.0026	0.0026	0.0026
23.400	0.0026	0.0026	0.0026	0.0025	0.0025
23.650	0.0025	0.0025	0.0025	0.0025	0.0024
23.900	0.0024	0.0024	0.0024	(N/A)	(N/A)

Storm Event	100 YR
Return Event	100 years
Duration	24.000 hours
Depth	8.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2,668.000 ft²

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	0.4068 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.4068 ft³/s

Drainage Area	
SCS CN (Composite)	82.000
Area (User Defined)	2,668.000 ft²
Maximum Retention (Pervious)	2.2 in
Maximum Retention (Pervious, 20 percent)	0.4 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.7 in
Runoff Volume (Pervious)	1,493.645 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1,493.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.8328 ft³/s
Unit peak time, Tp	0.056 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Storm Event	100 YR
Return Event	100 years
Duration	24.000 hours
Depth	8.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2,668.000 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)
5.650	0.0010	0.0011	0.0011	0.0012	0.0012
5.900	0.0013	0.0013	0.0014	0.0014	0.0015
6.150	0.0015	0.0016	0.0017	0.0017	0.0018
6.400	0.0019	0.0020	0.0021	0.0021	0.0022
6.650	0.0023	0.0024	0.0025	0.0026	0.0027
6.900	0.0028	0.0028	0.0029	0.0030	0.0031
7.150	0.0032	0.0033	0.0034	0.0035	0.0037
7.400	0.0038	0.0039	0.0040	0.0041	0.0042
7.650	0.0043	0.0044	0.0046	0.0047	0.0048
7.900	0.0049	0.0050	0.0051	0.0053	0.0055
8.150	0.0057	0.0058	0.0061	0.0063	0.0065
8.400	0.0067	0.0069	0.0071	0.0074	0.0076
8.650	0.0078	0.0081	0.0083	0.0086	0.0088
8.900	0.0091	0.0093	0.0096	0.0099	0.0101
9.150	0.0104	0.0107	0.0110	0.0113	0.0115
9.400	0.0118	0.0121	0.0124	0.0127	0.0130
9.650	0.0133	0.0136	0.0139	0.0142	0.0146
9.900	0.0149	0.0152	0.0155	0.0159	0.0164
10.150	0.0169	0.0174	0.0180	0.0185	0.0191
10.400	0.0197	0.0202	0.0208	0.0214	0.0220
10.650	0.0226	0.0233	0.0239	0.0245	0.0251
10.900	0.0258	0.0264	0.0271	0.0282	0.0295
11.150	0.0313	0.0333	0.0354	0.0375	0.0396
11.400	0.0418	0.0440	0.0462	0.0546	0.0648
11.650	0.0819	0.1013	0.1215	0.1426	0.1644
11.900	0.1868	0.2667	0.3648	0.3948	0.4068
12.150	0.3366	0.2426	0.2037	0.1781	0.1557
12.400	0.1338	0.1119	0.0897	0.0751	0.0622
12.650	0.0574	0.0545	0.0521	0.0498	0.0475
12.900	0.0451	0.0428	0.0405	0.0388	0.0373
13.150	0.0365	0.0358	0.0352	0.0346	0.0340
13.400	0.0334	0.0328	0.0322	0.0316	0.0310
13.650	0.0304	0.0298	0.0292	0.0286	0.0280
13.900	0.0273	0.0267	0.0261	0.0256	0.0252
14.150	0.0248	0.0246	0.0243	0.0240	0.0237

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)
14.400	0.0234	0.0231	0.0228	0.0225	0.0222
14.650	0.0219	0.0216	0.0213	0.0211	0.0208
14.900	0.0204	0.0202	0.0199	0.0196	0.0193
15.150	0.0190	0.0187	0.0184	0.0181	0.0178
15.400	0.0175	0.0172	0.0169	0.0166	0.0163
15.650	0.0160	0.0157	0.0154	0.0151	0.0148
15.900	0.0145	0.0142	0.0140	0.0137	0.0135
16.150	0.0133	0.0132	0.0131	0.0130	0.0128
16.400	0.0127	0.0126	0.0125	0.0123	0.0122
16.650	0.0120	0.0119	0.0118	0.0116	0.0115
16.900	0.0114	0.0113	0.0111	0.0110	0.0109
17.150	0.0108	0.0106	0.0105	0.0104	0.0102
17.400	0.0101	0.0100	0.0099	0.0097	0.0096
17.650	0.0094	0.0093	0.0092	0.0090	0.0089
17.900	0.0088	0.0087	0.0085	0.0084	0.0083
18.150	0.0083	0.0083	0.0082	0.0082	0.0082
18.400	0.0081	0.0081	0.0080	0.0080	0.0080
18.650	0.0079	0.0079	0.0078	0.0078	0.0078
18.900	0.0077	0.0077	0.0077	0.0076	0.0076
19.150	0.0075	0.0075	0.0075	0.0074	0.0074
19.400	0.0073	0.0073	0.0073	0.0072	0.0072
19.650	0.0071	0.0071	0.0071	0.0070	0.0070
19.900	0.0069	0.0069	0.0069	0.0068	0.0068
20.150	0.0068	0.0068	0.0067	0.0067	0.0066
20.400	0.0066	0.0066	0.0066	0.0065	0.0065
20.650	0.0065	0.0064	0.0064	0.0064	0.0064
20.900	0.0063	0.0063	0.0063	0.0063	0.0062
21.150	0.0062	0.0062	0.0061	0.0061	0.0061
21.400	0.0060	0.0060	0.0060	0.0059	0.0059
21.650	0.0059	0.0058	0.0058	0.0058	0.0058
21.900	0.0057	0.0057	0.0057	0.0057	0.0056
22.150	0.0056	0.0056	0.0055	0.0055	0.0055
22.400	0.0055	0.0054	0.0054	0.0054	0.0054
22.650	0.0053	0.0053	0.0052	0.0052	0.0052
22.900	0.0052	0.0051	0.0051	0.0051	0.0050
23.150	0.0050	0.0050	0.0050	0.0049	0.0049
23.400	0.0049	0.0049	0.0048	0.0048	0.0047
23.650	0.0047	0.0047	0.0047	0.0046	0.0046
23.900	0.0045	0.0045	0.0045	(N/A)	(N/A)

Storm Event	1 YR
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	3,232.000 ft²

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.111 hours
Flow (Peak, Computed)	0.1014 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.1008 ft³/s

Drainage Area

SCS CN (Composite)	83.000
Area (User Defined)	3,232.000 ft²
Maximum Retention (Pervious)	2.0 in
Maximum Retention (Pervious, 20 percent)	0.4 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	1.3 in
Runoff Volume (Pervious)	350.962 ft³

Hydrograph Volume (Area under Hydrograph curve)

Volume	351.000 ft³

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.0088 ft³/s
Unit peak time, Tp	0.056 hours

Subsection: Unit Hydrograph Summary
Label: PDA-1C

Return Event: 1 years
Storm Event: 1 YR

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Storm Event	1 YR
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	3,232.000 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)
10.000	0.0010	0.0011	0.0012	0.0013	0.0014
10.250	0.0015	0.0016	0.0017	0.0018	0.0019
10.500	0.0020	0.0022	0.0023	0.0024	0.0025
10.750	0.0027	0.0028	0.0030	0.0031	0.0033
11.000	0.0034	0.0037	0.0039	0.0042	0.0046
11.250	0.0050	0.0054	0.0058	0.0063	0.0068
11.500	0.0073	0.0088	0.0107	0.0140	0.0178
11.750	0.0222	0.0270	0.0324	0.0383	0.0574
12.000	0.0825	0.0937	0.1008	0.0861	0.0636
12.250	0.0544	0.0482	0.0426	0.0370	0.0312
12.500	0.0251	0.0211	0.0176	0.0163	0.0155
12.750	0.0148	0.0142	0.0136	0.0130	0.0123
13.000	0.0117	0.0112	0.0108	0.0106	0.0104
13.250	0.0102	0.0101	0.0099	0.0098	0.0096
13.500	0.0094	0.0093	0.0091	0.0089	0.0088
13.750	0.0086	0.0084	0.0083	0.0081	0.0079
14.000	0.0078	0.0076	0.0075	0.0074	0.0073
14.250	0.0072	0.0071	0.0071	0.0070	0.0069
14.500	0.0068	0.0067	0.0067	0.0066	0.0065
14.750	0.0064	0.0063	0.0063	0.0062	0.0061
15.000	0.0060	0.0059	0.0058	0.0057	0.0057
15.250	0.0056	0.0055	0.0054	0.0053	0.0052
15.500	0.0051	0.0051	0.0050	0.0049	0.0048
15.750	0.0047	0.0046	0.0045	0.0044	0.0043
16.000	0.0043	0.0042	0.0041	0.0041	0.0040
16.250	0.0040	0.0040	0.0039	0.0039	0.0038
16.500	0.0038	0.0038	0.0037	0.0037	0.0037
16.750	0.0036	0.0036	0.0035	0.0035	0.0035
17.000	0.0034	0.0034	0.0034	0.0033	0.0033
17.250	0.0032	0.0032	0.0032	0.0031	0.0031
17.500	0.0030	0.0030	0.0030	0.0029	0.0029
17.750	0.0028	0.0028	0.0028	0.0027	0.0027
18.000	0.0026	0.0026	0.0026	0.0026	0.0026
18.250	0.0026	0.0025	0.0025	0.0025	0.0025
18.500	0.0025	0.0025	0.0025	0.0025	0.0024

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)
18.750	0.0024	0.0024	0.0024	0.0024	0.0024
19.000	0.0024	0.0024	0.0024	0.0023	0.0023
19.250	0.0023	0.0023	0.0023	0.0023	0.0023
19.500	0.0023	0.0023	0.0022	0.0022	0.0022
19.750	0.0022	0.0022	0.0022	0.0022	0.0022
20.000	0.0021	0.0021	0.0021	0.0021	0.0021
20.250	0.0021	0.0021	0.0021	0.0021	0.0021
20.500	0.0021	0.0020	0.0020	0.0020	0.0020
20.750	0.0020	0.0020	0.0020	0.0020	0.0020
21.000	0.0020	0.0020	0.0019	0.0019	0.0019
21.250	0.0019	0.0019	0.0019	0.0019	0.0019
21.500	0.0019	0.0019	0.0019	0.0019	0.0018
21.750	0.0018	0.0018	0.0018	0.0018	0.0018
22.000	0.0018	0.0018	0.0018	0.0018	0.0018
22.250	0.0017	0.0017	0.0017	0.0017	0.0017
22.500	0.0017	0.0017	0.0017	0.0017	0.0017
22.750	0.0017	0.0016	0.0016	0.0016	0.0016
23.000	0.0016	0.0016	0.0016	0.0016	0.0016
23.250	0.0016	0.0015	0.0015	0.0015	0.0015
23.500	0.0015	0.0015	0.0015	0.0015	0.0015
23.750	0.0015	0.0015	0.0015	0.0014	0.0014
24.000	0.0014	(N/A)	(N/A)	(N/A)	(N/A)

Storm Event	10 YR
Return Event	10 years
Duration	24.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	3,232.000 ft^2

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	0.2452 ft^3/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.2452 ft^3/s

Drainage Area

SCS CN (Composite)	83.000
Area (User Defined)	3,232.000 ft^2
Maximum Retention (Pervious)	2.0 in
Maximum Retention (Pervious, 20 percent)	0.4 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	3.2 in
Runoff Volume (Pervious)	869.526 ft^3

Hydrograph Volume (Area under Hydrograph curve)

Volume	869.000 ft^3

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.0088 ft^3/s
Unit peak time, Tp	0.056 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Storm Event	10 YR
Return Event	10 years
Duration	24.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	3,232.000 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)
7.750	0.0010	0.0011	0.0012	0.0012	0.0013
8.000	0.0013	0.0014	0.0015	0.0016	0.0017
8.250	0.0018	0.0018	0.0019	0.0020	0.0021
8.500	0.0022	0.0024	0.0025	0.0026	0.0027
8.750	0.0028	0.0029	0.0031	0.0032	0.0033
9.000	0.0035	0.0036	0.0037	0.0039	0.0040
9.250	0.0042	0.0043	0.0045	0.0046	0.0048
9.500	0.0050	0.0051	0.0053	0.0055	0.0057
9.750	0.0058	0.0060	0.0062	0.0064	0.0066
10.000	0.0067	0.0070	0.0072	0.0075	0.0078
10.250	0.0081	0.0084	0.0087	0.0090	0.0093
10.500	0.0097	0.0100	0.0104	0.0107	0.0111
10.750	0.0114	0.0118	0.0122	0.0126	0.0130
11.000	0.0134	0.0140	0.0147	0.0157	0.0168
11.250	0.0180	0.0192	0.0204	0.0216	0.0229
11.500	0.0242	0.0288	0.0344	0.0439	0.0548
11.750	0.0665	0.0789	0.0921	0.1059	0.1536
12.000	0.2134	0.2346	0.2452	0.2050	0.1489
12.250	0.1258	0.1105	0.0970	0.0836	0.0701
12.500	0.0563	0.0472	0.0391	0.0361	0.0344
12.750	0.0329	0.0314	0.0300	0.0285	0.0271
13.000	0.0256	0.0246	0.0236	0.0231	0.0227
13.250	0.0224	0.0220	0.0216	0.0212	0.0209
13.500	0.0205	0.0201	0.0197	0.0194	0.0190
13.750	0.0186	0.0182	0.0179	0.0175	0.0171
14.000	0.0167	0.0164	0.0161	0.0159	0.0157
14.250	0.0155	0.0153	0.0152	0.0150	0.0148
14.500	0.0146	0.0144	0.0143	0.0141	0.0139
14.750	0.0137	0.0135	0.0133	0.0131	0.0130
15.000	0.0128	0.0126	0.0124	0.0122	0.0120
15.250	0.0118	0.0116	0.0115	0.0113	0.0111
15.500	0.0109	0.0107	0.0105	0.0103	0.0101
15.750	0.0099	0.0098	0.0096	0.0094	0.0092
16.000	0.0090	0.0089	0.0087	0.0086	0.0085
16.250	0.0084	0.0084	0.0083	0.0082	0.0081

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)
16.500	0.0080	0.0079	0.0079	0.0078	0.0077
16.750	0.0076	0.0075	0.0074	0.0074	0.0073
17.000	0.0072	0.0071	0.0070	0.0070	0.0069
17.250	0.0068	0.0067	0.0066	0.0065	0.0065
17.500	0.0064	0.0063	0.0062	0.0061	0.0060
17.750	0.0060	0.0059	0.0058	0.0057	0.0056
18.000	0.0055	0.0055	0.0054	0.0054	0.0054
18.250	0.0053	0.0053	0.0053	0.0053	0.0052
18.500	0.0052	0.0052	0.0052	0.0051	0.0051
18.750	0.0051	0.0051	0.0050	0.0050	0.0050
19.000	0.0050	0.0049	0.0049	0.0049	0.0049
19.250	0.0048	0.0048	0.0048	0.0048	0.0047
19.500	0.0047	0.0047	0.0047	0.0046	0.0046
19.750	0.0046	0.0046	0.0045	0.0045	0.0045
20.000	0.0045	0.0044	0.0044	0.0044	0.0044
20.250	0.0044	0.0043	0.0043	0.0043	0.0043
20.500	0.0043	0.0043	0.0042	0.0042	0.0042
20.750	0.0042	0.0042	0.0041	0.0041	0.0041
21.000	0.0041	0.0041	0.0040	0.0040	0.0040
21.250	0.0040	0.0040	0.0040	0.0039	0.0039
21.500	0.0039	0.0039	0.0039	0.0038	0.0038
21.750	0.0038	0.0038	0.0038	0.0037	0.0037
22.000	0.0037	0.0037	0.0037	0.0036	0.0036
22.250	0.0036	0.0036	0.0036	0.0036	0.0035
22.500	0.0035	0.0035	0.0035	0.0035	0.0034
22.750	0.0034	0.0034	0.0034	0.0034	0.0033
23.000	0.0033	0.0033	0.0033	0.0033	0.0033
23.250	0.0032	0.0032	0.0032	0.0032	0.0032
23.500	0.0031	0.0031	0.0031	0.0031	0.0031
23.750	0.0030	0.0030	0.0030	0.0030	0.0030
24.000	0.0030	(N/A)	(N/A)	(N/A)	(N/A)

Storm Event	100 YR
Return Event	100 years
Duration	24.000 hours
Depth	8.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	3,232.000 ft²

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	0.4990 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.4990 ft³/s

Drainage Area

SCS CN (Composite)	83.000
Area (User Defined)	3,232.000 ft²
Maximum Retention (Pervious)	2.0 in
Maximum Retention (Pervious, 20 percent)	0.4 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	6.8 in
Runoff Volume (Pervious)	1,842.305 ft³

Hydrograph Volume (Area under Hydrograph curve)

Volume	1,841.000 ft³

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.0088 ft³/s
Unit peak time, Tp	0.056 hours

Subsection: Unit Hydrograph Summary
Label: PDA-1C

Return Event: 100 years
Storm Event: 100 YR

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Storm Event	100 YR
Return Event	100 years
Duration	24.000 hours
Depth	8.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	3,232.000 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)
5.200	0.0010	0.0011	0.0011	0.0012	0.0012
5.450	0.0013	0.0014	0.0014	0.0015	0.0015
5.700	0.0016	0.0017	0.0017	0.0018	0.0018
5.950	0.0019	0.0020	0.0020	0.0021	0.0022
6.200	0.0023	0.0024	0.0025	0.0026	0.0027
6.450	0.0028	0.0029	0.0030	0.0031	0.0032
6.700	0.0033	0.0034	0.0035	0.0036	0.0038
6.950	0.0039	0.0040	0.0041	0.0043	0.0044
7.200	0.0045	0.0046	0.0048	0.0049	0.0050
7.450	0.0052	0.0053	0.0055	0.0056	0.0057
7.700	0.0059	0.0060	0.0062	0.0063	0.0065
7.950	0.0066	0.0068	0.0070	0.0072	0.0074
8.200	0.0077	0.0079	0.0082	0.0085	0.0087
8.450	0.0090	0.0093	0.0096	0.0099	0.0102
8.700	0.0105	0.0108	0.0111	0.0114	0.0117
8.950	0.0121	0.0124	0.0127	0.0131	0.0134
9.200	0.0137	0.0141	0.0144	0.0148	0.0151
9.450	0.0155	0.0159	0.0162	0.0166	0.0170
9.700	0.0174	0.0177	0.0181	0.0185	0.0189
9.950	0.0193	0.0197	0.0202	0.0207	0.0213
10.200	0.0220	0.0227	0.0234	0.0241	0.0248
10.450	0.0255	0.0262	0.0270	0.0277	0.0285
10.700	0.0292	0.0300	0.0308	0.0315	0.0323
10.950	0.0331	0.0339	0.0353	0.0369	0.0392
11.200	0.0416	0.0442	0.0468	0.0494	0.0521
11.450	0.0548	0.0575	0.0679	0.0806	0.1017
11.700	0.1256	0.1506	0.1766	0.2032	0.2306
11.950	0.3287	0.4489	0.4851	0.4990	0.4125
12.200	0.2971	0.2493	0.2178	0.1904	0.1635
12.450	0.1368	0.1096	0.0918	0.0760	0.0701
12.700	0.0666	0.0636	0.0608	0.0579	0.0551
12.950	0.0523	0.0494	0.0474	0.0455	0.0445
13.200	0.0437	0.0430	0.0422	0.0415	0.0408
13.450	0.0400	0.0393	0.0386	0.0378	0.0371
13.700	0.0363	0.0356	0.0348	0.0341	0.0334

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)
13.950	0.0326	0.0319	0.0313	0.0307	0.0303
14.200	0.0299	0.0296	0.0292	0.0289	0.0285
14.450	0.0282	0.0278	0.0274	0.0271	0.0267
14.700	0.0264	0.0260	0.0257	0.0253	0.0249
14.950	0.0246	0.0242	0.0239	0.0235	0.0231
15.200	0.0228	0.0224	0.0220	0.0217	0.0213
15.450	0.0210	0.0206	0.0202	0.0199	0.0195
15.700	0.0192	0.0188	0.0185	0.0181	0.0177
15.950	0.0174	0.0170	0.0167	0.0165	0.0163
16.200	0.0161	0.0159	0.0158	0.0156	0.0154
16.450	0.0153	0.0152	0.0150	0.0148	0.0147
16.700	0.0145	0.0144	0.0142	0.0140	0.0139
16.950	0.0137	0.0135	0.0134	0.0133	0.0131
17.200	0.0129	0.0128	0.0126	0.0125	0.0123
17.450	0.0121	0.0120	0.0118	0.0117	0.0115
17.700	0.0114	0.0112	0.0110	0.0109	0.0107
17.950	0.0106	0.0104	0.0103	0.0102	0.0101
18.200	0.0101	0.0100	0.0100	0.0099	0.0099
18.450	0.0098	0.0098	0.0097	0.0097	0.0096
18.700	0.0096	0.0095	0.0095	0.0095	0.0094
18.950	0.0094	0.0093	0.0093	0.0092	0.0092
19.200	0.0091	0.0091	0.0090	0.0090	0.0089
19.450	0.0089	0.0088	0.0088	0.0088	0.0087
19.700	0.0086	0.0086	0.0086	0.0085	0.0085
19.950	0.0084	0.0084	0.0083	0.0083	0.0082
20.200	0.0082	0.0082	0.0081	0.0081	0.0081
20.450	0.0080	0.0080	0.0080	0.0079	0.0079
20.700	0.0078	0.0078	0.0078	0.0078	0.0077
20.950	0.0077	0.0077	0.0076	0.0076	0.0075
21.200	0.0075	0.0075	0.0074	0.0074	0.0074
21.450	0.0073	0.0072	0.0072	0.0072	0.0072
21.700	0.0071	0.0071	0.0071	0.0071	0.0070
21.950	0.0070	0.0069	0.0069	0.0069	0.0068
22.200	0.0068	0.0067	0.0067	0.0067	0.0067
22.450	0.0066	0.0065	0.0065	0.0065	0.0065
22.700	0.0064	0.0064	0.0063	0.0063	0.0063
22.950	0.0063	0.0062	0.0062	0.0061	0.0061
23.200	0.0061	0.0060	0.0060	0.0060	0.0060
23.450	0.0059	0.0058	0.0058	0.0058	0.0057
23.700	0.0057	0.0057	0.0056	0.0056	0.0055
23.950	0.0055	0.0055	(N/A)	(N/A)	(N/A)

Storm Event	1 YR
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2,993.000 ft²

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.111 hours
Flow (Peak, Computed)	0.0758 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.0751 ft³/s

Drainage Area	
SCS CN (Composite)	79.000
Area (User Defined)	2,993.000 ft²
Maximum Retention (Pervious)	2.7 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.1 in
Runoff Volume (Pervious)	264.038 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	264.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.9342 ft³/s
Unit peak time, Tp	0.056 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Storm Event	1 YR
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2,993.000 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)
10.750	0.0010	0.0011	0.0012	0.0013	0.0014
11.000	0.0015	0.0017	0.0018	0.0021	0.0023
11.250	0.0025	0.0028	0.0031	0.0034	0.0037
11.500	0.0041	0.0051	0.0063	0.0084	0.0109
11.750	0.0139	0.0174	0.0214	0.0258	0.0398
12.000	0.0587	0.0683	0.0751	0.0651	0.0486
12.250	0.0420	0.0375	0.0333	0.0290	0.0245
12.500	0.0198	0.0167	0.0139	0.0129	0.0123
12.750	0.0118	0.0113	0.0108	0.0103	0.0098
13.000	0.0093	0.0090	0.0086	0.0085	0.0083
13.250	0.0082	0.0081	0.0080	0.0079	0.0077
13.500	0.0076	0.0075	0.0074	0.0072	0.0071
13.750	0.0070	0.0068	0.0067	0.0066	0.0064
14.000	0.0063	0.0062	0.0061	0.0060	0.0059
14.250	0.0059	0.0058	0.0057	0.0057	0.0056
14.500	0.0056	0.0055	0.0054	0.0054	0.0053
14.750	0.0052	0.0052	0.0051	0.0050	0.0050
15.000	0.0049	0.0048	0.0048	0.0047	0.0046
15.250	0.0046	0.0045	0.0044	0.0044	0.0043
15.500	0.0042	0.0041	0.0041	0.0040	0.0039
15.750	0.0039	0.0038	0.0037	0.0036	0.0036
16.000	0.0035	0.0034	0.0034	0.0034	0.0033
16.250	0.0033	0.0033	0.0032	0.0032	0.0032
16.500	0.0031	0.0031	0.0031	0.0030	0.0030
16.750	0.0030	0.0029	0.0029	0.0029	0.0029
17.000	0.0028	0.0028	0.0028	0.0027	0.0027
17.250	0.0027	0.0026	0.0026	0.0026	0.0025
17.500	0.0025	0.0025	0.0024	0.0024	0.0024
17.750	0.0024	0.0023	0.0023	0.0023	0.0022
18.000	0.0022	0.0022	0.0021	0.0021	0.0021
18.250	0.0021	0.0021	0.0021	0.0021	0.0021
18.500	0.0021	0.0021	0.0020	0.0020	0.0020
18.750	0.0020	0.0020	0.0020	0.0020	0.0020
19.000	0.0020	0.0020	0.0020	0.0019	0.0019
19.250	0.0019	0.0019	0.0019	0.0019	0.0019

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)
19.500	0.0019	0.0019	0.0019	0.0018	0.0018
19.750	0.0018	0.0018	0.0018	0.0018	0.0018
20.000	0.0018	0.0018	0.0018	0.0018	0.0018
20.250	0.0017	0.0017	0.0017	0.0017	0.0017
20.500	0.0017	0.0017	0.0017	0.0017	0.0017
20.750	0.0017	0.0017	0.0017	0.0016	0.0016
21.000	0.0016	0.0016	0.0016	0.0016	0.0016
21.250	0.0016	0.0016	0.0016	0.0016	0.0016
21.500	0.0016	0.0016	0.0016	0.0015	0.0015
21.750	0.0015	0.0015	0.0015	0.0015	0.0015
22.000	0.0015	0.0015	0.0015	0.0015	0.0015
22.250	0.0015	0.0014	0.0014	0.0014	0.0014
22.500	0.0014	0.0014	0.0014	0.0014	0.0014
22.750	0.0014	0.0014	0.0014	0.0014	0.0014
23.000	0.0013	0.0013	0.0013	0.0013	0.0013
23.250	0.0013	0.0013	0.0013	0.0013	0.0013
23.500	0.0013	0.0013	0.0013	0.0012	0.0012
23.750	0.0012	0.0012	0.0012	0.0012	0.0012
24.000	0.0012	(N/A)	(N/A)	(N/A)	(N/A)

Storm Event	10 YR
Return Event	10 years
Duration	24.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2,993.000 ft²

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.111 hours
Flow (Peak, Computed)	0.2037 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.2033 ft³/s

Drainage Area

SCS CN (Composite)	79.000
Area (User Defined)	2,993.000 ft²
Maximum Retention (Pervious)	2.7 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	2.9 in
Runoff Volume (Pervious)	711.678 ft³

Hydrograph Volume (Area under Hydrograph curve)

Volume	711.000 ft³

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.9342 ft³/s
Unit peak time, Tp	0.056 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Storm Event	10 YR
Return Event	10 years
Duration	24.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2,993.000 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)
8.600	0.0010	0.0011	0.0011	0.0012	0.0013
8.850	0.0014	0.0015	0.0016	0.0017	0.0018
9.100	0.0019	0.0020	0.0021	0.0022	0.0023
9.350	0.0025	0.0026	0.0027	0.0028	0.0029
9.600	0.0031	0.0032	0.0033	0.0035	0.0036
9.850	0.0038	0.0039	0.0041	0.0042	0.0044
10.100	0.0046	0.0048	0.0050	0.0052	0.0055
10.350	0.0057	0.0060	0.0062	0.0065	0.0067
10.600	0.0070	0.0073	0.0076	0.0079	0.0082
10.850	0.0085	0.0088	0.0091	0.0094	0.0099
11.100	0.0105	0.0113	0.0121	0.0130	0.0139
11.350	0.0149	0.0159	0.0169	0.0180	0.0215
11.600	0.0259	0.0332	0.0417	0.0511	0.0612
11.850	0.0721	0.0838	0.1229	0.1729	0.1924
12.100	0.2033	0.1713	0.1252	0.1063	0.0937
12.350	0.0824	0.0712	0.0598	0.0481	0.0404
12.600	0.0335	0.0310	0.0295	0.0282	0.0270
12.850	0.0258	0.0246	0.0233	0.0221	0.0212
13.100	0.0204	0.0200	0.0196	0.0193	0.0190
13.350	0.0187	0.0184	0.0180	0.0177	0.0174
13.600	0.0171	0.0168	0.0164	0.0161	0.0158
13.850	0.0155	0.0151	0.0148	0.0145	0.0142
14.100	0.0140	0.0138	0.0136	0.0135	0.0133
14.350	0.0132	0.0130	0.0129	0.0127	0.0126
14.600	0.0124	0.0122	0.0121	0.0119	0.0118
14.850	0.0116	0.0114	0.0113	0.0111	0.0110
15.100	0.0108	0.0106	0.0105	0.0103	0.0102
15.350	0.0100	0.0098	0.0097	0.0095	0.0093
15.600	0.0092	0.0090	0.0088	0.0087	0.0085
15.850	0.0084	0.0082	0.0080	0.0079	0.0077
16.100	0.0076	0.0075	0.0074	0.0074	0.0073
16.350	0.0072	0.0072	0.0071	0.0070	0.0070
16.600	0.0069	0.0068	0.0067	0.0067	0.0066
16.850	0.0065	0.0065	0.0064	0.0063	0.0062
17.100	0.0062	0.0061	0.0060	0.0059	0.0059

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)
17.350	0.0058	0.0057	0.0057	0.0056	0.0055
17.600	0.0054	0.0054	0.0053	0.0052	0.0051
17.850	0.0051	0.0050	0.0049	0.0048	0.0048
18.100	0.0047	0.0047	0.0047	0.0047	0.0047
18.350	0.0046	0.0046	0.0046	0.0046	0.0045
18.600	0.0045	0.0045	0.0045	0.0045	0.0044
18.850	0.0044	0.0044	0.0044	0.0044	0.0043
19.100	0.0043	0.0043	0.0043	0.0043	0.0042
19.350	0.0042	0.0042	0.0042	0.0041	0.0041
19.600	0.0041	0.0041	0.0040	0.0040	0.0040
19.850	0.0040	0.0040	0.0039	0.0039	0.0039
20.100	0.0039	0.0039	0.0039	0.0038	0.0038
20.350	0.0038	0.0038	0.0038	0.0038	0.0037
20.600	0.0037	0.0037	0.0037	0.0037	0.0037
20.850	0.0036	0.0036	0.0036	0.0036	0.0036
21.100	0.0036	0.0035	0.0035	0.0035	0.0035
21.350	0.0035	0.0035	0.0034	0.0034	0.0034
21.600	0.0034	0.0034	0.0034	0.0033	0.0033
21.850	0.0033	0.0033	0.0033	0.0033	0.0032
22.100	0.0032	0.0032	0.0032	0.0032	0.0031
22.350	0.0031	0.0031	0.0031	0.0031	0.0031
22.600	0.0031	0.0031	0.0030	0.0030	0.0030
22.850	0.0030	0.0030	0.0029	0.0029	0.0029
23.100	0.0029	0.0029	0.0029	0.0028	0.0028
23.350	0.0028	0.0028	0.0028	0.0028	0.0027
23.600	0.0027	0.0027	0.0027	0.0027	0.0027
23.850	0.0026	0.0026	0.0026	0.0026	(N/A)

Storm Event	100 YR
Return Event	100 years
Duration	24.000 hours
Depth	8.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2,993.000 ft²

Computational Time Increment	0.011 hours
Time to Peak (Computed)	12.100 hours
Flow (Peak, Computed)	0.4377 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.4377 ft³/s

Drainage Area	
SCS CN (Composite)	79.000
Area (User Defined)	2,993.000 ft²
Maximum Retention (Pervious)	2.7 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	6.4 in
Runoff Volume (Pervious)	1,584.035 ft³

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1,583.000 ft³

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.9342 ft³/s
Unit peak time, Tp	0.056 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.222 hours
Total unit time, Tb	0.278 hours

Storm Event	100 YR
Return Event	100 years
Duration	24.000 hours
Depth	8.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	2,993.000 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)
6.250	0.0010	0.0011	0.0011	0.0012	0.0013
6.500	0.0013	0.0014	0.0015	0.0016	0.0017
6.750	0.0017	0.0018	0.0019	0.0020	0.0021
7.000	0.0022	0.0023	0.0024	0.0025	0.0026
7.250	0.0027	0.0028	0.0029	0.0030	0.0031
7.500	0.0032	0.0033	0.0034	0.0035	0.0037
7.750	0.0038	0.0039	0.0040	0.0041	0.0043
8.000	0.0044	0.0045	0.0047	0.0049	0.0051
8.250	0.0053	0.0055	0.0057	0.0059	0.0061
8.500	0.0063	0.0066	0.0068	0.0070	0.0073
8.750	0.0075	0.0078	0.0080	0.0083	0.0086
9.000	0.0088	0.0091	0.0094	0.0097	0.0099
9.250	0.0102	0.0105	0.0108	0.0111	0.0114
9.500	0.0117	0.0121	0.0124	0.0127	0.0130
9.750	0.0133	0.0137	0.0140	0.0144	0.0147
10.000	0.0150	0.0155	0.0159	0.0164	0.0170
10.250	0.0176	0.0182	0.0188	0.0194	0.0200
10.500	0.0206	0.0212	0.0219	0.0225	0.0232
10.750	0.0238	0.0245	0.0252	0.0259	0.0266
11.000	0.0273	0.0285	0.0298	0.0317	0.0338
11.250	0.0360	0.0382	0.0405	0.0428	0.0451
11.500	0.0475	0.0562	0.0669	0.0848	0.1051
11.750	0.1267	0.1492	0.1727	0.1970	0.2827
12.000	0.3887	0.4229	0.4377	0.3634	0.2626
12.250	0.2209	0.1935	0.1693	0.1456	0.1219
12.500	0.0978	0.0819	0.0679	0.0626	0.0595
12.750	0.0569	0.0543	0.0518	0.0493	0.0468
13.000	0.0443	0.0424	0.0408	0.0399	0.0392
13.250	0.0385	0.0379	0.0372	0.0366	0.0359
13.500	0.0353	0.0346	0.0340	0.0333	0.0326
13.750	0.0320	0.0313	0.0306	0.0300	0.0293
14.000	0.0286	0.0281	0.0276	0.0272	0.0269
14.250	0.0266	0.0263	0.0260	0.0257	0.0253
14.500	0.0250	0.0247	0.0244	0.0241	0.0237
14.750	0.0234	0.0231	0.0228	0.0225	0.0221

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)
15.000	0.0218	0.0215	0.0212	0.0209	0.0205
15.250	0.0202	0.0199	0.0196	0.0192	0.0189
15.500	0.0186	0.0183	0.0179	0.0176	0.0173
15.750	0.0170	0.0166	0.0163	0.0160	0.0157
16.000	0.0153	0.0151	0.0149	0.0147	0.0145
16.250	0.0144	0.0143	0.0141	0.0139	0.0138
16.500	0.0137	0.0135	0.0134	0.0132	0.0131
16.750	0.0130	0.0128	0.0127	0.0126	0.0124
17.000	0.0122	0.0121	0.0120	0.0118	0.0117
17.250	0.0115	0.0114	0.0113	0.0111	0.0110
17.500	0.0109	0.0107	0.0105	0.0104	0.0103
17.750	0.0101	0.0100	0.0098	0.0097	0.0096
18.000	0.0094	0.0093	0.0092	0.0091	0.0091
18.250	0.0091	0.0090	0.0090	0.0089	0.0089
18.500	0.0088	0.0088	0.0088	0.0087	0.0087
18.750	0.0086	0.0086	0.0086	0.0085	0.0085
19.000	0.0084	0.0084	0.0083	0.0083	0.0083
19.250	0.0082	0.0082	0.0081	0.0081	0.0080
19.500	0.0080	0.0080	0.0079	0.0079	0.0078
19.750	0.0078	0.0078	0.0077	0.0076	0.0076
20.000	0.0076	0.0075	0.0075	0.0075	0.0075
20.250	0.0074	0.0074	0.0073	0.0073	0.0073
20.500	0.0072	0.0072	0.0072	0.0071	0.0071
20.750	0.0071	0.0071	0.0070	0.0070	0.0070
21.000	0.0069	0.0069	0.0068	0.0068	0.0068
21.250	0.0068	0.0067	0.0067	0.0067	0.0066
21.500	0.0066	0.0066	0.0065	0.0065	0.0064
21.750	0.0064	0.0064	0.0064	0.0063	0.0063
22.000	0.0063	0.0062	0.0062	0.0062	0.0062
22.250	0.0061	0.0060	0.0060	0.0060	0.0060
22.500	0.0059	0.0059	0.0059	0.0059	0.0058
22.750	0.0058	0.0058	0.0057	0.0057	0.0057
23.000	0.0056	0.0056	0.0055	0.0055	0.0055
23.250	0.0055	0.0054	0.0054	0.0054	0.0054
23.500	0.0053	0.0053	0.0052	0.0052	0.0052
23.750	0.0051	0.0051	0.0051	0.0050	0.0050
24.000	0.0050	(N/A)	(N/A)	(N/A)	(N/A)

Storm Event	1 YR
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.145 hours
Area (User Defined)	3,395.000 ft²

Computational Time Increment	0.019 hours
Time to Peak (Computed)	12.134 hours
Flow (Peak, Computed)	0.0890 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.150 hours
Flow (Peak Interpolated Output)	0.0877 ft³/s

Drainage Area

SCS CN (Composite)	81.000
Area (User Defined)	3,395.000 ft²
Maximum Retention (Pervious)	2.3 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	1.2 in
Runoff Volume (Pervious)	332.917 ft³

Hydrograph Volume (Area under Hydrograph curve)

Volume	332.000 ft³

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.145 hours
Computational Time Increment	0.019 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.6103 ft³/s
Unit peak time, Tp	0.096 hours

Subsection: Unit Hydrograph Summary
Label: PDA-1E

Return Event: 1 years
Storm Event: 1 YR

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.386 hours
Total unit time, Tb	0.482 hours

Storm Event	1 YR
Return Event	1 years
Duration	24.000 hours
Depth	2.8 in
Time of Concentration (Composite)	0.145 hours
Area (User Defined)	3,395.000 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)
10.350	0.0010	0.0011	0.0011	0.0012	0.0014
10.600	0.0015	0.0016	0.0017	0.0018	0.0019
10.850	0.0021	0.0022	0.0023	0.0025	0.0026
11.100	0.0028	0.0031	0.0034	0.0037	0.0040
11.350	0.0044	0.0048	0.0052	0.0057	0.0064
11.600	0.0077	0.0096	0.0125	0.0158	0.0199
11.850	0.0243	0.0295	0.0388	0.0569	0.0740
12.100	0.0855	0.0877	0.0754	0.0624	0.0538
12.350	0.0475	0.0414	0.0359	0.0300	0.0250
12.600	0.0208	0.0180	0.0164	0.0154	0.0146
12.850	0.0139	0.0133	0.0127	0.0120	0.0115
13.100	0.0110	0.0107	0.0104	0.0102	0.0100
13.350	0.0099	0.0097	0.0096	0.0094	0.0093
13.600	0.0091	0.0090	0.0088	0.0086	0.0085
13.850	0.0083	0.0081	0.0080	0.0078	0.0076
14.100	0.0075	0.0074	0.0073	0.0072	0.0071
14.350	0.0071	0.0070	0.0069	0.0068	0.0067
14.600	0.0067	0.0066	0.0065	0.0064	0.0063
14.850	0.0063	0.0062	0.0061	0.0060	0.0059
15.100	0.0058	0.0058	0.0057	0.0056	0.0055
15.350	0.0054	0.0053	0.0053	0.0052	0.0051
15.600	0.0050	0.0049	0.0048	0.0047	0.0047
15.850	0.0046	0.0045	0.0044	0.0043	0.0042
16.100	0.0042	0.0041	0.0040	0.0040	0.0040
16.350	0.0039	0.0039	0.0039	0.0038	0.0038
16.600	0.0037	0.0037	0.0037	0.0036	0.0036
16.850	0.0036	0.0035	0.0035	0.0034	0.0034
17.100	0.0034	0.0033	0.0033	0.0032	0.0032
17.350	0.0032	0.0031	0.0031	0.0031	0.0030
17.600	0.0030	0.0029	0.0029	0.0029	0.0028
17.850	0.0028	0.0027	0.0027	0.0027	0.0026
18.100	0.0026	0.0026	0.0026	0.0026	0.0025
18.350	0.0025	0.0025	0.0025	0.0025	0.0025
18.600	0.0025	0.0025	0.0024	0.0024	0.0024
18.850	0.0024	0.0024	0.0024	0.0024	0.0024

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)
19.100	0.0024	0.0023	0.0023	0.0023	0.0023
19.350	0.0023	0.0023	0.0023	0.0023	0.0023
19.600	0.0022	0.0022	0.0022	0.0022	0.0022
19.850	0.0022	0.0022	0.0022	0.0022	0.0021
20.100	0.0021	0.0021	0.0021	0.0021	0.0021
20.350	0.0021	0.0021	0.0021	0.0021	0.0020
20.600	0.0020	0.0020	0.0020	0.0020	0.0020
20.850	0.0020	0.0020	0.0020	0.0020	0.0020
21.100	0.0020	0.0019	0.0019	0.0019	0.0019
21.350	0.0019	0.0019	0.0019	0.0019	0.0019
21.600	0.0019	0.0019	0.0018	0.0018	0.0018
21.850	0.0018	0.0018	0.0018	0.0018	0.0018
22.100	0.0018	0.0018	0.0018	0.0018	0.0017
22.350	0.0017	0.0017	0.0017	0.0017	0.0017
22.600	0.0017	0.0017	0.0017	0.0017	0.0017
22.850	0.0016	0.0016	0.0016	0.0016	0.0016
23.100	0.0016	0.0016	0.0016	0.0016	0.0016
23.350	0.0016	0.0015	0.0015	0.0015	0.0015
23.600	0.0015	0.0015	0.0015	0.0015	0.0015
23.850	0.0015	0.0014	0.0014	0.0014	(N/A)

Storm Event	10 YR
Return Event	10 years
Duration	24.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.145 hours
Area (User Defined)	3,395.000 ft^2

Computational Time Increment	0.019 hours
Time to Peak (Computed)	12.134 hours
Flow (Peak, Computed)	0.2299 ft^3/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.2253 ft^3/s

Drainage Area

SCS CN (Composite)	81.000
Area (User Defined)	3,395.000 ft^2
Maximum Retention (Pervious)	2.3 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	3.0 in
Runoff Volume (Pervious)	859.616 ft^3

Hydrograph Volume (Area under Hydrograph curve)

Volume	858.000 ft^3

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.145 hours
Computational Time Increment	0.019 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.6103 ft^3/s
Unit peak time, Tp	0.096 hours

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.386 hours
Total unit time, Tb	0.482 hours

Storm Event	10 YR
Return Event	10 years
Duration	24.000 hours
Depth	5.1 in
Time of Concentration (Composite)	0.145 hours
Area (User Defined)	3,395.000 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)
8.200	0.0010	0.0011	0.0012	0.0013	0.0013
8.450	0.0014	0.0015	0.0016	0.0017	0.0018
8.700	0.0019	0.0020	0.0021	0.0023	0.0024
8.950	0.0025	0.0026	0.0027	0.0029	0.0030
9.200	0.0031	0.0033	0.0034	0.0036	0.0037
9.450	0.0039	0.0040	0.0042	0.0043	0.0045
9.700	0.0047	0.0048	0.0050	0.0052	0.0053
9.950	0.0055	0.0057	0.0059	0.0061	0.0063
10.200	0.0066	0.0069	0.0072	0.0075	0.0078
10.450	0.0081	0.0084	0.0087	0.0091	0.0094
10.700	0.0097	0.0101	0.0104	0.0108	0.0112
10.950	0.0116	0.0120	0.0124	0.0130	0.0138
11.200	0.0147	0.0157	0.0168	0.0179	0.0192
11.450	0.0203	0.0216	0.0239	0.0283	0.0343
11.700	0.0433	0.0532	0.0648	0.0767	0.0903
11.950	0.1143	0.1611	0.2020	0.2253	0.2247
12.200	0.1894	0.1540	0.1308	0.1140	0.0985
12.450	0.0848	0.0703	0.0584	0.0484	0.0416
12.700	0.0378	0.0354	0.0335	0.0319	0.0304
12.950	0.0289	0.0274	0.0261	0.0250	0.0242
13.200	0.0236	0.0231	0.0227	0.0223	0.0220
13.450	0.0216	0.0212	0.0208	0.0205	0.0201
13.700	0.0197	0.0193	0.0189	0.0185	0.0182
13.950	0.0178	0.0174	0.0170	0.0167	0.0164
14.200	0.0162	0.0160	0.0158	0.0156	0.0154
14.450	0.0153	0.0151	0.0149	0.0147	0.0145
14.700	0.0143	0.0142	0.0140	0.0138	0.0136
14.950	0.0134	0.0132	0.0130	0.0128	0.0126
15.200	0.0125	0.0123	0.0121	0.0119	0.0117
15.450	0.0115	0.0113	0.0111	0.0109	0.0107
15.700	0.0105	0.0103	0.0102	0.0100	0.0098
15.950	0.0096	0.0094	0.0092	0.0091	0.0089
16.200	0.0088	0.0087	0.0086	0.0086	0.0085
16.450	0.0084	0.0083	0.0082	0.0081	0.0080
16.700	0.0080	0.0079	0.0078	0.0077	0.0076

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)
16.950	0.0075	0.0074	0.0074	0.0073	0.0072
17.200	0.0071	0.0070	0.0069	0.0069	0.0068
17.450	0.0067	0.0066	0.0065	0.0064	0.0063
17.700	0.0063	0.0062	0.0061	0.0060	0.0059
17.950	0.0058	0.0057	0.0057	0.0056	0.0055
18.200	0.0055	0.0055	0.0055	0.0054	0.0054
18.450	0.0054	0.0054	0.0053	0.0053	0.0053
18.700	0.0053	0.0052	0.0052	0.0052	0.0052
18.950	0.0051	0.0051	0.0051	0.0051	0.0050
19.200	0.0050	0.0050	0.0050	0.0049	0.0049
19.450	0.0049	0.0049	0.0048	0.0048	0.0048
19.700	0.0047	0.0047	0.0047	0.0047	0.0046
19.950	0.0046	0.0046	0.0046	0.0045	0.0045
20.200	0.0045	0.0045	0.0045	0.0044	0.0044
20.450	0.0044	0.0044	0.0044	0.0044	0.0043
20.700	0.0043	0.0043	0.0043	0.0043	0.0042
20.950	0.0042	0.0042	0.0042	0.0042	0.0041
21.200	0.0041	0.0041	0.0041	0.0041	0.0041
21.450	0.0040	0.0040	0.0040	0.0040	0.0040
21.700	0.0039	0.0039	0.0039	0.0039	0.0039
21.950	0.0038	0.0038	0.0038	0.0038	0.0038
22.200	0.0037	0.0037	0.0037	0.0037	0.0037
22.450	0.0036	0.0036	0.0036	0.0036	0.0036
22.700	0.0036	0.0035	0.0035	0.0035	0.0035
22.950	0.0035	0.0034	0.0034	0.0034	0.0034
23.200	0.0033	0.0033	0.0033	0.0033	0.0033
23.450	0.0033	0.0032	0.0032	0.0032	0.0032
23.700	0.0032	0.0031	0.0031	0.0031	0.0031
23.950	0.0030	0.0030	(N/A)	(N/A)	(N/A)

Storm Event	100 YR
Return Event	100 years
Duration	24.000 hours
Depth	8.9 in
Time of Concentration (Composite)	0.145 hours
Area (User Defined)	3,395.000 ft²

Computational Time Increment	0.019 hours
Time to Peak (Computed)	12.115 hours
Flow (Peak, Computed)	0.4848 ft³/s
Output Increment	0.050 hours
Time to Flow (Peak Interpolated Output)	12.100 hours
Flow (Peak Interpolated Output)	0.4786 ft³/s

Drainage Area

SCS CN (Composite)	81.000
Area (User Defined)	3,395.000 ft²
Maximum Retention (Pervious)	2.3 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff

Cumulative Runoff Depth (Pervious)	6.6 in
Runoff Volume (Pervious)	1,866.050 ft³

Hydrograph Volume (Area under Hydrograph curve)

Volume	1,864.000 ft³

SCS Unit Hydrograph Parameters

Time of Concentration (Composite)	0.145 hours
Computational Time Increment	0.019 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	0.6103 ft³/s
Unit peak time, Tp	0.096 hours

Subsection: Unit Hydrograph Summary
Label: PDA-1E

Return Event: 100 years
Storm Event: 100 YR

SCS Unit Hydrograph Parameters	
Unit receding limb, Tr	0.386 hours
Total unit time, Tb	0.482 hours

Storm Event	100 YR
Return Event	100 years
Duration	24.000 hours
Depth	8.9 in
Time of Concentration (Composite)	0.145 hours
Area (User Defined)	3,395.000 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)
5.750	0.0010	0.0011	0.0012	0.0012	0.0013
6.000	0.0013	0.0014	0.0015	0.0015	0.0016
6.250	0.0017	0.0018	0.0019	0.0020	0.0020
6.500	0.0021	0.0022	0.0023	0.0024	0.0025
6.750	0.0026	0.0027	0.0028	0.0030	0.0031
7.000	0.0032	0.0033	0.0034	0.0035	0.0037
7.250	0.0038	0.0039	0.0040	0.0042	0.0043
7.500	0.0044	0.0046	0.0047	0.0048	0.0050
7.750	0.0051	0.0053	0.0054	0.0056	0.0057
8.000	0.0059	0.0060	0.0062	0.0064	0.0066
8.250	0.0069	0.0071	0.0074	0.0076	0.0079
8.500	0.0082	0.0084	0.0087	0.0090	0.0093
8.750	0.0096	0.0099	0.0102	0.0105	0.0108
9.000	0.0112	0.0115	0.0118	0.0121	0.0125
9.250	0.0128	0.0132	0.0135	0.0139	0.0142
9.500	0.0146	0.0150	0.0153	0.0157	0.0161
9.750	0.0165	0.0169	0.0173	0.0177	0.0181
10.000	0.0185	0.0189	0.0194	0.0199	0.0206
10.250	0.0212	0.0219	0.0226	0.0233	0.0240
10.500	0.0248	0.0255	0.0262	0.0270	0.0277
10.750	0.0285	0.0293	0.0301	0.0309	0.0317
11.000	0.0325	0.0335	0.0349	0.0366	0.0389
11.250	0.0412	0.0438	0.0463	0.0490	0.0516
11.500	0.0545	0.0597	0.0700	0.0839	0.1049
11.750	0.1272	0.1529	0.1783	0.2067	0.2570
12.000	0.3550	0.4369	0.4786	0.4704	0.3921
12.250	0.3158	0.2661	0.2303	0.1981	0.1697
12.500	0.1404	0.1162	0.0962	0.0825	0.0748
12.750	0.0699	0.0661	0.0629	0.0598	0.0569
13.000	0.0539	0.0514	0.0491	0.0474	0.0462
13.250	0.0453	0.0445	0.0437	0.0429	0.0422
13.500	0.0414	0.0407	0.0399	0.0391	0.0384
13.750	0.0376	0.0368	0.0361	0.0353	0.0345
14.000	0.0338	0.0331	0.0324	0.0319	0.0314
14.250	0.0310	0.0306	0.0303	0.0299	0.0296

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)
14.500	0.0292	0.0288	0.0284	0.0281	0.0277
14.750	0.0273	0.0270	0.0266	0.0262	0.0258
15.000	0.0255	0.0251	0.0247	0.0244	0.0240
15.250	0.0236	0.0232	0.0229	0.0225	0.0221
15.500	0.0217	0.0214	0.0210	0.0206	0.0202
15.750	0.0199	0.0195	0.0191	0.0187	0.0184
16.000	0.0180	0.0177	0.0174	0.0171	0.0169
16.250	0.0167	0.0165	0.0164	0.0162	0.0160
16.500	0.0159	0.0157	0.0156	0.0154	0.0152
16.750	0.0151	0.0149	0.0147	0.0146	0.0144
17.000	0.0142	0.0141	0.0139	0.0138	0.0136
17.250	0.0134	0.0133	0.0131	0.0129	0.0128
17.500	0.0126	0.0125	0.0123	0.0121	0.0120
17.750	0.0118	0.0116	0.0115	0.0113	0.0111
18.000	0.0110	0.0108	0.0107	0.0106	0.0105
18.250	0.0105	0.0104	0.0104	0.0103	0.0103
18.500	0.0102	0.0102	0.0101	0.0101	0.0100
18.750	0.0100	0.0099	0.0099	0.0098	0.0098
19.000	0.0097	0.0097	0.0096	0.0096	0.0095
19.250	0.0095	0.0094	0.0094	0.0093	0.0093
19.500	0.0092	0.0092	0.0091	0.0091	0.0090
19.750	0.0090	0.0089	0.0089	0.0088	0.0088
20.000	0.0087	0.0087	0.0086	0.0086	0.0086
20.250	0.0086	0.0085	0.0085	0.0084	0.0084
20.500	0.0083	0.0083	0.0083	0.0082	0.0082
20.750	0.0081	0.0081	0.0081	0.0080	0.0080
21.000	0.0080	0.0080	0.0079	0.0079	0.0078
21.250	0.0078	0.0078	0.0077	0.0077	0.0076
21.500	0.0076	0.0075	0.0075	0.0075	0.0075
21.750	0.0074	0.0074	0.0074	0.0073	0.0073
22.000	0.0072	0.0072	0.0072	0.0071	0.0071
22.250	0.0071	0.0070	0.0070	0.0069	0.0069
22.500	0.0069	0.0068	0.0068	0.0068	0.0067
22.750	0.0067	0.0066	0.0066	0.0066	0.0065
23.000	0.0065	0.0065	0.0064	0.0064	0.0063
23.250	0.0063	0.0063	0.0062	0.0062	0.0062
23.500	0.0061	0.0061	0.0060	0.0060	0.0060
23.750	0.0059	0.0059	0.0059	0.0058	0.0058
24.000	0.0057	(N/A)	(N/A)	(N/A)	(N/A)

Summary for Hydrograph Addition at 'DP-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-1A
Outlet-8	IB-1

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	PDA-1A	922.912	12.150	0.2360
Flow (From)	Outlet-8	0.000	0.000	0.0000
Flow (In)	DP-1	922.912	12.150	0.2360

Summary for Hydrograph Addition at 'DP-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-1A
Outlet-8	IB-1

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	PDA-1A	2,797.460	12.100	0.7500
Flow (From)	Outlet-8	229.520	12.200	0.1540
Flow (In)	DP-1	3,026.979	12.150	0.8598

Summary for Hydrograph Addition at 'DP-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-1A
Outlet-8	IB-1

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	PDA-1A	6,655.809	12.100	1.7808
Flow (From)	Outlet-8	2,889.238	12.250	0.9648
Flow (In)	DP-1	9,545.047	12.150	2.3188

Elevation (ft)	Planimeter (ft^2)	Area (ft^2)	A1+A2+sqr(A1*A2) (ft^2)	Volume (ft^3)	Volume (Total) (ft^3)
77.33	0.0	78.500	0.000	0.000	0.000
78.33	0.0	78.500	235.500	78.000	78.000
79.33	0.0	78.500	235.500	78.000	157.000
80.33	0.0	78.500	235.500	78.000	236.000
81.33	0.0	78.500	235.500	78.000	314.000
82.33	0.0	78.500	235.500	78.000	392.000
83.33	0.0	78.500	235.500	78.000	471.000
84.33	0.0	78.500	235.500	78.000	550.000
85.33	0.0	78.500	235.500	78.000	628.000
86.33	0.0	78.500	235.500	78.000	706.000
87.50	0.0	78.500	235.500	92.000	798.000
89.50	0.0	7.840	111.148	74.000	872.000

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Subsection: Elevation-Area Volume Curve
Label: DW-1

Return Event: 10 years
Storm Event: 1 YR

Elevation (ft)	Planimeter (ft^2)	Area (ft^2)	A1+A2+sqr(A1*A2) (ft^2)	Volume (ft^3)	Volume (Total) (ft^3)
77.33	0.0	78.500	0.000	0.000	0.000
78.33	0.0	78.500	235.500	78.000	78.000
79.33	0.0	78.500	235.500	78.000	157.000
80.33	0.0	78.500	235.500	78.000	236.000
81.33	0.0	78.500	235.500	78.000	314.000
82.33	0.0	78.500	235.500	78.000	392.000
83.33	0.0	78.500	235.500	78.000	471.000
84.33	0.0	78.500	235.500	78.000	550.000
85.33	0.0	78.500	235.500	78.000	628.000
86.33	0.0	78.500	235.500	78.000	706.000
87.50	0.0	78.500	235.500	92.000	798.000
89.50	0.0	7.840	111.148	74.000	872.000

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:		
	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Subsection: Elevation-Area Volume Curve
Label: DW-1

Return Event: 100 years
Storm Event: 1 YR

Elevation (ft)	Planimeter (ft^2)	Area (ft^2)	A1+A2+sqr(A1*A2) (ft^2)	Volume (ft^3)	Volume (Total) (ft^3)
77.33	0.0	78.500	0.000	0.000	0.000
78.33	0.0	78.500	235.500	78.000	78.000
79.33	0.0	78.500	235.500	78.000	157.000
80.33	0.0	78.500	235.500	78.000	236.000
81.33	0.0	78.500	235.500	78.000	314.000
82.33	0.0	78.500	235.500	78.000	392.000
83.33	0.0	78.500	235.500	78.000	471.000
84.33	0.0	78.500	235.500	78.000	550.000
85.33	0.0	78.500	235.500	78.000	628.000
86.33	0.0	78.500	235.500	78.000	706.000
87.50	0.0	78.500	235.500	92.000	798.000
89.50	0.0	7.840	111.148	74.000	872.000

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Elevation (ft)	Planimeter (ft^2)	Area (ft^2)	A1+A2+sqr(A1*A2) (ft^2)	Volume (ft^3)	Volume (Total) (ft^3)
77.33	0.0	78.500	0.000	0.000	0.000
78.33	0.0	78.500	235.500	78.000	78.000
79.33	0.0	78.500	235.500	78.000	157.000
80.33	0.0	78.500	235.500	78.000	236.000
81.33	0.0	78.500	235.500	78.000	314.000
82.33	0.0	78.500	235.500	78.000	392.000
83.33	0.0	78.500	235.500	78.000	471.000
84.33	0.0	78.500	235.500	78.000	550.000
85.33	0.0	78.500	235.500	78.000	628.000
86.33	0.0	78.500	235.500	78.000	706.000
87.50	0.0	78.500	235.500	92.000	798.000
89.50	0.0	7.840	111.148	74.000	872.000

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Subsection: Elevation-Area Volume Curve
Label: DW-2

Return Event: 10 years
Storm Event: 1 YR

Elevation (ft)	Planimeter (ft^2)	Area (ft^2)	A1+A2+sqr(A1*A2) (ft^2)	Volume (ft^3)	Volume (Total) (ft^3)
77.33	0.0	78.500	0.000	0.000	0.000
78.33	0.0	78.500	235.500	78.000	78.000
79.33	0.0	78.500	235.500	78.000	157.000
80.33	0.0	78.500	235.500	78.000	236.000
81.33	0.0	78.500	235.500	78.000	314.000
82.33	0.0	78.500	235.500	78.000	392.000
83.33	0.0	78.500	235.500	78.000	471.000
84.33	0.0	78.500	235.500	78.000	550.000
85.33	0.0	78.500	235.500	78.000	628.000
86.33	0.0	78.500	235.500	78.000	706.000
87.50	0.0	78.500	235.500	92.000	798.000
89.50	0.0	7.840	111.148	74.000	872.000

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Subsection: Elevation-Area Volume Curve
Label: DW-2

Return Event: 100 years
Storm Event: 1 YR

Elevation (ft)	Planimeter (ft^2)	Area (ft^2)	A1+A2+sqr(A1*A2) (ft^2)	Volume (ft^3)	Volume (Total) (ft^3)
77.33	0.0	78.500	0.000	0.000	0.000
78.33	0.0	78.500	235.500	78.000	78.000
79.33	0.0	78.500	235.500	78.000	157.000
80.33	0.0	78.500	235.500	78.000	236.000
81.33	0.0	78.500	235.500	78.000	314.000
82.33	0.0	78.500	235.500	78.000	392.000
83.33	0.0	78.500	235.500	78.000	471.000
84.33	0.0	78.500	235.500	78.000	550.000
85.33	0.0	78.500	235.500	78.000	628.000
86.33	0.0	78.500	235.500	78.000	706.000
87.50	0.0	78.500	235.500	92.000	798.000
89.50	0.0	7.840	111.148	74.000	872.000

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:		
	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Subsection: Elevation-Area Volume Curve
Label: DW-3

Return Event: 1 years
Storm Event: 1 YR

Elevation (ft)	Planimeter (ft^2)	Area (ft^2)	A1+A2+sqr(A1*A2) (ft^2)	Volume (ft^3)	Volume (Total) (ft^3)
77.33	0.0	78.500	0.000	0.000	0.000
78.33	0.0	78.500	235.500	78.000	78.000
79.33	0.0	78.500	235.500	78.000	157.000
80.33	0.0	78.500	235.500	78.000	236.000
81.33	0.0	78.500	235.500	78.000	314.000
82.33	0.0	78.500	235.500	78.000	392.000
83.33	0.0	78.500	235.500	78.000	471.000
84.33	0.0	78.500	235.500	78.000	550.000
85.33	0.0	78.500	235.500	78.000	628.000
86.33	0.0	78.500	235.500	78.000	706.000
87.50	0.0	78.500	235.500	92.000	798.000
89.50	0.0	7.840	111.148	74.000	872.000

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:		
	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Subsection: Elevation-Area Volume Curve
Label: DW-3

Return Event: 10 years
Storm Event: 1 YR

Elevation (ft)	Planimeter (ft^2)	Area (ft^2)	A1+A2+sqr(A1*A2) (ft^2)	Volume (ft^3)	Volume (Total) (ft^3)
77.33	0.0	78.500	0.000	0.000	0.000
78.33	0.0	78.500	235.500	78.000	78.000
79.33	0.0	78.500	235.500	78.000	157.000
80.33	0.0	78.500	235.500	78.000	236.000
81.33	0.0	78.500	235.500	78.000	314.000
82.33	0.0	78.500	235.500	78.000	392.000
83.33	0.0	78.500	235.500	78.000	471.000
84.33	0.0	78.500	235.500	78.000	550.000
85.33	0.0	78.500	235.500	78.000	628.000
86.33	0.0	78.500	235.500	78.000	706.000
87.50	0.0	78.500	235.500	92.000	798.000
89.50	0.0	7.840	111.148	74.000	872.000

Pond Volume Equations
*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Subsection: Elevation-Area Volume Curve
Label: DW-3

Return Event: 100 years
Storm Event: 1 YR

Elevation (ft)	Planimeter (ft^2)	Area (ft^2)	A1+A2+sqr(A1*A2) (ft^2)	Volume (ft^3)	Volume (Total) (ft^3)
77.33	0.0	78.500	0.000	0.000	0.000
78.33	0.0	78.500	235.500	78.000	78.000
79.33	0.0	78.500	235.500	78.000	157.000
80.33	0.0	78.500	235.500	78.000	236.000
81.33	0.0	78.500	235.500	78.000	314.000
82.33	0.0	78.500	235.500	78.000	392.000
83.33	0.0	78.500	235.500	78.000	471.000
84.33	0.0	78.500	235.500	78.000	550.000
85.33	0.0	78.500	235.500	78.000	628.000
86.33	0.0	78.500	235.500	78.000	706.000
87.50	0.0	78.500	235.500	92.000	798.000
89.50	0.0	7.840	111.148	74.000	872.000

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Elevation-Volume

Pond Elevation (ft)	Pond Volume (ft^3)
76.73	0.000
77.23	54.080
77.73	170.480
77.98	226.880
78.23	281.840
78.48	334.800
78.73	385.520
78.98	433.360
79.23	477.280
79.48	515.680
79.73	545.120
79.98	572.160
80.23	599.200

Elevation-Volume

Pond Elevation (ft)	Pond Volume (ft^3)
76.73	0.000
77.23	54.080
77.73	170.480
77.98	226.880
78.23	281.840
78.48	334.800
78.73	385.520
78.98	433.360
79.23	477.280
79.48	515.680
79.73	545.120
79.98	572.160
80.23	599.200

Elevation-Volume

Pond Elevation (ft)	Pond Volume (ft^3)
76.73	0.000
77.23	54.080
77.73	170.480
77.98	226.880
78.23	281.840
78.48	334.800
78.73	385.520
78.98	433.360
79.23	477.280
79.48	515.680
79.73	545.120
79.98	572.160
80.23	599.200

Requested Pond Water Surface Elevations	
Minimum (Headwater)	84.50 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	89.50 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Culvert-Circular	Culvert - 1	Forward	TW	85.33	89.50
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Culvert - 1
Structure Type: Culvert-Circular

Number of Barrels	1
Diameter	12.0 in
Length	18.00 ft
Length (Computed Barrel)	18.00 ft
Slope (Computed)	0.010 ft/ft

Outlet Control Data

Manning's n	0.013
Ke	0.200
Kb	0.031
Kr	0.000
Convergence Tolerance	0.00 ft

Inlet Control Data

Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.090
T2 ratio (HW/D)	1.192
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	86.42 ft	T1 Flow	2.7489 ft³/s
T2 Elevation	86.52 ft	T2 Flow	3.1416 ft³/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 3.8323 ft^3/s
Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
77.33	0.0000	(N/A)	0.00
77.83	0.0000	(N/A)	0.00
78.33	0.0000	(N/A)	0.00
78.83	0.0000	(N/A)	0.00
79.33	0.0000	(N/A)	0.00
79.83	0.0000	(N/A)	0.00
80.33	0.0000	(N/A)	0.00
80.83	0.0000	(N/A)	0.00
81.33	0.0000	(N/A)	0.00
81.83	0.0000	(N/A)	0.00
82.33	0.0000	(N/A)	0.00
82.83	0.0000	(N/A)	0.00
83.33	0.0000	(N/A)	0.00
83.83	0.0000	(N/A)	0.00
84.33	0.0000	(N/A)	0.00
84.83	0.0000	(N/A)	0.00
85.33	0.0000	(N/A)	0.00
85.83	0.6944	(N/A)	0.00
86.33	2.3454	(N/A)	0.00
86.83	3.9816	(N/A)	0.00
87.33	5.0604	(N/A)	0.00
87.83	5.9426	(N/A)	0.00
88.33	6.7115	(N/A)	0.00
88.83	7.3999	(N/A)	0.00
89.33	8.0317	(N/A)	0.00
89.50	8.2344	(N/A)	0.00

Computation Messages
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 3.8323 ft^3/s
Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Computation Messages
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
CRIT.DEPTH CONTROL Vh= .127ft Dcr= .347ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .287ft Dcr= .655ft CRIT.DEPTH Hev= .00ft
INLET CONTROL... Submerged: HW =1.50
INLET CONTROL... Submerged: HW =2.00
INLET CONTROL... Submerged: HW =2.50
INLET CONTROL... Submerged: HW =3.00
INLET CONTROL... Submerged: HW =3.50
INLET CONTROL... Submerged: HW =4.00
INLET CONTROL... Submerged: HW =4.17

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
77.33	0.0000	(N/A)	0.00
77.83	0.0000	(N/A)	0.00
78.33	0.0000	(N/A)	0.00
78.83	0.0000	(N/A)	0.00
79.33	0.0000	(N/A)	0.00
79.83	0.0000	(N/A)	0.00
80.33	0.0000	(N/A)	0.00
80.83	0.0000	(N/A)	0.00
81.33	0.0000	(N/A)	0.00
81.83	0.0000	(N/A)	0.00
82.33	0.0000	(N/A)	0.00
82.83	0.0000	(N/A)	0.00
83.33	0.0000	(N/A)	0.00
83.83	0.0000	(N/A)	0.00
84.33	0.0000	(N/A)	0.00
84.83	0.0000	(N/A)	0.00
85.33	0.0000	(N/A)	0.00
85.83	0.6944	(N/A)	0.00
86.33	2.3454	(N/A)	0.00
86.83	3.9816	(N/A)	0.00
87.33	5.0604	(N/A)	0.00
87.83	5.9426	(N/A)	0.00
88.33	6.7115	(N/A)	0.00
88.83	7.3999	(N/A)	0.00
89.33	8.0317	(N/A)	0.00
89.50	8.2344	(N/A)	0.00

Contributing Structures
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing

Composite Outflow Summary

Contributing Structures
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1

Requested Pond Water Surface Elevations	
Minimum (Headwater)	84.50 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	89.50 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Culvert-Circular	Culvert - 1	Forward	TW	85.33	89.50
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Culvert - 1
Structure Type: Culvert-Circular

Number of Barrels	1
Diameter	12.0 in
Length	26.00 ft
Length (Computed Barrel)	26.00 ft
Slope (Computed)	0.000 ft/ft

Outlet Control Data

Manning's n	0.013
Ke	0.200
Kb	0.031
Kr	0.000
Convergence Tolerance	0.00 ft

Inlet Control Data

Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.095
T2 ratio (HW/D)	1.197
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	86.43 ft	T1 Flow	2.7489 ft^3/s
T2 Elevation	86.53 ft	T2 Flow	3.1416 ft^3/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances

Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 0.0000 ft^3/s
Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
77.33	0.0000	(N/A)	0.00
77.83	0.0000	(N/A)	0.00
78.33	0.0000	(N/A)	0.00
78.83	0.0000	(N/A)	0.00
79.33	0.0000	(N/A)	0.00
79.83	0.0000	(N/A)	0.00
80.33	0.0000	(N/A)	0.00
80.83	0.0000	(N/A)	0.00
81.33	0.0000	(N/A)	0.00
81.83	0.0000	(N/A)	0.00
82.33	0.0000	(N/A)	0.00
82.83	0.0000	(N/A)	0.00
83.33	0.0000	(N/A)	0.00
83.83	0.0000	(N/A)	0.00
84.33	0.0000	(N/A)	0.00
84.83	0.0000	(N/A)	0.00
85.33	0.0000	(N/A)	0.00
85.83	0.5750	(N/A)	0.00
86.33	2.0506	(N/A)	0.00
86.83	3.4386	(N/A)	0.00
87.33	4.5358	(N/A)	0.00
87.83	5.4817	(N/A)	0.00
88.33	6.2995	(N/A)	0.00
88.83	7.0329	(N/A)	0.00
89.33	7.6985	(N/A)	0.00
89.50	7.9110	(N/A)	0.00

Computation Messages
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 0.0000 ft^3/s
Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Computation Messages
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
BACKWATER CONTROL.. Vh= .045ft hwDi= .445ft Lbw= 26.0ft Hev= .00ft
BACKWATER CONTROL.. Vh= .132ft hwDi= .842ft Lbw= 26.0ft Hev= .00ft
FULL FLOW...Lfull=15.28ft Vh=.298ft HL=.500ft Hev= .00ft
FULL FLOW...Lfull=23.37ft Vh=.518ft HL=1.001ft Hev= .00ft
FULL FLOW...Lfull=25.02ft Vh=.757ft HL=1.501ft Hev= .00ft
FULL FLOW...Lfull=25.56ft Vh=1.000ft HL=1.999ft Hev= .00ft
FULL FLOW...Lfull=25.79ft Vh=1.246ft HL=2.500ft Hev= .00ft
FULL FLOW...Lfull=25.87ft Vh=1.493ft HL=3.000ft Hev= .00ft
FULL FLOW...Lfull=25.90ft Vh=1.577ft HL=3.169ft Hev= .00ft

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
77.33	0.0000	(N/A)	0.00
77.83	0.0000	(N/A)	0.00
78.33	0.0000	(N/A)	0.00
78.83	0.0000	(N/A)	0.00
79.33	0.0000	(N/A)	0.00
79.83	0.0000	(N/A)	0.00
80.33	0.0000	(N/A)	0.00
80.83	0.0000	(N/A)	0.00
81.33	0.0000	(N/A)	0.00
81.83	0.0000	(N/A)	0.00
82.33	0.0000	(N/A)	0.00
82.83	0.0000	(N/A)	0.00
83.33	0.0000	(N/A)	0.00
83.83	0.0000	(N/A)	0.00
84.33	0.0000	(N/A)	0.00
84.83	0.0000	(N/A)	0.00
85.33	0.0000	(N/A)	0.00
85.83	0.5750	(N/A)	0.00
86.33	2.0506	(N/A)	0.00
86.83	3.4386	(N/A)	0.00
87.33	4.5358	(N/A)	0.00
87.83	5.4817	(N/A)	0.00
88.33	6.2995	(N/A)	0.00
88.83	7.0329	(N/A)	0.00
89.33	7.6985	(N/A)	0.00
89.50	7.9110	(N/A)	0.00

Contributing Structures
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing

Composite Outflow Summary

Contributing Structures
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1

Requested Pond Water Surface Elevations	
Minimum (Headwater)	77.33 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	89.50 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Culvert-Circular	Culvert - 1	Forward	TW	85.33	89.50
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Culvert - 1
Structure Type: Culvert-Circular

Number of Barrels	1
Diameter	12.0 in
Length	26.00 ft
Length (Computed Barrel)	26.00 ft
Slope (Computed)	0.000 ft/ft

Outlet Control Data

Manning's n	0.013
Ke	0.200
Kb	0.031
Kr	0.000
Convergence Tolerance	0.00 ft

Inlet Control Data

Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	0.000
T2 ratio (HW/D)	1.197
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	85.33 ft	T1 Flow	2.7489 ft^3/s
T2 Elevation	86.53 ft	T2 Flow	3.1416 ft^3/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances

Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft^3/s
Flow Tolerance (Maximum)	10.000 ft^3/s

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 0.0000 ft^3/s
Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
77.33	0.0000	(N/A)	0.00
77.83	0.0000	(N/A)	0.00
78.33	0.0000	(N/A)	0.00
78.83	0.0000	(N/A)	0.00
79.33	0.0000	(N/A)	0.00
79.83	0.0000	(N/A)	0.00
80.33	0.0000	(N/A)	0.00
80.83	0.0000	(N/A)	0.00
81.33	0.0000	(N/A)	0.00
81.83	0.0000	(N/A)	0.00
82.33	0.0000	(N/A)	0.00
82.83	0.0000	(N/A)	0.00
83.33	0.0000	(N/A)	0.00
83.83	0.0000	(N/A)	0.00
84.33	0.0000	(N/A)	0.00
84.83	0.0000	(N/A)	0.00
85.33	0.0000	(N/A)	0.00
85.83	0.5750	(N/A)	0.00
86.33	2.0553	(N/A)	0.00
86.83	3.4386	(N/A)	0.00
87.33	4.5358	(N/A)	0.00
87.83	5.4817	(N/A)	0.00
88.33	6.2995	(N/A)	0.00
88.83	7.0329	(N/A)	0.00
89.33	7.6985	(N/A)	0.00
89.50	7.9110	(N/A)	0.00

Computation Messages
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 0.0000 ft³/s
Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Computation Messages
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
Upstream HW & DNstream TW < Inv.El
BACKWATER CONTROL.. Vh= .045ft hwDi= .445ft Lbw= 26.0ft Hev= .00ft
BACKWATER CONTROL.. Vh= .131ft hwDi= .844ft Lbw= 26.0ft Hev= .00ft
FULL FLOW...Lfull=15.28ft Vh=.298ft HL=.500ft Hev= .00ft
FULL FLOW...Lfull=23.37ft Vh=.518ft HL=1.001ft Hev= .00ft
FULL FLOW...Lfull=25.02ft Vh=.757ft HL=1.501ft Hev= .00ft
FULL FLOW...Lfull=25.56ft Vh=1.000ft HL=1.999ft Hev= .00ft
FULL FLOW...Lfull=25.79ft Vh=1.246ft HL=2.500ft Hev= .00ft
FULL FLOW...Lfull=25.87ft Vh=1.493ft HL=3.000ft Hev= .00ft
FULL FLOW...Lfull=25.90ft Vh=1.577ft HL=3.169ft Hev= .00ft

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
77.33	0.0000	(N/A)	0.00
77.83	0.0000	(N/A)	0.00
78.33	0.0000	(N/A)	0.00
78.83	0.0000	(N/A)	0.00
79.33	0.0000	(N/A)	0.00
79.83	0.0000	(N/A)	0.00
80.33	0.0000	(N/A)	0.00
80.83	0.0000	(N/A)	0.00
81.33	0.0000	(N/A)	0.00
81.83	0.0000	(N/A)	0.00
82.33	0.0000	(N/A)	0.00
82.83	0.0000	(N/A)	0.00
83.33	0.0000	(N/A)	0.00
83.83	0.0000	(N/A)	0.00
84.33	0.0000	(N/A)	0.00
84.83	0.0000	(N/A)	0.00
85.33	0.0000	(N/A)	0.00
85.83	0.5750	(N/A)	0.00
86.33	2.0553	(N/A)	0.00
86.83	3.4386	(N/A)	0.00
87.33	4.5358	(N/A)	0.00
87.83	5.4817	(N/A)	0.00
88.33	6.2995	(N/A)	0.00
88.83	7.0329	(N/A)	0.00
89.33	7.6985	(N/A)	0.00
89.50	7.9110	(N/A)	0.00

Contributing Structures
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing
None Contributing

Subsection: Composite Rating Curve
Label: 1e-1d

Return Event: 1 years
Storm Event: 1 YR

Composite Outflow Summary

Contributing Structures
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1
Culvert - 1

Requested Pond Water Surface Elevations	
Minimum (Headwater)	76.73 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	80.23 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Orifice-Circular	Orifice - 1	Forward	Culvert - 1	77.75	80.23
Orifice-Circular	Orifice - 2	Forward	Culvert - 1	79.50	80.23
Culvert-Circular	Culvert - 1	Forward	TW	77.23	80.23
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: Orifice - 1
Structure Type: Orifice-Circular

Number of Openings	1
Elevation	77.75 ft
Orifice Diameter	6.0 in
Orifice Coefficient	0.600

Structure ID: Culvert - 1
Structure Type: Culvert-Circular

Number of Barrels	1
Diameter	15.0 in
Length	66.00 ft
Length (Computed Barrel)	66.03 ft
Slope (Computed)	0.028 ft/ft

Outlet Control Data

Manning's n	0.013
Ke	0.200
Kb	0.023
Kr	0.000
Convergence Tolerance	0.00 ft

Inlet Control Data

Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.081
T2 ratio (HW/D)	1.183
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	78.58 ft	T1 Flow	4.8021 ft^3/s
T2 Elevation	78.71 ft	T2 Flow	5.4881 ft^3/s

Structure ID: Orifice - 2
Structure Type: Orifice-Circular

Number of Openings	1
Elevation	79.50 ft
Orifice Diameter	6.0 in
Orifice Coefficient	0.600

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances

Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft^3/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
76.73	0.0000	0.00	0.00	0.00	0.00	0.0000	(N/A)	0.00
77.23	0.0000	0.00	0.00	0.00	0.00	0.0000	(N/A)	0.00
77.73	0.0000	0.00	0.00	0.00	0.00	0.0000	(N/A)	0.00
77.75	0.0000	0.00	0.00	0.00	0.00	0.0000	(N/A)	0.00
78.23	0.4282	78.23	Free Outfall	77.60	0.00	0.0000	(N/A)	0.00
78.73	0.8074	78.73	Free Outfall	77.73	0.00	0.0000	(N/A)	0.00
79.23	1.0481	79.23	77.81	77.81	0.00	0.0000	(N/A)	0.00
79.50	1.1574	79.50	77.84	77.84	0.00	0.0000	(N/A)	0.00
79.73	1.2430	79.73	77.89	77.90	0.00	0.0000	(N/A)	0.00
80.23	1.3913	80.23	78.06	78.06	0.00	0.0000	(N/A)	0.00

Message
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
CRIT.DEPTH CONTROL Vh= .147ft Dcr= .333ft CRIT.DEPTH Hev= .00ft
H =.73
H =1.23
H =1.50
H =1.73
H =2.17

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 11.7272 ft^3/s
Upstream ID = Orifice - 1, Orifice - 2
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Device Flow (ft^3/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
76.73	0.0000	0.00	0.00	Free Outfall	0.00	0.0000	(N/A)	0.00
77.23	0.0000	0.00	0.00	Free Outfall	0.00	0.0000	(N/A)	0.00
77.73	0.0000	0.00	0.00	Free Outfall	0.00	0.0000	(N/A)	0.00
77.75	0.0000	0.00	0.00	Free Outfall	0.00	0.0000	(N/A)	0.00
78.23	0.4270	77.60	Free Outfall	Free Outfall	0.00	0.0006	(N/A)	0.00
78.73	0.8093	77.73	Free Outfall	Free Outfall	0.00	0.0000	(N/A)	0.00
79.23	1.0493	77.81	Free Outfall	Free Outfall	0.00	0.0000	(N/A)	0.00
79.50	1.1578	77.84	Free Outfall	Free Outfall	0.00	0.0004	(N/A)	0.00
79.73	1.3576	77.90	Free Outfall	Free Outfall	0.00	0.0008	(N/A)	0.00
80.23	2.0438	78.06	Free Outfall	Free Outfall	0.00	0.0011	(N/A)	0.00

Message
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
CRIT.DEPTH CONTROL Vh= .089ft Dcr= .254ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .126ft Dcr= .353ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .146ft Dcr= .403ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .155ft Dcr= .424ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .170ft Dcr= .461ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .219ft Dcr= .570ft CRIT.DEPTH Hev= .00ft

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 2 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft^3/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
76.73	0.0000	0.00	0.00	0.00	0.00	0.0000	(N/A)	0.00
77.23	0.0000	0.00	0.00	0.00	0.00	0.0000	(N/A)	0.00
77.73	0.0000	0.00	0.00	0.00	0.00	0.0000	(N/A)	0.00
77.75	0.0000	0.00	0.00	0.00	0.00	0.0000	(N/A)	0.00
78.23	0.0000	0.00	0.00	77.60	0.00	0.0000	(N/A)	0.00
78.73	0.0000	0.00	0.00	77.73	0.00	0.0000	(N/A)	0.00
79.23	0.0000	0.00	0.00	77.81	0.00	0.0000	(N/A)	0.00
79.50	0.0000	0.00	0.00	77.84	0.00	0.0000	(N/A)	0.00
79.73	0.1163	79.73	Free Outfall	77.90	0.00	0.0000	(N/A)	0.00
80.23	0.6547	80.23	Free Outfall	78.06	0.00	0.0000	(N/A)	0.00

Message
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
CRIT.DEPTH CONTROL Vh= .062ft Dcr= .169ft CRIT.DEPTH Hev= .00ft H =.48

Subsection: Composite Rating Curve
Label: OCS-A-2

Return Event: 1 years
Storm Event: 1 YR

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
76.73	0.0000	(N/A)	0.00
77.23	0.0000	(N/A)	0.00
77.73	0.0000	(N/A)	0.00
77.75	0.0000	(N/A)	0.00
78.23	0.4276	(N/A)	0.00
78.73	0.8074	(N/A)	0.00
79.23	1.0481	(N/A)	0.00
79.50	1.1578	(N/A)	0.00
79.73	1.3584	(N/A)	0.00
80.23	2.0449	(N/A)	0.00

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

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0055 ft^3/s

Initial Conditions	
Elevation (Water Surface, Initial)	77.33 ft
Volume (Initial)	0.000 ft^3
Flow (Initial Outlet)	0.0000 ft^3/s
Flow (Initial Infiltration)	0.0000 ft^3/s
Flow (Initial, Total)	0.0000 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)
77.33	0.0000	0.000	78.500	0.0000	0.0000	0.0000
77.83	0.0000	39.250	78.500	0.0055	0.0055	0.4416
78.33	0.0000	78.500	78.500	0.0055	0.0055	0.8777
78.83	0.0000	117.750	78.500	0.0055	0.0055	1.3138
79.33	0.0000	157.000	78.500	0.0055	0.0055	1.7499
79.83	0.0000	196.250	78.500	0.0055	0.0055	2.1861
80.33	0.0000	235.500	78.500	0.0055	0.0055	2.6222
80.83	0.0000	274.750	78.500	0.0055	0.0055	3.0583
81.33	0.0000	314.000	78.500	0.0055	0.0055	3.4944
81.83	0.0000	353.250	78.500	0.0055	0.0055	3.9305
82.33	0.0000	392.500	78.500	0.0055	0.0055	4.3666
82.83	0.0000	431.750	78.500	0.0055	0.0055	4.8027
83.33	0.0000	471.000	78.500	0.0055	0.0055	5.2388
83.83	0.0000	510.250	78.500	0.0055	0.0055	5.6749
84.33	0.0000	549.500	78.500	0.0055	0.0055	6.1111
84.83	0.0000	588.750	78.500	0.0055	0.0055	6.5472
85.33	0.0000	628.000	78.500	0.0055	0.0055	6.9833
85.83	0.5750	667.250	78.500	0.0055	0.5805	7.9944
86.33	2.0553	706.500	78.500	0.0055	2.0608	9.9108
86.83	3.4386	745.750	78.500	0.0055	3.4441	11.7302
87.33	4.5358	785.000	78.500	0.0055	4.5413	13.2635
87.83	5.4817	821.436	61.781	0.0055	5.4872	14.6142
88.33	6.2995	846.756	40.260	0.0055	6.3050	15.7134
88.83	7.0329	862.462	23.330	0.0055	7.0384	16.6213
89.33	7.6985	870.851	10.990	0.0055	7.7040	17.3802
89.50	7.9110	872.444	7.840	0.0055	7.9165	17.6103

Subsection: Level Pool Pond Routing Summary — Return Event: 1 years
Label: DW-1 (IN) — Storm Event: 1 YR

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0055 ft^3/s

Initial Conditions	
Elevation (Water Surface, Initial)	77.33 ft
Volume (Initial)	0.000 ft^3
Flow (Initial Outlet)	0.0000 ft^3/s
Flow (Initial Infiltration)	0.0000 ft^3/s
Flow (Initial, Total)	0.0000 ft^3/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.0751 ft^3/s	Time to Peak (Flow, In)	12.100 hours
Infiltration (Peak)	0.0055 ft^3/s	Time to Peak (Infiltration)	12.050 hours
Flow (Peak Outlet)	0.0000 ft^3/s	Time to Peak (Flow, Outlet)	10.000 hours

Elevation (Water Surface, Peak)	85.33 ft
Volume (Peak)	628.000 ft^3

Mass Balance (ft^3)	
Volume (Initial)	0.000 ft^3
Volume (Total Inflow)	264.000 ft^3
Volume (Total Infiltration)	239.000 ft^3
Volume (Total Outlet Outflow)	0.000 ft^3
Volume (Retained)	25.000 ft^3
Volume (Unrouted)	0.000 ft^3
Error (Mass Balance)	0.0 %

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0055 ft^3/s

Initial Conditions	
Elevation (Water Surface, Initial)	77.33 ft
Volume (Initial)	0.000 ft^3
Flow (Initial Outlet)	0.0000 ft^3/s
Flow (Initial Infiltration)	0.0000 ft^3/s
Flow (Initial, Total)	0.0000 ft^3/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.2033 ft^3/s	Time to Peak (Flow, In)	12.100 hours
Infiltration (Peak)	0.0055 ft^3/s	Time to Peak (Infiltration)	11.500 hours
Flow (Peak Outlet)	0.0000 ft^3/s	Time to Peak (Flow, Outlet)	0.000 hours

Elevation (Water Surface, Peak)	83.50 ft
Volume (Peak)	484.442 ft^3

Mass Balance (ft^3)	
Volume (Initial)	0.000 ft^3
Volume (Total Inflow)	711.000 ft^3
Volume (Total Infiltration)	269.000 ft^3
Volume (Total Outlet Outflow)	0.000 ft^3
Volume (Retained)	442.000 ft^3
Volume (Unrouted)	0.000 ft^3
Error (Mass Balance)	0.0 %

Subsection: Level Pool Pond Routing Summary
Label: DW-1 (IN)

Return Event: 100 years
Storm Event: 100 YR

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0055 ft^3/s

Initial Conditions	
Elevation (Water Surface, Initial)	77.33 ft
Volume (Initial)	0.000 ft^3
Flow (Initial Outlet)	0.0000 ft^3/s
Flow (Initial Infiltration)	0.0000 ft^3/s
Flow (Initial, Total)	0.0000 ft^3/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.4377 ft^3/s	Time to Peak (Flow, In)	12.100 hours
Infiltration (Peak)	0.0055 ft^3/s	Time to Peak (Infiltration)	9.650 hours
Flow (Peak Outlet)	0.3447 ft^3/s	Time to Peak (Flow, Outlet)	12.200 hours

Elevation (Water Surface, Peak)	85.63 ft
Volume (Peak)	651.532 ft^3

Mass Balance (ft^3)	
Volume (Initial)	0.000 ft^3
Volume (Total Inflow)	1,583.000 ft^3
Volume (Total Infiltration)	310.000 ft^3
Volume (Total Outlet Outflow)	646.000 ft^3
Volume (Retained)	626.000 ft^3
Volume (Unrouted)	0.000 ft^3
Error (Mass Balance)	0.0 %

Peak Discharge	0.0055 ft^3/s
Time to Peak	16.550 hours
Hydrograph Volume	236.462 ft^3

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)
11.600	0.0010	0.0012	0.0014	0.0017	0.0020
11.850	0.0025	0.0030	0.0037	0.0049	0.0055
12.100	0.0055	0.0055	0.0055	0.0055	0.0055
12.350	0.0055	0.0055	0.0055	0.0055	0.0055
12.600	0.0055	0.0055	0.0055	0.0055	0.0055
12.850	0.0055	0.0055	0.0055	0.0055	0.0055
13.100	0.0055	0.0055	0.0055	0.0055	0.0055
13.350	0.0055	0.0055	0.0055	0.0055	0.0055
13.600	0.0055	0.0055	0.0055	0.0055	0.0055
13.850	0.0055	0.0055	0.0055	0.0055	0.0055
14.100	0.0055	0.0055	0.0055	0.0055	0.0055
14.350	0.0055	0.0055	0.0055	0.0055	0.0055
14.600	0.0055	0.0055	0.0055	0.0055	0.0055
14.850	0.0055	0.0055	0.0055	0.0055	0.0055
15.100	0.0055	0.0055	0.0055	0.0055	0.0055
15.350	0.0055	0.0055	0.0055	0.0055	0.0055
15.600	0.0055	0.0055	0.0055	0.0055	0.0055
15.850	0.0055	0.0055	0.0055	0.0055	0.0055
16.100	0.0055	0.0055	0.0055	0.0055	0.0055
16.350	0.0055	0.0055	0.0055	0.0055	0.0055
16.600	0.0055	0.0055	0.0055	0.0055	0.0055
16.850	0.0055	0.0055	0.0055	0.0055	0.0055
17.100	0.0055	0.0055	0.0055	0.0055	0.0055
17.350	0.0055	0.0055	0.0055	0.0055	0.0055
17.600	0.0055	0.0055	0.0055	0.0055	0.0055
17.850	0.0055	0.0055	0.0055	0.0055	0.0055
18.100	0.0055	0.0055	0.0055	0.0055	0.0055
18.350	0.0055	0.0055	0.0055	0.0055	0.0055
18.600	0.0055	0.0055	0.0055	0.0055	0.0055
18.850	0.0055	0.0055	0.0055	0.0055	0.0055
19.100	0.0055	0.0055	0.0055	0.0055	0.0055
19.350	0.0055	0.0055	0.0055	0.0055	0.0055
19.600	0.0055	0.0055	0.0055	0.0055	0.0055
19.850	0.0055	0.0055	0.0055	0.0055	0.0055
20.100	0.0055	0.0055	0.0055	0.0055	0.0055
20.350	0.0055	0.0055	0.0055	0.0055	0.0055
20.600	0.0055	0.0055	0.0055	0.0055	0.0055
20.850	0.0055	0.0055	0.0055	0.0055	0.0055
21.100	0.0055	0.0055	0.0055	0.0055	0.0055

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)
21.350	0.0055	0.0055	0.0055	0.0055	0.0055
21.600	0.0055	0.0055	0.0055	0.0055	0.0055
21.850	0.0055	0.0055	0.0055	0.0055	0.0055
22.100	0.0055	0.0055	0.0055	0.0055	0.0055
22.350	0.0055	0.0055	0.0055	0.0055	0.0055
22.600	0.0055	0.0055	0.0055	0.0055	0.0055
22.850	0.0054	0.0053	0.0052	0.0051	0.0050
23.100	0.0050	0.0049	0.0048	0.0047	0.0046
23.350	0.0045	0.0044	0.0044	0.0043	0.0042
23.600	0.0041	0.0041	0.0040	0.0039	0.0039
23.850	0.0038	0.0037	0.0037	0.0036	(N/A)

Peak Discharge	0.0055 ft^3/s
Time to Peak	15.650 hours
Hydrograph Volume	265.329 ft^3

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)
9.700	0.0010	0.0011	0.0011	0.0012	0.0013
9.950	0.0013	0.0014	0.0015	0.0016	0.0016
10.200	0.0017	0.0018	0.0019	0.0020	0.0021
10.450	0.0022	0.0023	0.0024	0.0025	0.0026
10.700	0.0027	0.0029	0.0030	0.0031	0.0033
10.950	0.0034	0.0035	0.0037	0.0039	0.0040
11.200	0.0042	0.0044	0.0047	0.0049	0.0052
11.450	0.0054	0.0055	0.0055	0.0055	0.0055
11.700	0.0055	0.0055	0.0055	0.0055	0.0055
11.950	0.0055	0.0055	0.0055	0.0055	0.0055
12.200	0.0055	0.0055	0.0055	0.0055	0.0055
12.450	0.0055	0.0055	0.0055	0.0055	0.0055
12.700	0.0055	0.0055	0.0055	0.0055	0.0055
12.950	0.0055	0.0055	0.0055	0.0055	0.0055
13.200	0.0055	0.0055	0.0055	0.0055	0.0055
13.450	0.0055	0.0055	0.0055	0.0055	0.0055
13.700	0.0055	0.0055	0.0055	0.0055	0.0055
13.950	0.0055	0.0055	0.0055	0.0055	0.0055
14.200	0.0055	0.0055	0.0055	0.0055	0.0055
14.450	0.0055	0.0055	0.0055	0.0055	0.0055
14.700	0.0055	0.0055	0.0055	0.0055	0.0055
14.950	0.0055	0.0055	0.0055	0.0055	0.0055
15.200	0.0055	0.0055	0.0055	0.0055	0.0055
15.450	0.0055	0.0055	0.0055	0.0055	0.0055
15.700	0.0055	0.0055	0.0055	0.0055	0.0055
15.950	0.0055	0.0055	0.0055	0.0055	0.0055
16.200	0.0055	0.0055	0.0055	0.0055	0.0055
16.450	0.0055	0.0055	0.0055	0.0055	0.0055
16.700	0.0055	0.0055	0.0055	0.0055	0.0055
16.950	0.0055	0.0055	0.0055	0.0055	0.0055
17.200	0.0055	0.0055	0.0055	0.0055	0.0055
17.450	0.0055	0.0055	0.0055	0.0055	0.0055
17.700	0.0055	0.0055	0.0055	0.0055	0.0055
17.950	0.0055	0.0055	0.0055	0.0055	0.0055
18.200	0.0055	0.0055	0.0055	0.0055	0.0055
18.450	0.0055	0.0055	0.0055	0.0055	0.0055
18.700	0.0055	0.0055	0.0055	0.0055	0.0055
18.950	0.0055	0.0055	0.0055	0.0055	0.0055
19.200	0.0055	0.0055	0.0055	0.0055	0.0055

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	0.0055	0.0055	0.0055	0.0055	0.0055
19.700	0.0055	0.0055	0.0055	0.0055	0.0055
19.950	0.0055	0.0055	0.0055	0.0055	0.0055
20.200	0.0055	0.0055	0.0055	0.0055	0.0055
20.450	0.0055	0.0055	0.0055	0.0055	0.0055
20.700	0.0055	0.0055	0.0055	0.0055	0.0055
20.950	0.0055	0.0055	0.0055	0.0055	0.0055
21.200	0.0055	0.0055	0.0055	0.0055	0.0055
21.450	0.0055	0.0055	0.0055	0.0055	0.0055
21.700	0.0055	0.0055	0.0055	0.0055	0.0055
21.950	0.0055	0.0055	0.0055	0.0055	0.0055
22.200	0.0055	0.0055	0.0055	0.0055	0.0055
22.450	0.0055	0.0055	0.0055	0.0055	0.0055
22.700	0.0055	0.0055	0.0055	0.0055	0.0055
22.950	0.0055	0.0055	0.0055	0.0055	0.0055
23.200	0.0055	0.0055	0.0055	0.0055	0.0055
23.450	0.0055	0.0055	0.0055	0.0055	0.0055
23.700	0.0055	0.0055	0.0055	0.0055	0.0055
23.950	0.0055	0.0055	(N/A)	(N/A)	(N/A)

Peak Discharge	0.0055 ft^3/s
Time to Peak	14.450 hours
Hydrograph Volume	306.790 ft^3

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)
7.450	0.0010	0.0011	0.0012	0.0012	0.0013
7.700	0.0013	0.0014	0.0014	0.0015	0.0016
7.950	0.0016	0.0017	0.0018	0.0018	0.0019
8.200	0.0020	0.0021	0.0021	0.0022	0.0023
8.450	0.0024	0.0025	0.0026	0.0027	0.0028
8.700	0.0029	0.0030	0.0031	0.0033	0.0034
8.950	0.0035	0.0036	0.0038	0.0039	0.0041
9.200	0.0042	0.0043	0.0045	0.0046	0.0048
9.450	0.0050	0.0051	0.0053	0.0055	0.0055
9.700	0.0055	0.0055	0.0055	0.0055	0.0055
9.950	0.0055	0.0055	0.0055	0.0055	0.0055
10.200	0.0055	0.0055	0.0055	0.0055	0.0055
10.450	0.0055	0.0055	0.0055	0.0055	0.0055
10.700	0.0055	0.0055	0.0055	0.0055	0.0055
10.950	0.0055	0.0055	0.0055	0.0055	0.0055
11.200	0.0055	0.0055	0.0055	0.0055	0.0055
11.450	0.0055	0.0055	0.0055	0.0055	0.0055
11.700	0.0055	0.0055	0.0055	0.0055	0.0055
11.950	0.0055	0.0055	0.0055	0.0055	0.0055
12.200	0.0055	0.0055	0.0055	0.0055	0.0055
12.450	0.0055	0.0055	0.0055	0.0055	0.0055
12.700	0.0055	0.0055	0.0055	0.0055	0.0055
12.950	0.0055	0.0055	0.0055	0.0055	0.0055
13.200	0.0055	0.0055	0.0055	0.0055	0.0055
13.450	0.0055	0.0055	0.0055	0.0055	0.0055
13.700	0.0055	0.0055	0.0055	0.0055	0.0055
13.950	0.0055	0.0055	0.0055	0.0055	0.0055
14.200	0.0055	0.0055	0.0055	0.0055	0.0055
14.450	0.0055	0.0055	0.0055	0.0055	0.0055
14.700	0.0055	0.0055	0.0055	0.0055	0.0055
14.950	0.0055	0.0055	0.0055	0.0055	0.0055
15.200	0.0055	0.0055	0.0055	0.0055	0.0055
15.450	0.0055	0.0055	0.0055	0.0055	0.0055
15.700	0.0055	0.0055	0.0055	0.0055	0.0055
15.950	0.0055	0.0055	0.0055	0.0055	0.0055
16.200	0.0055	0.0055	0.0055	0.0055	0.0055
16.450	0.0055	0.0055	0.0055	0.0055	0.0055
16.700	0.0055	0.0055	0.0055	0.0055	0.0055
16.950	0.0055	0.0055	0.0055	0.0055	0.0055

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)
17.200	0.0055	0.0055	0.0055	0.0055	0.0055
17.450	0.0055	0.0055	0.0055	0.0055	0.0055
17.700	0.0055	0.0055	0.0055	0.0055	0.0055
17.950	0.0055	0.0055	0.0055	0.0055	0.0055
18.200	0.0055	0.0055	0.0055	0.0055	0.0055
18.450	0.0055	0.0055	0.0055	0.0055	0.0055
18.700	0.0055	0.0055	0.0055	0.0055	0.0055
18.950	0.0055	0.0055	0.0055	0.0055	0.0055
19.200	0.0055	0.0055	0.0055	0.0055	0.0055
19.450	0.0055	0.0055	0.0055	0.0055	0.0055
19.700	0.0055	0.0055	0.0055	0.0055	0.0055
19.950	0.0055	0.0055	0.0055	0.0055	0.0055
20.200	0.0055	0.0055	0.0055	0.0055	0.0055
20.450	0.0055	0.0055	0.0055	0.0055	0.0055
20.700	0.0055	0.0055	0.0055	0.0055	0.0055
20.950	0.0055	0.0055	0.0055	0.0055	0.0055
21.200	0.0055	0.0055	0.0055	0.0055	0.0055
21.450	0.0055	0.0055	0.0055	0.0055	0.0055
21.700	0.0055	0.0055	0.0055	0.0055	0.0055
21.950	0.0055	0.0055	0.0055	0.0055	0.0055
22.200	0.0055	0.0055	0.0055	0.0055	0.0055
22.450	0.0055	0.0055	0.0055	0.0055	0.0055
22.700	0.0055	0.0055	0.0055	0.0055	0.0055
22.950	0.0055	0.0055	0.0055	0.0055	0.0055
23.200	0.0055	0.0055	0.0055	0.0055	0.0055
23.450	0.0055	0.0055	0.0055	0.0055	0.0055
23.700	0.0055	0.0055	0.0055	0.0055	0.0055
23.950	0.0055	0.0055	(N/A)	(N/A)	(N/A)

Peak Discharge	0.0000 ft^3/s
Time to Peak	10.000 hours
Hydrograph Volume	0.000 ft^3

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)
0.000	0.0000	0.0000	(N/A)	(N/A)	(N/A)

Peak Discharge	0.0000 ft^3/s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ft^3

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)
0.000	0.0000	0.0000	(N/A)	(N/A)	(N/A)

Peak Discharge	0.3447 ft^3/s
Time to Peak	12.200 hours
Hydrograph Volume	643.052 ft^3

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)
12.100	0.0000	0.0367	0.3447	0.2214	0.1990
12.350	0.1727	0.1491	0.1254	0.1015	0.0820
12.600	0.0677	0.0587	0.0551	0.0523	0.0498
12.850	0.0473	0.0448	0.0423	0.0397	0.0376
13.100	0.0359	0.0347	0.0340	0.0333	0.0326
13.350	0.0320	0.0313	0.0307	0.0300	0.0294
13.600	0.0287	0.0280	0.0274	0.0267	0.0261
13.850	0.0254	0.0247	0.0241	0.0234	0.0228
14.100	0.0223	0.0219	0.0216	0.0212	0.0209
14.350	0.0206	0.0203	0.0200	0.0196	0.0193
14.600	0.0190	0.0187	0.0184	0.0180	0.0177
14.850	0.0174	0.0171	0.0168	0.0164	0.0161
15.100	0.0158	0.0155	0.0152	0.0148	0.0145
15.350	0.0142	0.0139	0.0135	0.0132	0.0129
15.600	0.0126	0.0122	0.0119	0.0116	0.0113
15.850	0.0109	0.0106	0.0103	0.0100	0.0097
16.100	0.0095	0.0092	0.0091	0.0089	0.0088
16.350	0.0087	0.0085	0.0084	0.0082	0.0081
16.600	0.0079	0.0078	0.0077	0.0075	0.0074
16.850	0.0072	0.0071	0.0070	0.0068	0.0067
17.100	0.0065	0.0064	0.0062	0.0061	0.0060
17.350	0.0058	0.0057	0.0055	0.0054	0.0053
17.600	0.0051	0.0049	0.0048	0.0047	0.0045
17.850	0.0044	0.0043	0.0041	0.0040	0.0038
18.100	0.0037	0.0037	0.0036	0.0036	0.0035
18.350	0.0035	0.0035	0.0034	0.0034	0.0033
18.600	0.0033	0.0032	0.0032	0.0031	0.0031
18.850	0.0031	0.0030	0.0030	0.0029	0.0029
19.100	0.0029	0.0028	0.0028	0.0027	0.0027
19.350	0.0026	0.0026	0.0026	0.0025	0.0025
19.600	0.0024	0.0024	0.0023	0.0023	0.0023
19.850	0.0022	0.0022	0.0021	0.0021	0.0021
20.100	0.0020	0.0020	0.0020	0.0019	0.0019
20.350	0.0018	0.0018	0.0018	0.0018	0.0017
20.600	0.0017	0.0017	0.0016	0.0016	0.0016
20.850	0.0015	0.0015	0.0015	0.0014	0.0014
21.100	0.0014	0.0013	0.0013	0.0013	0.0012
21.350	0.0012	0.0012	0.0011	0.0011	0.0011
21.600	0.0010	(N/A)	(N/A)	(N/A)	(N/A)

Summary for Hydrograph Addition at 'DW-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-1D

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	PDA-1D	263.718	12.100	0.0751
Flow (In)	DW-1	263.718	12.100	0.0751

Summary for Hydrograph Addition at 'DW-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-1D

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	PDA-1D	711.005	12.100	0.2033
Flow (In)	DW-1	711.005	12.100	0.2033

Summary for Hydrograph Addition at 'DW-1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-1D

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	PDA-1D	1,582.780	12.100	0.4377
Flow (In)	DW-1	1,582.780	12.100	0.4377

Subsection: Elevation-Volume-Flow Table (Pond)
Label: DW-2

Return Event: 1 years
Storm Event: 1 YR

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0055 ft^3/s

Initial Conditions	
Elevation (Water Surface, Initial)	77.33 ft
Volume (Initial)	0.000 ft^3
Flow (Initial Outlet)	0.0000 ft^3/s
Flow (Initial Infiltration)	0.0000 ft^3/s
Flow (Initial, Total)	0.0000 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)
77.33	0.0000	0.000	78.500	0.0000	0.0000	0.0000
77.83	0.0000	39.250	78.500	0.0055	0.0055	0.4416
78.33	0.0000	78.500	78.500	0.0055	0.0055	0.8777
78.83	0.0000	117.750	78.500	0.0055	0.0055	1.3138
79.33	0.0000	157.000	78.500	0.0055	0.0055	1.7499
79.83	0.0000	196.250	78.500	0.0055	0.0055	2.1861
80.33	0.0000	235.500	78.500	0.0055	0.0055	2.6222
80.83	0.0000	274.750	78.500	0.0055	0.0055	3.0583
81.33	0.0000	314.000	78.500	0.0055	0.0055	3.4944
81.83	0.0000	353.250	78.500	0.0055	0.0055	3.9305
82.33	0.0000	392.500	78.500	0.0055	0.0055	4.3666
82.83	0.0000	431.750	78.500	0.0055	0.0055	4.8027
83.33	0.0000	471.000	78.500	0.0055	0.0055	5.2388
83.83	0.0000	510.250	78.500	0.0055	0.0055	5.6749
84.33	0.0000	549.500	78.500	0.0055	0.0055	6.1111
84.83	0.0000	588.750	78.500	0.0055	0.0055	6.5472
85.33	0.0000	628.000	78.500	0.0055	0.0055	6.9833
85.83	0.5750	667.250	78.500	0.0055	0.5805	7.9944
86.33	2.0506	706.500	78.500	0.0055	2.0561	9.9061
86.83	3.4386	745.750	78.500	0.0055	3.4441	11.7302
87.33	4.5358	785.000	78.500	0.0055	4.5413	13.2635
87.83	5.4817	821.436	61.781	0.0055	5.4872	14.6142
88.33	6.2995	846.756	40.260	0.0055	6.3050	15.7134
88.83	7.0329	862.462	23.330	0.0055	7.0384	16.6213
89.33	7.6985	870.851	10.990	0.0055	7.7040	17.3802
89.50	7.9110	872.444	7.840	0.0055	7.9165	17.6103

Subsection: Level Pool Pond Routing Summary
Label: DW-2 (IN)

Return Event: 1 years
Storm Event: 1 YR

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0055 ft³/s

Initial Conditions	
Elevation (Water Surface, Initial)	77.33 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.0000 ft³/s
Flow (Initial Infiltration)	0.0000 ft³/s
Flow (Initial, Total)	0.0000 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.1008 ft³/s	Time to Peak (Flow, In)	12.100 hours
Infiltration (Peak)	0.0055 ft³/s	Time to Peak (Infiltration)	11.950 hours
Flow (Peak Outlet)	0.0000 ft³/s	Time to Peak (Flow, Outlet)	0.000 hours

Elevation (Water Surface, Peak)	79.81 ft
Volume (Peak)	194.329 ft³

Mass Balance (ft³)	
Volume (Initial)	0.000 ft³
Volume (Total Inflow)	351.000 ft³
Volume (Total Infiltration)	250.000 ft³
Volume (Total Outlet Outflow)	0.000 ft³
Volume (Retained)	101.000 ft³
Volume (Unrouted)	0.000 ft³
Error (Mass Balance)	0.0 %

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0055 ft^3/s

Initial Conditions	
Elevation (Water Surface, Initial)	77.33 ft
Volume (Initial)	0.000 ft^3
Flow (Initial Outlet)	0.0000 ft^3/s
Flow (Initial Infiltration)	0.0000 ft^3/s
Flow (Initial, Total)	0.0000 ft^3/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.2452 ft^3/s	Time to Peak (Flow, In)	12.100 hours
Infiltration (Peak)	0.0055 ft^3/s	Time to Peak (Infiltration)	11.000 hours
Flow (Peak Outlet)	0.0000 ft^3/s	Time to Peak (Flow, Outlet)	0.000 hours

Elevation (Water Surface, Peak)	85.19 ft
Volume (Peak)	616.782 ft^3

Mass Balance (ft^3)	
Volume (Initial)	0.000 ft^3
Volume (Total Inflow)	869.000 ft^3
Volume (Total Infiltration)	283.000 ft^3
Volume (Total Outlet Outflow)	0.000 ft^3
Volume (Retained)	586.000 ft^3
Volume (Unrouted)	0.000 ft^3
Error (Mass Balance)	0.0 %

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0055 ft^3/s

Initial Conditions	
Elevation (Water Surface, Initial)	77.33 ft
Volume (Initial)	0.000 ft^3
Flow (Initial Outlet)	0.0000 ft^3/s
Flow (Initial Infiltration)	0.0000 ft^3/s
Flow (Initial, Total)	0.0000 ft^3/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.6418 ft^3/s	Time to Peak (Flow, In)	12.200 hours
Infiltration (Peak)	0.0055 ft^3/s	Time to Peak (Infiltration)	8.950 hours
Flow (Peak Outlet)	0.5510 ft^3/s	Time to Peak (Flow, Outlet)	12.250 hours

Elevation (Water Surface, Peak)	85.81 ft
Volume (Peak)	665.612 ft^3

Mass Balance (ft^3)	
Volume (Initial)	0.000 ft^3
Volume (Total Inflow)	2,487.000 ft^3
Volume (Total Infiltration)	327.000 ft^3
Volume (Total Outlet Outflow)	1,533.000 ft^3
Volume (Retained)	627.000 ft^3
Volume (Unrouted)	0.000 ft^3
Error (Mass Balance)	0.0 %

Peak Discharge	0.0055 ft^3/s
Time to Peak	15.950 hours
Hydrograph Volume	246.547 ft^3

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)
11.000	0.0010	0.0011	0.0011	0.0012	0.0013
11.250	0.0014	0.0015	0.0016	0.0017	0.0018
11.500	0.0019	0.0021	0.0023	0.0025	0.0029
11.750	0.0033	0.0038	0.0045	0.0052	0.0055
12.000	0.0055	0.0055	0.0055	0.0055	0.0055
12.250	0.0055	0.0055	0.0055	0.0055	0.0055
12.500	0.0055	0.0055	0.0055	0.0055	0.0055
12.750	0.0055	0.0055	0.0055	0.0055	0.0055
13.000	0.0055	0.0055	0.0055	0.0055	0.0055
13.250	0.0055	0.0055	0.0055	0.0055	0.0055
13.500	0.0055	0.0055	0.0055	0.0055	0.0055
13.750	0.0055	0.0055	0.0055	0.0055	0.0055
14.000	0.0055	0.0055	0.0055	0.0055	0.0055
14.250	0.0055	0.0055	0.0055	0.0055	0.0055
14.500	0.0055	0.0055	0.0055	0.0055	0.0055
14.750	0.0055	0.0055	0.0055	0.0055	0.0055
15.000	0.0055	0.0055	0.0055	0.0055	0.0055
15.250	0.0055	0.0055	0.0055	0.0055	0.0055
15.500	0.0055	0.0055	0.0055	0.0055	0.0055
15.750	0.0055	0.0055	0.0055	0.0055	0.0055
16.000	0.0055	0.0055	0.0055	0.0055	0.0055
16.250	0.0055	0.0055	0.0055	0.0055	0.0055
16.500	0.0055	0.0055	0.0055	0.0055	0.0055
16.750	0.0055	0.0055	0.0055	0.0055	0.0055
17.000	0.0055	0.0055	0.0055	0.0055	0.0055
17.250	0.0055	0.0055	0.0055	0.0055	0.0055
17.500	0.0055	0.0055	0.0055	0.0055	0.0055
17.750	0.0055	0.0055	0.0055	0.0055	0.0055
18.000	0.0055	0.0055	0.0055	0.0055	0.0055
18.250	0.0055	0.0055	0.0055	0.0055	0.0055
18.500	0.0055	0.0055	0.0055	0.0055	0.0055
18.750	0.0055	0.0055	0.0055	0.0055	0.0055
19.000	0.0055	0.0055	0.0055	0.0055	0.0055
19.250	0.0055	0.0055	0.0055	0.0055	0.0055
19.500	0.0055	0.0055	0.0055	0.0055	0.0055
19.750	0.0055	0.0055	0.0055	0.0055	0.0055
20.000	0.0055	0.0055	0.0055	0.0055	0.0055
20.250	0.0055	0.0055	0.0055	0.0055	0.0055
20.500	0.0055	0.0055	0.0055	0.0055	0.0055

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)
20.750	0.0055	0.0055	0.0055	0.0055	0.0055
21.000	0.0055	0.0055	0.0055	0.0055	0.0055
21.250	0.0055	0.0055	0.0055	0.0055	0.0055
21.500	0.0055	0.0055	0.0055	0.0055	0.0055
21.750	0.0055	0.0055	0.0055	0.0055	0.0055
22.000	0.0055	0.0055	0.0055	0.0055	0.0055
22.250	0.0055	0.0055	0.0055	0.0055	0.0055
22.500	0.0055	0.0055	0.0055	0.0055	0.0055
22.750	0.0055	0.0055	0.0055	0.0055	0.0055
23.000	0.0055	0.0055	0.0055	0.0055	0.0055
23.250	0.0055	0.0055	0.0055	0.0055	0.0055
23.500	0.0055	0.0055	0.0055	0.0055	0.0055
23.750	0.0055	0.0055	0.0055	0.0055	0.0055
24.000	0.0055	(N/A)	(N/A)	(N/A)	(N/A)

Peak Discharge	0.0055 ft^3/s
Time to Peak	15.300 hours
Hydrograph Volume	279.062 ft^3

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)
8.900	0.0010	0.0011	0.0012	0.0012	0.0013
9.150	0.0013	0.0014	0.0015	0.0015	0.0016
9.400	0.0017	0.0018	0.0018	0.0019	0.0020
9.650	0.0021	0.0022	0.0023	0.0024	0.0024
9.900	0.0025	0.0026	0.0027	0.0028	0.0029
10.150	0.0031	0.0032	0.0033	0.0034	0.0035
10.400	0.0037	0.0038	0.0040	0.0041	0.0043
10.650	0.0044	0.0046	0.0047	0.0049	0.0051
10.900	0.0053	0.0055	0.0055	0.0055	0.0055
11.150	0.0055	0.0055	0.0055	0.0055	0.0055
11.400	0.0055	0.0055	0.0055	0.0055	0.0055
11.650	0.0055	0.0055	0.0055	0.0055	0.0055
11.900	0.0055	0.0055	0.0055	0.0055	0.0055
12.150	0.0055	0.0055	0.0055	0.0055	0.0055
12.400	0.0055	0.0055	0.0055	0.0055	0.0055
12.650	0.0055	0.0055	0.0055	0.0055	0.0055
12.900	0.0055	0.0055	0.0055	0.0055	0.0055
13.150	0.0055	0.0055	0.0055	0.0055	0.0055
13.400	0.0055	0.0055	0.0055	0.0055	0.0055
13.650	0.0055	0.0055	0.0055	0.0055	0.0055
13.900	0.0055	0.0055	0.0055	0.0055	0.0055
14.150	0.0055	0.0055	0.0055	0.0055	0.0055
14.400	0.0055	0.0055	0.0055	0.0055	0.0055
14.650	0.0055	0.0055	0.0055	0.0055	0.0055
14.900	0.0055	0.0055	0.0055	0.0055	0.0055
15.150	0.0055	0.0055	0.0055	0.0055	0.0055
15.400	0.0055	0.0055	0.0055	0.0055	0.0055
15.650	0.0055	0.0055	0.0055	0.0055	0.0055
15.900	0.0055	0.0055	0.0055	0.0055	0.0055
16.150	0.0055	0.0055	0.0055	0.0055	0.0055
16.400	0.0055	0.0055	0.0055	0.0055	0.0055
16.650	0.0055	0.0055	0.0055	0.0055	0.0055
16.900	0.0055	0.0055	0.0055	0.0055	0.0055
17.150	0.0055	0.0055	0.0055	0.0055	0.0055
17.400	0.0055	0.0055	0.0055	0.0055	0.0055
17.650	0.0055	0.0055	0.0055	0.0055	0.0055
17.900	0.0055	0.0055	0.0055	0.0055	0.0055
18.150	0.0055	0.0055	0.0055	0.0055	0.0055
18.400	0.0055	0.0055	0.0055	0.0055	0.0055

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)
18.650	0.0055	0.0055	0.0055	0.0055	0.0055
18.900	0.0055	0.0055	0.0055	0.0055	0.0055
19.150	0.0055	0.0055	0.0055	0.0055	0.0055
19.400	0.0055	0.0055	0.0055	0.0055	0.0055
19.650	0.0055	0.0055	0.0055	0.0055	0.0055
19.900	0.0055	0.0055	0.0055	0.0055	0.0055
20.150	0.0055	0.0055	0.0055	0.0055	0.0055
20.400	0.0055	0.0055	0.0055	0.0055	0.0055
20.650	0.0055	0.0055	0.0055	0.0055	0.0055
20.900	0.0055	0.0055	0.0055	0.0055	0.0055
21.150	0.0055	0.0055	0.0055	0.0055	0.0055
21.400	0.0055	0.0055	0.0055	0.0055	0.0055
21.650	0.0055	0.0055	0.0055	0.0055	0.0055
21.900	0.0055	0.0055	0.0055	0.0055	0.0055
22.150	0.0055	0.0055	0.0055	0.0055	0.0055
22.400	0.0055	0.0055	0.0055	0.0055	0.0055
22.650	0.0055	0.0055	0.0055	0.0055	0.0055
22.900	0.0055	0.0055	0.0055	0.0055	0.0055
23.150	0.0055	0.0055	0.0055	0.0055	0.0055
23.400	0.0055	0.0055	0.0055	0.0055	0.0055
23.650	0.0055	0.0055	0.0055	0.0055	0.0055
23.900	0.0055	0.0055	0.0055	(N/A)	(N/A)

Peak Discharge	0.0055 ft^3/s
Time to Peak	14.000 hours
Hydrograph Volume	322.878 ft^3

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)
6.500	0.0010	0.0011	0.0011	0.0012	0.0012
6.750	0.0013	0.0013	0.0014	0.0014	0.0015
7.000	0.0016	0.0016	0.0017	0.0018	0.0018
7.250	0.0019	0.0020	0.0020	0.0021	0.0022
7.500	0.0023	0.0023	0.0024	0.0025	0.0026
7.750	0.0027	0.0027	0.0028	0.0029	0.0030
8.000	0.0031	0.0032	0.0033	0.0034	0.0035
8.250	0.0036	0.0037	0.0038	0.0040	0.0041
8.500	0.0042	0.0043	0.0045	0.0046	0.0047
8.750	0.0049	0.0050	0.0052	0.0054	0.0055
9.000	0.0055	0.0055	0.0055	0.0055	0.0055
9.250	0.0055	0.0055	0.0055	0.0055	0.0055
9.500	0.0055	0.0055	0.0055	0.0055	0.0055
9.750	0.0055	0.0055	0.0055	0.0055	0.0055
10.000	0.0055	0.0055	0.0055	0.0055	0.0055
10.250	0.0055	0.0055	0.0055	0.0055	0.0055
10.500	0.0055	0.0055	0.0055	0.0055	0.0055
10.750	0.0055	0.0055	0.0055	0.0055	0.0055
11.000	0.0055	0.0055	0.0055	0.0055	0.0055
11.250	0.0055	0.0055	0.0055	0.0055	0.0055
11.500	0.0055	0.0055	0.0055	0.0055	0.0055
11.750	0.0055	0.0055	0.0055	0.0055	0.0055
12.000	0.0055	0.0055	0.0055	0.0055	0.0055
12.250	0.0055	0.0055	0.0055	0.0055	0.0055
12.500	0.0055	0.0055	0.0055	0.0055	0.0055
12.750	0.0055	0.0055	0.0055	0.0055	0.0055
13.000	0.0055	0.0055	0.0055	0.0055	0.0055
13.250	0.0055	0.0055	0.0055	0.0055	0.0055
13.500	0.0055	0.0055	0.0055	0.0055	0.0055
13.750	0.0055	0.0055	0.0055	0.0055	0.0055
14.000	0.0055	0.0055	0.0055	0.0055	0.0055
14.250	0.0055	0.0055	0.0055	0.0055	0.0055
14.500	0.0055	0.0055	0.0055	0.0055	0.0055
14.750	0.0055	0.0055	0.0055	0.0055	0.0055
15.000	0.0055	0.0055	0.0055	0.0055	0.0055
15.250	0.0055	0.0055	0.0055	0.0055	0.0055
15.500	0.0055	0.0055	0.0055	0.0055	0.0055
15.750	0.0055	0.0055	0.0055	0.0055	0.0055
16.000	0.0055	0.0055	0.0055	0.0055	0.0055

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)
16.250	0.0055	0.0055	0.0055	0.0055	0.0055
16.500	0.0055	0.0055	0.0055	0.0055	0.0055
16.750	0.0055	0.0055	0.0055	0.0055	0.0055
17.000	0.0055	0.0055	0.0055	0.0055	0.0055
17.250	0.0055	0.0055	0.0055	0.0055	0.0055
17.500	0.0055	0.0055	0.0055	0.0055	0.0055
17.750	0.0055	0.0055	0.0055	0.0055	0.0055
18.000	0.0055	0.0055	0.0055	0.0055	0.0055
18.250	0.0055	0.0055	0.0055	0.0055	0.0055
18.500	0.0055	0.0055	0.0055	0.0055	0.0055
18.750	0.0055	0.0055	0.0055	0.0055	0.0055
19.000	0.0055	0.0055	0.0055	0.0055	0.0055
19.250	0.0055	0.0055	0.0055	0.0055	0.0055
19.500	0.0055	0.0055	0.0055	0.0055	0.0055
19.750	0.0055	0.0055	0.0055	0.0055	0.0055
20.000	0.0055	0.0055	0.0055	0.0055	0.0055
20.250	0.0055	0.0055	0.0055	0.0055	0.0055
20.500	0.0055	0.0055	0.0055	0.0055	0.0055
20.750	0.0055	0.0055	0.0055	0.0055	0.0055
21.000	0.0055	0.0055	0.0055	0.0055	0.0055
21.250	0.0055	0.0055	0.0055	0.0055	0.0055
21.500	0.0055	0.0055	0.0055	0.0055	0.0055
21.750	0.0055	0.0055	0.0055	0.0055	0.0055
22.000	0.0055	0.0055	0.0055	0.0055	0.0055
22.250	0.0055	0.0055	0.0055	0.0055	0.0055
22.500	0.0055	0.0055	0.0055	0.0055	0.0055
22.750	0.0055	0.0055	0.0055	0.0055	0.0055
23.000	0.0055	0.0055	0.0055	0.0055	0.0055
23.250	0.0055	0.0055	0.0055	0.0055	0.0055
23.500	0.0055	0.0055	0.0055	0.0055	0.0055
23.750	0.0055	0.0055	0.0055	0.0055	0.0055
24.000	0.0055	(N/A)	(N/A)	(N/A)	(N/A)

Peak Discharge	0.0000 ft^3/s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ft^3

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)
0.000	0.0000	0.0000	(N/A)	(N/A)	(N/A)

Peak Discharge	0.0000 ft³/s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 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)
0.000	0.0000	0.0000	(N/A)	(N/A)	(N/A)

Peak Discharge	0.5510 ft^3/s
Time to Peak	12.250 hours
Hydrograph Volume	1,531.620 ft^3

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)
12.050	0.0000	0.4159	0.4759	0.5488	0.5510
12.300	0.4227	0.3792	0.3259	0.2758	0.2250
12.550	0.1817	0.1493	0.1282	0.1185	0.1126
12.800	0.1071	0.1017	0.0964	0.0910	0.0857
13.050	0.0810	0.0772	0.0745	0.0727	0.0713
13.300	0.0699	0.0685	0.0671	0.0657	0.0643
13.550	0.0629	0.0615	0.0602	0.0587	0.0573
13.800	0.0559	0.0545	0.0531	0.0517	0.0503
14.050	0.0490	0.0479	0.0470	0.0462	0.0456
14.300	0.0449	0.0442	0.0435	0.0429	0.0422
14.550	0.0415	0.0409	0.0402	0.0395	0.0388
14.800	0.0381	0.0375	0.0368	0.0361	0.0354
15.050	0.0348	0.0340	0.0334	0.0327	0.0320
15.300	0.0313	0.0306	0.0300	0.0293	0.0286
15.550	0.0279	0.0272	0.0265	0.0258	0.0251
15.800	0.0245	0.0238	0.0231	0.0224	0.0217
16.050	0.0211	0.0206	0.0202	0.0198	0.0195
16.300	0.0192	0.0189	0.0186	0.0183	0.0180
16.550	0.0177	0.0174	0.0171	0.0168	0.0165
16.800	0.0162	0.0159	0.0156	0.0153	0.0150
17.050	0.0147	0.0144	0.0141	0.0138	0.0135
17.300	0.0132	0.0129	0.0126	0.0123	0.0120
17.550	0.0117	0.0114	0.0111	0.0108	0.0105
17.800	0.0102	0.0099	0.0096	0.0093	0.0090
18.050	0.0087	0.0085	0.0083	0.0082	0.0082
18.300	0.0080	0.0079	0.0079	0.0078	0.0077
18.550	0.0076	0.0075	0.0074	0.0073	0.0072
18.800	0.0072	0.0071	0.0070	0.0069	0.0068
19.050	0.0067	0.0066	0.0065	0.0064	0.0064
19.300	0.0062	0.0061	0.0061	0.0060	0.0059
19.550	0.0058	0.0057	0.0056	0.0055	0.0054
19.800	0.0054	0.0053	0.0052	0.0051	0.0050
20.050	0.0049	0.0048	0.0047	0.0047	0.0047
20.300	0.0046	0.0045	0.0044	0.0043	0.0043
20.550	0.0042	0.0042	0.0041	0.0040	0.0039
20.800	0.0039	0.0038	0.0037	0.0036	0.0036
21.050	0.0036	0.0035	0.0034	0.0033	0.0032
21.300	0.0032	0.0031	0.0031	0.0030	0.0029
21.550	0.0028	0.0028	0.0027	0.0026	0.0026

Subsection: Pond Routed Hydrograph (total out) Return Event: 100 years
Label: DW-2 (OUT) Storm Event: 100 YR

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)
21.800	0.0025	0.0025	0.0024	0.0023	0.0022
22.050	0.0022	0.0021	0.0020	0.0020	0.0019
22.300	0.0018	0.0017	0.0017	0.0016	0.0015
22.550	0.0015	0.0014	0.0014	0.0013	0.0012
22.800	0.0011	0.0011	0.0010	(N/A)	(N/A)

Summary for Hydrograph Addition at 'DW-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-1C
Outlet-4	DW-1

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	PDA-1C	350.585	12.100	0.1008
Flow (From)	Outlet-4	0.000	10.000	0.0000
Flow (In)	DW-2	350.585	12.100	0.1008

Summary for Hydrograph Addition at 'DW-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-1C
Outlet-4	DW-1

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	PDA-1C	868.773	12.100	0.2452
Flow (From)	Outlet-4	0.000	0.000	0.0000
Flow (In)	DW-2	868.773	12.100	0.2452

Summary for Hydrograph Addition at 'DW-2'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	PDA-1C
Outlet-4	DW-1

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	PDA-1C	1,840.937	12.100	0.4990
Flow (From)	Outlet-4	646.091	12.200	0.3447
Flow (In)	DW-2	2,487.028	12.200	0.6418

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0055 ft³/s

Initial Conditions	
Elevation (Water Surface, Initial)	77.33 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.0000 ft³/s
Flow (Initial Infiltration)	0.0000 ft³/s
Flow (Initial, Total)	0.0000 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)
77.33	0.0000	0.000	78.500	0.0000	0.0000	0.0000
77.83	0.0000	39.250	78.500	0.0055	0.0055	0.4416
78.33	0.0000	78.500	78.500	0.0055	0.0055	0.8777
78.83	0.0000	117.750	78.500	0.0055	0.0055	1.3138
79.33	0.0000	157.000	78.500	0.0055	0.0055	1.7499
79.83	0.0000	196.250	78.500	0.0055	0.0055	2.1861
80.33	0.0000	235.500	78.500	0.0055	0.0055	2.6222
80.83	0.0000	274.750	78.500	0.0055	0.0055	3.0583
81.33	0.0000	314.000	78.500	0.0055	0.0055	3.4944
81.83	0.0000	353.250	78.500	0.0055	0.0055	3.9305
82.33	0.0000	392.500	78.500	0.0055	0.0055	4.3666
82.83	0.0000	431.750	78.500	0.0055	0.0055	4.8027
83.33	0.0000	471.000	78.500	0.0055	0.0055	5.2388
83.83	0.0000	510.250	78.500	0.0055	0.0055	5.6749
84.33	0.0000	549.500	78.500	0.0055	0.0055	6.1111
84.83	0.0000	588.750	78.500	0.0055	0.0055	6.5472
85.33	0.0000	628.000	78.500	0.0055	0.0055	6.9833
85.83	0.6944	667.250	78.500	0.0055	0.6999	8.1138
86.33	2.3454	706.500	78.500	0.0055	2.3509	10.2009
86.83	3.9816	745.750	78.500	0.0055	3.9871	12.2732
87.33	5.0604	785.000	78.500	0.0055	5.0659	13.7882
87.83	5.9426	821.436	61.781	0.0055	5.9481	15.0752
88.33	6.7115	846.756	40.260	0.0055	6.7170	16.1254
88.83	7.3999	862.462	23.330	0.0055	7.4054	16.9883
89.33	8.0317	870.851	10.990	0.0055	8.0372	17.7133
89.50	8.2344	872.444	7.840	0.0055	8.2399	17.9337

Subsection: Level Pool Pond Routing Summary
Label: DW-3 (IN)

Return Event: 1 years
Storm Event: 1 YR

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0055 ft³/s

Initial Conditions	
Elevation (Water Surface, Initial)	77.33 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.0000 ft³/s
Flow (Initial Infiltration)	0.0000 ft³/s
Flow (Initial, Total)	0.0000 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.0790 ft³/s	Time to Peak (Flow, In)	12.100 hours
Infiltration (Peak)	0.0055 ft³/s	Time to Peak (Infiltration)	12.000 hours
Flow (Peak Outlet)	0.0000 ft³/s	Time to Peak (Flow, Outlet)	0.000 hours

Elevation (Water Surface, Peak)	79.11 ft
Volume (Peak)	139.422 ft³

Mass Balance (ft³)	
Volume (Initial)	0.000 ft³
Volume (Total Inflow)	275.000 ft³
Volume (Total Infiltration)	245.000 ft³
Volume (Total Outlet Outflow)	0.000 ft³
Volume (Retained)	30.000 ft³
Volume (Unrouted)	0.000 ft³
Error (Mass Balance)	0.0 %

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0055 ft³/s

Initial Conditions	
Elevation (Water Surface, Initial)	77.33 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.0000 ft³/s
Flow (Initial Infiltration)	0.0000 ft³/s
Flow (Initial, Total)	0.0000 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.1972 ft³/s	Time to Peak (Flow, In)	12.100 hours
Infiltration (Peak)	0.0055 ft³/s	Time to Peak (Infiltration)	11.350 hours
Flow (Peak Outlet)	0.0000 ft³/s	Time to Peak (Flow, Outlet)	0.000 hours

Elevation (Water Surface, Peak)	83.31 ft
Volume (Peak)	469.411 ft³

Mass Balance (ft³)	
Volume (Initial)	0.000 ft³
Volume (Total Inflow)	696.000 ft³
Volume (Total Infiltration)	275.000 ft³
Volume (Total Outlet Outflow)	0.000 ft³
Volume (Retained)	421.000 ft³
Volume (Unrouted)	0.000 ft³
Error (Mass Balance)	0.0 %

Subsection: Level Pool Pond Routing Summary
Label: DW-3 (IN)

Return Event: 100 years
Storm Event: 100 YR

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0055 ft³/s

Initial Conditions	
Elevation (Water Surface, Initial)	77.33 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.0000 ft³/s
Flow (Initial Infiltration)	0.0000 ft³/s
Flow (Initial, Total)	0.0000 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.8227 ft³/s	Time to Peak (Flow, In)	12.100 hours
Infiltration (Peak)	0.0055 ft³/s	Time to Peak (Infiltration)	9.450 hours
Flow (Peak Outlet)	0.8569 ft³/s	Time to Peak (Flow, Outlet)	12.200 hours

Elevation (Water Surface, Peak)	85.88 ft
Volume (Peak)	671.113 ft³

Mass Balance (ft³)	
Volume (Initial)	0.000 ft³
Volume (Total Inflow)	3,026.000 ft³
Volume (Total Infiltration)	318.000 ft³
Volume (Total Outlet Outflow)	2,082.000 ft³
Volume (Retained)	626.000 ft³
Volume (Unrouted)	0.000 ft³
Error (Mass Balance)	0.0 %

Peak Discharge	0.0055 ft^3/s
Time to Peak	16.000 hours
Hydrograph Volume	242.010 ft^3

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)
11.300	0.0010	0.0011	0.0012	0.0012	0.0013
11.550	0.0015	0.0016	0.0018	0.0020	0.0024
11.800	0.0028	0.0033	0.0039	0.0047	0.0055
12.050	0.0055	0.0055	0.0055	0.0055	0.0055
12.300	0.0055	0.0055	0.0055	0.0055	0.0055
12.550	0.0055	0.0055	0.0055	0.0055	0.0055
12.800	0.0055	0.0055	0.0055	0.0055	0.0055
13.050	0.0055	0.0055	0.0055	0.0055	0.0055
13.300	0.0055	0.0055	0.0055	0.0055	0.0055
13.550	0.0055	0.0055	0.0055	0.0055	0.0055
13.800	0.0055	0.0055	0.0055	0.0055	0.0055
14.050	0.0055	0.0055	0.0055	0.0055	0.0055
14.300	0.0055	0.0055	0.0055	0.0055	0.0055
14.550	0.0055	0.0055	0.0055	0.0055	0.0055
14.800	0.0055	0.0055	0.0055	0.0055	0.0055
15.050	0.0055	0.0055	0.0055	0.0055	0.0055
15.300	0.0055	0.0055	0.0055	0.0055	0.0055
15.550	0.0055	0.0055	0.0055	0.0055	0.0055
15.800	0.0055	0.0055	0.0055	0.0055	0.0055
16.050	0.0055	0.0055	0.0055	0.0055	0.0055
16.300	0.0055	0.0055	0.0055	0.0055	0.0055
16.550	0.0055	0.0055	0.0055	0.0055	0.0055
16.800	0.0055	0.0055	0.0055	0.0055	0.0055
17.050	0.0055	0.0055	0.0055	0.0055	0.0055
17.300	0.0055	0.0055	0.0055	0.0055	0.0055
17.550	0.0055	0.0055	0.0055	0.0055	0.0055
17.800	0.0055	0.0055	0.0055	0.0055	0.0055
18.050	0.0055	0.0055	0.0055	0.0055	0.0055
18.300	0.0055	0.0055	0.0055	0.0055	0.0055
18.550	0.0055	0.0055	0.0055	0.0055	0.0055
18.800	0.0055	0.0055	0.0055	0.0055	0.0055
19.050	0.0055	0.0055	0.0055	0.0055	0.0055
19.300	0.0055	0.0055	0.0055	0.0055	0.0055
19.550	0.0055	0.0055	0.0055	0.0055	0.0055
19.800	0.0055	0.0055	0.0055	0.0055	0.0055
20.050	0.0055	0.0055	0.0055	0.0055	0.0055
20.300	0.0055	0.0055	0.0055	0.0055	0.0055
20.550	0.0055	0.0055	0.0055	0.0055	0.0055
20.800	0.0055	0.0055	0.0055	0.0055	0.0055

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)
21.050	0.0055	0.0055	0.0055	0.0055	0.0055
21.300	0.0055	0.0055	0.0055	0.0055	0.0055
21.550	0.0055	0.0055	0.0055	0.0055	0.0055
21.800	0.0055	0.0055	0.0055	0.0055	0.0055
22.050	0.0055	0.0055	0.0055	0.0055	0.0055
22.300	0.0055	0.0055	0.0055	0.0055	0.0055
22.550	0.0055	0.0055	0.0055	0.0055	0.0055
22.800	0.0055	0.0055	0.0055	0.0055	0.0055
23.050	0.0055	0.0055	0.0055	0.0055	0.0055
23.300	0.0055	0.0055	0.0055	0.0054	0.0053
23.550	0.0052	0.0051	0.0050	0.0049	0.0048
23.800	0.0047	0.0046	0.0045	0.0044	0.0044

Peak Discharge	0.0055 ft³/s
Time to Peak	15.550 hours
Hydrograph Volume	271.343 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)
9.250	0.0010	0.0011	0.0011	0.0012	0.0012
9.500	0.0013	0.0014	0.0014	0.0015	0.0015
9.750	0.0016	0.0017	0.0018	0.0018	0.0019
10.000	0.0020	0.0021	0.0021	0.0022	0.0023
10.250	0.0024	0.0025	0.0026	0.0027	0.0028
10.500	0.0029	0.0030	0.0032	0.0033	0.0034
10.750	0.0035	0.0037	0.0038	0.0040	0.0041
11.000	0.0043	0.0044	0.0046	0.0048	0.0050
11.250	0.0052	0.0054	0.0055	0.0055	0.0055
11.500	0.0055	0.0055	0.0055	0.0055	0.0055
11.750	0.0055	0.0055	0.0055	0.0055	0.0055
12.000	0.0055	0.0055	0.0055	0.0055	0.0055
12.250	0.0055	0.0055	0.0055	0.0055	0.0055
12.500	0.0055	0.0055	0.0055	0.0055	0.0055
12.750	0.0055	0.0055	0.0055	0.0055	0.0055
13.000	0.0055	0.0055	0.0055	0.0055	0.0055
13.250	0.0055	0.0055	0.0055	0.0055	0.0055
13.500	0.0055	0.0055	0.0055	0.0055	0.0055
13.750	0.0055	0.0055	0.0055	0.0055	0.0055
14.000	0.0055	0.0055	0.0055	0.0055	0.0055
14.250	0.0055	0.0055	0.0055	0.0055	0.0055
14.500	0.0055	0.0055	0.0055	0.0055	0.0055
14.750	0.0055	0.0055	0.0055	0.0055	0.0055
15.000	0.0055	0.0055	0.0055	0.0055	0.0055
15.250	0.0055	0.0055	0.0055	0.0055	0.0055
15.500	0.0055	0.0055	0.0055	0.0055	0.0055
15.750	0.0055	0.0055	0.0055	0.0055	0.0055
16.000	0.0055	0.0055	0.0055	0.0055	0.0055
16.250	0.0055	0.0055	0.0055	0.0055	0.0055
16.500	0.0055	0.0055	0.0055	0.0055	0.0055
16.750	0.0055	0.0055	0.0055	0.0055	0.0055
17.000	0.0055	0.0055	0.0055	0.0055	0.0055
17.250	0.0055	0.0055	0.0055	0.0055	0.0055
17.500	0.0055	0.0055	0.0055	0.0055	0.0055
17.750	0.0055	0.0055	0.0055	0.0055	0.0055
18.000	0.0055	0.0055	0.0055	0.0055	0.0055
18.250	0.0055	0.0055	0.0055	0.0055	0.0055
18.500	0.0055	0.0055	0.0055	0.0055	0.0055
18.750	0.0055	0.0055	0.0055	0.0055	0.0055

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)
19.000	0.0055	0.0055	0.0055	0.0055	0.0055
19.250	0.0055	0.0055	0.0055	0.0055	0.0055
19.500	0.0055	0.0055	0.0055	0.0055	0.0055
19.750	0.0055	0.0055	0.0055	0.0055	0.0055
20.000	0.0055	0.0055	0.0055	0.0055	0.0055
20.250	0.0055	0.0055	0.0055	0.0055	0.0055
20.500	0.0055	0.0055	0.0055	0.0055	0.0055
20.750	0.0055	0.0055	0.0055	0.0055	0.0055
21.000	0.0055	0.0055	0.0055	0.0055	0.0055
21.250	0.0055	0.0055	0.0055	0.0055	0.0055
21.500	0.0055	0.0055	0.0055	0.0055	0.0055
21.750	0.0055	0.0055	0.0055	0.0055	0.0055
22.000	0.0055	0.0055	0.0055	0.0055	0.0055
22.250	0.0055	0.0055	0.0055	0.0055	0.0055
22.500	0.0055	0.0055	0.0055	0.0055	0.0055
22.750	0.0055	0.0055	0.0055	0.0055	0.0055
23.000	0.0055	0.0055	0.0055	0.0055	0.0055
23.250	0.0055	0.0055	0.0055	0.0055	0.0055
23.500	0.0055	0.0055	0.0055	0.0055	0.0055
23.750	0.0055	0.0055	0.0055	0.0055	0.0055
24.000	0.0055	(N/A)	(N/A)	(N/A)	(N/A)

Peak Discharge	0.0055 ft^3/s
Time to Peak	14.300 hours
Hydrograph Volume	313.665 ft^3

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)
6.950	0.0010	0.0011	0.0011	0.0012	0.0012
7.200	0.0013	0.0013	0.0014	0.0014	0.0015
7.450	0.0016	0.0016	0.0017	0.0017	0.0018
7.700	0.0019	0.0019	0.0020	0.0021	0.0021
7.950	0.0022	0.0023	0.0023	0.0024	0.0025
8.200	0.0026	0.0027	0.0028	0.0028	0.0029
8.450	0.0030	0.0031	0.0032	0.0033	0.0035
8.700	0.0036	0.0037	0.0038	0.0039	0.0040
8.950	0.0042	0.0043	0.0044	0.0046	0.0047
9.200	0.0049	0.0050	0.0052	0.0053	0.0055
9.450	0.0055	0.0055	0.0055	0.0055	0.0055
9.700	0.0055	0.0055	0.0055	0.0055	0.0055
9.950	0.0055	0.0055	0.0055	0.0055	0.0055
10.200	0.0055	0.0055	0.0055	0.0055	0.0055
10.450	0.0055	0.0055	0.0055	0.0055	0.0055
10.700	0.0055	0.0055	0.0055	0.0055	0.0055
10.950	0.0055	0.0055	0.0055	0.0055	0.0055
11.200	0.0055	0.0055	0.0055	0.0055	0.0055
11.450	0.0055	0.0055	0.0055	0.0055	0.0055
11.700	0.0055	0.0055	0.0055	0.0055	0.0055
11.950	0.0055	0.0055	0.0055	0.0055	0.0055
12.200	0.0055	0.0055	0.0055	0.0055	0.0055
12.450	0.0055	0.0055	0.0055	0.0055	0.0055
12.700	0.0055	0.0055	0.0055	0.0055	0.0055
12.950	0.0055	0.0055	0.0055	0.0055	0.0055
13.200	0.0055	0.0055	0.0055	0.0055	0.0055
13.450	0.0055	0.0055	0.0055	0.0055	0.0055
13.700	0.0055	0.0055	0.0055	0.0055	0.0055
13.950	0.0055	0.0055	0.0055	0.0055	0.0055
14.200	0.0055	0.0055	0.0055	0.0055	0.0055
14.450	0.0055	0.0055	0.0055	0.0055	0.0055
14.700	0.0055	0.0055	0.0055	0.0055	0.0055
14.950	0.0055	0.0055	0.0055	0.0055	0.0055
15.200	0.0055	0.0055	0.0055	0.0055	0.0055
15.450	0.0055	0.0055	0.0055	0.0055	0.0055
15.700	0.0055	0.0055	0.0055	0.0055	0.0055
15.950	0.0055	0.0055	0.0055	0.0055	0.0055
16.200	0.0055	0.0055	0.0055	0.0055	0.0055
16.450	0.0055	0.0055	0.0055	0.0055	0.0055

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)
16.700	0.0055	0.0055	0.0055	0.0055	0.0055
16.950	0.0055	0.0055	0.0055	0.0055	0.0055
17.200	0.0055	0.0055	0.0055	0.0055	0.0055
17.450	0.0055	0.0055	0.0055	0.0055	0.0055
17.700	0.0055	0.0055	0.0055	0.0055	0.0055
17.950	0.0055	0.0055	0.0055	0.0055	0.0055
18.200	0.0055	0.0055	0.0055	0.0055	0.0055
18.450	0.0055	0.0055	0.0055	0.0055	0.0055
18.700	0.0055	0.0055	0.0055	0.0055	0.0055
18.950	0.0055	0.0055	0.0055	0.0055	0.0055
19.200	0.0055	0.0055	0.0055	0.0055	0.0055
19.450	0.0055	0.0055	0.0055	0.0055	0.0055
19.700	0.0055	0.0055	0.0055	0.0055	0.0055
19.950	0.0055	0.0055	0.0055	0.0055	0.0055
20.200	0.0055	0.0055	0.0055	0.0055	0.0055
20.450	0.0055	0.0055	0.0055	0.0055	0.0055
20.700	0.0055	0.0055	0.0055	0.0055	0.0055
20.950	0.0055	0.0055	0.0055	0.0055	0.0055
21.200	0.0055	0.0055	0.0055	0.0055	0.0055
21.450	0.0055	0.0055	0.0055	0.0055	0.0055
21.700	0.0055	0.0055	0.0055	0.0055	0.0055
21.950	0.0055	0.0055	0.0055	0.0055	0.0055
22.200	0.0055	0.0055	0.0055	0.0055	0.0055
22.450	0.0055	0.0055	0.0055	0.0055	0.0055
22.700	0.0055	0.0055	0.0055	0.0055	0.0055
22.950	0.0055	0.0055	0.0055	0.0055	0.0055
23.200	0.0055	0.0055	0.0055	0.0055	0.0055
23.450	0.0055	0.0055	0.0055	0.0055	0.0055
23.700	0.0055	0.0055	0.0055	0.0055	0.0055
23.950	0.0055	0.0055	(N/A)	(N/A)	(N/A)

Subsection: Pond Routed Hydrograph (total out) Return Event: 1 years
Label: DW-3 (OUT) Storm Event: 1 YR

Peak Discharge	0.0000 ft^3/s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ft^3

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)
0.000	0.0000	0.0000	(N/A)	(N/A)	(N/A)

Peak Discharge	0.0000 ft³/s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 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)
0.000	0.0000	0.0000	(N/A)	(N/A)	(N/A)

Peak Discharge	0.8569 ft^3/s
Time to Peak	12.200 hours
Hydrograph Volume	2,081.592 ft^3

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)
12.100	0.0000	0.6910	0.8569	0.7156	0.6576
12.350	0.5406	0.4806	0.4039	0.3324	0.2683
12.600	0.2196	0.1870	0.1708	0.1617	0.1538
12.850	0.1461	0.1384	0.1308	0.1231	0.1162
13.100	0.1106	0.1065	0.1037	0.1016	0.0996
13.350	0.0976	0.0957	0.0937	0.0917	0.0897
13.600	0.0877	0.0857	0.0837	0.0817	0.0796
13.850	0.0776	0.0756	0.0736	0.0716	0.0697
14.100	0.0680	0.0667	0.0656	0.0646	0.0637
14.350	0.0627	0.0617	0.0608	0.0598	0.0588
14.600	0.0579	0.0569	0.0559	0.0549	0.0540
14.850	0.0530	0.0520	0.0510	0.0501	0.0491
15.100	0.0481	0.0471	0.0462	0.0452	0.0442
15.350	0.0432	0.0423	0.0413	0.0403	0.0393
15.600	0.0383	0.0374	0.0364	0.0354	0.0344
15.850	0.0334	0.0324	0.0314	0.0305	0.0296
16.100	0.0288	0.0282	0.0276	0.0272	0.0268
16.350	0.0264	0.0259	0.0254	0.0251	0.0247
16.600	0.0242	0.0237	0.0234	0.0230	0.0225
16.850	0.0220	0.0216	0.0212	0.0208	0.0203
17.100	0.0199	0.0195	0.0190	0.0186	0.0182
17.350	0.0178	0.0173	0.0169	0.0165	0.0161
17.600	0.0156	0.0151	0.0148	0.0144	0.0139
17.850	0.0134	0.0130	0.0126	0.0122	0.0117
18.100	0.0114	0.0112	0.0110	0.0109	0.0108
18.350	0.0106	0.0105	0.0104	0.0103	0.0101
18.600	0.0100	0.0099	0.0097	0.0096	0.0095
18.850	0.0094	0.0092	0.0091	0.0090	0.0089
19.100	0.0087	0.0086	0.0085	0.0084	0.0082
19.350	0.0081	0.0080	0.0078	0.0077	0.0075
19.600	0.0074	0.0073	0.0072	0.0070	0.0069
19.850	0.0068	0.0067	0.0065	0.0064	0.0063
20.100	0.0061	0.0060	0.0060	0.0059	0.0058
20.350	0.0057	0.0055	0.0055	0.0054	0.0053
20.600	0.0052	0.0051	0.0049	0.0048	0.0048
20.850	0.0047	0.0046	0.0045	0.0044	0.0044
21.100	0.0042	0.0041	0.0040	0.0039	0.0038
21.350	0.0037	0.0036	0.0035	0.0034	0.0033
21.600	0.0032	0.0032	0.0030	0.0029	0.0029

Subsection: Pond Routed Hydrograph (total out) Return Event: 100 years
Label: DW-3 (OUT) Storm Event: 100 YR

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)
21.850	0.0028	0.0027	0.0025	0.0024	0.0023
22.100	0.0023	0.0022	0.0021	0.0020	0.0018
22.350	0.0017	0.0017	0.0016	0.0015	0.0014
22.600	0.0013	0.0013	0.0011	0.0010	(N/A)

Summary for Hydrograph Addition at 'DW-3'

Upstream Link	Upstream Node
Outlet-5	DW-2
<Catchment to Outflow Node>	PDA-1B

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Outlet-5	0.000	0.000	0.0000
Flow (From)	PDA-1B	275.130	12.100	0.0790
Flow (In)	DW-3	275.130	12.100	0.0790

Summary for Hydrograph Addition at 'DW-3'

Upstream Link	Upstream Node
Outlet-5	DW-2
<Catchment to Outflow Node>	PDA-1B

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Outlet-5	0.000	0.000	0.0000
Flow (From)	PDA-1B	695.907	12.100	0.1972
Flow (In)	DW-3	695.907	12.100	0.1972

Summary for Hydrograph Addition at 'DW-3'

Upstream Link	Upstream Node
Outlet-5	DW-2
<Catchment to Outflow Node>	PDA-1B

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Outlet-5	1,533.330	12.250	0.5510
Flow (From)	PDA-1B	1,492.518	12.100	0.4068
Flow (In)	DW-3	3,025.847	12.100	0.8227

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0190 ft^3/s

Initial Conditions	
Elevation (Water Surface, Initial)	76.73 ft
Volume (Initial)	0.000 ft^3
Flow (Initial Outlet)	0.0000 ft^3/s
Flow (Initial Infiltration)	0.0000 ft^3/s
Flow (Initial, Total)	0.0000 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)
76.73	0.0000	0.000	0.000	0.0000	0.0000	0.0000
77.23	0.0000	54.080	0.000	0.0190	0.0190	0.6199
77.73	0.0000	170.480	0.000	0.0190	0.0190	1.9132
77.75	0.0000	174.992	0.000	0.0190	0.0190	1.9634
78.23	0.4276	281.840	0.000	0.0190	0.4466	3.5781
78.73	0.8074	385.520	0.000	0.0190	0.8264	5.1100
79.23	1.0481	477.280	0.000	0.0190	1.0671	6.3702
79.50	1.1578	518.035	0.000	0.0190	1.1768	6.9328
79.73	1.3584	545.120	0.000	0.0190	1.3774	7.4343
80.23	2.0449	599.200	0.000	0.0190	2.0639	8.7217

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0190 ft^3/s

Initial Conditions	
Elevation (Water Surface, Initial)	76.73 ft
Volume (Initial)	0.000 ft^3
Flow (Initial Outlet)	0.0000 ft^3/s
Flow (Initial Infiltration)	0.0000 ft^3/s
Flow (Initial, Total)	0.0000 ft^3/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.0877 ft^3/s	Time to Peak (Flow, In)	12.150 hours
Infiltration (Peak)	0.0190 ft^3/s	Time to Peak (Infiltration)	12.150 hours
Flow (Peak Outlet)	0.0000 ft^3/s	Time to Peak (Flow, Outlet)	0.000 hours

Elevation (Water Surface, Peak)	77.48 ft
Volume (Peak)	111.670 ft^3

Mass Balance (ft^3)	
Volume (Initial)	0.000 ft^3
Volume (Total Inflow)	332.000 ft^3
Volume (Total Infiltration)	328.000 ft^3
Volume (Total Outlet Outflow)	0.000 ft^3
Volume (Retained)	4.000 ft^3
Volume (Unrouted)	0.000 ft^3
Error (Mass Balance)	0.0 %

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0190 ft^3/s

Initial Conditions	
Elevation (Water Surface, Initial)	76.73 ft
Volume (Initial)	0.000 ft^3
Flow (Initial Outlet)	0.0000 ft^3/s
Flow (Initial Infiltration)	0.0000 ft^3/s
Flow (Initial, Total)	0.0000 ft^3/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	0.2253 ft^3/s	Time to Peak (Flow, In)	12.100 hours
Infiltration (Peak)	0.0190 ft^3/s	Time to Peak (Infiltration)	11.800 hours
Flow (Peak Outlet)	0.1540 ft^3/s	Time to Peak (Flow, Outlet)	12.200 hours

Elevation (Water Surface, Peak)	77.92 ft
Volume (Peak)	214.005 ft^3

Mass Balance (ft^3)	
Volume (Initial)	0.000 ft^3
Volume (Total Inflow)	858.000 ft^3
Volume (Total Infiltration)	620.000 ft^3
Volume (Total Outlet Outflow)	230.000 ft^3
Volume (Retained)	9.000 ft^3
Volume (Unrouted)	0.000 ft^3
Error (Mass Balance)	0.0 %

Infiltration	
Infiltration Method (Computed)	Constant
Infiltration Rate (Constant)	0.0190 ft³/s

Initial Conditions	
Elevation (Water Surface, Initial)	76.73 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.0000 ft³/s
Flow (Initial Infiltration)	0.0000 ft³/s
Flow (Initial, Total)	0.0000 ft³/s
Time Increment	0.050 hours

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	1.2490 ft³/s	Time to Peak (Flow, In)	12.200 hours
Infiltration (Peak)	0.0190 ft³/s	Time to Peak (Infiltration)	10.700 hours
Flow (Peak Outlet)	0.9648 ft³/s	Time to Peak (Flow, Outlet)	12.250 hours

Elevation (Water Surface, Peak)	79.06 ft
Volume (Peak)	446.867 ft³

Mass Balance (ft³)	
Volume (Initial)	0.000 ft³
Volume (Total Inflow)	3,946.000 ft³
Volume (Total Infiltration)	1,020.000 ft³
Volume (Total Outlet Outflow)	2,889.000 ft³
Volume (Retained)	37.000 ft³
Volume (Unrouted)	0.000 ft³
Error (Mass Balance)	0.0 %

Peak Discharge	0.0190 ft^3/s
Time to Peak	13.500 hours
Hydrograph Volume	326.202 ft^3

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)
10.950	0.0010	0.0011	0.0012	0.0013	0.0014
11.200	0.0015	0.0016	0.0018	0.0019	0.0021
11.450	0.0023	0.0025	0.0027	0.0029	0.0033
11.700	0.0038	0.0044	0.0052	0.0063	0.0075
11.950	0.0092	0.0115	0.0148	0.0188	0.0190
12.200	0.0190	0.0190	0.0190	0.0190	0.0190
12.450	0.0190	0.0190	0.0190	0.0190	0.0190
12.700	0.0190	0.0190	0.0190	0.0190	0.0190
12.950	0.0190	0.0190	0.0190	0.0190	0.0190
13.200	0.0190	0.0190	0.0190	0.0190	0.0190
13.450	0.0190	0.0190	0.0190	0.0190	0.0190
13.700	0.0190	0.0190	0.0190	0.0190	0.0190
13.950	0.0190	0.0190	0.0190	0.0190	0.0190
14.200	0.0190	0.0190	0.0190	0.0190	0.0190
14.450	0.0185	0.0178	0.0172	0.0165	0.0159
14.700	0.0153	0.0148	0.0143	0.0138	0.0133
14.950	0.0129	0.0125	0.0121	0.0117	0.0113
15.200	0.0110	0.0107	0.0103	0.0100	0.0098
15.450	0.0095	0.0092	0.0090	0.0087	0.0085
15.700	0.0083	0.0081	0.0079	0.0077	0.0075
15.950	0.0073	0.0071	0.0069	0.0068	0.0066
16.200	0.0064	0.0063	0.0062	0.0060	0.0059
16.450	0.0058	0.0056	0.0055	0.0054	0.0053
16.700	0.0052	0.0051	0.0050	0.0049	0.0049
16.950	0.0048	0.0047	0.0046	0.0045	0.0045
17.200	0.0044	0.0043	0.0043	0.0042	0.0041
17.450	0.0041	0.0040	0.0039	0.0039	0.0038
17.700	0.0038	0.0037	0.0037	0.0036	0.0036
17.950	0.0035	0.0035	0.0034	0.0034	0.0033
18.200	0.0033	0.0032	0.0032	0.0031	0.0031
18.450	0.0031	0.0030	0.0030	0.0030	0.0029
18.700	0.0029	0.0029	0.0029	0.0028	0.0028
18.950	0.0028	0.0028	0.0027	0.0027	0.0027
19.200	0.0027	0.0026	0.0026	0.0026	0.0026
19.450	0.0026	0.0025	0.0025	0.0025	0.0025
19.700	0.0025	0.0025	0.0024	0.0024	0.0024
19.950	0.0024	0.0024	0.0024	0.0024	0.0023
20.200	0.0023	0.0023	0.0023	0.0023	0.0023
20.450	0.0023	0.0023	0.0022	0.0022	0.0022

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)
20.700	0.0022	0.0022	0.0022	0.0022	0.0022
20.950	0.0021	0.0021	0.0021	0.0021	0.0021
21.200	0.0021	0.0021	0.0021	0.0021	0.0021
21.450	0.0020	0.0020	0.0020	0.0020	0.0020
21.700	0.0020	0.0020	0.0020	0.0020	0.0020
21.950	0.0020	0.0019	0.0019	0.0019	0.0019
22.200	0.0019	0.0019	0.0019	0.0019	0.0019
22.450	0.0019	0.0018	0.0018	0.0018	0.0018
22.700	0.0018	0.0018	0.0018	0.0018	0.0018
22.950	0.0018	0.0018	0.0018	0.0017	0.0017
23.200	0.0017	0.0017	0.0017	0.0017	0.0017
23.450	0.0017	0.0017	0.0017	0.0017	0.0016
23.700	0.0016	0.0016	0.0016	0.0016	0.0016
23.950	0.0016	0.0016	(N/A)	(N/A)	(N/A)

Peak Discharge	0.0190 ft³/s
Time to Peak	15.850 hours
Hydrograph Volume	617.308 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)
8.800	0.0010	0.0011	0.0012	0.0013	0.0013
9.050	0.0014	0.0015	0.0016	0.0017	0.0018
9.300	0.0019	0.0020	0.0021	0.0022	0.0023
9.550	0.0024	0.0025	0.0026	0.0027	0.0029
9.800	0.0030	0.0031	0.0033	0.0034	0.0035
10.050	0.0037	0.0038	0.0040	0.0041	0.0043
10.300	0.0044	0.0046	0.0048	0.0050	0.0052
10.550	0.0054	0.0056	0.0058	0.0061	0.0063
10.800	0.0065	0.0068	0.0070	0.0073	0.0076
11.050	0.0079	0.0082	0.0085	0.0088	0.0092
11.300	0.0097	0.0101	0.0107	0.0112	0.0118
11.550	0.0125	0.0133	0.0144	0.0159	0.0179
11.800	0.0190	0.0190	0.0190	0.0190	0.0190
12.050	0.0190	0.0190	0.0190	0.0190	0.0190
12.300	0.0190	0.0190	0.0190	0.0190	0.0190
12.550	0.0190	0.0190	0.0190	0.0190	0.0190
12.800	0.0190	0.0190	0.0190	0.0190	0.0190
13.050	0.0190	0.0190	0.0190	0.0190	0.0190
13.300	0.0190	0.0190	0.0190	0.0190	0.0190
13.550	0.0190	0.0190	0.0190	0.0190	0.0190
13.800	0.0190	0.0190	0.0190	0.0190	0.0190
14.050	0.0190	0.0190	0.0190	0.0190	0.0190
14.300	0.0190	0.0190	0.0190	0.0190	0.0190
14.550	0.0190	0.0190	0.0190	0.0190	0.0190
14.800	0.0190	0.0190	0.0190	0.0190	0.0190
15.050	0.0190	0.0190	0.0190	0.0190	0.0190
15.300	0.0190	0.0190	0.0190	0.0190	0.0190
15.550	0.0190	0.0190	0.0190	0.0190	0.0190
15.800	0.0190	0.0190	0.0190	0.0190	0.0190
16.050	0.0190	0.0190	0.0190	0.0190	0.0190
16.300	0.0190	0.0190	0.0190	0.0190	0.0190
16.550	0.0190	0.0190	0.0190	0.0190	0.0190
16.800	0.0190	0.0190	0.0190	0.0190	0.0190
17.050	0.0190	0.0190	0.0190	0.0190	0.0190
17.300	0.0190	0.0190	0.0190	0.0190	0.0190
17.550	0.0190	0.0190	0.0190	0.0190	0.0190
17.800	0.0190	0.0190	0.0190	0.0183	0.0175
18.050	0.0168	0.0161	0.0155	0.0149	0.0143
18.300	0.0137	0.0132	0.0128	0.0123	0.0119

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)
18.550	0.0115	0.0111	0.0107	0.0104	0.0101
18.800	0.0098	0.0095	0.0092	0.0090	0.0088
19.050	0.0085	0.0083	0.0081	0.0079	0.0078
19.300	0.0076	0.0074	0.0073	0.0071	0.0070
19.550	0.0069	0.0067	0.0066	0.0065	0.0064
19.800	0.0063	0.0062	0.0061	0.0060	0.0059
20.050	0.0058	0.0058	0.0057	0.0056	0.0055
20.300	0.0055	0.0054	0.0054	0.0053	0.0052
20.550	0.0052	0.0051	0.0051	0.0050	0.0050
20.800	0.0050	0.0049	0.0049	0.0048	0.0048
21.050	0.0048	0.0047	0.0047	0.0047	0.0046
21.300	0.0046	0.0046	0.0045	0.0045	0.0045
21.550	0.0044	0.0044	0.0044	0.0044	0.0043
21.800	0.0043	0.0043	0.0043	0.0042	0.0042
22.050	0.0042	0.0042	0.0041	0.0041	0.0041
22.300	0.0041	0.0040	0.0040	0.0040	0.0040
22.550	0.0039	0.0039	0.0039	0.0039	0.0039
22.800	0.0038	0.0038	0.0038	0.0038	0.0038
23.050	0.0037	0.0037	0.0037	0.0037	0.0037
23.300	0.0036	0.0036	0.0036	0.0036	0.0036
23.550	0.0035	0.0035	0.0035	0.0035	0.0035
23.800	0.0034	0.0034	0.0034	0.0034	0.0034

Peak Discharge	0.0190 ft³/s
Time to Peak	15.200 hours
Hydrograph Volume	1,015.448 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)
6.400	0.0010	0.0011	0.0012	0.0012	0.0013
6.650	0.0013	0.0014	0.0015	0.0016	0.0016
6.900	0.0017	0.0018	0.0019	0.0020	0.0020
7.150	0.0021	0.0022	0.0023	0.0024	0.0025
7.400	0.0026	0.0027	0.0028	0.0029	0.0030
7.650	0.0031	0.0032	0.0033	0.0035	0.0036
7.900	0.0037	0.0038	0.0039	0.0041	0.0042
8.150	0.0043	0.0044	0.0046	0.0047	0.0049
8.400	0.0051	0.0052	0.0054	0.0056	0.0058
8.650	0.0059	0.0061	0.0063	0.0066	0.0068
8.900	0.0070	0.0072	0.0074	0.0077	0.0079
9.150	0.0082	0.0084	0.0087	0.0090	0.0092
9.400	0.0095	0.0098	0.0101	0.0103	0.0106
9.650	0.0109	0.0112	0.0116	0.0119	0.0122
9.900	0.0125	0.0128	0.0132	0.0135	0.0139
10.150	0.0142	0.0146	0.0150	0.0154	0.0158
10.400	0.0162	0.0167	0.0172	0.0176	0.0181
10.650	0.0187	0.0190	0.0190	0.0190	0.0190
10.900	0.0190	0.0190	0.0190	0.0190	0.0190
11.150	0.0190	0.0190	0.0190	0.0190	0.0190
11.400	0.0190	0.0190	0.0190	0.0190	0.0190
11.650	0.0190	0.0190	0.0190	0.0190	0.0190
11.900	0.0190	0.0190	0.0190	0.0190	0.0190
12.150	0.0190	0.0190	0.0190	0.0190	0.0190
12.400	0.0190	0.0190	0.0190	0.0190	0.0190
12.650	0.0190	0.0190	0.0190	0.0190	0.0190
12.900	0.0190	0.0190	0.0190	0.0190	0.0190
13.150	0.0190	0.0190	0.0190	0.0190	0.0190
13.400	0.0190	0.0190	0.0190	0.0190	0.0190
13.650	0.0190	0.0190	0.0190	0.0190	0.0190
13.900	0.0190	0.0190	0.0190	0.0190	0.0190
14.150	0.0190	0.0190	0.0190	0.0190	0.0190
14.400	0.0190	0.0190	0.0190	0.0190	0.0190
14.650	0.0190	0.0190	0.0190	0.0190	0.0190
14.900	0.0190	0.0190	0.0190	0.0190	0.0190
15.150	0.0190	0.0190	0.0190	0.0190	0.0190
15.400	0.0190	0.0190	0.0190	0.0190	0.0190
15.650	0.0190	0.0190	0.0190	0.0190	0.0190
15.900	0.0190	0.0190	0.0190	0.0190	0.0190

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)
16.150	0.0190	0.0190	0.0190	0.0190	0.0190
16.400	0.0190	0.0190	0.0190	0.0190	0.0190
16.650	0.0190	0.0190	0.0190	0.0190	0.0190
16.900	0.0190	0.0190	0.0190	0.0190	0.0190
17.150	0.0190	0.0190	0.0190	0.0190	0.0190
17.400	0.0190	0.0190	0.0190	0.0190	0.0190
17.650	0.0190	0.0190	0.0190	0.0190	0.0190
17.900	0.0190	0.0190	0.0190	0.0190	0.0190
18.150	0.0190	0.0190	0.0190	0.0190	0.0190
18.400	0.0190	0.0190	0.0190	0.0190	0.0190
18.650	0.0190	0.0190	0.0190	0.0190	0.0190
18.900	0.0190	0.0190	0.0190	0.0190	0.0190
19.150	0.0190	0.0190	0.0190	0.0190	0.0190
19.400	0.0190	0.0190	0.0190	0.0190	0.0190
19.650	0.0190	0.0190	0.0190	0.0190	0.0190
19.900	0.0190	0.0190	0.0190	0.0190	0.0190
20.150	0.0190	0.0190	0.0190	0.0190	0.0190
20.400	0.0190	0.0190	0.0190	0.0190	0.0190
20.650	0.0190	0.0190	0.0190	0.0190	0.0190
20.900	0.0190	0.0190	0.0190	0.0190	0.0190
21.150	0.0190	0.0190	0.0190	0.0190	0.0190
21.400	0.0190	0.0190	0.0190	0.0190	0.0190
21.650	0.0190	0.0190	0.0190	0.0190	0.0190
21.900	0.0190	0.0190	0.0190	0.0190	0.0190
22.150	0.0190	0.0190	0.0190	0.0190	0.0190
22.400	0.0190	0.0190	0.0190	0.0190	0.0190
22.650	0.0190	0.0190	0.0190	0.0190	0.0190
22.900	0.0190	0.0190	0.0190	0.0190	0.0190
23.150	0.0190	0.0190	0.0190	0.0190	0.0190
23.400	0.0190	0.0190	0.0190	0.0190	0.0190
23.650	0.0183	0.0175	0.0168	0.0161	0.0155
23.900	0.0149	0.0143	0.0138	(N/A)	(N/A)

Subsection: Pond Routed Hydrograph (total out) Return Event: 1 years
Label: IB-1 (OUT) Storm Event: 1 YR

Peak Discharge	0.0000 ft^3/s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ft^3

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)
0.000	0.0000	0.0000	(N/A)	(N/A)	(N/A)

Peak Discharge	0.1540 ft^3/s
Time to Peak	12.200 hours
Hydrograph Volume	229.347 ft^3

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)
12.050	0.0000	0.0141	0.1158	0.1540	0.1533
12.300	0.1375	0.1194	0.1024	0.0866	0.0718
12.550	0.0578	0.0454	0.0351	0.0275	0.0223
12.800	0.0186	0.0160	0.0140	0.0122	0.0106
13.050	0.0091	0.0078	0.0066	0.0057	0.0050
13.300	0.0044	0.0040	0.0035	0.0031	0.0027
13.550	0.0024	0.0020	0.0016	0.0012	0.0008

Peak Discharge	0.9648 ft^3/s
Time to Peak	12.250 hours
Hydrograph Volume	2,888.709 ft^3

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)
11.750	0.0000	0.0332	0.0933	0.1357	0.1766
12.000	0.2351	0.3102	0.3783	0.5911	0.8681
12.250	0.9648	0.9624	0.9112	0.8328	0.7284
12.500	0.6172	0.5143	0.4232	0.3440	0.2881
12.750	0.2518	0.2280	0.2107	0.1969	0.1848
13.000	0.1734	0.1628	0.1531	0.1450	0.1386
13.250	0.1338	0.1299	0.1266	0.1236	0.1208
13.500	0.1180	0.1152	0.1124	0.1096	0.1069
13.750	0.1041	0.1013	0.0986	0.0958	0.0930
14.000	0.0902	0.0875	0.0849	0.0826	0.0806
14.250	0.0789	0.0773	0.0759	0.0745	0.0732
14.500	0.0718	0.0705	0.0691	0.0678	0.0665
14.750	0.0651	0.0638	0.0625	0.0611	0.0598
15.000	0.0584	0.0571	0.0557	0.0544	0.0530
15.250	0.0517	0.0504	0.0490	0.0476	0.0463
15.500	0.0449	0.0436	0.0422	0.0409	0.0395
15.750	0.0381	0.0368	0.0354	0.0341	0.0327
16.000	0.0313	0.0300	0.0288	0.0277	0.0268
16.250	0.0259	0.0252	0.0246	0.0240	0.0234
16.500	0.0228	0.0222	0.0216	0.0210	0.0204
16.750	0.0198	0.0192	0.0186	0.0180	0.0174
17.000	0.0169	0.0162	0.0156	0.0151	0.0145
17.250	0.0139	0.0133	0.0127	0.0121	0.0115
17.500	0.0109	0.0103	0.0097	0.0091	0.0085
17.750	0.0079	0.0074	0.0067	0.0061	0.0056
18.000	0.0050	0.0044	0.0038	0.0033	0.0030
18.250	0.0027	0.0025	0.0023	0.0021	0.0019
18.500	0.0017	0.0015	0.0014	0.0012	0.0010

Summary for Hydrograph Addition at 'IB-1'

Upstream Link	Upstream Node
Outlet-7	DW-3
<Catchment to Outflow Node>	PDA-1E

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Outlet-7	0.000	0.000	0.0000
Flow (From)	PDA-1E	332.326	12.150	0.0877
Flow (In)	IB-1	332.326	12.150	0.0877

Summary for Hydrograph Addition at 'IB-1'

Upstream Link	Upstream Node
Outlet-7	DW-3
<Catchment to Outflow Node>	PDA-1E

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Outlet-7	0.000	0.000	0.0000
Flow (From)	PDA-1E	858.364	12.100	0.2253
Flow (In)	IB-1	858.364	12.100	0.2253

Summary for Hydrograph Addition at 'IB-1'

Upstream Link	Upstream Node
Outlet-7	DW-3
<Catchment to Outflow Node>	PDA-1E

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (hours)	Flow (Peak) (ft^3/s)
Flow (From)	Outlet-7	2,082.491	12.200	0.8569
Flow (From)	PDA-1E	1,863.678	12.100	0.4786
Flow (In)	IB-1	3,946.168	12.200	1.2490

Peak Discharge	0.0000 ft³/s
Time to Peak	10.000 hours
Hydrograph Volume	0.000 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)
0.000	0.0000	0.0000	(N/A)	(N/A)	(N/A)

Peak Discharge	0.0000 ft^3/s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ft^3

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)
0.000	0.0000	0.0000	(N/A)	(N/A)	(N/A)

Peak Discharge	0.3447 ft^3/s
Time to Peak	12.200 hours
Hydrograph Volume	643.052 ft^3

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)
12.100	0.0000	0.0367	0.3447	0.2214	0.1990
12.350	0.1727	0.1491	0.1254	0.1015	0.0820
12.600	0.0677	0.0587	0.0551	0.0523	0.0498
12.850	0.0473	0.0448	0.0423	0.0397	0.0376
13.100	0.0359	0.0347	0.0340	0.0333	0.0326
13.350	0.0320	0.0313	0.0307	0.0300	0.0294
13.600	0.0287	0.0280	0.0274	0.0267	0.0261
13.850	0.0254	0.0247	0.0241	0.0234	0.0228
14.100	0.0223	0.0219	0.0216	0.0212	0.0209
14.350	0.0206	0.0203	0.0200	0.0196	0.0193
14.600	0.0190	0.0187	0.0184	0.0180	0.0177
14.850	0.0174	0.0171	0.0168	0.0164	0.0161
15.100	0.0158	0.0155	0.0152	0.0148	0.0145
15.350	0.0142	0.0139	0.0135	0.0132	0.0129
15.600	0.0126	0.0122	0.0119	0.0116	0.0113
15.850	0.0109	0.0106	0.0103	0.0100	0.0097
16.100	0.0095	0.0092	0.0091	0.0089	0.0088
16.350	0.0087	0.0085	0.0084	0.0082	0.0081
16.600	0.0079	0.0078	0.0077	0.0075	0.0074
16.850	0.0072	0.0071	0.0070	0.0068	0.0067
17.100	0.0065	0.0064	0.0062	0.0061	0.0060
17.350	0.0058	0.0057	0.0055	0.0054	0.0053
17.600	0.0051	0.0049	0.0048	0.0047	0.0045
17.850	0.0044	0.0043	0.0041	0.0040	0.0038
18.100	0.0037	0.0037	0.0036	0.0036	0.0035
18.350	0.0035	0.0035	0.0034	0.0034	0.0033
18.600	0.0033	0.0032	0.0032	0.0031	0.0031
18.850	0.0031	0.0030	0.0030	0.0029	0.0029
19.100	0.0029	0.0028	0.0028	0.0027	0.0027
19.350	0.0026	0.0026	0.0026	0.0025	0.0025
19.600	0.0024	0.0024	0.0023	0.0023	0.0023
19.850	0.0022	0.0022	0.0021	0.0021	0.0021
20.100	0.0020	0.0020	0.0020	0.0019	0.0019
20.350	0.0018	0.0018	0.0018	0.0018	0.0017
20.600	0.0017	0.0017	0.0016	0.0016	0.0016
20.850	0.0015	0.0015	0.0015	0.0014	0.0014
21.100	0.0014	0.0013	0.0013	0.0013	0.0012
21.350	0.0012	0.0012	0.0011	0.0011	0.0011
21.600	0.0010	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Diverted Hydrograph
Label: Outlet-5

Return Event: 1 years
Storm Event: 1 YR

Peak Discharge	0.0000 ft^3/s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ft^3

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)
0.000	0.0000	0.0000	(N/A)	(N/A)	(N/A)

Peak Discharge	0.0000 ft^3/s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ft^3

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)
0.000	0.0000	0.0000	(N/A)	(N/A)	(N/A)

Peak Discharge	0.5510 ft^3/s
Time to Peak	12.250 hours
Hydrograph Volume	1,531.620 ft^3

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)
12.050	0.0000	0.4159	0.4759	0.5488	0.5510
12.300	0.4227	0.3792	0.3259	0.2758	0.2250
12.550	0.1817	0.1493	0.1282	0.1185	0.1126
12.800	0.1071	0.1017	0.0964	0.0910	0.0857
13.050	0.0810	0.0772	0.0745	0.0727	0.0713
13.300	0.0699	0.0685	0.0671	0.0657	0.0643
13.550	0.0629	0.0615	0.0602	0.0587	0.0573
13.800	0.0559	0.0545	0.0531	0.0517	0.0503
14.050	0.0490	0.0479	0.0470	0.0462	0.0456
14.300	0.0449	0.0442	0.0435	0.0429	0.0422
14.550	0.0415	0.0409	0.0402	0.0395	0.0388
14.800	0.0381	0.0375	0.0368	0.0361	0.0354
15.050	0.0348	0.0340	0.0334	0.0327	0.0320
15.300	0.0313	0.0306	0.0300	0.0293	0.0286
15.550	0.0279	0.0272	0.0265	0.0258	0.0251
15.800	0.0245	0.0238	0.0231	0.0224	0.0217
16.050	0.0211	0.0206	0.0202	0.0198	0.0195
16.300	0.0192	0.0189	0.0186	0.0183	0.0180
16.550	0.0177	0.0174	0.0171	0.0168	0.0165
16.800	0.0162	0.0159	0.0156	0.0153	0.0150
17.050	0.0147	0.0144	0.0141	0.0138	0.0135
17.300	0.0132	0.0129	0.0126	0.0123	0.0120
17.550	0.0117	0.0114	0.0111	0.0108	0.0105
17.800	0.0102	0.0099	0.0096	0.0093	0.0090
18.050	0.0087	0.0085	0.0083	0.0082	0.0082
18.300	0.0080	0.0079	0.0079	0.0078	0.0077
18.550	0.0076	0.0075	0.0074	0.0073	0.0072
18.800	0.0072	0.0071	0.0070	0.0069	0.0068
19.050	0.0067	0.0066	0.0065	0.0064	0.0064
19.300	0.0062	0.0061	0.0061	0.0060	0.0059
19.550	0.0058	0.0057	0.0056	0.0055	0.0054
19.800	0.0054	0.0053	0.0052	0.0051	0.0050
20.050	0.0049	0.0048	0.0047	0.0047	0.0047
20.300	0.0046	0.0045	0.0044	0.0043	0.0043
20.550	0.0042	0.0042	0.0041	0.0040	0.0039
20.800	0.0039	0.0038	0.0037	0.0036	0.0036
21.050	0.0036	0.0035	0.0034	0.0033	0.0032
21.300	0.0032	0.0031	0.0031	0.0030	0.0029
21.550	0.0028	0.0028	0.0027	0.0026	0.0026

Subsection: Diverted Hydrograph
Label: Outlet-5

Return Event: 100 years
Storm Event: 100 YR

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)
21.800	0.0025	0.0025	0.0024	0.0023	0.0022
22.050	0.0022	0.0021	0.0020	0.0020	0.0019
22.300	0.0018	0.0017	0.0017	0.0016	0.0015
22.550	0.0015	0.0014	0.0014	0.0013	0.0012
22.800	0.0011	0.0011	0.0010	(N/A)	(N/A)

Peak Discharge	0.0000 ft^3/s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ft^3

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)
0.000	0.0000	0.0000	(N/A)	(N/A)	(N/A)

Peak Discharge	0.0000 ft^3/s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ft^3

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)
0.000	0.0000	0.0000	(N/A)	(N/A)	(N/A)

Peak Discharge	0.8569 ft^3/s
Time to Peak	12.200 hours
Hydrograph Volume	2,081.592 ft^3

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)
12.100	0.0000	0.6910	0.8569	0.7156	0.6576
12.350	0.5406	0.4806	0.4039	0.3324	0.2683
12.600	0.2196	0.1870	0.1708	0.1617	0.1538
12.850	0.1461	0.1384	0.1308	0.1231	0.1162
13.100	0.1106	0.1065	0.1037	0.1016	0.0996
13.350	0.0976	0.0957	0.0937	0.0917	0.0897
13.600	0.0877	0.0857	0.0837	0.0817	0.0796
13.850	0.0776	0.0756	0.0736	0.0716	0.0697
14.100	0.0680	0.0667	0.0656	0.0646	0.0637
14.350	0.0627	0.0617	0.0608	0.0598	0.0588
14.600	0.0579	0.0569	0.0559	0.0549	0.0540
14.850	0.0530	0.0520	0.0510	0.0501	0.0491
15.100	0.0481	0.0471	0.0462	0.0452	0.0442
15.350	0.0432	0.0423	0.0413	0.0403	0.0393
15.600	0.0383	0.0374	0.0364	0.0354	0.0344
15.850	0.0334	0.0324	0.0314	0.0305	0.0296
16.100	0.0288	0.0282	0.0276	0.0272	0.0268
16.350	0.0264	0.0259	0.0254	0.0251	0.0247
16.600	0.0242	0.0237	0.0234	0.0230	0.0225
16.850	0.0220	0.0216	0.0212	0.0208	0.0203
17.100	0.0199	0.0195	0.0190	0.0186	0.0182
17.350	0.0178	0.0173	0.0169	0.0165	0.0161
17.600	0.0156	0.0151	0.0148	0.0144	0.0139
17.850	0.0134	0.0130	0.0126	0.0122	0.0117
18.100	0.0114	0.0112	0.0110	0.0109	0.0108
18.350	0.0106	0.0105	0.0104	0.0103	0.0101
18.600	0.0100	0.0099	0.0097	0.0096	0.0095
18.850	0.0094	0.0092	0.0091	0.0090	0.0089
19.100	0.0087	0.0086	0.0085	0.0084	0.0082
19.350	0.0081	0.0080	0.0078	0.0077	0.0075
19.600	0.0074	0.0073	0.0072	0.0070	0.0069
19.850	0.0068	0.0067	0.0065	0.0064	0.0063
20.100	0.0061	0.0060	0.0060	0.0059	0.0058
20.350	0.0057	0.0055	0.0055	0.0054	0.0053
20.600	0.0052	0.0051	0.0049	0.0048	0.0048
20.850	0.0047	0.0046	0.0045	0.0044	0.0044
21.100	0.0042	0.0041	0.0040	0.0039	0.0038
21.350	0.0037	0.0036	0.0035	0.0034	0.0033
21.600	0.0032	0.0032	0.0030	0.0029	0.0029

Subsection: Diverted Hydrograph
Label: Outlet-7

Return Event: 100 years
Storm Event: 100 YR

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)
21.850	0.0028	0.0027	0.0025	0.0024	0.0023
22.100	0.0023	0.0022	0.0021	0.0020	0.0018
22.350	0.0017	0.0017	0.0016	0.0015	0.0014
22.600	0.0013	0.0013	0.0011	0.0010	(N/A)

Peak Discharge	0.0000 ft^3/s
Time to Peak	8.000 hours
Hydrograph Volume	0.000 ft^3

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)
0.000	0.0000	0.0000	(N/A)	(N/A)	(N/A)

Peak Discharge	0.1540 ft^3/s
Time to Peak	12.200 hours
Hydrograph Volume	229.347 ft^3

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)
12.050	0.0000	0.0141	0.1158	0.1540	0.1533
12.300	0.1375	0.1194	0.1024	0.0866	0.0718
12.550	0.0578	0.0454	0.0351	0.0275	0.0223
12.800	0.0186	0.0160	0.0140	0.0122	0.0106
13.050	0.0091	0.0078	0.0066	0.0057	0.0050
13.300	0.0044	0.0040	0.0035	0.0031	0.0027
13.550	0.0024	0.0020	0.0016	0.0012	0.0008

Peak Discharge	0.9648 ft^3/s
Time to Peak	12.250 hours
Hydrograph Volume	2,888.709 ft^3

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)
11.750	0.0000	0.0332	0.0933	0.1357	0.1766
12.000	0.2351	0.3102	0.3783	0.5911	0.8681
12.250	0.9648	0.9624	0.9112	0.8328	0.7284
12.500	0.6172	0.5143	0.4232	0.3440	0.2881
12.750	0.2518	0.2280	0.2107	0.1969	0.1848
13.000	0.1734	0.1628	0.1531	0.1450	0.1386
13.250	0.1338	0.1299	0.1266	0.1236	0.1208
13.500	0.1180	0.1152	0.1124	0.1096	0.1069
13.750	0.1041	0.1013	0.0986	0.0958	0.0930
14.000	0.0902	0.0875	0.0849	0.0826	0.0806
14.250	0.0789	0.0773	0.0759	0.0745	0.0732
14.500	0.0718	0.0705	0.0691	0.0678	0.0665
14.750	0.0651	0.0638	0.0625	0.0611	0.0598
15.000	0.0584	0.0571	0.0557	0.0544	0.0530
15.250	0.0517	0.0504	0.0490	0.0476	0.0463
15.500	0.0449	0.0436	0.0422	0.0409	0.0395
15.750	0.0381	0.0368	0.0354	0.0341	0.0327
16.000	0.0313	0.0300	0.0288	0.0277	0.0268
16.250	0.0259	0.0252	0.0246	0.0240	0.0234
16.500	0.0228	0.0222	0.0216	0.0210	0.0204
16.750	0.0198	0.0192	0.0186	0.0180	0.0174
17.000	0.0169	0.0162	0.0156	0.0151	0.0145
17.250	0.0139	0.0133	0.0127	0.0121	0.0115
17.500	0.0109	0.0103	0.0097	0.0091	0.0085
17.750	0.0079	0.0074	0.0067	0.0061	0.0056
18.000	0.0050	0.0044	0.0038	0.0033	0.0030
18.250	0.0027	0.0025	0.0023	0.0021	0.0019
18.500	0.0017	0.0015	0.0014	0.0012	0.0010

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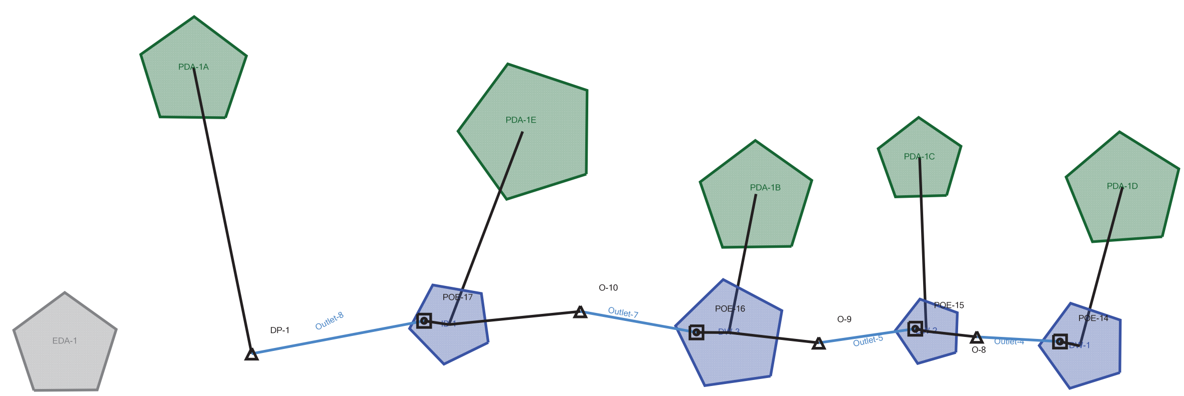
Scenario: POST-DEVELOPMENT



APPENDIX C

WATER QUALITY VOLUME CALCULATIONS

WATER QUALITY VOLUME CALCULATIONS

Townhouses at 32-34 Washington Avenue

32-34 Washington Avenue
Hastings-on-Hudson, NY

JMC Project: **13180**

Drawing Reference: **DA-1, DA-2**

Computed by: **EH**
Checked by: **DL**

Date Printed: 8/13/2015

WATER QUALITY VOLUME WORKSHEET
FOR REDEVELOPMENT PROJECTS

JMC Project: **13180**
Design Point: **DP-1**

Townhouses at 32-34 Washington Avenue Drainage Area: **PDA-1A-E**

Initial Water Quality Treatment Volume

DESCRIPTION	Design Storm	Area	Existing Impervious Area	New Impervious Area	Percent Impervious	Runoff Coefficient	Total Required WQ Volume
SYMBOL	P	A	I_E	I_N	%I	R_V	WQ_V
VALUE	1.5	0.60	0.15	0.12	45.00	0.455	**1,486**
UNITS	In	Ac	Ac	Ac	%	CF	CF
VALUE	Enhanced Phosphorus Removal (WQ_V = 1-yr Storm Runoff)						

Runoff Reduction Techniques (Area)

DESCRIPTION	Total Area	Impervious Area
SYMBOL	A	I
Conservation of Natural Areas		
Sheetflow to Riparian Buffers or Filter Strips		
Vegetated Swale		
Tree Planting / Tree Pit		
Disconnection of Rooftop Runoff		
Stream Daylighting		
TOTAL		
UNITS	Ac	Ac

Net Water Quality Treatment Volume for Standard Practices (25% I_E + 100% I_N)

DESCRIPTION	Design Storm	Area	Existing Impervious Area	New Impervious Area	Percent Impervious	Runoff Coefficient	Total Required WQ Volume
SYMBOL	P	A	I_E	I_N	%I	R_V	WQ_V
VALUE	1.5	0.60	0.04	0.12	26.25	0.28625	**935**
UNITS	In	Ac	Ac	Ac	%	CF	CF

Date Printed: 8/13/2015

WATER QUALITY VOLUME WORKSHEET

JMC Project: **13180**

Design Point: **DP-1**

Townhouses at 32-34 Washington Avenue	Drainage Area:	**PDA-1A-E**

Net Total Water Quality Treatment Volume

	SYMBOL	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	WQ_V	**935**	CF

Water Quality Volume Provided

GREEN INFRASTRUCTURE PRACTICE / SMP	*SYMBOL*	*VALUE*	*UNITS*
Dry Well #1	WQ_V	264	CF
Dry Well #2	WQ_V	351	CF
Dry Well #3	WQ_V	275	CF
Continuous Deflective Separation Unit (CDS)	WQ_V	234	CF
Stormtech Chambers (SC-740)	WQ_V	332	CF
Porous Paver Area #1	WQ_V	240	CF
Porous Paver Area #2	WQ_V	45	CF
TOTAL	WQ_V	**1,740**	CF

Date Printed: 8/13/2015

PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**13180**
Design Point:	**DP-1**
Drainage Area:	**PDA-1B-E**

Continuous Deflective Separation Unit
(Water Quality Flow)

Rainfall Distribution Type: **III**

Coefficients for the equation unit peak
[$R = I_a / P$]
[$C_i = A \times R^2 + B \times R + C$]

	A	B	C
C_0	-1.774	0.3301	2.4577
C_1	1.8622	-0.7397	-0.4627
C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	0.16	Ac
Area	A	0.28	Ac
Percent Impervious	%I	55.14	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.55	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**839**	CF

Water Quality Peak Flow Calculation

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	839	CF
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Time of Concentration	t_c	0.1450	Hr
Runoff Volume [$Q = WQ_V / (A \times 3630)$]	Q	0.82	In
Curve Number [$CN = 1000 / (10 + 5P + 10Q - 10 \times (Q^2 + 1.25\ QP)^{1/2}$]	CN	92.29	
Curve Number	CN	92	
Initial Abstraction [$I_a = 200 / CN - 2$]	I_a	0.17	In
Ratio [$R = I_a / P$]	R	0.11	
$C_0 = A \times R^2 + B \times R + C$	C_0	2.47	
$C_1 = A \times R2 + B \times R + C$	C_1	-0.52	
$C_2 = A \times R2 + B \times R + C$	C_2	-0.17	
Unit Peak Discharge	q_u	618.88	$cfs/mi^2/in$
Peak Discharge [$Q_p = q_u \times A \times Q / 640$]	Q_p	**0.22**	cfs

Proposed Device

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Peak Flow Provided	Q_p	**0.7**	cfs
Water Quality Volume Provided [$WQ_V = 640 \times 3600 \times Q_P / q_u$]	WQ_V	**2,606**	CF
Model Designation		CDS-2015-4	
Quantity		1	

Date Printed: 8/13/2015

PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**13180**
Design Point:	**DP-1**
Drainage Area:	**PDA-1E**

Continuous Deflective Separation Unit (Water Quality Volume)

Rainfall Distribution Type: **III**

		A	**B**	**C**
Coefficients for the equation unit peak	C_0	-1.774	0.3301	2.4577
$[R = I_a / P]$	C_1	1.8622	-0.7397	-0.4627
$[C_i = A \times R^2 + B \times R + C]$	C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	0.04	Ac
Area	A	0.08	Ac
Percent Impervious	%I	55.82	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.55	CF
TOTAL VOLUME Required $[WQ_V = (P \times R_V \times A) / 12]$	WQ_V	**234**	CF

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INFILTRATION WORKSHEET

JMC Project:	**13180**
Design Point:	**DP-1**
Drainage Area:	**PDA-1A**

Porous Paver Area #1

Site Data for Drainage Area to be Treated by Practice			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	0.05	Ac
Area	A	0.05	Ac
Percent Impervious	%I	100.00	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.95	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**240**	CF

Minimum Porous Pavement Area			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	240	CF
Porosity	n	0.40	Ft / Day
Trench Depth	d_t	0.67	Ft
Surface Area Required [$A_R = WQ_v / (n \times d_t)$]	A_R	**894**	SF

Proposed Porous Pavement			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Surface Area of Porous Pavement Provided [A_p]	A_p	**2,017**	SF
Actual Volume Provided	WQ_{VP}	541	CF

INFILTRATION WORKSHEET

JMC Project:	**13180**
Design Point:	**DP-1**
Drainage Area:	**PDA-1F**

Porous Paver Area #2

Site Data for Drainage Area to be Treated by Practice

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	0.01	Ac
Area	A	0.01	Ac
Percent Impervious	%I	100.00	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.95	CF
TOTAL VOLUME Required [WQ_V = (P x R_V x A) / 12]	WQ_V	**45**	CF

Minimum Porous Pavement Area

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	45	CF
Porosity	*n*	0.40	Ft / Day
Trench Depth	d_t	0.67	Ft
Surface Area Required [$A_R = WQ_v / (n \times d_t)$]	A_R	**166**	SF

Proposed Porous Pavement

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Surface Area of Porous Pavement Provided [A_p]	A_p	**375**	SF
Actual Volume Provided	WQ_{VP}	101	CF

INFILTRATION WORKSHEET

JMC Project: **13180**
Design Point: **DP-1**
Drainage Area: **PDA-B**

Dry Well #1

Site Data for Drainage Area to be Treated by Practice			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	0.04	Ac
Area	A	0.06	Ac
Percent Impervious	%I	57.16	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.56	CF
TOTAL VOLUME Required [WQ_V = (P x R_V x A) / 12]	WQ_V	**188**	CF

Water Quality Volume Provided			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
1-Year Storm Inflow Volume	IN	264	CF
1-Year Storm Outflow Volume	OUT	0	CF
VOLUME INFILTRATED [WQv = IN-OUT]	WQv	**264**	CF

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INFILTRATION WORKSHEET

JMC Project: **13180**
Design Point: **DP-1**
Drainage Area: **PDA-C**

Dry Well #2

Site Data for Drainage Area to be Treated by Practice			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	0.04	Ac
Area	A	0.07	Ac
Percent Impervious	%I	59.84	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.59	CF
TOTAL VOLUME Required [WQ_V = (P x R_V x A) / 12]	WQ_V	**238**	CF

Water Quality Volume Provided			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
1-Year Storm Inflow Volume	IN	351	CF
1-Year Storm Outflow Volume	OUT	0	CF
VOLUME INFILTRATED [WQv = IN-OUT]	WQv	**351**	CF

Date Printed: 8/13/2015

INFILTRATION WORKSHEET

JMC Project:	**13180**
Design Point:	**DP-1**
Drainage Area:	**PDA-D**

Dry Well #3

Site Data for Drainage Area to be Treated by Practice			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	0.03	Ac
Area	A	0.07	Ac
Percent Impervious	%I	47.48	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.48	CF
TOTAL VOLUME Required [WQ_V = (P x R_V x A) / 12]	WQ_V	**179**	CF

Water Quality Volume Provided			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
1-Year Storm Inflow Volume	IN	275	CF
1-Year Storm Outflow Volume	OUT	0	CF
VOLUME INFILTRATED [WQv = IN-OUT]	WQv	**275**	CF

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INFILTRATION WORKSHEET

JMC Project: **13180**
Design Point: **DP-1**
Drainage Area: **PDA-B-E**

Stormtech Chambers (SC-740)

Water Quality Volume Provided			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
1-Year Storm Inflow Volume	IN	332	CF
1-Year Storm Outflow Volume	OUT	0	CF
VOLUME INFILTRATED [WQv = IN-OUT]	WQv	**332**	CF

Date Printed: 8/13/2015

APPENDIX D

STORMTECH CHAMBERS SIZING

STORM_TECH RECHARGER SC 740

THE VOLUMES ACCOUNT FOR VOID SPACE IN THE 6" STONE BASE AND SURROUNDING STONE
ADDITIONAL STONE IS CALCULATED AT 40% VOID SPACE

	HEIGHT f.t.	STAGE f.t.	STORAGE PLAIN cf/ft	STORAGE W/STONE cf/unit
STONE COVER	3.00	3.50		74.90
STONE COVER	2.75	3.25		71.52
StormTech Crown	2.50	3.00		68.14
StormTech	2.25	2.75		64.46
StormTech	2.00	2.50		59.66
StormTech	1.75	2.25		54.17
StormTech	1.50	2.00		48.19
StormTech	1.25	1.75		41.85
StormTech	1.00	1.50		35.23
StormTech	0.75	1.25		28.36
StormTech	0.50	1.00		21.31
StormTech Invert	0	0.50		6.76
BOTTOM BROKEN STONE	GRAVEL	0		0.00

		DIM. f.t.	LAY-UP f.t.
AREA/UNIT	s.f.		33.82
HEIGHT		2.50	3.50
LENGTH		7.56	7.12
WIDE		4.25	4.75

INFILTRATION	3.00	in/hr	0.0023486	cfs/unit
ELEVATION BOTTOM STONE	76.73			CUMMULATIVE

VOLUME OF STORAGE IN EACH STAGE (cf.)

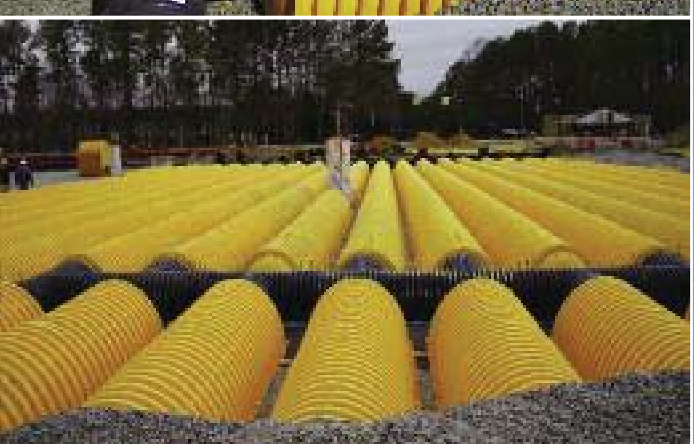
1	GRAVEL		STORM-TECH RECHARGER SC 740									GRAVEL					GUIDANCE W-quantity Volume
1	STAGE	STAGE	STAGE	STAGE	STAGE	STAGE	STAGE	STAGE	STAGE	STAGE (GUIDANCE WQ volume)	STAGE	STAGE	STAGE	CONSTANT		infiltrate	Storage +
inch	0	6	12	15	18	21	24	27	30	33	36	39	42				
No UNIT	0.00	0.50	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	FLOW RATE	AREA*UNIT	in 12 hrs	Infiltration
ELEV.	76.73	77.23	77.73	77.98	78.23	78.48	78.73	78.98	79.23	79.48	79.73	79.98	80.23	cfs		cf	cf
1	0.00	6.76	21.31	28.36	35.23	41.85	48.19	54.17	59.66	64.5	68.14	71.52	74.90	*0.002*	33.82		
2	0.00	14	43	57	70	84	96	108	119	129	136	143	150	*0.005*	67.64	203	353
3	0.00	20	64	85	106	126	145	163	179	193	204	215	225	*0.007*	101.46	304	529
4	0.00	27	85	113	141	167	193	217	239	258	273	286	300	*0.009*	135.28	406	705
5	0.00	34	107	142	176	209	241	271	298	322	341	358	375	*0.012*	169.10	507	882
6	0.00	41	128	170	211	251	289	325	358	387	409	429	449	*0.014*	202.92	609	1,058
7	0.00	47	149	199	247	293	337	379	418	451	477	501	524	*0.016*	236.74	710	1,235
8	0.00	54	170	227	282	335	386	433	477	516	545	572	599	*0.019*	270.56	812	1,411
9	0.00	61	192	255	317	377	434	488	537	580	613	644	674	*0.021*	304.38	913	1,587
10	0.00	68	213	284	352	419	482	542	597	645	681	715	749	*0.023*	338.20	1,015	1,764
11	0.00	74	234	312	388	460	530	596	656	709	750	787	824	*0.026*	372.02	1,116	1,940
12	0.00	81	256	340	423	502	578	650	716	774	818	858	899	*0.028*	405.84	1,218	2,116
13	0.00	88	277	369	458	544	626	704	776	838	886	930	974	*0.031*	439.66	1,319	2,293
14	0.00	95	298	397	493	586	675	758	835	902	954	1,001	1,049	*0.033*	473.48	1,420	2,469
15	0.00	101	320	425	528	628	723	813	895	967	1,022	1,073	1,124	*0.035*	507.30	1,522	2,645

APPENDIX E

STORMTECH DESIGN MANUAL







SC-310 / SC-740 / DC-780

StormTech®

Detention • Retention • Water Quality

Design Manual

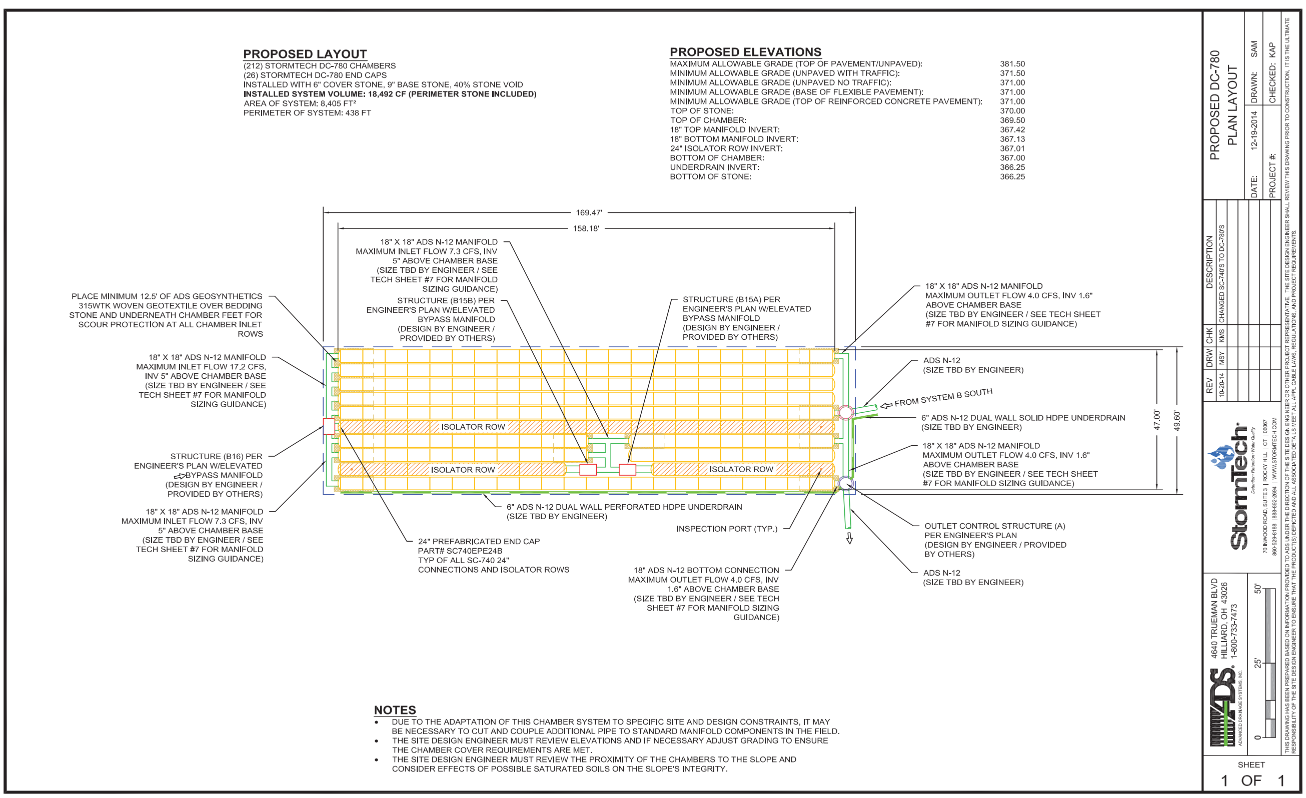
StormTech® Chamber Systems
for Stormwater Management

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.

StormTech

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.

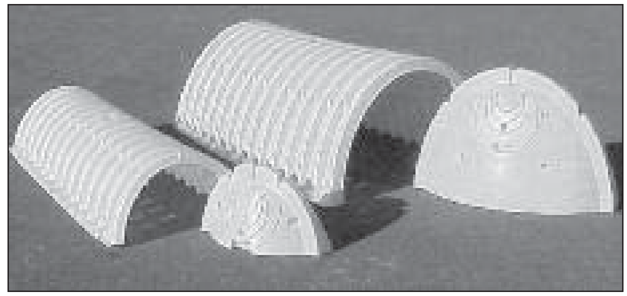
2.3 STONE POROSITY ASSUMPTION

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 ft^3/ft^2 (0.40 m^3/m^2) [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 ft^3/ft^2 (0.40 m^3/m^2) [minimum] of storage.

The StormTech SC-740 chamber shown on page 8 optimizes storage volumes in relatively small footprints. By providing 2.2 ft^3/ft^2 (0.67 m^3/m^2) [minimum] of storage, the SC-740 chambers can minimize excavation, backfill and associated costs.

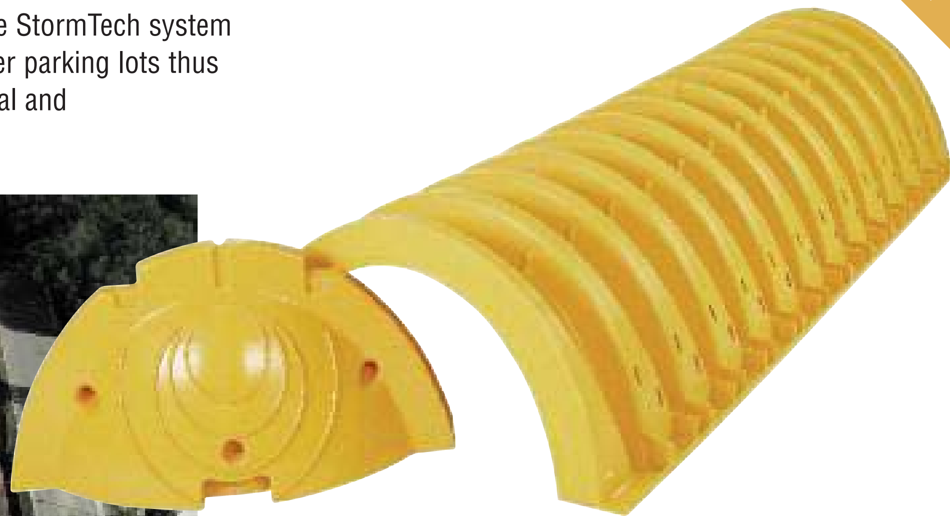
The DC-780 chamber shown on page 10 has been developed for those applications which exceed the maximum 8 ft (2.44 m) burial depth of the SC-740 and SC-310 chambers. The DC-780 is a modified version of the SC-740 allowing it to reach a maximum burial depth of 12 ft (3.66 m). The design of the DC-780 chamber, 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.

SC-310 Chamber

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)

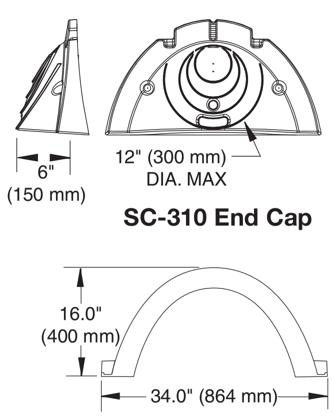
Nominal Chamber Specifications

Size (L x W x H)	85.4" x 34.0" x 16.0" (2170 x 864 x 406 mm)
Chamber Storage	14.7 ft³ (0.42 m³)
Min. Installed Storage*	31.0 ft³ (0.88 m³)
Weight	37.0 lbs (16.8 kg)

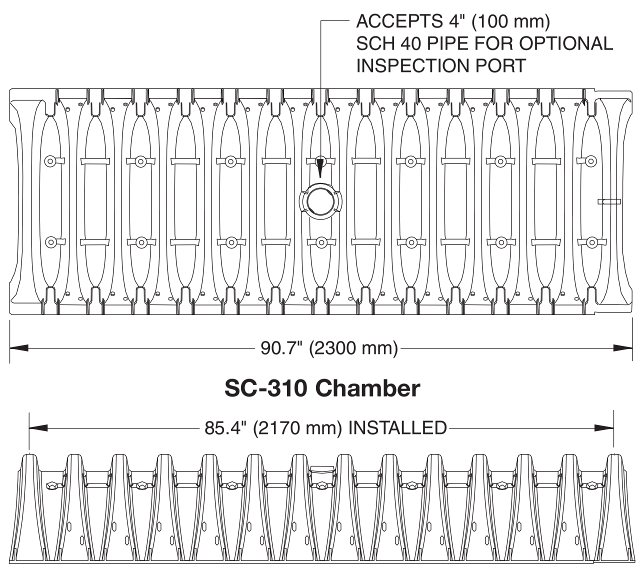
*Assumes 6" (150 mm) stone above, below and between chambers and 40% stone porosity.

Shipping

- 41 chambers/pallet
- 108 end caps/pallet
- 18 pallets/truck



SC-310 End Cap



SC-310 Chamber

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 ft³ (m³)	Total System Cumulative Storage ft³ (m³)
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 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-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

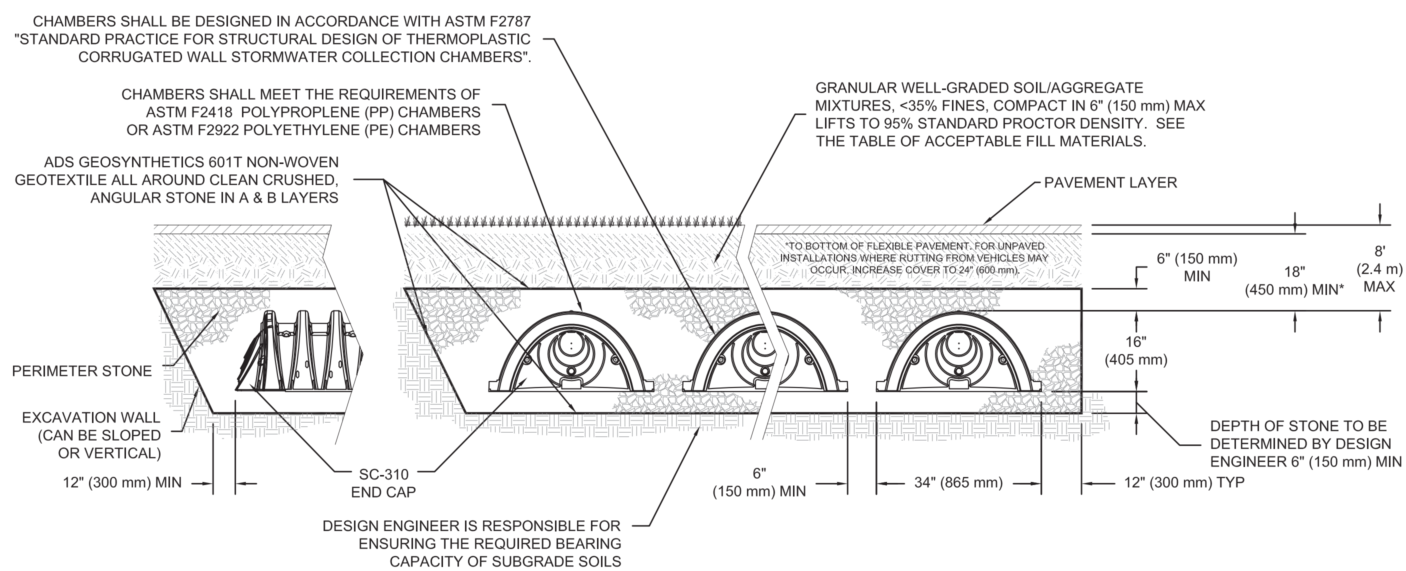
	Stone Foundation Depth		
ENGLISH TONS (yds³)	**6"**	**12"**	**18"**
StormTech SC-310	2.1 (1.5 yd³)	2.7 (1.9 yd³)	3.4 (2.4 yd³)
METRIC KILOGRAMS (m³)	**150 mm**	**300 mm**	**450 mm**
StormTech SC-310	1830 (1.1 m³)	2490 (1.5 m³)	2990 (1.8 m³)

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-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 ft^3 (0.42 m^3)
Min. Installed Storage*	29.3 ft^3 (0.83 m^3)
Weight	37.0 lbs (16.8 kg)

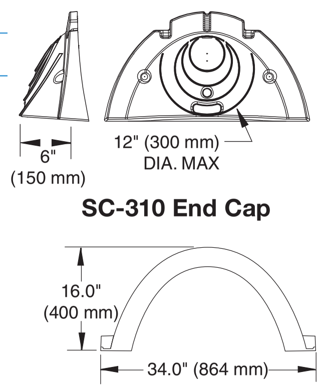
*Assumes 6" (150 mm) stone above and below chambers, 3" (76 mm) row spacing and 40% stone porosity.

Shipping

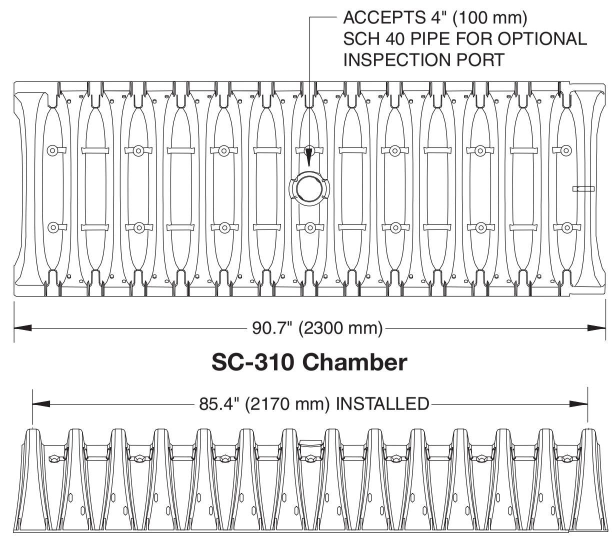
41 chambers/pallet

108 end caps/pallet

18 pallets/truck

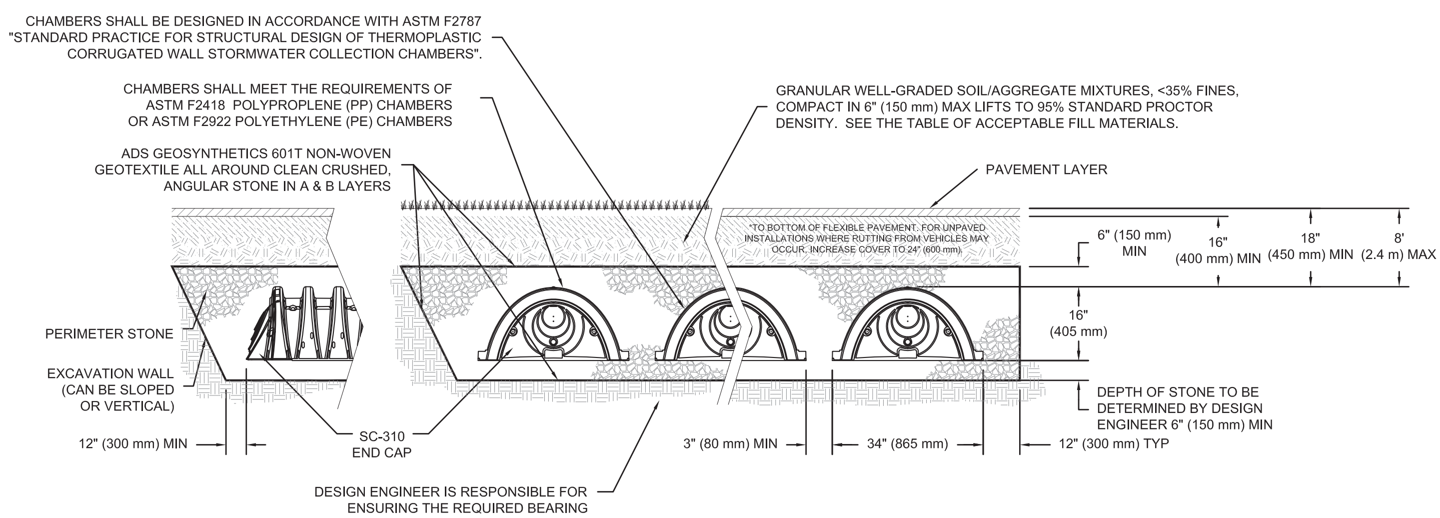


SC-310 End Cap



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)	Stone Cover ↑	14.7 (0.416)	29.34 (0.831)
27 (686)		14.7 (0.416)	28.60 (0.810)
26 (660)		14.7 (0.416)	27.87 (0.789)
25 (635)		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)	Stone Foundation ↑	0	4.39 (0.124)
5 (127)		0	3.66 (0.104)
4 (102)		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)

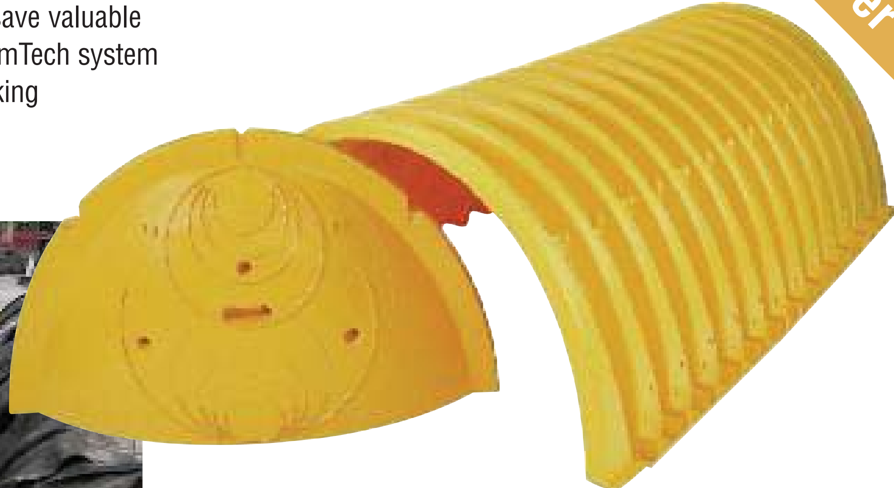
Note: Assumes 6" (150 mm) of stone above chambers and 3" (76 mm) row spacing.

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)

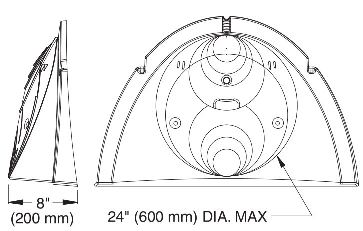
Nominal Chamber Specifications

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)

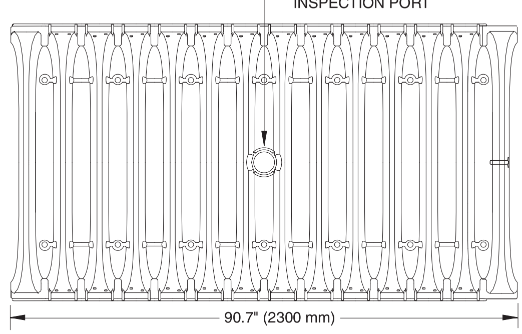
*Assumes 6" (150 mm) stone above, below and between chambers and 40% stone porosity.

Shipping

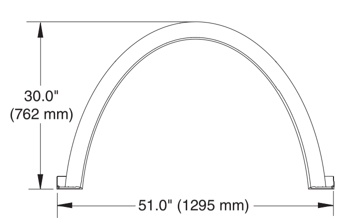
- 30 chambers/pallet
- 60 end caps/pallet
- 12 pallets/truck

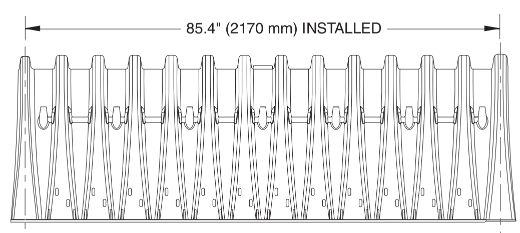


SC-740 End Cap



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

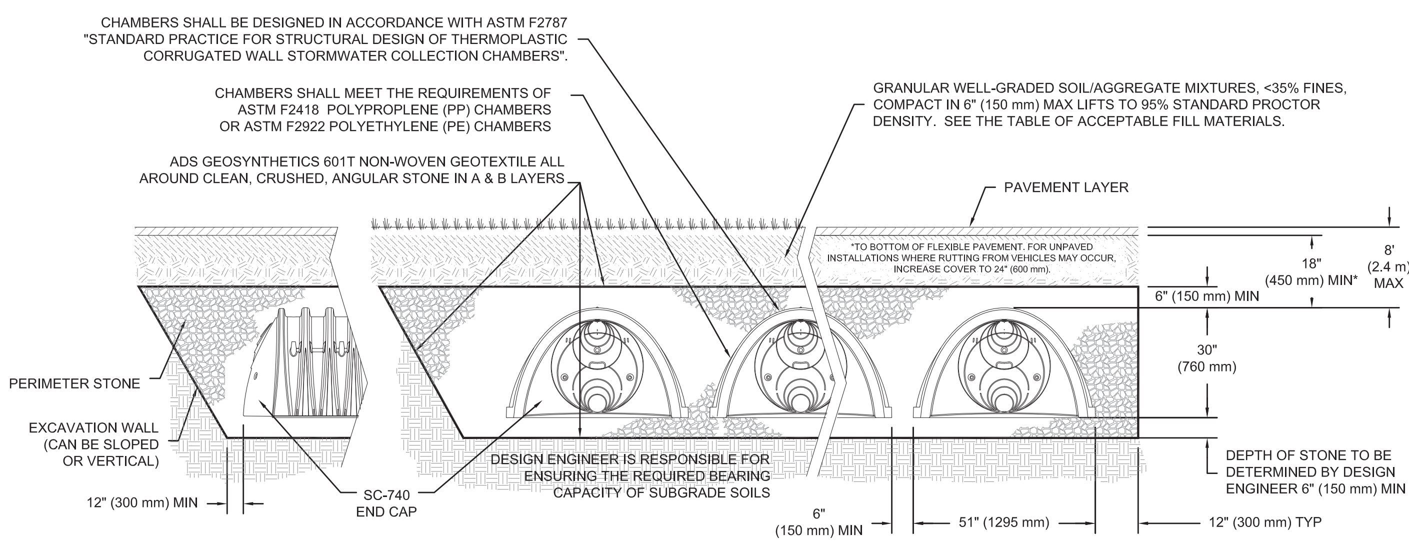
	Stone Foundation Depth		
ENGLISH TONS (yd³)	6"	12"	18"
StormTech SC-740	3.8 (2.8 yd³)	4.6 (3.3 yd³)	5.5 (3.9 yd³)
METRIC KILOGRAMS (m³)	150 mm	300 mm	450 mm
StormTech SC-740	3450 (2.1 m³)	4170 (2.5 m³)	4490 (3.0 m³)

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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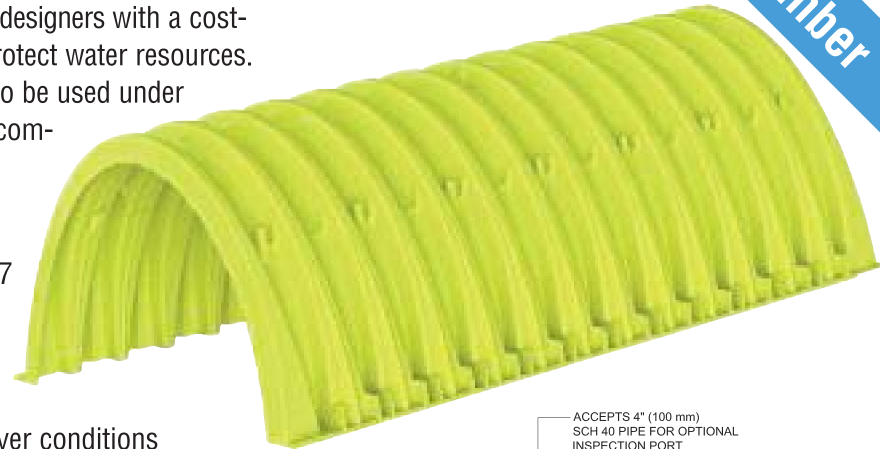
StormTech DC-780 Chamber

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 ft^3 (1.3 m^3)
Min. Installed Storage*	78.4 ft^3 (2.2 m^3)

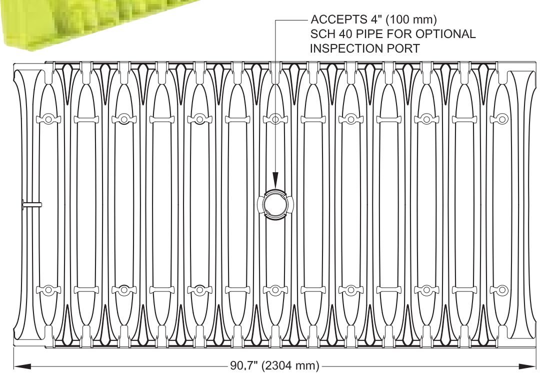
* Assumes 9" (230 mm) stone below, 6" (150 mm) stone above, 6" (150 mm) row spacing and 40% stone porosity.

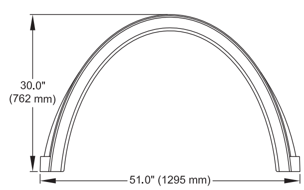
Shipping

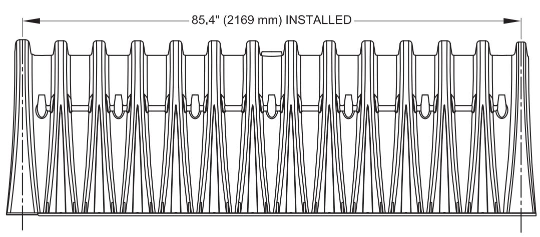
24 chambers/pallet

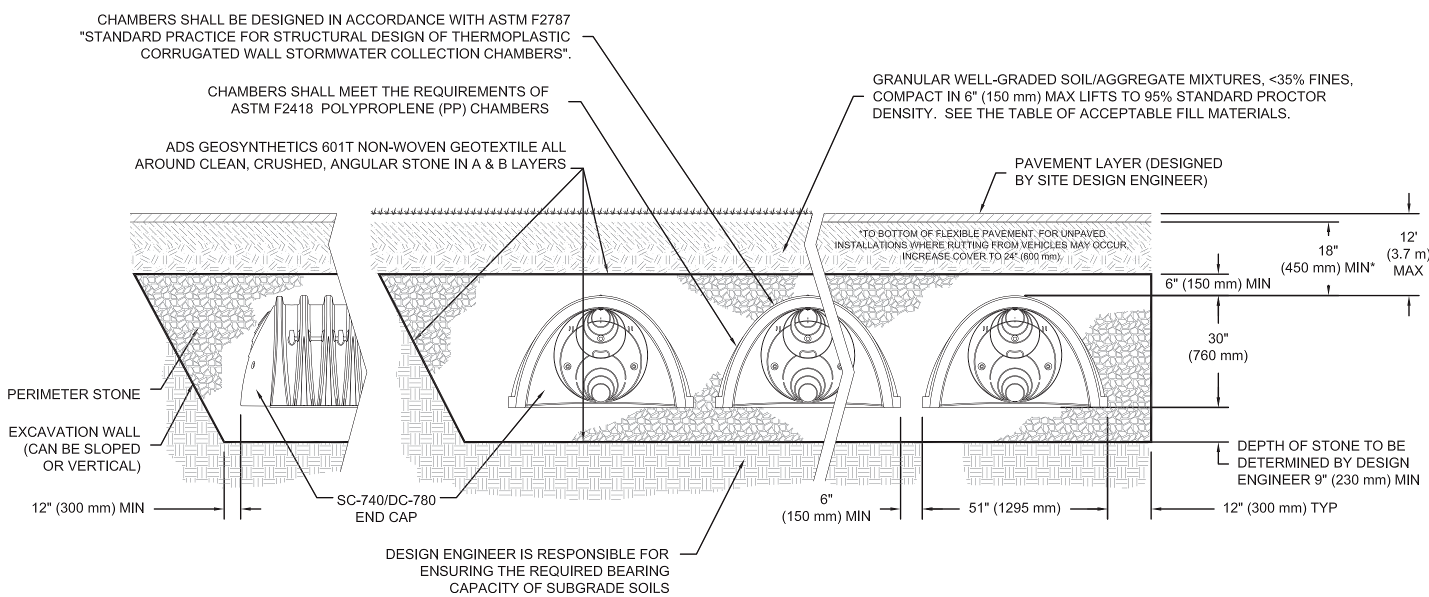
60 end caps/pallet

12 pallets/truck









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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**.

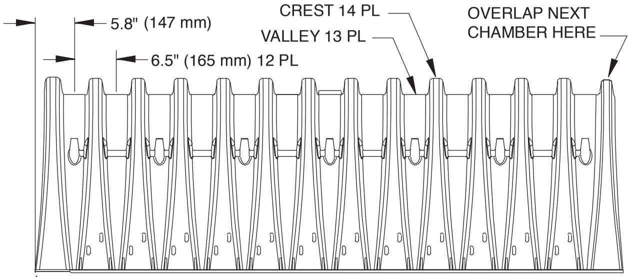
To assist the contractor, StormTech chambers are molded with simple assembly instructions and arrows that indicate the direction in which to build rows. Rows are formed by overlapping the next chamber's "Start End" corrugation with the previously laid chamber's end corrugation. Two people can safely 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

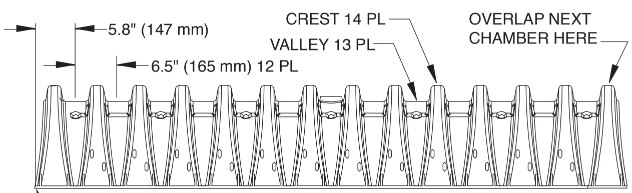
The StormTech end cap has features which make the chamber system simple to design, easy to build and more versatile than other products. StormTech end caps can be easily secured within any corrugation's crest. A molded-in handle makes attaching the end cap a one-person operation. Tools or fasteners are 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)

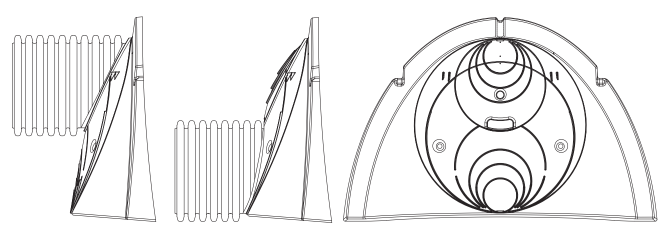


SC-740 chamber



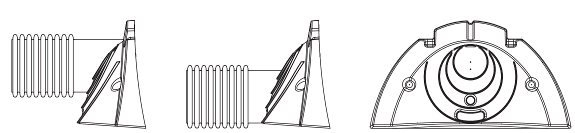
SC-310 chamber

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)

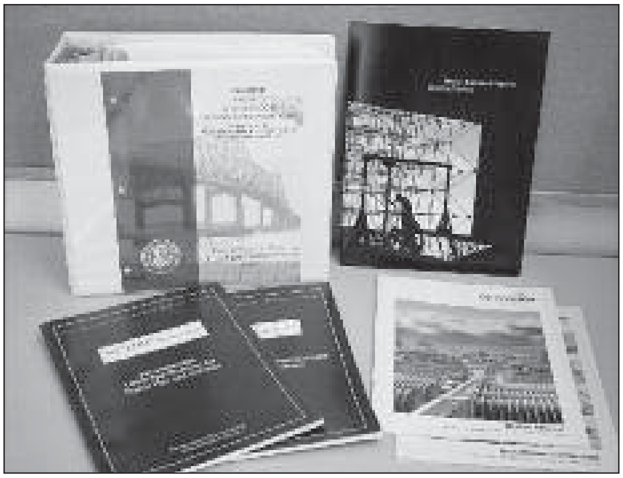
SC-740 / DC-780 end cap



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:

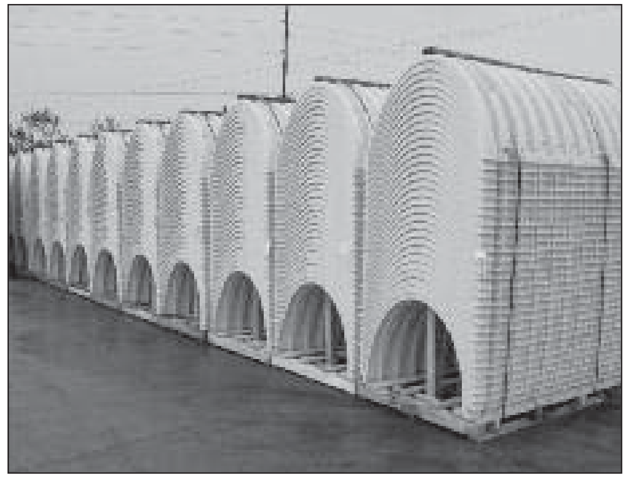
- Precise control of wall thickness throughout parts
- Precise fit of joints and end caps
- Molded-in inspection port fitting
- Molded-in handles on end caps
- Molded-in pipe guides with blade starter slots
- Repeatability for Quality Control (See Section 3.6)

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 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)
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 ft³ (0.032 m³) 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 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)
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 m³) of storage for each additional inch (25 mm) of stone foundation.

6.0 Required Materials/Row Separation

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.

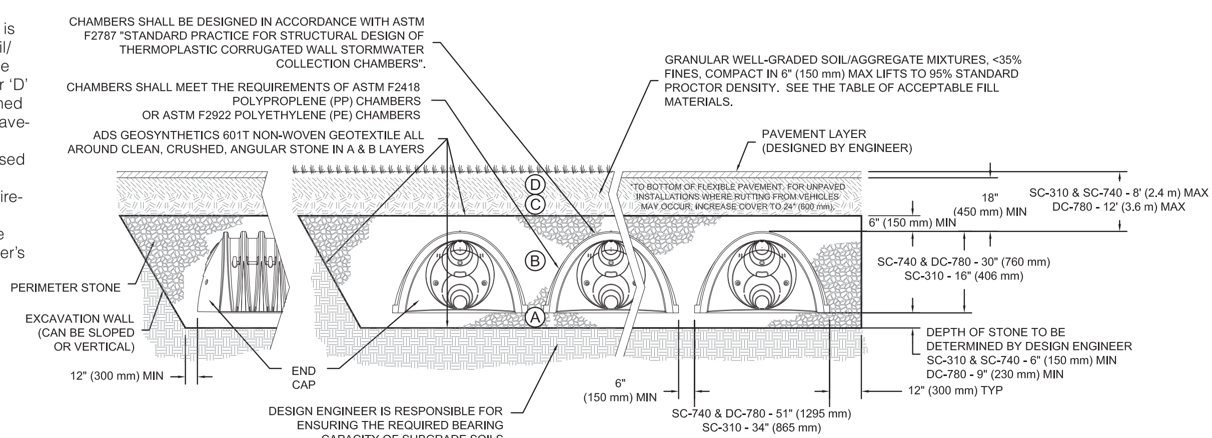
Table 6 – Acceptable Fill Materials

	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

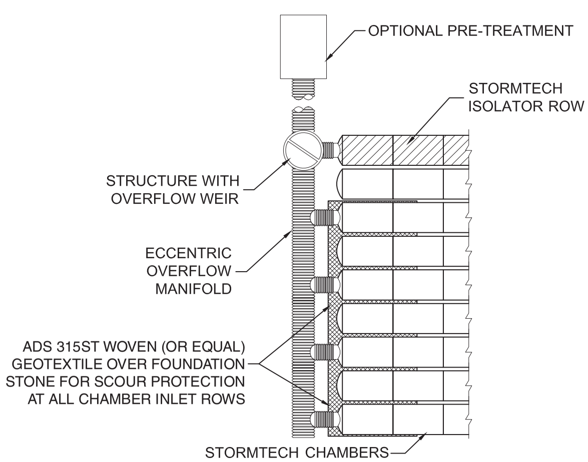
The design flexibility of a StormTech chamber system includes many inletting possibilities. Contact StormTech's Technical Service Department for guidance on designing an inlet system to meet specific site goals.

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.

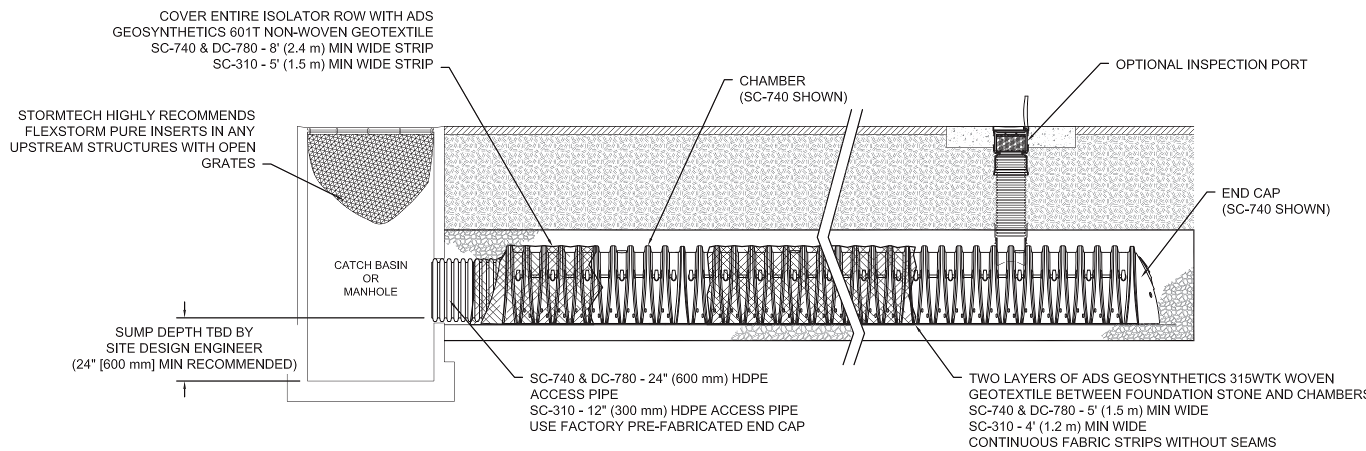
7.3 STORMTECH ISOLATOR ROW – TREATMENT TIER 2

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.

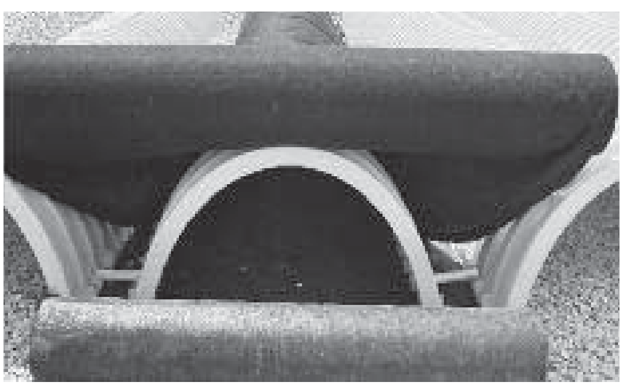
Specifying and installing proper geotextiles is essential for efficient operation and to prevent damage to the system during the JetVac maintenance process. In a typical configuration, two strips of woven geotextile that meet AASHTO M288 Class 1 requirements are required between the chambers and the stone foundation. This strong filter fabric traps sediments and protects the stone base during maintenance. A strip of non-woven

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.

7.6 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.

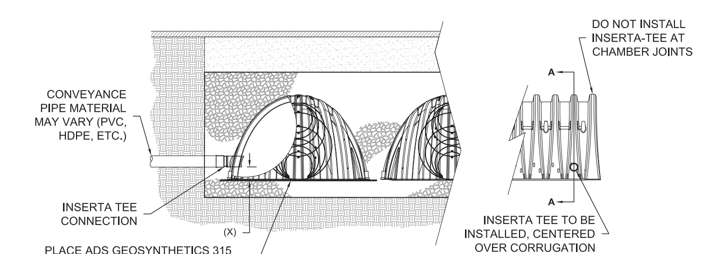
7.7 LATERAL FLOW RATES

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

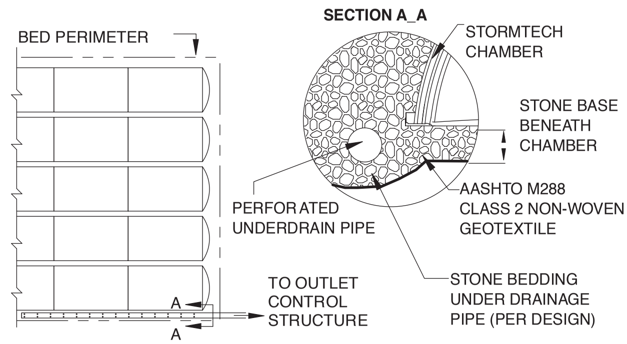


Figure 11 – Underdrain Perpendicular

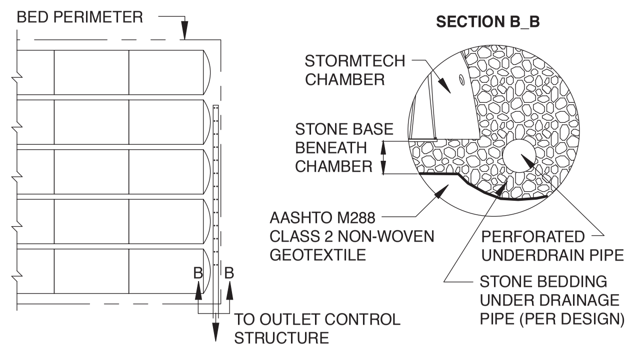


Figure 12 – Outlet Manifold

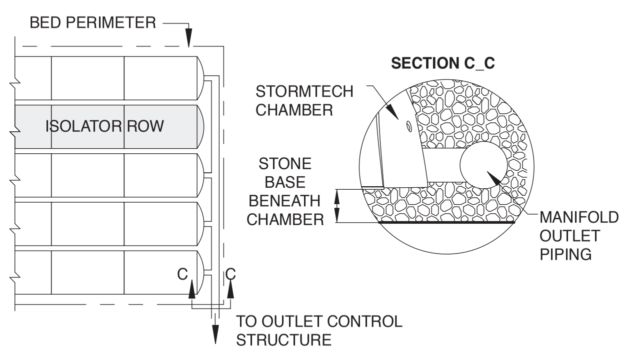
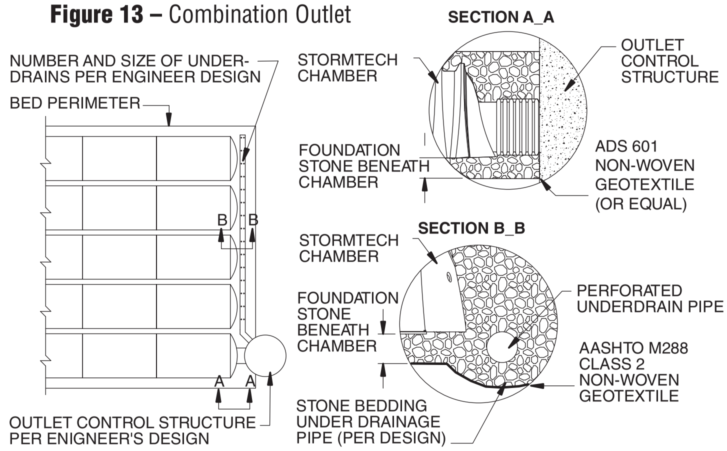


Figure 13 – Combination Outlet



9.0 Other Considerations

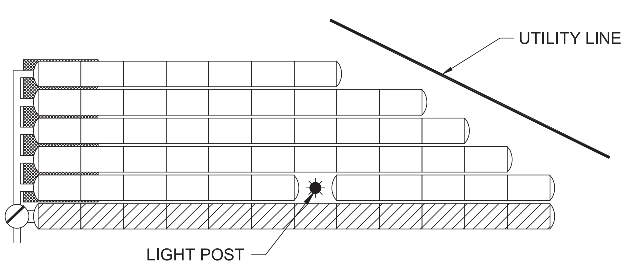
9.1 EROSION CONTROL
Erosion and sediment control measures must be integrated into the plan to protect the stormwater system both during and after construction. These practices may have a direct impact on the system's infiltration performance and longevity. Vegetation, temporary sediment barriers (silt 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.

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 ft^3 (m^3)

	Bare Chamber Storage	Chamber and Stone Foundation Depth in. (mm)		
	ft^3 (m^3)	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)
	ft^3 (m^3)	**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 ft^2 (3.1 m^3)

StormTech SC-310
bed area per chamber = 23.7 ft^2 (2.2 m^3)

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 (yd^3)	**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 (m^3)	**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 (yd^3)	**9"**	**12"**	**18"**
StormTech DC-780	4.2 (3.0)	4.7 (3.3)	5.6 (3.9)
METRIC kg (m^3)	**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 yd^3 (m^3)

	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 yds^3 (1.0 m^3) per SC-740 / DC-780 and 0.9 yds^3 (0.7 m^3) 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

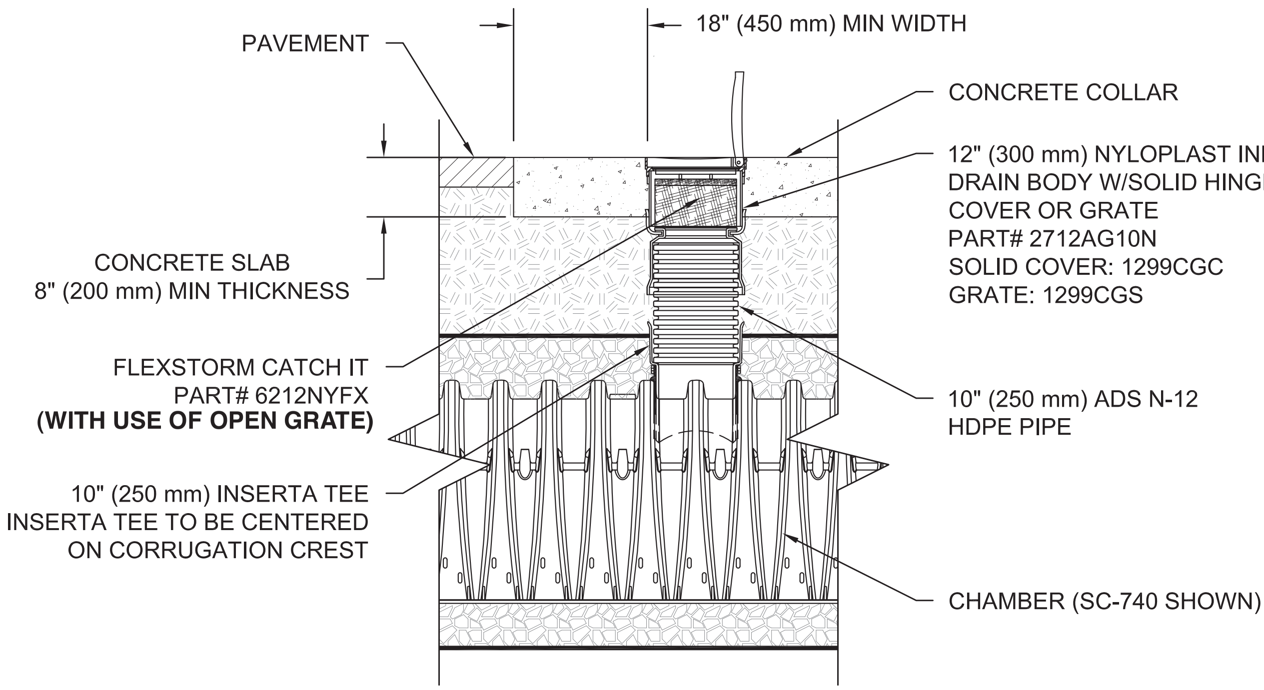
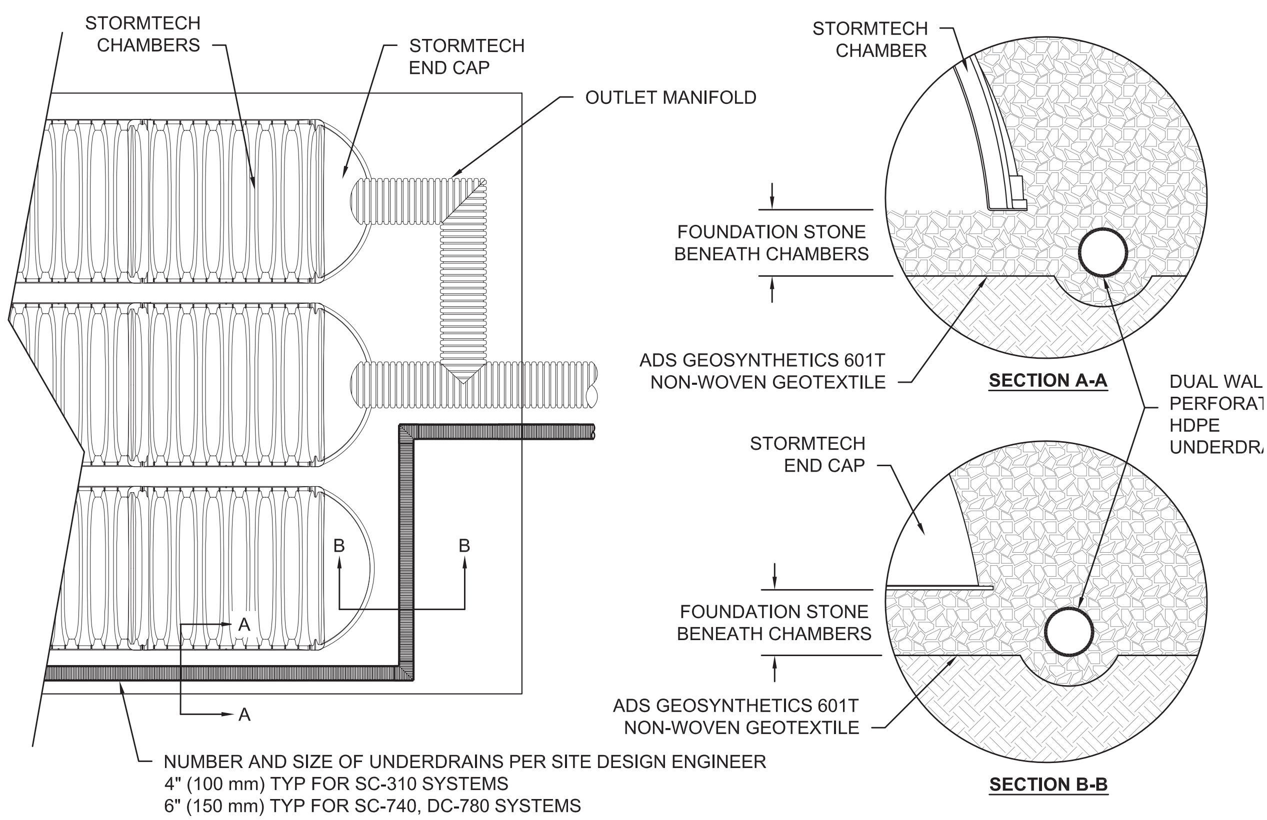


Figure 17 – Under Drain Detail



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.

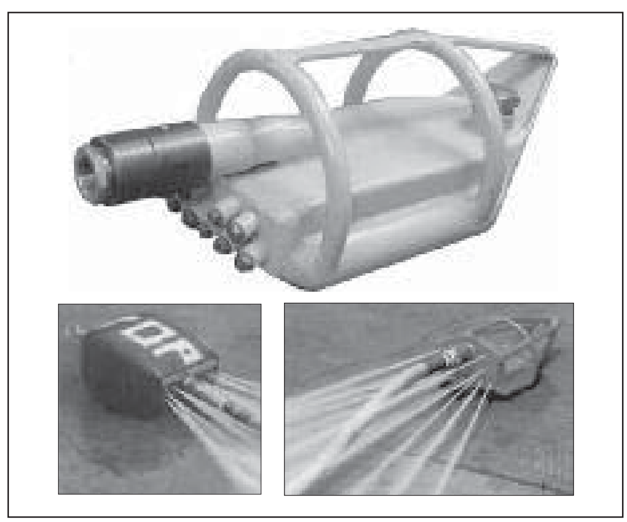
A StormTech Isolator Row should initially be inspected immediately after completion of the site's construction. While every effort should be made to prevent sediment from entering the system during construction, it is during this time that excess amounts of sediments are most likely to enter any stormwater 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

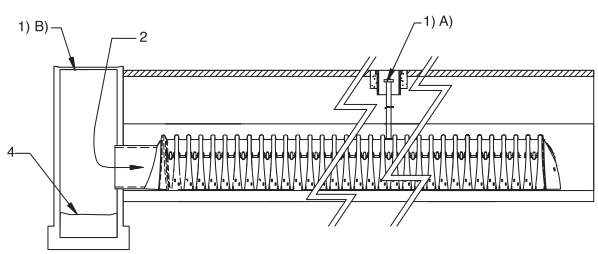
B) Apply multiple passes of JetVac until backflush water is clean

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.

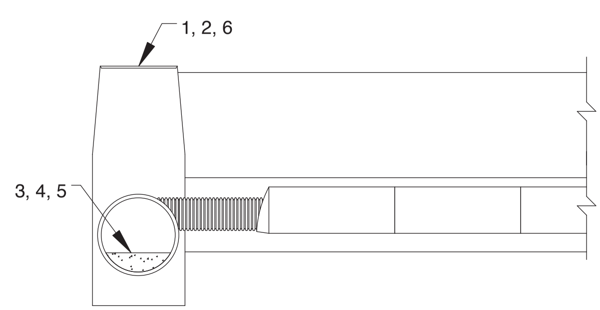
12.4 ECCENTRIC PIPE MANIFOLD MAINTENANCE

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

StormTech®
Detention • Retention • Water Quality
A division of ADS

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860.529.8188 | 888.892.2694 | fax 866.328.8401 | fax 860.529.8040 | www.stormtech.com

www.stormtech.com

APPENDIX F

CDS GUIDE:
OPERATION, DESIGN, PERFORMANCE AND MAINTENANCE MANUAL

CONTECH® ENGINEERED SOLUTIONS

CDS Guide
Operation, Design, Performance and Maintenance

CDS®

Using patented continuous deflective separation technology, the CDS system screens, separates and traps debris, sediment, and oil and grease from stormwater runoff. The indirect screening capability of the system allows for 100% removal of floatables and neutrally buoyant material without blinding. Flow and screening controls physically separate captured solids, and minimize the re-suspension and release of previously trapped pollutants. Inline units can treat up to 6 cfs, and internally bypass flows in excess of 50 cfs (1416 L/s). Available precast or cast-in-place, offline units can treat flows from 1 to 300 cfs (28.3 to 8495 L/s). The pollutant removal capacity of the CDS system has been proven in lab and field testing.

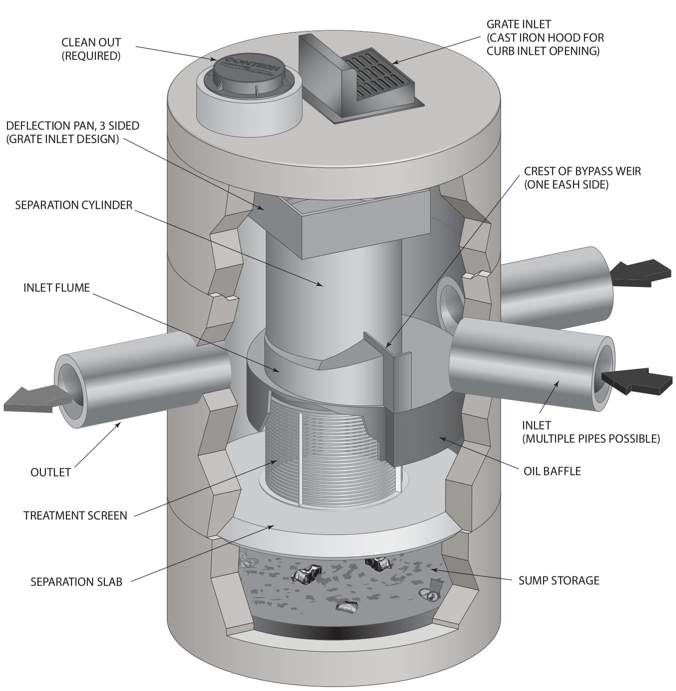
Operation Overview

Stormwater enters the diversion chamber where the diversion weir guides the flow into the unit's separation chamber and pollutants are removed from the flow. All flows up to the system's treatment design capacity enter the separation chamber and are treated.

Swirl concentration and screen deflection force floatables and solids to the center of the separation chamber where 100% of floatables and neutrally buoyant debris larger than the screen apertures are trapped.

Stormwater then moves through the separation screen, under the oil baffle and exits the system. The separation screen remains clog free due to continuous deflection.

During the flow events exceeding the treatment design capacity, the diversion weir bypasses excessive flows around the separation chamber, so captured pollutants are retained in the separation cylinder.



Design Basics

There are three primary methods of sizing a CDS system. The Water Quality Flow Rate Method determines which model size provides the desired removal efficiency at a given flow rate for a defined particle size. The Rational Rainfall Method™ or the and Probabilistic Method is used when a specific removal efficiency of the net annual sediment load is required.

Typically in the Unites States, CDS systems are designed to achieve an 80% annual solids load reduction based on lab generated performance curves for a gradation with an average particle size (d50) of 125 microns (μm). For some regulatory environments, CDS systems can also be designed to achieve an 80% annual solids load reduction based on an average particle size (d50) of 75 microns (μm) or 50 microns (μm).

Water Quality Flow Rate Method

In some cases, regulations require that a specific treatment rate, often referred to as the water quality design flow (WQQ), be treated. This WQQ represents the peak flow rate from either an event with a specific recurrence interval, e.g. the six-month storm, or a water quality depth, e.g. 1/2-inch (13 mm) of rainfall.

The CDS is designed to treat all flows up to the WQQ. At influent rates higher than the WQQ, the diversion weir will direct most flow exceeding the WQQ around the separation chamber. This allows removal efficiency to remain relatively constant in the separation chamber and eliminates the risk of washout during bypass flows regardless of influent flow rates.

Treatment flow rates are defined as the rate at which the CDS will remove a specific gradation of sediment at a specific removal efficiency. Therefore the treatment flow rate is variable, based on the gradation and removal efficiency specified by the design engineer.

Rational Rainfall Method™

Differences in local climate, topography and scale make every site hydraulically unique. It is important to take these factors into consideration when estimating the long-term performance of any stormwater treatment system. The Rational Rainfall Method combines site-specific information with laboratory generated performance data, and local historical precipitation records to estimate removal efficiencies as accurately as possible.

Short duration rain gauge records from across the United States and Canada were analyzed to determine the percent of the total annual rainfall that fell at a range of intensities. US stations' depths were totaled every 15 minutes, or hourly, and recorded in 0.01-inch increments. Depths were recorded hourly with 1-mm resolution at Canadian stations. One trend was consistent at all sites; the vast majority of precipitation fell at low intensities and high intensity storms contributed relatively little to the total annual depth.

These intensities, along with the total drainage area and runoff coefficient for each specific site, are translated into flow rates using the Rational Rainfall Method. Since most sites are relatively small and highly impervious, the Rational Rainfall Method is appropriate. Based on the runoff flow rates calculated for each intensity, operating rates within a proposed CDS system are determined. Performance efficiency curve determined from full scale laboratory tests on defined sediment PSDs is applied to calculate solids removal efficiency. The relative removal efficiency at each operating rate is added to produce a net annual pollutant removal efficiency estimate.

Probabilistic Rational Method

The Probabilistic Rational Method is a sizing program Contech developed to estimate a net annual sediment load reduction for a particular CDS model based on site size, site runoff coefficient, regional rainfall intensity distribution, and anticipated pollutant characteristics.

The Probabilistic Method is an extension of the Rational Method used to estimate peak discharge rates generated by storm events of varying statistical return frequencies (e.g. 2-year storm event). Under the Rational Method, an adjustment factor is used to adjust the runoff coefficient estimated for the 10-year event, correlating a known hydrologic parameter with the target storm event. The rainfall intensities vary depending on the return frequency of the storm event under consideration. In general, these two frequency dependent parameters (rainfall intensity and runoff coefficient) increase as the return frequency increases while the drainage area remains constant.

These intensities, along with the total drainage area and runoff coefficient for each specific site, are translated into flow rates using the Rational Method. Since most sites are relatively small and highly impervious, the Rational Method is appropriate. Based on the runoff flow rates calculated for each intensity, operating rates within a proposed CDS are determined. Performance efficiency curve on defined sediment PSDs is applied to calculate solids removal efficiency. The relative removal efficiency at each operating rate is added to produce a net annual pollutant removal efficiency estimate.

Treatment Flow Rate

The inlet throat area is sized to ensure that the WQQ passes through the separation chamber at a water surface elevation equal to the crest of the diversion weir. The diversion weir bypasses excessive flows around the separation chamber, thus preventing re-suspension or re-entrainment of previously captured particles.

Hydraulic Capacity

The hydraulic capacity of a CDS system is determined by the length and height of the diversion weir and by the maximum allowable head in the system. Typical configurations allow hydraulic capacities of up to ten times the treatment flow rate. The crest of the diversion weir may be lowered and the inlet throat may be widened to increase the capacity of the system at a given water surface elevation. The unit is designed to meet project specific hydraulic requirements.

Performance

Full-Scale Laboratory Test Results

A full-scale CDS system (Model CDS2020-5B) was tested at the facility of University of Florida, Gainesville, FL. This CDS unit was evaluated under controlled laboratory conditions of influent flow rate and addition of sediment.

Two different gradations of silica sand material (UF Sediment & OK-110) were used in the CDS performance evaluation. The particle size distributions (PSDs) of the test materials were analyzed using standard method "Gradation ASTM D-422 "Standard Test Method for Particle-Size Analysis of Soils" by a certified laboratory.

UF Sediment is a mixture of three different products produced by the U.S. Silica Company: "Sil-Co-Sil 106", "#1 DRY" and "20/40 Oil Frac". Particle size distribution analysis shows that the UF Sediment has a very fine gradation (d50 = 20 to 30 μm) covering a wide size range (Coefficient of Uniformity, C averaged at 10.6). In comparison with the hypothetical TSS gradation specified in the NJDEP (New Jersey Department of Environmental Protection) and NJCAT (New Jersey Corporation for Advanced Technology) protocol for lab testing, the UF Sediment covers a similar range of particle size but with a finer d50 (d50 for NJDEP is approximately 50 μm) (NJDEP, 2003).

The OK-110 silica sand is a commercial product of U.S. Silica Sand. The particle size distribution analysis of this material, also included in Figure 1, shows that 99.9% of the OK-110 sand is finer than 250 microns, with a mean particle size (d50) of 106 microns. The PSDs for the test material are shown in Figure 1.

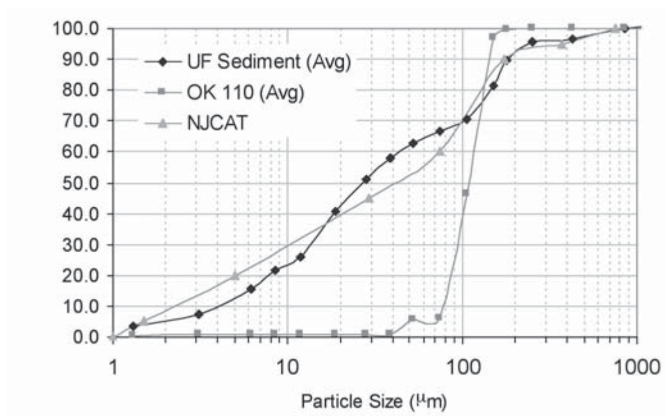


Figure 1. Particle size distributions

Tests were conducted to quantify the performance of a specific CDS unit (1.1 cfs (31.3-L/s) design capacity) at various flow rates, ranging from 1% up to 125% of the treatment design capacity of the unit, using the 2400 micron screen. All tests were conducted with controlled influent concentrations of approximately 200 mg/L. Effluent samples were taken at equal time intervals across the entire duration of each test run. These samples were then processed with a Dekaport Cone sample splitter to obtain representative sub-samples for Suspended Sediment Concentration (SSC) testing using ASTM D3977-97 "Standard Test Methods for Determining Sediment Concentration in Water Samples", and particle size distribution analysis.

Results and Modeling

Based on the data from the University of Florida, a performance model was developed for the CDS system. A regression analysis was used to develop a fitting curve representative of the scattered data points at various design flow rates. This model, which demonstrated good agreement with the laboratory data, can then be used to predict CDS system performance with respect to SSC removal for any particle size gradation, assuming the particles are inorganic sandy-silt. Figure 2 shows CDS predictive performance for two typical particle size gradations (NJCAT gradation and OK-110 sand) as a function of operating rate.

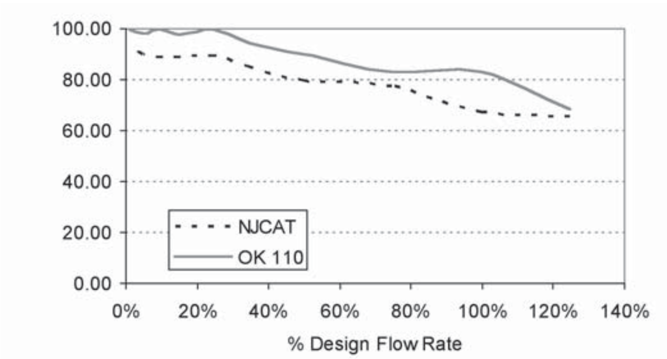


Figure 2. CDS stormwater treatment predictive performance for various particle gradations as a function of operating rate.

Many regulatory jurisdictions set a performance standard for hydrodynamic devices by stating that the devices shall be capable of achieving an 80% removal efficiency for particles having a mean particle size (d50) of 125 microns (e.g. Washington State Department of Ecology — WASDOE - 2008). The model can be used to calculate the expected performance of such a PSD (shown in Figure 3). The model indicates (Figure 4) that the CDS system with 2400 micron screen achieves approximately 80% removal at the design (100%) flow rate, for this particle size distribution (d50 = 125 μm).

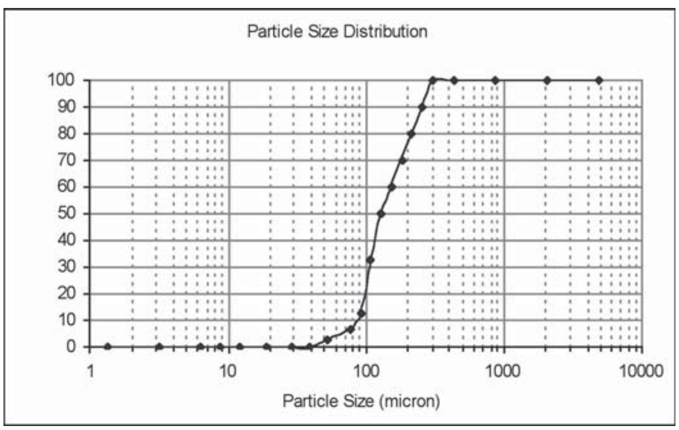


Figure 3. WASDOE PSD

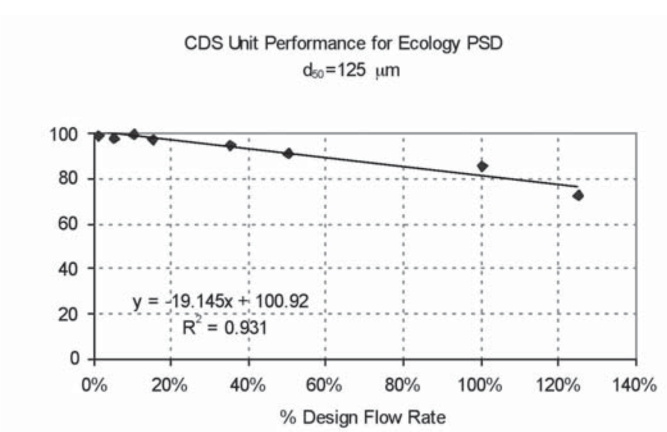


Figure 4. Modeled performance for WASDOE PSD.

Maintenance

The CDS system 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 than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified

during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply 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 also be cleaned out if pollutant build-up exists in this area.

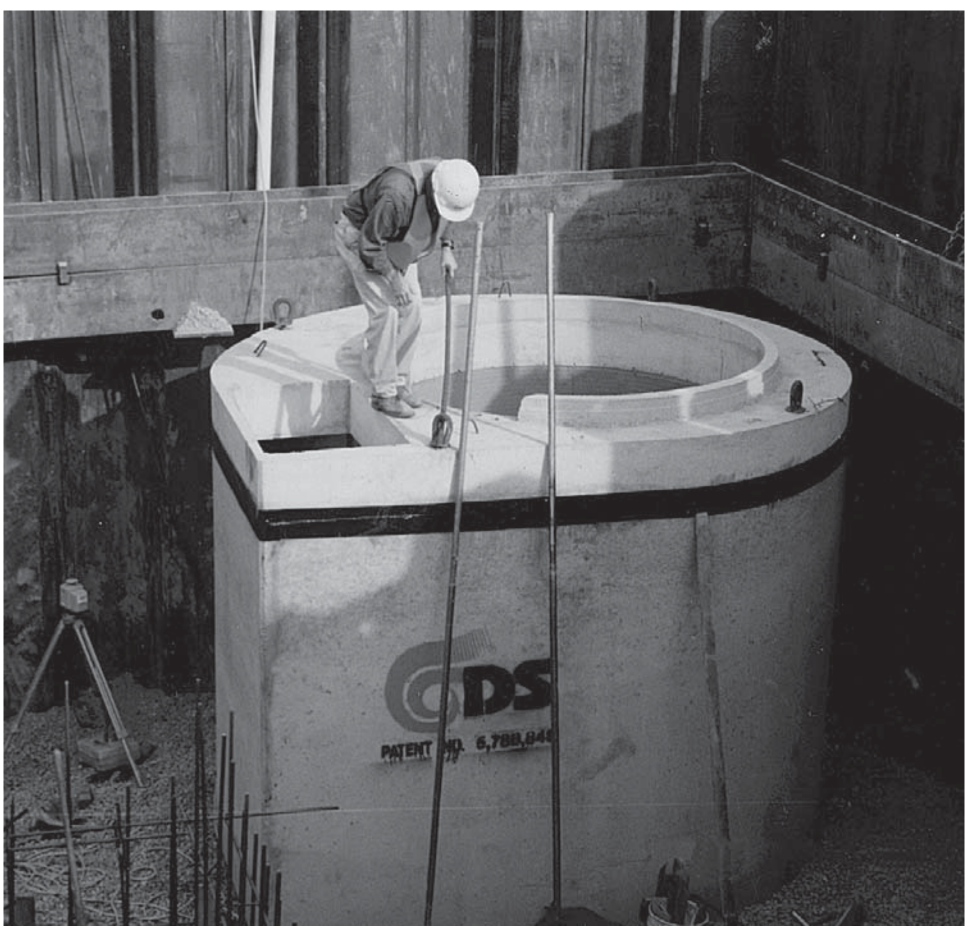
In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be cleaned to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	yd3	m3
CDS2015-4	4	1.2	3.0	0.9	0.5	0.4
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Note: To avoid underestimating the volume of sediment in the chamber, carefully lower the measuring device to the top of the sediment pile. Finer silty particles at the top of the pile may be more difficult to feel with a measuring stick. These finer particles typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile.



CDS Inspection & Maintenance Log

CDS Model: ______________________ Location: ______________________

Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile**.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

Support

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

CONTECH ENGINEERED SOLUTIONS
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cds_manual 7/14 PDF

APPENDIX G

TEMPORARY EROSION AND SEDIMENT CONTROL INSPECTION & MAINTENANCE CHECKLIST/PERMANENT STORMWATER MANAGEMENT PRACTICE INSPECTION & MAINTENANCE CHECKLIST

Temporary Erosion and Sediment Control Inspection and Maintenance Checklist

Erosion and Sediment Control Measure	**Inspection/Maintenance Intervals**	**Inspection/Maintenance Requirements**
Stabilized Construction Entrance	Daily	• Periodic top dressing with additional aggregate as required • Clean sediment in public right-of-ways immediately
Silt Fence	Weekly + After Each Rain	• Remove & redistribute sediment when bulges develop in the silt fence.
Inlet Protection	Weekly + After Each Rain	• Refer to Figures A5.11, A5.12, A5.13 & A5.14 within the NYSDEC New York State Standard and Specifications for Erosion and Sediment Control

Permanent Stormwater Management Practice Inspection and Maintenance Checklist

Stormwater Management Practice	**Inspection/Maintenance Intervals**	**Inspection/Maintenance Requirements**
Drain Inlets	Monthly	• Check for blockage and/or erosion at top of each inlet. Repair/remove as necessary. • Check for sediment and debris collected within sumps and clean out as necessary.
Porous Pavement and Permeable Pavers	Monthly and As Needed	• Ensure that paving area is clean of debris • Ensure that paving dewaters between storms • Ensure that the area is clean of sediments • Mow upland and adjacent areas, and seed bare areas
	Quarterly	• Vacuum sweep frequently to keep surface free of sediments
	Annually	• Inspect the surface for deterioration or spalling
StormTech Subsurface Retention Facility	Semi-Annually + After Major Storms	• Check level of sediment accumulated within the isolator row through the access manhole. If 3 inches of sediment or greater, clean out utilizing a high pressure water nozzle to scour and suspend sediments. • Flush all sediment to access manhole and remove using a vacuum truck.

<u>Permanent Stormwater Management Practice Inspection and Maintenance Checklist (Cont'd)</u>

Stormwater Management Practice	Inspection/Maintenance Intervals	Inspection/Maintenance Requirements
CDS Water Quality Structure	Quarterly + After Major Storms	• Open access cover for visual inspection and measure the distance from the standing water surface to the sediment pile with a measuring stick or tape. If less than 4 feet, insert hose from vacuum truck into the sump and screen through both access covers to clean out the standing water, layer of oil, sediment, trash, etc. • The screen must be powerwashed to ensure it is free of trash and debris.
Dry Wells	Quarterly + After Major Storms	• General inspection to see if infiltrating properly. • Pump stored runoff from impaired or failed to remove debris, trash, sediment, and other waste material.

The owner/operator responsible for inspection and maintenance as outlined above:

CCI Properties, LLC
Andrew Cortese
52 Cedar Street
Dobbs Ferry, NY 10522
Phone: 914-478-4250
Email: Andrew@CorteseConstruction.com

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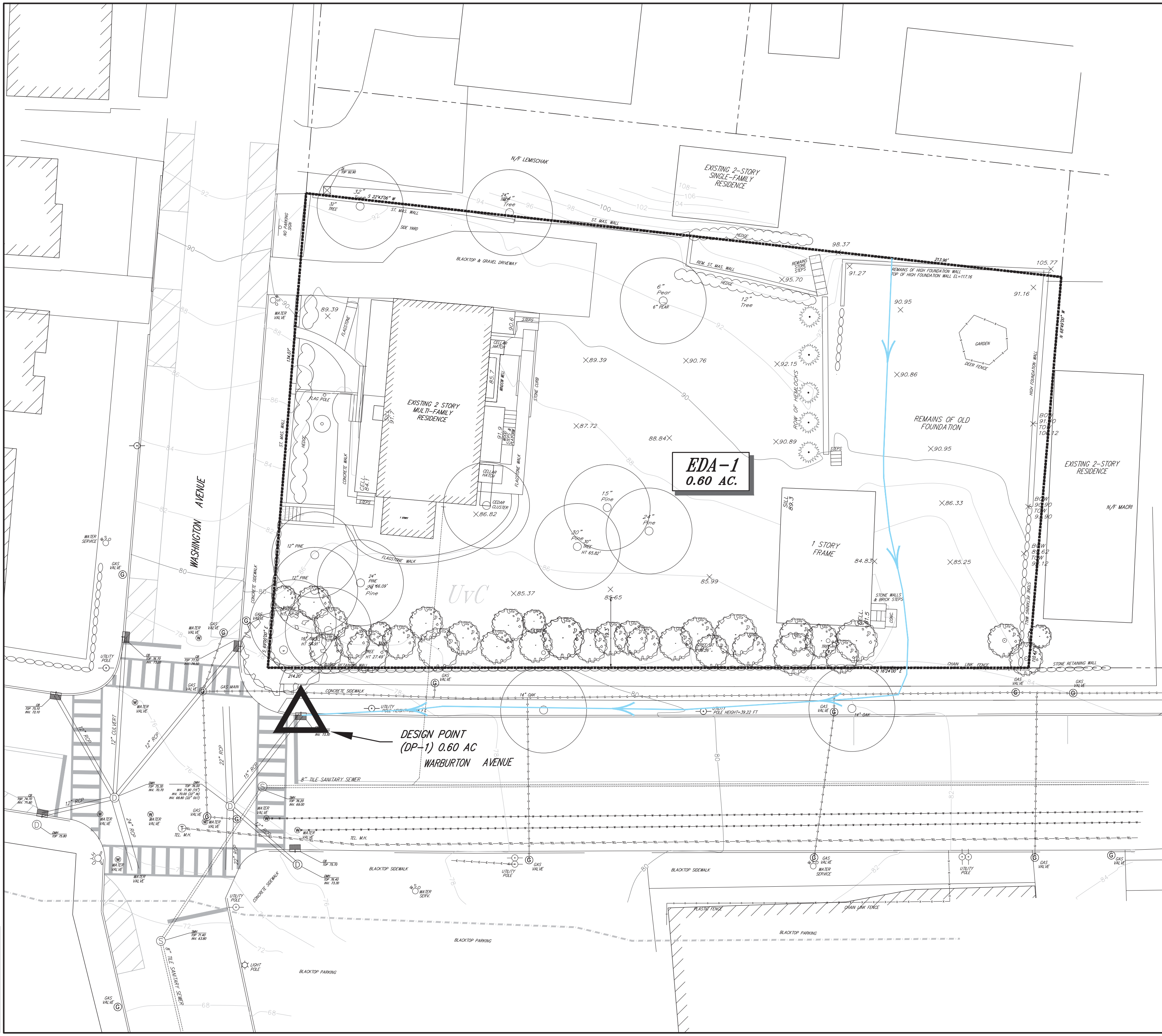
APPENDIX H

DRAWINGS



EXISTING DRAINAGE LEGEND

- EXISTING GRADE
- FLAGGED WETLANDS WITH FLAG NUMBERS
- EXISTING STONE WALL
- WATERSHED BOUNDARY LINE
- BOUNDARY OF COVER TYPE LINE
- LIMIT OF SOIL GROUPS LINE
- FLOW PATH LINE
- HYDROLOGIC SOIL GROUP 'B'

SOIL TYPE TABLE

DESIGNATION	HYDROLOGIC GROUP	DESCRIPTION
UvC	B	URBAN LAND–RIVERHEAD COMPLEX, 8 TO 15 PERCENT SLOPES

No.	Revision	Date	By

Previous Editions Obsolete

APPLICANT/OWNER:
CCI PROPERTIES, LLC
52 CEDAR STREET
DOBBS FERRY, NY 10522

ARCHITECT:
CHRISTINA GRIFFIN ARCHITECT, PC
10 SPRING STREET
HASTINGS–ON–HUDSON, NY 10706

JMC
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

EXISTING DRAINAGE AREA MAP

TOWNHOUSES AT 32–34 WASHINGTON AVENUE
32–34 WASHINGTON AVENUE
HASTINGS–ON–HUDSON

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.

Drawn:	EH	Approved:	RR
Scale:	1" = 10'		
Date:	08/11/2015		
Project No:	13180		
13180-DRAINAGE	EDA	EDA.LS	

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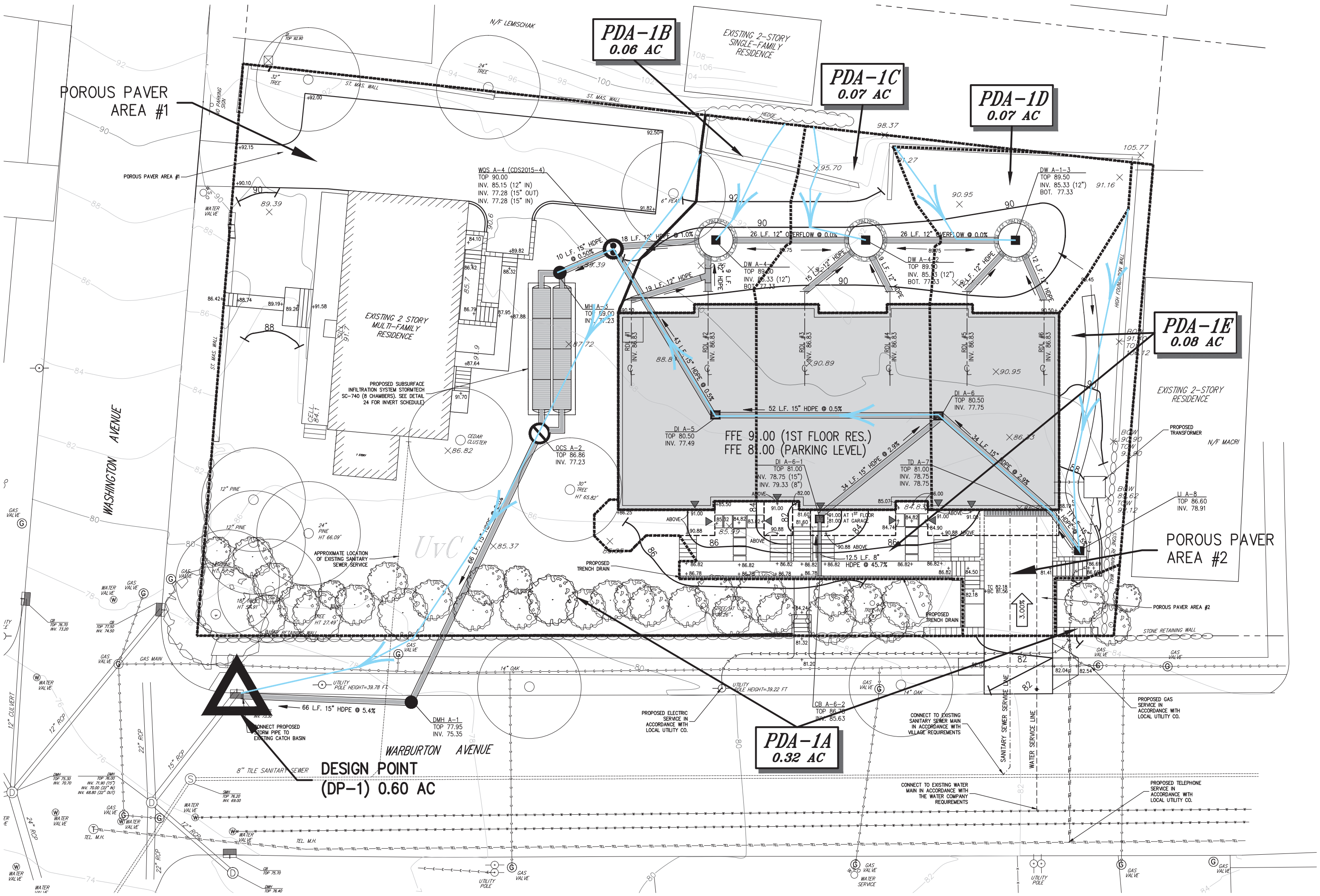

PROPOSED DRAINAGE LEGEND

- EXISTING GRADE
- PROPOSED FINISHED GRADE
- PROPOSED DITCH OR SWALE
- EXISTING WALL
- EXISTING STONE WALL
- PROPOSED WALL
- PERVIOUS PAVERS
- WATERSHED BOUNDARY LINE
- FLOW PATH LINE
- PROPOSED BUILDING LINE
- PROPOSED CONCRETE CURB
- PROPOSED MANHOLE (MH)
- EXISTING DRAIN INLET
- PROPOSED DRAIN INLET (DI)
- PROPOSED LAWN INLET (LI)
- PROPOSED DRY WELL (DW)
- PROPOSED WATER QUALITY STRUCTURE
- PROPOSED BYPASS MANHOLE
- PROPOSED OUTLET CONTROL STRUCTURE

SOIL TYPE TABLE

DESIGNATION	HYDROLOGIC GROUP	DESCRIPTION
UvC	B	URBAN LAND-RIVERHEAD COMPLEX, 8 TO 15 PERCENT SLOPES

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ARCHITECT:
CHRISTINA GRIFFIN ARCHITECT, PC
10 SPRING STREET
HASTINGS-ON-HUDSON, NY 10706

JMC

www.jmcpllc.com

PROPOSED DRAINAGE AREA MAP

TOWNHOUSES AT 32-34 WASHINGTON AVENUE
32-34 WASHINGTON AVENUE
HASTINGS-ON-HUDSON

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.

Drawn:	EH	Approved:	RR
Scale:	1" = 10'		
Date:	08/11/2015		
Project No:	13180		
13180-DRAINAGE	PDA	PDA.LS	
Drawing No:	DA-2		

NOT FOR CONSTRUCTION

CHRISTINAGRIFFINARCHITECT PC
10 Spring Street, Hastings-on-Hudson, New York 10706

August 11, 2015
Chairman and Members of the Hastings Planning Board
Village of Hastings-on-Hudson
7 Maple Avenue
Hastings-on-Hudson, NY 10706

Re: Townhouses at 32-34 Washington Avenue
Revised Documents for review by the Planning Board

Dear Chairman and Members of the Planning Board:

As the Architect for the proposed townhouses at 32-34 Washington Avenue, I am submitting the following revised documents for review at the August 27, 2015 Planning Board meeting:

Summary of Response to Comments by the Planning Board, dated 5-21-15, 7-1-15, & 8-13-15
Environmental Assessment Form, dated 8-11-15
Stormwater Pollution Prevention Plan, dated 8-11-15
Letter to Andrew Cortese regarding traffic, dated 8-11-15
Traffic Study by JMC Site Development Consultants, dated 8-11-15
Letter from Stephen Lopez, Landscape Architect regarding trees, dated 8-11-15
S-1 Site Plan, dated 8-11-15
S-2 Section through Site, dated 8-11-15
S-3 Site Density and Coverage Map, dated 8-11-15
S-4 Density Study of Neighboring Properties, dated 8-11-15
A-1- 4 Basement, First Floor, Second Floor and Attic Floor Plans
A-5 West Elevation, dated 8-11-15
A-6 North & South Elevation, dated 8-11-15
A-7 East Elevation, dated 8-11-15
A-8 -16 View Preservation Photos, dated 8-11-15
C-1 Layout & Building Coverage Plan, dated 8-11-15
C-2 Grading & Utilities Plan, dated 8-11-15
C-3 Sediment & Erosion Control Plan, dated 8-11-15
C-4 – 6 Construction Details, dated 8-11-15
C-7 Sight Line Distance Plan, dated 8-11-15

In addition, please find attached an electronic version of the full set of documents, including the revised documents listed above, and the latest version of all other documents previously submitted.

I look forward to presenting the revised documents to the Planning Board meeting on August 27th.

Thank you again for your time and consideration in your review of our proposal.

Sincerely,

Christina Griffin AIA LEED AP CPHC

cc: CCI Properties

Summary of Response to Planning Board Comments 5-21-15

1. Survey, site plan, and layout plans updated and corrected.
2. Footprint of New Building reduced from 4,813 to 4,762 SF
3. Reduced length of building by 2 ft.
4. Height of Building reduced from 34,6 ft. to 32.6 ft.
5. Central garage entry and steps added to improve pedestrian access to garage
6. Waste areas shown, central location for pick-up added
7. Dormers are reduced in size to reduce bulk
8. Front setback changed from 15.75 to 19.33 ft. to provide more space between building and trees, corner porch reduced in size
9. Driveway at two-family house enlarged, turn-around moved to rear of house
10. Details of Driveway showing site lines, distance from traffic lights, etc., provided
11. Garage layout changed to show parking spaces and turn around to meet zoning code
12. View analysis prepared based on photos taken from inside 15 William Street & 42 Washington Street (properties most affected)
13. Usage of back yards - to be kept open without fences
14. Civil engineering details, such as drainage details, do not coordinate with the plans - reviewed and confirmed by JMC, tree protection details added
15. Comparison of size of units with other townhouses in the area:

32-34 Washington	1,570 - 1,996 SF
Ridge Street	1,680 - 2,400 SF
400 Warburton	2,100 SF
River Town House	2,100 SF
Warburton Avenue Townhouses	+/-3,500 SF

16. Method for collecting data for density studies - example of information obtained from property card presented at 5-21-15 Planning Board Meeting

Summary of Response to Planning Board Comments 7-1-15

1. Poles and string were mounted on site to show top of ridge of proposed townhouses
2. EAF Statement by JMC Site Development Consultants, dated 7-1-15, corrected Traffic Study by JMC Site Development Consultants, dated 7-1-15, provided
3. Letter from landscape architect, Stephen Lopez, dated 7-1-15, about impact on trees by construction provided. Note that the recommended safe distance of 15 feet from the trees to the building has been provided, see Site Plan drawing S-1, dated 6-30-15
4. Central exterior stair to provide pedestrian access from Warburton Avenue has been added back to the plans, see drawings S-1, C-1. C-2, C-3, dated 6-30-15. As a result, the development coverage changed from 39% to 40%, see revised zoning data, drawing S-1, and revised density studies, drawings S-3 and S-4, dated 6-30-15.
5. Changes were made to clarify (same data, better graphics) the Density Study of Neighboring Properties, drawing A-4, dated 6-30-15. Note that the proposed development has 3,752 SF lot area per unit, which is the he highest ratio of lot area to unit (lowest density) when compared to the lot area per unit of groups of properties with similar lot areas. Also note that

the proposed lot area per unit is 2.5 times greater than the minimum 1,500 SF lot area per unit required in the MR 1.5 zone.

6. Additional view analysis, drawing A-11, dated 6-30-15, provided to show views from second floor of 15 William Street, as requested by neighbor

Summary of Changes and Response to Planning Board Comments 8-13-15

1. A fully developed SWPPP has been submitted, showing necessary drainage plans and details
2. The Landscape Plan, Drawing L-1, has been updated and completed.
3. Fences between units have been eliminated to provide more open space. For privacy, six foot long trellises will be attached to the rear wall between the units.
4. Path to south of building was added to improve pedestrian circulation through the property.
5. The driveway along Warburton Avenue has been widened to 16 feet, as requested by Westchester County Engineering Department. A zoning variance will be needed for a total driveway width of 26 feet, exceeding the 24 foot maximum.
6. Development coverage was recalculated and is now 40.7%, to account for new path and wider driveway.
7. The south side of the building has been regraded to include the gravel walkway and to preserve the existing retaining walls.
8. Additional information has been added to Drawings C-2 to show spot grades throughout the site, including grades on the expanded driveway, renovated walkway/steps to existing building (both sides), and throughout the front of the proposed building.
9. A trench drain has been added along the new walkway in front of the new building, see Drawing C-2, to collect stormwater. We are still in the process of determining the specifications/details but you can see the general location on the plan.
10. The 12" tree to the east of the building to allow for the drywells and without exceeding a 3:1 slope, the 92-foot contour cannot be moved closer to the existing building - it is likely that such regrading would have impacted the root system and overall health of the tree.
11. The EAF has been corrected to indicate no waterbodies located on site.